Governance Characteristics of Information Technology

Rajiv C. Shah
University of Illinois
Institute of Communications Research
228 Gregory Hall, 810 S. Wright St.
(217)333-1549
rshah@a5.com

Jay P. Kesan
University of Illinois
College of Law
504 E. Pennsylvania Ave.
(217) 333-7887
kesan@uiuc.edu

ABSTRACT

Regulation through information technologies is growing in importance. Policymakers are addressing societal concerns such as privacy, freedom of speech, and intellectual property protection through the design of information technology. While scholars have noted the power of information technologies, there is little analysis of how people are affected or regulated by information technology. This paper builds upon structuration theory to provide a theoretically informed analysis of how information technologies affect individuals. The paper then examines two governance characteristics that policymakers may use to ensure information technology comports with societal concerns. The characteristics are defaults and standards. For each characteristic, the paper discusses the salient regulatory issues for manipulating them. The results should aid policymakers in manipulating information technologies to address societal concerns.

Categories and Subject Descriptors

K.4.1 [**Computers and Society**]: Public Policy Issues-Regulation, Privacy

General Terms

Legal Aspects

Keywords

Regulation, law, code, governance, structuration,

1. INTRODUCTION

Digital Government relies on information technology, which is not a dry inert material. Instead, information technologies are political and their design can favor certain actions, values, or groups of people [10]. This ability of information technologies to influence or regulate behavior affecting fundamental societal issues, such as privacy, has been widely acknowledged in policy circles [18, 29]. This has now led to a spate of proposals for proactively designing information technology to address issues such as crime, competition, free speech, privacy, protection of intellectual property, and the revitalization of democratic discourse [4, 14, 17, 19, 28, 33]. After all, addressing these issues through the design of information technologies provides policymakers with another regulatory tool besides the law. However, there is little theoretical or empirical knowledge driving these decisions. In effect, regulators are "shooting from the hip" when utilizing information technologies to influence social policy.

This article provides a theoretically informed strategy for using information technologies to influence behavior. This is accomplished by suggesting there are certain characteristics of information technologies that influence behavior. By manipulating these characteristics, it is possible to influence behavior. These governance characteristics are analogous to "knobs and levers" that policymakers could manipulate.

Just as policymakers influence behavior by manipulating incentives and penalties through subsidies and fines, an analogous course could be accomplished by changing the design of information technologies. For example, legislators are currently holding off on creating new laws regulating technologies such as digital rights management and Radio Frequency Identification (RFID), because of the belief that their goals can be accomplished through the design of these systems. In the case of RFID, it seems likely that consumer level tags will be designed to protect privacy and therefore regulation will not be necessary. However, for this approach to be successful, it is necessary to rely on social science for developing a theoretical understanding of how technology regulates individuals and how individuals react to technology. Moreover, an informed understanding of computer science is necessary to identify the governance characteristics of information technology.

Understanding the design of information technologies is of heightened importance, even outside Digital Government application domains. First, consider the growing pervasiveness of information technologies. We are increasingly spending more and more time in virtual worlds, many of which are commercially developed. The design of these worlds has implications on transferring information and influencing societal values, such as privacy. Second, information technologies are malleable. The design of information technologies is entirely man-made and is not subject to the same physical laws as the built environment. This malleability allows for a large amount of variation depending upon the intentions of the designers. Finally, time is of the essence in understanding these issues. If society seeks to shape information technologies, it must do it in the early stages before it becomes entrenched, and hence, more difficult to shape. For example, the transition to digital television broadcasting has been a costly and complex transition because of the entrenched nature of the standards and infrastructure for television.

This article has two main parts. The first part relies on social science to provide a theoretical explication of how technology regulates. The framework for this is structuration theory, which considers both how technology affects individuals and how individuals react to technology. This leads to an analysis of the

recursive relationship of technology. The second part uses this framework to explain how two concepts from computer science, defaults and standards, affect how people use technology. These are both characteristics of technology that policymakers can manipulate for varying effects on social issues, such as privacy.

2. THEORY

Scholars within organization communication have studied how people use and interact with information technologies. Typically they focus on how on how information technology affects collaboration, management, and social support within organizations. [24, 25] The focus here is on organizational dynamics and not public policy issues. As a result, it does not bear directly on how technology regulates. Nevertheless, the theoretical underpinnings of this research can be useful. This section reviews these theoretical underpinnings to improve our understanding of how technology influences behavior.

An influential school of thought within organizational communication is structuration theory, which is a social theory that has moved beyond the dichotomy in sociology between structure and agency. Traditionally, sociologists have argued that individuals are either determined by social structures, e.g, race, class, or gender, or that these social structures only exist in the minds of people, thus granting people immense agency. Giddens tried to overcome these two opposing schools in his structuration theory. Giddens argues that structure consists of the rules and resources that are created through the actions of individuals through practices and routines [11]. A duality emerges as structure constrains action, but simultaneously, action serves to maintain and modify structure.

Scholars in organizational communication use this theoretical approach to examine how individuals are affected by technology. The advantage to structuration is that it moves beyond technological determinism and social constructivism. Following Giddens, they argue that an individual's actions are neither determined by technology, nor are they capable of constructing technology as they see fit. There is a duality of structure, so that technology constrains and enables individual action while also being a product of individual action. We develop technology, but technology also affects our activities. This recursive relationship recognizes that while individuals design technologies to enable new actions, these technologies also constrain our action. This is often summarized as technologies constrain/enable action.

The limitations of structuration are that it does not allow us to examine the relationship between people and technology beyond the recognition that technology both enables and constrains us. After all, structuration is a theory of social organization that explains change and stability in a social system over time. For example, structuration does not address how power and values are embodied or found in the use of technology. As a result, structuration is not capable of unpacking exactly how technology regulates us, and how we react to technology. This leads Monteiro and Hanseth to argue that structuration simply does not provide a fine grained analysis of the interaction between individuals and technology [22]. While Orlikowski and Iacono conclude that scholars need to better theorize the information technology artifact and move beyond the simple constrain/enable distinction [26].

What it is missing from structuration is concepts that allow the interrogation of the relationship between individuals and technology. These concepts can be found within Actor Network Theory (ANT) from technology studies. ANT is largely concerned with the interactions between technology and individuals [16]. It contains a wealth of concepts for understanding the relationship between technology and individuals, such as actors, networks, the process of inscription, and reconfiguration. The addition of these concepts allows for the further theoretical development for how technology regulates. We use the concepts in the next two sections, which focus on the recursive relationship of technology as shown in Figure 1. First, we discuss how technology regulates us. Second, we focus on how users can reconfigure and modify technology.

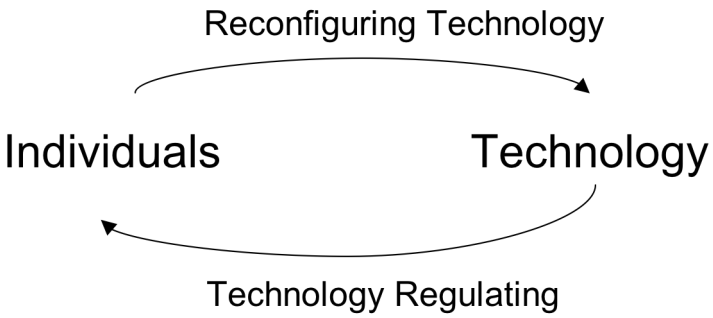

Figure 1. Recursive relationship of technology

2.1 Technology Regulating

The ability of technology to mediate activity allows technology to constrain or facilitate certain types of actions. In short, technology can regulate. The technology of a fountain pen, mechanical pencil, and word processor simultaneously facilitate and constrain certain actions when it comes to composing, editing, and saving our writings. The manner in which these technologies operate differently is the result of the inscription process embedding certain norms into the technology. As a result, technology can affect society in a variety of ways including our cognition, culture, socio-structure, and laws.

The idea that technology influences us is not new. Scholars within media ecology [13, 20, 21], computer-mediated communication [7, 12], organizational communication [24], and cultural studies [15, 23] have all recognized the ability of technology to regulate actions. Nevertheless, the emphasis on technology should not be considered as technological determinism. First, individuals have agency. They can choose not to use technology. Second, technology does not only limit behavior, but allows enables new actions. Consider the ability to send messages over long distances via the telegraph or send pictures via a computer. This is often summarized as how technology can both constrain and enable.

To understand how technology regulates, it is necessary to fully examine how technology operates. This involves a technical understanding of technology. Only by examining the rules inscribed in the design of technology is it possible to understand how it regulates. To examine an inscription, Monteiro and Hanseth suggest analyzing "which anticipations of use are envisioned", "how are they inscribed", and "how powerful are the inscriptions, that is, how much effort does it take to oppose an inscription" [22]. These steps allow for the analysis and assessment of inscriptions in technology. However, there is a recursive element here. While technology affects individuals, they

too can affect technology by reconfiguring technology. As a result, one cannot understand how technology regulates without studying its interaction with individuals.

2.2 Reconfiguring Technology

Individuals also play a crucial rule in how technology regulates, because they have agency. They can decide whether to use a technology, how to use a technology, and whether to try to modify the technology. After all, individuals do not always use the technology as intended by developers. The history of communication technologies is full of examples of unanticipated uses, such as the personal use of the telephone by women [9]. This occurs because even though developers have inscribed the technology, it doesn't mean the technology will be used in that manner. Orikowski synthesizes past research in recognizing that "through error (misperception, lack of understanding, slippage) or intent (sabotage, inertia, innovation), users often ignore, alter, or work around the inscribed technological properties" [25, 409].

Individuals can also reconfigure the material properties of the technology. This process involves individuals adding or modifying a technology and therefore shaping it to fit their requirements and interests. This can be as simple as turning on the v-chip feature or the closed captioning feature in televisions. Nowadays, users of personal computers are expected to continually reconfigure their computers by installing new updates for software. Technologies vary on their degree of reconfigurability. In some cases, the ability to reconfigure a technology may be the result of users pushing developers to change the design of a technology. For example, the recent incorporation of security management tools in Windows XP came in response to pressure from users.

This concept of reconfiguring technology has not been well studied. Most work stems from the economic literature, which attempts to understand innovation of technology, and not how technology affects societal concerns. Work within Human Computer Interaction (HCI) has touched upon how individuals customize technology. For example, research has shown that experienced users are more likely to reconfigure technology [27]. However, this research provides little guidance in understanding how people can reconfigure technology that affects them in everyday life.

We argue that the ability of an individual to reconfigure a technology depends upon its durability. This concept is important, because technologies are neither totally malleable nor fixed. Scholars within ANT have argued that technologies can be made more durable in two ways. First, technologies become more durable when switching or changing technologies requires a consideration of investments made in hardware, software, and individuals. This concept is discussed in the economic literature as switching costs [31]. Thus, the durability of a technology increases as its switching costs increase. The second concept, path dependence, is also discussed in the economic literature. Here technologies become durable from a lock-in effect that arises from "random" historical events [1, 8]. In this way a technology, such as the QWERTY keyboard layout, becomes durable and irreversible because of events during its development.

3. GOVERNANCE CHARACTERISTICS

The previous section provided a theoretical informed understanding of how technology regulates from a social science perspective. It should be clear that technology does not affect individuals in a uni-directional manner. Instead, how a technology regulates and is used depends upon the difficulty of reconfiguring the technology. This section uses this explanation in elucidating certain "governance characteristics", which are analogous to "knobs and levers" that policymakers can manipulate to regulate behavior. By manipulating these governance characteristics, policymakers have an alternative to law as a means of regulating

This section identifies and analyzes two of these governance characteristics. These characteristics have implications for anyone seeking to employ technology as a method for regulating behavior. The governance characteristics are defined in three ways. First, they are universal and found it many forms of information technology. Second, they are manipulable or reconfigurable. Third, they influence or regulate individuals in a meaningful manner. This section discusses two governance characteristics of technology–defaults and standards. Elsewhere, we have elaborated on other governance characteristics including transparency and obligatory passage points [30]. For each characteristic, the analysis considers how the characteristic operates, how it relates to our theoretical explanation for how technology regulates, its public policy implications, and how regulators should modify the characteristic.

3.1 Defaults

The first salient governance characteristic is defaults. A default is a preselected option adopted when no alternative is specified by the user. It has significant public policy consequences, because a default suggests a setting, while providing a user with choices. For regulators, a default accords for multiple settings that can be chosen by the user by reconfiguring the technology. Thus by changing the default or adding a default setting, a regulator is changing how a technology affects individuals.

A default setting is the manifestation of the recursive nature of technology. A default setting is not an immutable setting that is "hard-wired" into the technology. A default setting is also not a setting that allows users to freely choose any option. Instead, a default setting pushes users to towards a setting, but also provides them with the ability to change the setting. It simultaneously regulates individuals, while providing them the ability to reconfigure the technology. As a result, it is an excellent example of how the recursive relationship of technology explains the relationship between technology and individuals.

Defaults are an essential part of information technology. A typically program has tens (and up to hundreds) of default values that are set by the developers. For example, a web browser contains default settings relating to privacy, security, and even freedom of speech. Society can easily insist that a developer create a default to give people choices, because of the malleability of information technology. For example, defaults could be designed so people have to intervene to protect their personal information or they could insist that defaults be set to protect personal information.

There are many examples of default settings used as a technological method of social policy. For example, Microsoft's recent update to its XP operating system changed the default

settings for the built-in firewall. The new default setting turns on the firewall to enhance computer security. Another example is the call for privacy by default for consumer use of Radio Frequency Identification (RFID) technologies. This default setting would protect the privacy of consumers, while also limiting the usefulness of RFID technologies. As a result, there is considerable debate between retailers and privacy advocates over whether RFID technologies should protect privacy by default.

This leads policymakers to ask, why do people follow default settings that are not in their best interest. Why don't people reconfigure the technology in cases where the technology is not durable? After all, don't people have agency? The reason for this is two-fold. The first reason is bounded rationality. People don't change defaults because they are uninformed. A default setting is essentially useless if a person doesn't know about the possibility of changing the option or the ramifications of each choice.

The second reason people don't change defaults is their lack of technical sophistication. If people can't figure out how to change a default, they can't change the default. For example, to change the cookie settings in early web browsers required users to navigate through complex menus. It was not until the most recent browsers that an unsophisticated user could readily change their default settings for cookies. This suggests that guidance, education, or documentation can influence whether individuals change the default settings.

Another issue for regulators is determining the optimal setting of default values for a particular technology. Behavioral economics has been used to defaults associated with law and social policy, specifically contracts [32]. The starting point of the analysis is the Coase theorem, which holds that a default rule does not matter if there are no transaction costs. This is because the parties will bargain to a common result that is efficient. Under this analysis, regulators do not need to be concerned with defaults, assuming there are no transaction costs. However, we know that there are transactions costs. People are limited in their knowledge and abilities. This leads to the conclusion that regulators should set the default to minimize transactions costs.

Besides transactions costs, there are three other effects unrecognized by the Coase theorem that regulators need to consider. First, defaults often initially favor one party over another. This results in an endowment effect where people who initially were allocated the default value it more than if the default had been set to favor the other party. Consequently, the parties will not bargain to the same result, with different initial default allocations. Second, the initial allocation of defaults has another effect besides the endowment effect. Defaults have a legitimating effect, because they carry information about what most people are expected to do. This is often the case with technology. People often assume that the default settings are ordinary or sensible practices. For example, the default setting of allowing cookies in web browsers has resulted in people considering cookies to be an ordinary part of using the web. This suggests regulators should focus on ensuring default values in technologies correspond to sensible practices. Third, regulators can set defaults to operate as "penalty defaults" to ensure disclosure between the parties [2]. Penalty defaults can require the parties to reveal information to each other or third parties. For example, a penalty default could be used to ensure that consumers are provided adequate information on all the potential uses of their medical information. All three of these effects are useful in determining whether a regulator should intervene to change a default as well as the optimal default values.

3.2 Standards

A second important regulatory characteristic for information technology is standards. Standards are considered to be a quantifiable metric used by a group of people for common interchange [5]. In relation to information technology, standards can be considered as the specification, schematic, or blue print for the parts of software that must interoperate or interconnect with other software. For example, in order to transmit e-mail between different computers running different software, there is a need for standards that specify the format for the transmission of e-mail messages. A related characteristic is modularity, which can be considered as a higher form of a standard. Modularity breaks down a large piece of software into smaller pieces or modules. Both of these characteristics reduce switching costs and thereby making technology less durable and easier for people to reconfigure.

Open standards are of interest, because they can promote competition and consumer choice by providing for more than one vendor for any product. Furthermore, consumers can be confident that the solution they purchase will be compatible with products from other vendors. Similarly, modularity provides for flexibility, competition, and choice by allowing multiple vendors to develop parts of a technology. From a regulatory standpoint, this flexibility allows consumers to choose the appropriate technology for their task and is preferable to requiring certain information technology. For example, the open standard for telephone interconnection allows consumers to buy many different types of phones with an assurance that they will operate with each other.

Open standards are typically in the form of a written specification. The specification notes the requirements to meet the standard and allows for interoperability. Open standards are defined by three elements [6]. First, the standard is publicly available to everyone at a minimal cost. Second, no entity controls the standard or the standard is licensed on "reasonable and nondiscriminatory terms". Third, the development process in creating the standard involves public participation. Examples of open standards on the Internet include the transmission protocols such as FTP, or HTML, which serves as the language for web pages, and the image format known as JPEG. The development of an open standard typically occurs within Standard Developing Organizations or consortia. Within these groups, the shapes of standards are decided. This can be an important process, because standards can be biased and favor certain values or parties.

The choice of an open standard is not taken lightly by firms [31]. Moreover, even when using an open standard, the economic pressures on firms are so pervasive that they will tend to incorporate proprietary features into their products that are based on open standards. Firms hope to raise switching costs for users, and thereby maintain their share of customers. For example, Cisco is adding proprietary features to its open standards-based routers. These new features can be used only with other Cisco routers. Their goal is to keep customers from switching, by persuading them to use their proprietary features.

The characteristic of modularity is analogous to standards. Modularity breaks down a large piece of software into smaller pieces or modules [3]. With modularity, it is possible to replace a

module with a different module and the program as a whole would still operate as before. This saves developers time and effort from having to recreate the entire program. Moreover, this style of design allows for considerable flexibility. For example, a developer unhappy with a certain module need only replace that module. This is much simpler than modifying the entire program.

The public policy ramifications for standards are that they make technology less durable by permitting varied settings, thus allowing consumers to choose a form of private governance. In using open standards, there may be a certain set of standardized software that allows for interoperability. But beyond the basic standard for interconnection, there are many technical and non-technical possibilities for developers. This can result in a variety of products for different tastes all of which compete and perform the same basic function. For example, consider the variation available in telephones all of which use the same common standard. So from a regulatory standpoint, an open standard can allow for certain settings in the technology, while encouraging developers to build a diverse portfolio of products. This allows individuals to select the technology that they feel is most appropriate.

The public policy ramifications for modularity are similar. Modularity allows developers to modify parts of software, without have to recreate the entire program. This allows developers to build new applications rapidly. An example of this is with the open source web browser, Mozilla. It has been designed using modularity. This allows developers to reconfigure and enhance Mozilla for different purposes. The parties include: university researchers experimenting with enhanced privacy protection; firms, such as Netscape that are developing consumer-oriented web browsers; and the open source community which is designing alternative web browsers. The result is that modularity allows developers to modify a piece of software to match their needs and values. For regulators, this means software can be used in many ways, because it is much simpler to modify the settings and functionality.

4. CONCLUSION

This article seeks to provide a way for policymakers to utilize information technology to serve societal ends by relying on insights from social science and computer science. To this end, this article began with a theoretical informed understanding of how technology affects individuals. This led to the analysis of two universal governance characteristics—defaults and standards. This analysis shows how policymakers can manipulate the design of information technologies for socially beneficial goals.

The two governance characteristics this article focuses on are defaults and standards. Default settings are a good example of the recursive relationship of technology, because they not only regulate individuals, but also allow individuals to reconfigure a technology. By manipulating a default setting, it is possible to influence how the technology regulates. The examples provided showed how default settings for the Windows XP and RFID can affect societal concerns, such as privacy and security. Our discussion leads us to argue that defaults are an essential and important characteristic available to regulators. We also discuss issues related to changing default values as well as determining the optimal default value. The other analyzed governance characteristic was standards. Standards and modularity affect the durability of a technology. Standards allow people to more easily reconfigure a technology and therefore choose a form of private governance. By supporting these characteristics, regulators can provide individuals with considerable flexibility on how they are regulated by technology.

This analysis is a first step towards manipulating information technology. We recognize that there are many more governance characteristics that are knobs to manipulate information technology, such as transparency, obligatory passage points, flexibility, robustness, and network layers. Future work will explore how these characteristics can impact how people use information technology. Our analysis permits policymakers and regulators to begin employing information technology as an alternative regulatory mechanism to address societal concerns.

5. REFERENCES

[1] Arthur, W.B. Competing Technologies, Increasing Returns and Lock-in by Historical Events. *Economic Journal*, *99*. 106-131.

[2] Ayres, I. and Gertner, R. Filling the Gaps in Incomplete Contracts: An Economic Theory of Default Rules. *Yale Law Journal*, *99*. 97-130.

[3] Baldwin, C.Y. and Clark, K.B. *Design Rules: The Power of Modularity*. MIT Press, Cambridge, MA, 1999.

[4] Burk, D.L. and Cohen, J.E. Fair Use Infrastructure for Rights Management Systems. *Harvard Journal of Law and Technology*, *15*. 41-83.

[5] Cargill, C. *Information Technology Standardization: Theory, Process, and Organization*. Digital Press, 1989.

[6] Crocker, D. Making Standards the IETF Way. *Standardview*, *1* (1). 48-56.

[7] Daft, R.L. and Lengel, R.H. Information Richness: A New Approach to Managerial Behavior and Organization Design. in Staw, B.M. and Cummings, L.L. eds. *Research in Organizational Behavior*, JAI Press, Greenwich, 1984, 191-233.

[8] David, P.A. Clio and the Economics of QWERTY. *American Economic Review*, *75* (5). 332-337.

[9] Fischer, C.S. *America Calling, A Social History of the Telephone to 1940*. University of California Press, Berkeley, 1992.

[10] Friedman, B. *Human Values and the Design of Computer Technology*. CLSI Publications, Stanford, CA, 1997.

[11] Giddens, A. *The Constitution of Society: Outline of the Theory of Structure*. University of California Press, Berkeley, CA, 1984.

[12] Haythornthwaite, C., Wellman, B. and Garton, L. Work and Community Via Computer-Mediated Communication. in Gackenbach, J. ed. *Psychology of the Internet*, Academic Press, San Diego, CA, 1998, 199-226.

[13] Innis, H. *The Bias of Communication*. University of Toronto Press, Toronto, Canada, 1951.

[14] Katyal, N.K. Criminal Law in Cyberspace. *University of Pennsylvania Law Review*, *149*. 1003-1114.

[15] Kolko, B.E. Erasing @race: Going White in the (Inter)Face. in Kolko, B.E., Nakamura, L. and Rodman, G.B. eds. *Race in Cyberspace*, Routledge, New York, 2000.

[16] Law, J. Notes on the Theory of the Actor-Network: Ordering, Strategy and Heterogeneity. *Systems Practice*, *5*. 379-393.

[17] Lemley, M. and Lessig, L. The End of End-To-End: Preserving the Architecture of the Internet in the Broadband Era. *UCLA Law Review*, *48*. 925-972.

[18] Lessig, L. *Code and Other Laws of Cyberspace*. Basic Books, New York, 1999.
[19] Lessig, L. and Resnick, P. Zoning Speech On The Internet: A Legal And Technical Model. *Michigan Law Review*, *98*. 395-431.
[20] McLuhan, M. *Understanding Media: The Extensions of Man*. McGraw-Hill Book Co., New York, 1964.
[21] Meyrowitz, J. Medium Theory. in Crowley, D. and Mitchell, D. eds. *Communication Theory Today*, Polity Press, Cambridge, MA, 1994, 50-77.
[22] Monteiro, E. and Hanseth, O. Social Shaping of Information Infrastructure: On Being Specific About the Technology. in Orlikowski, W., Walsham, G., Jones, M.R. and DeGross, J.I. eds. *Information Technology and Changes in Organisational Work*, Chapman & Hall, 1995, 325 - 343.
[23] Nakamura, L. Race In/For Cyberspace: Identity Tourism on the Internet. in Bell, D. ed. *The Cybercultures Reader*, Routledge Press, New York, 2000.
[24] Orlikowski, W.J. The Duality of Technology: Rethinking the Concept of Technology in Organizations. *Organizational Science*, *3* (3). 398-427.
[25] Orlikowski, W.J. Using Technology and Constituting Structures: A Practice Lens for Studying Technology in Organizations. *Organizational Science*, *11* (4). 404-428.
[26] Orlikowski, W.J. and Iacono, C.S. Desperately Seeking the "IT" in IT Research--A Call to Theorizing the IT Artifact. *Information Systems Research*, *12* (2). 121-134.
[27] Page, S.R., Johnsgard, T.J., Albert, U. and Allen, C.D., User Customization of a Word Processor. in *CHI 96*, (Vancouver, BC Canada, 1996), 340-346.
[28] Pollack, M. Opt-In Government: Using the Internet to Empower Choice-Privacy Application. *Catholic University Law Review*, *50*. 653.
[29] Reidenberg, J.R. Lex Informatica: The Formulation of Information Policy Rules Through Technology. *Texas Law Review*, *76*. 553-593.
[30] Shah, R.C. and Kesan, J.P. Manipulating the Governance Characteristics of Code. *Info*, *5* (4). 3-9.
[31] Shapiro, C. and Varian, H.R. *Information Rules: A Strategic Guide to the Network Economy*. Harvard Business School Press, Boston, MA, 1999.
[32] Sunstein, C.R. Switching the Default Rule. *New York University Law Review*, *77*. 106-134.
[33] Wilhelm, A.G. *Democracy in the Digital Age: Challenges to Political Life in Cyberspace*. Routledge, New York, 2000.