

Comparative Analysis of Privacy Concerns in Website Register Process between China and Korea

ANALYSE COMPARATIVE DES QUESTIONS DE VIE PRIVÉE SUR LE PROCESSUS DE L'ENREGISTREMENT DES SITE WEB ENTRE LA CHINE ET LA CORÉE

ZHANG Haibin¹

Seok-Jae Ok²

Abstract: Personal information privacy is fast becoming one of the most important ethical issues of our information society. Most of Internet users and non-Internet users are concerned about the protection of their privacy information in Internet. This empirical research developed a model based on the Theory of Reasoned Action and Theory of Planning Behavior, which try to address the relationships among protect regulations and differences in concerns for information privacy between China and Korea. This study used structural equation modeling to validate the proposed research model. The result illustrate that the level of concerns for information privacy in Korea is higher than what in China. For Korea, the influence of concern for information privacy is mediated by trust beliefs and administrative regulations. For China, The concern for information privacy of Internet users impacts their risk beliefs and regulation positively, but not affects their trust beliefs.

Key words: Privacy information; Website register; SEM model

Résumé: La confidentialité des informations personnels est en entrain de devenir l'une des plus importantes questions éthiques de notre société de l'information. La plupart des utilisateurs d'Internet et non-utilisateurs d'Internet sont préoccupés par la protection de leurs confidentialité des renseignements sur Internet. Cette recherche empirique a développé un modèle basé sur la théorie de l'action raisonnée et la théorie de la planification du comportement, qui tentent d'aborder les relations entre les règlements de protection et leur différences dans la préoccupation sur les informations privées entre la Chine et la Corée. Cette étude a utilisé la modélisation par équation structurelle pour valider le modèle de recherche proposé. Le résultat montre que le niveau de préoccupations pour la protection des renseignements en Corée est plus élevé qu'en Chine. Pour la Corée, l'influence de préoccupation pour la protection des informations

¹ Corresponding author. Business school, Qinzhou University, Qinzhou city, Guangxi, China.
Email: zhanghaibin18@gmail.com

² Business school, Pusan National University, Korea.

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personnelles est médiée par les croyances de confiance et les règlements administratifs. Pour la Chine, le souci de protection des renseignements personnels des utilisateurs d'Internet a un impact de leurs croyances de risques et la réglementation de manière positive, mais ne touche pas leur confiance de croyances.

Mots clés: Information sur la confidentialité; S'inscrire au site; Le modèle SEM

1. INTRODUCTION

In today's information society, the growth of information technology threatens our privacy, with its enhanced capacity for surveillance, communication, computation, storage, and retrieval (R. O. Mason, 1986). The consumer privacy can be invaded in many ways on the Internet, such as through technical tools that can collect granular information about online consumers and record their activities on the websites.

Many organizations collect customer information through registration, order, and/or survey forms, and by using "cookies" and tracking software to follow customers' online activities to gather information about their personal interests and preferences (Q. Liu and S. Konstantinos 2006).

A Yankelovich Partners study reports that 90% of its respondents feel that privacy is the most pressing concern when shopping online, rating it more important than prices or return policies (EPIC Alert, 2000). Norman Y. Mineta, the former U.S. Secretary of Commerce, remarked that the U.S. government regarded privacy as one of the most critical issues in the continued growth of the economy (N. K. Malhotra, 2004). This paper will describe the nature of privacy concerns and related factors, and develop a reliable and valid model to address the questions as below:

What are the relationships among regulations, concerns for information privacy, trust beliefs, risk beliefs, and the Internet users' behavioral intention of submitting personal information to websites? Are there any differences in concerns for information privacy between Korea and China, if there are, what are they?

2. METHODOLOGY

A questionnaire survey was employed in this study. The sampling frame used was university students of Korea and China. A 42-items questionnaire and a cover letter explaining the purpose of this study and asking their participation in the survey were sent to the respondents. Data analysis consisted of 3 parts: descriptive analysis, test of validity and reliability. The respondents were first examined by their demographic profile of gender and experiences of Internet using and improper invasion of privacy, and so on. Second, the instrument was analyzed for its reliability and validity to ensure adequacy for further data analysis. Then, structural equation modeling was the main statistical technique used to examine the proposed hypotheses of this study.

3. CONCERN FOR INFORMATION PRIVACY

Privacy concerns have been shown to "stem from a variety of factors, including the individual's previous learning, cultural milieu, and physiological reactivity" (Stone and Stone, 1990; Milberg et al., 2000)

The concern for information privacy (CFIP) is an important issue in e-commerce because the lack of confidence that Internet users have regarding security and privacy is one of the major impediments to full-scale utilization of the Internet (S. Faja and S. Trimi, 2006). Early surveys of consumer e-commerce reported privacy as one of the most important concerns of consumers when engaging in online shopping. While privacy concerns are reported to be a major factor inhibiting e-commerce, sales over the Internet continue to increase. In the meantime, Economists and practitioners point out consumers' actual behaviors may be different from their revealed privacy preferences (Dinev and Hart, 2006).

There are four central dimensions of individual's concerns about organizational information privacy practices: collection of personal information; secondary use of personal information; errors in personal information and improper access to personal information.

3.1 Collection

The concern for collection of personal information reflects the perception that extensive amount of personally identifiable data are being collected and stored in database (Smith et al., 1996). The collection of detailed information on consumer preferences enables firms to engage in relationship marketing and to target offers more accurately based on their customers' specific interests (Blattberg and Deighton, 1991). However, the practices that provide value to organizations and their customers also can arise privacy concerns (Bloom et al., 1994).

3.2 Secondary Use

This area of concern is that information is collected from individuals for one purpose but is used for another, secondary purpose without authorization from the individuals (Smith et al., 1996). Concerns for such secondary use were raised in several industry settings in a later study and echoed in Linowes (1989). Stone et al. (1983) refers to this issue under the label of "information usage", it is reiterated by Stone and Stone (1990) in a discussion of various information uses. Culnan (1993) examines attitudes toward external secondary uses in direct marketing applications. Control over secondary use of information is likely to be a sticking point. Over 80% of web consumers simply do not want websites to resell their personal information to other businesses (Huffman et al., 1999).

3.3 Improper Access

This concern is about that individuals' data are readily available to people not properly authorized to view or work with these data (Smith et al., 1996). It is often held that individual should have a "need to know" before access to personal information is granted (Smith et al., 1996). The technical options existed for controlling such access at file, record, or field level. But how those options are utilized and how policies associated with those uses are formed represent value-laden managerial judgments should be considered.

3.4 Errors

Early privacy studies detail some procedures for minimizing such errors (Westin and Baker, 1972). Laudon (1986) and Linowes (1989) document continuing problems in this domain. Provisions for inspection and correction are often considered as antidotes for problems of erroneous data. But many errors are ones, and they seem to snowball in spite of such provisions (Smith, 1994).

4. RESEARCH MODEL AND HYPOTHESIS

4.1 Research Model

Numerous studies focusing on behavior related to information technology were based on the theory of reasoned action (TRA) (Ajzen and Fishbein, 1980) and its later revision, the theory of planned behavior (TPB) (Ajzen, 1988), that established a parsimonious frame-work for investigating behavioral intention. This study follows the direction of prior literature studies to specify a model as below that focuses on two of the TRA and TPB models. Specifically, we are interested in the beliefs that influence the behavioral intention to give personal information necessary to successfully complete a registration on the webs.

In this model, firstly, collection of personal information (simply called collection), errors in personal information (simply called errors), secondary use of personal information (simply called secondary use), and improper access to personal information (simply called improper access) as first-order factors affect concerns for information privacy (simply called CFIP).

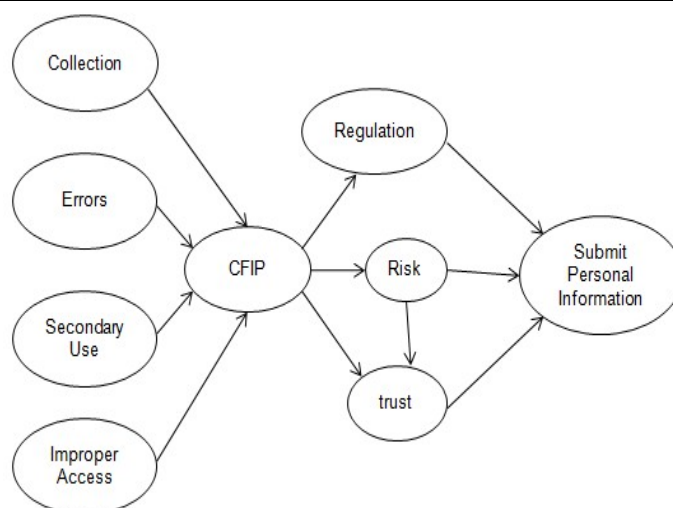


Figure 1: Research Model

As described above, CFIP as the prior factor influence the regulation, Internet users' risk beliefs, and trust beliefs in websites, respectively. And then regulation, trust beliefs and risk beliefs influence the result factor that behavioral intention of submitting personal information to websites to register.

Some cross-cultural research (Milberg et al., 2000) had shown that cultural values differ to some degree across countries and influences a society's response to the environment, cultural values will be associated with differences in Internet users' concern for information privacy as well. Different internet users based on different culture and education environment showed a big difference in privacy concerns contents (L. Yezheng et al., 2009; J.Xiao, et al., 2010). According to the research of Geert Hofstede's theory of cultural dimensions, the index value of Korea is different with China's in power distance index (PDI), masculinity (MAS), uncertainty avoidance index (UAI) and long-term orientation (LTO), even though they are both Asian countries and have been influenced by the Buddhish and Confucianism.

Furthermore, the differences of growth of information technology and government regulation in different countries also lead to Internet users' different degree of concern for information privacy, and their trust and risk beliefs in websites which influence their intention to submit personal information to register.

4.2 Research Hypothesis

Based on Fig.1 and foregoing discussion, the following hypotheses are proposed:

H1: Internet users' concerns for information privacy will have a positive effect on their risk beliefs in submitting their personal information to websites to register in Korea and China.

H2: Internet users' concerns for information privacy will have a positive effect on the regulations set down to protect the users' personal information in Korea and China.

H3: Internet users' concerns for information privacy will have a negative effect on their trust beliefs in submitting their personal information to websites to register in Korea and China.

H4: Internet users' risk beliefs in submitting their personal information will have a negative effect on their trust beliefs in Korea and China.

H5: Internet users' risk beliefs in submitting have a negative effect on their intention of submitting their personal information to websites to register in Korea and China.

H6: Internet users' trust beliefs in submitting their personal information will have a positive effect on their intention of submitting their personal information to websites to register in Korea and China.

H7: The regulation will have a positive effect on Internet users' intention of submitting their personal information to websites to register in Korea and China.

H8: The level of internet users' concerns for information privacy in Korea is different with the level of that in China.

5. DATA COLLECTION

This study employed a questionnaire survey. And since the college students have good knowledge of websites and are good at registering on the websites, we use the college students in Korea and China as the sample subjects in this study. The questionnaire was surveyed in three weeks from June 2nd to 23rd, 2009. A pretest was first conducted on a convenience sample of 58 graduate students majored in MIS in Korea.

The initial 42 items developed for measuring the 5 constructs were subjected to correlation and exploratory factor analysis. All items had loadings of more than 0.5, which indicate that to make sure the questionnaire items valid, reliable, and appropriate. Reliability analysis was also conducted on the items and the Cronbach's α values for all scales exceeded the recommended minimum level of 0.7, suggesting sufficient reliability for use in our analysis. At the end of pretest questionnaire, open-ended feedback was solicited from respondents regarding areas of ambiguity, clarity of questions, and other commendations that could improve the survey. These answers were then used to reword the survey, which resulted in a few marginal changes in the wordings of instructions and questions.

6. ASSESSMENT OF MEASUREMENT MODEL

6.1 Reliability Test

For a reliability test, Cronbach's α values were obtained, as shown in Table 1. Most of the Cronbach's α value of 8 factors were higher than 0.7 for Korea and China, proven to be reliable measures with Cronbach's α values respectively.

Table 1: Reliability Analysis

Factor	Number Of Total Item	Number of Analysis Item	Items	Cronbach's α	
				korea	China
Collection	4	4	Co1 Co2 Co3 Co4	0.917	0.732
Errors	4	4	Err1 Err2 Err3 Err4	0.859	0.767
Secondary use	4	4	Su1 Su2 Su3 Su4	0.730	0.813
Improper Access	4	4	IA1 IA2 IA3 IA4	0.911	0.841
Trust	4	4	Tr1 Tr2 Tr3 Tr4	0.875	0.731
Risk	4	4	Ri1 Ri2 Ri3 Ri4	0.712	0.816
Regulation	4	4	Rg1 Rg2 Rg3 Rg4	0.6930	0.716
Behavioral Intention	4	4	Bi1 Bi2 Bi3 Bi4	0.863	0.830

6.2 Validity Test

The validity analysis results of final variables were shown in Table 2, Table 3, Table 4, and Table 5.

As shown in the Table 4 and Table 5, all the items loadings are above 0.7, and are higher than cross-factor loadings of the other factors, which indicate that individual items' reliability and discriminant validity is available for Korea and China data sets.

Table 2: Factor Structure of Loadings and Cross-Loadings (Korea)

	cflp	Trust	Risk	Regulation	Behavioral
Co	0.741	-0.231	0.377	0.346	-0.050
Err	0.283	0.035	0.237	0.177	0.073
Su	0.941	-0.253	0.365	0.460	-0.016
IA	0.815	-0.232	0.431	0.392	0.028
Tr1	-0.318	0.841	-0.262	-0.160	0.166
Tr2	-0.273	0.680	-0.264	-0.189	0.059
Tr3	-0.279	0.901	-0.225	-0.162	0.117
Tr4	-0.216	0.888	-0.243	-0.144	0.131
Ri1	0.251	-0.160	0.654	0.273	0.046
Ri2	0.427	-0.267	0.900	0.276	0.127
Ri3	0.358	-0.243	0.877	0.294	0.109
Ri4	0.306	-0.228	0.749	0.296	0.137
Rg1	0.422	-0.157	0.307	0.872	0.182
Rg2	0.468	-0.221	0.361	0.889	0.143
Rg3	0.383	-0.129	0.277	0.821	0.163
Rg4	0.228	-0.066	0.153	0.625	-0.003
BI1	0.005	0.111	0.103	0.152	0.819
BI2	0.042	0.057	0.132	0.189	0.672
BI3	-0.074	0.156	0.086	0.111	0.757
BI4	-0.037	0.138	0.135	0.113	0.855

Table 3: Factor Structure of Loadings and Cross-Loadings (china)

	cflp	Trust	Risk	Regulation	Behavioral
Co	0.691	0.042	0.373	0.399	0.199
Err	0.751	0.178	0.318	0.430	0.176
Su	0.815	-0.033	0.446	0.531	0.145
IA	0.683	0.133	0.356	0.506	0.200
Tr1	0.017	0.784	0.141	0.119	0.237
Tr2	0.095	0.773	0.100	0.191	0.286
Tr3	0.141	0.796	0.196	0.263	0.331
Tr4	0.015	0.713	0.135	0.160	0.265
Ri1	0.296	0.073	0.682	0.384	-0.009
Ri2	0.435	0.092	0.840	0.461	0.079
Ri3	0.448	0.232	0.859	0.531	0.229
Ri4	0.449	0.195	0.855	0.547	0.217
Rg1	0.568	0.215	0.529	0.857	0.228
Rg2	0.612	0.257	0.552	0.903	0.356
Rg3	0.543	0.200	0.460	0.842	0.272
Rg4	0.487	0.199	0.512	0.827	0.379
BI1	0.262	0.292	0.213	0.359	0.804
BI2	0.209	0.353	0.159	0.341	0.839
BI3	0.147	0.333	0.121	0.288	0.831
BI4	0.107	0.228	0.077	0.216	0.738

Table 4: Discriminant Validity Analysis (Korea)

Correlation	AVE	CSRI	CFIP	Trust	Risk	Regulation	Behavioral Intention
Cfip	0.541	0.806	0.736				
Trust	0.761	0.927	-0.269	0.863			
Risk	0.638	0.874	0.374	-0.286	0.789		
Regulation	0.660	0.884	0.463	-0.188	0.353	0.813	
Behavioral Intention	0.711	0.908	-0.024	0.138	0.136	0.167	0.844

Table 5: Discriminant Validity Analysis (China)

Correlation	AVE	CSRI	CFIP	Trust	Risk	Regulation	Behavioral Intention
Cfip	0.508	0.804	0.703				
Trust	0.552	0.831	0.087	0.741			
Risk	0.660	0.885	0.519	0.196	0.824		
Regulation	0.736	0.918	0.654	0.261	0.601	0.838	
Behavioral Intention	0.647	0.879	0.239	0.384	0.183	0.389	0.814

And as shown in Table 4 and Table 5, all the index of integration factors of CSRI are above 0.7, so every measurement item is reliable. The shaded elements along the diagonal represent the square root of AVE, off-diagonal elements are the correlations among constructs. All weights of square roots of the AVEs are higher than correlation coefficients for both Korea and China data sets, thus discriminant validity is achieved in this study. Overall, the evidence reliability, internal consistency and discriminant validity indicates that the measurement model was appropriate for testing the structural model at a subsequent stage.

6.3 Model Evaluation Measures of Overall Fit

After assessing the reliability and validity, the hypothesized paths in the model were tested using the maximum likelihood estimated. The fit statistics indicate that the model provides a good fit to the data (Chi-square/d.f.=2.599, $p < 0.01$; GFI=0.901, AGFI= 0.812, RMSEA=0.080; CFI=0.905 for Korea data, Chi-square/d.f.=2.629, $p < 0.01$; GFI=0.902, AGFI= 0.800, RMSEA=0.073; CFI=0.890 for China data).

Table 6: Goodness-of-fit the structural model for Korea

	Fit Indices	Recommended Value	Value
Absolute Fit Indices	Chi-square/ d.f	≤ 3.00	2.599
	GFI	≥ 0.90	0.901
	RMSR	≤ 0.05	0.047
	RMSEA	≤ 0.08	0.080
Incremental Fit Indices	AGFI	≥ 0.80	0.812
	NFI	≥ 0.90	0.915
	CFI	≥ 0.90	0.905
	TLI	≥ 0.90	0.896
	IFI	≥ 0.90	0.937
Parsimony Fit Indices	PCFI	≥ 0.60	0.633
	PNFI	≥ 0.60	0.705

Table 7: Goodness-of-fit the structural model for China

	Fit Indices	Recommended Value	Value
Absolute Fit Indices	Chi-square/ d.f	≤ 3.00	2.629
	GFI	≥ 0.90	0.902
	RMSR	≤ 0.05	0.048
	RMSEA	≤ 0.08	0.073
Incremental Fit Indices	AGFI	≥ 0.80	0.800
	NFI	≥ 0.90	0.937
	CFI	≥ 0.90	0.890
	TLI	≥ 0.90	0.913
	IFI	≥ 0.90	0.951
Parsimony Fit Indices	PCFI	≥ 0.60	0.624
	PNFI	≥ 0.60	0.701

7. RESEARCH HYPOTHESIS TEST

7.1 Structural Model Test

Figure 2 shows the conceptual path model. The path coefficients were used to indicate the strength and direction of the relationships between the observed variables and underlying latent variable.

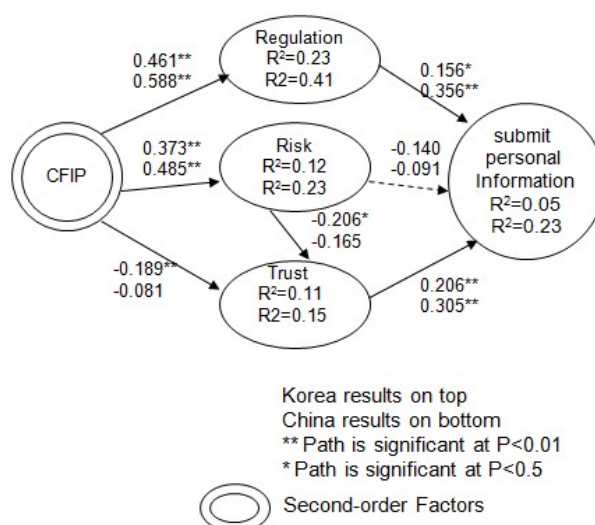


Figure 2: Conceptual Path Model

7.2 Hypothesis Test

As shown in Table 8, for Korea data set, the path from risk to submit personal information was not significant at the $\alpha=0.05$ level, the paths from risk to trust, and regulation to submit personal information were significant at the $\alpha=0.05$ level, the other paths were significant at the $\alpha=0.01$ level. Furthermore, the significant negative coefficient from CFIP to trust (-0.189), from risk to trust (-0.206), indicates the presence of a negative causal relationship between two factors respectively. For China data set, all paths were significant at the $\alpha=0.01$ level, but except the paths from CFIP to trust, risk to trust, and risk to submit

personal information were not significant at the $\alpha=0.05$ level, which is contrary to hypothesis H3, H4, and H5.

Table 8: Results of Paths Test

Paths	Korea			China		
	β	t	Support	β	t	Support
H1:cfip→Risk	0.373	5.08	O**	0.485	7.81	O**
H2:cfip→Regulation	0.461	7.06	O**	0.588	9.89	O**
H3:cfip→Trust	-0.189	-2.62	O**	-0.081	0.97	×
H4:Risk→Trust	-0.206	-2.43	O*	-0.165	-1.86	×
H5:Risk→Intention	-0.140	-1.94	×	-0.091	-1.25	×
H6:Trust→Intention	0.206	3.11	O**	0.305	4.53	O**
H7:Regulation→Intention	0.156	2.29	O*	0.356	3.80	O**

** p < 0.01; * p < 0.05. O = Supported; × = Not supported

8. RESULTS AND FINDINGS

The results of Korea data sets reveal that concerns for information privacy and risk beliefs of Internet users impact their trust beliefs which can influence their behavioral intention of submitting personal information to websites to register. Furthermore, concerns for information privacy also affect the regulations of websites which can affect behavioral intentions too.

The results of China data sets are a little different. The concern for information privacy of Internet users impact their risk beliefs and regulation positively, but not affect their trust beliefs. The Internet users' trust beliefs and regulations of websites affect the behavioral intentions of submitting personal information positively but their risk beliefs do not, which is similar to Korea.

Differences in overall levels of concerns for information privacy in Korea and China were observed, as were associations among users' perspective on regulations, trust and risk beliefs.

Moreover, according to procedural justice theory, companies that establish fair information practices and disclose these practices greatly reduce the customers' perceived risk. Thus, the greater the efforts to disclose these practices, the better the user perceptions. If companies exhibit loose management of information privacy, then individuals are more likely to call for strong privacy laws. Similarly, as individuals' privacy concerns rise, so do their demands for additional legal intervention. In fact, a much stronger predictor of regulatory preferences appears to be the manner in which companies manage their privacy environment via their policies and structures.

These findings constitute a major contribution to the emerging theoretical base of information privacy research and provide the basis for some specific recommendations to those managing personal data in an international environment.

REFERENCES

- A. F. Westin and M. A. Baker. (1972). *Data Banking in A Free Scociety*. NY: Quadrangle books.
- D.F. Linowes. (1989). *Privacy in America: Is Your Private Life in the Public Eye?* Chicago, IL: University of Illinois Press.
- D. L.Hoffman , T. P. Novak, and M. A. Peralta. (1999). Building Consumer Trust Online. *Communications of the ACM*, 42(4), 80-85.

- E. F. Stone, H. G. Gueutal, D. G. Gardner, and S.A McClure. (1983). Field Experiment Comparing Information-Privacy Values, Beliefs, and Attitudes Across Several Types of Organizations. *Journal of Applied Psychology*, 68(2), 459-468.
- E. F. Stone and D. L. Stone. (1990). Privacy in organizations: Theoretical Issues, Research Findings, and Protection Mechanisms. *Research in Personnel and Human Resource Management*, 8(1), 349-357.
- G. Hofstede. (1997). *Cultures and Organizations: Software of the Mind*. London: Mc Graw Hill.
- H. J. Smith, S. J. Milberg and S. J. Burke. (1996). Information Privacy: Measuring Individuals' Concerns about Organization Practice. *MIS Quarterly*, 20(2), 167-177.
- I. Ajzen and M. Fishbein. (1980). *Understanding Attitudes and Predicting Social Behavior*. Englewood Cliffs, NJ: Prentice-Hall, Inc.
- I. Ajzen. (1988). *Attitudes, Personality, and Behavior*. Buckingham: Open University Press.
- J. Thibaut & L. Walker. (1975). *procedural Justice: A psychological Analysis*. Hillsdale, NJ: Erlbaum.
- J. Deighton and R. C. Blattberg. (1991). Interactive Marketing: Exploiting the Age of Addressability. *Sloan Management Review*, 33(1), 5-14.
- K. C. Laudon. (1986). Data Quality and Due Process in Large Interorganizational Record Systems. *Communications of the ACM*, 29(1), 4-11.
- L. Yezheng, J. Fan & J. Yuanchun. (2009). Internet Users' Privacy Concerns Research. *Commercial Research*, 38(2), 22-27.
- M. J. Culnan. (1993). How Did They Get My Name? An Exploratory Investigation of Consumer Attitudes Toward Secondary Information Use. *MIS Quarterly*, 17(3), 341-363.
- N. K. Malhotra, S. S. Kim and J. Agarwal. (2004). Internet Users' Information Privacy Concerns (IUIPC): The Construct, the Scale, and a Causal Model. *Information Systems Research*, 15(4), 336-355.
- New Polls Show Public Support for Privacy Policies. (2000, September). *EPIC Alert* 7.16.
- P. N. Bloom, G. R. Milne and R. Adler. (1994). Avoiding Misuse of New Information Technologies: Legal and Societal Consideration. *Journal of Marketing*, 58(1), 98-110.
- Q. Liu and S. Konstantinos. (2006). Customer information sharing among rival firms. *European Economic Review*, 50(6), 1571-1600.
- R. O. Mason. (1986). Four ethical issues of the information age. *MIS Quarterly*, 10(1), 5-12.
- S. J. Milberg, H. J. Smith and S. J. Burke. (2000). Information Privacy: Corporate Management and National Regulation. *Organization Science*, 11(1), 35-57.
- S. Faja and S. Trimi. (2006). Influence of the Web Vendor's Interventions on Privacy-Related Behaviors in E-Commerce. *Communications of the Association for Information Systems*, 17(1), 593-634.
- T. Dinev and P. Hart. (2006). Internet Privacy Concerns and Social Awareness as Determinants of Intention to Transact. *International Journal of Electronic Commerce*, 10(2), 7-31.