

PRIVACY IN THE DIGITAL AGE: A REVIEW OF INFORMATION PRIVACY RESEARCH IN INFORMATION SYSTEMS¹

France Bélanger

Pamplin College of Business, Virginia Tech, 3007 Pamplin Hall,
Blacksburg, VA 24061-0101 U.S.A. {belanger@vt.edu}

Robert E. Crossler

Department of Management and Information Systems, College of Business, Mississippi State University,
P.O. Box 9581, Mississippi State, MS 39762-9581 U.S.A. {rob.crossler@msstate.edu}

Information privacy refers to the desire of individuals to control or have some influence over data about themselves. Advances in information technology have raised concerns about information privacy and its impacts, and have motivated Information Systems researchers to explore information privacy issues, including technical solutions to address these concerns. In this paper, we inform researchers about the current state of information privacy research in IS through a critical analysis of the IS literature that considers information privacy as a key construct. The review of the literature reveals that information privacy is a multilevel concept, but rarely studied as such. We also find that information privacy research has been heavily reliant on student-based and USA-centric samples, which results in findings of limited generalizability. Information privacy research focuses on explaining and predicting theoretical contributions, with few studies in journal articles focusing on design and action contributions. We recommend that future research should consider different levels of analysis as well as multilevel effects of information privacy. We illustrate this with a multilevel framework for information privacy concerns. We call for research on information privacy to use a broader diversity of sampling populations, and for more design and action information privacy research to be published in journal articles that can result in IT artifacts for protection or control of information privacy.

Keywords: Information privacy, privacy, level of analysis, information privacy framework, information privacy concerns

Introduction

The concept of information privacy existed long before information and communication technologies changed its occurrences, impacts, and management. In the mid-1980s, Mason

(1986) suggested that the advent of the increased use of information technologies, or the Information Age, would lead to four major concerns about the use of information: privacy, accuracy, property, and accessibility (PAPA). This prediction proved to be accurate for each area, and particularly for privacy, which has been the subject of increasing concern over the years. A Pew Internet Project survey found that 85 percent of adults believed it was “very important” to control access to their personal information (Madden et al. 2007). Information privacy is also an important concern for corporations. In a survey, 85 percent of responding companies

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experienced some sort of reportable privacy breach during the previous year; 63 percent reported multiple breaches. The majority of the reporting companies stated that they spent their time reacting to privacy breaches as opposed to being proactive in their attempts to prevent them (Deloitte 2007).

Information privacy can be defined in many ways. While Clarke (1999) states “privacy is often thought of as a moral right or a legal right” (p. 60), many researchers have suggested that privacy is one’s ability to control information about oneself (Bélanger et al. 2002; Stone et al. 1983). No matter how privacy is defined, it is clear that the issues surrounding privacy are myriad and of a varied nature. As such, information privacy has been studied not only by IS researchers, but also by researchers in marketing, law, management, psychology, and many other fields. In this paper, we explore the construct of information privacy within the information systems domain. This paper aims to inform researchers about the current state of information privacy research in IS through a critical analysis of the literature. The paper also aims to inform practitioners with a global view of the current state of IS academic knowledge on information privacy.

This review provides several findings and contributions for the literature. First, we identify a wide variety of topics relevant to the information privacy construct and show that information privacy can be studied at multiple levels of analysis, although rarely considered as a multilevel concept. We recommend that future research should consider different levels of analysis as well as multilevel effects of information privacy, and illustrate this with a multilevel framework for information privacy concerns. We also find that information privacy research has been heavily reliant on student-based and USA-centric samples, which results in findings of limited generalizability. We provide suggested directions and research questions that can be studied with a broader diversity of sampling populations. Finally, we find that information privacy research focuses largely on explaining and predicting theoretical contributions, with few studies in journal articles focusing on design and action contributions. We call for more design and action information privacy research to be published in journal articles as opposed to mainly being available through conference proceedings. However, we recognize that publishing such design and action research in journals would likely require more interdisciplinary research.

Literature Review

Information privacy is a subset of the overall concept of privacy, which has been explored and discussed for centuries.

Skinner et al. (2006) suggest that most interpretations of the concept of privacy refer to a human right, but within different contexts. Those contexts led Clarke (1999) to identify four dimensions of privacy: privacy of a person, personal behavior privacy, personal communication privacy, and personal data privacy. Today, as most communications are digitized and stored as information, personal communication privacy and data privacy can be merged into the construct of information privacy. This review focuses on information privacy because most privacy-related IS research has focused on this construct. This singular focus is not surprising since technology is driving many concerns (and some solutions) related to information privacy. Specifically, with the advent of advanced information and communication technologies, data can be collected, aggregated, and analyzed at a faster pace and in larger volume than ever (Malhotra et al. 2004). Further, data can be collected without individuals’ awareness (Bélanger and Hiller 2006).

There are many definitions for information privacy, but there is little variance in the elements of the definitions, which typically include some form of control over the potential secondary uses of one’s personal information (Bélanger et al. 2002). Secondary use refers to the practice of using data for purposes other than those for which they were originally collected. Smith et al. (1996) identify four dimensions of information privacy: collection, unauthorized secondary use, improper access, and errors. Another taxonomy includes information collection, information processing, information dissemination, and invasion (Solove 2006). Skinner et al. (2006) propose a taxonomy of information privacy in collaborative environments focused on time, matter, and space dimensions; the space dimension reflects the structural view of information privacy, which includes individual, group, and organizational privacy. Clarke defined information privacy specifically as “the interest an individual has in controlling, or at least significantly influencing, the handling of data about themselves.” For the purpose of our study, we rely on this definition of information privacy.

In order to explore the information privacy construct in IS research, we conducted an in-depth review of the literature in several stages. To be included in our review, each journal article had to include information privacy as a key construct. We use several frameworks concurrently to perform an analysis of the literature. First, we use Gregor’s (2006) framework of theory classifications to evaluate the theoretical contributions made by the information privacy literature. As suggested by Gregor, researchers can gain significant insights into a research domain by identifying the types of theories used within the domain. Second, we use the structural view of information privacy proposed by Skinner et al. to classify

the literature based on the levels of analysis. In addition to the individual, group, and organizational levels that Skinner et al. propose, we also include a societal level to capture information privacy that is studied within or across national or cultural regions, as proposed by Smith et al. (2011).

The first stage in our search for the literature involved identifying papers on *information privacy* in the ABI/Informs database. Using those keywords, 340 articles were listed as relating to information privacy. We then proceeded to extract from this list research related to information systems and information privacy. In the preliminary screening, we removed articles that were either anonymous short stories, tables of contents, interviews with experts, opinion pieces, papers listed more than once, or articles focused on security but appearing in journals with information privacy in the journal title. We also removed articles presenting legal reviews and commentaries since our focus was on information privacy research in IS, and on papers that we could code for theoretical foundations, sample characteristics, and level of analysis. Most legal articles provide legal discussions and commentaries on laws related to information privacy. Readers interested in legal aspects of information privacy can refer to Appendix A for a substantial list of papers discussing this aspect of information privacy. In total, we removed 218 articles. Appendix A explains this detailed screening and provides the list of removed articles. We then examined the remaining 122 articles for in-depth coding.

The papers were jointly coded for topic area, key constructs, theoretical contributions, and methodology. Details of this coding are presented in Appendices B and C. As a result of our coding efforts, an additional 52 papers were removed from the list of journal articles. These included editorial prefaces, security focused articles, commentaries, opinions pieces that were missed in our initial screening, book reviews, “how to” articles (prescriptive), conference panel session summaries, papers listed twice under different naming or that were identical but in different journals, and papers that were not focused on information privacy research, such as papers on studies of supply chains with side mention of information privacy, studies of general healthcare privacy, and studies or discussions of chief privacy officers. Again, the details of the removed papers can be found in Appendix A. Details of the 70 coded papers are presented in Appendices B and C.

For the second stage of literature review, we identified over 100 additional papers through further investigation of references from the papers identified in the first stage. Our initial screening (as per above criteria) resulted in 72 additional papers being coded. The first 20 papers were coded independently by both authors, who achieved a Cohen’s kappa of

75 percent. Given that Cohen kappas above 0.60 are considered to show substantial agreement (Landis and Koch 1977), one of the authors coded the remaining articles, requesting feedback on difficult to classify articles. Coding details are provided in Appendix B. The resulting sample of 142 coded journal articles papers is included in Appendices C and D.

The final stage of the literature review involved searching conference proceedings databases to identify papers discussing information privacy to (1) verify if trends identified in the coding of the journal articles were also found in conference proceedings, and (2) identify any topic areas or trends emerging from conference papers that were not identified in the coding of journal articles. We investigated 284 articles (50 each from the IEEE conference proceedings database and the ACM Digital Library proceedings database, and 184 from the International Conference on Information Systems proceedings database). Details of the procedures, articles, and coding are provided in Appendix E.

Findings

In total, we reviewed over 500 articles, and coded 142 journal articles and 102 conference proceedings papers. The review revealed several important insights about information privacy research in Information Systems. First, there is a wide variety of topics relevant to the information privacy concept of interest to IS researchers. Second, information privacy research focuses largely on explaining and predicting theoretical contributions, with few studies in journal articles focusing on design and action contributions. Third, information privacy research in IS has been heavily reliant on student-based and USA-centric samples. Finally, information privacy can be studied at multiple levels of analysis, although it is rarely considered as a multilevel concept by IS researchers. We explore each of these issues as related to the existing research more in-depth in the following sections, and discuss the implications of these findings.

Topics in IS Information Privacy Research

IS researchers have studied information privacy through a number of lenses, discussing a wide variety of topics. As can be seen in Appendix D, some topics appear more often in journal articles than others, in particular research related to information privacy concerns, e-business impacts of information privacy, and information privacy attitudes and practices. We briefly discuss important findings from these major

streams of research. Articles in information privacy topic areas less frequently researched can be identified in Appendices A, B, D, and E. These include papers on trust, culture, security, economics of information privacy, surveillance, personalization, risk, marketing, and control, among others. An additional topic area that needs to be briefly discussed is the tools and technologies for information privacy. There are two reasons to highlight this topic even if it does not appear regularly in journal articles. First, from a design science perspective, tools and technologies represent the main contributions expected from design and action theories, as discussed in our analysis of theoretical contributions. Second, our review of the literature in conference proceedings reveals that a large number of tools are published in conference proceedings rather than in traditional journal outlets.

Information Privacy Concerns

Research on information privacy concerns is clearly of importance to IS researchers, and typically seeks to explain differences in levels of privacy concern or to explore the effects of privacy concerns on various dependent variables, such as the willingness to provide personal information or the willingness to transact online. Internet privacy concerns represent individuals' perceptions of what happens with the information they provide via the Internet (Dinev and Hart 2006). More specifically, many researchers have adopted the definition of privacy concerns as focusing on the concerns individuals have with the information privacy practices of organizations (Smith et al. 1996). Others have defined privacy concerns more broadly as the "individual's subjective views of fairness within the context of information privacy" (Malhotra et al. 2004, p. 337). Findings suggest that information privacy concerns influence individuals' attitudes, such as their preferences for regulatory environments and willingness to be profiled (Milberg et al. 2000; Van Slyke et al. 2006). They also influence individuals' acceptance of technology, such as their intentions to purchase online (Malhotra et al. 2004; Smith et al. 1996; Stewart and Segars 2002). Most studies use one of two instruments: concern for information privacy (CFIP) or Internet user's information privacy concerns (IUIPC). CFIP was the first of these to be developed and tested. CFIP has four dimensions including collection of data, unauthorized secondary use of data, improper access to data, and errors in data (Smith et al. 1996). The CFIP scale is composed of 15 items. A later study of the CFIP scale showed that each of its dimensions serves as a second order factor that make up the concern for information privacy construct (Stewart and Segars 2002). A few years later, the IUIPC construct was developed and included three dimensions: control, awareness, and collection (Malhotra et

al. 2004). The resulting scale is composed of 10 items. When developing the IUIPC scale, Malhotra et al. (2004) show that IUIPC explains more of the variance in a person's willingness to transact than CFIP. However, the IUIPC instrument has not been used extensively in subsequent research since the majority of research related to privacy concerns utilizes the initial CFIP instrument. The heavy use of CFIP even after an alternative was shown to work better could be the result of two situations: either research had already started when IUIPC was published, or CFIP is viewed as the *de facto* measure for information privacy concerns. There are many recent papers that continue to use CFIP instead of IUIPC (Bellman et al. 2004; Cockcroft 2006; Dinev and Hart 2004; Earp and Payton 2006; Hoadley et al. 2010; Korzaan and Boswell 2008; Kuo et al. 2007; Lin and Wu 2008; Rose 2006; Van Slyke et al. 2006). A number of studies also included the influence CFIP has on behavioral intentions (Korzaan and Boswell 2008; Pavlou et al. 2007; Van Slyke et al. 2006) or privacy actions (Dinev and Hart 2006; Son and Kim 2008). Recent research in conference proceedings indicates that the trend continues with CFIP more widely used than IUIPC, although some studies do use IUIPC (e.g., Nov and Wattal 2009; Yang and Miao 2008; Zukowski and Brown 2007). Of note, when using secondary data, researchers have sometimes controlled for privacy concerns instead of measuring them with one of the two instruments described above (Awad and Krishnan 2006; Culnan 1993). Given the availability of well-tested instruments and the impacts information privacy concerns have on attitudes and behaviors, future studies should definitely measure concerns. Future research in this domain could use meta analyses to compare the two instruments (CFIP and IUIPC) beyond the comparisons provided by the developers of IUIPC. In addition, studies should explore the differences in antecedents and consequences of both constructs. If findings suggest that both CFIP and IUIPC are equally important and valid, then explanations of why each instrument is selected need to be clearly provided by researchers. Or, as one study recently did, use both constructs if appropriate (Yang and Wang 2009).

Information Privacy and E-Business Impacts

This area of research typically studies how individuals' views of privacy affect their intention to participate in e-commerce or e-government interactions, or their willingness to share information with e-commerce merchants or e-government agencies. Several studies also compare individual differences across national borders. Results show that concerns related to information privacy, along with other factors, affect individuals' intentions to use online services (Bélanger et al. 2002; Chellappa and Sin 2005; Eastlick et al. 2006; Pavlou et

al. 2007; Resnick and Montania 2003), with greater concerns leading to lower intentions. Concerns also lead to individuals being less willing to share personal information with websites (Bélanger et al. 2002; Dinev and Hart 2006; Hoffman et al. 1999). There are, however, some contradictory findings, with some researchers finding that unauthorized use of secondary data—a dimension of privacy (Brown and Muchira 2004), privacy concerns (Drennan et al. 2006), or information privacy protection perceptions (Chen and Li 2009)—has little impact on online purchasing behavior. A potential explanation for these findings is the role of trust. When trust is considered as a factor together with information privacy, trust is more important than privacy when determining Internet purchasing intentions (Bélanger et al. 2002; George 2004). However, it is difficult to say whether the role of trust explains different findings, or if it is that studies with contradictory results (Brown and Muchira 2004; Chen and Li 2009; Drennan et al. 2006) all used student samples. In a study that utilized a nonstudent sample of Internet users, trust (together with risk perceptions) was found to mediate the relationship between privacy concerns and willingness to transact online (Van Slyke et al. 2006). Unfortunately, there are few studies exploring these potential mediating effects. The only other study that explores mediation finds that Internet literacy—“ability to use an Internet-connected computer and Internet applications to accomplish practical tasks” (Dinev and Hart 2005, p. 9)—affects the relationship between privacy and e-business, which reduces an individual’s level of Internet privacy concerns and increases a person’s intention to transact online. Therefore, future research might explore the possible mediating or dominating role of trust when considered together with information privacy, as alluded to by some researchers (Bélanger et al. 2002; Van Slyke et al. 2006). Potential mediating variables other than Internet literacy, trust, and risk perceptions should be explored, including the possibility that the willingness to share information online is related to individuals’ willingness to transact. One potential way to gain this understanding is to utilize a grounded theory approach (Eisenhardt 1989) to develop a theoretical framework for why people have the intentions to perform certain privacy practices, similar to recent work on factors influencing parents’ intentions to protect their children’s privacy online (Bélanger et al. 2009).

In this research, the outcome variable overwhelmingly used is intentions to use an electronic service. Research suggests there is a privacy paradox, in which a person’s intentions to disclose their information does not match up to their behavior in actually sharing that information (Norberg et al. 2007). A respondent’s concerns might lead him or her to state they would not use an online service, but when faced with the possibility of convenience, their actual behavior might be

different (Bélanger et al. 2002). Even if other streams of IS research suggest that intentions lead to behaviors, the privacy paradox should be explored further to provide an understanding as to why such is not the case with information privacy. Furthermore, researchers should not assume *de facto* that intentions lead to behaviors when information privacy research is conducted.

Information Privacy Attitudes

Research on information privacy attitudes often explores perceptions of and reactions to information privacy policies, practices, and tools. Examples of attitudes include sensitivity to sharing or loss of information, or willingness to share personal information (Culnan and Armstrong 1999; Miyazaki and Krishnamurthy 2002; Norberg and Horne 2007), and reactions to privacy invasive technologies such as instant messaging (Cao and Everard 2008) and RFID (radio frequency identification tags) (Razzouk et al. 2008; Thiesse 2007). One issue with research on information privacy attitudes is that each study conceptualizes attitudes differently, with some studies focusing on attitudes toward privacy in general (Razzouk et al. 2008), as perceptions of privacy practices (Miyazaki and Krishnamurthy 2002), as attitudes toward others’ privacy (Earp and Payton 2001), or as attitudes toward data access (Mossholder et al. 1991). While all of these are interesting aspects of privacy attitudes to explore, there is little commonality to build future research upon. Some studies use attitudes as the dependent variable (Cao and Everard 2008; Dillon et al. 2008), while the majority of studies look at privacy attitudes as an independent variable that influences behaviors such as creative performance, use and acceptance of invasive technologies, and online information disclosure (Alge et al. 2006; Culnan 1993; Miyazaki and Krishnamurthy 2002; Mossholder et al. 1991; Norberg and Horne 2007; Thiesse 2007; Webster 1998). The most intriguing finding in information privacy attitudes research is that, in the presence of privacy attitudes, greater concern for information privacy no longer influences willingness to disclose personal information. For example, as people’s attitudes change based on being told that fair information practices are used to manage their information, their concern for information privacy is mitigated enough that they will provide personal information online (Culnan and Armstrong 1999) or will not take actions to protect their privacy (Berendt et al. 2005). A number of conferences papers (Nguyen et al. 2008; Spiekermann et al. 2001; Zeng et al. 2009) confirm these findings. Future studies are needed to understand why privacy attitudes impact decisions people make regarding the disclosure of information and their willingness to interact with invasive technologies.

As the review reveals, the majority of research in this area focuses intensively on *what* leads to a person's reactions to information privacy attitudes. What is missing in the literature, however, is *why* individuals react in a certain way. For example, monetary incentives (Hui et al. 2007) and less sensitivity about the secondary use of data (Culnan 1993) positively affect students' willingness to disclose information. Some studies are starting to explore why individuals act in certain ways in the context of electronic surveillance (Allen et al. 2007; Friedman and Reed 2007). When employees understand why they are being watched they have a better attitude toward this invasive practice (Allen et al. 2007). Another area that needs further exploration for privacy attitudes is RFID (Cazier et al. 2003; Pramatarari and Theotokis 2009; Razzouk et al. 2008; Thiesse 2007).

Information Privacy Practices

Research on privacy practices often explores individual and organizational actions regarding privacy protection or infringement, and various factors that affect these practices. Individual information privacy practices include using caution when divulging information, using privacy protection software (McGinity 2000), falsifying personal information, employing passive restraints such as filtering or deleting unwanted e-mail, and utilizing identity modification (i.e., creating new e-mail accounts when one is being spammed or using a gender neutral ID during chat) (Chen and Rea 2004). Factors affecting privacy practices include the types of websites visited and country of origin (Hsu 2006). Some research suggests that individuals are not always aware of the proper practices they should employ (Klasnja et al. 2009). Research on organizational practices is abundant, and mostly focused on analyses of privacy policies of websites and frameworks for organizational practices. Researchers typically discuss the fair information practices (FIP) compliance in privacy policies or provide assessments or metrics to investigate the policies. Findings suggest companies still do not provide appropriate privacy protection for consumers because many do not have privacy policies, and when they do, they often do not comply with the FIP standards (Jensen and Potts 2004; Liu and Arnett 2002; Peslak 2005a, 2005b; 2006; Ryker et al. 2002; Sheehan 2005; Yang and Chiu 2002), or they are long and complex (Schwaig et al. 2005). One consistent finding is that U.S. companies are most likely to have a privacy policy (Liu and Arnett 2002; Peslak 2006). What is missing from research on privacy policies is why companies do not comply with FIP, or whether FIP standards are relevant for consumers.

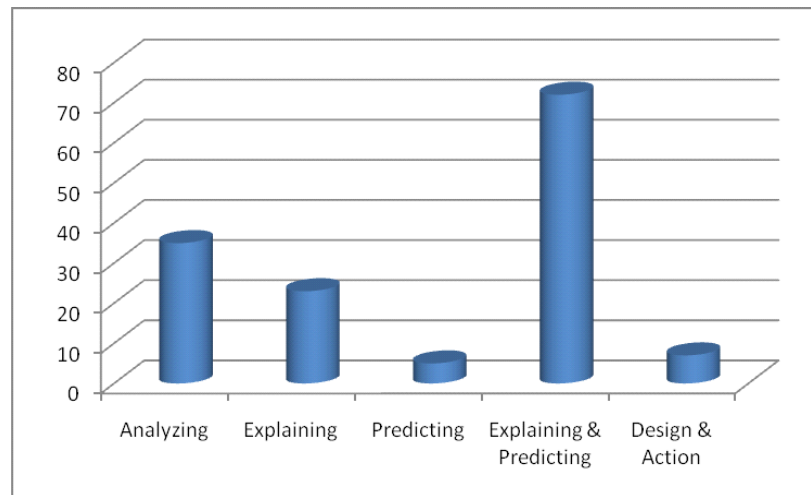
Information Privacy Tools and Technologies

Research on information privacy tools and technologies typically presents and/or evaluates artifacts or technological solutions for dealing with information privacy protection. The research often starts with an examination of privacy threats and then presents solutions, either technical or conceptual, for addressing those threats. The tools and technologies discussed include both privacy invasive technologies (PITS) and privacy enhancing technologies (PETs). This is clearly an area with both research and practical implications. While there has been a call for more of this type of research (Cranor 1999), the results of this review suggest that this call has been mostly answered by computer scientists as opposed to IS researchers, and that it has been addressed mostly at the conceptual (proof of concept) level as opposed to actual implementable and available tools. This only suggests that there are many opportunities for IS researchers to be more involved in research on information privacy tools and technologies.

One of the most surprising findings from this review is that most, if not all, of the research on information privacy tools and technologies is conducted in isolation from actual future users of the tools. None of the research presented included both design of an information privacy tool and subsequent evaluation of the tool by its expected users. We believe that this is a fruitful area for future research. Such research can be conducted using a multidisciplinary team where a tool designed by computer scientists or design science researchers is informed by IS researchers' understanding of factors that influence individuals' use of technology and reactions to information privacy. This designed and implemented tool can then be evaluated by collecting data from potential users through standard research approaches used by IS researchers. Clearly, there are many behavioral questions to be explored with respect to not only use of potential privacy protection tools but also effectiveness and consequences of use. Designers often forget to consider how they would measure the effectiveness of privacy protection tools, and that is something IS researchers should seek to answer. Similarly, IS researchers need to identify the features of privacy protection tools that are the most important for consumers. Finally, one area of future research that seems likely to gain importance is the balancing of information privacy concerns with the advantages of location-based services (LBS), as hinted at in some conference papers (Gkoulalas-Divanis et al. 2009; Hong et al. 2004), since vendors increasingly explore ways to use LBS for marketing purposes.

Table 1. Contributions to Theory: Definitions (Adapted from Gregor 2006)

Theory Type	Definition
Analyzing	Describe the state of information privacy or the need for information privacy research.
Explaining	Explain what is occurring but do not provide testable predictions.
Predicting	Provide testable predictions without well-developed causal relationships
Explaining and Predicting	Explain what is occurring and provide testable predictions with causal explanations.
Design and Action	Specifically design a tool for providing information privacy or a framework to evaluate such tools.

**Figure 1. Summary of Theoretical Classifications for Information Privacy Literature**

Theoretical Contributions of Information Privacy Research

We analyzed the theoretical contributions of the information privacy articles using an adaptation of Gregor's (2006) proposed framework for classifying theories, which suggests that there are five different theory types: analyzing, explaining, predicting, explaining and predicting, and design and action. The definitions of these categories, as adapted to our research domain, are presented in Table 1.

Each article in our review was coded for theoretical contributions as presented in Figure 1 and Table 2, which present a summary of online Appendix C. The theoretical classification reveals some interesting trends. First, it is clear that the majority of information privacy research has focused on explaining and predicting theoretical contributions, with analytical theoretical contributions as a second major category. A further finding is that very few articles provide design and action contributions.

As can be seen in Table 2, the majority of research in information privacy concerns, e-business impacts, and information privacy attitudes has been devoted to explaining and predicting theories. For information privacy concerns, this work includes a substantial focus on the development and testing of instruments, as previously discussed (Malhotra et al. 2004; Smith et al. 1996; Stewart and Segars 2002). This approach is consistent with Gregor's framework, which suggests that theory development starts with analysis of a domain followed by explaining and predicting theories. As such, other research domains would benefit from this approach, in particular privacy attitudes research, which does not have a standardized definition for measurement of privacy attitudes. Developing a common way of conceptualizing and measuring privacy attitudes, using a similar approach to the development of the CFIP construct (Smith et al. 1996), would be beneficial to information privacy research by allowing the work of different researchers to build upon one another to provide for a more thorough understanding of privacy attitudes.

Table 2. Theoretical Contributions in IS Information Privacy Literature

Theory Type	Topic Areas*				
	Information Privacy Concern	Information Privacy & E-Business Impacts	Information Privacy Attitudes	Information Privacy Practices	Information Privacy and Technologies
Analyzing	5	7	2	22	9
Explaining	2	5	6	15	0
Predicting	3	2	2	0	1
Explaining & Predicting	36	24	16	25	2
Design & Action	0	0	0	0	7
	46	38	26	62	19

*Some articles are counted more than once because they cover more than one topic.

An interesting finding from Table 2 is that information privacy practices research, contrary to most of the other thematic areas, has not focused on a particular theory type. In fact, there are many analyzing and explaining studies together with explaining and predicting studies. This is largely due to the analysis of privacy policies on websites. Easy access to publicly available information makes it possible to perform in-depth analyses of what companies are including in their privacy policies. Many studies explore whether the fair information practices are reflected in the policies. However, we believe that information privacy practices research has evolved to where we expect to see more explanation and prediction contributions. For example, expanding on the conflicting desires between corporations and consumers for use of information, research could develop theories that explain and predict company attributes that lead to more effective privacy practices. Additionally, researchers could look at how these traits manifest themselves as successful privacy practices are utilized across international borders.

Gregor proposes that explaining and predicting theories will lead to design and action theories. The review reveals that this has not occurred overall in published IS journal articles. There are exceptions, with some papers discussing information privacy tools and technologies based on the existing P3P framework, a privacy protection protocol that standardizes privacy policy information to allow users to gain a better understanding of how websites' privacy policies match their own privacy preferences (Cranor et al. 2006; Reagle and Cranor 1999). This has resulted in a privacy enhancing tech-

nology named Privacy Bird, which uses a notification process to inform a person browsing the Internet about how privacy friendly a website is (Cranor 2006; Cranor et al. 2006).

One concern is that many of the tools or frameworks discussed in design and action theory papers are proofs of concepts that never result in actual tools being implemented. For example, TrustBank, which consists of a repository of digital personas that help transfer the ownership of information from companies to individuals (Nilakanta and Scheibe 2005), and the personal information detection tool used to scan websites to see if they comply with the privacy policy of the organization using them (Kudo et al. 2007), are described in journal articles but not publicly available. Frameworks such as Freenet to handle privacy concerns in peer-to-peer networks (Clarke et al. 2002) or an XML agent to ensure that a user's desired privacy posture is followed when browsing websites (Warkentin and Johnston 2006) have yet to result in implementable tools. As a result, most proofs of concepts or frameworks remain confined to conference proceedings and do not become mainstream articles (Cai et al. 2009; Godfrey 2000; Hall and Zisman 2004; Peng et al. 2009a, 2009b; Yee 2006, 2007).

The review of recent conference proceedings suggests studies published in proceedings have much to offer. For example, conference proceedings include research on a schema for the protection of information consumers placed online while conducting an e-commerce transaction (Peng et al. 2009a, 2009b), designs of a browser plug-in for parental control of

information sharing by children (Channakeshava 2008; Crossler et al. 2007), human-computer interaction concepts to handle privacy concerns (Hawkey 2008), usability studies for privacy protection systems (Ko et al. 2007), new encryption schemes (Wilson 2008), various frameworks for exploring better ways to protect individuals' privacy in e-business (Hall and Zisman 2004; Yee 2006, 2007), a P3P-based privacy preference generator (Kolter and Pernul 2009), a website data tracking tool to study usage of privacy tools (Jensen et al. 2007), a tool called iWatch to protect individual privacy (DeGrande and Donizetti 2006), a plug-in tag-based tool to control privacy in Web 2.0 applications such as blogging (Hart et al. 2009), a prototype to protect information shared on facebook.com (Lucas and Borisov 2008), and a tool to create and analyze privacy policies (Dreyer and Olivier 1998).

Most proposed and/or designed tools are not publicly available, with very few exceptions. The one tool we could find that users can use is Privacy Bird™, which is offered as a free download from AT&T. Others, like the privacy preference generator, provide a link to the tool for download. Unfortunately, the link does not work at the writing of this review. The plug-in for control of privacy for Web 2.0 application, to our knowledge, has not been made publicly available. We believe it would be useful for more tools to be downloadable or available for future research to verify prior findings, test the tools in different contexts, and allow subsequent research to build on existing tools. This would also be useful for conceptual tools or proofs of concepts, which could be turned into products. Converting conceptual frameworks to actual tools is a desired research endeavor since frameworks may have fewer practical implications than tools. Of course, there are issues of intellectual property to tackle, but somehow researchers need tools to be available for progress to be made instead of constantly reinventing the wheel. Maybe the solution is to develop a centralized repository of frameworks and tools that researchers can share with each other. Another way to make progress to increase the availability of information privacy protection tools would be to clearly identify and test a set of common guidelines or criteria that design scientists should use for the development of privacy protection tools for consumers and for organizations. Finally, it could be that information privacy research should be conducted in an open source environment, which would enable the code that one group designed to be expanded on by another group. This would allow research to build incrementally on prior work.

Researchers should also investigate ways to protect consumers and citizens beyond simple assurances through the development of design and action theories that operationalize

their understanding of information privacy and its impacts. For example, they could design tools that reduce the risk of online transactions and increase the trust consumers have with websites, or tools that would allow people to indicate how their privacy attitude changes (from positive to negative) while they interact with a website. A related search tool that would provide results based on factors that may be affecting the user's attitude could then utilize this information. Feedback could also be provided to websites about when people's attitudes change during their experience visiting the website. Companies could modify how they interact with users on their website based on this information. Without academic researchers involved in the process of making the transition from explaining and predicting theories to design and action theories, knowledge about information privacy may be lost.

Sample Characteristics in IS Information Privacy Research

In classifying the IS literature on information privacy, we explored the nature of the samples used for empirical research or the context used for conceptual research. In particular, we identified the type of respondent (student versus nonstudent) and the national or cultural origin of the respondents. We found, as explained below, that information privacy research has been heavily reliant on student-based samples and U.S.-centric samples, which results in findings of limited generalizability. The detailed results are also included in online Appendices D and E.

Respondent Type

IS researchers often use student samples to explore various phenomena, and information privacy research does not escape this fact. However, it varies greatly by topic area. For information privacy concerns and privacy attitudes, a significant portion of the studies are done using consumers and professionals as opposed to student samples. This suggests that the research provides good insights into the privacy concerns and attitudes of everyday consumers and that the findings are likely to generalize over different populations. For e-business research, however, there are approximately equal numbers of studies that use citizens or consumers as opposed to students, with many studies using both types of respondents (e.g., Dinev et al. 2006a, 2006b; Dinev and Hart 2006). While one can argue that students may represent an appropriate sample as a category of consumers, there is reason for concern when studies have conflicting findings between the two types of respondents, as was the case in e-business research where studies showed contradictory results to the general findings

when they utilized student samples (e.g., Brown and Muchira 2004; Chen and Li 2009; Drennan et al. 2006), as explained earlier in the paper. There is less of an issue of respondent type in information privacy practices research, where the vast majority of studies are conducted at the organizational level, focusing on information privacy policies on websites. The few individual level studies in this area often use nonstudent samples like consumers (Dillon et al. 2008), managers (Smith 1993), and Internet users (Earp et al. 2005; Son and Kim 2008).

IS researchers often discuss how the use of nonstudent samples improves generalizability. We argue that student studies should not be dismissed, as they provide valuable testing and, in reality, students can have privacy concerns and attitudes, and are consumers as well. However, students might have different concerns than professionals or consumers in general, and may have different buying behaviors. In a recent conference paper, Hart (2008) argues that, in the context of information privacy, making generalizations based solely on student samples may be misleading. Therefore, when a large number of studies use student data in a research domain (e.g., e-business impacts, information privacy concerns, etc.), it is important for researchers to compare results of student and nonstudent-based studies using meta-analyses to identify general differences and similarities in findings. Future research also needs to test their proposed relationships with nonstudent samples to ensure that findings reflect the underlying relationship and not the nature of the subjects studied. For example, studies can explore whether students exhibit a weaker relationship between privacy and e-business use intentions even though they are consumers like everybody else (although with different budgets and types of purchases). They can compare differences in information privacy attitudes and information privacy concerns in student and nonstudent samples, including people from a wide range of ages, incomes, and ethnicities. Results may suggest that further research is needed to explore differences across samples in antecedents and consequences of information privacy concerns. For example, anecdotal evidence shows that students tend to be more willing to give information (think Facebook.com) than professionals. How do such differences affect overall findings regarding information privacy concerns?

Respondent Origin

A large number of information privacy research studies have been U.S.-centric, with few samples drawn from other countries. In particular, research on e-business impacts, information privacy attitudes, and even privacy practices provides few insights on differences between countries. What is sur-

prising is that information privacy and e-business research, for example, should be even more present in other countries since many countries are more e-business ready than the United States (EIU 2009), and have shown substantial growth in Internet use in recent years (www.internetworldstats.com). Of note, some recent research using non-U.S. samples do appear in conference proceedings, with countries such as Dubai, France, New Zealand, South Africa, and Germany represented (Agarwal and Rodhain 2002; Akhter 2007; Cullen and Reilly 2008; Hart 2008; Spiekermann et al. 2001).

Individuals from different countries can be expected to have different cultures, values, and laws, which may result in differences in their perceptions of information privacy and its impacts. The findings of studies that take a multi-country perspective support this expectation. For example, Italians showed lower privacy concerns but higher government intrusion concerns than Americans (Dinev et al. 2006a), exhibited a weaker relationship between privacy concerns and e-commerce use, but a stronger relationship between perceived risk and privacy concerns (Dinev et al. 2006b). This highlights the need for researchers to consider whether their findings are generalizable to other countries. They often may not be, as is the case of e-business research conducted in countries other than the United States. In two studies of Australian students, one found similar findings as those in the United States, but the other found an inverse relationship between information privacy (errors and invasion of privacy dimensions) and online purchase behavior (Brown and Muchira 2004). Another Australian study found that privacy-active behaviors, such as reading privacy policies or seeking actions related to privacy, are not related to purchasing intentions (Drennan et al. 2006), something contrary to many findings of prior research.

One research area that has benefitted from inputs from countries other than the United States, and as such provides a more global view of the concepts, is that of information privacy concern, where approximately half of the coded studies used a U.S.-based sample, while the others used samples from other countries such as Australia, China, New-Zealand, and Taiwan. Recent research in conference proceedings pursues this trend with studies in South Africa (Zukowski and Brown 2007), Japan and New Zealand (Cullen and Reilly 2008), India (Xu et al. 2009), and Asian countries (Tam 2000; Zhao and He 2009; Zheng et al. 2008), to name a few.

Even research on information practices that focused on privacy policies in websites seem to rely heavily on websites based in the United States, even though worldwide access is available for most companies' policies. Only one study investigated websites for companies specifically based outside the

United States, which was Taiwan (Yang and Chiu 2002). Some studies do look at companies from various countries in addition to the United States, but they rarely make any inferences about international comparisons (Henderson and Snyder 1999; Peslak 2006; Ryker et al. 2002; Schwaig et al. 2005; Storey et al. 2009). This is especially troubling considering that websites for companies based outside the United States are much less likely to have a privacy policy (Schwaig et al. 2005), and that the types of websites visited and the country of origin of respondents affect privacy practices (Hsu 2006). What is interesting is that most of the research on information privacy in general does not take into account the nationality of the respondent, assuming that the findings are somewhat generalizable. This study suggests otherwise, at least with respect to privacy practices. While it is possible that citizens of countries where governments have long promoted and enforced legal protection for information privacy (e.g., European Union, Hong Kong, Australia, or New Zealand) may be less sensitive to information privacy issues, and therefore organizations in these countries are less likely to view the need for information privacy policies as crucial, this needs to be investigated.

Studies are needed to provide IS researchers with a deeper understanding of information privacy by conducting more research in multiple countries. Researchers need to better conceptualize their expectations about privacy antecedents and consequences in various cultural environments. Studies that would help us differentiate privacy attitudes and concerns based on cultural or government influences would be of interest. Researchers could also compare U.S. privacy practices to those of companies in other countries. Such approaches would provide insights into how companies from different countries behave when it comes to protection of their customers' privacy. For example, when Google refuses to provide the government with the personal information of its users (Sydell 2006) but Yahoo gives up the identity of bloggers to another government (Goodman 2005), one has to ask why two companies in the same industry make different decisions about protecting their customers' privacy in the midst of legal and cultural challenges. Such situations are ripe for research where one could explore the conflicting roles in which gatekeepers of personal information find themselves.

Finally, analyses of information privacy from a national and cultural perspective, as was done for Japan in a journal article (Mizutani et al. 2004) and other Asian countries in conference proceedings (Tam 2000; Zhao and He 2009), could enhance information privacy research with a more holistic perspective for each country or culture. Such in-depth discussions should be provided for other cultures, including African cultures, Latin American cultures, or northern European cultures.

Non-Sampled Studies

Discussing findings on information privacy tools and technologies research takes on a different meaning since most of these studies do not test any construct by requesting information from study participants. Tools are proposed, designed and/or evaluated independently of actual or potential users. One exception is a tool designed with a particular market in mind, the Personal Intrusion Detection, proposed and developed by IBM Japan and discussed in that context (Kudo et al. 2007).

Summary

As this discussion highlights, IS research seems to have relied heavily on student samples and to have taken a very U.S.-centric view of information privacy attitudes, practices, and consequences since most of this empirical research is conducted with U.S. citizens. While it is possible that these findings are a reflection of the journal sample, which included English language journals only, it does indicate a trend to further investigate. Due to the conflicting findings identified in this review and the need for a broader understanding of information privacy, a topic of great interest to IS researchers, we believe there is a clear need to expand future research on information privacy from a sample perspective.

Structural View of Information Privacy

A final classification of the literature was based on the structural view (levels of analysis) for information privacy, as presented in Appendices D and E, and summarized in Table 3 for journal articles. While Skinner et al. (2006) identified three levels of information privacy—individual, group, and organization—the article by Smith et al. in this issue of *MIS Quarterly* uses four levels to classify information privacy research: individual, group, organizational, and societal. These levels were determined after the authors followed a rigorous classification schema as conducted in previous research (Clark et al. 2007; Leidner and Kayworth 2006). These levels of analysis serve as a starting point from which to explore the construct of information privacy as conceptualized in the IS literature. Clearly, even if information privacy is most often defined at the individual level (“ability to control information about oneself”), it has implications at other levels, for example, when organizations and industries decide to self-regulate or fail to enforce privacy policies (Nilakanta and Scheibe 2005).

Table 3. Summary of Topics per Levels of Analysis in Information Privacy Research

Levels of Analysis	Topic Areas*				
	Information Privacy Concern	Information Privacy & E-Business Impacts	Information Privacy Attitudes	Information Privacy Practices	Information Privacy and Technologies
Individual	36	28	23	23	12
Group	0	0	0	0	0
Organization	0	6	0	22	4
Societal	3	0	1	7	1
Individual + Organization	2	3	2	4	1
Individual + Societal	4	1	0	2	0
Organization + Societal	0	0	0	4	0
Individual + Organization + Societal	1	0	0	0	1
	46	38	26	62	19

*Some articles are counted more than once because they cover more than one topic.

The review of the literature reveals two interesting findings with respect to the structural view of information privacy research. First, information privacy research has been studied at various levels of analysis, although most studies have been conducted at the individual level. Second, we find that information privacy research can also be conceptualized as a multi-level concept, but is very rarely researched as such. In multi-level research, researchers investigate effects of phenomena occurring at or across multiple levels of analysis concurrently. In the next section, we propose a multilevel framework and a research agenda for information privacy concern as a starting point to explore the multilevel nature of information privacy.

Levels of Analysis in Information Privacy Research

As Table 3 reveals, very limited information privacy research has been done at any level besides the individual level, except for information privacy practices (with organizational level studies). For the other topics, between 63 and 89 percent of the studies are conducted at the individual level. It is not surprising that most research is conducted at this level because there are validated instruments that can be used for this research, and it is easier to collect and analyze data from a large number of individuals using surveys or interviews. Finally, many information privacy concepts are concep-

tualized and understood to be individual-level constructs. For example, when most people think of attitudes, it is at the individual level. We are not suggesting individual level research should not be done. Clearly, there are many avenues for future research. For example, research should be conducted on how to improve the privacy practices of individuals. In addition, given the high volume of research on information privacy concerns at the individual level, we would expect more efforts in developing tools for individuals to protect their information privacy. There is also a need for metrics to evaluate privacy policies from the individual’s point of view. Such a metric may then be utilized as a mediating factor in empirically testing how privacy practices differ between individuals. However, given the large number of studies at the individual level for most topics, we focus our remaining discussion on how information privacy can be studied at other levels of analysis.

An interesting finding from Table 3 is that most of the studies conducted at the organizational level of analysis focus on information privacy practices, and that several studies about tools and technologies focus on the organization as well. The larger number of studies on privacy policies may be the result of the easier access to the data (publicly available policies) and the existence of tools such as P3P, which can be used for automatic screening of privacy policies or the development of privacy policy generators. While not appearing in journal

articles, many tools targeting online privacy policies are published in conference proceedings (DeGrande and Donizetti 2006; Dreyer and Olivier 1998; Hart et al. 2009; Jensen et al. 2007; Kolter and Pernul 2009). One possible avenue to extend this research would be to look at other types of organizations beyond commercial websites, for example, studying privacy policies for government agencies.

Other research typically provides or discusses tools organizations can use to either protect (PETs) and/or infringe (PITs) on consumer information privacy. For example, there are discussions of privacy invasive technologies (PITs) companies use such as adware and spyware to infringe on consumers' information privacy (Dobosz et al. 2006), and trust seals organizations can use as a means to protect information privacy of consumers (Moore and Dhillon 2003). What is interesting is that very few researchers study information privacy concerns of organizations even though some researchers do seem to believe concerns exist since they design and/or evaluate tools for companies to use. There seems to be a paradox where organizations are concerned with information privacy but researchers rarely consider this level of analysis in their studies (except to discuss privacy policies).

It is surprising that the other topic areas in information privacy research do not exhibit a larger number of studies at the organizational level. For example, in the context of e-business or even e-government, organizations should be interested in understanding privacy impacts since privacy concerns can affect the ultimate success of the e-commerce or e-government initiative (as highlighted by findings in the review). Researchers should explore whether organizations have different stakes in information privacy than the consumers they serve. Companies might have their own set of privacy concerns for the organization (as demonstrated by companies like Microsoft and Google not allowing employees to discuss their work life on public blogs) and related consequences. How do these information privacy concerns influence the collaboration and ultimate success of inter-organizational systems? Organizations may also have their own unique attitudes about privacy. For example, Microsoft provides very little privacy protection for its users (Sobiesk et al. 2007), while companies like Eli Lilly and Company provide significant amounts of privacy protection (Donlan 2007). These differences could be the result of the sensitivity of the information the companies possess, with more sensitive information resulting in greater concern. Future studies should explore what causes different privacy attitudes and concerns within companies and between companies. They could also explore how differences in the business model companies employ or products they offer influence their attitudes about privacy. Action research (Davison et al.

2004), case studies (Benbasat et al. 1987), or ethnography (Myers 1999) may be good approaches to gain enough information inside of a company to report on the company's perceptions related to information privacy.

One possible explanation for the lack of organizational research is that while organizations are interested in understanding information privacy impacts, researchers have yet to tackle these issues. However, gathering information from citizens or consumers in general is easier than getting organizations to participate in such research. As proof, even recent conference papers (Lobato et al. 2009; Nachtigal 2007; Yu 2007) offer only prescriptions for companies regarding information privacy and e-business; there is no data collection. Another example is a study that inappropriately claims to discuss benefits from the organizational perspective, but actually derives a list of benefits from surveys and interviews of students (Hui et al. 2006). Future research should avoid such organizational prescriptions unless they are based on relevant samples (in this case, organizational informants).

An area for future research at the organizational level is the role of organizational culture on information privacy. Organizational behavior researchers have a long-established tradition of studying cultures in organizations. IS researchers should build on that research to explore how it affects privacy concerns, attitudes, and practices of individuals, their groups, and management of the organization. Research shows that U.S. corporations have different concerns for information privacy than Canadian firms (Swartz 2004). Since organizational cultures impact how individuals perform tasks and live their day-to-day work lives (Kwantes et al. 2007; Yazici 2009), future research needs to explore the impacts of these differences. It is possible also that there is an inverse relationship between culture and information privacy in organizations. Could different information privacy requirements between organizations create differences in their organizational culture?

At the societal level of analysis, there are typically two main approaches to conduct studies related to information privacy. First, there are comparisons of information privacy constructs between individuals or organizations in two different countries (Bellman et al. 2004; Cockcroft 2006), with many studies investigating compliance with FIP standards (Liu and Arnett 2002; Peslak 2006; Schwaig et al. 2005; Sheehan 2005; Yang and Chiu 2002). These studies tend to be mostly descriptive of the differences in standards use. Empirical studies, on the other hand, typically involve data collection at the individual level but aggregated for comparisons across nations or cultures. Another approach, which provides a more in-depth understanding of the privacy constructs, uses differences in

culture and cultural values of individuals from different countries, along with other variables, to show their effect on privacy constructs (Lin 2005; Milberg et al. 1995). This is more challenging from a data collection standpoint since researchers need a large enough nonstudent sample from several different countries to make valid comparisons. These studies most often operationalize culture using the same instrument: Hofstede's (1991) dimensions of national culture.

We believe that more studies of information privacy should be conducted at the societal level of analysis. In doing such studies, one should not forget that the societal level of analysis can be broad, including individuals, groups, and organizations embedded into societal phenomena. As corporations, social networks, and even governments appeal increasingly to a global audience, it is important to understand citizen, employee, and consumer information privacy better. For example, it is unclear which dimensions of culture (e.g., Hofstede 1991) have a greater impact and/or explain differences in information privacy attitudes, concerns, and impacts. As a result, studies are needed to help uncover the attitudinal differences that affect the behaviors of individuals in different countries. Of great interest would also be studies of information privacy tools and technologies at the societal level, specifically focusing on potential national bias in design. Is the design of information privacy tools and technologies focused on the American understanding of information privacy, and is that understanding applicable to the rest of the world? In a discussion of enterprise resource planning (ERP), Soh et al. (2000) demonstrate how the ERP system implementation in non-Western countries can fail because local practices are different. Future research on information privacy tools and techniques should likewise be more contextually sensitive.

One of the most interesting findings from the review is that no studies exist that focus on the group level of analysis in the IS information privacy literature. We argue that group information privacy is a valid category, as also proposed and discussed by Skinner et al (2006) and Smith et al. (2011). As individuals interact in groups, information privacy can become a relevant constraint or enabler (Westin 1967). In the next section, we specifically discuss the construct of group information privacy concerns. We identified another very interesting group level construct in information privacy from recent conference proceedings: group culture (Nov and Wattal 2009; Razavi and Iverson 2006). In these papers, researchers discuss how users share information differently in various groups and communities that have different cultures and characteristics. More studies of the effects of group culture and organizational culture on information privacy practices are needed. Most likely, this will require in-depth qualitative analyses (Miles and Huberman 1994; Myers 1997).

Information Privacy Research as a Multilevel Concept

As can be seen from Table 3, few articles specifically research more than one level of analysis concurrently. We argue that from a multilevel perspective, research should extend beyond the individual level of analysis and consider several levels concurrently when appropriate. Clearly, the individual is often a component of other levels of analysis, especially in research at the societal level of analysis. For example, researchers interested in international comparisons may collect information from individuals and then compare these differences based on the individual's country of origin. This research may strictly look at country differences with national conclusions reached, or it may focus on the individuals within these countries. Similarly, while individuals are a core component of groups (Morgeson and Hofmann 1999), groups also have their own identity, structures, and constructs (Watson-Manheim and Bélanger 2002). The attitudes of groups may vary somewhat from those of the individuals who are members of the group. The privacy attitudes and views of the group may reflect that of the group leader or be a function of all group members. Regardless of how the group's privacy views and behaviors are formed, the individual is a key factor in this process.

Some researchers are beginning to look at the interaction between individuals and organizations (Earp et al. 2005; Miyazaki and Krishnamurthy 2002; Nowak and Phelps 1997), individuals and societal approaches to privacy (Milne and Gordon 1993), and organizations on a societal front (Peslak 2006; Schwaig et al. 2005; Smith 2004). Such approaches provide added insights not available at a single level of analysis, and we encourage such studies.

In many respects, privacy is often an area of conflicting desires between organizations and individuals. For example, in e-business, consumers desire that their information be used only for what is necessary to complete the transaction, while companies often desire to make additional money from the consumer information they receive. These conflicting desires lead to a fine balance in how companies approach their privacy practices. If they push the envelope too far in their desire to make a profit, they risk alienating their customer base. However, if they do not use the information they have to make additional profit, they leave themselves vulnerable to other companies filling that niche and providing extra competition for them. Therefore, understanding the desires and interactions of both of these groups provides practical insight that can be used to further enhance the online experience for both companies and the consumer.

While many studies focus on online privacy policies of organizations, few examine the individual's perceptions about these policies. The few studies that attempt to address this concern from a multilevel perspective focus on how well FIP standards are meeting the needs of consumers. In the context of healthcare websites, it was found that privacy policies were being developed to satisfy the company's objectives but not the consumers' (Earp et al. 2005). It is interesting, then, that individuals are more likely to provide information to websites as the level of privacy guaranteed by the website increases (Meinert et al. 2006). These results may be explained by the fact that only half of the population ever read privacy policies (Meinert et al. 2006; Princeton Survey Research Associates 2002), or the fact that they do not understand them (Awad and Krishnan 2006). If privacy policies are not being read, then they may serve more as a means of protection for companies than as a means of communicating information to consumers. FIP standards were designed to provide a balance between the desire of consumers for privacy protection and the desire of businesses to derive value from customer information. However, the above findings suggest that perhaps the FIP standards need to be reevaluated to determine whether they truly are providing that balance.

Future research could expand the understanding of privacy policies by conducting multilevel research to determine the equilibrium point where consumers feel their privacy is adequately protected so they would provide personal information and where companies consider they have the freedom they need to conduct profitable business. The results of this multilevel research could include reevaluating FIP standards, resulting in potentially better compliance and consumers believing their privacy needs were being met, as suggested in a recent conference paper (Brown and Kosa 2008). Research could also take the form of an analysis of the dual perspective of the consumer and the web merchant, investigating the impacts of match or mismatch between the privacy preferences of the consumer and the merchant. Given the impacts of information privacy on e-business success, researchers could also explore how e-businesses could use consumer information privacy preferences to gain a competitive advantage. Businesses and groups within organizations possess vast amounts of information they do not want others such as competitors, and even business partners, to know about. The level of concern for privacy that organizations face may be related to the culture of the company and how transparent they try to present themselves, or may be industry related. Future research could provide a way to measure the privacy concerns of businesses and groups, and then try to differentiate the factors that explain these concerns and the related consequences in an industry or a society.

The other combination of levels most studied is the individual and societal levels. As explained in the prior discussion of societal studies, data is often collected from individuals and then aggregated. When properly done, this can provide insights at multiple levels of analysis, for example, exploring differences in privacy concerns between two nationalities and the effects of these differences on intentions to continue as previously to transact online (Dinev et al. 2006a, 2006b). It is surprising that there are not more studies published on international comparisons on information privacy constructs. Future research could use a multilevel framework to gain a better perspective of the role information privacy at the group, organizational, and societal levels. We further explore the multilevel nature of information privacy next.

A Multilevel Model of Information Privacy Concerns

The results of our analyses reveal that there is much to be studied in the realm of information privacy research. The results also demonstrate the usefulness of various perspectives (theoretical contributions, levels of analysis, and sampling choices) for analyzing an IS research domain. In this section, we combine the results of our prior analyses to further explore one particularly popular topic in information privacy, that of information privacy concerns. This in-depth analysis starts with the premise that information privacy concern is a multilevel concept. Figure 2 serves as an illustration of the expected interrelationships between the levels of analysis. We discuss the model in detail in the subsequent paragraphs.

The thematic analysis clearly highlights the fact that information privacy concern is one of the two most studied topics in the information privacy literature, particularly at the individual level of analysis. As previously discussed, this may be the result of several attempts at providing an instrument to measure individual concerns. Consistent with the focus on individuals, we start our discussion of the information privacy concern multilevel framework at the individual level. The model suggests that individuals' information privacy concerns are influenced by external factors, such as individual differences. Several individual differences have been studied in prior research, such as gender, age, and education. Other individual differences could be studied, such as the effects of self-efficacy or personality traits like amicability on information privacy concerns. There is also the need to study the moderating effects these individual differences could have on the linkages between information privacy concerns and dependent variables like e-business adoption. Since much has

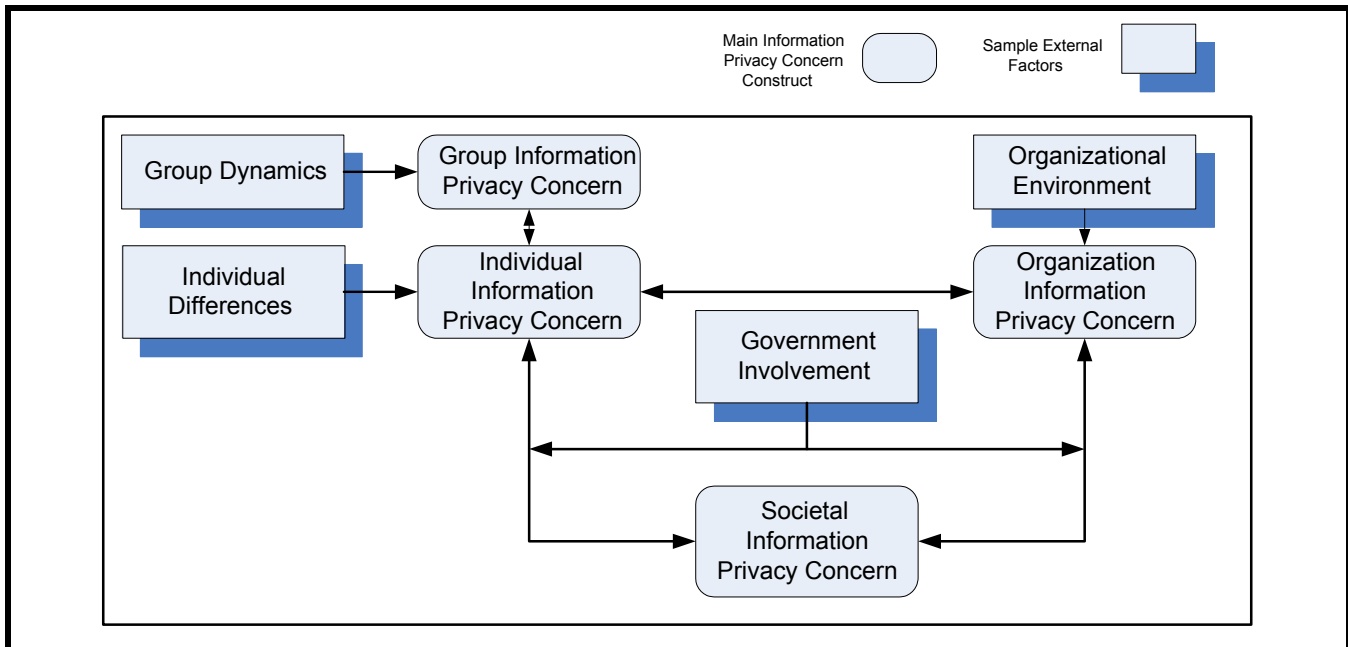


Figure 2. Information Privacy Concern Multilevel Framework

already been said about the individual concern for information privacy, we focus the rest of our discussion on the other levels and, more importantly, on the relationships across levels as they relate to concern for information privacy.

As with all of the topics identified in the thematic analysis, information privacy concern has not been studied at the group level, with the exception of the framework and definitions provided by Skinner et al. (2006). This is surprising since groups are one of the predominant structures for work in organizations today; individuals often belong to multiple teams concurrently (Watson-Manheim and Bélanger 2007). We believe group concern for information privacy is a potentially very interesting and fruitful area for future research. We define group information privacy concern as the collective concern that group members have regarding the privacy of the information the group possesses and has access to.

In organizational theorists' multilevel research, groups are often defined as collectives. A collective is "any interdependent and goal-directed combination of individuals, groups, departments, organizations, or institutions" (Morgeson and Hofmann 1999, p. 251). More importantly, a collective has its own constructs, which have their own "structural properties that can exert influence that is independent of the interaction that initially cause the construct to emerge" (ibid, p. 251). For example, one well-recognized construct at the group level is team cohesion. Others have identified how

different groups develop their own norms for communication and use of technologies (Watson-Manheim and Bélanger 2007). Given that groups have their own identity, structures, and constructs, and that they are often in competition with one another (Watson-Manheim and Bélanger 2002), it is likely that groups have different privacy concerns. This is consistent with findings from prior research on knowledge sharing that suggests teams fear loss of autonomy if they grant access to their data, which would hinder their ability to accomplish their tasks (Markus 2001). These group information privacy concerns can differ somewhat from those of the individuals who are members of the group. A group concern for information privacy may rise to the level of the highest member, be a function of the group leader's privacy concerns, or be some sort of function of all the group members' privacy concerns combined. Research in psychology shows that group attitudes can be highly influenced by an assertive member (Janis 1972), by the majority in the group (Mugny and Perez 1991), or even by the minority in the group (Moscovici 1980).

The development of this group privacy concern may also differ based on the sensitivity of the work that is done within the group. For example, while an individual may not worry about providing some information online personally, the group may have developed a norm that no information related to the group is to be made available online. Interestingly, it is also possible that individuals' privacy concerns depend on what group they are part of. For example, in a setting where

everyone else in the group is concerned about privacy, an individual may feel likewise. The same individual may feel less concerned about privacy in another group that is more open about sharing information. As a result, we show the relationship as a double arrow, indicating possible causal relationships in both directions.

The framework proposes that group information privacy concerns are influenced by external factors in addition to individual members' concerns for information privacy. One example of external factors is group dynamics, which can represent a number of variables such as group cohesion, group centrality (level of centralized communications in the group), group distribution (level of collocation of team members), or group characteristics such as group size or length of group existence. While there is no research at this level, many questions could be explored such as

- What tools and procedures could be developed to provide groups such as buyer communities with privacy protections?
- What are the impacts of group information privacy concerns on group communication, performance, and interactions?
- How does the group concern for information privacy influence communication of the group with other groups?
- How do organizational units (functional areas) differ in their information privacy concerns?
- How should privacy protection tools be designed for groups where members use highly collaborative communication tools for their work?

The framework also suggests an important relationship between the individual and group information privacy concerns. As previously stated, it is important to realize that the group's concerns for information privacy do not represent an average of the individual members' concerns. Rather, group information privacy concern is the group members' normalized view of information privacy concerns, which can be higher or lower than the individual members' concerns taken as a whole. Since none of the proposed relationships in the framework have been studied, many research questions can be identified for the relationship between group and individual information privacy concerns, such as

- What factors influence the relationship between the concern for information privacy for a group and that of the individuals within the group?

- Will the group concern for privacy converge towards the highest levels of concerns within the group?
- How do individual information privacy concerns influence the use of communication media for group communication?
- How do team structures (collocated, distributed, *ad hoc*, etc.) affect the privacy concerns of their members?

Organizational information privacy concerns reflect the overall concern that organizational leaders have regarding the privacy of the information the organization possesses and has access to. Such concerns typically arise from management practices and policies. In past research, concern for information privacy at the organizational level has focused mostly on publicly available privacy policies. One would hope that organizational privacy policies should reflect the concern for information privacy of individuals, but limited research has actually explored this potential linkage. One study shows that there is no link between individual concerns for information privacy and privacy policies set forth by organizations (Earp et al. 2005). Rather, organizations use privacy policies for their own purposes, which is disconcerting. For future research, it may be important to consider the types of organizational privacy concerns: concern for privacy of the organization's information (e.g., when Google fired a blogger who wrote about working at Google on a public blog), and concerns for privacy of the organizations' customers. Organizations may have varying incentives to protect both types of information. Studies should be conducted comparing individual to organizational information privacy concerns. For example,

- How can organizations leverage their understanding of their customers' information privacy concerns in designing their online offerings?
- Why do organizations not take into consideration consumers' concerns for information privacy in the development of their online offerings?

As with individuals and groups, an organization's information privacy concerns are expected to be affected by external factors such as type of industry, the competitive position of its product or service, or the regulations it must follow. For example, banks have to be more concerned about the privacy of their customers' information due to legal mandates in most countries. Similarly, large organizations with highly recognizable brand names may be more sensitive to privacy of their customers' information as negative reactions to poor handling of customer private information can spread rapidly through

word of mouth (and the Internet, of course). As a result, the model shows a relationship between individual and organization privacy concerns. That said, it is surprising that so few studies consider the organizational environment when discussing privacy in general, let alone information privacy concerns. Some questions that may start researchers in that direction include: What is the link between organizational characteristics such as size, industry, or governance structure, and organizational information privacy concerns?

Societal information privacy concern refers to the overall concerns citizens in societies taken as a whole have for the privacy of the information about them. While the overall privacy concerns of a nation should reflect the concerns of its citizens and organizations, it is clear that government interventions such as laws, regulations, controls, and even publicity can substantially affect the relationships between the various constituents' concerns and the overall national concerns. Studies of information privacy concerns at the national level, as previously mentioned, tend to aggregate concerns of groups of citizens. However, focusing solely on the aggregation of individual perceptions may be misleading as to how much these represent the decisions made at the national level concerning information privacy. For example, organizations' information privacy concerns, while not typically measured, most probably find their way into national laws and regulations regarding privacy through effective and intensive lobbying. One just has to recall that seals of approvals arose out of the desire of organizations to self-regulate instead of facing government regulations regarding the privacy of individuals (Bélanger and Hiller 2006). Therefore, many questions arise that are in need of investigation, such as

- How are organizational information privacy concerns reflected in the privacy concerns of a society?
- What mediating and moderating effects exist between concerns for information privacy of individuals, groups, and organizations, and those of the society?

Comparisons could also occur at specific levels or for specific cross-level relationships between nations. As discussed previously, prior literature has only compared information privacy concerns between individuals of different countries. It would be very interesting to perform similar comparisons for organizations. This could be explored with questions such as

- What are the influences of nationality for information privacy concerns of organizations?
- What is the relationship between individual and organizational concerns for information privacy in different countries?

The framework offers a wide variety of potential avenues for research; we only briefly discussed various levels of analysis and their relationships in the multilevel information privacy concern framework. Clearly, a simplified multilevel model cannot completely do justice to the complex interrelationships between the different levels of privacy we discussed in the paper. As a result, the questions presented in this section and the previous one only represent a few ideas that could be explored by IS researchers with respect to information privacy.

Implications and Recommendations ■

We believe that all of the topics identified in the review could be further explored by mapping them into a multilevel framework as was done for information privacy concerns in the previous section. The one conclusion that can be clearly reached about information privacy research is that much remains to be explored and explained. Yet, we need to acknowledge some limitations to our review. First, we did exclude some areas of research such as the legal aspects of information privacy and the marketing literature on information privacy. While these topics are very important, we believe that focusing on topic areas closer to the interests of most IS researchers allowed us to present a more systematic view of the literature and provide more directed ideas for future research. Second, we did not include all of the conference proceedings papers on information privacy. Nevertheless, by using a sample of the most relevant papers, we are able to verify if the trends identified in the journal literature are consistent with what is presented at conferences. In general, this is the case. However, when the literature is not consistent we discussed the differences and consequences in the critical analysis of the literature.

We made a number of recommendations throughout our paper about future information privacy research, and even information systems research in general. We have attempted to summarize the most significant recommendations in Table 4 by organizing them into five broad categories. We hope that these recommendations and examples will help future researcher build on the current work in information privacy.

Conclusion ■

Information privacy is a construct of great interest to IS researchers. The continued growth of the digitization of all types of information indicates that this concept is likely to

Table 4. Summary of Recommendation for Information Privacy Research

Recommendation	Examples
1. Researchers should move beyond the individual and explore other levels of analysis	<ul style="list-style-type: none"> • Consider multiple levels of analysis • Study information privacy concerns, impacts, and culture at the organizational level, utilizing action research, case studies, and ethnography • Conduct studies that focus on the group level of information privacy
2. Researchers should utilize a broader diversity of sample populations	<ul style="list-style-type: none"> • Utilize nonstudent populations • Utilize non-U.S. centric populations • Consider comparisons between contextual parts of studies such as U.S. versus non-U.S. and student versus nonstudent
3. Researchers should conduct more design and action research	<ul style="list-style-type: none"> • Utilize explaining and predicting research to inform design and action research • Conduct more interdisciplinary research, capitalizing on different research fields' strengths • Conduct design and action research with an eye towards actual implementation • Make existing design research available to other researchers so research can build upon one another
4. Researchers should conduct more studies investigating the why related to privacy as opposed to the how	<ul style="list-style-type: none"> • Utilize the analyzing theories in areas such as privacy attitudes, privacy policies, and privacy practices to inform and drive more use of theories that explain and predict • Investigate why people indicate they won't perform a given behavior, but when given the opportunity act contrary to their stated intention • Investigate the moderating (or is it mediating) effect of individual characteristics such as self-efficacy on the relationship between CFIP and e-business adoption
5. Researchers should justify their use of existing construct measurements and develop more common measurements to be used across studies	<ul style="list-style-type: none"> • Create and utilize more validated instruments so that future privacy research can more readily build upon one another as has been demonstrated with the CFIP instrument, in particular focus on a measure for privacy attitudes • When studying concern for information privacy, provide justification for why CFIP or IUIPC was chosen as a measure as opposed to just picking one or the other

gain even more importance in the coming years. When looking at the theoretical contributions made in information privacy literature, most of the studies that provide explanatory and predictive theoretical contributions are found in three categories: information privacy concern, e-business impacts, and privacy attitudes. Clearly, the fact that instruments have been developed for measuring concerns for privacy (CFIP and IUIPC) has led to more research in this domain, just like the largely developed area of technology adoption (or intentions to use) impacted research on the relationship between information privacy and intentions to use e-business. This only reinforces the fact that instruments and theories are

needed in order for IS researchers to accumulate knowledge regarding information privacy (Straub 1989). Another major finding with respect to theoretical contributions is that few papers present design and action research on information privacy. As design science becomes an increasingly important area of research, IS researchers should consider the development of more (and easier to use) privacy protection tools for individuals, groups, organizations, and society. In conclusion, information privacy is a very current and exciting research domain that will continue to evolve as new technologies and new initiatives such as social networking or virtual worlds further push the limit of access to information.

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About the Authors

France Bélanger is Tom & Daisy Byrd Senior Faculty Fellow and Professor in the Department of Accounting and Information Systems at Virginia Tech. Her research focuses on the use of communication technologies, in particular for technology mediated work and e-business, and on information privacy and security. Her award-winning work has been published in leading IS journals, including *Information Systems Research*, *MIS Quarterly*, *Journal of Strategic Information Systems*, *Information Systems Journal*, various *IEEE Transactions*, and many others. Dr. Bélanger coauthored three books. She is or has been associate editor for *Information Systems Research*, *MIS Quarterly*, and other journals. Her work has been funded by several agencies, corporations, and research centers, including the National Science Foundation. She was a Fulbright Distinguished Chair in 2006 (Portugal) and an Erskine Visiting Fellow in 2009 (New Zealand).

Robert E. Crossler is an assistant professor in the Department of Management and Information Systems at Mississippi State University. His research focuses on the factors that affect the security and privacy decisions that individuals make. He has over 10 publications in the IS field, including such outlets as *Journal of Information Systems Security*, *Americas Conference on Information Systems*, *Annual Conference of the Decision Sciences Institute*, *Hawaii International Conference on System Sciences*, and many others. Dr. Crossler serves on the editorial review board for *Information Resources Management Journal* and *Journal of Information Systems Security*. Prior to his academic career, he worked as a database programmer, where he led many projects to completion and coordinated the work of others.

PRIVACY IN THE DIGITAL AGE: A REVIEW OF INFORMATION PRIVACY RESEARCH IN INFORMATION SYSTEMS

France Bélanger

Pamplin College of Business, Virginia Tech, 3007 Pamplin Hall,
Blacksburg, VA 24061-0101 U.S.A. {belanger@vt.edu}

Robert E. Crossler

Department of Management and Information Systems, College of Business, Mississippi State University,
P.O. Box 9581, Mississippi State, MS 39762-9581 U.S.A. {rob.crossler@msstate.edu}

Appendix A

Literature Search Procedures and Results

After searching for the keywords “information privacy” in ABI/Informs focusing on scholarly articles, we obtained a listing of 340 papers. We first eliminated papers that were anonymous, table of contents, interviews with experts, or short opinion pieces. We also removed articles not related to our focus on information privacy research in IS literature. A total of 218 articles were removed as explained in Table A1.

Table A1. Papers Removed from Initial Screening			
	Articles in Category	Quantity Removed	Total (balance)
Total list in ABI/Informs			340
Removed anonymous, table of contents, interviews with experts and opinion pieces	(Anonymous 2005a; Anonymous 2005b; Anonymous 2005c; Anonymous 2005d; Anonymous 2005e; Anonymous 2005f; Anonymous 2005g; Anonymous 2005h; Anonymous 2006a; Anonymous 2006b; Anonymous 2006c; Anonymous 2006d; Anonymous 2006e; Anonymous 2006f; Anonymous 2006g; Anonymous 2007a; Anonymous 2007b; Anonymous 2007c; Anonymous 2007d; Anonymous 2007e; Anonymous 2007f; Anonymous 2007g; Anonymous 2007h; Anonymous 2008a; Anonymous 2008b; Anonymous 2008c; Anonymous 2008d; Anonymous 2008e; Anonymous 2008f; Anonymous 2008g; Anonymous 2009a; Anonymous 2009b; Anonymous 2009c; Anonymous 2009d; Anonymous 2009e; Anonymous 2009f; Anonymous 2009g; Anonymous 2009h; Anonymous 2009i; Anonymous 2010; Basu 2007a; Basu 2007b; Basu 2007e; Basu 2007f; Basu 2007g; Basu 2008b; Basu 2009a; Basu 2009b; Basu 2009c; Basu 2009d; Basu and Chenoweth 2006a; Basu 2005a; Basu 2005b; Basu 2005c; Basu 2006b; Chambers 2008; Chenoweth 2006; Chenoweth 2005a; Chenoweth 2005b; Chenoweth 2005d; Chenoweth 2005e; Finch 2003; Lim 2008; Melby 2008; Penn 2006; Reid 2005; Reid 2006b; Sánchez 2005; Tai and Ayyagari 2009)	69	271
Removed articles related to legal reviews or discussion of legal and ethical aspects of information privacy. [†]	(Anonymous 2009e; Anonymous 2009j; Auerbach 1983; Bamberger 2010; Bellia 2008; Benjamin 1991; Benoit and Lovoy 2005; Cain 2002; Casey 2007; Ciocchetti 2007; Fedorowicz and Ray 2004; George 1999; Gindin 1997; Glenn 2000; Graham 1987; Greenberg et al. 2004; Hayes 2006; Himma 2007a; Himma 2007b; Kang 1998; Kelly and Unsal 2002; King 2003; Lally 1996; Lipton 2010; Litman 2000; Luck et al. 2006; Mossholder et al. 1991; Nehf 2003; O'Brien 1979; Ohm 2010; Oliver 2002; Petersen 1995; Post and Kagan 2006; Prosch 2008; Pyman et al. 2008; Rauhofer 2008; Regan 2009; Sachs 2009; Samuelson 2000; Schwartz 2000; Solove 2001; Swartz 2007; Usmani 2003; Volokh 2000a; Warren 2002; Weinberg 2000; West 2010; Winn 2001)	48	223
Removed articles discussing information privacy in the context of marketing	(Campbell 1997; Chellappa and Shivendu 2006; Dobosz et al. 2006; Dolnicar and Jordaan 2006; Dolnicar and Jordaan 2007; Dubelaar et al. 2003; Eastlick et al. 2006; Laric and Pitta 2009; Peltier et al. 2009; Peltier et al. 2010; Prabhaker 2000; Rohm and Milne 2004; Sachs 2009; Sheehan 2005; Smith 2001; Tsarenko and Tojib 2009; Zorotheos and Kafeza 2009)	17	206
Removed articles focused on security but published in journals with privacy in the title of the journal (e.g. Journal of Information Systems Security and privacy)	(Adams and Dimitriou 2008; Basu 2006a; Basu 2007c; Basu 2007d; Basu 2008a; Basu 2005d; Basu and Chenoweth 2006b; Bhaskar 2005; Brehm and Gómez 2005; Campbell 1997; Cannoy et al. 2006; Carr 2009; Cavusoglu 2010; Chan et al. 2005a; Changchit 2007a; Changchit 2007b; Changchit 2007c; Changchit 2008b; Changchit 2009a; Changchit 2009c; Chellappa and Shivendu 2006; Cheng and Wong 2006; Chenoweth 2007; Chenoweth 2005c; Chenoweth 2005f; Chenoweth 2005g; Conklin and McLeod 2009; Dantu and Cangussu 2007; Dewan and Chen 2005; Dobosz et al. 2006; Dolnicar and Jordaan 2006; Dolnicar and Jordaan 2007; Dubelaar et al. 2003; Eastlick et al. 2006; Elson and LeClerc 2006; Gilbert et al. 2008; Gómez and Lichtenberg 2007; Gómez and Paxmann 2006; Hazari et al. 2008; Johnson 2009; Kim et al. 2008; Klaus 2008; Korotka et al. 2005; Kruger et al. 2008; Kumar et al. 2007; Malliga and Tamilarasi 2008; Marks and Hale 2006; Medlin et al. 2008; Medlin and Cazier 2005; Medlin and Romaniello 2007; Mills et al. 2009; Mollick 2008; Mollick 2006; Mooradian 2008; Nilakanta and Scheibe 2005; Peltier et al. 2009; Post and Kagan 2006; Prabhaker 2000; Reid 2006a; Rohm and Milne 2004; Ross et al. 2009; Sachs 2009; Sheehan 2005; Sindre and Opdahl 2008; Smith 2001; Stevenson et al. 1995; Stewart et al. 2006; Stippich and Stippich 2005; Swart et al. 2005; Tang et al. 2009; Tsarenko and Tojib 2009; Wang et al. 2007; Wei and Ozok 2009; White and Rea 2007; Wong et al. 2006; Yin 2006; Young 2009; Young and Zhang 2007; Zhang and Dayarathn 2010; Zhao and Xue 2009; Zorotheos and Kafeza 2009)	81	125
Removed papers listed twice in the search results	(Salton 1980; Smith 1993; Woodman et al. 1982)	3	122

[†] We removed articles presenting legal reviews and commentaries because our focus was on information privacy research in information systems, and on papers we could code for theoretical foundations, sample characteristics, and level of analysis. Most legal articles provide legal discussions and commentaries on laws related to information privacy.

After this preliminary screening of the article listings, we downloaded the 122 remaining articles and jointly coded them for topic area, key constructs, theoretical contributions, and methodology. The dependent and independent variable analysis, together with a review of the context and implications of the study, allowed us to identify general research areas that make use of or explain the information privacy construct. Appendix B describes the details of the coding, in particular with respect to the topic areas. When further exploring the papers, several papers did not seem to contribute specifically to the IS literature and/or information privacy literature, and were removed from further coding. Specific details on these papers are provided in Table A2.

Table A2. In-Depth Coding Stage: Additional Papers Removed from Coding Analysis			
Reason	Papers	Count	Total (n = 122)
Book reviews not previously identified	(Chenoweth 2005f; Cutshall 2007; Fugate 2008; Weaver 2010)	4	118
Editorial prefaces not previously identified	(Basu 2005e; Changchit 2007c ; Changchit 2008a; Changchit 2008c; Changchit 2009b; Changchit 2010; Korotka et al. 2005)	7	111
Papers focused on security with only side mention of privacy	(Laric et al. 2009; Lunsford et al. 2004; Mooradian 2008; Roberts 2005; Stewart et al. 2006)	4	107
Papers listed twice under different naming or identical in different journals (removed one copy from list)	(Auerbach 1985; Brown 2007; Harkiolakis 2007; Jafar and Abdullat 2009; Tamimi and Sebastianelli 2007; Xiaoni et al. 2007)	7	100
Panel discussion summarized from conference	(Chan et al. 2005b)	1	99
Commentaries or “how to” papers (discussed how to do steps for security or privacy)	(Auerbach 1985; Collier 1995; DeMarco 2006; Geppert 1999; Himma 2007a; Jajodia 1996; Johnston and Warkentin 2008; Kelly and Unsal 2002; Laurent 2006; Lautsch 1985; Levine 2003; Mooradian 2009; Pujals 1993; Pyman et al. 2008; Rudraswamy and Vance 2001; Salton 1980; Volokh 2000b)	17	82
Opinion piece not previously identified – building trust in healthcare	(Mancilla and Biedermann 2009)	1	81
Papers or studies not on information privacy research: studies of supply chain with side mention of information privacy	(Chu and Leon 2009; Hennet 2009)	2	79
Papers or studies not on information privacy research: study of general healthcare privacy	(Laric et al. 2009)	1	78
Papers or studies not on information privacy research: studies or discussions of chief privacy officers	(Cohen 2001; Kayworth et al. 2005)	2	76
Papers or studies not on information privacy research: various	(Bhaskar and Zhang 2007; Brown 2007; Iannacci 2009; Szewczak and Snodgrass 2009; Wong et al. 2006)	5	71
Paper not discussing information privacy research: takes English language decomposition look at privacy	(Harkiolakis 2007)	1	70

The coding of the remaining 70 papers identified through ABI/Informs on information privacy is summarized in Appendices C and D. The appendices also include the coding of the additional papers identified through the second stage of our literature review, as described below.

For the second stage of literature review, we identified over 100 additional papers through further investigation of references from the papers identified in the first stage. Our initial screening (as per above criteria) resulted in 72 additional papers being coded. In total, we coded 142 journal articles.

The final stage of the literature review involved searching conference proceedings databases to identify papers discussing information privacy to (1) verify if trends identified in the coding of the journal articles were also found in conference proceedings and (2) identify any topic areas or trends emerging from conference papers that were not identified in the coding of journal articles. We investigated 284 articles (50 each from the IEEE conference proceedings database and the ACM Digital Library proceedings database, and 184 from the ICIS proceedings database).

The papers were identified with the search engines of the database mentioned above using the relevance feature for ACM and IEEE, and a full text search for the ICIS database (which does not have a relevance feature). Ultimately 38 of the ICIS papers were coded after determining whether or not each paper actually dealt with information privacy. Details of the procedures, articles, and coding are provided in online Appendix E.

Appendix B

Coding Procedures and Details

We coded a large number of journal articles and conference papers for topic area, theoretical contributions, methodology, and levels of analysis. We started by jointly coding a large number of articles (the first 70 articles). We then tested our coding by separately coding 20 journal articles. We computed Cohen's kappa for those papers. Kappa indicates the strength of agreement between two raters as the "proportion of agreement between two groups adjusted for agreement attributable to chance" (Reynolds 1977, p. 59). Levels of agreement above zero indicate some agreement not attributable to chance. Therefore, using Cohen's Kappa as a measure of agreement instead of simple correlation provides the researcher with greater confidence in the ratings obtained since it offers agreement beyond what could be due to chance. The raters achieved an 80 percent inter-rater reliability on levels of analysis and theoretical contributions, and a 67 percent inter-rater reliability on research topics, for an overall inter-rater reliability of 75 percent. Given that Cohen Kappa's above 0.60 are considered to show substantial agreement (Landis and Koch 1977), one of the authors coded the remaining articles, requesting feedback on difficult to classify articles. Below we describe briefly the categories we used for coding.

Topic Area

In the initial coding, we identified a very large number of topic areas. They are presented in Table B1. After discussing each topic, we classified similar topics into larger categories. For example, papers discussing e-commerce, e-business, e-government, or web services were categorized as e-business impacts. We reviewed the classification scheme several times before, during, and after our initial coding.

Theoretical Contributions

We adapted Gregor's (2006) proposed framework for classifying theories as follows:

- Analyzing: describing the state of information privacy or the need for information privacy research.
- Explaining: explaining what is occurring but not providing testable predictions.
- Predicting: providing testable predictions without well-developed causal relationships.
- Explaining and Predicting: explaining what is occurring and providing testable predictions with causal explanations.
- Design and Action: designing tools for providing information privacy or a framework to evaluate such tools.

Sampling Characteristics

We searched the articles for the origin of samples either specifically identified or implied (e.g., students from an eastern U.S. university). Most studies clearly identified students versus nonstudent data. Origin of sample was not always available.

Levels of Analysis

For coding levels of analysis, we used Smith et al.'s (2011) proposed levels of individual, group, organizational, and societal privacy. We based our classification on the measurement and analyses conducted.

Table B1. Topic Areas in Information Privacy Research

<p>Information Privacy Concerns</p> <ul style="list-style-type: none"> • CFIP • Collection • Concern for Privacy • Errors • General Concern for Privacy • GIPC • Government Intrusion Concerns • Internet Privacy Concerns • Internet User Information Privacy Concern • IUIPC • Loss Of Control • Perceived Internet Privacy Risk • Perceived Privacy Concerns • Perceived Risks • Perceived Vulnerability • Perception of Privacy Concerns • Privacy Problems • Risk Beliefs • Risk Perception • Secondary Use • Surveillance • Unauthorized Access • Unauthorized Secondary Use of Information 	<p>Information Privacy Attitudes</p> <ul style="list-style-type: none"> • Attitude Toward Internet Purchasing • Attitude Toward Privacy • Attitude Toward Privacy • Attitudes • Attitudes Toward Secondary Information Use • Beliefs • Confidence • Desire for Privacy • Efficacy • Familiarity • Loneliness • Perceived Ability to Control • Perceived Behavioral Control • Perceived Need for Government Surveillance • Privacy Active • Privacy Aware • Privacy Suspicious • Regulatory Preferences • Values • Willingness to Be Profiled • Willingness to Provide Information
<p>E-Business Impacts Of Information Privacy</p> <ul style="list-style-type: none"> • Attitude Toward Internet Purchasing • Behavioral Intention • E-Commerce Use • Internet Purchasing • Online Purchasing Behavior • Online Subscription and Purchasing • Purchasing Behavior • Willingness to Transact 	<p>Trust And Information Privacy</p> <ul style="list-style-type: none"> • Institutional Trust • Internet Trust • Internet Trustworthiness Beliefs • Propensity to Trust • Trust • Trust Beliefs • Trust of Privacy Notices
<p>Information Privacy Technologies and Tools</p> <ul style="list-style-type: none"> • Design Frameworks • Software Descriptions • Taxonomies for Design • Tool Evaluations 	<p>Culture and Information Privacy</p> <ul style="list-style-type: none"> • Country of Origin • Cultural Values • Cultural Values • German Environmental View • Japanese Perspective

Information Privacy Practices	Other
<ul style="list-style-type: none"> • Amount Spent to Protect Privacy • Customer Service • Familiarity with Privacy Statements • Government Involvement in Regulation • Information Released • Limited Use of Internet • Privacy Infringement • Privacy Policies • Privacy Policy Statements • Protection Behaviors • Ratings/Testimonials • Read Online Privacy Notices • Regulatory Approaches • Safe Internet Browsing • Self-Disclosing Behavior • Validity of Privacy Policies 	<ul style="list-style-type: none"> • Communicative Action • Computer Anxiety • Contextual Privacy • Corporate Privacy Environment • Cost Per Unit of Information • Desktop Videoconferencing Use • Direct Marketing Frequency • Discursive Action • Expertise • Imbalances of Power And Control • Information Deprived Because of Privacy • Instrumental Action • Internet Experience • Internet Literacy • Intrusion/Disruption of Legitimate Activity • Legitimacy of Motives for Info Request • Media Choice • Normative Structure • Perceived Comprehension • Perception of Customer Service • Perception on Quality of Products • Personal Internet Interest • Price Charged Per Unit of Privacy • Price Received for Providing Privacy • Privacy Protection Experience • Readability of Privacy Policies • Social Awareness • Social Citizenship • Social Context • Strategic Action • Subjective Norms • Types of Information • Visibility of a Mediating Technology • Website Preference

Appendix C

Coded Articles: Contributions to Theory Classification

Articles	Types of Theoretical Contributions				
	Analyzing	Explaining	Predicting	Explaining & Predicting	Design & Action
Total (n = 142)	35	23	5	72	7
Adams and Katos 2007	X				
Agranoff 1991	X				
Al Abri et al. 2009				X	
Alge et al. 2006				X	
Allen et al. 2007		X			
Angst and Agarwal 2009				X	
Awad and Krishnan 2006				X	
Bélanger and Hiller 2006	X				
Bélanger et al. 2002				X	
Bellman et al. 2004				X	
Benassi 1999	X				
Bensen et al. 2006	X				
Brown and Muchira 2004				X	
Campbell 1997		X			
Cao and Everard 2008				X	
Carter and McBride 2010	X				
Chai et al. 2009				X	
Chakraborty and Sharma 2005			X		
Chellappa and Shivendu 2006			X		
Chellappa and Sin 2005				X	
Chen and Rea Jr. 2004				X	
Cho 2010				X	
Clark et al. 2009	X				
Clarke et al. 2002					X
Cockcroft 2006			X		
Conger 2009	X				
Coursaris et al. 2003		X			
Cranor 1999	X				
Cranor 2006	X				
Cranor et al. 2006					X
Crazier et al. 2008				X	
Cullen 2009	X				
Culnan 1993				X	
Culnan 2000				X	
Culnan and Armstrong 1999				X	
Desai et al. 2003	X				
Dillon et al. 2008		X			

Articles	Types of Theoretical Contributions				
	Analyzing	Explaining	Predicting	Explaining & Predicting	Design & Action
Dinev and Hart 2004				X	
Dinev and Hart 2005				X	
Dinev and Hart 2006				X	
Dinev et al. 2006a				X	
Dinev et al. 2006b				X	
Dobosz et al. 2006	X				
Drennan et al. 2006				X	
Dubelaar et al. 2003				X	
Earp and Payton 2006		X			
Earp et al. 2005		X			
Eastlick et al. 2006				X	
Faja and Trimi 2008				X	
Feng-Yang et al. 2007				X	
Friedman and Reed 2007	X				
George 2004				X	
Gray and Christiansen 2009	X				
Greenaway and Chan 2005	X				
Hann et al. 2008		X			
Henderson and Snyder 1999	X				
Hine and Eve 1998				X	
Hoadley et al. 2010				X	
Hoffman et al. 1999				X	
Hooper and Vos 2009				X	
Hsu 2006				X	
Hsu and Kuo 2003				X	
Hui et al. 2006				X	
Hui et al. 2007				X	
Jafar and Abdullat 2009		X			
Katos and Adams 2005	X				
Khalfan and Alshawaf 2004		X			
Kim and Lee 2009			X		
Korzaan and Boswell 2008				X	
Kudo et al. 2007					X
Kuo et al. 2007				X	
Laudon 1996	X				
Li et al. 2008				X	
Lin 2005				X	
Lin and Wu 2008				X	
Liu and Arnett 2002		X			
Liu et al. 2005				X	
Malhotra et al. 2004				X	
McGinity 2000	X				
Meinert et al. 2006				X	

Articles	Types of Theoretical Contributions				
	Analyzing	Explaining	Predicting	Explaining & Predicting	Design & Action
Milberg et al. 1995				X	
Milberg et al. 2000				X	
Milne and Culnan 2002		X			
Milne and Culnan 2004				X	
Milne and Gordon 1993		X			
Milne et al. 2004				X	
Milne et al. 2006				X	
Miyazaki and Fernandez 2000	X				
Miyazaki and Fernandez 2001				X	
Miyazaki and Krishnamurthy 2002		X			
Mizutani et al. 2004	X				
Mollick 2009				X	
Moore 2005				X	
Moore and Dhillon 2003	X				
Nabil and Rose 2007				X	
Nilakanta and Scheibe 2005					X
Norberg and Horne 2007				X	
Norberg et al. 2007				X	
Nowak and Phelps 1999		X			
Park 2008				X	
Pavlou et al. 2007				X	
Peslak 2005	X				
Peslak 2006	X				
Pollach 2007		X			
Pramatari and Theotokis 2009				X	
Rajavel and Karuppuswamy 2008			X		
Razzouk et al. 2008		X			
Reagle and Cranor 1999	X				
Resnick and Montania 2003				X	
Rindfleisch 1997	X				
Robbin and Koball 2001				X	
Rohm and Milne 2004				X	
Rose 2006				X	
Ryker et al. 2002	X				
Schwaig et al. 2005				X	
Schwaig et al. 2006	X				
Shapiro and Baker 2001	X				
Sheehan 2005		X			
Sheldon and Strader 2002	X				
Smith 1993		X			
Smith 2004		X			
Smith et al. 1996				X	
Son and Kim 2008				X	

Articles	Types of Theoretical Contributions				
	Analyzing	Explaining	Predicting	Explaining & Predicting	Design & Action
Stewart and Segars 2002				X	
Storey et al. 2009				X	
Thiesse 2007				X	
Udo 2001		X			
Van Slyke et al. 2006				X	
Venter et al. 2004					X
Volokh 2000b	X				
Warkentin and Johnston 2006					X
Webster 1998		X			
Weiss 2009	X				
Woodman et al. 1982		X			
Xiaoni et al. 2007				X	
Xu 2009	X				
Xu 2010				X	
Xu and Gupta 2009				X	
Xu et al. 2010				X	
Yang and Chiu 2002		X			
Zhang et al. 2007	X				
Zuo and O'Keefe 2007					X

Appendix D

Coded Articles: Topic Areas and Levels of Analysis

Author	Sample Origin	Level of Analysis				Research Topic						
		Individual	Group	Organization	Societal	Information Privacy Concern	E-Business Impacts	Attitudes	Practices	Tools	Others	
Adams and Katos 2007	None			*					*			Security, audits
Agranoff 1991	None (context USA)			*					*			Privacy codes
Al Abri et al. 2009	420 Omani employees and citizens	*				*	*					
Alge et al. 2006	Consumers: 613 USA	*				*	*				*	Surveillance
Allen et al. 2007	Employees: 154 USA	*							*			Workplace surveillance, privacy boundaries
Angst and Agarwal 2009	366 citizens from USA (unclear)	*				*						Health information
Awad and Krishnan 2006	Internet users: USA (assumed)	*				*			*			Information transparency, willing to be profiled
Bélanger et al. 2002	Students: 140 USA	*							*			Security, seals
Bélanger and Hiller 2006	None (context USA)	*					*		*			Government, policy
Bellman et al. 2004	Internet users: 534 Worldwide				*	*						Culture
Benassi 1999	None (context USA)			*					*			Seals, Trust
Bensen et al. 2006	None (context China)				*				*	*		Politics
Brown and Muchira 2004	Students: 186 Australia	*				*	*					
Campbell 1997	Canada	*							*			
Cao and Everard 2008	Students: 161 China	*							*			Culture, instant messaging
Carter and McBride 2010	n/a conceptual	*				*						
Chai et al. 2009	285 pre-teens and early teens	*							*	*		
Chakraborty and Sharma 2005	n/a (simulation)	*										
Chellappa and Shivendu 2006	n/a (modeling)	*		*			*					Personalization
Chellappa and Sin 2005	Online Consumers: 243 USA	*				*	*					Personalization
Chen and Rea Jr. 2004	Students: 92 USA	*							*			Privacy control
Cho 2010	836 home users in Singapore	*				*	*		*	*		

Author	Sample Origin	Level of Analysis				Research Topic						
		Individual	Group	Organization	Societal	Information Privacy Concern	E-Business Impacts	Attitudes	Practices	Tools	Others	
Clark et al. 2009	n/a (conceptual)			*					*	*	Privacy governance for KMS design	
Clarke et al. 2002	None	*								*		
Cockcroft 2006	Students: 67 Australia				*	*						
Conger 2009	n/a (conceptual)	*		*		*						
Coursaris et al. 2003	None (context Canada)	*				*					Wireless privacy	
Cranor 1999	None	*				*					Security	
Cranor 2006	None	*				*					Security	
Cranor et al. 2006	None	*				*				*	P3P, Privacy Bird	
Crazier et al. 2008	320 students and consumers from USA	*				*				*	Risk, RFID	
Cullen 2009	38 New Zealand & 34 Japan citizens	*				*			*		Culture, government	
Culnan 1993	Students: 126 USA	*				*			*		Point of sales, control	
Culnan 2000	Websites: 361 USA			*					*		Self-regulation	
Culnan and Armstrong 1999	Adults: 1000 USA	*		*					*		Procedural fairness, privacy calculus, FIP, trust	
Desai et al. 2003	None (context Internet companies)			*					*			
Dillon et al. 2008	Consumers: 1085 USA	*							*		Workplace	
Dinev and Hart 2004	Students and Employees: 369 USA	*				*					Control, vulnerability	
Dinev and Hart 2005	Internet Users: 422 USA	*				*						
Dinev and Hart 2006	Students and Employees: 369 USA	*				*			*		Risk, privacy calculus, trust	
Dinev et al. 2006a	Students and Employees: 899 Italy vs. 422 USA	*				*			*		Culture, trust	
Dinev et al. 2006b	Students and Employees: 899 Italy vs. 422 USA	*			*	*			*		Culture, surveillance	
Dobosz et al. 2006	None			*					*		Marketing	
Drennan et al. 2006	Students: 69 Australia	*				*					Risk	
Dubelaar et al. 2003	Students: 181 (context unknown)	*				*			*			
Earp and Payton 2006	Professionals: 294 USA	*				*			*		Privacy orientation, security, policy	

Author	Sample Origin	Level of Analysis				Research Topic						
		Individual	Group	Organization	Societal	Information Privacy Concern	E-Business Impacts	Attitudes	Practices	Tools	Others	
Earp et al. 2005	Internet Users: 827 USA	*		*					*		Values	
Eastlick et al. 2006	Internet Users: 477 USA	*				*			*		Marketing, trust	
Faja and Trimi 2008	Unknown	*				*			*		Gender differences	
Feng-Yang et al. 2007	168 Taiwanese employees	*							*		Gender differences	
Friedman and Reed 2007	None (context USA)	*		*					*		Surveillance, email	
George 2004	Students: 193 USA	*							*		Control, trust	
Greenaway and Chan 2005	None	*		*					*			
Gray and Christiansen 2009	5 USA privacy experts	*									Teen online privacy protection	
Hann et al. 2008	None	*							*			
Henderson and Snyder 1999	None (context worldwide)	*		*					*			
Hine and Eve 1998	Consumers: 26 UK	*							*			
Hoadley et al. 2010	172 students from USA	*				*					Situated privacy	
Hoffman et al. 1999	Internet Users: 15,569 Worldwide	*							*		Locus of control	
Hooper and Vos 2009	200 New Zealand companies			*					*			
Hsu 2006	Students: 400 China vs. USA vs. Netherlands vs. Taiwan				*				*			
Hsu and Kuo 2003	Employees: 186 Taiwan	*							*			
Hui et al. 2006	Students: 331 Singapore (?)	*							*		Disclosure willingness	
Hui et al. 2007	Students: 109 Singapore	*							*		Disclosure willingness, seals	
Jafar and Abdullat 2009	Privacy statements of four companies			*					*			
Katos and Adams 2005	None			*					*		Wireless, security	
Khalfan and Alshawaf 2004	Professionals from Omani banks: 8 interviewed & 28 surveyed.			*					*			
Kim and Lee 2009	n/a simulation	*		*					*		Personalization	
Korzaan and Boswell 2008	Students: 230 USA	*				*			*		Personality traits	
Kudo et al. 2007	None (context Japan)			*					*		IBM Japan	
Kuo et al. 2007	Managers: 168 Taiwan	*				*			*		Gender differences, privacy protection	

Author	Sample Origin	Level of Analysis				Research Topic						
		Individual	Group	Organization	Societal	Information Privacy Concern	E-Business Impacts	Attitudes	Practices	Tools	Others	
Laudon 1996	n/a (conceptual)				*				*			National information market
Li et al. 2008	154 USA students	*				*			*			
Lin 2005	Consumers: 595 USA, China and Taiwan	*			*	*						
Lin and Wu 2008	Students: 511 Taiwan	*				*		*				Knowledge, trust, procedural fairness
Liu and Arnett 2002	Global 500			*					*			
Liu et al. 2005	212 students in USA	*						*				Trust
Malhotra et al. 2004	Internet Users: 742 USA	*				*						
McGinity 2000	None	*							*			
Meinert et al. 2006	Students: 261 USA	*				*		*	*			Disclosure willingness
Milberg et al. 1995	Professionals: 900 Worldwide	*			*	*						Culture, values
Milberg et al. 2000	Professionals: 595 Worldwide	*			*	*						Culture
Milne and Culnan 2002	223 to 286 USA websites		*					*				
Milne and Culnan 2004	Adults: 2468 USA	*			*	*		*	*			Trust
Milne and Gordon 1993	Adults: 175 USA	*			*	*		*	*			
Milne et al. 2004	2468 consumers: 300 students; 40 consumers All USA	*							*			Identity theft
Milne et al. 2006	Websites: 312 USA			*				*	*			Readability of policies
Mollick 2009	75 USA students	*							*			
Miyazaki and Fernandez 2000	Websites: 381 USA			*					*			Security, risk
Miyazaki and Fernandez 2001	Adults: 160 USA	*						*				Risk, knowledge
Miyazaki and Krishnamurthy 2002	Websites: 60 AND students: 204 USA	*		*				*	*			Compliance, seals
Mizutani et al. 2004	None (context Japan)				*				*			Culture, sense of privacy
Moore and Dhillon 2003	None	*		*				*	*			Seals, trust
Moore 2005	Students: 143 USA	*							*			Seals, trust
Nabil and Rose 2007	422 consumers worldwide	*						*	*			Gender differences
Niliakanta and Scheibe 2005	None	*		*					*			Digital persona, trust
Norberg and Home 2007	None	*							*			Attribution

Author	Sample Origin	Level of Analysis				Research Topic					
		Individual	Group	Organization	Societal	Information Privacy Concern	E-Business Impacts	Attitudes	Practices	Tools	Others
Norberg et al. 2007	Students: 88 USA	*							*		Privacy paradox
Nowak and Phelps 1999	None (context USA)	*		*					*		
Park 2008	127 USA and 198 Korean student comparison	*						*			Culture
Pavlou et al. 2007	531 Internet consumers (origin unknown)	*				*					Security, principal agency, information asymmetry
Peslak 2005	Websites: 50 USA			*					*		FIP, self-regulation
Peslak 2006	Websites: 100 Worldwide			*	*				*		FIP, compliance
Pollach 2007	Websites: 50 Fortune 50			*				*			Trust
Pramatari and Theotokis 2009	Consumers in Greece (n = 173) and Ireland (n = 402)	*				*					RFID
Rajavel and Karuppuswamy 2008	n/a (simulation)	*								*	Privacy preserving data mining approach
Razzouk et al. 2008	Students: 203 USA	*						*			RFID
Reagle and Cranor 1999	None	*								*	P3P
Resnick and Montania 2003	Students: 20 USA	*					*				Design
Rindfleisch 1997	None (context USA)	*		*	*	*				*	Health information, role of technology
Robbin and Koball 2001	25 USA professionals			*					*		
Rohm and Milne 2004	1427 USA consumers	*				*		*			Health information
Rose 2006	Adults: 459 New Zealand	*				*			*		Culture
Ryker et al. 2002	Websites: 50 Worldwide			*	*				*		FIP
Schwaig et al. 2005	Websites: 500 Worldwide			*	*				*		FIP
Schwaig et al. 2006	Websites: 500 Worldwide			*	*				*		FIP
Shapiro and Baker 2001	n/a (conceptual: context USA and Europe)	*								*	Risk, seals
Sheehan 2005	Websites: 94 USA				*				*		FIP, health information
Sheldon and Strader 2002	None: (context USA)			*		*					
Smith 1993	Executives and managers: 105 USA			*					*		
Smith 2004	None			*	*				*		

Author	Sample Origin	Level of Analysis				Research Topic								
		Individual	Group	Organization	Societal	Information Privacy Concern	E-Business Impacts	Attitudes	Practices	Tools	Others			
Smith et al. 1996	Students & employees: 2147 mostly USA	*				*								
Son and Kim 2008	Internet users: 523 USA	*				*			*					
Stewart and Segars 2002	Consumers: 400 USA	*				*								
Storey et al. 2009	Companies: Fortune 500			*					*					
Thiesse 2007	None	*								*			RFID	
Udo 2001	IT Users: 158 USA	*				*			*				Security concern	
Van Slyke et al. 2006	Internet Users: 1000 (USA?)	*				*			*				Risk, trust	
Venter et al. 2004	None							*					Privacy IDS	
Volokh 2000b	None	*								*			Personalization	
Warkentin and Johnston 2006	None	*								*			XML, trust	
Webster 1998	Company: 1 USA (case study)	*									*		Vide Conferencing	
Weiss 2009	(# unknown) experts in USA, Europe and Asia	*							*			*	Social network	
Woodman et al. 1982	2047 employees of 5 multinationals in USA	*								*				
Xiaoni et al. 2007	125 companies worldwide										*			Culture
Xu 2009	n/a (conceptual)	*							*		*			
Xu 2010	292 students from Singapore	*							*					Location-based services; locus of control
Xu and Gupta 2009	176 students in Singapore	*							*					Location-based services
Xu et al. 2010	528 consumers in Singapore	*						*						Privacy calculus; risks, benefits, location-based services
Yang and Chiu 2002	Websites: 354 Taiwan							*			*			Compliance
Zhang et al. 2007	Websites: 150 Worldwide							*			*			Culture, trust
Zuo and O'Keefe 2007	n/a (design)	*											*	Self-destructive file SDF tool
TOTALS						46	38	26	62	19				

Appendix E

Conference Proceedings

After coding the journal articles, we turned our attention to conference proceedings. We searched the IEEE, ACM, and ICIS databases using the term “information privacy.” We then analyzed and coded the 50 most relevant IEEE and ACM articles using the same procedures that were used in coding the journal articles. We investigated 284 articles: 50 each from the IEEE conference proceedings database and the ACM Digital Library proceedings database, and 184 from the ICIS proceedings database. The papers were identified with the search engines of the databases using the relevance feature for ACM and IEEE, and a full text search for the ICIS database (which does not have a relevance feature).

After analyzing the papers from the IEEE and ACM databases, some papers were not categorized as they were not about information privacy. In addition, there is some overlap between the two databases so duplicate articles were eliminated and coded only once. This process resulted in the coding of 64 IEEE and ACM conference papers. The ICIS database consisted of proceedings from 1994 to 2009 and did not have a relevancy feature to sort on, so all 184 articles that appeared in the search were analyzed. An initial analysis, to determine whether the papers were about information privacy resulted in 41 being further analyzed for categorization. In the final analysis, 38 ICIS papers were included in the coding presented below. Three papers were not categorized because they were discussions of panels. Ultimately, 102 conference papers were categorized and are presented in the following tables.

Table E1. Conference Proceedings by Sample Characteristics

Respondent Type for Sample			National Origin of Sample		
Student Only	Nonstudent Only	Mixed	U.S.-centric	Non-U.S. centric	Mixed
Bansal et al. 2008; Chen et al. 2009; Dinev et al. 2009; Hann et al. 2007; Kim 2005; Krasnova et al. 2009; Hann et al. 2002; Lai and Hui 2004; Lai and Hui 2006; Li and Sarathy 2007; Razavi and Iverson 2006; Tam et al. 2002; Wu et al. 2009; Xu and Teo 2004; Xu et al. 2003; Xu et al. 2008a; Yao and Houston 2002	Al-Natour et al. 2009; Anderson and Agarwal 2009; Angst and Agarwal 2006; Cullen 2008; Cullen and Reilly 2007; Dhillon et al. 2002; Farahmand et al. 2008; Lu et al. 2004; Luanrattana et al. 2010; Navlakha et al. 2008; Noeteberg et al. 1999; Nguyen et al. 2008; Park 2009; Prince and Barrett 2005; Tan and Czerwinski 2003; Treiblmaier and Pollach 2007; Tsai et al. 2007; Tung et al. 2001; Xu et al. 2005; Xu 2007; Zukowski and Brown 2007	Kwasny et al. 2008; Lee and Kwon 2009	Bansal et al. 2008; Anderson and Agarwal 2009; Angst and Agarwal 2006; Dinev et al. 2009; Farahmand et al. 2008; Kwasny et al. 2008; Li and Sarathy 2007; Navlakha et al. 2008; Nguyen et al. 2008; Wu et al. 2009; Tan and Czerwinski 2003; Razavi and Iverson 2006; Xu et al. 2008a; Yao and Houston 2002	Al-Natour et al. 2009; Chen et al. 2009; Cullen 2008; Krasnova et al. 2009; Lai and Hui 2004; Lai and Hui 2006; Lu et al. 2004; Luanrattana et al. 2010; Noeteberg et al. 1999; Park 2009; Prince and Barrett 2005; Tam et al. 2002; Treiblmaier and Pollach 2007; Tsai et al. 2007; Xu and Teo 2004; Xu et al. 2003; Xu et al. 2005; Xu 2007; Yang and Miao 2008; Zukowski and Brown 2007	Dhillon et al. 2002; Hann et al. 2007; Kim 2005; Lee and Kwon 2009; Tung et al. 2001
No Sample					
Acquisto et al. 2006; Aggarwal et al. 2004; Ahmed et al. 2005; Al-Fedaghi and Alhaqan 2009; Al-Fedaghi and Thalheim 2008; An et al. 2006; Ateniense and Medeiros 2002; Blazic et al. 2007; Dewan et al. 2007; Dewri et al. 2009; Domingo-Ferrer and Bras-Amoros 2008; Dreyer and Olivier 1998; Franco et al. 2008; Ghanavati et al. 2007; Ghani and Sidek 2008; Ghani and Sidek 2009; Gurses et al. 2008; Han et al. 2006; Hawkey 2008; Hendricks 1991; Henricksen et al. 2005; Kauffman et al. 2009; Kondratova et al. 2006; Kraemer et al. 2002; Li et al. 2004; Light et al. 2008; Li and Sarkar 2004; Liu et al. 2010; Mashwani et al. 2009; Mun et al. 2007; Ochoa et al. 2007; Omran et al. 2008; Pan et al. 2009; Peng et al. 2009; Petersen and Turn 1967; Qingsheng et al. 2007; Razavi and Iverson 2007; Reddy and Venter 2009; Reddy et al. 2008; Shaw 1998; Sheppard et al. 2009; Shirali-Shahreza and Shirali-Shahreza 2007; Sipior and Ward 1996; Skinner 2007a; Skinner 2007b; Skinner 2008; Skinner and Chang 2007; Skinner et al. 2006a; Skinner et al. 2006b; Spiridon and Dichiu 2008; Suriadi et al. 2008; Taghva et al. 2007; Thatcher and Clemons 2000; Wu and Weaver 2006; Wu et al. 2008; Xu et al. 2008b; Yang and Luo 2009; Zhu and Peng 2007; Zhu et al. 2007					

Table E2. Conference Proceedings by Research Topics and Levels of Analysis

Author	Level of Analysis				Research Topic					
	Individual	Group	Organization	Societal	Information Privacy Concerns	E-Business	Attitudes	Practices	Tools	Other
Acquisto et al. 2006			*							Economics
Aggarwal et al. 2004			*						*	
Ahmed et al. 2005			*						*	
Al-Fedaghi and Alhaqan 2009	*								*	
Al-Fedaghi and Thalheim 2008			*						*	
Al-Natour et al. 2009	*					*				
An et al. 2006			*						*	
Anderson and Agarwal 2009	*						*			Health Care
Angst and Agarwal 2006	*						*			Health Care
Ateniese and Medeiros 2002			*						*	Health Care
Bansal et al. 2008	*							*		Trust
Blazic et al. 2007			*						*	
Chen et al. 2009	*				*					
Chellappa and Sin 2004			*							Economics
Cullen 2008	*						*			
Cullen and Reilly 2007	*						*			
Dewan et al. 2007			*						*	
Dewri et al. 2009			*						*	
Dhillon et al. 2002	*				*					
Dinev et al. 2009	*						*			
Domingo-Ferrer and Bras-Amoros 2008	*								*	
Dreyer and Olivier 1998			*						*	
Franco et al. 2008			*						*	
Ghanavati et al. 2007			*						*	
Ghani and Sidek 2008	*								*	
Ghani and Sidek 2009	*								*	
Gurses et al. 2008			*						*	
Han et al. 2006			*						*	Health Care
Hann et al. 2007	*					*				
Hann et al. 2002	*									Economics
Hawkey 2008	*								*	
Henricksen et al. 2005	*								*	
Farahmand et al. 2008	*						*			
Kauffman et al. 2009			*							Economics
Kim 2005	*									Culture, trust
Kondratova et al. 2006	*								*	
Kraemer et al. 2002				*		*				Culture
Krasnova et al. 2009	*							*		
Kwasny et al. 2008	*						*			
Lai and Hui 2004	*							*		

Author	Level of Analysis				Research Topic					
	Individual	Group	Organization	Societal	Information Privacy Concerns	E-Business	Attitudes	Practices	Tools	Other
Lai and Hui 2006	*							*		
Lee and Kwon 2009			*						*	
Li and Sarathy 2007	*					*				
Li and Sarkar 2004			*						*	
Li et al. 2004			*						*	
Light et al. 2008	*							*		
Liu et al. 2010	*								*	
Lu et al. 2004	*					*				
Luanrattana et al. 2010			*					*		
Mashwani et al. 2009	*								*	
Mun et al. 2007	*								*	
Navlakha et al. 2008	*					*				Trust
Nguyen et al. 2008	*				*					RFID
Noeteberg et al. 1999	*					*				Trust
Ochoa et al. 2007			*						*	
Omran et al. 2008			*						*	
Pan et al. 2009	*								*	
Park 2009	*				*					
Peng et al. 2009	*								*	
Petersen and Turn 1967			*						*	
Prince and Barrett 2005	*				*				*	
Qingsheng et al. 2007	*								*	
Razavi and Iverson 2006	*				*					
Razavi and Iverson 2007	*								*	
Reddy and Venter 2009			*						*	
Reddy et al. 2008			*						*	
Shaw 1998	*						*			
Sheppard et al. 2009			*						*	
Shirali-Shahreza and Shirali-Shahreza 2007			*						*	
Sipior and Ward 1996	*									Legal
Skinner 2008			*						*	
Skinner 2007a	*		*						*	
Skinner 2007b			*						*	
Skinner and Chang 2007			*						*	
Skinner et al. 2006a			*					*		
Skinner et al. 2006b	*								*	
Spiridon and Dichiu 2008			*						*	
Suriadi et al. 2008	*								*	
Taghva et al. 2007			*						*	
Tam et al. 2002	*								*	
Tan and Czerwinski 2003	*				*				*	
Thatcher and Clemons 2000			*						*	Economics

Author	Level of Analysis				Research Topic					
	Individual	Group	Organization	Societal	Information Privacy Concerns	E-Business	Attitudes	Practices	Tools	Other
Treiblmaier and Pollach 2007	*				*		*			
Tsai et al. 2007	*							*		
Tung et al. 2001	*									Trust
Wu and Weaver 2006	*									Trust
Wu et al. 2008			*						*	
Wu et al. 2009	*							*		
Xu 2007	*				*					
Xu and Teo 2004	*				*					
Xu et al. 2003	*					*				Trust
Xu et al. 2005	*					*				Trust
Xu et al. 2008a	*				*					
Xu et al. 2008b	*								*	
Yang 2008				*					*	
Yang and Luo 2009			*						*	RFID
Yang and Miao 2008	*				*					
Yao and Houston 2002	*					*				
Zhu and Peng 2007			*						*	
Zhu et al. 2007			*						*	
Zukowski and Brown 2007	*				*					Control, awareness

Table E3. Conference Proceedings by Theoretical Contributions

Analyzing	Explaining	Predicting	Explaining & Predicting	Design & Action
Hendricks 1991; Kwasny et al. 2008; Light et al. 2008; Luanrattana et al. 2010; Prince and Barrett 2005; Skinner et al. 2006a; Sipior and Ward 1996)	Acquisto et al. 2006; Chellappa and Sin 2004; Cullen 2008; Dhillon et al. 2002; Farahmand et al. 2008; Hann et al. 2002; Kraemer et al. 2002; Krasnova et al. 2009; Razavi and Iverson 2006; Treiblmaier and Pollach 2007; Wu and Weaver 2006; Zukowski and Brown 2007	Shaw 1998)	Al-Natour et al. 2009; Anderson and Agarwal 2009; Angst and Agarwal 2006; Bansal et al. 2008; Chen et al. 2009; Cranor et al. 2007; Dinev et al. 2009; Hann et al. 2007; Kauffman et al. 2009; Kim 2005; Lai and Hui 2004; Li and Sarathy 2007; Lu et al. 2004; Navlakha et al. 2008; Noeteberg et al. 1999; Park 2009; Tam et al. 2002; Tan and Czerwinski 2003; Thatcher and Clemons 2000; Tsai et al. 2007; Tung et al. 2001; Wu et al. 2009; Xu et al. 2003; Xu et al. 2005; Xu 2007; Xu and Teo 2004; Xu et al. 2008a; Yang and Miao 2008; Yao and Houston 2002	Aggarwal et al. 2004; Ahmed et al. 2005; Al-Fedaghi and Alhaqan 2009; Al-Fedaghi and Thalheim 2008; An et al. 2006; Ateniese and Medeiros 2002; Blazic et al. 2007; Dewan et al. 2007; Dewri et al. 2009; Domingo-Ferrer and Bras-Amoros 2008; Dreyer and Olivier 1998; Franco et al. 2008; Ghanavati et al. 2007; Ghani and Sidek 2008; Ghani and Sidek 2009; Gurses et al. 2008; Han et al. 2006; Hawkey 2008; Henricksen et al. 2005; Kondratova et al. 2006; Lee and Kwon 2009; Li and Sarkar 2004; Li et al. 2004; Liu et al. 2010; Mashwani et al. 2009; Mun et al. 2007; Ochoa et al. 2007; Omran et al. 2008; Pan et al. 2009; Peng et al. 2009; Petersen and Turn 1967; Qingsheng et al. 2007; Razavi and Iverson 2007; Reddy and Venter 2009; Reddy et al. 2008; Sheppard et al. 2009; Shirali-Shahreza and Shirali-Shahreza 2007; Skinner 2007a; Skinner 2007b; Skinner 2008; Skinner and Chang 2007; Skinner et al. 2006b; Spiridon and Dichiu 2008; Suriadi et al. 2008; Taghva et al. 2007; Wu et al. 2008; Xu et al. 2008b; Yang 2008; Yang and Luo 2009; Zhu and Peng 2007; Zhu et al. 2007

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