The Construction of an Unequal Information Society: A Proposed Approach to Study Differences in Information Access Initiative Outcomes

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Abstract

Unequal access to information has significant social and political consequences, and is itself a consequence of sociotechnical systems born of social, cultural, economic, and institutional context. Information is unequally distributed both within communities and between communities. While many factors that shape information inequality shift subtly over time, due to historical distributions and path dependent natures, changes to sociotechnical systems and infrastructural support for ICTs are often intentionally changed through access initiatives prescribed in policies. Furthermore, these policies also often seek to address issues of access in other ways, such as through information and digital literacy campaigns. As a result evaluation of the policies that define access initiatives provide a useful mechanism to understand how successful efforts to increase access are and how context impacts implementation and use in such ways as to produce unequal outcomes.

The proposed research will examine what policy dimensions, particularly as relate to ICTs and digital infrastructure, lead to unequal outcomes in access initiatives, using a comparative design to examine differences in outcomes from the Information Society initiative across the European Union. Specifically, hypotheses regarding access initiative outcomes will be generated through qualitative content analysis of policy documents, with attention on contextual differences across nations and in implementation strategies. Differences in strategies across and within nations will then be analyzed quantitatively, through difference in difference analysis, to identify what leads to differences in outcomes, herein as access to information status and variance in information inequality. Multi sample instrumental variables will also be examined to explore the civic and political consequences of unequal access, to provide empirical analysis of assumptions made about access and the implications of initiatives.

In exploring policy-based initiatives designed to create and modify sociotechnical systems, so as to benefit from increased access and development of the information society, adopting a social informatics perspective provides distinct practical, conceptual, and methodological benefits. First, at the practical level, there are implications for the institutionalization of sociotechnical systems. Second, this work will provide a more detailed understanding of how values and interests, as operationalized through particular policy designs and implementation plans, lead to different sociotechnical configurations with implications for access that have strong social and political reverberations. It addresses how the status of access of individuals in specific contexts depends on ICT system design, but also how context interacts with systems to lead to unequal, inequitable, and unanticipated outcomes.

Third, there are important methodological implications and novelty of the proposed research. First, this work will importantly provide macro level, quantitative analysis, which is,

notably, underrepresented both in scholarship on information inequality specifically and in social informatics research generally. In this sense, the proposed research is significantly different than other efforts to examine related questions and puzzles. Second, this research importantly provides a both a new indicator for information inequality and a generalizable method to measure inequality in terms of spread or variance, rather than simple comparative ratios of advantaged to disadvantaged or non-quantitative methods of analysis, which are more common in studying inequalities.

This proposal is organized in a sequential way, reflecting the development process of the proposed research. Following the introduction (Chapter 1), which identifies specific research question and introduces the problem space, a concise review of relevant literature provides a background (Chapter 2) for the conceptual framework presented in Chapter 3. Chapter 4 discusses the research design and Chapter 5 presents preliminary results that illustrate the viability of the proposed project and lead to proposed hypotheses to be tested in future phases of the proposed research. Finally, Chapter 6 concludes this proposal by discussing the significance and implications of this work.

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1. Introduction

Distributions of information and information and communication technologies (ICTs) impact interactions in all domains within the present information society. Access to—as the availability of, awareness of, and the ability to use—information and the infrastructure that supports access impacts employment and earning potential (Lievrouw & Farb, 2003), political participation (Jaeger, 2007), social opportunities (Di Maggio, Hargittai, Celeste, & Shafer, 2004; Neckerman, 2004), and educational opportunities (Halford & Savage, 2010). However, access to information is distributed in highly unequal and inconsistent ways, thereby creating information inequalities (Meyer & Kraft, 2000; Yu, 2006; 2011).

The pervasive nature of information inextricably links information inequality to other forms of inequality, such as political and economic distributions; information deprivation leads to capability deprivation in a variety of domains (Barja & Gigler, 2007). In this sense, information inequality has significantly impacts individuals' lives and society at large, by contributing to inequalities in other outcomes (Di Maggio & Garip, 2012; Yu, 2011). Yet information and ICT inequalities are also products of other inequalities (Di Maggio, Hargittai, Celeste, & Shafer, 2004; Yu, 2006; 2011); those with economic, political and social power, who seek to reinforce their privileged positions and the status quo, control access to information and information technology (Rethemeyer, 2006; Singh, 2013). Barriers to access are created with the intent to reinforce existing institutions and distributions (Singh, 2013), making it very difficult for the marginalized to gain access, which is particularly important to both overcoming their disadvantage in the contemporary information society and to reshaping society and the economy, for which changes are enabled by information and ICTs (Ávila Montalegre, 2014).

Disadvantaged communities and groups receive less scholarly attention, in addition to often receiving less public and political attention (Neckerman & Torche, 2007), which results in part from the structural nature of disadvantages (Di Maggio & Garip, 2012). Relationships between information and socio-political inequalities are complex and evidently mediated by policy in certain contexts (Di Maggio & Garip, 2012; Yu, 2011), yet few scholars consider the relationship holistically and instead focus inquiry within one domain (Yu, 2011).

The connections between economic development, political problems, social inequalities, and information are increasingly recognized by policy-makers and industry, large organizations and grassroots activities, at local, regional, national, and international levels (e.g. Albagli & Maciel, 2010; Blom, 2014; Blom & Vanhoonacker, 2014; Croeser, 2015). Efforts have been made to address the digital divide and information inequality in a variety of ways with formal policy initiatives driving sociotechnical network development to increase access directed from: individual states, such as initiatives in Kentucky (Powell, 2015); federal governments to improve access universally, as in Canada (Cullen, 2001) and Sweden (Phang & Kankanhalli, 2008), or as needed in particular states and communities, as in Peru and Brazil (Galperin & Girard, 2007); and supranational governance, as in the European Union's Information Society initiative (Bijsmans, 2014; Blom & Vanhoonacker, 2014) and the Association of South-East Asian Nations' (ASEAN) efforts (Paul, 2002). Not all efforts to increase access stem from formal policies, however; some ICT network development has been spurned by multinational telecommunications corporations with vested interests in reducing costs, maintaining their infrastructure, and catering to increasing expectations of connectivity, as well as incentives provided by policies that encourage pro-globalization development, as in Latin America (Hitscherich & Roldán Perea, 2007; Galperin & Girard, 2007).

Inequality in the contemporary information society is fundamentally a sociotechnical problem (Halford & Savage, 2010). Thus, conceptualizing differences in information inequalities, both in terms of differences in variance and in rates of change, as contextually dependent, shaped by and contributing to sociotechnical systems—networks of ICTs embedded in sociocultural and institutional contexts that impact implementation and outcomes (Lamb, Sawyer, & Kling, 2000)—provides insight not only into specific questions about how the status of access at a particular point in time in a specific context depends on ICT system design, but also generally about how context interacts with systems to lead to different and unexpected outcomes. Furthermore, examining policy driven initiatives, as institutional efforts, directed at shaping and altering sociotechnical systems for the public good provides insights on how values and ideological interests impact ICT configurations and social outcomes (e.g. Tapia, Kvasny, & Ortiz, 2011).

Access initiatives differ not only in design, but also in outcomes across and within designs. Why outcomes differ so drastically, particularly when the policies that define the initiatives are similar or even identical, becomes a function of context in terms of initial conditions, interpretation of policies, and implementation. The research proposed herein addresses the following specific research question:

What leads to unequal outcomes in information access initiatives?

This can be deconstructed into specific subordinate questions: What policy dimensions/prescriptions yield different outcomes in access initiatives (with respect to information inequality as unequal access to information)? What aspects of context, in terms of social, cultural, economic, political, and technological status, lead to successful interpretations and implementations of these dimensions?

Answers to this question have significant practical and theoretical implications. At the practical level, improved understanding of how subtle differences in implementation and contextual differences in policy preferences can lead to the identification of what key policy and institutional aspects are necessary for successful access initiatives in general and in context, as well as what may lead to increasing or stagnant inequality in access. At the theoretical level, these findings can be generalized to improve scholarly understanding of how values, preferences, and interests can lead to differences in outcomes in the design, implementation, and use of sociotechnical systems. It is important to address these issues because unequal and unexpected outcomes have serious implications for social, economic, and political inequalities that feed one another, as well as other inequalities, in society.

This proposal is organized as follows: a literature review summarizes key findings that support the development of propositions to be tested, a theoretical framework integrates these propositions with a sociotechnical perspective on the embedded nature of information systems in an institutional context, methodology describes the proposed approach to answer the specified research question, and preliminary analysis is presented to illustrate how specific hypotheses can be generated coupling the theoretical framework with content analysis of policies, as well as how aggregated quantitative indicators of information inequality can be generated, before concluding statements are made in support of the significance and implications of the proposed study.

2. Literature Review

This chapter seeks to put the proposed research into context. First, theories and definitions of information inequality are reviewed. Second, issues of access will be discussed, so as to identify what aspects of access may influence inequality in access, which is the third area of literature reviewed. Finally, discussion of access initiatives will be provided. The purpose of this chapter is to support the development of a contextual framework, to be presented in chapter 3.

2.1 Information inequality

This work is premised with an understanding that while inequality has been defined in a variety of ways, as presented in table 1, more encompassing definitions such as variance and difference provide the most useful conceptualization for understanding distributions across societies as a whole. Variance and difference provide the most encompassing views of inequality, in that considering how distributions vary across a population or groups differ from one another depends on data and concern about all levels, including highest, lowest, and average. Variance and difference are distinct concepts, beyond semantics, with respect to units, as they refer to comparisons between or within individuals or aggregates respectively; this has implications for quantitative analysis, as the variables are either continuous or discrete (Litchfield, 1999).

Table 1. Conceptualizations of Inequality

Approach to Conceptualizing Inequality	**Definition**
Variance	Variance refers to inequalities as the relative spread of distributions within a group or population (Litchfield, 1999).

Difference	Difference refers to inequalities as gaps between individuals and groups in a distribution (Litchfield, 1999).
Advantage	Advantages represent disproportionate distribution social resources within unequal distributions and are often studied by focusing on elites (Rahman Khan, 2012).
Disadvantage	Approaching issues of inequality by addressing disadvantage represents a conceptualization of the problem as one in which those who are worst off "should be (the) absolute priority" (Wolff & De-Shalit, 2013, p.3).
Exclusion	Exclusion, as an issue of inequality, represents the deprivation of capabilities to participate in society with an opportunity to change social status (Zheng & Walsham, 2008).
Discrimination	Discrimination represents a specific issue within inequality in which discriminatory actions, as rights-depriving actions, target particular groups based on social conceptualizations (Feagin & Eckberg, 1980).
Marginalization	Marginalization occurs when groups maintain distinct culture that is not valued by and do not have significant interaction with society at large (Phinney, Horenezyk, Liebkind, & Vedder, 2001).

Information inequalities, or inequalities in information access, are thus generally resultant from the wide range in levels of access to information in a defined context. For the purposes of this discussion, a general definition will serve as the basis for understanding information conceptually; information is well-formed and meaningful data that is understood as semantic content (Floridi, 2010). In this sense, information need not be used, so long as it has been articulated in a meaningful way. Yet, from a social perspective, it is often the use of information that is a concern. It is important to examine what may promote or inhibit acquisition or use, as this is what leads to information inequality. "'Knowledge' and 'information' are often used synonymously, but at the heart of most practical distinctions between the terms is the sense that 'knowledge' requires higher-order human processing, whereas 'information' is something that is generally only produced and communicated. Accordingly, if 'information' is not understood and actively used it cannot become 'knowledge'" (Unwin, 2009, p.21).

A variety of theories have sought to explain and conceptualize information inequality, yet few examine the root causes or consequences. One exception being the general theory provided

by Meyer and Kraft (2000), which states that inequality is context dependent based on socioeconomic factors. Meyer and Kraft's (2000) theory of information inequality emphasizes three primary points:

1. Individual actors are both information rich and information poor, depending on context;
2. Environmentally dynamic context shapes and interacts with social constraints; and
3. Inequality is only measurable in context.

In this sense, consideration of both absolute and relative inequality in information distributions is important, and environmental features, particularly social barriers, but also policies and ICTs that shape interaction, define the nature of this inequality. Information inequality, thus, includes differences in access, which is often narrowly conceptualized as availability, as well as in autonomy of use, skill, and social support (Di Maggio, Hargittai, Celeste, & Shafer, 2004).

A second exception being the work by James (2011) that examined patterns that exist in overcoming the digital divide, having found two primary patterns, one of convergence consistent with regression and another of prolonged inequality within countries, preventing nations from converging to global patterns. The study concluded that there were unequal outcomes by context, with some nations following a pattern of convergence and others facing increasing inequality within their own countries (James, 2011); while the digital divide thus appears to be a paradox, the results in fact support theories of information inequality, such as Meyer's theory on the context dependent nature of information inequality (Meyer, 2000; Meyer & Kraft, 2000). While James succeeding in mapping relationships between information and economic inequalities using two indicators, there is more to analyze because it is not yet clear how other indicators correlate

or why. In this sense, asking what leads to divergent patterns, beginning with political variables, is a logical mechanism to expand inquiry in way that has not yet been done.

Information inequality has primarily been examined in components through non-mutually exclusive issues of: the digital divide, knowledge gaps, information poverty, information literacy, access, and awareness. Information inequality concerns difference and variation in distributions of availability, access, ability, and infrastructure to support the use and consumption of information and ICTs, extending beyond the scope of the digital divide (Yu, 2006). Information inequality is also distinct from information inequity, though scholarship often fails to differentiate between the two; information inequity refers to unjust distributions, assuming that information inequality is inevitable and necessary (Lievrouw & Farb, 2003).

Information inequality can be conceptualized generally to include issues of digital inequality, if conceiving of the digital divide as inequality in digitally mediated information behaviors. Digital divide assessment has considered differences across a variety of dividing lines: region and place of residence, employment status, income, educational attainment, race and ethnicity, age, gender, and family structure within countries (Di Maggio, Hargittai, Celeste, & Shafer, 2004), as well as comparative assessment between countries (e.g. Epstein, Nisbet, & Gillespie, 2011; James, 2011). Popular discourse on the digital divide most often considers differences in location and income (e.g. James, 2011), only occasionally dealing with race (e.g. Kvasny, 2006) or culture (Gebremichael & Jackson, 2006), yet rarely with other concerns.

A large proportion of information inequality research has focused only on disadvantage, marginalization, and those at the bottom of information distributions. For example, Chatman provides a number of theories in accordance with this conceptualization: the theory of information poverty (Chatman, 1991; 1996), which provides the most robust theorization about

how lack of access and ability to use information is most highly correlated with low achievement in other socioeconomic categories; and the information life worlds of outsiders (Burnett, Besant, & Chatman, 2001; Chatman, 1996), which postulates not only the isolation of social groups in terms of information access and use, but also in terms of preferences for legitimate information from within groups.

The conception of poverty life-world shaping information experiences is fundamentally dependent on social construction of reality as there is interaction between an individual's perceived and experienced reality and the reality of those around them (Chatman, 1996). In this sense, sociological conceptions of information inequality, developed in parallel to information science theories, rather than in concert (Di Maggio, Hargittai, Celeste, & Shafer, 2004), could be integrated in a manner that would benefit improved understanding of experienced information inequality.

An interdisciplinary approach, integrating aspects of multiple traditions would likely provide clearer insights about variable relationships, as well, because information inequality is not just a social, technical, or political problem, but a problem with multivariate causes and consequences. Information inequality is thus a multifaceted concept, which has been examined in diverse ways, addressing distinct components of interest, such as information poverty (e.g. Chatman, 1996) or the digital divide (e.g. Bertot, 2003; James, 2011), from distinct theoretical perspectives. However, information inequality has not been systematically conceptualized, despite distinct theories of its provenance and impact.

In order to provide a systematic conceptualization of information inequality, which will be presented in chapter 3, it is necessary to delve into dimensions of and aspects shaping access

to information, given the recurrent them in theories about information inequality as inequality in access.

2.2 Access to information

Information inequality results from distinct constraints on access (Adair, 2010). The concept of information access, as one conceptualization employed to study information inequality (Hudson, 2012; Yu, 2006; 2011), can be further subdivided into dimensions of availability (Blakemore & Craglia, 2007; Dervin, 1994; Fisher & Julien, 2009; Juergensmeyer & Bishop, 1985; Soroka, 2012; Świgoń, 2011), awareness (Britz, 2004; Haider & Bawden, 2007), and ability to use information (Epstein, Nisbet, & Gillespie, 2011; James, 2011; Kvasny, 2006; Lantz, 1984). Each dimension has social (Sonnenwald, 2006), institutional (Jaeger, 2007), and technical (Orlikowski & Robey, 1991) facets. Specifically, information availability refers to channels of access, including the medium (Fisher & Julien, 2009), policies and rules that constrain access (Blakemore & Craglia, 2007; Dervin, 1994), and social norms that differentiate among groups deserving of access (Falkheimer & Heide, 2009). Information awareness can be decomposed into social recognition of availability, understanding of channels, and understanding of rules governing use (Britz, 2004; Haider & Bawden, 2007). Ability to use information is a skills-based dimension of access (Hudson, 2012), which includes ability to use channels, ability to process information, both as technical skills (Gebremichael & Jackson, 2006; Hudson, 2012), and ability to interact within the social and institutional context (Gebremichael & Jackson, 2006; Kvasny, 2006; Sonnenwald, 2006).

Adair (2010) has established that each of these dimensions of information access is shaped by a variety of dynamic variables, including political, social, cultural, legal, and

economic distributions. These distributions constrain information access in a variety of intentional (e.g. Braman, 2009) and unintentional ways (e.g. Kvasny, 2006). Gatekeepers actively employ policies to limit access, differentiating between information types as well as between individuals in determining who can access what (Barzilai-Nahon, 2009; Bozeman & Cole, 1982; Lu, 2007; Soroka, 2012). On the other hand, information differences sometimes result from unintentional boundaries between individuals, thereby limiting availability and awareness as those who are less advantaged occupy different social networks (Stanton-Salazar & Dornbusch, 1995). Ability to use information is rarely intentionally leveraged as a means to exclude or differentiate and is generally acknowledged as a critical skill to be universally developed through education (Webber & Johnston, 2000).

Access is important when assessing inequality. Previous reviews on equity, as opposed to equality, identify horizontal and vertical distinctions, as distinctions between information and users, respectively, in unequal access (Lievrouw & Farb, 2003). Lievrouw and Farb (2003) make this distinctions between horizontal differences, which are based on information type, do not have as significant of social or political implications as do vertical differences, which lead to differences in access between groups and communities. These distinctions can be used to structure analysis of information inequality to provide a more complete picture, as represented in table 2.

Table 2. Horizontal and Vertical Differentiation in Access

	Aspects	References
Horizontal Levels of Access: differences based on nature of information (Lievrouw & Farb, 2003)	Public sector information What information cannot be accessed, must be accessible Dissemination, distribution, access, availability	Blakemore & Craglia, 2007 Jaeger, 2007 Robertson & Vatrapu, 2010

	Information access, collection, dissemination	Strickland & Hunt, 2005
Vertical Levels of Access: differences by demographic, stakeholder groups (Lievrouw & Farb, 2003)	What information social groups, organizations can access Levels of access Knowledge, communication, control	Jaeger, 2007 Juergensmeyer & Bishop, 1985 Świgoń, 2011

What the literature reveals is that not all information inequalities are equally as problematic or unjust; information equity becomes a more precise concept for examining differences in access, to some extent, because horizontal differences in access are in many cases necessary and to be expected, while vertical differences in access discriminate and exacerbate social, political, and economic differences (Lievrouw & Farb, 2003). Horizontal differences in access result from legitimate social interests in, for example, national security as a reason to withhold information from the general public or intellectual property and trade secrets as a reason for businesses not to share information and ICT fundamental to their practices with everyone else. Vertical differences, on the other hand, are in some cases the results of differences in distributions, such as economic inequalities leading to different access based on cost barriers or location of infrastructure.

Issues of access are important to inclusion in the information society and must be understood to decrease information inequity. The access divide, extending beyond the digital divide, includes issues of availability, differences in access that are mental, material, skills, and usage based (Chadwick, 2006). There are significant consequences to gaps in access, including economic opportunity and democratic divides, that not only reinforce the inequalities that contribute to information inequality in a feedback loop, but are problematic in their own rights

(Chadwick, 2006).

In this sense, there are distinct challenges to decreasing inequities in information distributions because of the complexities of access. Human aspects in particular create barriers to information access, as trust, emotion, and socially constructed understandings of information lead to differences in representation and disclosure as groups are created and some are excluded (Sonnenwald, 2006). Furthermore, policies are employed to control information, not only in the justifiable horizontal sense, but also in discriminatory vertical configurations based on the social constructions enforced and experienced in society (Jaeger, 2007). ICTs also constrain information, as access, in all dimensions, to information technologies that constrain information is often required (Orlikowski & Robey, 1991). Each of these factors will be discussed, in terms of how they facilitate and inhibit access to information.

2.2.1 Socio-cultural Aspects of Access

Social aspects shape access, to a significant extent. Analyses of the digital divide and multicultural collaboration supported by ICTs illustrate the extent to which gaps in use exist between social and cultural groups, as studies of educational gaps illustrate social and cultural discrepancies in literacy and information literacy. This section specifically examines literature that illustrates the socio-cultural aspects of access and inequality in access, as one significant component of information inequality.

While ICTs have the potential to facilitate an inclusive multicultural public sphere (Papaioannou, 2011), unequal access to ICTs further fragments diverse societies by reinforcing boundaries along cultural, socioeconomic, and demographic lines; reciprocally, cultural differences lead to differences in ICT ownership, access, and use, thereby limiting the potential

of ICTs to overcome inequalities without complimentary policy or social shifts (Falkheimer & Heide, 2009).

Social factors enable and constrain access to information in part by determining who interacts and what groups exchange information or share members. Sonnenwald (1995) identifies observed communication roles that span group boundaries: agents as those who facilitate interaction and mediate conflict; external stars who extend beyond the group to interact with external people; intergroup stars who interact with other participants and represent their groups; gatekeepers who filter information between groups and sources; and boundary translators who present group information to outsiders. At the individual level, people impact the information that can be accessed by others.

Furthermore, as social factors are aggregated in the distributions that yield social inequality, and there is inequality in access based on vertical differentiation, social factors mediate other aspects of access. Burnett, Jaeger, and Thompson (2008), for example, employ a conceptualization of information access that consists of physical, intellectual, and social aspects that contribute to the institutional context of information access, drawing on Chatman's small worlds theory of information inequality. Through case study analysis, they illustrate that "social norms, worldview, and social types influence what information is seen as permissible for members of a small world to access and what kinds of information from the outside world is acceptable within a specific small world" as well as that social and cultural norms regarding "information behaviors define the appropriate mechanisms and activities involved in information access" (Burnett, Jaeger, & Thompson, 2008, p.59). As a result of social and cultural norms, information may not be accessible beyond specific communities or by specific communities due to socio-cultural logic of appropriateness.

Social differences in information access impact the ability of individuals to participate in other economic, social, and political activities, due to inadequate information at the low end of information distributions and inordinate advantages due to highly asymmetric information favoring the top end of information distributions. In this sense, those social and cultural groups with more information are empowered to exert greater influence over political aspects and policy constraints on information and access than is proportionate.

2.2.2 Political and Policy Aspects

Information access is thus importantly constrained by politics and policy. Furthermore, "Information is a prerequisite of governance, affecting the decisional premises and shaping the substance of political decisions. The nature of information systems, the organized production, distribution, and use of information, reflects ideas about what kinds of information are deemed relevant, necessary, and appropriate to base decisions on" (Gornitzka & Sverdrup, 2014, p.127). This section will discuss both of these aspects of access, in order to convey understanding about the political importance of information to development concerns and how various social and political concerns are translated into policy constraints on access.

Focusing specifically on political aspects of access, there are distinct political interests in different vertical and horizontal constrains on access. For example, national security preferences favor vertical differentiation in access; additionally, the Social Construction of Target Groups theory explains why social constructions of particular groups may lead to political preferences favoring horizontal differentiation between groups in information access. English-only laws represent a fruition of distinct preferences in constraining information access horizontally, as

socially constructed frames have been employed to establish non-English speakers as undeserving.

There are also important political preferences in increasing information access generally. The United Nations and the Internet Governance Forum, through the Internet Society (ISOC), have encouraged specific policies within nations to spur development through information technology access on the basis that access is determined by cooperative regulation, provision of infrastructure, creation of standards, and decision-making between Governments, the private section, and civil society (Souter, 2012). Between nations, promotion of globally standard information policies includes arguments that uniformity: promotes information exchange, provides continuity in a global society, routinizes and automates information decision making, insulates decision makers from emotional and "ill-considered requests for a policy change", and better coordinate global society, encouraging communication without borders (Riggs, 1996, p.2). Furthermore, Riggs argues this would encourage innovation in information technology and increase reliability, access, and quality of ICT and internet access.

There is also explicit evidence that differences in politics and polices yield different distributions of information and internet access, within different economic contexts and with different economic implications. For example, Fan (2005) empirically examined linkages between regulation, markets, and internet access, comparing China and Australia, as exemplar of distinct digital opportunity strategies. Fan suggests that the level of internet access is dependent on regulation of the telecommunications industry, particularly internet service providers, to promote and guarantee fair competition (Fan 2005). While information is non-rival and non-excludable (Torrens, 2013), information access, in this case by means of internet access, is

excludable thereby providing onus for policy makers to seek to affect the distributions of access because of the important role of information in an informed citizenry and labor force.

Henderson, Gentle, and Ball (2005) importantly considered how the international regulatory environment with respect to telecommunications impacts social and economic outcomes in developing nations, focusing specifically on WTO principles. They found that the divergent patterns between developed and developing nations, with respect to telecommunication and information policy led to choices that favored the developed at the expense of the developing (Henderson, Gentle, & Ball, 2005). International regulation of information and ICT can have negative social and economic impacts in developing nations by pricing the public out of access and thereby socially fragmenting regions and even neighborhoods based on accessibility (Henderson, Gentle, & Ball, 2005).

Based on these previous findings, it can be assumed that policies that impact the incentive structures and the payoff calculus of information technology companies, as well as telecommunications companies who provide internet access, has dramatic impact upon the distribution of internet access. Furthermore, policies can have dramatic impact on economic development, independent of information and internet access (Acemoglu, 2008). In this sense, James comparison of changes in the absolute digital divide with ratios of growth in developed versus developing countries omitted a fundamental variable that likely explains a pattern of divergence and a pattern of convergence: policies.

Focusing specifically on the relationship between information access and policy, within the relevant context of social policy, the primary aspect to consider is how policy constrains access to information. Conceptually, there many competing frameworks that both treat issues of

information and social characteristics differently and hold different implications for modeling the relationships between information inequality, social distributions, and policy.

The Social Construction of Target Groups, as a framework, asserts that social understanding and perception of groups is constructed in a way that advantages and disadvantages groups, thereby impacting their participation in the democratic process and how policies are constructed to preferentially meet social needs (Schneider & Ingram, 1993). Specifically, social construction is a process through which shared characteristics of a particular social group, a target group, are identified and correlated with social values within popular and political discourse (Schneider & Ingram, 1993). Constructions are not necessarily persistent, and in fact there is contention with regard to particular constructions, making certain constructions relevant in particular contexts (Ingram, Schneider, & Deleon, 2007).

In this sense, the social construction framework directly addresses issues of social inequality, arguing that perception of and subsequent active Social Construction of Target Groups drives different distributions of policy outcomes based on the political calculus of a particular group's perceived positive or negative connotations and relative social power, as indicative of their deservedness for benefits or rights in a particular context (Ingram, Schneider, & Deleon, 2007). This framework is also significant in that it "… helps explain why public policy … fails in its nominal purposes, fails to solve important public problems, perpetuates injustice, fails to support democratic institutions, and produces an unequal citizenship" (Ingram, Schneider, & Deleon, 2007, p.93). Inequalities specifically replicate as social inequalities are projected onto the distribution of rights and services by policies that distribute based on social constructions. Within this framework, questions consider what leads to particular constructions, as well as what impact particular constructions have on policy outcomes.

Social construction importantly affects information distributions; policies developed in response to particular constructions lead to messaging toward the target population that "indicate(s) whether the problems of the target population are legitimate ones for government attention, what kind of game politics is (public-spirited or the pursuit of private interests), and who usually wins" (Schneider & Ingram, 1993, p.340). This is significant in coupling social legitimacy with information that is internalized by the group about their political position and social power, yet this is only a surface level implication of the framework about how social construction affects information distributions. If assumptions are reflected in practice, in addition to affecting information distributions by social positions, only groups constructed to be deserving within political discourse will have information needs met by the government, leaving the disadvantaged, or in the language of the framework the "deviants" and in some cases the "dependents" and "contenders," further disadvantaged whereas the advantaged benefit and are further empowered over the rest of the citizenry. As Ingram, Schneider, and Deleon (2007) wrote, this framework explains why injustice is perpetuated, and further, it explains the empirical reality of social and informational disadvantage overlapping (e.g. Kim, Lee, & Menon, 2009; Yu, 2011).

An alternative would be to consider path dependent approaches offer historical institutionalism as the cause of the relatively constant, slow-to-change policy environment in particular domains (Peters, Pierre, & King, 2005), rather than considering information processing as the impediment of change. This conceptualization often draws on punctuated equilibrium models to explain changes (Peters, Pierre, & King, 2005).

Within this approach, it would be possible to conceptualize social and informational environments as consistent and entrenched institutionalisms which because of their co-

occurrence at path origins and at points of impact on policy, jointly impact policy at points of change, but do not in fact interact with one another in relationship to policy. This would consistently illustrate why change is slow, as the framework suggests that changes require perceptions of gaps between norms and performance, as well as a serious policy replacement and even this does not guarantee a new equilibrium (Peters, Pierre, & King, 2005). For example, historical path dependence explains unequal outcomes from Poland's drastic market changes during the 1990s on the basis that social capital was unequally distributed historically and this distribution could not be overcome, despite economic policy change (Zukowski, 2004). The parallel economic and social paths fundamentally impact outcomes in this case, and the same may be true of social and informational environments. This conceptualization of entrenchment of the status quo based on social and information institutions is possible when compared to empirical knowledge, though is much less intuitive.

With respect to this framework, what is necessary to understand is how policy changes impact information distributions and whether informational distributions impact entrenched social institutions by producing policy change, as well as why these changes might not occur.

Path dependent approaches are often criticized for their failure to consider what leads to rare changes, in part answering the second question (Peters, Pierre, & King, 2005), yet this failure does in itself reflect on policy failure with respect to disadvantaged populations (Jacobs & Soss, 2010). However, historically unequal social and information distributions do seemingly impact policy under this model, albeit slowly (Pierson, 2003). This is consistent with descriptions from other related bodies of literature describing instances in which policies are developed when socially powerful and information rich actors call for change (e.g. Soss & Schram, 2007), whereas socially and information disadvantaged actors rarely achieve the policy

changes they desire if they participate at all (Soss & Jacobs, 2009). This is fundamentally what path dependent literature describes when discussing "the dynamics of self-reinforcing or positive feedback processes" as the modest and slow moving changes as the status quo is reinforced (Pierson, 2003, p.195).

A historical path dependent approach also illustrates why policies intended to impact information distributions often fail (Bertot, 2003): other disadvantages are so tightly coupled to informational disadvantage (Yu, 2011) that availability alone does not guarantee an improvement in position, as literacy, awareness, and time limit information processing (Yu, 2011). Information policies, which reflect seven values ranging from access to privacy, fundamentally redistribute or attribute ownership rights over information and have historically suffered from "policy impossibility" in which perspectives and preferences are so varied that the status quo is often maintained (Overman & Cahill, 1990, p.813).

In this sense, policies and political efforts to address information inequality are strongly shaped by existing inequalities and it is difficult for them to successfully alter distributions of access. Power and control are entrenched and are difficult to overcome, despite the potential of ICTs to alter social communication patterns.

2.2.3 Sociotechnical Aspects of Access

Technology controls access to information in a variety of ways, through (1) innate features of ICTs, (2) implicit embedded values within information technologies, or (3) explicit decisions to employ ICT to meet particular goals of control. All three mechanisms for technological barriers to access will be discussed. It is important to emphasize that "technologies as well as the notion of an information society itself are being used to reinforce the 'differences' and contradictions that remain essential to a thriving capitalist global economy" (Unwin, 2009, p.20).

First, ICTs innately increase "information networking, sharing, and access, which require increased precision in carefully defining information parameters and management" (Sanfilippo, 2014, p.). Technology decreases the costs of information sharing by replicating and connecting people to information, yet access to information technology, which is unequal, limits social benefits without intentional intervention in technology development, implementation, and control (Navas-Sabater, Dymond, & Juntunen, 2002).

Second, ICTs are created with specific values in mind, leading to technologies that reflect social norms with implications for access (Fichman & Sanfilippo, 2013). Through the identification and analysis of social expectations, ICTs are designed to suit specific contexts and sometimes reflect majority or dominant cultural values over inclusivity, whether that is intentional or not (Bird & Osland, 2005/2006). ICTs are cultural products. When different value sets come into contact, technologies with specific sets of embedded values can either exacerbate or mitigate social conflict and differentiation (Fleischmann, 2007; 2014). Specifically, ICTs that are products of particular cultures may enhance the position of that culture within multicultural interactions at the expense of their collaborators, while ICTs that represent multicultural values are more likely to reduce conflict.

Third, policy and ICT interact to affect access to information. As discussed in Sanfilippo (2014, p.46-47):

> Policy has driven some of the largest technological innovations, for example ARPANET as the Internet's precursor, and technology has driven significant policy changes. Bidirectional interactions between these spheres and constructs are of extensive scholarly and public debate. The consideration of legal policy implications is critical to the design

> of compliant and usable information technologies, particularly in support of information access. Privacy, security, intellectual property, and federal standards must be balanced with technical possibilities and financial constraints for accuracy and accessibility. Policy constraints on technology have an impact on government information because detailed, and sometimes conflicting, policies from multiple levels of authority govern information management. Furthermore, technology increases information networking, sharing, and access, which require increased precision in carefully defining information parameters and management. The dynamics of the policy and technological context of government information have been evaluated to identify a variety of interactions…

Specifically, policies stipulate how technological infrastructure for information resources should be structured, with the impact of defining who can access what resources and the specific ways that access is possible (Doty & Bishop, 1994; Gostojić, Sladić, Milosavljević, and Konjović, 2012).

In this sense, whether information is encrypted, password protected, or restricted in more complex ways makes a difference with respect to access. Certainly choices are made about ICT, but the technology itself is an important factor. ICTs that require specific skills to use or at least knowledge of the structural context of information, such as in organization in databases, can impede access, making education one of the important factors in increasing access.

Furthermore, access is sometimes broken down into issues of mental, material, skills, and usage access (Chadwick, 2006) and technological aspects of access have implications for all of these issues. Emotional and cognitive perceptions of technology, cost and availability of technology, requisite skills to use technology, and actual use of technology all limit the extent to which ICTs provide access to information. Technological aspects of access significantly impact

information inequalities, particularly as information is increasingly preserved, shared, and made available through ICTs.

2.3 Inequality in access

Inequality in information access results from the complexity of the social, cultural, political, and technological aspects of context discussed in section 2.2. While the impact of these factors on access has already been discussed, findings associated with their contributions to information inequality will be reviewed in further detail within this section, with specific emphasis on how inequalities in these aspects of contexts, as well as dynamics.

Intentional efforts to control information access in a vertical way are often designed to favor those who are advantaged or privileged, rather than to reduce inequality. In encouraging development and technological diffusion, the interests of the privileged are often prioritized, leading efforts that could introduce equitable change to simply perpetuate difference or actually exacerbate it (James, 2011). Information behaviors, shaped by individuals' social, cultural, and political dimensions (Urquhart, 2011), lead those who occupy positions of power to make decisions that favor the status quo (Braman, 2009; Robertson & Vatrapu, 2010). When information policies are made to increase access, they are often only superficial efforts to increase availability, but which does nothing to guarantee use; information availability does not constitute access on its own (Lievrouw, 2000).

Importantly, there have been efforts to conceptualize differences in access in clear ways. Barrantes (2007), for example, developed a framework for digital poverty that explains variation in connectivity, from digitally wealthy to digitally poor, as presented in table 3. From this perspective, connectivity and access are interchangeable for the purposes of measurement. What is notable in this conceptualization are the availability, infrastructure, and literacy dimensions,

associated with demographics, such as education and age. It is possible to see social divides in connectivity that are easy to differentiate, yet the reality is perhaps more complicated.

Table 3. Variations in Connectivity (reproduced from Barrantes, 2007, p.35)

Connectivity Level	**Functionality**	**Infrastructure**	**Educational Level**	**Age**
III	Digital Interaction (Electronic Government and Business)	Internet Broadband	High	Youths
II	Electronic Messaging	Internet / Mobile Telephone Services	Middle	Young and Not-So-Young People
I	Communication and Reception of Information	Telephone Services (Fixed or Mobile)	Low but not Illiterate	Elderly
0	Reception of Information	Radio or Television	Illiterate	Elderly

Differences in information availability, information awareness, and ability to use information, jointly as differences in access, yield differences among individuals with serious social implications (Świgoń, 2011). For example, those with reduced access have less knowledge about potential social and economic opportunities (Martinez, 1994). The relationship between information inequality and socioeconomic levels is strong (Martinez, 1994), as is that between information inequality and demographic groups (Kvasny, 2006). Information access is complexly intertwined with other inequalities (Lievrouw & Farb, 2003) and these relationships are often exacerbated because ICTS are so often employed to provide access (Kumpulainen & Järvelin, 2012), yet it is expensive and requires knowledge and experience to use (Joseph, 2012).

The nuances of information inequality and information access are complex and have been explored in a variety of scholarly domains. Furthermore, adjacent areas of literature, such as

information behavior and social informatics literature illustrate findings with important implications for information access and inequality, which importantly provides insights that allow for the development of expectations where there are gaps in the literature.

2.3.1 Economic Impact on Information Inequality

Economic differences are often identified as the root causes of information inequality (Yu, 2011). It is hypothesized that differences in incomes and financial circumstances between countries lead to differences in access to ICTs and different infrastructural support for information and information technology resources (Kvasny, 2006). Furthermore, there is expectation that increases in access to and infrastructure for information and ICTs will have positive economic results (Epstein, Nisbet, & Gillespie, 2011; Jensen, Danziger, & Venkatesh, 2007).

Technological change is strongly related to income inequality and economic growth trends (Ávila Montealegre, 2014). Biased technological change refers to innovations that increase intensity of work and modify elasticity of labor substitutions, which favors individuals with higher initial human capital to increase the wage gap while positively impacting long-term growth, whereas neutral technological change does not impact human capital elasticity; in order to reduce inequality and increase economic growth, human capital accumulation should be encouraged by policy (Ávila Montealegre, 2014).

James (2011) has examined these hypotheses on a global scale to illustrate with strong empirical support that there is a definite pattern by which digital convergence and high access are associated with high incomes, as well as high incomes with a decrease in the divide. What is also evident is that the stagnation of the digital divide, and in some areas regression as the divide

widens, are associated with economic strife; in this sense, inequalities reinforce one another (James, 2011). Stanton-Salazar and Dornbusch (1995) examined these hypotheses at the level of individual students, finding that parental socioeconomic status determined students' awareness and uses of information resources regarding post-secondary education and employment, which shaped their perceived opportunities and reproduced socioeconomic gaps among peers. In this sense, information and economic inequality reinforce one another.

Conceptually, the problem is more complex than that, however, as information has an economic impact that is more diverse. To understand the nature of these interrelationships more fully, it is important to understand economic inequality in greater conceptual detail. As a concept, economic inequality includes: wage inequality, inequality of wealth, and inequality of opportunity (Neckerman & Torche, 2007). Among other hypothesized implications, these inequalities have been empirically demonstrated to yield consequences in: health, education, crime and incarceration, social relations, and politics (Neckerman & Torche, 2007). Causes identified for economic inequality include: policies, institutions, markets, and other structural inequalities (Neckerman & Torche, 2007), as well as the historical distributions of these factors (van Leeuwen & Maas, 2010).

If economic inequality is accepted to be something broader than differences in per capita GDP or the net worth of individual, the relationship between information and the economy expands to have implications for development. The knowledge economy and the improved decision-making afforded by increased access to information create opportunities for development. Evidence points to the fact that information drives the contemporary economy, with respect to the intellectual goods produced and information shaping globalization and

international exchange and cooperation, as ICTs have changed interactions based on human values (Castells, 2010; 2011).

There is empirical evidence illustrating that: unequal literacy levels lead to unequal income levels (Acemoglu, 2008; Bhargava, 2010), distributions of technology impact productivity levels (Acemoglu, 2008; James, 2011), and intellectual property inequalities yield unequal growth rates (Acemoglu & Akcigit 2012; Chu, Leung, & Tang, 2012). Development initiatives often fail to account for the differences in starting points, leading to differences in development outcomes. Inequalities are important to development outcomes (Acemoglu, 2008), yet these relationships have been understudied with respect to direct variable treatment.

Barja and Gigler (2007) argue that information access is necessary for economic development, asserting that availability does not constitute access without incentives to use it and that interventions are necessary to contradict disincentives ("unsuitability and obsolescence; existence of a process of creative destruction; need of technological substitution and reorganization of the productive activity; creation of winners and losers, and resistance from the latter; attitude of the society toward innovations within a democratic environment; shortage of factors complimentary to new technologies; uncertainty of the technological direction of the future, and its economic result; attraction of new innovations toward geographical concentrations" (p. 16)) for use.

Macro and micro-economic trends shape the roles of ICTs in development. Macroeconomic factors impacting investment, diffusion, and use include: advanced infrastructure; institutional capacity, particularly financial institutions; and human resources (Unwin, 2009). Microeconomic factors impacting efficiency and effectiveness include financial support and individual capacity and training (Unwin, 2009).

As information is so intrinsically linked to economic outcomes, information and economic inequalities impact each other in ways that reinforce one another. It is important to continue to study these factors, particularly from an interdisciplinary perspective, because much current research comes from scholars more interested in one side of that equation, which thus treats the other variable as one-dimensional and simpler than it really is. Ekbia (Under Revision) provides a notable example of an attempt to being to integrate these approaches, in the forthcoming article on exploitation of labor in social information production. However, while income is highly correlated with access, it is not the only explanation; age, geography, and education also explain access levels (Barrantes, 2007).

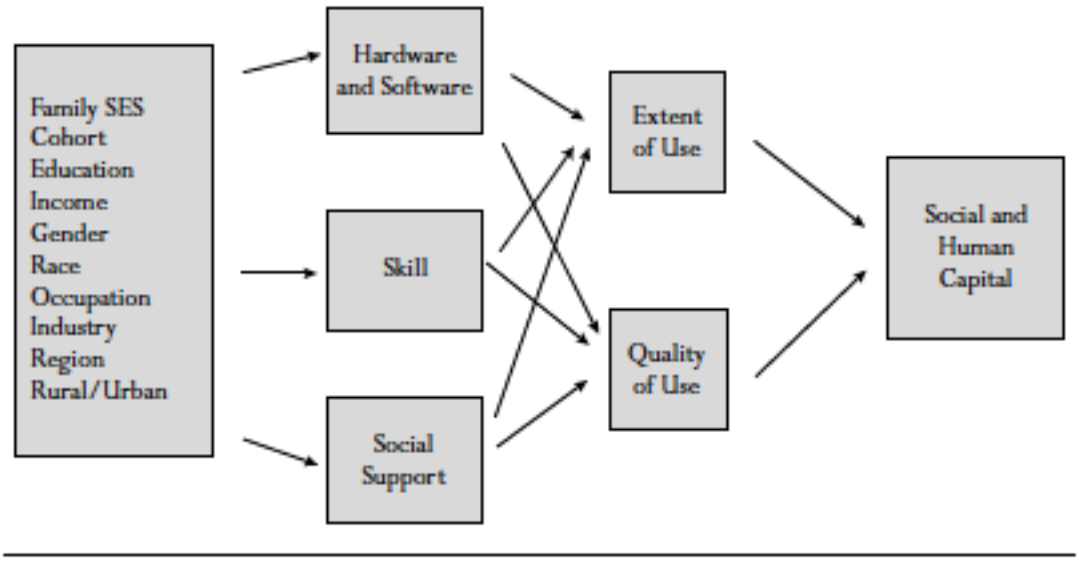
2.3.2 Sociocultural Impacts on Information Inequality

There is also evidence that social and cultural inequalities contribute to information inequalities, in some cases in concert with economic or political variables. For example, in a study by Stanton-Salazar and Dornbusch (1995), lower socio-economic status was associated with fewer and more disjointed social connections, leading to lower information flow. Sociocultural inequalities are importantly both the vertical distinctions described by Lievrouw and Farb (2003) as leading to information inequity, and consequences of information inequality, as social and cultural groups are afforded different opportunities based on their access to and use of information. In this sense, sociocultural inequality and information inequality are importantly related.

However, interactions between information and social inequality are complex. For example, Di Maggio, Hargittai, Celeste, and Shafer (2004) identify four socially unequal distributions that interact with inequality with respect to technology: “competence destruction

increases inequality" (p.357), "new technologies reduce inequality by generating demand for more skilled workers" (p.358), "new technology influence inequality indirectly by altering the structure of political interests and the capacity of groups to mobilize" (p.358), and "new technologies enhance social equality by democratizing consumption" (p.358). Competence destruction, as a concept, is particularly interesting as it refers to the extent that new technologies depart from previous patterns of use and skills to use; as new technologies require more learning, previous competencies are rendered useless. In other words, as learning requirements increase to use technology, inequality is increased. The authors extend their work by developing a model of the relationship between the digital divide and social outcomes, entitled: The Impact of Internet Access on Life Chances.

Figure 1. The Impact of Internet Access on Life Chances (Di Maggio, Hargittai, Celeste, & Shafer, 2004)



This model provides one example of how social and demographic characteristics impact distinct aspects of information behavior, with subsequent impacts on later social outcomes. If the constructs in the first and last boxes in this sequence are taken as representing dimensions of

demographic inequality, and the variables mediating the process of change or reinforcement are taken as representing inequality in information access and use, the becomes one illustrating the mediating impact of information inequality on socioeconomic inequality, as reinforcing inequality, temporally. In this sense, social inequalities interact with information inequalities in a feedback loop over time, much as economic variables interacted reciprocally with information inequality.

Social inequality incorporates differences and inequities based on a number of differentiating factors, including education, gender, race, ethnicity, culture, occupation, and location among them (Di Maggio, Hargittai, Celeste, & Shafer, 2004). An understanding of the ways in which demographic concepts interact can facilitate sound decision-making and better planning for the future (Cozzens, 2012). Scholars have sought to understand both how culture impacts ICT and how ICT impacts culture based not only on the reasonable presumption that there is a relationship between these variables (Boast, Bravo, & Srinivasan, 2007; Fichman & Sanfilippo, 2013; Gibson & Gibbs, 2006), but also on the observation that cultural, social, and technological inequalities overlap in populations over which they are distributed (Sassi, 2005).

Furthermore, cultural values shape ICT infrastructure, impacting society in such a way as to reinforce distributions that favor cultural norms, rather than to reform or reassess them (Oyedemi, 2009). In this sense, cultural conflict is in part the result of technologies shaped by cultures in conflict (Kaye & Little, 2000). An example of cultural conflict in South Africa concerns access initiatives for the poor and rural minority groups. Failure of the South African project increased resentment among those who sought to benefit but did not, and increased distance between the affluent and middle classes because the access gap increased (Oyedemi, 2009). Furthermore, social inequality can result from leverage of ICTs through heterotopic

communication and cultural values concerning power and control. Accordingly, ICTs can be used to gain socioeconomic advantage, stratify and separate society, perpetuate conflict, and manipulate competition, because they are embedded with social values from a cultural context in which they already occur (Lievrouw, 1998). ICT diffusion initiatives can mask underlying exclusion and deprivations in instances where information technology is available but not accessible due to knowledge, resources, or cultural constraints (Zheng & Walsham, 2008). Yet, social justice can be achieved through ICT diffusion (Papaioannou, 2011); for example, in Finland equal access to information, resources, and ICTs within its present economy results in relatively egalitarian socio-cultural structures (Sassi, 2005). Finland, while a small nation, manages to maintain low within country information inequality, incorporating migrant populations in a way that other Scandinavian countries do not match.

There is also evidence that cultural and technological cycles are primary factors in rising global inequality despite increasing integration and interdependence in global supply chains (Cozzens, 2012; Halford & Savage, 2010). As technologies enable globalization, the cultural and social elite favor technological innovation and policy which favors them, thereby exacerbating tensions, while global civil society and cultural forces of the masses better favor cohesion and equitable access to ICTs and knowledge, which would diminish inequality at the expense of the powerful (Cozzens, 2012). In addition to the economic sphere, global society experiences inequality between cultural consumers, producers, and those excluded from the global ICT network as a result of social differentiation through and of information technology (Halford & Savage, 2010).

Examination of interactions between information inequality and sociocultural inequality has primarily focused on issues of ICT with respect to social and cultural factors, rather than

information generally. Yet there are many conclusions made with respect to ICTs that could be generalized as suggested hypotheses to be tested in future research, such as that information creates social conflict over issues of control and the values that are embedded in information production or information inequality impact social attainment and social integration.

2.3.3 Political Impact on Information Inequality

Political implications of information inequality are in some cases clear from the discussion of social inequalities, which logically integrate with political concepts of power, conflict, and control. Political inequality has largely been conceptualized in relationship to social and economic inequalities, in that "Dominant groups can use their social and economic power resources more or less directly in the political sphere" (Rueschemeyer, 2004, p.76). Yet information is also strongly tied to this form of inequality within the information society because "Where material inequality massively differentiates people's access to goods and services, and those goods and services are themselves a necessary resource for citizenship, then political rights are the victim of the vicissitudes of the marketplace and its inegalitarian structure" (Murdock & Golding, 1989).

In this sense, information inequality creates unequal political opportunities by altering the political environment. This pattern was alluded to within section 2.1.2.2, when discussing implications of the Social Construction of Target Groups framework for information inequality. This section provides greater depth into issues of political inequality as they relate to information inequality, with key findings summarized in Table 4.

Table 4. Relationships between information and the political environment

References	Findings

Blakemore & Craglia, 2007	Tensions between rights and obligations Economic perspectives drive policy lifecycle
Dervin, 1994	Order/chaos tradeoffs best describe political treatment of information in democratic society
Epstein, Nisbet, & Gillespie, 2011	Information manipulation leads to informational inequalities Information non-objective
Jensen, Danziger, & Venkatesh, 2007	Political role of information and information technologies
Lievrouw, 1994	Access to involving information resources enable engaged discursive democracy
McClure & Jaeger, 2008	Information policy constrains information environment/society
Nilsen, 2010	Excludable information not economically efficient Market failures for public sector information justify government information redistribution
Wilson, 1999	Information representation is a function of individual, political interests
Zheng & Walsham, 2008	Freedom of agency and freedom of well-being effect social exclusion Socioeconomic inequality creates information exclusion

Power, as an intangible social force, interacts with culture in a relationship mediated by ICT (Cozzens, 2012; Lievrouw, 1998; Nurmi, Bosch-Sijtsema, Sivunen, & Fruchter, 2009; Srinivasan, 2013). Power depends on and is perpetuated by ICT, which marshals resources for the control of culture, society, and information. Yet ICTs can also empower (Cozzens, 2012). Political power specifically interacts with ICTs and culture to the extent that it is wielded to integrate, segregate, or stratify the public by ICT inclusiveness or boundary establishment (Falkheimer & Heide, 2009). Politicians also leverage their power to restrict ICT access, thereby limiting multicultural interaction as well as socioeconomic integration (Hamada, 2004). The

mediating impact of power extends beyond human actors in the network, allowing ideas to gain power through mediation of this interaction (Srinivasan, 2013).

Speaking of the impacts of information, more broadly than ICTs, individuals protect information, avoiding disclosure, as well as misrepresent information to further their political and ideological interests (Wilson, 1999). This also happens with respect to the digital divide, as politicians and advocacy groups frame issues of information inequality in terms that best suit their needs and preferences (Epstein, Nisbet, & Gillespie, 2011). Political inequality shapes information inequality through direct and indirect political interventions, yet information and information technology also shape political inequality.

Di Maggio, Hargittai, Celeste, and Shafer (2004), for example, specifically posed the question "Does technology enhance political influence and community engagement?" (p.385). In their review of the literature, they found significant empirical evidence to support this claim and concluded that: "Internet use does not lead to passivity or privatism" (p.385), "Internet use does not cause people to become socially or politically involved" but "makes it easier for people who are already engaged in community activities and political affairs to become even more so" (p.386), and "Internet use simultaneously increases local and long-distance communication, serving as a complementary channel to (rather than a substitute for) face-to-face interaction" (p.386). In this sense, there is evidence to support the expectation that information and ICTs shape political involvement, without creating it. In this sense information exacerbates inequality in political participation because those already involved become more so, increasing the divide between themselves and those who do not or cannot participate.

The concept of political participation, which is often unequally distributed across a population, is highly correlated with democracy, effective local governance, and community

integration (McLeod, Scheufele, & Moy, 1999). Furthermore, research has considered the importance of interpersonal communication, as an everyday life information behavior (Fisher & Julien, 2009), to political participation and found that it is critical to two dimensions of political participation: institutional and public forum participation (McLeod, Scheufele, & Moy, 1999). Along with the dimensions of institutional and public forum participation, resource-based (Brady, Verba, & Schlozman, 1995) and consciousness (Miller, Gurin, Gurin, & Malanchuk, 1981) participations dimensions constitute political participation. Institutional participation includes electoral and non-electoral facets, such as voting, petitioning, contacting public officials, and volunteering for candidates (McLeod, Scheufele, & Moy, 1999). Public forum participation includes local committee service and speaking at public meetings (McLeod, Scheufele, & Moy, 1999). Resource based participation includes monetary donations to political campaigns and interest groups, as well as donations of time to political causes (Brady, Verba, & Schlozman, 1995). Consciousness, as a form of participation, includes the active consideration of political issues and political candidates and the ideological alignment with particular positions (Miller, Gurin, Gurin, & Malanchuk, 1981).

Thus the relationship between information and political inequality, which has been recognized for upwards of 25 years (e.g. Murdock & Golding, 1989), represents a complex mutual shaping. While this relationship has been theoretically developed, there are still areas that require further attention. For example, it is still a relatively open question whether "Internet use exacerbates inequality in political engagement and social participation" (Di Maggio, Hargittai, Celeste, & Shafer, 2004, 386).

2.3.4 Sociotechnical Impacts on Information Inequality

Based on the evidence that there are mutually shaping interactions between various inequalities, political institutions, and ICTs within social contexts, a sociotechnical perspective provides the most holistic view of the variables in question, yet this approach to assessment has received somewhat scant attention. This section will thus be divided into two subsections: (1) a review of findings from the SI perspective on information inequality, and (2) a review of SI findings with implications for information inequality.

2.3.4.1 Social Informatics Analyses of Information Inequality

From a social informatics perspective, as socio-cultural and organizational contexts are perceived to be fundamental forces that shape the design, implementation, and use of ICTs, the interaction between culture and ICTs is a logical progression from the general idea of interaction between social and technological factors. To take Sub-Saharan Africa as an example, cultural differences between the creators of ICTs and users in separate places impact implementation and use because preferences and interpretations differ between the two (Mutula, 2005). Simultaneously, ICTs impact users in terms of their limited knowledge of technology and subsequent struggle to interpret intended use consistently with those from other cultures, which whom they may want to collaborate (Mutula, 2005). Concurrent impact of culture on ICT design, implementation, and use with the impact of ICT affordances, including usability and reliability, and mediums on multiculturalism feed into one another and are largely determined by context (Mutula, 2005).

ICTs provide particular affordances that make them better suited to bridging cultures, for example connecting immigrant populations to national cultures, than traditional broadcast or

print media, because these migrant cultural minorities are more likely to have access to ICTs and social media to connect to their home countries. This is evident in research focusing on Sweden, and is particularly important for providing equal social services in times of crises (Falkheimer & Heide, 2009). Given ICTs important role in this regard, cultural, economic, and social inequality result from cultural competition and unequal access to ICTs (Halford & Savage, 2010; Mutula, 2005); globalization in this sense integrates unequal groups without providing social cohesion, because tensions are exacerbated by ICTs which favor particular cultures over others (Cozzens, 2012).

Furthermore, reconceptualization of the digital divide as digital social inequality allows for more holistic discussion of the shared impact of economics, culture, and ICT on social outcomes and distributions (Halford & Savage, 2010). Digital social inequality shifts focus from the disadvantages symptomatic of the digital divide to the change and stasis in social arrangements that accompany differentiation, exclusion, and bridging of cultures through ICT (Halford & Savage, 2010). This revised theoretical construct modifies information poverty theory (Gebremichael & Jackson, 2006), which holds that lack of information or ability to use it is tied to lower economic development. This theory modification illustrates the negative social impact of: 1) significant cultural and educational barriers, 2) a lack of access to emerging technology and information infrastructure, and 3) a lack of skills to process or use the information (Halford & Savage, 2010). Specifically, Halford and Savage (2010) found that lack of access created by these barriers led to socioeconomic stagnation and isolation. These conclusions expanded information poverty theory by incorporating: 1) actor network theory, as barriers to information access are both created by and limit an agent's social network; 2) feminist

theory, as information marginalization is coupled with social marginalization; and 3) Bourdieu's sociological field analysis.

This approach presents the most nuanced conceptualization of information inequality in relation to other dynamic trends and distributions, yet has not been well developed or widely applied. It is thus the purpose of the next section to contextualize this approach toward inequality within the larger set of findings supported by social informatics, so as to later develop a conceptual framework for these inquiries by integrating a detailed understanding of access to information with fundamental social informatics concepts, so as to produce a conceptual model of key points of contact between the domains of research, to be applied in future empirical works.

2.3.4.2 Implications from Social Informatics for Information Inequality Research

Social informatics[1] has importantly come to certain conclusions about unequal distributions of outcomes from, decision-making power about, and consequences of technological use and change within stratified societies. These findings provide the most support for adopting this perspective in addressing information inequality, given that all human interaction with information within society is governed by these trends and that human-information interaction is increasingly mediated by ICT. Among these highly relevant assertions are:

1. ICTs favor the status quo,
2. Outcome distributions are unequal,

[1] Sections on social informatics are based on previously published analysis of the development of social informatics; portions have been published in Sanfilippo and Fichman, 2014, and Fichman, Sanfilippo, and Rosenbaum, forthcoming.

3. Technology impacts identity,
4. Politics and strategic interests impact outcomes, and
5. ICTs have unintended consequences.

Each of these findings will be discussed in detail, and in relationship to one another.

The idea that ICTs favor the status quo is supported in various contexts. Not only does majoritarianism impact ICT design, that is ICTs are designed for the majority and for elites in control, but also impacts ICT use and implementation. This was clear from the earliest work within the US social informatics tradition. Case studies of information systems adoption revealed that key actors leveraged authority and influence to gain legitimacy and encourage computerization because it was in their own self-interest (Kling & Iacono, 1984b), thereby making changes in social structure and power unlikely. Furthermore, this finding is tightly coupled with the others within this list. Emphasis on social dynamics, including political interests and personal preferences (Davenport & Horton, 2006; Maldonado, Maitland, & Tapia, 2010; Robbin & Day, 2006; Robbin, Lamb, King, & Berleur, 2006; Shachaf & Hara, 2007), has importantly continued to describe unequal distributions of social change (Sawyer & Tapia, 2006; Sawyer & Tyworth, 2006; Tapia & Maitland, 2009) and to explain why in many instances ICTs benefit the status quo (Robbin, Lamb, King, & Berleur, 2006), as those in power advocate what will benefit them.

As a result of the complexity of interactions between people and ICTs in context, other findings recur, such as the paradoxical impacts of ICTs (e.g. Lamb & Sawyer, 2005; Sawyer, 2005; Sawyer & Eschenfelder, 2002; Sawyer & Rosenbaum, 2000), unintended consequences to ICT use and change (e.g. Courtright, 2004; Davenport, 2005), and unequal distribution of changes (e.g. Kling, 2000a; 2000b; Lamb & Sawyer, 2005; Sawyer, 2005; Sawyer &

Eschenfelder, 2002; Sawyer & Rosenbaum, 2000). Agre, for example, found that business and political governance narratives painted idealized views of the positive impact of information technology on those spheres, yet analysis provided detailed evidence of countervailing factors, consequences, and inequality, rather than standardization (2000b; 2002). Expectations founded in inaccurate assumptions lead to unexpected situations in which investments made exceed productivity gains or exacerbate and worsen inequalities (Kling & Hara, 2004; Meyer & Kling, 2002). Furthermore, there is evidence that when information professionals don't understand the complexity of their organization, information technologies are used in unplanned for ways (Kling, 2003; Kling & Hara, 2004).

The idea that technology impacts identity is significant to the study of inequality because it illustrates how ICTs impact both perceived self-worth and social perception of individuals, which has implications for allocation of access, from a policy perspective. This specific finding has primarily been explored with respect to professional identity. The interaction between the social and technological natures of ICTs affects professional identity of users in organizational contexts (Hara & Kling, 2002; Lamb & Davidson, 2005). Hara and Kling (2002), in studying professional communities of practice, found that less experienced attorneys relied more on information technologies because they were less integrated into the community which was bound in part by collective knowledge building and shared identity; the implication is thus that, in this context, information technology integration is negatively correlated with strong communities of practice (Hara & Kling, 2002). Their paper is further contextualized by the more expansive study of legal communities of practice, as presented in Hara's dissertation (2000). In contrast, Lamb and Davidson (2005) found that ICTs enhanced scientific identities by allowing scientists with

specializations or expertise to have greater, more meaningful contributions. While the impacts differed by context, ICTs did alter existing identities within professional communities.

Strategic and political interests were evident as impactful on computing outcomes in an ongoing capacity from pre- to post-implementation (Kling & Iacono, 1984b; 1988; 1989). Politics, preferences, and a permeable environment are important in influencing outcomes because ICT users are social actors who interact with other contexts and with each other (Davenport, 2001; Kling, 2000b; Kling, McKim, & King, 2003; Kling, Rosenbaum, & Sawyer, 2005; Lamb, King, & Kling, 2003; Lamb & Kling, 2003; Wood-Harper & Wood, 2005). ICTs are not value neutral, despite the fact that they are frequently conceptualized as sterile, standardized tools; values are embedded within ICTs, the use of ICTs by users and designers, and supportive infrastructure (Kling & Courtright, 2003; Kling, Rosenbaum, & Sawyer, 2005; Lamb & Sawyer, 2005; Meyer & Kling, 2002; Sawyer, 2005; Sawyer & Eschenfelder, 2002; Sawyer & Rosenbaum, 2000). The recurring patterns within social informatics findings support a nuanced and sound perspective from which to challenge arguments based on non-empirical premises; continued empirical support for these findings strengthened social informatics.

It is important to recognize that unequal outcomes result in part from unequal social beginnings, with advantaged and disadvantaged actors, making the potential for social justice through technological change or innovation alone extremely unlikely (Kling & Star, 1997). Assumptions that advanced ICT will provide improvement fail to recognize the access issues and thus unintended outcomes and consequences are experienced because the situation was not as simple and equitable as asserted (Kling, 1998). Unintended consequences, negative externalities, and unsustainability lead to technological failure because socio-economic embeddedness limits the extent to which ICT and online environments can created their envisioned utopias (Kling &

Lamb, 1996). Inequality and consequences of ICTs imply that there are winners and losers, making information technologies moral and ethical subjects (Kling, 1996).

Research has iterated particular findings, emphasizing specific aspects of the complex context that lead to surprising outcomes; planning often accounts for the technical requirements, but too often ignores significant cultural or institutional aspects. There is strong evidence that politics and strategic interests impact outcomes (Agre, 2002; Allen, 2005; Ekbia & Kling, 2003; 2005; Kling & Callahan, 2003; Kling, McKim, & King, 2003; Kling, Rosenbaum, & Sawyer, 2005; Lamb, King, & Kling, 2003; Mansell, 2005; Wood-Harper & Wood, 2005), as well as that external factors affect interactions between users, ICTs, and context (Courtright, 2005; Ekbia & Kling, 2005; Kling, 2001; Kling & Courtright, 2003; Kling, McKim, & King, 2003; Lamb, King, & Kling, 2003).

Second, social informatics findings provide rich descriptions of the larger context of human-information interaction, which allows us to better situate inquiries of inequality and to anticipate how the context may lead to unanticipated consequences, as already discussed as a major claim of social informatics. However, it is often difficult to anticipate consequences or outcomes.

While there are sometimes predictable patterns about who will benefit from the adoption of new technologies, there are certainly paradoxical impacts of ICTs (Oltmann, Rosenbaum, & Hara, 2006; Sawyer & Tyworth, 2006), in part because: ICTs are not value neutral (Davenport & Horton, 2006; Robbin & Day, 2006; Robbin, Lamb, King, & Berleur, 2006), there are moral and ethical aspects of ICTs (Davenport & Horton, 2006; Robbin, Lamb, King, & Berleur, 2006; Sawyer & Tyworth, 2006), contexts are complex (Contractor, Monge, & Leonardi, 2011; Davenport & Horton, 2006; 2007; Hara & Rosenbaum, 2008; Oltmann, Rosenbaum, & Hara,

2006; Robbin, Lamb, King, & Berleur, 2006; Rosenbaum & Shachaf, 2010; Sawyer & Tapia, 2006; Shachaf & Hara, 2007; Tapia & Maitland, 2009), and contexts impact implementation and use (Davenport & Horton, 2006; 2007; King, Iacono, & Grudin, 2007; Maldonado, Maitland, & Tapia, 2010; Oltmann, Rosenbaum, & Hara, 2006; Robbin, Lamb, King, & Berleur, 2006; Sawyer & Tyworth, 2006).

Contexts are complex. The complexity of control in institutional computerized work contexts revealed that expectations of social change resultant from new technologies were unrealistic (Kling & Iacono, 1984a). These diverse factors, along with the particular histories of organizations and individuals, and the structures within which they operate create highly complex contexts (e.g. Kling, 2000b; Kling, Rosenbaum, & Sawyer, 2005; Lamb & Sawyer, 2005; Sawyer, 2005). Research continued to indicate that simplistic analysis in planning for technological change led to consequences and externalities because reality was more complex (Courtright, 2004), as well as that multiple incentives and practices compete and interact in context (Ekbia & Kling, 2005; Kling, McKim, & King, 2003; Lamb, King, & Kling, 2003). Findings also revealed that subtle differences in context impact outcomes in complex ways (Mansell, 2005), such as normative differences between and within scholarly domains (Kling, 2003; Kling & Callahan, 2003; Meyer & Kling, 2002). Wood-Harper and Wood presented an approach for information system planning as considering multiple perspectives, in order to better account for complexity in context (2005). Within these complex contexts, change is constant (Sawyer & Rosenbaum, 2000).

This social context and subsequent social shaping of ICT are important because the meaning and value of technologies are socially constructed by the groups and organizations who use them (Iacono, 1996); these groups have been shaped themselves by sociopolitical and

historical factors, creating ideologies, and defining their habits and practices, which include ICT (Iacono, 1996). In this sense, all groups are not equal and social discrepancies and disparities greatly impact computerization and public access (Kling, 1998; 1999) This social embeddedness of ICT determines outcomes, negative externalities, changes, and consequences (Kling &Star, 1997). Social factors are important because users of technologies are social actors who create social dynamics, institutions, norms, and practices (Iacono, 1996).

These findings indicate there are many more facets to socio-technical interactions than were previously evaluated, as well as the importance of beginning to explain more precisely and under different conditions what the role of information technologies is in social and organizational change. Later research further verified surrounding the social context, in that: there is social shaping and context of ICT (e.g. Kling, 2000a; 2000b; Kling, Rosenbaum, & Sawyer, 2005), context impacts implementation and use (e.g. Kling, 2001; 2003), and ICT use is situated and context dependent (e.g. Kling, McKim, & King, 2003; Kling, Rosenbaum, & Sawyer, 2005; Sawyer & Rosenbaum, 2000). These findings mutually reinforce social informatics principles and support conclusions about the significance of analyzing social and contextual variables as they situate and interact with ICTs.

Analysis of social aspects and social change associated with ICTs did continue to be a major focus. Data continued to indicate and further elucidate the socially shaped nature and context of ICT (King, Iacono, & Grudin, 2007; Maldonado, Maitland, & Tapia, 2010). King, Iacono, and Grudin (2007) specifically emphasize the limitations of rational, critical approaches in predicting social outcomes surrounding computing, particularly with respect to social computing in comparison to professional or scholarly computing, because social forces and viral trends can overwhelm critical perspectives. Furthermore, separation and barriers between users,

as social context, are often conserved in technological collaboration allowing social factors to shape technological potential (Maldonado, Maitland, & Tapia, 2010).

While earlier research had emphasized that use of technology does not happen in a vacuum and the situated nature of ICTs is important, it had not explored how context specifically affected ICTs in implementation and use stages (Kling, 1996). Context was found to strongly impact implementation and use because the preferences of individuals in decision making positions (Kling & Lamb, 1999) and the practices and habits of users determine implementation and use in organizations, as social systems (Kling, 1996). This impact, as empirically assessed, better explained why outcomes varied by context because the complexity of work environments and processes is specific and does not fit perfectly into general systems and technologies (Kling, 1998). Contractor and Seibold (1993) identified the impact of user experience and communication between users in context as determinant of outcomes and Lamb (1996) further explored other social interactions and relationships as impacting outcomes. Social context (Contractor & Seibold, 1993; Lamb, 1996) and cultural models determine change, implementation and use of information technologies (Kling & Tilquist, 1998).

Evidence reveals that context impacts not only attitudes toward ICT, but also their implementation, adoption and use (Davenport, 2005; Kling, 2001; 2003; Kling & Hara, 2004). Kling and Hara explain how context shapes implementation of technology in education and how consequences arise from this context (2004). Davenport argues that this evidence provides a fundamental precept of social informatics (2005). When ICTs are implemented, their uses cannot be separated from their contexts (Kling & Iacono, 2001; Lamb & Davidson, 2005; Lamb, King, & Kling, 2003; Lamb & Kling, 2003; Lamb & Sawyer, 2005; Meyer & Kling, 2002; Sawyer, 2005). In order to understand changes resultant from and unanticipated results experienced

through use, the situation, environment, and social aspects of users must be considered (Davenport, 2005; Kling, 2003; Kling & McKim, 2000; Mansell, 2005; Sawyer & Eschenfelder, 2002; Wood-Harper & Wood, 2005).

Because use is situated and contexts vary, particular socio-technical interactions lead to different, and sometimes contradictory, impacts in context, such as simultaneous specialization and routinization in institutionalized settings with shared control and competing interests (Kling & Iacono, 1989). That the context of technology is social and that this context impacts technologies is evident in Agre's (2000a) analysis of higher education and challenge to arguments that technological infrastructure will fundamentally change universities as institutions. Empirical evidence simply does not support the claim that introducing new ICTs will force institutions to completely standardize and reform their practice (Agre, 2000a; Hara & Kling, 2002; Sawyer & Tapia, 2005), because the complexity of context matters (Courtright, 2004; Kling, 2001; Kling, Rosenbaum, & Sawyer, 2005). Kling and McKim (2000) explained how even the social norms and forces of different scholarly domains provided different stabilizing and destabilizing factors with respect to technological media.

The interests impacting positions in computerization movements are representative of values placed on the power of computing, social change, and idealism (Kling & Iacono, 1988); these values, which often lead to activism for computerization, are falsely grounded in the belief that people are the problem when computerization fails to meet expectations, rather than ICT not fitting context (Kling & Iacono, 1988). The reality is that ICTs are socio-technical and therefore must coordinate with social structure and meet technological needs of a group or organization (Kling & Iacono, 1988; 1989).

In addition to complex contexts, change is constant in reality. Kling discusses the dynamics of computerization in terms of human changes, control and privacy changes, risks of accidents or failures, and constant evolution of questions through work that change the context of ICTs as time passes (1996). Change also results from other changes; when new technologies are introduced, they affect work and implicit processes are often challenged or overlooked in this process (Kling, 1999; Kling & Lamb, 1999).

When social, technical, and institutional complexities interact in context, these factors are mutually shaping (Davenport & Horton, 2006; Robbin, Lamb, King, & Berleur, 2006). Furthermore, while it may be tempting to analyze factors within a bounded context, the reality is that external factors affect interaction (Maldonado, Maitland, & Tapia, 2010).

Yet it is not only the unnoticed within organizations that affects outcomes, external factors play a role including interaction with regulatory agencies, clients' or partners' needs, and industry-wide changes Kling & Lamb, 1999). In adopting ICTs, organizations largely hope to increase productivity, but sometimes find that automation investments and actual gains are paradoxical (Kling & Star, 1997). Increases in productivity do not keep pace with the cost of technologies (Kling, 1998); therefore incentives really do matter in encouraging users to learn the technology to the optimal level (Kling & Lamb, 1999).

Repeated findings indicated that the mutually shaping relationships between ICTs and context result from iterated interactions (e.g. Kling, 2001; Kling, Rosenbaum, & Sawyer, 2005; Sawyer, 2005; Sawyer & Eschenfelder, 2002; Sawyer & Rosenbaum, 2000). Agre (2000a, 2000b) and Hara and Kling (2002) explain how as social forces change the context, uses of ICTs change, and as new technologies are introduced, social shifts occur. Lamb and Sawyer (2005) present a version of the socio-technical perspective that considers interdependencies and

networked links over time as shaping both the social and technical interactions. In this sense, ICTs are sociotechnical network systems (e.g. Kling, 2000a; 2000b; Kling & Iacono, 2001). Scholarly communication forums and scholarly norms, for example, create a structure through and including technological mediation that serves as a professional network for discussion and collaboration (Kling, McKim, & King, 2003). Lamb and Kling (2003) conceptualize the social interactions between people and technologies as a network dependent on users as social actors with affiliations, environments, interactions, and identities.

It is thus clear that a social informatics perspective could address a number of questions about information inequality. Table 5 provides a summary of key social informatics findings, relevant to this inquiry, as they appear in seminal social informatics works.

Table 5. Selected Social Informatics Findings

Finding	First Published	References
Context is complex	1984	Courtright, 2004; Contractor, Monge, & Leonardi, 2011; Davenport & Horton, 2006; 2007; Hara & Rosenbaum, 2008; Kling, 1998; 2001; 2000b; 2003; Kling & Hara, 2004; Kling and Iacono, 1984a; Kling & Star 1997; Kling & Tilquist, 1998; Kling, Rosenbaum, & Sawyer, 2005; Lamb & Sawyer, 2005; Oltmann, Rosenbaum, & Hara, 2006; Robbin, Lamb, King, & Berleur, 2006; Rosenbaum & Shachaf, 2010; Sawyer, 2005; Sawyer & Tapia, 2006; Shachaf & Hara, 2007; Tapia & Maitland, 2009; Wood-Harper & Wood, 2005
ICTs favor the status quo	1984	Kling and Iacono, 1984a; 1984b; Contractor & Seibold, 1993; Kling, 1999; Kling & Tilquist, 1998; Agre, 2000a; Hara & Kling, 2002; Sawyer & Tapia, 2005; Agre, 2002; Davenport, 2000; Ekbia & Kling,

		2003; Meyer & Kling, 2002; Sawyer & Rosenbaum, 2000; Robbin, Lamb, King, & Berleur, 2006
Politics and strategic interests impact outcomes	1984	Kling and Iacono, 1984b; 1988; 1989; Kling & Lamb, 1996; Agre, 2002; Allen, 2005; Ekbia & Kling, 2003; 2005; Kling & Callahan, 2003; Kling, McKim, & King, 2003; Kling, Rosenbaum, & Sawyer, 2005; Lamb, King, & Kling, 2003; Mansell, 2005; Wood-Harper & Wood, 2005; Davenport & Horton, 2006; Maldonado, Maitland, & Tapia, 2010; Robbin & Day, 2006; Robbin, Lamb, King, & Berleur, 2006; Shachaf & Hara, 2007
ICTs are not value neutral	1988	Kling and Iacono, 1988; Kling, 1996; Kling & Courtright, 2003; Kling, Rosenbaum, & Sawyer, 2005; Lamb & Sawyer, 2005; Meyer & Kling, 2002; Sawyer, 2005; Sawyer & Eschenfelder, 2002; Sawyer & Rosenbaum, 2000; Davenport & Horton, 2006; Robbin & Day, 2006; Robbin, Lamb, King, & Berleur, 2006
ICT use is situated and context dependent	1988	Kling and Iacono, 1988; 1989; Iacono, 1996; Kling, McKim, & King, 2003; Kling, Rosenbaum, & Sawyer, 2005; Sawyer & Rosenbaum, 2000; Davenport, 2005; Kling, 2001; 2003; Kling & Hara, 2004; Kling & Iacono, 2001; Lamb & Davidson, 2005; Lamb, King, & Kling, 2003; Lamb & Kling, 2003; Lamb & Sawyer, 2005; Meyer & Kling, 2002; Sawyer, 2005
ICTs have multiple and paradoxical impacts	1989	Kling and Iacono, 1989; Lamb & Sawyer, 2005; Sawyer, 2005; Sawyer & Eschenfelder, 2002; Sawyer & Rosenbaum, 2000; Agre, 2000b; 2002; Oltmann, Rosenbaum, & Hara, 2006; Sawyer & Tyworth, 2006
Impact of context on implementation and use	1993	Contractor & Seibold, 1993; Kling, 1996; 1998; Kling & Lamb, 1999;

		Kling & Tilquist, 1998; Lamb, 1996; Kling, 2001; 2003; Davenport, 2005; Kling, 2001; 2003; Kling & Hara, 2004; Davenport & Horton, 2006; 2007; King, Iacono, & Grudin, 2007; Maldonado, Maitland, & Tapia, 2010; Oltmann, Rosenbaum, & Hara, 2006; Robbin, Lamb, King, & Berleur, 2006; Sawyer & Tyworth, 2006
Social shaping and context of technology	1996	Iacono, 1996; Kling, 1998; 1999; Kling & Star, 1997; Kling, 2000a; 2000b; Kling, Rosenbaum, & Sawyer, 2005; Agre, 2000a; King, Iacono, & Grudin, 2007; Maldonado, Maitland, & Tapia, 2010; Davenport & Horton, 2006; Maldonado, Maitland, & Tapia, 2010; Robbin & Day, 2006; Robbin, Lamb, King, & Berleur, 2006; Shachaf & Hara, 2007
ICT users are social actors	1996	Iacono, 1996; Davenport, 2001; Kling, 2000b; Kling, McKim, & King, 2003; Kling, Rosenbaum, & Sawyer, 2005; Lamb, King, & Kling, 2003; Lamb & Kling, 2003; Wood-Harper & Wood, 2005; Blincoe, Valetto, & Goggins, 2012; Contractor, 2009; Goggins, Laffey, & Gallagher, 2011; Rosenbaum & Shachaf, 2010; Shachaf & Hara, 2007
There are moral and ethical aspects of ICTs	1996	Kling, 1996; Davenport & Horton, 2006; Robbin, Lamb, King, & Berleur, 2006; Sawyer & Tyworth, 2006
Change is constant	1996	Kling, 1996; Sawyer & Rosenbaum, 2000
There are unintended consequences	1996	Kling & Lamb, 1996; Davenport, 2005; Kling, 2001; 2003; Kling & Hara, 2004; Davenport, 2005; Kling, 2003; Kling & McKim, 2000; Mansell, 2005; Sawyer & Eschenfelder, 2002; Wood-Harper & Wood, 2005; Courtright, 2004; Davenport, 2005; Kling & Hara,

		2004; Meyer & Kling, 2002
Outcome distributions are unequal	1997	Kling, 1999; Kling & Star 1997; Mansell, 2005; Kling, 2003; Kling & Callahan, 2003; Meyer & Kling, 2002; Kling, 2000a; 2000b; Lamb & Sawyer, 2005; Sawyer, 2005; Sawyer & Eschenfelder, 2002; Sawyer & Rosenbaum, 2000; Sawyer & Tapia, 2006; Sawyer & Tyworth, 2006; Tapia & Maitland, 2009
Incentives matter	1999	Kling & Lamb, 1999; Ekbia & Kling, 2005; Kling, McKim, & King, 2003; Lamb, King, & Kling, 2003
ICTs and their context are mutually shaping	2000	Agre, 2000a; 2000b; Hara & Kling, 2002; Kling, 2001; Kling, Rosenbaum, & Sawyer, 2005; Lamb & Sawyer, 2005; Sawyer, 2005; Sawyer & Eschenfelder, 2002; Sawyer & Rosenbaum, 2000; Davenport & Horton, 2006; Robbin, Lamb, King, & Berleur, 2006
ICTs are sociotechnical network systems	2000	Kling, 2000a; 2000b; Kling & Iacono, 2001; Kling, McKim, & King, 2003; Lamb & Kling, 2003; Lamb & Sawyer, 2005; Blincoe, Valetto, & Goggins, 2012; Contractor, 2009; Contractor, Monge, & Leonardi, 2011; Goggins, Laffey, & Gallagher, 2011; Orlikowski & Iacono, 2008
Technology affects professional identity	2002	Hara & Kling, 2002; Lamb & Davidson, 2005
ICTs are configurable	2003	Kling, McKim, & King, 2003; Kling, Rosenbaum, & Sawyer, 2005; Robbin, Lamb, King, & Berleur, 2006
ICTs have social, technical, and institutional natures	2005	Kling, Rosenbaum, & Sawyer, 2005; Lamb & Sawyer, 2005; Sawyer, 2005; Sawyer & Tyworth, 2006

2.4 Access initiatives

Despite all of the potential barriers to access, there are also ways to leverage factors that constrain in favor of increased access to information. Various intentional efforts have been made toward socially positive ends. These are clear technological and socio-cultural products, such as global public-private partnerships for global information justice (Papaioannou, 2011) in which valuation of equality and ICT innovation and diffusion yield social equality and the inclusion of marginalized populations in the global multicultural society (Papaioannou, 2011). To take an example from the education sector, collaboration throughout the European Union for open and distance learning has been enabled by cultural and technological factors, and has in turn impacted them (Siakas, 2008). Study of the attempt to integrate ICT-mediated classrooms highlights the ability to capitalize on internet and multimedia potential for the sake of high-quality ICT education resources and the development of European intercultural awareness because they value cooperation and exchange (Siakas, 2008). In this sense, cultural openness and ICT attributes and communication modes can be leveraged for access.

Collaboration succeeds when ICT access can be matched and cultures seek to integrate to accomplish a particular end; collaboration is not viable in all situations, yet is critical to equitably integrating the global community and bridging gaps that leave certain cultures and developing nations to struggle with problems that are dealt with better in other places, such as collaboration for AIDS telemedicine (Gebremichael & Jackson, 2006).

Multicultural collaboration is important because it increases global tolerance through increasing awareness and allowing cultures to interact and coexist, thereby crossing boundaries, rather than converging on a global culture or diverging and becoming isolationist (Hamada,

2004). Furthermore, collaboration and inclusion within diverse countries leads to more equitable outcomes across cultures and through ICTs, yet instances of exclusion and marginalization relate to more fundamental causes in addition to culture and information technology (Sassi, 2005). Collaboration and intercultural discourse are complicated; culturally, interaction is believed to be socially positive, helping to diminish differences, yet competitive self-interests shape communication and interaction, as well as commodification of knowledge, which perpetuates social challenges (Lievrouw, 1998).

Furthermore, information diffusion can be enhanced for increased access by increasing awareness of resources, to lessen barriers based simply on unknowns. For example, Chatman (1986) explains the diffusion process "as consisting of four essential elements: (1) the innovation, (2) its communication from one individual to another, (3) in a social structure (defined here as social environment), and (4) over a period of time" (p.378). In this sense, social interaction increases information access in a low resistance, passive way.

Active strategies to improved access can also be taken. Dervin (2005) articulated 25 propositions, based on existing literature for how the information needs of underserved communities can be better supported, within the context of health information. Yet these principles can be translated to a general context, as presented in table 6.

Table 6. Implications of Dervin's (2005) Propositions for Information Access

Dervin's Propositions	General Implications for Access
"Reaching target audiences or users with health information is tough; bridging the gap between information and behavior is even tougher." (Dervin, 2005, p.S75)	Increasing access will be difficult Increasing subsequent use will be difficult; resistance to change in information habits
"One-way information transmission works best with people who are similar to the information providers." (Dervin, 2005, p.S76)	People will be more receptive to information from peers than from individuals from different groups
"Too often, top-down information transmission rests on a host of faulty assumptions about	Authority figures seek to disseminate information without understanding target

target audiences." (Dervin, 2005, p.S76)	audience
"Too often, top-down information transmission has ignored the experiential realities of lay persons' lives; too often, it blames the victims and is received as irrelevant at best and as prejudicial and oppressive at worst." (Dervin, 2005, p.S76)	Access initiatives directed from positions of authority fail because they are shaped by the values and misunderstandings of those authorities
"The information environment is increasingly marked by decreasing trust in expert and institutional sources" (Dervin, 2005, p.S76)	Official access initiatives will be viewed skeptically
"Lay people are increasingly wise about how information is tied to vested interests" (Dervin, 2005, p.S76)	People understand what values have shaped information, biasing it based on interests
"The growing complexity of the information environment is making information dissemination more difficult" (Dervin, 2005, p.S76)	Complexity complicates access and dissemination
"The volatility of the information environment makes the professionals' jobs harder" (Dervin, 2005, p.S77)	Dynamic information environments make control of information and access provision more complicated
"When it comes to expertise, all nonexperts are vulnerable" (Dervin, 2005, p.S77)	Expert information is least accessible to individuals
"One-way information transmission can backfire" (Dervin, 2005, p.S77)	Access without feedback often does not improve information use or equity
"Information is rarely enough" (Dervin, 2005, p.S77)	Access is insufficient without skills to use information
"Information is not sufficient, but it is necessary" (Dervin, 2005, p.S77)	Access is highly necessary
"Tinkering with information presentation strategies can make a big difference, but there is a big caveat: the difference depends on where the recipient is coming from" (Dervin, 2005, p.S77)	Representation impacts accessibility
"The biggest increases in campaign effectiveness have come from conceptualizing campaign design away from information transmission to multistage communication intervention" (Dervin, 2005, p.S77)	Access is more effective than transmission in many circumstances
"Communication interventions must be communicative; it they revert to transmission they will fail" (Dervin, 2005, p.S77)	Access should be interactive
"Communication-based interventions necessarily involve community context; the most common route have been cultural, in the hope of addressing lived experiences and societal circumstances" (S78)	Access initiatives should be context specific

"The culture of community route to communicating is not a quick fix" (Dervin, 2005, p.S78)	Context specific access will not necessarily fix all associated inequities
"While target group memberships may define policy aims, they are not the best way of defining information dissemination purposes" (Dervin, 2005, p.S78)	Socially constructed contexts by group are not the most effective means of improving access because frames of groups may not coincide with those in need
"Recipient readiness is, in fact, the best predictor of information receptivity" (Dervin, 2005, p.S78)	Demand for access indicates where access will lead to improvements
"Recipient readiness is predicted best phenomenologically and situationally, not in terms of a priori-demographic or expert system categories" (Dervin, 2005, p.S78)	Demand for access is context specific
"Alternative research approaches have shown that what was formerly seen as chaotic behavior is in fact patterned information seeking and use" (Dervin, 2005, p.S78)	Information needs and uses follow complex patterns.
"Focusing on information seeking and use situationally and contextually decreases the variability that information disseminators must cope with" (Dervin, 2005, p.S79)	Context specific approaches to access will reduce unequal outcomes
"Focusing on the verbs of information seeking and use provides even greater capacity to predict and explain" (Dervin, 2005, p.S79)	Access that is tailored to users improves outcomes
"Treating people as human works best" (Dervin, 2005, p.S79)	Conceptualizing users as people, rather than target groups, is important
"Communication's most basic fundamental is the quid pro quo" (Dervin, 2005, p.S79)	Increased access can yield reciprocal exchange.

The implications of Dervin's (2005) work include suggestions as to why access initiatives often fail and insights that can produce successful access initiatives in the future. Context specific focus on users provides the best strategy to counteract the inequalities in information distributions produced by policies designed based on social constructions. In this sense, questioning the assumptions made within the political shaping of information inequality is an important step in understanding how to improve information access.

Many of Dervin's (2005) findings also tie into other findings within this literature sample. For example, the emphasis on values embedded in access initiatives coordinate with the

values shaping information policies and embedded in ICTs. Users' skepticism in access initiatives (Dervin, 2005), is well founded given the historical behavioral patterns of decision makers in favoring the status quo and only superficially addressing access by increasing availability without acknowledging other dimensions of access (Braman, 2009; James, 2011; Lievrouw, 2000; Robertson & Vatrapu, 2010). Furthermore, the issue of complexity that permeates these propositions signifies that approaching the study of access initiatives from a social informatics perspective would be especially effective in future research.

Improving information access is one important strategy toward decreasing information inequality. Dervin (2005) importantly offers a set of propositions that draw on previous scholarship, yet there are existing gaps in understanding how access initiatives can succeed and the extent to which improving access in particular contexts actually impacts information inequality. It is important to further determine how success in one context can be generalizable to other contexts, as well as what aspects of initiatives actually make a difference in reducing inequity. Understanding how contextual inequality relates to information inequality at large may help elucidate these mechanisms.

Specific access initiatives have had widely varied outcomes, only some of which have been examined in depth within the scholarly literature. For example, currently, much research into information politics within the EU is at the micro or meso-levels of analysis and there is a significant emphasis on legitimacy of information policies and politics (Blom & Vanhoonacker, 2014), which indicates that there is a need for further investigation of the Information Society initiative. However, Latin American and Caribbean access and ICT4D initiatives have been examined in depth, with respect to their successes in addressing digital poverty, within an edited volume by Mariscal & Galperin (2007).

Efforts to influence the telecommunications sectors through economic policies, such as in Spain and Mexico, have had significant impacts on information access (Mariscal, Bonina, Luna, 2007). Privatization efforts throughout Latin America have "increased coverage, improved service quality and reduced fees, while directing market forces to cover the basic needs of the poorest sectors" (Hitscherich & Roldán Perea, 2007, p.81). In this sense, assumptions about the economic benefits of ICTs and telecommunications services are well served by economic approaches to increased access. The results have largely been increased access, though not necessarily increased equality, much less equity of access.

Access initiatives that have led to the creation of microtelcos within the Latin American context have had variable degrees of success, based on differences in subsidies, incentives, and balances of co-production of services (Galperin & Girard, 2007). In an effort to effectively reach poor and rural populations with ICT services, collaboration between private and civil groups "effectively aggregate local demand, mobilize resources, develop appropriate applications, and experiment with input combinations that better suit local needs. This often requires active support for local authorities to facilitate coordination, stimulate demand, and operate essential facilities" (Galperin & Girard, 2007, p. 99-100). Very different strategies have been adopted. For example, while Peru and Brazil have developed federal initiatives in response to local demands, Argentina has fostered local support for local initiatives, which have been much more successful due to their context sensitive design (Galperin & Girard, 2007), yet are not consistently applied across the country.

The success of context sensitive designs is actually consistent with Cullen's (2001) arguments about rural access in Canada, as well. Cullen (2001) argues that initiatives "need to be community driven, have high community participation, and focus on community needs rather

than the technology" (p.320). In that context, however, community access centers turned out to be more useful than local service providers, because they were financially sustainable and provided training, clear incentives, and transparent relationships between business, government, and the community. The similarities and differences between these contexts illustrate a fundamental need to respond to the context to overcome inequality and provide access.

It is important, thus, to learn from past initiatives, so as to revise current initiatives and support effective and sustainable future efforts. Problems of information inequality will not disappear without action and are uniquely constructed in context, yet the fundamental forces shaping outcomes are generalizable. Lessons from Latin American access initiatives include recommendation to make improvements to the regulatory environment:

1. Monitor spectrum access;
2. Revise licensing requirements to allow for local providers;
3. Protect network, technological neutrality;
4. Increasing financing to support local initiatives;
5. Provide access to essential facilities to upgrade ICT infrastructure;
6. Remove shelters for incumbent operators at the expense of innovation (Galperin & Girard, 2007).

These lessons, as identified by Galperin and Girard (2007), emphasize the institutional, economic, and political influences on outcomes. While, social and cultural factors are also significant, these factors specifically allude to the association of information and ICTs with development. Development objectives and assumptions about this relationship, which is anything but simple, often lead to the policies in question.

In this sense, information and communications technologies for development (ICT4D) provides a parallel model to compare to access initiatives, in that while the assumptions of economic benefits are more explicit, both are policy defined efforts to alter information and ICT access, use, and infrastructure for public benefit. ICT4D initiatives are specifically concerns with how to "change things so that poor people and marginalized communities can have fairer access to the great opportunities that ICTs can make available?" (Unwin, 2009, p.2). The outcomes of these initiatives are as diverse as from general access initiatives.

Specifically, ICT4D initiatives have notably failed within Asian Pacific nations, while initiatives in Latin America have been revised over time, not yet reaching sustainable designs, despite the notable gains in teledensity, for example, that have been achieved (Unwin, 2009). Paul (2002), for example, evaluated the first five years of the ASEAN Vision 2020 with respect to access components, finding that the ASEAN information infrastructure (AII) and e-ASEAN components had only furthered the connectivity of the most advanced members, Singapore and Malaysia, while leaving behind Brunei, Cambodia, Indonesia, Laos, Myanmar, the Philippines, Thailand, and Vietnam. Specific challenges to e-ASEAN included: "Lack or clarity of purpose and vision", "Political, economic and technological disparities in the region", and "Severe funding constraints and the role of the private sector" (Paul, 2002, p.19).

Initiatives, including those that are driven by government through policies and those that are led by business (e.g. Albagli & Maciel, 2010; Blom, 2014; Blom & Vanhoonacker, 2014; Croeser, 2015), out of corporate social responsibility or other strategic interests, represent intentional efforts to overcome inequalities in access, based on a variety of assumptions in pursuit of diverse objectives. While, path dependence, social construction, and technological change endogenously impact outcomes over time, exogenous factors that change access levels

can most directly be examined through these initiatives. In this sense, in order to better understand how to improve access, it is necessary to understand the constraints on initiatives and policy aspects that can yield particular outcomes. It is from this need that the overarching research question emerges: What leads to unequal outcomes in information access initiatives?

While research into ICT4D and information initiatives has important implications for this question, as has been reviewed within this section and will be discussed in further depth in Chapter 3, this question has not been directly addressed. Concerns about past failures and desires to emulate successes have led to attention on the extremes, much as happens with research into inequality in general, yet the factors that contribute to diverse outcomes are not well understood, particularly across contexts. As a result the research proposed here seeks to address this gap by exploring what led to unequal outcomes from the Information Society initiative in the European Union. Chapter 3 presents a preliminary framework, to be assessed and supplemented by the research proposed in Chapter 4, that conceptually integrates the policy dimensions and factors shaping outcomes of the policy process that have been identified as shaping past access outcomes.

3. Theoretical Framework

This chapter synthesizes research on information inequality, primarily in summary of chapter 2, and contextualizes it with respect to the policy initiatives designed to impact it so as to present a situated framework for analysis of information inequality. Section 3.1 discusses the factors influencing information inequality, while section 3.2 applies these general supports and constraints to the context of access initiatives. Finally, section 3.3 discusses the implications of access initiatives, which are significant in that they validate and contradict the assumptions underlying policies in terms of what influencing factors are addressed.

3.1 Factors Influencing Information Inequality

Information inequality is the unequal distribution of information access—as availability, awareness, and ability—and infrastructure to support use and consumption of information and information technology. Information inequality is shaped by context and is universal; it is intricately linked with other forms of inequality, as economic, social, cultural, and political distributions impact both the context, as the information environment, and individuals in society. As a result of the complex information environment, policy constrains access to information in that policy makers allocate information according to preferences shaped in context. Information also impacts policy, in that preferences are informed by information flows. Furthermore, ICTs enable and constrain access to information by gatekeeping many forms of information, yet information inequality also impacts technology, as ICT are designed and implemented based on unequal information flows. In this sense, social, political, and technological constraints on

information access have significant impacts on distributions and use; efforts to provide information, as in public sector transparency or digital divide initiatives, cannot be expected to succeed without an encompassing effort to address all associated factors.

Information inequality research specifically develops the work on unequal outcomes, winners and losers, and identity shaping impacts. Furthermore, through the integration of information inequality research and SI perspectives, scholarship can begin to posit how unequal beginning points shape embedded values in ICTs and information regimes. Both of these precepts have long been asserted by empirical social informatics research (Sanfilippo & Fichman, 2014); social informatics emphasizes that despite the optimistic and simple predictions of technological determinists, there are negative consequences at the expense of certain individuals and social groups, who are different from and less powerful than decision makers (Kling, 1999). Deterministic discourse often expects decisions regarding ICTs, and in this case access initiatives, to yield successful outcomes, when in fact many increase inequality; decision makers often fail to understand the needs of users who are not like them.

The reality of unequal outcomes when ICTs are introduced into particular contexts is one of the primary tenets of the social informatics perspective; technologies produce inequalities. Placing this in a social context, within which social and political distributions exist, all stakeholders are not equally likely to be either winners or losers. The question thus becomes: how do ICTs impact socially and politically unequal information distributions and how do social and political institutions shape technological distributions? Furthermore, issues of identity should be considered in relationship to social construction of users in context, in order to fully understand how information, and ICT, inequality is experienced.

It can be anticipated that there is a relationship between this inequality and identity as users internalize and self-perceive based on access and context, including policy frames that place individuals in constructed target groups. Drawing on works, such as Hara's dissertation (2000) as previously discussed, which examined social construction of knowledge in concert with the identity shaping processes associated with ICT use in a professional community of practice, there is a logical expectation that similar processes occur in other types of communities. However, insufficient attention has been paid to identity issues associated with information.

Social reinforcing of inequality has been examined from many scholarly perspectives, including sociology and cultural anthropology (e.g. Morrison, 1993; Spradley, 1997). If it is accepted that "culture is acquired knowledge that people use to generate behavior and interpret experience" (Spradley, 1997, p.22), and knowledge acquisition is strongly shaped by life worlds (Chatman, 1991; 1996) and the information environment (Lievrouw, 2000), then unequal social contexts reproduce and reinforce inequality. This explains why inequality is entrenched (Sen, 1992) and disadvantage is difficult to escape (Bradbrook, et al., 2008).

Inequality is socially reinforced as unequal starting positions shape outcomes and separation increases with time when actions are not taken to counteract this trend through redistribution. Organizational socialization, "as the process whereby newcomers learn the behaviors and attitudes necessary for assuming roles in an organization (Morrison, 1993, p.557), illustrates a participation gap that can be overcome through "technical, referent, normative, performance feedback, and social feedback information in order to master their jobs and become integrated into their organizations" (Morrison, 1993, p.559). In this sense, people perform in way that is consistent with organizational expectations and their interpretations of them. However, considering socialization more broadly, it could be expected that what has been observed in

organizations also happens the same way in communities and society. In this sense, a lack of feedback between social groups, particularly between those advantaged and those disadvantaged, leads to highly distinct performances and stratified socialization.

Political reinforcing of inequality also occurs (e.g. Pieterse, 2002; Stunkel & Sarsar, 1994). Policies focus on poverty alleviation, as opposed to reducing inequality, and neoliberal ideologies drive domestic and international efforts in a way that benefits the status quo and hegemonic powers over actual improvement (Pieterse, 2002). Inequality between countries, in terms of standards of living and other economic indicators, as well as within countries, in terms of GDP and other economic indicators, grows in many contexts largely because those with the power to promote increased equity instead reframe issues in neoliberal and capitalist terms, thereby reinforcing their own privileges (Pieterse, 2002). In this sense, political rhetoric drives policy change and both impact inequality, with rhetoric reinforcing the perceived undeserving nature of the marginalized and policies reinforcing their positions (Ingram, Schneider, & Deleon, 2007; Schneider & Ingram, 1993).

Stunkel and Sarsar (1994)—in their expansive review of interactions between ideology, values, and technology that impact the political sphere—identify points of connection between political and technical reinforcing of inequalities, particularly along lines of social stratification. They specifically argue:

> … poverty usually tends to be more powerless and confining than white poverty because of an intimate link between access to education and skills needed for technologically sophisticated jobs. Access … to forms of technology as consumers … is no substitute for mastering technology through marketable skills and productive labor. As technology

> develops and educational opportunity and facilities lag behind, closing the gap becomes more difficult. (Stunkel & Sarsar, 1994, p.22)

In this sense, technology is fundamentally tied to the economy and economic status strongly shapes political power, both at group and individual levels. Furthermore technical ability, as a dimension of information behavior, is impacted by political decisions and allocation of education, thereby tightly coupling these dynamic forces shaping inequalities.

Technological reinforcing of inequality is multifaceted, as it is a dynamic shaped both by the ICTs themselves and the use of ICTs (Johnson & Nissenbaum, 1995). Unequal uses of ICT exacerbate inequality and leave those disadvantaged even more so, however ICT offers rare opportunities to counter inequality (Bradbrook, et al., 2008). Inequality is technically reinforced as many initiatives simply provide technology or infrastructure, though not necessarily together, without coupling them with resources for use or education to develop the ability to use information technology or even recognize its availability (Bradbrook, et al., 2008).

Couple these dynamic forces in shaping inequalities with the existing distributions and relationships between inequalities are suggested. These forces are local and global, perceived and relative; the marginalized often legitimize social status within subgroups delineated by other disadvantages, yet also experience marginalization within a large context as changes occur at various levels (Haglund, 2005). Inequalities, in this sense, are macro-level and micro-level phenomena. Distributions are rarely uniform, but rather are unequal with normal variation in ranges and skew. Constant changes affect these distributions, yet many are entrenched, and cross sectional consideration of a variety of interacting distributions illustrates what Meyer and Kraft (2000) asserted with respect to information: inequality is experienced by everyone, context shapes experiences of inequality.

Therefore, an understanding of information inequality must incorporate interdisciplinary theory on context, as well as on society. People are both products and shapers of their environments and, thus, people impact information distributions, directly and indirectly, within contexts. In aggregate, the literature suggests that policy, information technology, and complex aspects of context, including social, political, and cultural dimensions, impact information inequality. Furthermore, information inequality reciprocally shapes these factors.

As access is shaped in context, it becomes a sociotechnical construct. Those with social, economic, or political advantages, tend to have higher access to information, whereas those who are systematically disadvantaged are also disadvantaged in information distributions. This is particularly true within the context of public sector information and government information. Limited transparency and complex bureaucracy are difficult to navigate without resources to leverage in obtaining information. Those who are disadvantaged often are unaware of information and are more often unable to use information, even if they could obtain it. Access is a function of awareness, ability to use, and availability, as well as being shaped by infrastructure. Use is also distinct from access, as even when possible, certain disadvantaged communities resist use due to perceived legitimacy differences, as explained in small worlds, or life worlds of outsiders (e.g. Chatman, 1996), and information poverty theory. This importantly compliments Social Construction of Target Groups Theory.

As individuals, as products of their environment, process information about other social groups, messages are clear spread, through the media and popular culture, classifying social groups in particular ways. Classifications often draw on particular demographic details, economic or educational status, and social and political dynamics. These groups thus judge themselves by these social constructions, which importantly shapes their individual identities. In

this sense, their social and political participation is a product of self-identification based on the social context.

It is expected that information policy changes regarding access components or infrastructure would impact information inequality. Specifically, places with different policy constraints on information infrastructure or availability, will likely have different levels of information inequality. Access to information at the individual and societal levels may also be unequal due to transparency and disclosure differences, which would impact awareness, as differences in information literacy initiatives would impact abilities to use information. Instances where similar policy constraints may yield differences in information inequality may be attributable to other factors.

Thus, embedded within the overarching research question—What leads to unequal outcomes in information access initiatives—is an emphasis both on dimensions of access addressed and policy dimensions. From this, it is evident where the first subordinate research question emerges: What policy dimensions/prescriptions yield different outcomes in access initiatives (with respect to information inequality as unequal access to information)? Differences in initiative design, as well as in interpretation or implementation of design, lead to differences in access outcomes and have different impacts on information inequality, despite often very similar objectives.

Differences in ICT use, access, and configuration, are also expected to impact information inequality. In this sense, as the digital divide is subsumed within information inequality, it is possible to explore how one type of information inequality may produce another. For example, in countries that offer e-government services, the digital divide may have a more significant impact on differences in public sector information access than in nations that rely on

more traditional or analogue modes of information dissemination. This represents instances of within place information inequality that may differ relative to other contexts with similar digital equality. Furthermore, between places, differences in information inequality may result from differences in ICT use habits, such as reliance on mobile internet access as opposed to use of traditional internet browsers on computers.

Finally, as much of the digital divide literature asserts, economic and social inequalities are also expected to yield information inequality, along with political inequalities. Because these distributions differ across communities, states, and countries, it is likely possible to ascertain at a large scale across many contexts, how these variables cause changes in information inequality, rather than focusing on the digital divide specifically or interpreting the correlations between these factors as causation. It is important to better understand these relationships because many inequalities are entrenched and in order to overcome information inequality, or improve information equity, it is necessary to fully understand its causes, not simply its characteristics.

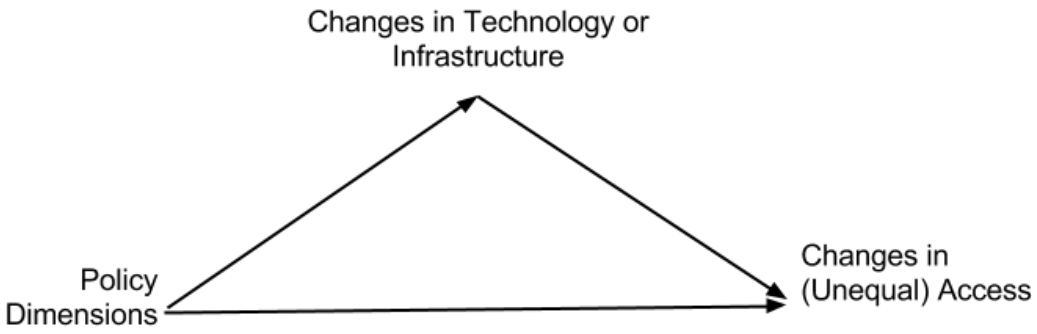
Overall, it is clear that social, political, cultural, economic, and technological aspects impact information inequality and shape interactions between policy dimensions, individuals, and access in context. Because of these complex interactions, a second subordinate research question emerges: What aspects of context, in terms of social, cultural, economic, political, and technological status, lead to successful interpretations and implementations of these dimensions?

While this section sought to summarize the general interrelationships between information inequality and context, as well as to identify the intentional shaping of policy and technology on access, the remainder of this chapter more specifically addresses the implications of these interactions on the outcomes of access initiatives.

3.2 Factors Influencing Information Access Initiatives

Of the many factors that shape information inequality, few are easily manipulated in a direct way. Policies, which specify operationalization of larger initiatives, are a specific way to seek to impact access to information and to possibly impact inequalities in access. Figure 2 specifically represents the mechanisms through which these initiatives may impact access, disregarding all of the contextual aspects that shape policies, technologies, or initial access status.

Figure 2. The Impact of Access Initiatives on Access to Information and ICTs



It is important that lessons be learned from past information and ICT initiatives, including both access and ICT4D initiatives. ICT4D and access initiatives often fail or underperform for a variety of reasons, including energy, literacy, gender disparities, costs, and ethical issues (Unwin, 2009). However, initiatives are also often flawed by design, in part because they often fail to incorporate social and technical learning from past mistakes (Unwin, 2009). This section will review and synthesize the factors that interact with policies and ICTs to contribute to access outcomes.

Unwin (2009), for example, enumerates a number of risk factors that access initiatives, as well as e-government initiatives, may face:

1. Lack of institutional capacity,
2. Lack of commitment,
3. Coordination problems between components,
4. Competing stakeholder interests,
5. Low utilization of systems,
6. Lack of clarity on responsibilities of sponsors,
7. Underfunded,
8. Change in priorities,
9. Coordination failure between levels of government,
10. Weak or absent legal framework, and
11. Unwillingness to share information among stakeholders.

These risks factors span many stages of the policymaking process, from initial negotiation to formulation to implementation to evaluation to sustainability of the systems and services produced. It is notable that social, political, and economic factors can all serve as risks, reflecting the diverse factors that research has indicated impact information inequality. Coordination surrounding, compatibility with, support—including financial, political, administrative, and infrastructural—for, and demand for the initiative all matter to the success of individual policies and the initiative as a whole, as they create sociotechnical networks in which people and information resources are connected through digital, analogue, and human services.

Optimal sociotechnical network designs, as envisioned within initiatives, must be context sensitive. For example, ICTs that are low in cost with a high ease of access are suitable for

communal cultures, while in social structures that are shaped by competitiveness and capitalism, initiatives are more likely to succeed when technologies require individual interactions, despite lower ease of access and higher costs to users, which makes initiatives expensive (Unwin, 2009). Demand for technology, information, and communication is, in part, a function of social and cultural factors, which are difficult to directly impact, but must be considered when designing a policy-based initiative in order for it to successfully impact access.

It is important that initiatives balance the supply and demand of ICTs and infrastructure, or else failures or sustainability problems will result (Unwin, 2009). Demand factors may include: user demand, user capacity, trust, and technological accessibility, while supple factors include: technological infrastructure, institutional capacity, and legality (Unwin, 2009). Barrantes (2007) takes a different approach to defining demand within this function "as the amount of a good/service people are willing to buy at a certain price" (p. 31); demand is not equal to need because it is dependent on purchasing power, thus making demand a function of connectivity, awareness, and economic purchasing power.

Furthermore, recognition of stakeholder groups is particularly important in access initiatives; not only are governments, NGOs, civil society, research institutions, and the private sector involved, but also, the needs of constituent groups differ between the majority of the population and the poorest individuals and marginalized communities (Unwin, 2009). Understanding actual needs, as contextualized demands, is important to fully understanding the diversity of stakeholders and the inequality in access and information. Without fully understanding variance in access and needs, inequities are perpetuated, despite efforts to reduce inequality. Social construction of needs and stakeholder groups also shape this process, in terms of determining deservedness (Ingram, Schneider, & Deleon, 2007; Schneider & Ingram, 1993),

and in this sense, full stakeholder evaluation is the best mechanism to counterbalance inequitable and discriminatory construction.

Successful initiatives, over time, have included mechanisms to support continued stakeholder buy-in and cooperation, such as: high-level or influential champions of the initiative; designated project managers; steering committees; strategic orientations; the organization of the initiative into tracks or divisions, which organize activities and objectives; detailed documentation; balanced representation of stakeholders; and monitoring and evaluation (Unwin, 2009). Human support for the initiative is thus social, political, and administrative. Even when the need is real and the policy design matches the context, it is impossible for the policy to have the desired outcome if it is not interpreted, implemented, deployed, or administered in appropriate ways. In this sense, outcomes can diverge from the same initiative after the policy has been written and adopted because further stages of the policy process impact outcomes as well. Theoretical conception of a policy and outcomes in reality are quite distinct.

Coordination mechanisms between stakeholders are also important. For example, the policy coordination process, within the EU institutional context, consists not only of information sharing, program evaluation, and revision, but also coordination for coincidence (Conzelmann, 2014). Initiatives are comprised of many policies, some of which are co-dependent or must be implemented sequentially, making it necessary to coordinate implementation and administration, so that the initiative objectives can be achieved. Without coordination, incompatibilities may arise or non-compliance with certain necessary provisions may lead to failure.

Within government deployed sociotechnical networks, the sequence of implementation, as well as processing of the initiative and surrounding information, matters to outcomes, as does the configuration of administration of the initiative (Blom, 2014). What this implies is that even

when the policies are precisely the same, implementation may yield differences in outcomes, based on contextual interpretation of how to administer the policy or the order in which policies are adopted. Blom drew these conclusions from the deployment of e-government initiatives in the European Union, but the implications are likely transferable to other information and ICT initiatives, particularly within the same context of the EU.

It is based on the evidence that these aspects of initiatives have implications for access outcomes, which leads to the specific subordinate research question: What policy dimensions/prescriptions yield different outcomes in access initiatives (with respect to information inequality as unequal access to information)? These factors shaping the outcomes of access initiatives have many testable implications, which can be generated in context in relationship to actual policy dimensions. Examples will be presented within chapter 5, in the form of hypotheses generated from content assessment of the Information Society initiative to be examined within the proposed research (section 5.3). A summary of factors shaping access initiative outcomes is presented within table 7.

Table 7. Initiative Aspects Influencing Outcomes

Factors	Dimensions
Institutions	• Lack of institutional capacity • Weak or absent legal framework
Sustainability	• Lack of commitment • Low utilization of systems • Change in priorities
Coordination	• Coordination problems between components • Lack of clarity on responsibilities of sponsors • Coordination failure between levels of government • Unwillingness to share information among stakeholders
Interests	• Competing stakeholder interests • Change in priorities • Unwillingness to share information among stakeholders
Finances	• Underfunded • Lack of clarity on responsibilities of sponsors

(Synthesized from: Barrantes, 2007; Blom, 2014; Conzelmann, 2014; Unwin, 2009)

3.3 Implications of Access Initiatives

In addition to the design of initiatives and the contextual factors that lead to differences in implementation, the motivations and long term goals that underlie objectives, such as increased access or reduced inequality, often differ and lead to divergent outcomes. These goals and motivations are strongly associated with values and assumptions about what information and technology can do for society. Many of these beliefs are grounded in the truth of complexity of access and information inequality that has been summarized in chapter 2, yet often understanding of the relationships surrounding information and ICTs are narrowly simplistic. It is for this reason, that sustainability issues often plague initiatives.

In this sense, the implications of access initiatives are very important, not only in illustrating what the outcomes of the initiatives are, but also in revealing whether expectations were met. Unanticipated outcomes often lead to revision or abandonment, and are in many cases the causes of increased inequality. Understanding the underlying assumptions and associating outcomes with assumptions is very informative in explaining initiative success, failure, and outside impacts.

Often initiatives fail to recognize that access is more complex than availability or dissemination (Paul, 2002). In order for public sector communications to effectively impact the population, particularly in support of development, it is necessary for access to be characterized by the following principles:

1. “Access to information … is a critical driver of social and political change”;

2. "The acquisition and use of knowledge is critical to the development process" ;
3. "Improving the content of what is communicated, and including poor people in communication processes are important factors in strengthening service delivery and the accountability of governments, as well as in empowering poor people to make better decisions about their livelihoods and participate in public debate and dialogue";
4. "Participative and accountable policy making requires improved information";
5. "Improved communications is in many countries a pre-condition for peace and reconciliation"; and
6. "Improved communications and information is in many countries a pre-condition for economic growth" (Unwin, 2009, p.47).

These principles importantly reflect the assumptions that underlie policies within access initiatives. They reveal the values and priorities that lead to effort to change access levels or distributions, as well as provide insight into why certain designs may have been selected. For example, concerns about ICTs supporting economic growth could likely lead to market-led approaches for expansion, despite the fact that market-based strategies often increase inequality even if they also raise average access.

Fundamentally, the principles specified by Unwin span ideal social, cultural, economic, and political outcomes that people associate with the benefits of information and technology. Policymakers often look to information and ICTs for positive development benefits, as was discussed with respect to ICT4D in section 2.4. In this sense examining the impact of initiatives on human capital development (e.g. Ávila Montealegre, 2014) or even basic literacy (e.g. Unwin, 2014), in addition to economic growth or changes in economic inequality, reveals the extent to

which the initiative succeeded in producing development benefits, but also whether assumptions about access were challenged and outcomes were expected.

In terms of political goals or priorities, there are a number of general benefits that can be attributed to increased access to public sector information, such as through e-government initiatives, including: efficiency, provision, responsiveness, accountability, and participation (Unwin, 2009). Many information-based initiatives have sought to increase transparency and accountability, as in the European Union's dissemination strategies (e.g. Blom, 2014) or the United States' Open Government Initiative. These efforts increased access without prioritizing economic benefits, and if analyzed with respect to economic outcomes, they would be unlikely to reveal the relationship between information and economic inequalities. In this sense, the underlying values are strongly tied to outcomes, as well as design.

Social responsibility, education, inclusiveness

Differentiation between micro and macro level benefits and objectives are also important because they have significant implications for information inequality, overall. Often priorities are on economic growth or societal level indicators, rather than seeking inclusiveness or to act upon social responsibilities to marginalized or disadvantaged individuals. In this sense, many efforts to increase access increase, or at least maintain, inequality, rather than reducing it. This isn't to say that micro-level initiatives are necessary to reduce inequality, but rather it is rare that the objectives are concerned with factors that would actually reduce inequality within, rather than between nations.

Inequalities in information access have wide implications and individuals can fall in different places on the access distribution depending on the context of information needs, which span economic, social, political and ideological or cultural domains (Unwin, 2009). "ICTs have

the potential either to increase inequalities or to reduce them, depending on the social, political, and economic contexts within which they are introduced." (Unwin, 2009, p.7). In this sense, examining actual outcomes reveals a lot about the factors that contributed and subsequent implications of changes in access and inequality.

4. Methodology

In order to investigate the specified question—What leads to unequal outcomes in information access initiatives?—a study has been designed that employs mixed methods to allow for comparative analysis and contextual detail, while providing a macro-level view of the changing nature of information inequalities. This chapter will present the proposed design, first providing an overview of the expected sequence of work and populations of interest, then discussing each of the three phases of research in detail, and finally discussing possible limitations to and important safeguards in the design to counterbalance concerns.

4.1 An Overview

The research question clearly reflects a desire to identify the mechanism yielding particular policy outcomes, as a generalizable implication. Specifically, the research question also reflects a desire to understand what contributes to successful information access initiatives. Phase one of the proposed research seeks to identify possible independent variables that would lead to differences in outcomes. Through textual analysis of policies and supporting documents, policy dimensions will be identified, looking for common patterns across policies and implementation documents, as well as contextual variation. Phase two will statistically test differences in outcomes based on differences in policy dimensions and implementation strategies across nations and regions within nations. Specific statistical tests to assess these outcomes will include difference in difference analysis and regressions. Fixed effects will also be examined to determine why different or unexpected outcomes may result from seemingly similar policies. Phase three will then examine the impacts of differences in outcomes on economic and political

distributions, with analysis supplemented by qualitative data on policy debates relative to inequalities, in order to test the assumptions underlying policies and the strategies specified within the initiative. The statistical analysis at this stage will employ multi-sample instrumental variable design, using multiple Eurostat data sets.

The European Union provides an excellent, bounded set of cases for comparative analysis. Not only are there many institutional similarities across nations and common institutions shared, but also there are also common initiatives with distinct implementation plans and supplementary initiatives with a wide variety of outcomes, such as the Information Society initiative that will be the focus of this proposed research. Furthermore, documentation and monitoring of these access initiative efforts are extensive, providing data that was systematically gathered and is comparable across national borders. In this sense, the EU is structured in such a way as to make it possible to compare outcomes in a somewhat controlled way. Yet the EU is also interesting in its own right; because the member nations are so diverse and because many less-developed non-member European states that hope to join the EU also adopt these policies, the countries that will be considered in this study are representative of a wide range of development levels.

Interpretation of policies adopted by the EU is complex and inconsistent because of the comitology arrangement, which produces information asymmetries between the commission and member states, legislative and executive branches, elected officials and experts, and organized interests and the public. Stakeholders involved in implementation are informed to very different degrees and this impacts decision-making (Christiansen, 2014). In this sense, polices often yield highly unequal outcomes within the EU.

4.2 Research Design by Phase

As briefly explained in the overview, this research will be conducted in multiple phases, through a multi-method approach. The intent of such a design is to broaden the dimensions considered of a complex problem, in order to gain better understanding of the reality observed (Morse, 2003). Specifically, this work will be a mixed multi-method design, in which quantitative traditions associated with examining the impact of policies are integrated with the qualitative traditions associated with textual policy analysis and social informatics, so as to supplement the weaknesses of each and provide a rigorous and comprehensive project on the whole (Morse, 2003). This design supports both critically and analytically oriented inquiry, in that the first two stages allow for the analytical deconstruction of specific sociotechnical systems (Kling, 1996), while the third stage then allows for a critical turn as implications from the first two stages are compared with other attributes of inequality to challenge policy-makers' assumptions about the ability of ICTs to foster development and reduce inequality, independent of other changes, reflecting the critical orientation of social informatics research with robust empirical support (Kling, 1994; 1996).

Multi-method designs have a number of advantages, including the potential for triangulation, and are considered important for producing reliable results with respect to complex and multidimensional problems, such as in information systems (Mingers, 2003), yet are not particularly popular in social informatics, especially when considering mixed method approaches (Sawyer & Eschenfelder, 2002; Robbin and Day, 2006). Furthermore, there is a dearth of quantitative work in social informatics and the study of information inequality in general. In this sense, there are important implications of the proposed work beyond the theoretical and practical levels. It is the intent of the proposed research to borrow from mixed and multi-method

traditions, to introduce a robust design for further inquiry into the impact of information policies and the status of information access, as well as social informatics as a broad domain.

4.2.1 Phase One: Qualitative Analysis

To initiate this research, it is necessary to understand the variation among policy solutions, as well as policy minutiae regarding access initiatives. Specifically, this allows for detailed qualitative understanding of policies intended to influence access to information and ICTs and the development of hypotheses regarding what policy dimensions, as independent variables, will yield particular outcomes or patterns of outcomes, as dependent variables to be tested during the quantitative second phase of this research project. Examination of policy and implementation documents will allow for the construction of a matrix detailing combinations of initiative components, as well as contextual details about particular initiatives.

In order to conduct qualitative content analysis of key information policies prescribing constraints and limitations on information access, as well as describing access initiatives, as conceived rather than as implemented, a method consistent with Scott and Garrison's parameters for policy analysis and Sharkansky and Hofferbert's recommendations for the identification of policy dimensions was developed. Specifically the physical, social, economic, and political factors that are recognized as impacting each stage of the policy process—origin, development, and implementation—will be considered as key aspects defining particular policy outcomes (Scott & Garrison, 2012). Furthermore, institutional aspects, or structure, of initiatives were further characterized through the employment of the codebook, developed by Barja and Gigler (2007), in order to address specific information and information and communication technology parameters that will impact access outcomes.

The emphasis within the bulk of this analysis is on policy prescriptions, rather than the implementation or objectives alone, because in order to understand why initiative outcomes may be different, it is necessary to understand how policy approaches may differ, in addition to why approaches may differ or how they are interpreted differently. In this sense, qualitative analysis of the policies is necessary to generate hypotheses about access initiative outcomes.

Drawing on these resources to develop a systematic approach, a strategy for qualitative analysis will include coding of policy dimensions at the level of articles, rather than paragraphs or sentences, based on a detailed codebook, presented in appendix 1, which draws on the parameters specified by Ritchie and Spencer (2002) and Barja and Gigler (2007). Coding will be conducted not only by the investigator, but also an outside reader on foundational policy documents, so that inter-rater reliability can be assessed to prevent systematic rater bias by the investigator. This assessment will be done at the policy article level, rather than in terms of averages, to guarantee the highest possible reliability.

Codebook development was supported by previous inquiries that operationalized policy dimensions and that specifically examined policy-driven initiatives that impacted access and ICT capability, as a context specific example of policy dimensions that would be relevant to this inquiry. Looking first at policy components in a general sense, Ritchie and Spencer (2002) provide a useful framework for qualitative content analysis of applied policies. They differentiate between four categories of content, in to which a codebook can be divided: contextual, diagnostic, evaluative, and strategic. They argue that each of these areas for research objectives should be identified, as they determine "potential for actionable outcomes" (Ritchie & Spencer, 2002, p.306). Specifically, contextual aspects of policies identify "the form and nature of what exists" in the applied policy in context and diagnostic aspects define "the reasons for, or causes

of what exists" (Ritchie & Spencer, 2002, p.307), whereas evaluative aspects relate to effectiveness measures of interventions and strategic aspects prescribe interventions.

Previous analysis of ICT access and the relationship between information and civic participation by Barja and Gigler (2007) was also considered in developing the codebook. In their effort to provide a detailed and replicable strategy for the measurement of information poverty, Barja and Gigler (2007) specified factors that contribute to a function of information poverty, including: current status of access, local constraints, technological constraints, and ICT usage constraints. Capability facets and constraints, as may be targeted by access initiatives, as well as can be measured, serve as the variables that produce differences in outcomes and thus can be examined in difference combinations quantitatively, once they are identified and detailed in context. Specific facets of capability and constraints are detailed in the codebook provided in appendix 1.

All in all the policy aspects that will be considered include contextual, diagnostic, evaluative, and strategic orientations, as well as dimensions of status of access, local constraints, technological constraints, and ICT usage constraint. It will also be important to consider the level at which the policy applies, in terms of whether the policy specifies local, regional, or national responsibilities or leaves the level of application up to interpretation by member states. Furthermore, the explicit applicability of the policies to directly impact facets of access—availability, awareness, ability, or infrastructure—will be documented.

From this analysis, differences in interpretations of aspects within countries across policies, as well as across countries, will be identified from implementation documents. Specifically, various concepts that are associated with computerization failures from the social informatics literature will be considered, such as centralization and decentralization of initiative

administration (e.g. King, 1983; King & Kraemer, 1995; Kraemer & King, 1986). These considerations, as preliminarily conceived, are also presented in appendix 1, though this list will likely be supplemented based on differences identified within the content of implementation documents.

Additionally, detailed reading of implementation documents will facilitate descriptive comparisons and contrasts between member states to create a rich understanding of the contexts in which the initiatives are implemented. Complete details of all policies, as well as details of the initial list of implementation documents, considered are presented in appendix 2. This research will include all policies within the Information Society initiative, as well as associated policies referenced within this set, while implementation documents considered will include only those publicly available in English for the identified policies and attributes expected to contribute to differences in outcomes.

4.2.2 Phase Two: Quantitative Analysis

A number of statistical strategies will employed to examine both the impacts and implications of policy directives and associated technological changes on levels of access to information and ICTs in the European Union. Not only will regression discontinuity models and fixed effects be examined, but more complex analysis based on difference in difference, so as to appropriately examine inequality in outcomes across boundaries, and multi-sample instrumental variables, so as to obtain a complete and detailed perspective on the context, will form the basis of arguments made.

The majority of the empirical quantitative data employed for this research has been obtained through Eurostat, though 2015 Oxfam and OECD Inequality Reports will provide

contextual details to classify countries and regions. Specifically, Eurostat microdata is drawn from the European Union Statistics on Income and Living Conditions (EU-SILC) instrument, with particular attention paid to the Income, social exclusion, and living conditions section. The European Union Information Society (EUIS) data from the Employment and Social Policy instruments will also be considered to explore infrastructural coverage, deployment of initiatives, and macro-level indicators of inequality between contexts.

Considerations from two-sample instrumental variable (TSIV) estimates will be necessary in some analyses of implications of access outcomes given that the primary data set only includes data on political and economic implications, distinct from social implications, which are necessary for analysis in phase 3. Thus examination of how changes of access levels, due to policy and technology changes, impact social information behaviors and information needs will require consideration of a second IV. This will be relatively simple, given that data for both sets represents large population size, random samples across the same population, gathered by the same entity at the same time. In this sense, many of the challenges often associated with TSIV can be avoided. Specifically, Dee and Evans (2003), for example, illustrate how to counterbalance concerns about overlooked assumptions between samples, omission bias, and correspondence between sampling frames by restricting data considered to parallel subsamples. Yet these concerns are null. On the other hand, concerns about causality and magnitude of impact and overestimates, indicated by OLS estimates, are significant and can be safeguarded against through the application of their TSIV fixed effects parameters (Dee & Evans, 2003) and the analysis of lags, as will be discussed further in section 4.3.

In order to address differences in outcomes, a variety of statistical tests will be employed in a particular sequence. It will first be necessary to examine the status of inequality and access

within the European Union, particularly with respect to changes over time. Then, models will be constructed to determine what led to particular changes and divergent outcomes.

Regressions, including simple ordinary least squared discontinuities, serve as a useful method to decompose the construction of inequality (Litchfield, 1999) because regression facilitates the development of models over complete distributions (Agresti & Finlay, 2009). When assessing factors independent from an inequality specified, in this case information inequality, regression analyses allow for the determination of how factors contribute to the inequality. In this sense, the first step in assessing the impact of policy dimensions on access outcomes is to regress their contributions. This simple strategy for analysis will also facilitate examination of the implications of changes in action levels (Card, Dobkin, & Maestas, 2008); regression will be performed to assess the impacts of changes in particular dimensions of access on political participation and engagement, economic status, and social participation and engagement.

Status has been assessed as the economic cost (EC) to reach poverty line from current status as a function of minimum capabilities (CAP), local constraints (LC), technological constraints (TC), ICT usage constraints (UC). This is in accordance with the model specified by Barja and Gigler (2007): $EC^j = F(CAP_0^i, LC^j, TC^j, UC^j)$. However, this model will be modified for application within this research, so as to assess the entire distribution, rather than simply the marginalized. As a result, competency of all individuals (AC) will be assessed, using microlevel data, to determine access sufficiency as a function of minimum capabilities, local constraints, technological constraints, ICT usage constraints ($AS^j = F(CAP_0^i, LC^j, TC^j, UC^j)$).

Furthermore, from the complete assessment of dimensions of access and the inequality of distributions within and between countries, a new measure of information inequality will be

proposed. Information inequality in the context of the European Union, which has enormous variation in access across and within nations, will serve as the basis for the introduction of this measure. Eurostat has aggregated significant macro-level and scalable micro-level data that not only reveals these differences but also portrays a comprehensive picture of information inequality at multiple levels of analysis within this context. In this sense, the case of the Information Society initiative is also ideal to develop a new indicator of information inequality that emphasizes variance and distribution. The proposed dissertation would include a generalizable method to measure inequality in terms of spread that is based on emerging indicators in economic inequality (e.g. Hardoon, 2015).

Once status is established, divergent outcomes can be explored. Difference in difference analysis usefully provides a mechanism to explore time series evidence within cross sectional studies (Card & Krueger, 1994). Given that the subject of interest in the proposed study is inequality in outcomes, examination of difference is important. Furthermore, given that differences exist across boundaries and strategies within the European Union, the application of difference in difference analysis is appropriate for the statistical design. In order to estimate a regression using a difference in difference strategy, it is necessary to have data for at least two groups for two time periods (or over time). The model will produce an interpretable estimate of a causal effect under the following assumptions: group differences are time invariant and time trends are group invariant (Card & Krueger, 1994). In other words, we assume that treatment and control groups would have had the same trend without treatments, with their only differences stemming from group differences that remain fixed over time. In this sense, what we examine is difference in difference as function of status of treatment A, change, interaction term, versus

equivalent for treatment B, plus constant, or fixed effects, over time. The variables and coefficients are defined as follows:

$$Y_{st} = \beta_0 + \beta_1 Treat_s + \beta_2 Post_t + \beta_3 (Treat_s \times Post_t) + \epsilon_{st}$$

Y_{st} = Outcome

β_0 = Intercept

β_1 = Difference between treatment and control

$Treat_s$ = Treatment unit

β_2 = Reference group in post

$Post_t$ = Time Period

β_3 = Treatment

$Treat_s x Post_t$ = Interaction term, where excess change is the difference in differences; observations in treatment group after time

ε_{st} = Error

It is also possible to examine this model in terms of a modified fixed effects notation, which makes it possible to scale up individual considerations of context in terms of how they may compare across boundaries in shaping outcomes (Angrist & Pischke, 2009). Specifically, the comparison can be made as follows:

Classical difference in difference model

$$Y_{st} = \beta_0 + \beta_1 Treat_s + \beta_2 Post_t + \beta_3 (Treat_s \times Post_t) + \epsilon_{st}$$

Equivalent two-way fixed effects model

$$Y_{st} = T_{gt}\delta + \theta_g + \theta_t + \epsilon_{st}$$

These notations are equivalents because θ_g and θ_t both include their contributions to the intercepts, as well as their contributions given the treatment and time period, and $T_{gt}\delta$ accounts

for the interaction and coefficient. In other words, T_{gt} = G2 x T2 and $\theta_g = \theta g_1 + \theta g_2 G2$ and $\theta_t = \theta t_1 + \theta t_2 T2$. Essentially, the alternate framework accounts for precisely the same variable contributions as the classical notation, but in a way that self-contains each group or period, which allows for scalability.

This alternate notation makes the assumptions more explicit, namely the same assumptions, that all the variables within the vector θ_g are time invariant and all the variables within the vector θ_t are group invariant. Furthermore, within θ_g and θ_t, all observed and unobserved variables are accounted for, so long as they conform to the invariant assumptions, which support the matching assumption of difference in difference.

Difference-in-difference models are often modified to account for group specific linear trends. This is commonly done through a parallel paths modification. However, a model that includes group specific linear trends that are more dynamic, as parallel growth, can be articulated with the following evaluation:

$$E[Y_t|D] = \delta_0 + \delta_L time_t + \delta_P Post_t + \gamma^D D + \gamma_L^D time_t D + \gamma_P^D Post_t D$$

These modifications, as specified in a working paper by Mora and Reggio (2012) are flexible and do not impose an assumption of equivalence between parallel trends.

Group specific trends might strengthen the case for causal inference in a generalized difference in difference setting because it accounts for within group changes, which occur in reality, in addition to group fixed effects (Murnane & Willet, 2011). The model thus becomes more accurate in reflecting the detail of the system being analyzed. This would remove these trends from the error term and more precisely indicate effects. This would be an improvement in precision, rather than in removing bias.

Overall, this section will facilitate understanding of information inequality as measured within the European Union. Furthermore, it will serve as a model for quantitative social informatics research in mathematically associating aspects of context, including policies and sociotechnical systems, with information access and computerization outcomes.

4.2.3 Phase Three: Mixed-Method Analysis of Implications

Analysis of implications, as in the third phase of the proposed research, will employ mixed method approaches. Quantitative analysis will employ the exploration of correlation and independent causation between facets of access, as policy outcomes, and indicators that are theorized to be impacted by relative levels of access and information inequality, such as economic, political, and social attainment or inequality. These approaches will be consistent with methods described in the section on quantitative analysis.

Qualitative analysis will contextualize and provide detail on these associated characteristics within and between countries through content analysis of policy evaluation documents associated with the Information Society initiative, as well as with state of European Union evaluation as required by institutional structures for transparency. The Information Society initiative requires constant monitoring, not only in the form of regularized, random surveys, from which the data will be gathered to support quantitative analysis in this study, but also in the form of detailed country level reports which put the survey results into context and reveal variation and cases not obviously captured by the quantitative indicators.

This section will importantly illustrate both the significance of access and information inequality on other aspects of society, as well as identify relationships that should be explored

independently in future work. In this sense, this third phase serves to support the construction of a long-term research agenda related to the social, political, and economic implications of information inequality. Yet, perhaps more importantly, it will turn a critical perspective on the assumptions made within the policy process about the social, economic, and political implications of the, then proposed, Information Society initiative. These assumptions will be identified within the first phase when coding for strategic policy objectives.

4.3 Design Aspects Intended to Mitigate Limitations

This design has a number of limitations that can be identified, including the constraints on the statistical inference power of the employed tests in illustrating directional causality and the independence of relationships between access status and particular implications. However both of these concerns can be addressed by modifying the design slightly. By employing time lag considerations through the application of Granger causality testing in applying the proposed difference in difference model, it will be possible to illustrate that changes in policy and technology led to subsequent changes in access, rather than the status of access developing from changes in context alone or changes in policy and technology stemming from changes in context alone, as would include changes in access. Furthermore, through the use of falsification testing, it is possible to illustrate the independence of particular implications and thus to isolate particular aspects of access as they relate to economic, social, and political implications.

Time lags can be usefully applied to illustrate treatment effects over time, thereby illustrating mutually shaping patterns or directionality. Differentiating between leading and lagged variables, as well as illustrating the strength of association when testing the model in both

directions, illustrates Granger-causality, though not, arguably true causality, in a clear way to strengthen arguments (Angrist & Pischke, 2009; Granger, 1969). Granger models are easily applied to modify the models for anticipated treatment effects, as follows:

$$Y_{st} = \gamma_s + \lambda_t + \sum_{\tau=0}^{m} \partial_{-\tau} \mathrm{D}_{s,t-\tau} + \sum_{\tau=0}^{q} \partial_{+\tau} \mathrm{D}_{s,t+\tau} + \mathrm{X}_{ist}^{'}\beta + \epsilon_{st}$$

(Angrist & Pischke, 2009).

Granger causality tests will be applied, as cross-spectral methods can describe causal relationships of two simple variables over time and are particularly useful when "one suspects feedback is occurring" (Granger, 1969, p.428). Furthermore, the tests generally illustrate length of lags in terms of impacts of both endogenous and exogenous changes (Granger, 1969), both of which are relevant in this case. This method of analysis has previously been applied in examining relationships between social and economic development indicators and growth, though it was developed for purely economic analysis (Pradhan, et al., 2013). It has been applied to examine parallel changes over time in areas of progress, concurrent to economic development; for example, examination of whether improvements in human health led to gains in GDP per capita or whether GDP per capita increases led to improved human health is easily facilitated in this manner to provide preliminary insights into hypotheses testing (Chen, Clarke, & Roy, 2013). These applications illustrate its viability in assessing quantitative indicators in multiple domains. Inferences on causality are, however, contentious and simple tests, such as the Grainger test, provide only a suggestion on causality, rather than absolute proof (Morgan & Winship, 2007). While this method may in many general cases be inappropriate, due to its simplicity, it does in this first empirical test support model development, to be tested further in future research.

Ascertaining the appropriate lag length is particularly difficult and significant to determination of Granger causality; without weighting cross-country averages, appropriateness of fit to lag length often differs significantly by country when considering economic variables (Pikkarainen & Viren, 1989). In this sense, multiple lag lengths will be calculated and the differences considered. Furthermore, Granger statistics were originally designed to test bivariate normal data and normal multivariate data sets, yet distributions of inequality often contain non-normal long tails. Statistical analysis of inequality, as "the dispersion of a distribution" (Litchfield, 1999, p.1), is unusual in that outliers and skewed distributions are among the most meaningful aspects in driving inequality, thereby requiring particular measures and tests (Litchfield, 1999). In this sense, a modified Ganger test is more appropriate. The Toda-Yamamoto modifications to the Granger test provide a mechanism for valid Wald statistic computation when y variables are non-stationary or non-linear; this modification is commonly applied so as to facilitate analysis of non-bivariate normal distributions (Toda & Yamamoto, 1995).

Serial correlation is another concerning limitation for difference in difference analysis; however, Bertrand, Duflo, and Mullainathan (2004) provide useful guidelines to avoid pitfalls of this strategy. Depending on the number of groups, applied research can be designed to employ the appropriate standard estimation methods to more accurately evaluate the standard deviation of estimated treatment effects within DinD studies. Block bootstrap, arbitrary and empirical variance-covariance matrices, and collapsing time series, given large, medium, and small numbers of groups, respectively, will prevent underestimation of error (Bertrand, Duflo, & Mullainathan, 2004, p.274).

Falsification testing, as has been employing in other analyses of the impacts of information and technology policies on access outcomes (e.g. Atasoy, 2013), also usefully allows for the isolation of particular hypothesized causal relationships to examine their differences against corresponding changes at that point in time to determine whether the relationship is independent of the other changes. For example, Atasoy (2013) employed this technique to determine whether policies regulating internet service providers impacted competition independently of economic development in particular areas, which also drives changes in service provision. In this case, falsification testing will determine the percentage of changes in status of political, economic, and social indicators that are impacted by access levels that stem from particular policy aspects or dimensions of access through the application of standard dropped dependent variable FLS regression, following the method prescribed by Atasoy (2013).

These modifications, coupled with the mixed method approaches described across phases, will provide a detailed representation of information inequality and efforts to provide more equitable access in the EU. Efforts to counter-balance limitations will provide a more robust design and provide confidence in conclusions.

5. Preliminary Analysis

Thus far, phase one has begun in earnest and preliminary consideration of data collected for phase two has commenced. Specifically, the foundational policy documents have all been examined in detail and coded completely (Current general legal framework), as well as the policies that specify the agenda for late adoption by countries new to the European Union or countries related to the EU but not full members (Enlargement) and those associated with digital strategy. Details of this work will be presented in section 5.1. Additional categories of policies within the Information Society initiative include: Internet, Online activities and ICT standards; Data protection, copyright and related rights; Radiofrequencies; and Interaction of the information society with certain policies.

Eventually, policies evaluated will include all directives issued by the European Union for the Information Society initiative; a complete list of policies is provided in appendix 2. In addition to the foundational pieces of legislation and all supplemental directives, implementation documents will be compared from member states and local regional authorities, in accordance with national institutional structures within nations and policy dimensions that specify levels of application; a list of documents is also available in appendix 2. At this point, initial reading of implementation documents has begun, using Germany as a starting case because the majority of documents are bilingual (German/English) and available, so as to develop the codebook for implementation in a grounded way. A brief discussion of this will be presented in section 5.2.

From this qualitative work, not only will a detailed and rich comparison between strategies be presented, but also hypotheses will be generated to test against quantitative data to determine what differences lead to differences in outcomes. A very preliminary set of hypotheses

is presented in section 5.3, based off of the coding that has already been completed and the framework presented in chapter 3.

Finally, among this preliminary work, some initial assessment of the quantitative data has taken place to affirm that differences in outcomes are taking place within the EU, despite uniform policies within the Information Society initiative. Some summary statistics, illustrating within and between information inequalities in Europe is presented in section 5.4.

This chapter was designed with the intent to illustrate the viability of the proposed research, as well as to present a preliminary picture of the problem. While chapter 4 presented the research design, this chapter begins to lay the terrain of the project in better detail. A proposed timeline to complete this work is presented in table 8.

Table 8. Proposed Research Schedule

Research Components		**Timeline**
Phase 1	Coding Policies	January 2015-June 2015
	Coding Implementation Documents	June 2015-August 2015
	Comparative Analysis	September 2015
Phase 2	General Analysis	February 2015- July 2015
	Statistical Hypothesis Testing	September 2015-October 2015
Phase 3	Statistical Testing of Implications	November 2015
	Comparative Analysis	December 2015-January 2015

5.1 Identification of Policy Dimensions

Framework, Extension, and Strategy policies reveal the conception of the EU's Information Society initiative to comprehensive and progressive. Links between information issues and

education, the economy, social issues, and politics have been identified and are explicit within policy documents. In this sense, the initiative is conceived of as addressing more than issues of information access. Details of policy aspects are summarized in table 9, yet this section will explore the dominant policy aspects and discuss policies that theoretically comply with requirements to adequately address inequality in access.

Table 9. Preliminary Coding Results for EU-level Policies

Policy	Contextual	Diagnostic	Evaluative	Strategic	Current Local Capabilities	Local Constraints	Usage Constraints	Technological Constraints
The Body of European Regulators for Electronic Communications (BEREC)	✓		✓	✓	Experience in Information Exchange; Experience in Ideas Exchange or Communication		Sustainability	
Regulatory framework for electronic communications	✓			✓	Physical Assets; Economic Assets; Experience in Information Exchange		Connectivity; Sustainability	Supply
Authorisation of electronic communications networks and services	✓			✓	Economic Assets; Experience in Information Exchange		Connectivity; Sustainability	Supply
Universal service and users' rights	✓	✓	✓	✓	Human Assets; Social Assets; Economic Assets; Experience in Information Exchange; Experience in Ideas Exchange or Communication	Economic Characteristics; Demographic Characteristics	Connectivity; Content; Training; Sustainability	Demand; Supply
Access to electronic	✓	✓		✓	Physical Assets;	Economic	Connectivity;	Supply

Policy	Contextual	Diagnostic	Evaluative	Strategic	Current Local Capabilities	Local Constraints	Usage Constraints	Technological Constraints
communications networks					Economic Assets; Experience in Information Exchange	Characteristics; Demographic Characteristics; Social Characteristics; Geographic Characteristics	Sustainability	
Data protection in the electronic communications sector	✓	✓		✓	Economic Assets; Experience in Information Exchange; Experience in Ideas Exchange or Communication	Economic Characteristics; Demographic Characteristics; Social Characteristics; Geographic Characteristics	Connectivity; Content; Sustainability	Supply
Selection and authorisation of systems providing mobile satellite services	✓		✓	✓	Physical Assets	Geographic Characteristics	Connectivity; Sustainability	Supply
Radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity	✓			✓	Physical Assets; Economic Assets; Experience in Information Exchange	Geographic Characteristics	Connectivity; Sustainability	Supply
Competition in the markets in telecommunications terminal equipment	✓		✓	✓	Experience in Information Exchange		Connectivity; Sustainability	
Competition in the markets for electronic communications networks and services	✓			✓	Physical Assets; Experience in Information Exchange	Demographic Characteristics; Social Characteristics; Geographic Characteristics	Connectivity; Content; Sustainability	

Policy	Contextual	Diagnostic	Evaluative	Strategic	Current Local Capabilities	Local Constraints	Usage Constraints	Technological Constraints
Enlargement Strategy and Main Challenges 2010-2011	✓	✓	✓	✓	Social Assets; Economic Assets; Experience in Ideas Exchange or Communication	Economic Characteristics; Demographic Characteristics; Social Characteristics; Geographic Characteristics	Connectivity	Supply
Enlargement Strategy and Main Challenges 2011-2012	✓	✓	✓	✓	Physical Assets; Human Assets; Social Assets; Economic Assets; Experience in Information Exchange; Experience in Ideas Exchange or Communication	Economic Characteristics; Demographic Characteristics; Social Characteristics; Geographic Characteristics	Connectivity; Sustainability	Supply
Media literacy in the digital environment	✓	✓	✓	✓	Human Assets; Social Assets; Experience in Information Exchange; Experience in Ideas Exchange or Communication	Economic Characteristics; Demographic Characteristics; Social Characteristics	Training	
Access for rural areas to ICTs	✓	✓	✓	✓	Physical Assets; Human Assets; Social Assets; Economic Assets	Economic Characteristics; Demographic Characteristics; Social Characteristics; Geographic Characteristics	Connectivity; Training	Supply
Boosting competition and encouraging investment in next-generation access electronic communications	✓	✓	✓	✓	Physical Assets; Social Assets; Economic Assets; Experience in Information Exchange	Economic Characteristics; Social Characteristics; Geographic Characteristics	Connectivity; Sustainability	Supply

Policy	Contextual	Diagnostic	Evaluative	Strategic	Current Local Capabilities	Local Constraints	Usage Constraints	Technological Constraints
networks								
ICT and eGovernment: European Action Plan 2011-2015	✓			✓	Human Assets; Social Assets; Economic Assets; Experience in Information Exchange; Experience in Ideas Exchange or Communication		Connectivity; Sustainability	Supply
Next Generation Access Networks (NGA)	✓		✓	✓	Economic Assets; Experience in Information Exchange	Geographic Characteristics	Connectivity; Sustainability	Supply
Broadband: investing in digitally driven growth	✓			✓	Economic Assets		Connectivity; Sustainability	Supply; Demand
Digital Agenda for Europe	✓			✓	Human Assets; Social Assets	Demographic Characteristics; Social Characteristics; Geographic Characteristics	Connectivity; Content; Training; Sustainability	Supply
The IDABC Programme (2005-2009)	✓			✓	Experience in Information Exchange		Connectivity; Sustainability	Supply
i2010: Digital libraries	✓			✓	Human Assets; Economic Assets; Experience in Information Exchange; Experience in Ideas Exchange or Communication		Connectivity; Content	

The context of the Information Society initiative as a whole, as well as of each policy, is well captured within policy text. Contextual codes were applied throughout all policies, though disproportionately within preambles to the policies. A clear vision for the initiative emerges, in which access is rarely the concern in its own right. Instead the EU envisions this initiative as integrating information and ICTs pervasive in contemporary society with government, governance, and political concerns in social and economic domains. The information and ICT needs of the public are well characterized, making the policies within this initiative very needs and stakeholder oriented.

Furthermore, while there has been considerable diagnostic and evaluative analysis within the scholarly literature and among some stakeholders involved in negotiations underlying the initiative, discussion of the factors contributing to needs and evaluation of past successes or failures applied or compensated for in a particularly policy are less often explicitly discussed than context. The minimal discussion of evaluation within policies is problematic given evidence from the literature that many initiatives fail to incorporate lessons from past initiatives (Unwin, 2009), or in this cast past iterations of the same initiative. This is something that must be tested within phase two of this project, to evaluate Unwin's argument.

Strategic orientations of the initiative are almost universally present within the policies examined. Not only are many policies explicitly addressing past failures to more effectively meet objectives, but many policies clearly articulate how they are designed to meet new needs and objectives set by the initiative and in response to public needs and demands.

Current local capabilities—including physical, human, social, and economic assets, as well as information exchange and communication—as assets and behaviors impacting access at a point in time, as well as information and communication capabilities targeted by policies (Barja

& Gigler, 2007), importantly serve as recognition of all the contextual factors that impact access. Efforts to impact the cost, physical availability, preferences, norms surrounding, exchange of, and ability of individuals to use and access information and ICTs are directly important to overcoming inequality in access. Unfortunately, these aspects are more often included in a descriptive, rather than prescriptive way.

Local constraints, as contextually constructed frames differentiating between characteristics of users and user groups (Barja & Gigler, 2007), include economic, demographic, social, and geographic characteristics. These constraints represent the factors impacting users, at the individual and group levels, both in terms of actual impacts and social frames characterizing target groups within policies. However, few policies fully characterize these assets. This facilitates social construction in context at the level of implementation, rather than of design. While this could theoretically better facilitate responsiveness to needs in context, it more likely has significant implications for inequality. Local biases and valuations of deservedness of target populations likely affect interpretation of frames that are provided in policies, as well as in framing implementation in cases where the population in need is not specified or is generally inclusive. While in some local cases marginalized and disadvantaged groups may be characterized as deserving of increased access, existing inequality within nations can be exacerbated as a result of framing and differences in interpretation and social construction will affect inequality between nations.

For example, in Access for Rural Areas to ICTs, groups who serve to benefit from explicit attention include agribusiness, small business, youth, women, the elderly, and those of lower socioeconomic status. The frames for these groups are explicitly defined:

Actors missing the opportunity

Farm businesses

Encouraging the take-up and diffusion of ICT in the agrifood sector as a whole, and for the agricultural business in general, is a key action in rural development. The lack of access to broadband reduces farmers' competitiveness considerably, restricts their options for applying better and innovative farm management, adjusting production patterns to current economic developments, controlling the volume and quality of production, and curtails their knowledge of markets and economic trends, agricultural research and development. It limits their commercial opportunities, prevents the use of advisory services, restricts their contacts with local and national administrations and hinders their participation in the decision-making process. Lack of internet access and e-services could also weaken farmers' stimuli for upgrading their professional skills and reduces the spill-over effects from sharing and exchanging successful professional experience.

Small and medium-sized enterprises and micro-businesses

ICT could act as a catalyst for (small) farm and non-farm businesses, including food industry, to work together, to network and to grow, strengthening in this way their competitiveness. It could positively affect their work performance and labour productivity, and can help farmers fulfill their multi-functional role in rural areas. Economies of scale can be achieved and e-business, e-commerce and e-banking can be more easily carried out.

The promotion of ICT use in the food industry and the creation of infrastructure that to ensure the access of food processors to internet can become important growth factors for the sector leading to increased added value and a better integration between farmers and processors.

Young people

Young people are one of the major drivers behind any ICT development in rural areas. Lack of internet provision isolates them from global events and information flows, and reduces their access to labour markets and the means of developing skills to qualify for well paid quality jobs. Creating access and relevant applications, especially for young people leaving school and entering working life, is essential if they are to be encouraged to stay in rural areas.

Women

More women in rural areas are becoming entrepreneurs and are getting involved in socio-economic activities. Their access to labour markets has to be eased further, and one way of doing this is by providing them with high-speed internet access and raising their digital literacy.

Elderly people and disadvantaged groups

Farmers at the end of their careers, old people and disadvantaged groups in rural areas have specific needs, many of which could be addressed through the supply of accessible and relevant technologies and ICT applications. ICT could ease their access to public services, job opportunities and quality education. (Access for Rural Areas to ICTs, Article 3.2).

While the EU at large characterizes these groups as deserving and important to rural development, it is not clear that all will be perceived as equally deserving or as equally important in different contexts. In the German case, emphasis on implementation seems disproportionately to emphasize youth, the elderly, and business concerns, without much discussion on

disadvantaged groups or women. It can be expected that other contexts will have different values and priorities that will further contribute to inequalities.

Usage constraints are disproportionately the focus of this initiative, where "Structural usage constraints are a group of internal factors of ICT, related to connectivity, content, training, and sustainability" (Barja & Gigler, 2007, p.23). In addition to technological constraints, usage constraints directly address dimensions of access. Of these aspects, sustainability and connectivity are the most prevalent throughout policies, while content and training are less often included within policies. The minimal efforts at addressing training among this preliminary set of policies is concerning because it directly concerns two dimensions of access: ability to use and awareness. Furthermore, this has important implications for demand, which is also infrequently addressed within the initiative, as will be discussed with respect to technological constraints.

Thus far, only four policies have addressed training: Universal Service and Users' Rights, Media Literacy in the Digital Environment, Access for Rural Areas to ICTs, and Digital Agenda for Europe. It will be particularly important to examine the impacts of these policies, as well as their implementation details and compliance levels.

Technological constraints, regarding the supply and demand for technologies, are not addressed in a balanced way, indicating that the initiative's design is not, at least as of yet, sustainable and that successful outcomes of particular policies are likely to be unpredictable. This is expected due to past experiences in Asia and South America, in which supply was manipulated without corresponding changes to demand, which led to lack of use of systems and ICTs provided by initiatives (Unwin, 2009). The imbalance seen within this policy design reflects the same problem; policies are much more concerned with supply of ICTs, information,

and infrastructure than demand. It can be expected that policies that do attempt to balance supply and demand have more successful outcomes.

In terms of addressing access, the initiative, thus far, appears to incorporate policy provisions to address all key dimensions: availability, awareness, ability, and infrastructure. However, some of these dimensions have received considerably more attention and few policies coordinate all aspects. The design of the initiative is broad and reflects a deep understanding of issues of information inequality and access, as well as the implications for political, social, and economic participation and development. Concerns about and lessons from past initiatives seemingly have informed the design, and yet the patchwork of policies that comprise the Information Society initiative still seemingly leave many areas for improvement, at least given preliminary assessment.

An interesting characteristic of the initiative at this stage is that there is a mismatch between policy aspects that theoretically ought to correspond. This is an evident weakness at this stage of analysis. Not only do many policies address supply of ICTs, infrastructure, and information, without addressing demand, as discussed with respect to technological constraints, but also the content of strategic codes rarely matches to the policy aspects that would be expected to most directly address specified goals. For example, the "Digital Agenda for Europe" discusses how ICTs strategically support economic development, both at the macro and micro levels, yet economic aspects of the project, individuals, and communities are not discussed at all in subsequent sections; the policy does not address policy aspects of either economic assets or economic characteristics.

From this preliminary analysis of the initiative, certain hypotheses can be made as to the weaknesses and aspects that will contribute to differences in outcomes, as well as which policies

are likely to be ineffective. Expectations developed will be discussed in section 5.3. It is also important to emphasize that content analysis of the policies within the initiative need to be examined comprehensively before conclusions are fully made about the weaknesses of the initiative, however preliminary concerns include the imbalance between supply and demand manipulations, non-correspondence between co-dependent policy aspects, and a failure to fully specify local constraints and capabilities.

5.2 Analysis of Implementation Strategies

Implementation documents reveal the differences in interpretation, not only between national contexts, but also over time and between policies within the same country. At this preliminary stage, differences in adoption, compliance, and interpretation between countries have not yet been examined, however the case of Germany has been explored to develop expectations about where individual countries may have diverged from the EU level initiative.

Of the 28 member states of the European Union and related states, Germany has above average internet penetration and provides access to government information beyond EU requirements. Germany has supplemented the EU's Information Society initiative with it's own Informationsgesellschaft Deutschland (2006; 2010; 2020) since 2005, with four key action areas including a total of 36 specific national level objectives. Actions specifically include:

1. Improve the legislative and technical framework. A particularly important aspect is the need to facilitate the development and use of services which are based on convergent technology solutions.

2. Accelerate the integration of citizens and government into the information society. To this end, the online services will have to be developed further and used on a wide scale. This in turn will also provide an incentive for the non-ICT-friendly sections of our population to become part of the information society.
3. Create a secure information society. There is room for improvement both in terms of the security of the information society and of individuals within the information society. At the same time, integrated use of ICTs can help strengthen domestic security.
4. Cultivate innovation potential by means of ICT research and boost ICT investments. It is not enough to simply step up R&D activities – the aim is commercial exploitation of the results in Germany.

These action areas highlight multiple important facets about the Germany case, which have implications for expected differences between contexts.

First, security and economic orientations dominate the preferences and values underlying development and interpretation of information society policies in this context. Within their domestic initiative and interpretation of EU policies, German policymakers emphasize efficiency, flexibility, and competitive advantage, thinking about their relationship to the macroeconomy, rather than the impact of the information society on the lives of individuals. The implication here is that priorities will not necessarily relate to access, along social, political, or economic lines, but rather may be oriented toward development and modernization, without considering issues of inequality at all.

Second, social construction will vary from place to place. Based on the prioritization of economic pursuits, business interests shape social construction within domestic level policies and interpretation of EU policies for implementation in Germany. While there are many populations

characterized as deserving in the EU level documents, Germany documents disproportionately emphasize human capital development and strengthening "the skilled labour base" (iD2010 – Information Society Germany 2010: Action Programme by the Federal Government, 2006, p.15), thereby characterizing students and businesses as deserving of investment. Active interpretation of policies directed at these populations is clear based on investments and depth of discussion within documents, while other populations, even when framed as relating to these preferences, such as women in IT, are more passively supported, such as through the awareness raising "Girls' Day - Mädchen-Zukunftstag", rather than actual deployment of resources, as with pool schemes devised to reduce the costs and improve the quality of access to the internet for the elderly as in "Onlinejahr 50plus – Internet verbindet". The implication here is that not all EU level constructions will be interpreted as legitimate or important based on differences in values and preferences across nations, leading to differences in implementation strategies and subsequent outcomes.

Third, German outcomes cannot be expected to coincide perfectly with EU objectives because there is simultaneously another objective impacting outcomes in this context. In this sense, there are more opportunities for policies to be effective and to compliment one another, thereby overcoming limitations of particular strategies. An increased effort is being made in Germany to increase access, as compared to average, which is more likely to lead to positive outcomes and can certainly be expected to lead to different outcomes, as compared to other EU states. Thus, the implication is that nations with supplementary initiatives will diverge from general EU trends, in terms of changes in access.

The complexity of such a design, in which different levels of government have compatible, yet distinct initiatives operationalized through many separate, thought

interdependent policies, has other important implications. For example, a fourth issue would be that of coordination efforts between policies, which becomes more complex given the possibility of coordinate across initiatives. Germany does coordinate implementation of policies, both within and across initiatives, creating documents that integrate and synthesize policies to create cohesive sociotechnical systems between people, ICTs, and information, in particular contexts, such as education, business, and civil society. While this simplifies the complexity possible from the dual initiative system, it may oversimplify in some aspects, but omitting provisions that conflict with other aspects of initiatives or the streamlined design. The implication here is that not only will differences in terms of coordination and non-coordination yield differences in outcomes, but also coordination designs will produce differences in outcomes.

Fifth would be issues of centralization and decentralization in implementation of policies. Within Germany's coordinated strategy for implementation of their domestic and the EU level initiatives, different policies are actually implemented in different ways. Despite the centralized interpretation of policies, many responsibilities are delegated to local levels, leading to further interpretation in semi-independent ways, which produces regional variation in outcomes. For example, the series of rural development policies are implemented locally, in contrast to efforts for the elderly and disabled that are centralized, leading to sharp differences in compliance and subsequent access. The implication is that the level of implementation, which differs by policy and by country, matters to outcomes in terms of consistent adoption, compliance, and context-sensitivity. There are advantages and disadvantages to both centralized and decentralized designs, which contributes to different choices made in application.

Expectations overall, based on this preliminary analysis, are that constraints in each national context will contribute variation in implementation strategies, creating a complex

system in which outcomes are highly diverse. In this sense, not only does the initial status of access matter to differences in outcomes, but implementation contributes to differences in outcomes for efforts to impact information inequality.

5.3 Preliminary Hypotheses

From these preliminary analyses and through the filter of the general set of expectations established within the framework from previous literature, it is possible to specify what differences likely contribute to the variety of differences in outcomes from the Information Society initiative. The hypotheses specified within this subsection and developed from phase one of this research will be tested in phase two of the proposed research design.

Based on the literature and variation within policy prescriptions for program and service administration, as well as implementation documents within the German case alone, there are very different preferences for centralization and decentralization of implementation by policy and by context. The literature tells us that these differences in policy design have significant impacts (King, 1983; King & Kraemer, 1995; Kraemer & King, 1986). It can therefore by hypothesized that:

H1: Centralization of implementation impacts effectiveness and consistency of policy outcomes.

Centralized administration will yield administration of the initiative in a way that is most consistent with intent, however it will not yield more equal outcomes within the nation because consistent application will not be successful in all contexts, particularly in those that are more disadvantaged. This is despite the expectation that centralized administration would provide the

opposite result with respect to inequality as decentralized approaches. Decentralized administration will yield more context specific and likely effective mechanisms for increasing access through the initiative, but it will also create highly unequal outcomes given the opportunities for differences in interpretation and variation in political preferences, social norms, and economic resources.

In this sense, hybrid approaches overcome the drawbacks to each approach most sensibly, yet there are very few attempts to do this. One notable exception is the policy "Access for rural areas to ICTs", which stipulates that there should be national coordination of local efforts to address rural access issues, grounded in concerns about rural poverty and literacy. Because of the hybrid design, it can be expected that this policy will more effectively impact the EU, than others that address geographic inequality of ICT access. This can be tested by looking at time series data to determine whether other policies that were initiated before this has as much of an impact on data instruments that reflect the same policy aspects, such as, for example, "i2010: Digital libraries" and "Competition in the markets for electronic communications networks and services".

A related, yet distinct, issue that may lead to differences in outcomes is the coordination of implementation and administration of policies within the initiative. In this sense, it not only matters how coordinated implementation of a single policy is, in terms of centralized or hybrid versus centralized (non-coordinated) implementation, but also how coordinated implementation of all policies supporting the initiative is. It is expected that:

H2: Coordination of implementation impacts effectiveness and consistency of policy outcomes.

Not all policies address all aspects of access or all relevant policy aspects and, thus, it is necessary for all policies to be fully and consistently implemented to achieve desired impacts on access. When implementation efforts are unequal for different policies, the impact of changes on certain aspects of access will be unequal, leading to ineffective policies within certain countries.

Furthermore, coordination at the international level is also significant. Some policies within the initiative came with detailed implementation plans to guarantee consistent interpretation across nations. While consistency within nations is theoretically beneficial to efforts to increase access through policies, it is not clear that the implication would be the same between nations. It is possible that consistent interpretation across nations would actually lead to divergent outcomes, rather than converging levels of access, because it would not be context specific. In this sense, it can be expected EU-level implementation strategies will contribute to greater between country information inequalities.

Another aspect of implementation at the initiative level, as opposed to the level of individual policies, is that of sequence. Between countries, there are significant differences in the order in which initiative policies were adopted. Specifically:

H3: The order of implementation impacts outcomes.

As with coordination concerns, the fact that all policies do not address all aspects of access indicates that there are interdependencies between the policies within this initiative. If policies are implemented before others, on which they are dependent, there may be failures or inefficiencies.

A significant difference in order, which is immediately obvious from the policies categorized within Extension, is the divide between late adopters and EU member states that complied with implementation requirements when the policies were initially passed. While late

adopting states, such as Croatia and Kosovo, had low levels of access to begin with in comparison to other EU states, indicating more severe problems to overcome, they are, perhaps counter-intuitively, at an advantage in implementation because it is simultaneous. It can be expected that the initiative as a whole had the greatest impact on late adopters, in part because of sequence.

Sequence is also important in other ways. First, the revision process within the initiative and emphasis among evaluative sections of policies on identifying failures and improving the initiative does indicate that the EU adopted some policies in a non-ideal order. Second, the issue of non-compliance with policies also creates differences in sequences between countries that can be expected to lead to differences in outcomes, beyond any differences in interpretation. In order to test this expectation, looking specifically at policies with EU-level implementation strategies that did not have full compliance at the onset may reveal if this expected impact is real.

Consistency, or inconsistency, in interpretation, which is at the heart of the issues associated with each of the three initial hypotheses, is also critical to the actual content associated with addressing inequality. Key to interpretation is social construction of the populations and problems targeted by the policies (Ingram, Schneider, & Deleon, 2007; Schneider & Ingram, 1993). The distinction that is made between deserving and undeserving social groups in particular contexts leads to differences in interpretation in policies addressing inequality. As a result, in contexts where information-disadvantaged populations are perceived to be deserving, interpretation and implementation take on more active forms than in contexts where they are perceived to be undeserving or not a priority. Therefore, it can be hypothesized that:

H4: Passive interpretation will not decrease inequality, whereas active interpretation will decrease information inequality.

Details associated with local constraints serve as the explicit frames of the populations targeted by specific polices, when the focus is not on Europeans at large. The coincidence of these frames with concerns in different nations is expected to yield differences in interpretations about the legitimacy of needs and policies, which is likely to correspond with efforts at implementation. In cases where the target group is social constructed as undeserving, passive implementation or possible non-compliance will likely not decrease inequality, at best, or, at worst, exacerbate inequality. Active implementation is much more likely to reduce information inequality.

The content of policies, in terms of the aspects addressed and irrespective of any interpretation for implementation, also can lead to differences in outcomes, despite the fact that aspects present would be equally applicable to all member states and subordinate regions and communities. Specifically, when aspects that are co-dependent in terms of increasing access are not jointly addressed, inequalities between countries will be exacerbated as policies are likely to fail in the places where the absent aspect is not well addressed and are likely to succeed, thereby reducing within inequality and increasing access, in places that were already better addressing issues of access. Two specific hypotheses can be posed illustrating different instances of this exacerbation problem:

H5: Supply and demand must be addressed conjointly to create a sustainable increase in access.

H6: ICT diffusion policies that do not increase infrastructure will not have significant impacts on access levels.

Both will be discussed independently.

With respect to hypothesis 5, and as discussed in section 5.1, it is necessary to balance supply and demand, yet many policies do not simultaneously address both. This is problematic because in countries with reasonable levels of access, increasing supply and manipulating it's cost and reliability will generally increase access, while in countries and even communities in which access is low, increased supply will not necessarily increase demand. There are individuals that choose not to participate (Chatman, 1991; 1996) and those that are unaware (Britz, 2004; Haider & Bawden, 2007; Yu, 2006; 2011); demand will not automatically increase. This division will exacerbate inequalities.

With respect to hypothesis 6, access cannot be increased through availability alone. All dimensions of access are important. Infrastructure to support access is particularly important because even when all of the other factors are manipulated and despite variation in levels of access across the population, infrastructure matters to everyone's access. Infrastructure must precede any possible uses of information and ICT, making infrastructure necessarily a precursor or a simultaneous requirement to impact access levels. Policies that omit infrastructure are likely to exacerbate information inequality by increasing access in only the places with reliable infrastructure, while policies that establish infrastructure standards are likely to decrease information inequality by supporting access universally.

Finally, given the level of analysis to preliminary results at this stage, it is necessary to emphasize the importance of evaluation and monitoring. Given the extensive data collection practices associated with the initiative and explicit discussion of compliance concerns in a variety of policies (e.g. Enlargement Strategy and Main Challenges 2010-2011; Competition in the Markets for Electronic Communications Networks and Services), monitoring is clearly a

priority. However, evaluation is mentioned explicitly in only three policies of the set that have been examined at this preliminary stage: The IDABC Programme, Media Literacy in the Digital Environment, and Enlargement Strategy and Main Challenges 2011-2012.

It can be hypothesized that:

H7: Policies with evaluation aspects will have greater increase in access levels.

This is a logical expectation because past research into access initiatives emphasize the importance of evaluation and revision to create a sustainable and effective strategy (Unwin, 2009).

While it is likely that more hypotheses will emerge as analysis of the policies and implementation documents continues, this set of expectations represents the complexity of access and information inequality, given a critical social informatics orientation. A summary of propositions, including subordinate hypotheses, is presented in table 10. These hypotheses will be empirically evaluated against the detailed data set collected through the monitoring efforts of the EU with respect to the Information Society initiative.

Table 10. Preliminary Hypotheses

Hypotheses	
1	**Centralization of implementation impacts effectiveness and consistency of policy outcomes.**
1a	Centralization increases consistency and decreases effectiveness.
1b	Decentralization increases effectiveness and decreases consistency.
1c	Hybrid implementation, with centralized interpretation and support with decentralized deployment and administration, increases consistency and effectiveness.
2	**Coordination of implementation impacts effectiveness and consistency of policy outcomes.**
2a	Coordinating implementation across policies within countries will increase effectiveness.
2b	Coordinating implementation of individual or multiple policies across countries will increase consistency and decrease effectiveness.
3	**The order of implementation impacts outcomes.**
3a	Simultaneous adoption of many policies in late adopting countries will lead to greater increases in access than implementing policies in the sequence they were passed.
3b	Adoption of policies in a revised order will increase effectiveness.

3c	Non-compliance with one or more policies will decrease the effectiveness of other policies within the initiative.
4	**Passive interpretation will not decrease inequality, whereas active interpretation will decrease information inequality.**
5	**Supply and demand must be addressed conjointly to create a sustainable increase in access.**
5a	Addressing demand alone will not produce sustainable increases in access.
5b	Addressing supply alone will create unsustainable increases in access.
5c	Addressing supply or demand independently will increase inequality in access.
6	**ICT diffusion policies that do not increase infrastructure will not have significant impacts on access levels.**
6a	Infrastructure must precede ICT diffusion to increase access levels.
6b	Policies with infrastructure provisions will decrease information inequality.
6c	Policies without infrastructure provisions will increase inequality in access.
7	**Policies with evaluation aspects will have greater increase in access levels.**
7a	Evaluation and revision will produce sustainable increases in access.
7b	Policies without evaluation provisions will lead only to short term gains in access.

5.4 Indicators of Information Access and Inequality

In addition to this qualitative content analysis, the quantitative data has been explored to develop a sense of the degree of difference in access levels and information inequality presented with in the EU. Not only will this data be employed to assess the impact of policies, but it will also be used to develop an indicator of information inequality based on distribution and variance, rather than simply representing the proportion of the population that is disadvantaged. At this preliminary stage, the data presented in this section is included to illustrate the variation across the EU.

To obtain an initial look at distribution of access, table 11 shows the percentage of the population using the internet in 2004, as the first benchmark year for review of the Information Society initiative, which was defined in 1999, and in 2014. Use of the internet was characterized as having access in any context to use the internet within the past 3 months. Over ten years, gains in access have been made, many of which have nothing to do with the initiative, but rather stem

from technological innovation or other changes over time that impact availability or awareness dimensions of access. However, it is likely that the initiative had some impact, such as in improving infrastructure to support demands, regulating internet service providers, and addressing other dimensions, such as ability to use information.

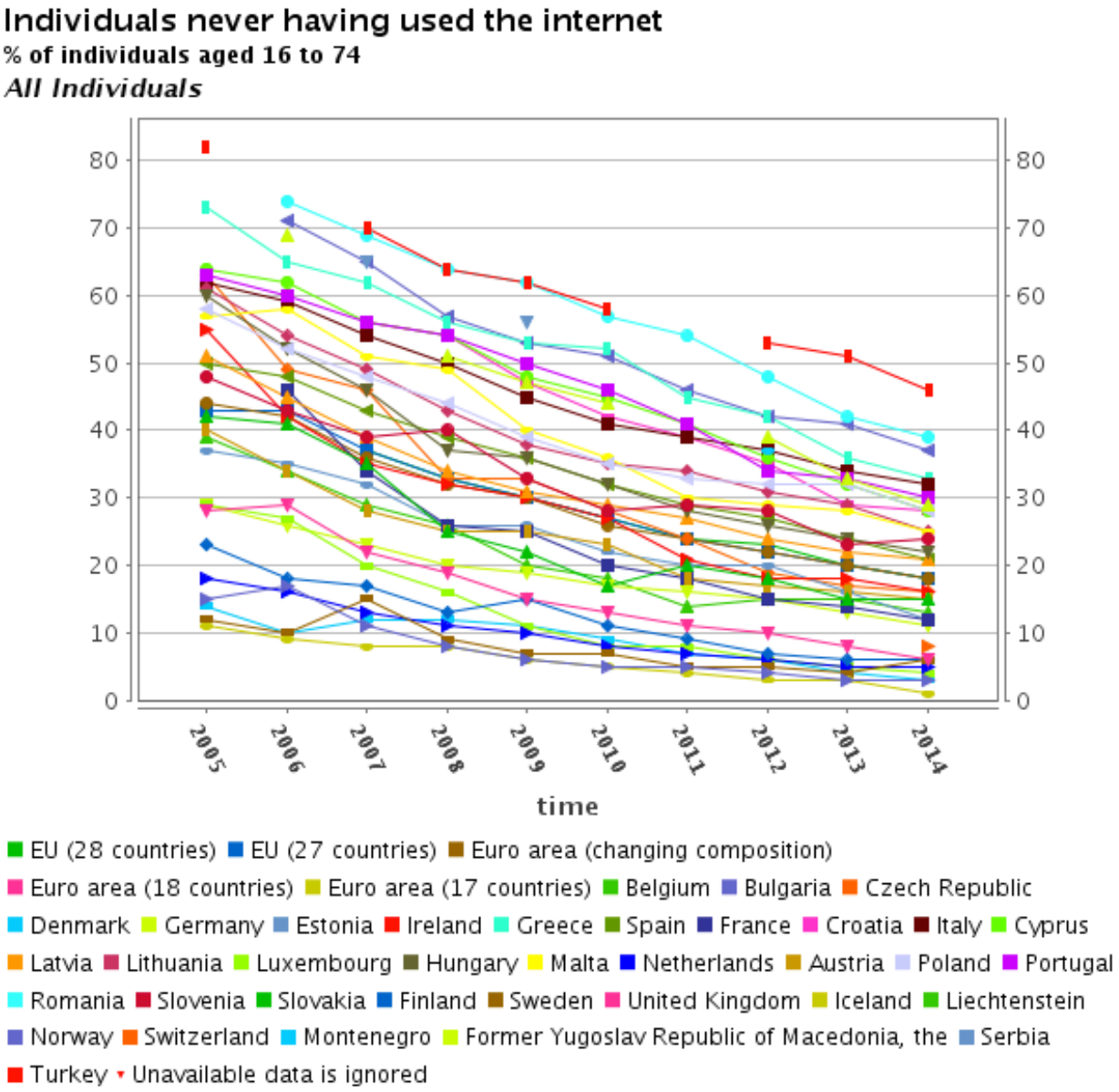
Table 11. Internet Use in the European Union

	% of Population Using the Internet (2004)	% of Population Using the Internet (2014)
MEMBER STATES	45	78
Austria	52	81
Belgium		85
Bulgaria	16	55
Croatia		69
Cyprus	32	69
Czech Republic	32	80
Denmark	76	96
Estonia	50	84
Finland	70	92
France		84
Germany	61	86
Greece	20	63
Hungary	28	76
Ireland	34	80
Italy	31	62
Latvia	33	76
Lithuania	29	72
Luxembourg	65	95
Malta		73
Netherlands	69	93
Poland	29	67
Portugal	29	67
Romania	12	54
Slovakia	46	80
Slovenia	37	72
Spain	40	76
Sweden	82	93
United Kingdom	63	92

The differences in gains in access over time are interesting and will hopefully be explained through further analysis of this data set. For example, why do Cyprus and the Czech Republic have such different levels of access now, when their initial levels of use were equal, while Poland and Portugal have had equal gains from equal starting points over time? Furthermore, in looking at more detailed time series data, why do some countries seemingly reach a ceiling in terms of the population using the internet? Why is access stagnant in some contexts, despite initiatives to change access that are succeeding in other contexts?

Part of the population of non-users may be explained by the proportion of the population who do not want to use the internet, while still other may not have the literacy levels or awareness to use it, or else may be restricted by other social, economic, or political constraints. Figure 3 depicts the gradual reduction over time of the group of individuals who have never used the internet, yet this data does not explain why there are non-users. While some of the increase in use over time reflects normal uptake of new technology over time, intentional efforts to reduce the group of non-users may also have had an impact.

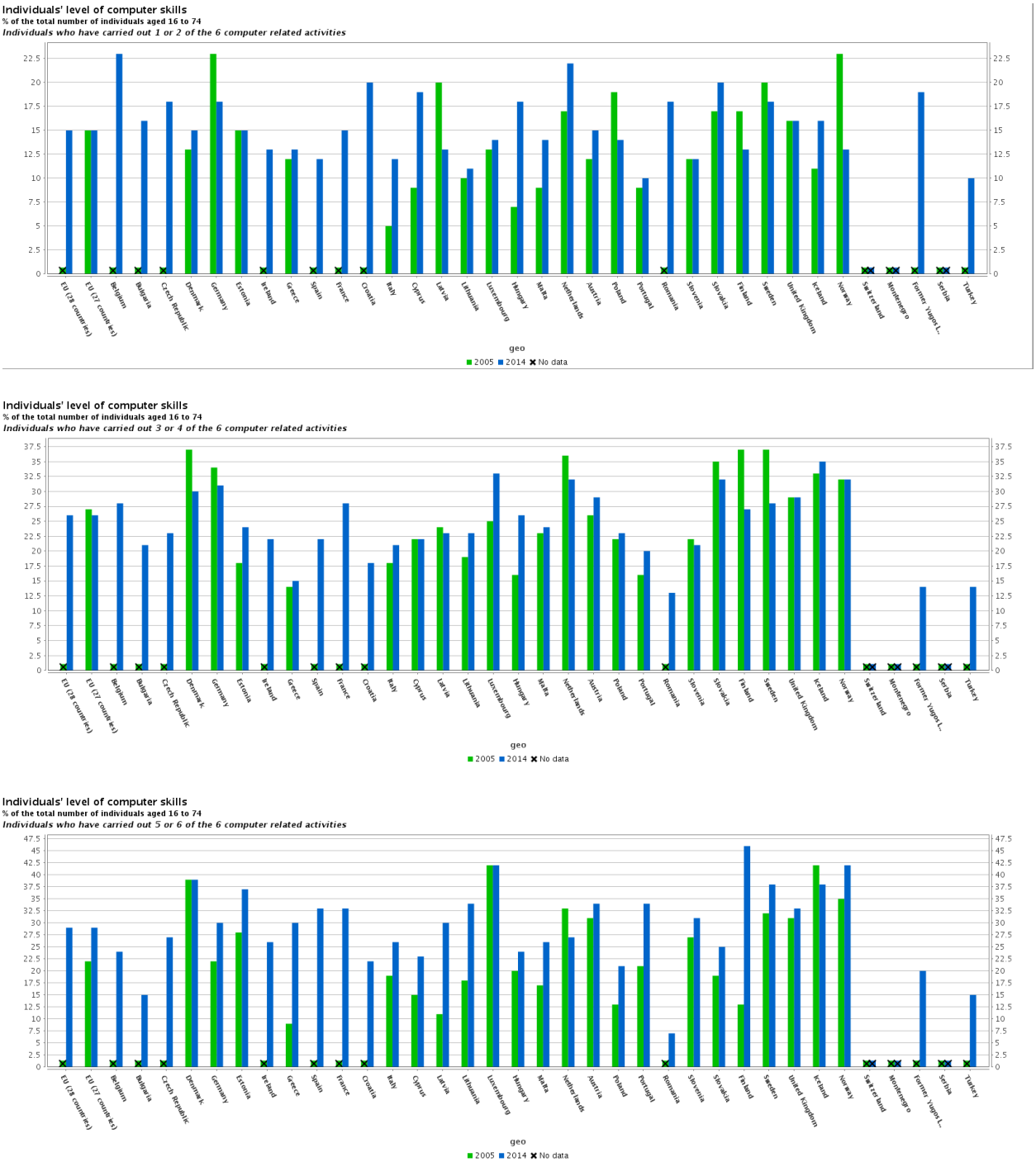
Figure 3. Individuals Never Using the Internet in the European Union



Provisions to increase information and digital literacy have been included in a variety of policies. As a part of the information society initiative, assessment of information literacy is also conducted with six key information and computing tasks on which individuals' skills are assessed. Low skills are characterized by the ability to complete 2 or fewer tasks, medium by 3 to 4 tasks, and high by 5 to 6 tasks. This usefully illustrates the initiative's emphasis on dimensions of access beyond availability and use. Figure 4 presents the changes in computer

literacy over time, with increases in levels of literacy as some countries improve in all categories and others progress further to reduce those with only low levels of skills as greater percentages of the population move on to more advanced categories.

Figure 4. Individuals' Computer Literacy in the European Union



In this preliminary look at the data collected through the monitoring component of the Information Society Initiative, it is clear that differences are significant across the European Union. This is at least in part explained by differences in context over time, but also can likely be explained by the differences in impact of the initiative, due to contextual and implementation variables. The extent to which particular policies led to changes and the extent to which objectives were obtained can be explored with respect to this variation in great depth by comparing: differences in implementation strategies, complying and non-complying nations, late adopters and other member states, and states with supplementary initiatives to those without. This analysis will allow for identification of factors producing differences in outcomes, which will support the development of improved access initiatives, as well as providing theoretical contributions about information inequality and the interactions between policy and technology.

6. Conclusions

Information inequality, as a concept, represents unequal distributions in information access and infrastructure, as they impact use and the potential to use socially and politically important information. Constraints on access and infrastructure produce unequal distributions of information. Information inequality is relative and context dependent, in that distributions vary by context, as do implications. In this sense, information inequality is a product of complex and highly unequal social, economic, and political contexts, and information inequality contributes to these distributions as information has social, economic, and political connotations.

Policies constrain and support access to information by formalizing terms of use, conditions of availability, and other factors that are intrinsic to the potential to use information, such as awareness and ability, through education and setting conditions which may require skills or knowledge. Information policies prescribe who can access and use information, how and when information can be used, and what information can be accessed or used. Because policies differentiate between users in ways that are context dependent, similar policies may in fact yield differences in access, as do different policy constraints on information. Thus there is sociopolitical shaping of information inequality, as well as sociopolitical consequences.

ICTs also constrain access to information. This is in some ways a product of policy, in that policies often establish information access through particular information technologies, which themselves may not be equally accessible. More significantly, the complex implications of ICTs that support information access produce unequal outcomes explicitly because of embedded values within their design and implementation. ICTs often support the status quo and in highly unequal society this systematically increases disadvantage by preventing those who likely most need public sector or socially important information from getting the resources that they need, or

in other words by decreasing opportunity. Sociotechnical shaping and consequences of information inequality are significant.

Understanding information inequality is important because it is a concept with significant social, policy, and research implications. Information inequality is somewhat entrenched and is often assumed to be irrevocable, and therefore not worth attention, or non-problematic, as inequality is naturally occurring. However, these are limited interpretations of the problem. Information asymmetries are too often accepted because they are innate to interactions and decision-making at both the individual and the organizational levels, yet asymmetries in some types of information are actually problematic, such as public sector information. To participate fully in society, it is necessary that a certain level of information access be provided, as civic, political, and economic participation require information.

As a result of these concerns, as well as the tendency for policymakers' optimism surrounding ICTs' potential impact on social and economic development, various efforts have been made to address information inequality through policy initiatives directed at access. Efforts by the European Union have been particularly extensive. The EU's Information Society initiative, comprised of dozens of policies, is also interesting because of the diverse outcomes associated with the programs and regulations it has initiated. Specifically, while some EU member states have seen dramatic improvements in information access, other nations have struggled to impact access and to comply with the initiative. Furthermore, as the EU has grown over time, new members have become late adopters of the policies, implementing the initiative a whole, rather than incrementally and in sequence as the initial members did. In this sense, the EU's Information Society initiative provides an excellent set of cases to understand the impact of

policy efforts to address inequality in information access, as well as to understand what specific aspects of context, interpretation, and implementation, lead to distinct outcomes.

The proposed study thus takes on a three-phase design. First, qualitative content analysis provides the rich detail necessary to understand each case and to develop hypotheses based on policy dimensions as to what aspects of initiatives differ and may lead to different or unexpected outcomes. This phase draws on both a long tradition of information policy analysis and is consistent with past efforts to understand information access initiatives and information inequalities in context by employing qualitative analysis. The second phase provides a more striking departure from both information inequality research and social information research by employing statistical analysis to test differences in outcomes based on policy dimensions and to understand differences in initiative outcomes comparatively. The final phase of the proposed research employs both qualitative interpretation and quantitative assessment of the differences in impacts of access initiatives, examining political and economic implications of changes in access distributions.

Implications of this research will be theoretical, practical, and methodological. Theoretically, the proposed research will better elucidate the concept of information inequality, by identifying differences between places in adopting the same initiative designed to address it. This will not only illustrate how contextual information inequality is, but also why is persists and is even exacerbated by policies and technologies. Practically, this study will address the institutionalization of sociotechnical systems, providing a more detailed understanding of how values and interests are embedded in the political and sociotechnical design of information systems that can be leveraged to design more inclusive and equitable information policies and systems. Methodologically, this will represent an attempt at macro level, quantitative social

informatics research. Finally, this research is novel in that it will provide a new indicator for information inequality and a generalizable method to measure inequality in terms of spread or variance.

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Appendix 1

Codebook for policies

Code	Definition	Examples
Contextual	"identifying the form and nature of what exists e.g. What are the dimensions of attitudes or perceptions that are held? What is the nature of people's experiences? What needs does the population of the study have? What elements operate within a system?" (Ritchie & Spencer, 2002, p.307)	"Convergence between different electronic communications networks and services and their technologies requires the establishment of an authorisation system covering all comparable services in a similar way regardless of the technologies used" (**Authorisation of electronic communications networks and services, Preamble**)
Diagnostic	"examining the reasons for, or causes of, what exists e.g. What factors underlie particular attitudes or perceptions? Why are decisions or actions taken or not taken? Why do particular needs arise? Why are services or programmes not being used?" (Ritchie & Spencer, 2002, p.307)	"In markets where there continue to be large differences in negotiating power between undertakings, and where some undertakings rely on infrastructure provided by others for delivery of their services, it is appropriate to establish a framework to ensure that the market functions effectively. National regulatory authorities should have the power to secure, where commercial negotiation fails, adequate access and interconnection and interoperability of services in the interest of end-users. In particular, they may ensure end-to-end connectivity by imposing proportionate obligations on undertakings that control access to end-users. Control

Code	Definition	Examples
		of means of access may entail ownership or control of the physical link to the end-user (either fixed or mobile), and/or the ability to change or withdraw the national number or numbers needed to access an end-user's network termination point. This would be the case for example if network operators were to restrict unreasonably end-user choice for access to Internet portals and services." (Access to electronic communications networks, Preamble)
Evaluative	"appraising the effectiveness of what exists e.g. How are objectives achieved? What affects the successful delivery of programmes or services? How do experiences affect subsequent behaviors? What barriers exist to the systems operating?" (Ritchie & Spencer, 2002, p.307)	"Directory information and a directory enquiry service constitute an essential access tool for publicly available telephone services and form part of the universal service obligation. Users and consumers desire comprehensive directories and a directory enquiry service covering all listed telephone subscribers and their numbers (including fixed and mobile numbers) and want this information to be presented in a non-preferential fashion. Directive 97/66/EC of the European Parliament and of the Council of 15 December 1997 concerning the processing of personal data and the protection of privacy in the telecommunications sector(5) ensures the subscribers' right to privacy

Code	Definition	Examples
		with regard to the inclusion of their personal information in a public directory." (Universal service and users' rights, Preamble)
Strategic	"identifying new theories, policies, plans or actions e.g. What types of services are required to meet needs? What actions are needed to make programmes or services more effective? How can systems be improved? What strategies are required to overcome newly defined problems?" (Ritchie & Spencer, 2002, p.307)	"The introduction of new systems providing mobile satellite services (MSS) would contribute to the development of the internal market and enhance competition by increasing the availability of pan-European services and end-to-end connectivity as well as encouraging efficient investment. MSS constitute an innovative alternative platform for various types of pan-European telecommunications and broadcasting/multicasting services, regardless of the location of end users, such as high-speed Internet/intranet access, mobile multimedia and public protection and disaster relief. MSS could, in particular, improve coverage of rural areas in the Community, thus bridging the digital divide in terms of geography, strengthening cultural diversity and media pluralism and simultaneously contributing to the competitiveness of European information and communication technology industries in line with the objectives of the renewed Lisbon strategy. Directive

Code	Definition	Examples
		89/552/EEC of 3 October 1989 of the European Parliament and of the Council on the coordination of certain provisions laid down by law, regulation or administrative action in Member States concerning the provision of audiovisual media services (Audiovisual Media Services Directive) (5) should apply, as appropriate, to audiovisual media services transmitted using MSS systems." (Selection and authorisation of systems providing mobile satellite services, Preamble)
Current Local Capabilities	Assets and behaviors impacting access at a point in time; includes all information and/or communication capabilities targeted by policies (Barja & Gigler, 2007)	
Information and/or Communication Capability Targeted: Physical Assets	Efforts to affect distributions of technology and technology infrastructure (Barja & Gigler, 2007)	"complementary ground components shall constitute an integral part of a mobile satellite system and shall be controlled by the satellite resource and network management mechanism; they shall use the same direction of transmission and the same portions of frequency bands as the associated satellite components and shall not increase the spectrum requirement of the associated mobile satellite system" (Selection and authorisation of systems providing mobile satellite

Code	Definition	Examples
		services, Article 8)
Information and/or Communication Capability Targeted: Human Assets	Efforts to affect information or ICT literacy (Barja & Gigler, 2007)	"Media literacy should be addressed in different ways at different levels. The modalities of inclusion of media literacy in school curricula at all levels are the Member States' primary responsibility. The role played by local authorities is also very important since they are close to the citizens and support initiatives in the non-formal education sector. Civil society should also make an active contribution to promoting media literacy in a bottom-up manner." (Media literacy for the digital environment, Preamble)
Information and/or Communication Capability Targeted: Social Assets	Efforts to affect social-informational networks, information exchanges, participation, or awareness (Barja & Gigler, 2007)	"The Media Industry increases its commitment to provide with the necessary tools to improve their level of media literacy by: 1. systematically spreading knowledge through information campaigns on how information and creative content are produced, edited and distributed in the digital world, including on how search engines work and how to better use them; 2. providing citizens with clear, user-friendly information, by organising awareness-raising campaigns, about techniques used for commercial

Code	Definition	Examples
		communication purpose, notably about product placement, online advertising, and with means to better identify the boundaries between marketing and content; 3. providing citizens with information, creating information packs especially aimed at young people, on how their personal data are processed in the context of tailored offers, notably interactive advertising, in the full respect of existing legal provisions; 4. actively informing citizens by organising information days, of how the creative economy works, including the role of copyright in that respect." (Media literacy for the digital environment, II)
Information and/or Communication Capability Targeted: Economic Assets	Efforts to affect costs of production, support, access, and use of information networks and ICTs (Barja & Gigler, 2007)	"Any administrative charges imposed on undertakings providing a service or a network under the general authorisation or to whom a right of use has been granted shall: … (b) be imposed upon the individual undertakings in an objective, transparent and proportionate manner which minimises additional administrative costs and attendant charges"

Code	Definition	Examples
		(**Authorisation of electronic communications networks and services, Article 12)**
Information and/or Communication Capability Targeted: Experience in Information Exchange	Efforts to impact participation in political, institutional, productive, social, or educational information exchange, including publishing (Barja & Gigler, 2007)	"The digital libraries initiative aims at making European information resources easier and more interesting to use in an online environment. It builds on Europe's rich heritage combining multicultural and multilingual environments with technological advances and new business models. Digital libraries are organised collections of digital content made available to the public. They can consist of material that has been digitised, such as digital copies of books and other 'physical' material from libraries and archives. Alternatively, they can be based on information originally produced in digital format. This is increasingly the case in the area of scientific information, where digital publications and enormous quantities of information are stored in digital repositories. Both aspects – digitised and born digital material – are covered by this initiative." (i2010: Digital Libraries, Section 2)
Information and/or Communication Capability Targeted: Experience in Ideas Exchange or	Efforts to impact participation in or incentives for support of exchange or communication	"The availability of innovative technologies such as social networks has increased the expectations

Code	Definition	Examples
Communication	grounds, local or civic knowledge preservation or publicity (Barja & Gigler, 2007)	of citizens in terms of responsiveness when accessing all kinds of services on line. However, cross-border eGovernment services are few and, even where eGovernment services are offered, the majority of EU citizens are reluctant to use them[8]. There is clearly a need to move towards a more open model of design, production and delivery of online services, taking advantage of the possibility offered by collaboration between citizens, entrepreneurs and civil society. The combination of new technologies, open specifications, innovative architectures and the availability of public sector information can deliver greater value to citizens with fewer resources." (ICT and eGovernment: European Action Plan 2011-2015, Preamble)
Local Constraints	Local structural constraints include the frames employed to differentiate between characteristics of users (Barja & Gigler, 2007)	
Social Construction of Target Group: Economic Characteristics	Characterization of population in need based on economic factors (Barja & Gigler, 2007)	"Affordable price means a price defined by Member States at national level in the light of specific national conditions, and may involve setting common tariffs irrespective of location or special tariff options to deal with the needs of low-

Code	Definition	Examples
		income users. Affordability for individual consumers is related to their ability to monitor and control their expenditure." (Universal service and users' rights, Preamble)
Social Construction of Target Group: Demographic Characteristics	Characterization of population in need based on demographic factors, such as literacy, household size, langauges spoken, age, gender, population density (Barja & Gigler, 2007)	"Media literacy is a matter of inclusion and citizenship in today's information society. It is a fundamental skill not only for young people but also for adults and elderly people, parents, teachers and media professionals. Thanks to the Internet and digital technology, an increasing number of Europeans can now create and disseminate images, information and content. Media literacy is today regarded as one of the key prerequisites for an active and full citizenship in order to prevent and diminish risks of exclusion from community life." (Media literacy in the digital environment, Preamble)
Social Construction of Target Group: Social Characteristics	Characterization of population in need based on social factors, such as health, education, culture, social mobility, civic or social participation (Barja & Gigler, 2007)	"Some progress was achieved in the area of cultural rights and minorities. The 10th anniversary of the Ohrid Framework Agreement provided a good opportunity for enhanced dialogue between the communities in the country. The President of the Republic and the Prime Minister both participated in events marking this

Code	Definition	Examples
		milestone. In parliament, implementation of the Law on languages moved forward. Representation of the ethnic Albanian community in the civil service is in line with its proportion of the population and the representation of the Roma and Turkish communities increased. Integration of the Roma in the education system improved, with increased enrolment in secondary and university education. Continued efforts are necessary to foster trust, especially in the areas of education, culture and language. Roma continue to face very difficult living conditions and discrimination." (**Enlargement Strategy and Main Challenges 2011-2012, Annex 2**)
Social Construction of Target Group: Geographic Characteristics	Characterization of population in need based on geographic factors (Barja & Gigler, 2007)	"Designation of undertakings 1. Member States may designate one or more undertakings to guarantee the provision of universal service as identified in Articles 4, 5, 6 and 7 and, where applicable, Article 9(2) so that the whole of the national territory can be covered. Member States may designate different undertakings or sets of undertakings to provide different elements of universal service and/or to

Code	Definition	Examples
		cover different parts of the national territory…" (Universal service and users' rights, Article 8)
Usage Constraints	"Structural usage constraints are a group of internal factors of ICT, related to connectivity, content, training, and sustainability" (Barja & Gigler, 2007, p.23)	
Structural Aspect: Connectivity	Issues of connectivity costs, equipment and software installation, maintenance (Barja & Gigler, 2007)	"Member States shall ensure that there are no restrictions which prevent undertakings in the same Member State or in different Member States from negotiating between themselves agreements on technical and commercial arrangements for access and/or interconnection, in accordance with Community law. The undertaking requesting access or interconnection does not need to be authorised to operate in the Member State where access or interconnection is requested, if it is not providing services and does not operate a network in that Member State" (Access to electronic communications networks, Article 3)
Structural Aspect: Content	Issues of content localization, production, and appropriateness, both in terms of technicality and language (Barja & Gigler, 2007)	"Making a digital copy of a book or a film does not necessarily guarantee its long-term survival. All digital material – digitised works as well as 'born digital' material – has to be maintained in order to keep

Code	Definition	Examples
		it available for use. Therefore digitisation without a proper preservation strategy can turn into a wasted investment. Digital preservation is a vital problem for the information society, where the supply of information is growing exponentially and where content is becoming more and more dynamic. At present, there is little experience with digital preservation, the legal framework is evolving, resources are scarce and the outcome of preservation efforts is uncertain. The problem deserves to be urgently addressed both by politicians and by the institutions most concerned. Its impact goes far beyond the realm of libraries and archives and concerns all organisations producing digital information and interested in maintaining its availability. There are different causes for the loss of digital content. A first reason is the succession of generations of hardware that can render files unreadable. To mark the 900th anniversary of the Domesday Book in 1985, a new multimedia edition was compiled. In 2002, it looked

Code	Definition	Examples
		as if the disc had become unreadable as computers capable of reading the format had become rare. To save it, a system was developed capable of accessing the discs using emulation techniques. Interestingly, while there are difficulties accessing digital data from 1986, the original Domesday Book, now over 900 years old, can still be consulted. The rapid succession and obsolescence of computer programmes is another factor. Unless data are migrated to current programs or care is taken to preserve the original source code, retrieval of information may become very costly, if not impossible. This is particularly true of 'closed' data formats, for which the source code is not publicly known. The limited lifetime of digital storage devices, for example CD-ROMs is another reason for the loss of digital content. Libraries and archives have started tackling the issues of preservation in the digital age at a limited scale. Some collaboration across borders exists, but overall action in Europe is fragmented. Within the individual Member States there is, in general, no clear policy on

Code	Definition	Examples
		digital preservation. Where national preservation plans do exist they tend to concentrate on safeguarding analogue material which is at risk, rather than venturing into the area of digital materials." (i2010: Digital Libraries, Section 6)
Structural Aspect: Training	Issues of capability, literacy, and training for software and design changes (Barja & Gigler, 2007)	"… raise awareness through trainings, information days and distribution of information packs of the risks involved in processing personal data through information and communication networks and educate users, especially young people, parents and teachers, in this field." (Media literacy in the digital environment, I)
Structural Aspect: Sustainability	Issues of user, network, and capability needs for management over time (Barja & Gigler, 2007)	"Interoperability is the ability of systems and machines to exchange, process and correctly interpret information. It is more than just a technical challenge, as it also involves legal, organisational and semantic aspects of handling data. Interoperability is an essential pre-condition for open, flexible delivery of eGovernment services and will enable collaboration between administrations in Europe. In particular, standards and open platforms offer opportunities for more cost-effective use of resources and delivery of services." (ICT and eGovernment:

Code	Definition	Examples
		European Action Plan 2011-2015, Scope)
Technological Constraints	Characteristics of technologies that create restrictions or opportunities, incentives or disincentives (Barja & Gigler, 2007)	
Opportunities and Constraints on Demand	"Economies of strategic complementarity, compatibility and standards, consumption external factors and substitution and lock-in costs, typical of markets characterized by network economies… Strategies of discrimination due to delay in dissemination of information, quality discrimination, production of new versions, renting before sale and production of different versions… Coexistence, flexibility and technological convergence that allow for a variety of technological solutions, for every need and circumstance… Adaptation of problems of technologies designed for developed countries to the realities of developing countries" (Barja & Gigler, 2007, p.23)	"Amendments necessary to adapt Annexes I, II, III, VI and VII to technological developments or to changes in market demand shall be adopted by the Commission, acting in accordance with the procedure referred to in Article 37(2)." (Universal service and users' rights, Article 35)
Opportunities and Constraints on Supply	"Production conditions characterized by scale economies… High level of technological innovation on data transmission and technological convergence demand continuous and significant investments… High fixed and sunk costs of information production,	"Rights and obligations for undertakings 1. Operators of public communications networks shall have a right and, when requested by other undertakings so authorised, an obligation to negotiate interconnection with each

Code	Definition	Examples
	and at the same time, additional costs of reproduction and distribution almost null… Competition limited to few operators can give rise to the exercise of market power" (Barja & Gigler, 2007, p.23)	other for the purpose of providing publicly available electronic communications services, in order to ensure provision and interoperability of services throughout the Community. Operators shall offer access and interconnection to other undertakings on terms and conditions consistent with obligations imposed by the national regulatory authority pursuant to Articles 5, 6, 7 and 8. 2. Public electronic communications networks established for the distribution of digital television services shall be capable of distributing wide-screen television services and programmes. Network operators that receive and redistribute wide-screen television services or programmes shall maintain that wide-screen format. 3. Without prejudice to Article 11 of Directive 2002/20/EC (Authorisation Directive), Member States shall require that undertakings which acquire information from another undertaking before, during or after the process of negotiating access or interconnection arrangements use that information solely for the purpose for which it was

Code	Definition	Examples
		supplied and respect at all times the confidentiality of information transmitted or stored. The received information shall not be passed on to any other party, in particular other departments, subsidiaries or partners, for whom such information could provide a competitive advantage." (Access to electronic communications networks, Article 4)

Codebook for implementation documents

Concept	First Published	References
Centralization	1983	King, 1983; King & Kraemer, 1995; Kraemer & King, 1986
Context	1984	Blincoe, Valetto, & Goggins, 2012; Contractor, 2009; Contractor, Monge, & Leonardi, 2011; Courtright, 2004; Davenport & Horton, 2006; 2007; Eschenfelder, 2002; Hara & Rosenbaum, 2008; Iacono, King, & Kraemer, 2003; Kling, 1996; 1998; 1999; Kling & Iacono, 1984a; Kling & Star, 1997; Kling & Tilquist, 1998; Lamb, 1996; Kling, 2000a; Kling & McKim, 2000; Kling, Rosenbaum, & Mansell, 2005; Oltmann, Rosenbaum, & Hara, 2006; Robbin & Day, 2006; Robbin, Lamb, King, & Berleur, 2006); Sawyer, 2005; Sawyer & Sawyer, 2005; Tapia & Maitland, 2009
Control	1984	Davenport & Horton, 2007; Ekbia & Kling, 2003; King, Iacono, &

		Grudin, 2007; Kling & Iacono, 1984a; 1984b; 1989; Maldonado, Maitland, & Tapia, 2010; Robbin & Day, 2006
Institutions	1984	Agre, 2002; Contractor, 2009; Elliot & Kraemer, 2007; Kling, 2003; Kling & Iacono, 1984a; 1989; Lamb & Davidson, 2005; Lamb, King, & Kling, 2003; Lamb & Kling, 2003; Sawyer & Tapia, 2007
Management	1984	Blincoe, Valetto, & Goggins, 2012; Contractor, 2009; Contractor, Monge, & Leonardi, 2011; Davenport, 2001; Davenport & Horton, 2007; Ekbia & Kling, 2003; Hara & Kling, 2002; Kling, 2000a; 2003; Kling & Hara, 2004; Kling & Iacono, 1984a; 1989; Kling & Tilquist, 1998; Maldonado, Maitland, & Tapia, 2010; Sawyer & Tapia, 2005
Consequences, intended and unintended	1996	Kling & Hara, 2004; Kling & Lamb, 1996; Kling & Star, 1997; Robbin, 2007; Robbin & Day, 2006; Robbin, Lamb, King, & Berleur, 2006
Communication	1997	Hara & Kling, 2002; Kling, 1997; 1999; 2000a; Kling & McKim, 2000; Kling, McKim, & King, 2003; Kling & Star, 1997; Kling, Rosenbaum & Hert, 1998; Lamb, 2003; Mansell, 2005; Meyer & Kling, 2002; Wood-Harper & Wood, 2005
Access	1998	Hara & Kling, 2002; Kling, 1998; 1999; 2000a; 2000b; Kling & Callahan, 2003; Maldonado, Maitland, & Tapia, 2010; Oltmann, Rosenbaum, & Hara, 2006
Constraints	1998	Kling & Tilquist, 1998; Maldonado, Maitland, & Tapia, 2010; Oltmann, Rosenbaum, & Hara, 2006
Collaboration	1999	Agre, 2000a; Contractor, 2009; Goggins, Laffey, & Gallagher, 2011; Kling & Lamb, 1999; Kling & McKim, 2000; Kling, McKim, & King, 2003; Lamb & Davidson,

		2005; Maldonado, Maitland, & Tapia, 2010
Governance	2000	Agre, 2000a; Davenport & Horton, 2006; 2007; Maldonado, Maitland, & Tapia, 2010
Coordination	2005	Blincoe, Valetto, & Goggins, 2012; Goggins, Laffey, & Gallagher, 2011; Lamb & Davidson, 2005

Appendix 2

European Union Information Society Initiative Policies

Policy	Directive Passage	EUR-Lex ID code	Year Passed
The Body of European Regulators for Electronic Communications (BEREC)	Regulation (EC) No 1211/2009 of the European Parliament and of the Council of 25 November 2009 establishing the Body of European Regulators for Electronic Communications (BEREC) and the Office (Text with EEA relevance)	32009R1211	2009
Regulatory framework for electronic communications	Directive 2002/21/EC of the European Parliament and of the Council of 7 March 2002 on a common regulatory framework for electronic communications networks and services (Framework Directive)	32002L0021	2002
Authorisation of electronic communications networks and services	Directive 2002/20/EC of the European Parliament and of the Council of 7 March 2002 on the authorisation of electronic communications networks and services (Authorisation Directive)	32002L0020	2002
Universal service and users' rights	Directive 2002/22/EC of the European Parliament and of the Council of 7 March 2002 on universal service and users' rights relating to electronic communications networks and services (Universal Service Directive)	32002L0022	2002
Access to electronic communications networks	Directive 2002/19/EC of the European Parliament and of the Council of 7 March 2002 on access to, and interconnection of, electronic communications networks and associated facilities (Access Directive)	32002L0019	2002

Policy	Directive Passage	EUR-Lex ID code	Year Passed
Data protection in the electronic communications sector	Directive 2002/58/EC of the European Parliament and of the Council of 12 July 2002 concerning the processing of personal data and the protection of privacy in the electronic communications sector (Directive on privacy and electronic communications)	32002L0058	2002
Selection and authorisation of systems providing mobile satellite services	Decision No 626/2008/EC of the European Parliament and of the Council of 30 June 2008 on the selection and authorisation of systems providing mobile satellite services (MSS)	32008D0626	2008
Radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity	Directive 1999/5/EC of the European Parliament and of the Council of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity	31999L0005	1999
Competition in the markets in telecommunications terminal equipment	Commission Directive 2008/63/EC of 20 June 2008 on competition in the markets in telecommunications terminal equipment	32008L0063	2008
Competition in the markets for electronic communications networks and services	Commission Directive 2002/77/EC of 16 September 2002 on competition in the markets for electronic communications networks and services	32002L0077	2002
Enlargement Strategy and Main Challenges 2010-2011	COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL Enlargement Strategy and Main Challenges 2010-2011 /* COM/2010/0660 final	52010DC0660	2010

Policy	Directive Passage	EUR-Lex ID code	Year Passed
Enlargement Strategy and Main Challenges 2011-2012	COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL Enlargement Strategy and Main Challenges 2011-2012 /* COM/2011/0666 final	52011DC0666	2011
Media literacy in the digital environment	COMMISSION RECOMMENDATION of 20 August 2009 on media literacy in the digital environment for a more competitive audiovisual and content industry and an inclusive knowledge society (2009/625/EC)	32009H0625	2009
Access for rural areas to ICTs	Communication from the Commission to the Council and the European Parliament - Better access for rural areas to modern ICT {SEC(2009) 254} /* COM/2009/0103 final */	52009DC0103	2009
Boosting competition and encouraging investment in next-generation access electronic communications networks	2013/466/EU: Commission Recommendation of 11 September 2013 on consistent non-discrimination obligations and costing methodologies to promote competition and enhance the broadband investment environment	32013H0466	2013
ICT and eGovernment: European Action Plan 2011-2015	COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS The European eGovernment Action Plan 2011-2015 Harnessing ICT to promote smart, sustainable & innovative Government /* COM/2010/0743	52010DC0743	2010

Policy	Directive Passage	EUR-Lex ID code	Year Passed
	final */		
Next Generation Access Networks (NGA)	2010/572/EU: Commission Recommendation of 20 September 2010 on regulated access to Next Generation Access Networks (NGA) Text with EEA relevance	32010H0572	2010
Broadband: investing in digitally driven growth	/* COM/2010/0472 final */ COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS European Broadband: investing in digitally driven growth	52010DC0472	2010
Digital Agenda for Europe	Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions A Digital Agenda for Europe /* COM/2010/0245 final */	52010DC0245	2010
The IDABC Programme (2005-2009)	2004/387/EC:Commission Decision of 28 April 2004 on the conclusion of an Agreement in the form of an Exchange of Letters between the European Community and the United Mexican States concerning amendments to Annex I to the Agreement between the European Community and the United Mexican States on the mutual	32004D0387	2010

Policy	Directive Passage	EUR-Lex ID code	Year Passed
	recognition and protection of designations for spirit drinks, taking into account the enlargement		
i2010: Digital libraries	Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - i2010 : digital libraries {SEC(2005) 1194} {SEC(2005) 1195} /* COM/2005/0465 final */	52005DC0465	2005
Electronic skills for the 21st century: fostering competitiveness, growth and jobs	Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions - E-skills for the 21st century: fostering competitiveness, growth and jobs /* COM/2007/0496 final */	52007DC0496	2007
Ageing well in the Information Society: Action Plan on Information and Communication Technologies and Ageing	Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - Ageing well in the Information Society - An i2010 Initiative - Action Plan on Information and Communication Technologies and Ageing {SEC(2007)811} /* COM/2007/0332 final */	52007DC0332	2007
eContentplus (2005-2008)	Decision No 456/2005/EC of the European Parliament and of the Council of 9 March 2005 establishing a multiannual	32005D0456	2005

Policy	Directive Passage	EUR-Lex ID code	Year Passed
	Community programme to make digital content in Europe more accessible, usable and exploitable (Text with EEA relevance)		
eGovernment	Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions - The Role of eGovernment for Europe's Future [SEC(2003) 1038] /* COM/2003/0567 final */	52003DC0567	2003
eEurope - An information society for all	Europe - An information society for all - Communication on a Commission initiative for the special European Council of Lisbon, 23 and 24 March 2000 /* COM/99/0687 final */	51999DC0687	1999
Numeric integration initiataive/Initiative sur l'intégration numérique	Communication de la Commission au Parlement européen, au Conseil, au Comité économique et social européen et au Comité des régions du 8 novembre 2007 intitulée « Initiative européenne i2010 sur l'insertion numérique - Participer à la société de l'information» [COM(2007) 694 final - Non publié au Journal officiel].	52007DC0694	2007
Europe's role in shaping the future of internet governance	Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: Internet policy and governance - Europe’s role in shaping the future of Internet governance (COM(2014) 72 final of 12 February 2014 - not published in the Official Journal).	52014DC0072	2014

Policy	Directive Passage	EUR-Lex ID code	Year Passed
ENISA - the European Union Agency for Network and Information Security	Regulation (EU) No 526/2013 of the European Parliament and of the Council of 21 May 2013 concerning the European Union Agency for Network and Information Security (ENISA) and repealing Regulation (EC) No 460/2004 Text with EEA relevance	32013R0526	2013
Protecting children in the digital world	REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS on the application of the Council Recommendation of 24 September 1998 concerning the protection of minors and human dignity and of the Recommendation of the European Parliament and of the Council of 20 December 2006 on the protection of minors and human dignity and on the right of reply in relation to the competitiveness of the European audiovisual and online information services industry- PROTECTING CHILDREN IN THE DIGITAL WORLD- /* COM/2011/0556 final */	52011DC0556	2011
Building a stronger and more secure digital Europe	JOINT COMMUNICATION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS Cybersecurity Strategy of the European Union: An Open, Safe and Secure	52013JC0001	2013

Policy	Directive Passage	EUR-Lex ID code	Year Passed
	Cyberspace /* JOIN/2013/01 final */		
The open internet and net neutrality	COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS The open internet and net neutrality in Europe /* COM/2011/0222 final */	52011DC0222	2011
The ".eu" top-level domain	Regulation (EC) No 733/2002 of the European Parliament and of the Council of 22 April 2002 on the implementation of the .eu Top Level Domain (Text with EEA relevance)	32002R0733	2002
ICT standardisation: modernisation and the way forward	WHITE PAPER Modernising ICT Standardisation in the EU - The Way Forward	52009DC0324	2009
Internet of things	Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - Internet of Things : an action plan for Europe /* COM/2009/0278 final */	52009DC0278	2009
Towards a single market in creative content online	Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on creative content online in the Single Market {SEC(2007) 1710} /* COM/2007/0836 final */	52007DC0836	2007

Policy	Directive Passage	EUR-Lex ID code	Year Passed
Safer internet programme 2009-13	Decision No 1351/2008/EC of the European Parliament and of the Council of 16 December 2008 establishing a multiannual Community programme on protecting children using the Internet and other communication technologies (Text with EEA relevance)	32008D1351	2008
ICT infrastructure for e-science	Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - ICT infrastructures for e-science /* COM/2009/0108 final */	52009DC0108	2009
Towards an accessible information society	Communication from the Commission to the European Parliament, the Council, the European economic and social Committee and the Committee of the regions - "Towards an accessible information society" /* COM/2008/0804 final */	52008DC0804	2008
Ageing well in the information society: The Ambient Assisted Living (AAL) Programme	Decision No 742/2008/EC of the European Parliament and of the Council of 9 July 2008 on the Community's participation in a research and development programme undertaken by several Member States aimed at enhancing the quality of life of older people through the use of new information and communication technologies (Text with EEA relevance)	32008D0742	2008
Protection of video game users	Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on the protection of	52008DC0207	2008

Policy	Directive Passage	EUR-Lex ID code	Year Passed
	consumers, in particular minors, in respect of the use of video games /* COM/2008/0207 final */		
Future networks and the internet	Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - Communication on future networks and the internet {SEC(2008) 2507} {SEC(2008) 2516} /* COM/2008/0594 final */	52008DC0594	2008
Attacks against information systems	Directive 2013/40/EU of the European Parliament and of the Council of 12 August 2013 on attacks against information systems and replacing Council Framework Decision 2005/222/JHA	32013L0040	2013
Fight against spam, spyware and malicious software	Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on fighting spam, spyware and malicious software /* COM/2006/0688 final */	52006DC0688	2006
Broadband internet access: the territorial divide	Communication from the Commission to the Council, the European Parliament, the European Economic and Social committee and the Committee of the Regions - Bridging the Broadband Gap {SEC(2006) 354} {SEC(2006) 355} /* COM/2006/0129 final */	52006DC0129	2006

Policy	Directive Passage	EUR-Lex ID code	Year Passed
Organisation and management of the internet	Communication from the Commission to the Council and the European Parliament - The organisation and management of the Internet - International and European policy issues 1998 - 2000 /* COM/2000/0202 final */	52000DC0202	2000
Strategy for a secure information society (2006 communication)	Communication from the Commission to the Council, the European Parliament, the European Economic and Social committee and the Committee of the Regions - A strategy for a Secure Information Society - "Dialogue, partnership and empowerment" {SEC(2006) 656} /* COM/2006/0251 final */	52006DC0251	2006
Green paper on the convergence of the telecommunications, media and information tecnhology sectors and the implications for regulation	Green Paper on the convergence of the telecommunications, media and information technology sectors, and the implications for Regulation - Towards an information society approach /* COM/97/0623 final */	51997DC0623	1997
Information security	92/242/EEC: Council Decision of 31 March 1992 in the field of security of information systems	31992D0242	1992
Measures to counter unsolicited commercial communications ("spam")	Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on unsolicited commercial communications or 'spam' (Text with EEA relevance) /* COM/2004/0028 final */	52004DC0028	2004
Copyright and related rights in the information society	Directive 2001/29/EC of the European Parliament and of the Council of 22 May 2001 on the harmonisation of certain aspects of copyright and related rights in the information society	32001L0029	2001

Policy	Directive Passage	EUR-Lex ID code	Year Passed
Strengthening personal data protection	Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on the protection of individuals with regard to the processing of personal data and on the free movement of such data (General Data Protection Regulation) /* COM/2012/011 final - 2012/0011 (COD) */	52012PC0011	2012
Protection of personal data	Directive 95/46/EC of the European Parliament and of the Council of 24 October 1995 on the protection of individuals with regard to the processing of personal data and on the free movement of such data	31995L0046	1995
Copyright in the knowledge economy	Communication from the Commission - Copyright in the Knowledge Economy /* COM/2009/0532 final */	52009DC0532	2009
Data protection by community institutions and bodies	Regulation (EC) No 45/2001 of the European Parliament and of the Council of 18 December 2000 on the protection of individuals with regard to the processing of personal data by the Community institutions and bodies and on the free movement of such data	32001R0045	2001
Promoting data protection by privacy-enhancing tecnhologies	Communication from the Commission to the European Parliament and the Council on Promoting Data Protection by Privacy Enhancing Technologies (PETs) /* COM/2007/0228 final */	52007DC0228	2007
Wider access to copyright material - orphan works - EUR-Lex	Directive 2012/28/EU of the European Parliament and of the Council of 25 October 2012 on certain permitted uses of orphan works Text with EEA relevance	32012L0028	2012

Policy	Directive Passage	EUR-Lex ID code	Year Passed
Preparing the ground for ultra-fast braodband by 2020	Decision No 243/2012/EU of the European Parliament and of the Council of 14 March 2012 establishing a multiannual radio spectrum policy programme Text with EEA relevance	32012D0243	2012
Radio local area networks (Wi-Fi networks)	2005/513/EC: Commission Decision of 11 July 2005 on the harmonised use of radio spectrum in the 5 GHz frequency band for the implementation of wireless access systems including radio local area networks (WAS/RLANs) (notified under document number C(2005) 2467)	32005D0513	2005
Radio Freqeuncy Identification (RFID) in Europe: steps toward a policy framework	Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - Radio Frequency Identification (RFID) in Europe: steps towards a policy framework {SEC(2007) 312} /* COM/2007/0096 final */	52007DC0096	2007
Mobile communications GSM - UMTS	Council Directive 87/372/EEC of 25 June 1987 on the frequency bands to be reserved for the coordinated introduction of public pan-European cellular digital land-based mobile communications in the Community	31987L0372	1987
Strengthening the internal market for mobile TV	Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - Strengthening the Internal Market for Mobile TV {SEC(2007) 980} {SEC(2007) 981} /* COM/2007/0409 final */	52007DC0409	2007

Policy	Directive Passage	EUR-Lex ID code	Year Passed
Radio spectrum policy programme	Decision No 243/2012/EU of the European Parliament and of the Council of 14 March 2012 establishing a multiannual radio spectrum policy programme	32012D0243	2012
Radio spectrum policy group	Commission Decision of 16 December 2009 amending Decision 2002/622/EC establishing a Radio Spectrum Policy Group	32009D0978	2009
Regulatory framework for radio spectrum policy	Decision No 676/2002/EC of the European Parliament and of the Council of 7 March 2002 on a regulatory framework for radio spectrum policy in the European Community (Radio Spectrum Decision)	32002D0676	2002
Roaming on mobile phone networks	Regulation (EU) No 531/2012 of the European Parliament and of the Council of 13 June 2012 on roaming on public mobile communications networks within the Union (recast)	32012R0531	2012
Legal framework for mobile TV	Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - Legal Framework for Mobile TV Networks and Services: Best Practice for Authorisation – The EU Model /* COM/2008/0845 final */	52008DC0845	2008
Use of mobile phones on aircraft	2008/294/EC: Commission Decision of 7 April 2008 on harmonised conditions of spectrum use for the operation of mobile communication services on aircraft (MCA services) in the Community (notified under document number C(2008) 1256)	32008D0294	2008

Policy	Directive Passage	EUR-Lex ID code	Year Passed
Towards optimal use of the digital dividend	Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - Reaping the full benefits of the digital dividend in Europe: a common approach to the use of the spectrum released by the digital switchover /* COM/2007/0700 final */	52007DC0700	2007
Third-generation mobile communications	Communication from the Commission to the Council, the European Parliament, the Economic and Social Committee and the Committee of the Regions - Towards the Full Roll-Out of Third Generation Mobile Communications /* COM/2002/0301 final */	52002DC0301	2002
Mobile braodband services	Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions - Mobile Broadband Services /* COM/2004/0447 final */	52004DC0447	2004
Radio frequencies: digital European cordless telecommunications - DECT - UMTS	Council Directive 91/287/EEC of 3 June 1991 on the frequency band to be designated for the coordinated introduction of digital European cordless telecommunications (DECT) into the Community	31991L0287	1991
Radio frequencies: European Radio Communications Committee	Council Resolution of 19 November 1992 on the implementation, within the Community, of ERC decisions.	318, 04.12.1992	1992

Policy	Directive Passage	EUR-Lex ID code	Year Passed
World Radiocommunications Conference 2003	Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions - The World Radiocommunication Conference 2003 (WRC-03) /* COM/2003/0183 final */	52003DC0183	2003
Next steps in radio spectrum policy	Communication from the Commission to the Council, the European Parliament, the Economic and Social Committee and the Committee of the Regions - Next steps in radio spectrum policy - Results of the public consultation on the Green Pape	51999DC0538	1999
World Radiocommunications Conference 2000 (WRC-2000)	Communication from the Commission to the European Parliament and the Council - Radio frequency requirements for Community policies in the context of the World Radiocommunications Conference 1999 (WRC-99)	51998DC0298	1998
Unlocking the potential for mHealth (mobile health) in the EU	GREEN PAPER on mobile Health ("mHealth") /* COM/2014/0219 final */	52014DC0219	2014
eCall service/Le service eCall	Commission Recommendation of 8 September 2011 on support for an EU-wide eCall service in electronic communication networks for the transmission of in-vehicle emergency calls based on 112 (eCalls) Text with EEA relevance	32011H0750	2011
Community framework for electronic signatures	Directive 1999/93/EC of the European Parliament and of the Council of 13 December 1999 on a Community framework for electronic signatures	31999L0093	1999

Policy	Directive Passage	EUR-Lex ID code	Year Passed
eCall aims to speed up response from emergency services to car crash victims	Directive 2010/40/EU of the European Parliament and of the Council of 7 July 2010 on the framework for the deployment of Intelligent Transport Systems in the field of road transport and for interfaces with other modes of transport.	32010L0040	2010
A strategy for research on future and emerging technologies in Europe	Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - Moving the ICT frontiers : a strategy for research on future and emerging technologies in Europe /* COM/2009/0184 final */	52009DC0184	2009
ICT-related recommendations to help the EU turn into a more energy-efficient, low-carbon economy	Commission Recommendation 2013/105/EC of 9 October 2009 on mobilising Information and Communications Technologies to facilitate the transition to an energy-efficient, low-carbon economy.	32013H0105	2013
Telemedicine systems and services	Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on telemedicine for the benefit of patients, healthcare systems and society /* COM/2008/0689 final */	52008DC0689	2008
ARTEMIS	Council Regulation (EC) No 74/2008 of 20 December 2007 on the establishment of the ARTEMIS Joint Undertaking to implement a Joint Technology Initiative in Embedded Computing Systems	32008R0074	2008

Policy	Directive Passage	EUR-Lex ID code	Year Passed
i2010 Intelligent Car Initataive (third eSafety communication)	Communication from the Commission to the Council, the European Parliament, the European Economic and Social committee and the Committee of the Regions On the Intelligent Car Initiative - "Raising Awareness of ICT for Smarter, Safer and Cleaner Vehicles" /* COM/2006/0059 final */	52006DC0059	2006
In-vehicle emergency call system "eCall" (second eSafety communication)	Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions - The 2nd eSafety Communication - Bringing eCall to Citizens /* COM/2005/0431 final */	52005DC0431	2005
eSafety: the use of information and communication tecnhology (ICT) for road safety	Communication from the Commission to the Council and the European Parliament - Information and Communications Technologies for Safe and Intelligent Vehicles (SEC(2003) 963) /* COM/2003/0542 final */	52003DC0542	2003
European initiataive on electronic commerce	Communication from the Commission to the Council, the European Parliament, the Economic and Social Committee and the Committee of the Regions - A European Initiative in Electronic Commerce /* COM/97/0157 final */	51997DC0157	1997
Relationship between card-holders and card-issuers (II)	Commission recommendation 97/489/EC of 30 July 1997 concerning transactions by electronic payment instruments and in particular the relationship between issuer and holder.	208 of 02.08.1997	1997
Electronic payment: code of conduct	Commission Recommendation 87/598/EEC of 8 December 1987, concerning a European	365 of 24.12.1987	1987

Policy	Directive Passage	EUR-Lex ID code	Year Passed
	code of conduct relating to electronic payments [Official Journal L 365 of 24.12.1987].		
Legal aspects of electronic commerce ("Directive on electronic commerce")	Directive 2000/31/EC of the European Parliament and of the Council of 8 June 2000 on certain legal aspects of information society services, in particular electronic commerce, in the Internal Market ('Directive on electronic commerce')	365 of 24.12.1987	2000

Supplementary Policies

Framework Regulation (EC) No 808/2004
Framework Regulation (EC) No 1006/2009 amending Framework Regulation (EC) No 808/2004
Commission Regulation (EC) No 1196/2014
Commission Regulation (EC) No 859/2013
Commission Regulation (EC) No 1083/2012
Commission Regulation (EC) No 937/2011
Commission Regulation (EC) No 821/2010
Commission Regulation (EC) No 1023/2009
Commission Regulation (EC) No 960/2008
Commission Regulation (EC) No 847/2007
Commission Regulation (EC) No 1031/2006
Commission Regulation (EC) No 1099/2005

Implementation Documents

Document	Applies to	Year
Entrepreneurship and Innovation Programme Committe (EIP)	all EU	2012
Entrepreneurship and Innovation Programme (EIP)	all EU	2012
Intelligente Energy-Europe Programme (IEE)	all EU	2012
ICT - Policy Support Programme (ICT - PSP)	all EU	2012
Competitiveness and Innovation Framework Programme (CIP)	all EU	2011
Entrepreneurship and Innovation Programme (EIP)	all EU	2011

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Intelligente Energy-Europe Programme (IEE)	all EU	2011
ICT - Policy Support Programme (ICT - PSP)	all EU	2011
Competitiveness and Innovation Framework Programme (CIP)	all EU	2010
Entrepreneurship and Innovation Programme (EIP)	all EU	2010
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ICT - Policy Support Programme (ICT - PSP)	all EU	2010
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Entrepreneurship and Innovation Programme (EIP)	all EU	2007
Intelligente Energy-Europe Programme (IEE)	all EU	2007
ICT - Policy Support Programme (ICT - PSP)	all EU	2007
iD2010 – Information Society Germany 2010: Action Programme by the Federal Government	Germany	2006
Information and communications technology (ICT)	Germany	2013
Information and communications technology (ICT)	Germany	2012
Energieeffiziente IKT für Mittelstand, Verwaltung und Wohnen - IT2Green	Germany	2012
Information society statistics 2003 - Pocketbook	Germany	2004
Statistics on the information society in Europe	Germany	2004
Gemeinsam für mehr Unternehmergeist	Germany	2013
r3 - Strategische Metalle und Mineralien	Germany	2013
Analyse von Wachstumshemmnissen kleiner und mittlerer Unternehmen am Beispiel der IT-Branche	Germany	2012
Eckpunkte für eine Strategie "Intelligente Vernetzung"	Germany	2014
Electric Mobility - Rethinking the Car	Germany	2013
Wachstumsorientierte Telekommunikationspolitik Handlungsbedarf und -optionen	Germany	2013
AUTONOMIK für Industrie 4.0	Germany	2012
GründerKlasse Nr. 2: Wirtschaftsplanspiele und Teamarbeit	Germany	2013
15 Jahre EXIST	Germany	2014
Neue Produkte: Aus Natur gemacht	Germany	2014
National Strategy for Critical Infrastructure Protection (CIP Strategy)	Germany	2009
Business Angels - Kapital und Erfahrung für Start-ups	Germany	2013
Gründungsberatung in der Wissenschaft: Qualität entwickeln - Erfolge	Germany	2014

Document	Applies to	Year
sichern		
Forschung für die zivile Sicherheit	Germany	2013
Horizont 2020 im Blick	Germany	2014
Industrie 4.0	Germany	2015
Qualität entwickeln - Standards sichern - mit Differenz umgehen	Germany	2008
Internationale Kooperation	Germany	2014
Green Economy Research Agenda	Germany	2014
Monitoring-Report Digitale Wirtschaft 2014 - Innovationstreiber IKT	Germany	2014
Energieeffiziente IKT in der Praxis - IT2Green	Germany	2014
Innovationsimpulse der Gesundheitswirtschaft - Auswirkungen auf Krankheitskosten, Wettbewerbsfähigkeit und Beschäftigung	Germany	2011
Leitfaden Krisenkommunikation	Germany	2014
International Cooperation	Germany	2014
Die Messung der industriellen Standortqualität in Deutschland	Germany	2012
Zukunftspfade Digitales Deutschland 2020	Germany	2013
Smart Energy made in Germany	Germany	2014
Der Europäische Globalisierungsfonds in Deutschland: Eine Untersuchung und Bewertung seiner Umsetzung und Potenziale	Germany	2012
Die Zukunft der Gründungsförderung - neue Trends und innovative Instrumente	Germany	2013
Fußball-WM 2006	Germany	2007
Sozialbericht 2013 - Broschüre	Germany	2013
nano.DE-Report 2013	Germany	2014
10. Bericht der Bundesregierung über ihre Menschenrechtspolitik	Germany	2013
Die Einführung eines Nationalen Qualifikationsrahmens in Deutschland (DQR) - Untersuchung der Möglichkeiten für den Bereich des formalen Lernens	Germany	2009
28. Forum Globale Fragen: (Kein) Brot für die Welt? Ernährung in der Krise	Germany	2013
Dokumentation der Europäischen Fachkonferenz der deutschen EU-Ratspräsidentschaft "Die Verteilung macht's - Gleichstellung und soziale Gerechtigkeit durch geschlechtersensible Haushalte"	Germany	2008
European Congress "Demographic Change as Opportunity: The Economic Potential of the Elderly"	Germany	2008
Aktives Altern - Active Ageing	Germany	2007
Migration und Integration - Aufenthaltsrecht, Migrations- und Integrationspolitik in Deutschland	Germany	2014
Migrationsbericht 2013	Germany	2015
Congrès européen "Faire du changement démographique une chance: le potentiel économique des seniors"	Germany	2008
Informationsgesellschaft in Deutschland	Germany	2009
iD2010 - Information Society Germany 2010: Action Programme by	Germany	2006

Document	Applies to	Year
the Federal Government		