The effect of deterrence policy in software piracy: cross-cultural analysis between Korea and Vietnam

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Abstract

This research focuses on the comparison of piracy behaviour between Korea and Vietnam, and empirical validation of a model of software piracy based on expected utility theory, deterrence theory and institution isomorphism theory. A survey of 132 (Korea) and 145 (Vietnam) respondents was carried out in 2008 and PLS (Partial Least Square) was utilized for the analysis. Our results indicate that the relationships between punishment certainty and attitude, and mimetic pressure and intention, are significantly different between Korea and Vietnam. Several implications are considered from the political and cultural aspects.

Keywords

software piracy, utility theory, deterrence theory, isomorphism theory, cultural dimensions, Korea, Vietnam

Different methods of preventing software piracy are necessary depending on cultural distinctions.

Introduction

According to the Software Publishers Association, the software piracy rate in South Korea was 86 percent in 1993, while in Vietnam the rate was 98 percent in 1995 (Gabella and Picasso 1995). There has since been a dramatic change in South Korea, with rates decreasing to 40 percent within a decade (Business Software Alliance 2010). Meanwhile, the rate in Vietnam remains high at 83 percent in 2010 (Business Software Alliance 2010). The piracy rate is computed by the formula, unlicensed software units/total software units installed. Therefore, 86 percent software piracy rate means that 86 percent of the software units installed in a certain country are unlicensed.

In fact, both countries' governments have made great efforts to reduce piracy rates. The Korean government enforced sentences of from 3 to 5 years for software piracy (Joins 2006) and the Vietnamese government quintupled their fines (Choi 2010). However, the results of these efforts are inconsistent. In Korea, a more fruitful effect is found than in Vietnam. It could be assumed that different responses originated from different cultural background make those different consequences.

In piracy literature, many factors are considered to be influential on piracy behaviour. Some have suggested that cultural differences and per capita GDP play a role in explaining the high software piracy rate in Asian countries, as well as the significant changes

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in the rate in countries such as South Korea (Gopal and Sanders 2000; Shin et al. 2004). These authors have shown empirically that a strong positive correlation is found between piracy rate and collectivism because software is naturally considered as a resource that can be shared in collectivistic countries where sharing resources with others is regarded as a virtue (or at least as a social norm). A strong negative correlation is found between per capita GDP and piracy rates since income levels influence the ability of consumers to purchase software.

Other researchers have investigated the role of deterrence efforts in reducing piracy behaviour (Cheng et al. 1997; Moores and Dhillon 2000; Peace et al. 2003). In those studies, the role of punishment in piracy behaviour was explored. The utility of using illegal software and the costs from possible punishments are calculated. In spite of existing research on piracy behaviour, comprehensive understanding of the relationships among cultural background, deterring effort, and piracy behaviour remains unexplored.

At this point, we would like to suggest two research questions:

1. What is the influence of cultural differences on piracy behaviour?
2. What factors have significantly different impact on piracy behaviour in Korea and Vietnam?

These two research questions are expected to fill the gap in the piracy behaviour research area.

To explore these questions, this paper draws on expected utility theory, deterrence theory, and institutional isomorphism to model intention to pirate software. Also included in the analysis is a price sensitivity variable because of the strong historical relationship between piracy and income.

We structure the rest of this article as follows: We first explore cultural dimensions in Korea and Vietnam to understand the cultural context of piracy behaviour. Secondly, we introduce other theoretical backgrounds, namely, expected utility theory, deterrence theory, and isomorphism theory. A research model is suggested to compare the different effects of piracy related variables in Korea and Vietnam. Subsequently, we explain the measurement instruments, analysis methods and data collection administration. Finally, we report the structural equation model results and conclude with a discussion of the implications of our findings.

Literature review

Many studies have considered culture from the perspective of institutional isomorphism (e.g. LeTendre et al. 2001; Teo et al. 2003). Culture plays an important role in institutional isomorphism as it gives legitimacy to particular behaviours (Zakaria and Zakaria 2003). Institutional isomorphism could be explained as a constraining process that forces one unit in a population to resemble other units (DiMaggio and Powell 1983). Software piracy could be regarded as a group activity because the mechanism of piracy involves a group of individuals who make the unauthorized copies for all group members (Gopal and Sanders 1997). In this sense, institutional isomorphism could be a useful lens through which to understand software piracy as a group activity. Software piracy will be examined here using institutional isomorphism to compare two countries, in order to allow for cultural differences. Culture is characterized by a set of unique values that guide the behaviour of people belonging to that culture (Triandis 1995).

Hofstede's cultural dimensions

Hofstede (1980a; 1980b; 1991) proposed four cultural dimensions:

1. power distance (PDI)
2. uncertainty avoidance (UAI)
3. individualism-collectivism (IDV)
4. masculinity-femininity (MAS)

He introduced the country score table by analysing a large database collected by IBM between 1967 and 1973 covering more than 70 countries. The country scores on the dimensions are relative – societies are compared to other societies. Without making a comparison a country score is meaningless (Hofstede 1991).

The major assertion of Hofstede's framework is that there are shared values, beliefs, and norms that are culture-specific. These factors can predict a wide range of human behaviour and practices.

Power distance. According to Hofstede (1980a; 1980b; 1991), PDI is the extent to which the less powerful members of a society accept and expect that power will be distributed unequally. This suggests that a society's level of inequality is endorsed by the followers as much as by the leaders. Power and inequality are, of course, fundamental within any society and anybody with some international experience will be

Table 1. Cultural dimensions, Korea and Vietnam (Hofstede 1991).

	PDI	UAI	MAS	IDV
Korea	60	85	39	18
Vietnam	70	30	40	20

aware that 'all societies are unequal, but some are more unequal than others'.

Uncertainty avoidance. UAI deals with a society's tolerance for uncertainty and ambiguity and indicates to what extent a culture programs its members to feel comfortable in unstructured situations. Unstructured situations are novel, unknown, surprising and different from usual. Uncertainty-avoiding cultures try to minimize the likelihood of such situations arising with strict laws and safety and security measures, and, at a philosophical and religious level, by a belief in absolute Truth.

Individualism–collectivism. Collectivism refers to the degree to which individuals are integrated into groups (Hofstede 1991). Societies to which people belong from birth onwards are integrated into strong, cohesive in-groups, often extended families (with uncles, aunts and grandparents) which continue protecting them in exchange for unquestioning loyalty. The word 'collectivism' in this sense has no political meaning: it refers to the group, not to the state.

Masculinity–femininity. Lastly, the masculinity side of this dimension represents a preference in society for achievement, heroism, assertiveness and material reward for success (Hofstede 1991).

Although all four cultural dimensions may be useful for predicting human behaviour and practices, Hofstede (1991) argues that uncertainty avoidance and power distance tend to be especially relevant for research pertaining to group behaviour and practices. This is because uncertainty avoidance and power distance jointly determine key aspects of corporate behaviour, such as distribution of decision authority, establishment of rules and methods, and management of risks and ambiguity (Hofstede 1991).

Table 1 illustrates the example of comparing cultural dimension scores between Korea and Vietnam. The scores are derived from Hofstede's work (Hofstede 1991).

As shown in Table 1, the individualism scores and masculinity scores of both Korea and Vietnam are quite similar. However, in the case of PDI (power distance index), Vietnam scores 10 points higher than Korea. For UAI (uncertainty avoidance index), Korea is higher (85) compared to Vietnam (30) Hofstede(1991). This means that Korean people tend to avoid uncertainty much more than Vietnamese people do.

Accordingly, we can postulate that these differences will strongly influence any differences in piracy between these countries. We are not testing the cultural variables directly in the model, but it is useful to see how close Vietnam and Korea are in terms of these cultural dimensions. It should be noted that cultural dimensions will be implicitly part of the cross-cultural analysis in the model.

Software piracy

Software piracy is an illegal act of copying software for any reason, other than backup, without explicit permission from and compensation to the copyright holder (Gopal and Sanders 1998). Piracy is against the law in most countries, including Vietnam and Korea, whether for commercial or private use. Even though motivations are different between piracy for commercial purposes and piracy for individual purposes, legally there is no difference between the two and both cases are considered illegal.

With the recent development of information technology, violation of software intellectual property occurs in a variety of fashions. Koen and Im (1997) define three types of software piracy; 'soft lifting', commercial piracy, and corporate piracy (Koen and Im 1997).

Soft lifting is the most common form of software piracy and is defined as piracy of software by a person working in an organization for utilization at the office or at home. For instance, unauthorized sharing of software with others or installing it on computers or laptops without the appropriate licenses is categorized as soft lifting.

Commercial piracy refers to illegal acts of copying or selling software to others for a commercial purpose.

Corporate piracy is the purchase of fewer software licenses than are required. This is equivalent to purchasing numerous pieces of software while only paying for a few licenses.

This study focuses on soft lifting only, from the perspective of the individual perpetrator.

Expected Utility theory. Individuals are rational and will make decisions that can maximize expected utility. This is defined as Expected Utility theory (Gopal and Sanders 1998; Gopal and Sanders 2000). When faced with a decision-making situation, an individual considers the expected costs, the benefits, the possibility of other alternatives, and the potential consequences of each alternative.

Expected utility theory has been put forward as a rationalization for software piracy in many analytical studies (Cheng et al. 1997; Conner and Rumelt 1991; Gopal and Sanders 1998; Gopal and Sanders 2000). Implicitly or explicitly, the factors that explain the theory were found to have an influence on decision-making in software piracy behaviour. According to a study by Peace (1997), in cases where software is needed, computer users either buy the software, continue the task without the software, or illegally copy the software. These three choices can be explained from the expected utility theory perspective (Peace 1997).

From the perspective of expected utility theory, one must first understand what are the costs and benefits of the piracy behaviour. First, in the case of cost, this refers not only to the purchase of the software, but also to the likelihood of being caught and the severity of punishment when caught. Therefore, the expected utility of piracy refers to the expected gains when taking into account the possibility and level of punishment. In other words, if an individual considers software piracy to have more utility than observing copyright law, they will be more willing to engage in the piracy. In addition, the software's cost itself works in terms of utility. In the context of expected utility theory, software costs affect attitudes toward software piracy (Peace et al. 2003).

Deterrence theory. Deterrence theory refers to the decline in the level of illegal behaviour that occurs when punishment certainty and severity are increased. In other words, unwanted behaviour can be suppressed by the threat of punishment. Schaub (2004) suggests that when people decide to take a risk, punishment certainty and severity are the primary considerations (Schaub 2004). Moreover, when a person decides whether or not to take a risk or commit a crime, punishment certainty was shown to be a more influential factor than punishment severity (Schaub 2004). Deterrence theory is based upon utilitarianism, which considers the human as a being that 'maximizes gains'. This is in agreement with exchange theory and utility theory.

People have a tendency to calculate the benefits and costs of any act and to aim to maximize the benefits (Gopal and Sanders 1997). Deterrence theory focuses on potential costs such as physical damage and property damage that may be the outcome of an illegal behaviour. Ehrlich (1996) linked deterrence theory directly to economic factors and proved that many crimes are related to expected cost compared to expected gains (Ehrlich 1996). Heavy crime rates have a substantial positive correlation with estimated gains, while expected costs have a negative correlation (Ehrlich 1996). Straub and Collins (1990) claim that deterrence measures are the most effective strategy in combating piracy. Recent surveys show that when there is a low probability of getting caught in piracy, the intention to pirate software is very high (Cheng et al. 1997). Based on previous studies, punishment certainty and punishment severity are used as important indicators when predicting software piracy and are employed as antecedents of attitude toward software piracy (Peace et al. 2003).

Institutional isomorphism. All institutions have their own accepted social order that has become the norm. Institutional isomorphism refers to the acceptance of this social order by an organization (Jepperson 1991). According to the theory of institutional isomorphism, an organization that accepts normative institutional gains and institutional validity sustains higher performance as it acquires more necessary resources compared to other organizations (DiMaggio and Powell 1983). Normative social order exists in many forms, such as laws and regulations, education, socially accepted ideas, generalized management forms, contracts, etc. Although all organizations are distinct, they are influenced by the general institutional environment. The institutional environment dictates the institutional norm and the social order (Tolbert and Zucker 1983). DiMaggio and Powell (1983) categorized this influence as inclusive of mimetic pressure, coercive pressure, and normative pressure.

Mimetic pressure. According to Hu et al. (2007), when faced with an environment of high uncertainty, mimetic pressure induces an organization to imitate other organizations' decisions (Hu et al. 2007). Imitation can bring economic benefits by reducing costs which otherwise would have been put into searching for a solution. Also, according to DiMaggio and Powell (1983), organizations are influential within a similar territory to themselves and they also tend

towards imitation of successful organizations. This is because these organizations have similar economic network status, similar goals, products, clients and experiences (Burt 1987). Many previous studies show that mimetic pressure is applied in various business situations such as the introduction of a website (Flanagin 2000), the introduction of EDI (Electronic Data Interchange) (Teo et al. 2003), and the selection of IT products (Tingling and Parent 2003). Khalifa and Davison (2006) discuss the mimetic pressure that often occurs after witnessing other firms earning profits (Khalifa and Davison 2006).

Accordingly, this study defines mimetic pressure as the practice of piracy due to the observed benefits seen in other people. According to Givon et al. (1995), although using pirated software is immoral, people may use pirated software partly because of the social acceptance of that behaviour (Givon et al. 1995).

Coercive pressure. DiMaggio and Powell (1983) explain that coercive pressure arises within an organizational environment and originates from other organizations or from social, cultural and political expectations. In other words, coercive pressure is the official or unofficial result of expectations from bodies that an organization is dependent upon and the cultures or milieu of which the organization is a part. Examples of official pressure are coercive regulations from the government or legal restraints. This sort of coercive pressure enhances control over an organization within a larger context and ensures its institutional validity. Khalifa and Davison (2006) used institutional isomorphism theory to explain how coercive pressure was applied to the introduction of ETS (Electronic Trading Systems) in an organization. Coercive pressure can be applied by customers and suppliers who are deeply related to e-retailers in an ETS environment. It is especially essential in e-commerce to meet existing customers' requirements since the switching cost is very low. The coercive pressure found in organizations can also exist between individuals. An individual's decision-making may be affected by regular pressure from interested parties such as friends, co-workers and authority figures. Instructions from one's boss within an organization can be categorized as coercive pressure. This same type of pressure can be relevant to software piracy.

Normative pressure. Generally, normative pressure refers to the sharing of the norm through related experiences. This type of pressure can again influence organizational behaviour (Powell and DiMaggio 1991). According to social association theory, an organization related to a more successful organization through the introduction of an innovative method will be easily persuaded to behave like the successful organization (Burt 1987). Teo et al. (2003) explain the acceptance of technology as the product of mimetic, coercive and normative pressure, the size of the company and its IT department and the complexity of the IT to be introduced. Direct and frequent communication induces related organizations to think and act similarly (Erickson 1988). Huff and Munro (1985) found that if information is shared and stored among organizations it will accelerate the introduction of new IT (Huff and Munro 1985). According to Bouchard (1993), the decision of an organization to accept a new technology does not depend on the characteristics of that technology, but rather on the number of companies that already use it (Bouchard 1993). Previous studies show that normative pressure also influences the decision-making of individuals. In the case of pirated software, an individual may consider using pirated software due to normative pressure from peers. Normative pressure arises out of the desire to fit in, and so differs from mimetic pressure, which originates from others gaining profit through pirated software. It also differs from coercive pressure, which is due to more direct persuasion.

Research methodology

Research model

Based on the literature review discussed earlier, the current study establishes a structural model to see if Korea and Vietnam show any differences in the relationships among focal variables. Most of these studies were conducted in developed countries such as the United States (Moores and Dhillon 2000; Peace et al. 2003; Woolley and Eining 2006), and the model shown in Figure 1 is established based on such studies, that acquired generalizability. In this model, Korea and Vietnam, that have a lot of cultural features in common, will be compared.

The proposed model tries to explain piracy behaviour with antecedents, software cost, punishment, and isomorphism pressures.

Measurement development

Measurement items were adapted from the literature and adjusted to the specific requirements of this
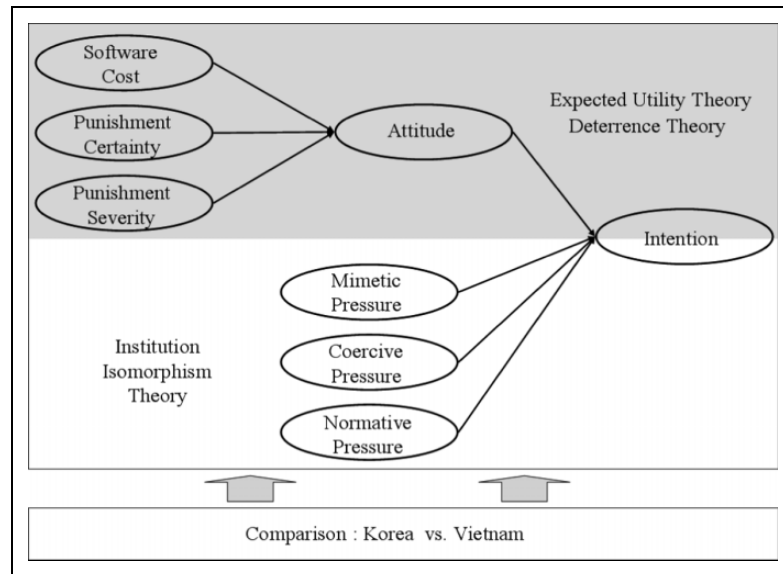
Figure 1. Research model.

research, as shown in Table 2. A pre-test of the questionnaire, written in Korean and Vietnamese, was conducted in Korea and Vietnam by using four research workers in each country to assess logical consistency, clarity, sequence of items, and task relevance. Overall, it was found that the questionnaire was clear and easy to complete. A number of suggestions were made about the wording of several items and the overall structure of the questionnaire; the suggestions were discussed and changes made to the instrument. A pilot study with 15 full-time master's degree students studying regional information was also conducted in Korea. The purpose of this pilot was to gain additional comments on the questionnaire content and structure. For the main study, a paper-based survey was conducted. All respondents were guaranteed confidentiality. Subjects were asked to answer the questionnaire items according to their experience with software piracy. To maximize the response rate, 30 randomly selected respondents were given a gift certificate. Table 2 shows the instrument. For all of the measures, a 7-point Likert-type scale was adopted with responses ranging from strongly disagree (1) to strongly agree (7).

Data collection

In order to proceed with an empirical analysis, 300 copies of the survey were distributed in each country in 2008 under the support of the Department of Regional Information of Seoul National University and the Department of Soil Science and Land Management of Can Tho University. The survey was conducted among graduate students from the schools of natural science, engineering, social science, agriculture and management in Seoul National University in Korea, and schools of agriculture and business in Can Tho University in Vietnam. We first made appointments and visited the offices and explained the detailed reason for and context of the study.

The survey targeted graduate students who typically used professional software such as statistical packages, GIS software and data mining tools, as well as universal applications such as Windows and MS Office. Hence, the survey data reflected software piracy in a working environment. In addition, respondents were working on projects in relationship with both governmental organizations and private enterprises. Therefore, constructs relevant to institutional isomorphism theory are well explained within the survey data. It was decided that there was enough validity for the study.

Results

Of the 300 questionnaires distributed in each country, 142 were retrieved from Korea and 153 from Vietnam. After excluding those that could not be used, 132 completed questionnaires from Korea and 145 from Vietnam were used for analysis. Table 3 shows the profile of respondents.

Assessment of the research model was conducted using Partial Least Square (PLS). PLS is a technique that analyzes structural equation models (SEMs)

Table 2. Questionnaire items.

Variable		Question	Literature
Punishment Severity	PS1	The punishment would be light when arrested for software piracy.	(Peace et al. 2003)
	PS2	If I got caught for software piracy, I would receive severe punishment	
	PS3	If I got arrested for piracy, punishment would not be severe.	
Punishment Certainty	PC1	If I committed software piracy, the probability of being caught is high.	(Peace et al. 2003)
	PC2	If I use pirated software I would likely get caught.	
Software Cost	SC1	I feel software cost is very low these days.	(Peace et al. 2003)
	SC2	In my opinion, software packages are very expensive.	
	SC3	If I was to buy software these days, I would need a lot of money.	
Mimetic Pressure	MP1	My co-workers profit by using pirated software.	(Teo et al. 2003)
	MP2	I don't feel co-workers who use pirated software are doing any harm.	
	MP3	By using pirated software, my co-workers have nothing to lose.	
Coercive Pressure	CP1	My work depends on my co-workers a great deal.	(Teo et al. 2003)
	CP2	My work is difficult without my co-workers' help.	
	CP3	My work requires a good relationship with my co-workers.	
Normative Pressure	NP1	My co-workers often use pirated software.	(Teo et al. 2003)
	NP2	My co-workers do not criticize usage of pirated software.	
	NP3	Using pirated software is natural among my co-workers.	
Attitude	AT1	To me, software piracy is a bad thing.	(Ajzen 1991)
	AT2	To me, software piracy is an unpleasant thing.	
	AT3	To me, software piracy is a smart thing.	
Intention	IT1	In the future, I will carry out software piracy.	(Ajzen 1991)
	IT2	If the opportunity presents itself, I will carry out software piracy.	

Table 3. The profile of respondents.

	Korea	%	Vietnam	%
Gender				
Female	45	34	70	48
Male	87	66	75	52
Average age (years)	24.6		22.6	
Software piracy experience more than twice	51	39	84	58
Total	132	100	145	100

involving multiple-item constructs using direct and indirect paths. PLS works by extracting successive linear combinations of the predictors, and is effective in explaining both response and predictor variation (Chin 1998). PLS is a powerful approach for analyzing models because of the minimal demands on measurement scales, sample size, and residual distributions. In addition, PLS avoids two serious problems: inadmissible solutions and factor indeterminacy (Fornell and Bookstein 1982). Structural equation modelling (SEM) approaches, such as Linear Structural Relations (LISREL) and AMOS, are not able to deal with non-normal distributions, and they can, in some cases, yield non-unique or otherwise improper solutions (Fornell

and Bookstein 1982). PLS is not as susceptible to these limitations (Wold 1974). The emphasis of PLS is on predicting the responses, as well as understanding the underlying relationship between the variables (Tobias 1999).

Measurement assessment

PLS analysis involves two stages: (1) the assessment of the measurement model, including the reliability and discriminant validity of the measures, and (2) the assessment of the structural model. Cronbach's α was investigated for internal consistency. Table 4 shows that Cronbach's α for all constructs was greater than 0.7. Therefore the reliability test shows the measurement tool to be feasible, with no significant defect in internal consistency.

The Average Variance Extracted (AVE) was also calculated. AVE measures the variance that a construct captures from its indicators, relative to the variance contained in measurement error. This statistic is generally interpreted as a measure of reliability for the construct and as a means of evaluating discriminant validity (Bakos 1998). All AVEs for the constructs in this study were greater than 0.6. This indicates that 60 percent of the variance of the indicators could be

Table 4. Descriptive statistics and internal consistency.

Construct	Item	Korean respondents					Vietnamese respondents				
		Mean	SD	Alpha	CR	AVE	Mean	SD	Alpha	CR	AVE
Software Cost	SC1	5.6	1.3	0.86	0.92	0.83	3.3	1.8	0.90	0.94	0.83
	SC2	5.4	1.3				3.8	1.9			
	SC3	5.5	1.3				3.7	1.8			
Punishment Severity	PS1	3.9	1.6	0.90	0.94	0.83	5.6	1.2	0.68	0.83	0.61
	PS2	3.7	1.6				5.1	1.2			
	PS3	3.9	1.6				5.7	1.3			
Punishment Certainty	PC1	2.5	1.3	0.70	0.87	0.77	4.1	1.8	0.84	0.90	0.76
	PC2	2.6	1.5				4.4	1.7			
Mimetic Pressure	MP1	4.9	1.6	0.71	0.84	0.63	4.3	1.6	0.81	0.89	0.72
	MP2	4.7	1.3				4.3	1.3			
	MP3	5.1	1.3				4.6	1.7			
Coercive Pressure	CP1	4.0	1.7	0.79	0.88	0.71	4.2	1.8	0.87	0.92	0.79
	CP2	3.8	1.6				4.1	1.8			
	CP3	4.7	1.4				4.1	1.8			
Normative Pressure	NP1	5.1	1.5	0.74	0.86	0.66	4.0	1.9	0.82	0.89	0.74
	NP2	5.2	1.2				4.3	1.6			
	NP3	5.2	1.3				4.4	1.7			
Attitude	AT1	4.1	1.4	0.81	0.89	0.73	3.5	1.9	0.69	0.83	0.62
	AT2	4.5	1.4				3.1	1.8			
	AT3	4.0	1.3				3.1	2.0			
Intention	IT1	4.3	1.6	0.91	0.96	0.91	4.1	1.7	0.69	0.86	0.76
	IT2	4.3	1.5				3.1	1.8			

accounted for by the latent variables. Also, as composite reliability was over 0.7, it can be said that the measurement tool has both internal consistency and convergent validity (Werts et al. 1974). According to the verification result, all measurements in this study were over 0.8 and had suitable composite reliability.

The AVE can also be used to assess discriminant validity. They should be greater than the square of the correlations among the constructs; that is, the amount of variance shared between a latent variable and its block of indicators should be greater than the shared variance between the latent variables. Table 5 shows the inter-correlations of constructs, and the variance shared between the latent variables and their indicators. The diagonal elements of Table 5 are the square root of the AVE. It can be seen that the square root of each AVE value was greater than the off-diagonal elements. The measurement model thus had a reasonable degree of discriminant validity among all of the constructs. The results of the measurement analysis also showed that all the constructs and measures had acceptable reliability and validity.

In order to verify discriminant validity, a cross-loading analysis was also conducted. As can be seen in the cross-loading tables in Appendices A and B, all loadings of construct of latent variables were over 0.7 and all factor loadings were significant at a confidence level of 0.01. Furthermore, for other constructs, the loadings were below 0.7. This shows that the measurement has discriminant validity.

The current study investigated the mean differences of each latent variable from the two countries using t-test analyses. The results are shown in Table 6. It can be seen that, except for two variables, "punishment severity" and "punishment certainty," the mean values of the latent variables of Korea are larger than those of Vietnam. There is no significant difference between the two countries in the comparison of "coercive pressure" and "intention".

These results imply that software piracy behaviours in Korea are, in general, conducted under a stronger economic burden, with more cultural pressure and a more positive attitude toward piracy than in Vietnam. Even though Koreans perceive lower punishment severity and certainty, as well as high software cost, their piracy rate is lower (40 percent)

Table 5. Correlations of the latent variables and the square root of the AVE.

	SC	PS	PC	MP	CP	NP	AT	IT
Korean respondents								
SC	(0.913)							
PS	−0.017	(0.913)						
PC	−0.103	0.356	(0.879)					
MP	0.298	−0.179	−0.238	(0.792)				
CP	0.063	0.036	−0.051	0.126	(0.840)			
NP	0.278	−0.151	−0.171	0.614	0.150	(0.814)		
AT	0.256	−0.411	−0.271	0.564	−0.065	0.439	(0.851)	
IT	0.132	−0.314	−0.295	0.410	0.111	0.449	0.513	(0.956)
Vietnamese respondents								
SC	(0.910)							
PS	−0.250	(0.782)						
PC	−0.038	0.029	(0.869)					
MP	−0.029	0.027	0.168	(0.848)				
CP	0.136	0.008	0.001	0.334	(0.889)			
NP	0.048	−0.045	−0.005	0.424	0.344	(0.859)		
AT	0.274	−0.381	−0.113	0.173	0.247	0.072	(0.785)	
IT	0.097	−0.010	0.117	0.680	0.502	0.474	0.418	(0.872)

Note: The numbers in parentheses are the square root of AVE

Table 6. Mean difference between two countries.

|	Korean respondents		Vietnamese respondents		
	Mean	SD	Mean	SD	*t* value
Software Cost	5.62	1.14	3.57	1.66	−11.820**
Punishment Severity	3.81	1.48	5.42	1.09	10.362**
Punishment Certainty	2.65	1.33	4.24	1.64	8.969**
Mimetic Pressure	4.89	1.12	4.34	1.40	−3.629**
Coercive Pressure	4.15	1.31	4.08	1.57	−0.447
Normative Pressure	5.15	1.09	4.27	1.46	−5.633**
Attitude	4.16	1.23	3.26	1.50	−5.424**
Intention	4.27	1.52	4.06	1.53	−1.167

** $p < 0.01$

than that of Vietnam (83 percent) (Business Software Alliance 2010). Thus, we can infer that Korean people have relatively low utility from pirating software. In addition, mimetic pressure and normative pressure are high in Korea. This is consistent with the fact that punishment severity and punishment certainty are low in Korea. As the Koreans associate less risk or uncertainty with piracy, they consider their co-workers' piracy as normal behaviour.

Software piracy in Vietnam, on the other hand, is conducted under a heavy risk such as punishment. However, as illustrated above, the piracy rate of Vietnam is higher than that of Korea. This result indicates that the possible benefits from software piracy are bigger than the possible risks or damages from punishment in Vietnam.

Structural model assessment

After assessing reliability and validity, the overall fit of the path model was tested to evaluate the correspondence of the actual or observed input matrix with that predicted by the proposed model. With an adequate measurement model, the hypotheses were tested by examining the structural model. The significance levels of paths in the research model were determined using PLS bootstrap re-sampling procedures. The R^2 value was used to assess the
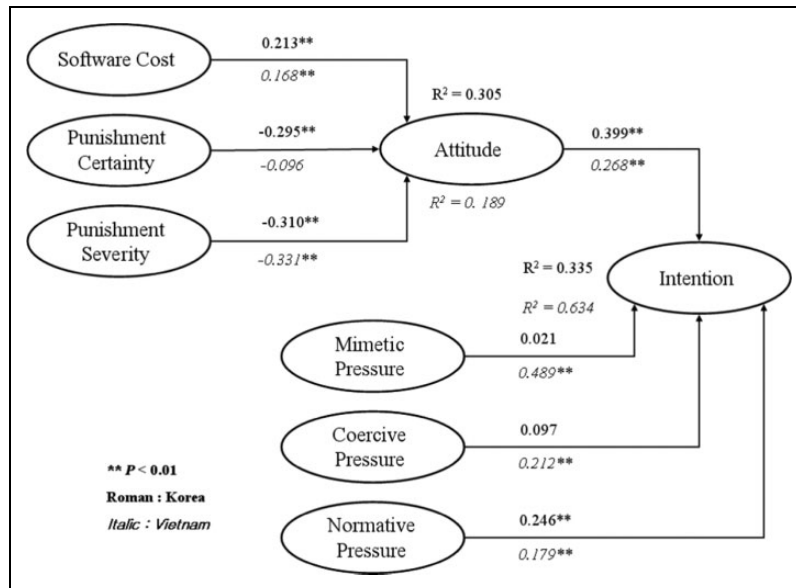
Figure 2. Structural model results.

proportion of variance in the endogenous constructs that could be explained by the antecedent constructs. The R^2 is computed as the ratio of the sum of squares explained by a regression model to the total sum of squares.

The structural equation model showed a better fit with the data from Vietnam, showing a higher R^2 compared to Korea in piracy intention. Three antecedent factors (i.e. software cost, punishment certainty and punishment severity) explain approximately 30.5 percent for Korea and 18.9 percent for Vietnam of the variance of attitude. The four factors (i.e. attitude, mimetic pressure, coercive pressure and normative pressure) explain 33.5 percent of Korean and 63.4 percent of Vietnamese variance of piracy intention, thus making the interpretation of the path coefficients meaningful.

Among antecedent factors, software cost and punishment severity exhibited significant effects in both countries at a 0.01 significance level. This result is consistent with previous research (Peace et al. 2003; Gopal and Sanders 2000). However, punishment certainty was influential at a 0.01 significance level in Korea yet not significant in Vietnam. It can be inferred that anti-piracy policies are rather ineffective in Vietnam or that respondents manifest feelings of invulnerability. Invulnerability here refers to a belief that difficult problems are unlikely to affect them.

Among factors relevant to isomorphism, all factors had a significant impact on piracy intention in

Vietnamese respondents. Mimetic pressure had the highest path coefficient (b=0.487), and normative pressure the lowest (b=0.179). However, in Korea, only normative pressure was significant (b=0.246). This result shows that pressure that promotes imitation of co-workers is the most influential reason for Vietnamese respondents' software piracy behaviour, whereas normative pressure from co-workers was the main reason for piracy in Korean respondents. The path coefficients from the PLS analysis are shown in Figure 2. The coefficients in the model represent standardized regression coefficients.

In order to compare path coefficients between two structural models, the t-values of each pair of path coefficients were calculated using the Smith-Satterthwaite t-test (Chin 2000). Table 7 shows the results of the path coefficient comparisons between the two groups. The test results show that, among the seven relationships, between three utility dimensions and three isomorphism dimensions, the political differences between the two countries significantly weaken the punishment certainty impact on attitudes toward piracy in Vietnam. The path coefficient for punishment certainty to attitude for Korean respondents was significantly stronger than for Vietnamese respondents. This is because in Korea, punishment for software piracy is increasing. According to the Software Property-right Council (2011), the number of cases fined for software piracy increased as follows: 2005 (1,311

Table 7. Path coefficient between two models.

Path	Path coefficient		
	Korea	Vietnam	*t* value
Software Cost → Attitude	0.238	0.188	0.168
Punishment Severity → Attitude	−0.366	−0.331	−0.528
Punishment Certainty → Attitude	−0.295	−0.096	−2.278*
Mimetic Pressure → Intention	0.021	0.489	−2.864**
Coercive Pressure → Intention	0.097	0.212	−0.627
Normative Pressure → Intention	0.246	0.175	1.112
Attitude → Intention	0.399	0.268	2.531*

Note: * $p < 0.05$, ** $p < 0.01$.

cases); 2007 (2,033 cases); 2009 (3,541 cases). However, the path coefficients for software cost to attitude and punishment severity to attitude were not significantly affected by the economic and political differences between the two countries. The influence of software cost, punishment severity and punishment certainty on attitudes to software piracy showed significant differences between the two countries at a 0.05 significance level.

The cultural differences between the two countries lead to a significant weakening in the impact of mimetic pressure on piracy intention in Korea. The path coefficient from mimetic pressure to piracy intention for Vietnamese respondents is significantly stronger than for Korean respondents. The test results also show that the path coefficients from coercive pressure and normative pressure to piracy intention are not significantly affected by cultural differences between the two countries. From the result, it can be inferred that this difference of impact of mimetic pressure on piracy intention is partly derived from cultural difference. Korea has a higher UAI (uncertainty avoidance index) value compared to Vietnam, indicating that Korean people try to minimize the possibility of unknown and surprising situations with norms, rules, and security measures. Hence, piracy intention is influenced by normative pressure rather than by mimetic pressure, which is caused by simple benefit.

Discussion and conclusion

In 1995, both Korea (75 percent) and Vietnam (98 percent) had high piracy rates. However, recent piracy rates are 40 percent in Korea and 83 percent in Vietnam (Business Software Alliance 2010). In order to investigate the factors that have decreased both countries' piracy rates, this study was conducted from a behavioural rather than a macroeconomic perspective. Both of these countries are Asian and collectivism is very strong in both. This suggests that they are likely to have high piracy rates (Gopal and Sanders 2000). On the other hand, they differ in their economic scales, political features and cultural dimensions, with significant difference between the two countries on the UAI (uncertainty avoidance index). Therefore expected utility theory, deterrence theory and isomorphism theory are necessary to examine the effect of such differences on software piracy intention. The results indicate that punishment severity and software cost are influential in Vietnam and software cost, punishment severity and punishment certainty are significant in Korea. When the mean values for each construct were compared, software cost is perceived as being higher in Korea, and punishment severity and certainty are perceived more strongly in Vietnam. These results are not what was expected.

In fact, both countries' governments have strengthened the degree of punishment. In 2006, the Korean government enforced sentences from 3 to 5 years for software piracy and the Vietnamese government quintupled their fines. Therefore, it is likely that high piracy rates in Vietnam could be influenced by these changes of policy and punishment for software piracy. On the other hand, such changes could not be recognized by Korean people who have a lower piracy rate compared to Vietnamese people. Punishment certainty has a significant impact on attitudes toward piracy in Korea, but not in Vietnam. The difference between path coefficients is also significant. This result implies that punishment certainty plays a more important role in suppressing software piracy as compared to punishment severity. This is consistent with previous findings (Peace et al. 2003; Schaub 2004). Peace et al. (2003) demonstrated that punishment certainty is a significant factor in piracy while Schaub (2004) found that punishment certainty is a more critical factor in piracy prevention. Software cost is a significant factor for both countries. However, perceived software cost in Vietnam was lower than that in Korea, which has a relatively high GDP per capita. The piracy rate in Vietnam

is very high, suggesting that Vietnamese people seldom purchase software. This may be why they evaluate software costs as lower than expected.

Among the isomorphic factors, only mimetic pressure showed a significant difference both in mean value and path coefficient. The reason that mimetic pressure, that has the highest path coefficient, is insignificant in Korea is due to the cultural difference between Korea and Vietnam. Benefits of piracy are a causal factor in Vietnam but not in Korea. Coercive pressure is strongly recognized but has an insignificant relation with piracy intention in Korea. However, coercive pressure is influential on piracy intention in Vietnam. Vietnam has a higher PDI (power distance index), thus this result is as would be expected. Normative pressure had the strongest influence among isomorphic factors in Korea. Conversely, normative pressure had the lowest path coefficient in Vietnam. Norm gives legitimacy to particular behaviour. This legitimacy has a strong relationship with a group's UAI (uncertainty avoidance index). Therefore the strong influence of normative pressure is consistent with Korea's cultural dimension.

Implications

This study analyzed and compared behavioural models with survey data from Korean and Vietnamese subjects. The results indicate the importance of punishment certainty and the differing influence of mimetic and normative pressure according to differences in cultural dimensions. The implications of this study are noteworthy. Firstly, the results demonstrate that attitudes towards software piracy can be explained by the theory of institutional isomorphism. Institutional isomorphism has previously been used to explained phenomena such as an organization's new technology acceptance (Teo et al. 2003; Khalifa and Davison 2006). This study has shown that software piracy in the form of soft lifting, which is an individual decision rather than organizational, can also be explained by institutional isomorphism, along with deterrence theory and expected utility theory. Behavioural intention, the dependent variable in this research model, had an R^2 of 0.335 for Korea and 0.633 for Vietnam. However, in Korea, normative pressure was the only significant influence, whilst mimetic, coercive and normative pressures were all significant in Vietnam.

Using primary data gathered from two countries with different piracy rates, this study has verified the behavioural model. Previous studies have used economic, cultural and ethical factors to analyze secondary data (Gopal and Sanders 2000; Al-Rafee and Cronan 2006; Gopal et al. 2004), or applied the behavioural model to just one country (Peace et al. 2003; Chiou et al. 2005). However, by analyzing the behavioural model with primary data, this study has demonstrated how individual, psychological, social and institutional variables interact to cause piracy behaviour.

The previous studies on piracy have focused on collectivism in the light of cultural dimensions to draw out significant relations between cultural dimension and piracy rates across countries (Shin et al. 2004). Yet, this research has taken an indirect approach to show how differences on Hofstede's cultural indexes (Hofstede 1991) can affect behaviours by comparing two countries – Vietnam and Korea – with similar level of collectivism and masculinity but different levels of PDI (power distance index) and UAI (uncertainty avoidance index). The importance of this study is in its revelation of these two factors as the most influential indexes in determining attitudes to piracy.

The implications of this study for practitioners are in its implication that different methods to prevent piracy are necessary depending on cultural distinctions. Countries with higher UAI index such as Korea have higher normative pressure, whilst countries with lower UAI tend to be more influenced by mimetic pressure. Thus in countries with higher normative pressures, it is more effective to persuade the computer users of the uncertainty and risks inherent in piracy through campaigns or education. However, in countries with higher mimetic pressure, it would be more advantageous to create social consensus that piracy can cause losses.

A further implication is that deterrent effects such as punishment should be carried out more effectively. The severity of punishment influenced the attitudes of subjects from both countries towards piracy, yet the certainty of punishment was only a significant influence in Korea. However, Korean people perceived both lower punishment severity and certainty compared to Vietnamese people. This demonstrates that the threat of punishment is insufficient for piracy prevention, particularly in Vietnam, where punishment certainty had no significant influence on attitudes. The

significant difference in the path coefficient for the correlation between punishment certainty and attitude suggests that it is important that individuals are shown that piracy is actively punished if its rates are to be reduced.

Limitations and future research

For the comparison between Vietnamese and Korean perceptions on software piracy, data split has been deployed, which requires a bigger sample size to validate the instrument. The sample size in this study met minimal requirements and is statistically valid; however, a bigger sample size would have provided stronger explanation without using bootstrapping techniques.

Although Vietnam and Korea have different economic, political and cultural environments, they also share certain cultural features, for example, a Confucian belief system. Further comparisons are needed between countries that have widely different cultural backgrounds, such as Asian countries and European countries. The survey in this study primarily targeted graduate students. Even though these data have validity for this study, a wider sample would enhance the range of the results applicability. Further research might use company CEOs as subjects, who make their company's business software purchasing decisions. This would strengthen the validity of any generalization of results. Finally, in spite of a large difference in piracy rates between the two countries, there was no significant difference between the mean scores for piracy intention. This suggests that there is an important factor that prevents software piracy in process from intention to actual piracy. Hence, research aimed at identifying this feature is needed.

Appendix A. Cross loadings between measurement items and constructs (Korea)

	SC	PS	PC	MP	CP	NP	AT	IT
SC1	0.849	0.031	−0.140	0.295	0.064	0.234	0.193	0.085
SC2	0.903	−0.085	−0.079	0.241	0.064	0.206	0.207	0.110
SC3	0.900	0.006	−0.066	0.260	0.045	0.285	0.268	0.146
PS1	0.022	0.887	0.292	−0.190	−0.007	−0.173	−0.334	−0.234
PS2	0.010	0.933	0.324	−0.124	0.114	−0.061	−0.374	−0.251
PS3	−0.069	0.919	0.354	−0.178	−0.008	−0.180	−0.411	−0.362
PC1	−0.140	0.387	0.921	−0.174	−0.062	−0.136	−0.273	−0.287
PC2	−0.019	0.208	0.825	−0.262	−0.019	−0.173	−0.189	−0.222
MP1	0.151	−0.081	−0.190	0.797	0.168	0.489	0.379	0.333
MP2	0.400	−0.226	−0.148	0.811	0.016	0.447	0.599	0.356
MP3	0.130	−0.107	−0.241	0.767	0.127	0.536	0.338	0.278
CP1	0.024	0.048	0.019	0.062	0.869	0.138	−0.067	0.093
CP2	0.069	0.110	−0.066	0.153	0.926	0.167	−0.033	0.110
CP3	0.070	−0.115	−0.090	0.098	0.709	0.052	−0.076	0.071
NP1	0.196	0.007	−0.174	0.461	0.108	0.777	0.282	0.345
NP2	0.151	−0.223	−0.154	0.406	0.138	0.770	0.249	0.315
NP3	0.310	−0.157	−0.104	0.609	0.124	0.890	0.504	0.426
AT1	0.214	−0.391	−0.216	0.456	−0.122	0.371	0.892	0.398
AT2	0.163	−0.277	−0.314	0.536	0.004	0.435	0.820	0.453
AT3	0.271	−0.376	−0.168	0.452	−0.047	0.320	0.840	0.458
IT1	0.111	−0.261	−0.301	0.409	0.096	0.497	0.500	0.962
IT2	0.145	−0.344	−0.261	0.373	0.118	0.353	0.480	0.950

Appendix B. Cross loadings between measurement items and constructs (Vietnam)

	SC	PS	PC	MP	CP	NP	AT	IT
SC1	0.899	−0.207	0.021	0.084	0.156	0.092	0.218	0.145
SC2	0.929	−0.216	−0.085	−0.058	0.155	0.084	0.264	0.079
SC3	0.903	−0.258	−0.029	−0.087	0.066	−0.038	0.263	0.051
PS1	−0.208	0.853	−0.005	−0.078	−0.016	−0.080	−0.338	−0.090
PS2	−0.159	0.769	0.095	0.044	0.045	−0.024	−0.240	0.042
PS3	−0.214	0.720	−0.005	0.114	0.001	0.006	−0.302	0.046
PC1	0.011	0.038	0.914	0.088	−0.060	−0.089	−0.106	0.026
PC2	−0.078	0.021	0.936	0.219	0.051	0.068	−0.117	0.162
MP1	−0.086	0.017	0.108	0.860	0.275	0.444	0.079	0.551
MP2	0.095	0.033	0.070	0.845	0.314	0.307	0.177	0.583
MP3	−0.086	0.018	0.245	0.839	0.261	0.332	0.179	0.593
CP1	0.092	−0.096	0.002	0.281	0.868	0.257	0.253	0.392
CP2	0.177	0.045	−0.018	0.292	0.906	0.300	0.213	0.480
CP3	0.087	0.057	0.018	0.317	0.893	0.355	0.200	0.459
NP1	0.032	0.067	−0.073	0.381	0.312	0.851	−0.023	0.381
NP2	0.031	−0.068	0.021	0.356	0.260	0.850	0.025	0.379
NP3	0.056	−0.102	0.031	0.357	0.313	0.876	0.164	0.455
AT1	0.289	−0.306	−0.117	0.098	0.128	0.010	0.729	0.212
AT2	0.197	−0.326	−0.069	0.161	0.224	0.146	0.849	0.375
AT3	0.172	−0.268	−0.085	0.144	0.222	0.004	0.774	0.383
IT1	0.062	0.037	0.064	0.618	0.426	0.449	0.302	0.872
IT2	0.107	−0.053	0.139	0.569	0.449	0.379	0.427	0.873

References

Ajzen I (1991) The theory of planned behaviour. *Organizational Behaviour and Human Decision Processes* 50: 179–211.

Al-Rafee S and Cronan TP (2006) Digital piracy: factors that influence attitude toward behaviour. *Journal of Business Ethics* 63: 237–259.

Bakos Y (1998) The emerging role of electronic marketplaces on the Internet. *Communications of the ACM* 41: 35–42.

Bouchard L (1993) Decision criteria in the adoption of EDI. *Proceedings of the Thirteenth International Conference on Information Systems*. Orlando, Florida, 365–376.

Burt RS (1987) Social contagion and innovation: cohesion versus structural equivalence. *The American Journal of Sociology* 92: 1287–1335.

Business Software Alliance (2010) *BSA Report 2010*. Available at: http://portal.bsa.org/globalpiracy2010/downloads/study_pdf/2010_BSA_Piracy_Study-Standard.pdf.

Cheng HK, Sims RR and Teegen H (1997) To purchase or to pirate software: an empirical study. *Journal of Management Information Systems* 13: 49–60.

Chin WW (1998) Issue and opinion on structural equation modeling. *MIS Quarterly* 22: 7–16.

Chin WW (2000) Frequently asked questions - Partial Least Squares & PLS-Graph. Available at http://disc-nt.cba.uh.edu/chin/plsfaq.htm

Chiou J-S, C-y Huang and H-h Lee (2005) The antecedents of music piracy attitudes and intentions. *Journal of Business Ethics* 57: 161–174.

Choi JW (2010) About intellectual property right and punishment in Vietnam. *J&P Law Group*. Available at http://www.jnplaw.com/board/column_view.asp?idx=256

Conner KR and Rumelt RP (1991) Software piracy: an analysis of protection strategies. *Management Science* 37: 125–139.

DiMaggio PJ and Powell WW (1983) The iron cage revisited: institutional isomorphism and collective rationality in organizational fields. *American Sociological Review* 48: 147–160.

Ehrlich I (1996) Crime, punishment and the market for offences. *Journal of Economic Perspectives* 10: 43–68.

Erickson B (1988) *The relational basis of attitudes in social structures*. Cambridge: Cambridge University Press.

Flanagin AJ (2000) Social pressures on organizational website adoption. *Human Communication Research* 26: 618–646.

Fornell C and Bookstein FL (1982) Two structural equation models: LISREL and PLS applied to consumer exit-voice theory. *Journal of Marketing Research* 19: 440–452.

Gabella G and Picasso M-D (1995) PC software industry lost $8.08 billion to pirates in 1994 piracy rate in the US declines. *Information & Management* 29: 285–288.

Givon M, Mahajan V and Muller E (1995) Software piracy: estimation of lost sales and the impact on software diffusion. *Journal of Marketing* 59: 29–37.

Gopal RD and Sanders GL (1997) Preventive and deterrent controls for software piracy. *Journal of Management Information Systems* 13: 29–48.

Gopal RD and Sanders GL (1998) International software piracy: analysis of key issues and impacts. *Information Systems Research* 9: 380–397.

Gopal RD and Sanders GL (2000) Global software piracy: you can't get blood out of a turnip. *Communications of the ACM* 43: 82–89.

Gopal RD, Sanders GL Bhattacharjee S, et al. (2004) A behavioural model of digital music piracy. *Journal of Organizational Computing and Electronic Commerce* 14: 89–105.

Hofstede GH (1980a) Motivation, leadership, and organization: do American theories apply abroad? *Organizational Dynamics* 9: 42–63.

Hofstede GH (1980b) *Culture's consequences: international differences in work-related values*. Beverly Hills, CA: Sage.

Hofstede GH (1991) *Cultures and organizations: software of the mind*. New York, NY: McGraw-Hill.

Hu Q, Hart P and Cooke D (2007) The role of external and internal influences on information systems security - a neo-institutional perspective. *The Journal of Strategic Information Systems* 16: 153–172.

Huff SL and Munro MC (1985) Information technology assessment and adoption: a field study. *MIS Quarterly* 9: 327–339.

Jepperson RL (1991) *Institutions, institutional effects, and institutionalism*. Chicago, IL: University of Chicago Press.

Joins (2006) Reinforced punishment on illegal software copy. Available at http://article.joinsmsn.com/news/article/article.asp?Total_ID=2129016

Khalifa M and Davison RM (2006) SME adoption of IT: the case of electronic trading systems. *IEEE Transactions on Engineering Management* 53: 275–284.

Koen CM and Im JH (1997) Software piracy and its legal implications. *Information and Management* 31: 265–272.

LeTendre GK, Baker DP Akiba M, et al. (2001) Teachers' work: institutional isomorphism and cultural variation in the U.S., Germany, and Japan. *Educational Researcher* 30: 3–15.

Moores T and Dhillon G (2000) Software piracy: a view from Hong Kong. *Communications of the ACM* 43: 88–93.

Peace AG (1997) Software piracy and computer-using professionals: a survey. *Journal of Computer Information Systems* 38: 94–99.

Peace AG, Galletta DF and Thong JYL (2003) Software piracy in the workplace: a model and empirical test. *Journal of Management Information Systems* 20: 153–177.

Powell WW and DiMaggio PJ (1991) *The new institutionalism in organizational analysis*. Chicago, IL: University of Chicago Press.

Schaub G (2004) Deterrence, compellence, and prospect theory. *Political Psychology* 25: 389–411.

Shin SK, Gopal RD Sanders GL, et al. (2004) Global software piracy: revisited. *Communication of the ACM* 47: 103–107.

Software Property-right Council (2011) Available at http://www.spc.or.kr/index.asp

Straub DW and Collins RW (1990) Key information liability issues facing managers: software piracy, proprietary databases, and individual rights to privacy. *MIS Quarterly* 14: 143–156.

Teo HH, Wei KK and Benbasat I (2003) Predicting intention to adopt interorganizational linkages: an institutional perspective. *MIS Quarterly* 27: 19–49.

Tingling P and Parent M (2003) Mimetic isomorphism and technology evaluation: does imitation transcend judgment. *Journal of the Association for Information Systems* 3: 113–143.

Tobias RD (1999) *An introduction to partial least squares regression*, Cary, NC: SAS Institute.

Tolbert PS and Zucker LG (1983) Institutional sources of change in the formal structure of organizations: the diffusion of civil service reform, 1880–1935. *Administrative Science Quarterly* 28: 23–39.

Triandis HC (1995) *Individualism and collectivism*. Boulder, CO: Westview.

Werts CE, Lin RL and Jöreskog KG (1974) Intraclass reliability estimates: testing structural assumptions. *Educational and Psychological Measurement* 34: 25–33.

Wold H (1974) Causal flows with latent variables. *European Economic Review* 5: 67–86.

Woolley DJ and Eining MM (2006) Software piracy among accounting students: a longitudinal comparison of changes and sensitivity. *Journal of Information Systems* 20: 49–63.

Zakaria N and Zakaria N (2003) Bridging Technological Isomorphism and Culture? Creating Institutional Values for ICTs adoption in MNCs. *Engineering Management Conference*. Albany, NY.

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