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Abstract

The ethical integrity and accountability of Information Technology (IT) professionals is important given our reliance on various forms of IT. We examined the applicability of Lawrence Kohlberg's theory of Cognitive Moral Development (CMD) in non-Western contexts by investigating the ethical values of IT professionals in Asia's two largest economies. Analysis of survey data from Japan (n=289) and China (n=290) indicates support for the basic six-stage model of CMD. The concept of abiding by universal laws and rules (termed stage 4 reasoning by Kohlberg) was widely accepted by IT professionals in both Japan and China, despite the Confucian cultural emphasis on personal relationships with particularistic obligations. However, differences between Japanese and Chinese IT professionals were found while, in direct contrast with the stage-wise theory of CMD, the respondents from Japan and especially China exhibited significant volatility, reasoning at different stages simultaneously. The implications of these findings for research and practice are discussed.

* Antony Bryant, Frank Land and John Leslie King were the accepting guest editors. It was submitted on March 13, 2008 and went through two revisions.

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The Ethics of IT Professionals in Japan and China

1. Introduction

Ethical integrity is an important yet challenging aspect of doing business. For many people, “the very concepts of ‘business’ and ‘ethics’ sit uneasily together. Business ethics, to them, is an oxymoron” (Anonymous, 2000) since ethical integrity is often threatened by a compulsion to make money. Ethical concerns can arise whenever money or information is exchanged. Since IT facilitates the transfer of both money and information, it increases both the speed and scope of potentially unethical behaviour. As more IT applications are deployed, IT-related ethical problems can be expected to increase in frequency and complexity (Moor, 2005).

Given our growing reliance on IT, the ethical integrity and accountability of IT professionals is particularly important. Although ethical values and behaviours have been investigated extensively, studies within the IT domain have commonly considered the ethical values of undergraduate students (e.g., Nyaw and Ng, 1994), sometimes masquerading as IT professionals (e.g., Paradise and Dejoie, 1991). Undergraduate students make poor surrogates for business or IT professionals given their lack of professional experience and relative immaturity (Robin and Babin, 1997). Significantly, little empirical attention has been paid to the ethical values of genuine IT professionals – those who, according to the Association of IT Professionals,¹ can perform a variety of duties that relate to the study, design, development, implementation, support and management of computer-based information systems (IS), including programmers, analysts, technicians, project managers, and engineers.

Understanding the ethical values of IT professionals from different parts of the world is also critical given the growth of international business. However, previous studies have concentrated on the developed countries of North America and Western Europe. We know very little about the ethics of IT professionals in other parts of the world, especially East Asia.

In this paper, we apply and extend the work of Lawrence Kohlberg (1969, 1981), and in particular, his six-stage theory of Cognitive Moral Development (CMD) to study the ethical reasoning of IT professionals in Japan and (the People’s Republic of) China. We selected these two countries as our research context because of their economic importance and distinctive national cultures. Japan and China are both major economic powers whose cultural heritages and current value systems differ greatly from those prevalent in the West.

Prior studies in Japan and China have examined the ethical values of both undergraduate students (Whitcomb et al., 1998) and selected groups of business professionals such as auditors (Gul et al., 2003) and general managers (Choi, 1998, 1999), as well as entire organisations (Ip, 2002). Descriptive studies of IT ethics, as well as specific topics, like privacy, have been published (e.g., Nakada and Tamura, 2005; Lu, 2005; Mizutani et al., 2004; Nishigaki, 2006). However, we are not aware of any empirical studies of the ethical values of IT professionals in either Japan or China.

Nisbett (2003) argues convincingly that people in East Asian and Western societies tend to think differently in scientifically measurable ways. For example, Westerners tend to inculcate individualism and a wide range of choices while East Asians are oriented toward interpersonal relations and obligations. The culture and history of East Asia has been influenced tremendously by a philosophical system originally developed from the teachings of Confucius. Confucian ideology has been used to explain not only the prevailing psychology of the Japanese (Benedict, 1989) and Chinese (Bond, 1986), but also the distinctive patterns of IT application that prevail in the Japanese and Chinese business cultures (Martinsons and Westwood, 1997; Martinsons and Davison, 2007). This theory and evidence suggest that Japanese and Chinese IT professionals may not reason in the same way as their Western counterparts, and so, from a theoretical perspective, may not conform to Western-originated standards of ethics and ethical reasoning.

¹ <http://www.aitp.org/>

Notwithstanding their common Confucian heritage, Japan and China differ greatly from each other. China has moved from a feudal system with civil and regional wars and revolution in the 19th and early 20th centuries to stronger central government since Mao proclaimed the founding of a People's Republic in 1949. Conversely, Japan, after a long period of isolation under the Tokugawa Shogunate, experienced significant change through the Meiji restoration, its World War II defeat, and post-World War involvement by the U.S. in political and economic reconstruction. From the 1950s until the late 1980s, it achieved remarkable economic development, which China is now seeking to replicate. Over the last two decades, Japan has exhibited the slower economic growth and social stability that are characteristic of a mature and developed economy.

The prevailing characteristics in Japan lend themselves to the development of work ethics that, while efficient, may, from a Western perspective, sacrifice transparency. For example, the tendency toward shared (rather than individual) responsibility and cosy business-government relations (Bhappu, 2000) encourages consensus-building and compromises in making choices and meeting standards rather than critical analysis, testing, and evaluation of ideas. Meanwhile, the popularity of job rotation, whereby employees are periodically given very different job responsibilities within a Japanese company, may reduce the potential for entrenched unethical practices, but raise the possibility of the whole system being manipulated by someone who is familiar with all the functional areas, and thus, the systemic checks and balances throughout the company. The limited literature on IT professionals suggests that they face high demands but, as system engineers (SEs), they have low social status (Murata, 2005). Few young people in Japan are interested in becoming IT professionals due to a perception of heavy workloads and the multi-tiered subcontracting processes common in the Japanese IT industry (Murata and Orito, 2008).

In China, a radical economic and social transformation is now underway (Martinsons, 2005). This process, in conjunction with the development of both e-commerce (Martinsons, 2002) and knowledge management systems (Burrows et al., 2005), is creating a huge demand for IT. Such demand may tempt IT professionals to cut corners and compromise their standards when developing and implementing new applications.

Status-based hierarchies are a key characteristic of Chinese management systems that distinguish them from both Western and Japanese management systems (Martinsons and Hempel, 1995). Relational hierarchy has been found to be more important to Chinese respondents than to their Japanese counterparts (Zhang et al., 2005). Consequently, Chinese bosses have a comparatively high degree of organizational authority; their subordinates obey directives with limited questioning of the ethical implications. The checks and balances that have been commonly institutionalized in Western and Japanese organisations also remain rare in China (Burrows et al., 2005). This may further encourage behaviour that is considered unethical by non-Chinese standards.

Significantly, the literature on Japan and China (Benedict, 1989; Chinese Culture Connection, 1987; Ogbor and Williams, 2003; Yabuuchi, 2004) reveals a low degree of variance in the prevailing cultural values of each country. This suggests that, in contrast to the cosmopolitan and multi-cultural societies that exist in countries like the United States and the United Kingdom, the populations of both Japan and China have developed a comparatively homogeneous set of social and cultural values.

Following this introduction, we review the ethics literature, paying particular attention to Kohlberg's work and to studies undertaken in East Asia. We then present our research design and explain how we operationalised our research methodology. The results are followed by an extensive discussion. Finally, we conclude the paper with an overview of the contributions, an exposition of the limitations, and directions for future research.

2. Literature Review

Kohlberg's (1969) theory of Cognitive Moral Development (CMD) incorporates a six-stage linear model that depicts what Snell (1996) describes as a "developmental hierarchy of the underlying conceptual bases that people draw on when judging what is the morally right thing to do in a dilemma situation, and when justifying their judgements". The developmental characteristic of CMD is critical:

individuals are expected, as they grow up and mature, to progress through the stages. According to Kohlberg (1981), each of the six stages represents a form of moral thought that is entirely independent of content. The six stages are: (1) obey to avoid punishment; (2) comply for immediate self-interests; (3) observe mutual interpersonal expectations and relationships; (4) abide by established laws and rules; (5) conform to the principles and spirit of a socially established system for law and order; and (6) uphold principles of rights and justice. The six stages are further organised into three levels: pre-conventional morality (stages 1-2), conventional morality (stages 3-4), and post-conventional morality (stages 5-6). The first level occupies the moral space of children, and the second level is appropriate to adults. Indeed, stage 4 is considered to be symptomatic of normal adult ethical maturity, and many adults may never progress beyond this stage.

Notwithstanding the wide appreciation of CMD, and Kohlberg's own contention that it is applicable universally (Kohlberg, 1971), it has also been the target of considerable criticism. The criticisms are varied in nature, but include: its exclusively Western philosophical roots; its origins in interviews solely with young males; its dogmatic and deterministic assumption that there is a single, correct form of terminal ethical maturity – stage 6 reasoning; and its "overarching use of justice as a 'first principle' of moral development" (Henry, 2001), without accepting the legitimacy of alternative ethical perspectives such as utilitarianism, care, or altruism. Please see Fraedrich et al. (1994) for a review of these criticisms.

Snarey (1985) reviewed 45 studies (e.g., Grimley's (1974) study of Hong Kong, Japan, U.S., UK and Zambia) carried out in 27 countries and concluded that the first three or perhaps four stages of the model are universal, while achievement of the latter two or three stages varies from culture to culture. Snarey's (1985) conclusions are not entirely surprising given the influence of contextual factors on various aspects of social psychology (cf. Chinese Culture Connection, 1987), and especially the theory and empirical findings subsequently reported by Nisbett (2003). Given the cultural values and management systems prevailing in Japan and China, it is imperative to examine more closely the issue of whether (and to what extent) Kohlberg's theory and model are applicable to East Asia, and particularly Japan and China.

Confucian philosophies concerning individual rights, duties, equality, and freedom are conceived such that they are "compatible with ... the subordination of the individual to society and state" (Lau and Kuan, 1988); the idea "that there are universal norms applicable to all irrespective of conditions ... [is] ... more or less anathema to traditional Chinese" (ibid.). In a similar vein, and in marked contrast to Western cultural values, the Chinese consider it self-evident that "all men are born unequal" (Bond, 1986). In Confucian societies, subordinates are expected to be docile and not challenge superiors' ideas openly, as to do so might be considered a deliberate attempt to make the superior lose face (Benedict, 1989; Zhang et al., 2005). Indeed, subordinates tend to give their superiors the benefit of the doubt, even if their behaviour appears to deviate from established rules (Martinsons and Hempel, 1995). These concerns support Snarey's contention (1985) that the upper stages of Kohlberg's model may not apply universally.

Snell (1999) found that Chinese employees were very likely to obey requests made by a boss or superior authority to do something regarded as ethically incorrect either in order to fulfil contractual obligations, and thereby avoid punishment (stage 1), while serving their own interests (stage 2), or in order to fulfil interpersonal obligations (stage 3). More generally, Martinsons and So (2000) note the centrality of the *wu lun* concept (five relationships with reciprocal obligations and expectations²) in Confucian teaching, and theorise that Chinese managers and professionals would consequently tend to favour ethical choices that reflect Kohlberg's third stage. The fundamental role of personal relationships with particularistic obligations in mainland China as a means to compensate for an undeveloped legal system (cf. Martinsons, 2008, Xin and Pearce, 1996) reinforces this tendency by implying that the Chinese would rely upon relationship-based solutions to ethical issues (stage 3) in the absence of well-established laws and rules that they could abide by (stage 4) or to which they

² The five relationships are: sovereign and subject, father and son, husband and wife, elder and younger brothers, older friend and younger friend.

could conform (stage 5).

A similar reliance on solutions that preserve relationships at the expense of strictly adhering to ethical codes and standards may also be expected in Japan despite its well-established legal framework. The Japanese culture stresses the importance of maintaining group harmony, saving face, and maintaining emotional ties such as *amae*, *on* and *giri-ninjo*, (Doi, 1971; Yabuuchi, 2004). These cultural norms could make Japanese IT professionals reluctant both to admit their own mistakes and to acknowledge/confront the mistakes of others, including ethical lapses (Bhappu, 2000). However, recent research suggests that in some situations, Japanese may voluntarily give up what amounts to their privacy with respect to mistakes that they have made (Nakada and Tamura, 2005).

Despite concerns about the cross-cultural applicability of Kohlberg's theory, Snell (1995, 1996) successfully used a slightly modified form of the CMD model with Hong Kong Chinese managers. In contrast to earlier claims (e.g., Kohlberg, 1981; Trevino, 1992) that individuals reason and resolve dilemmas at a single stage (unless they are in transition between two stages), Snell (1996) found that many Hong Kong Chinese decision makers displayed what he termed "stage volatility", i.e., they simultaneously considered reasons and arguments that pertain to different stages. Indeed, as Snell et al. (1997) explain, "Moral experience becomes increasingly complex and multifaceted, and potentially more volatile, as ethical reasoning capacity increases. Managers who have attained stage six capacity may still experience and be governed by stage one fears and amoral urges and impulses". Similar views about stage volatility were raised by Rest (1979), who suggested that lower stage reasoning may accompany an individual as s/he progresses to higher stages.

Despite criticisms, CMD theory remains widely used as a basis for research of ethical values, both within and beyond the North American context that informed its development (cf. Henry, 2001). It has also been used — inappropriately — as a basis for modelling behavioural intentions (Robin et al., 1996): Kohlberg never intended such a linkage (from reasoning to behavioural intention), believing that many other factors (e.g., knowledge, values, attitudes, important others, opportunities) would be involved. Thus, Gul et al. (2003), while noting that "a number of empirical studies have examined the ethical reasoning levels of professional accountants (auditors) using Kohlberg's CMD theory", extended this research by studying the ethical behaviour of auditors in China. Tsui and Windsor (2001) targeted the same professional context with a cross-cultural study of auditors in China, Hong Kong and Australia. Meanwhile, Snell and his associates (Snell, 1995, 1996, 1999, 2000; Snell et al., 1996, 1997) repeatedly employed a modified Kohlbergian approach to investigate the ethical reasoning (but not behaviour) employed by Hong Kong managers.

In comparison with managers and business executives, IT professionals are a relatively understudied group. A few scholars have written about the importance of adhering to professional standards of ethics (Davison, 2000; Mason, 1986; Oz, 1992, 1993), and of students developing appropriate ethical values (Couger, 1989), as well as standards of ethical decision making for IT professionals (O'Boyle, 2002). However, only a handful of studies report on the ethical beliefs, values and reasoning employed by actual IT professionals. Prominent among these are a survey of 123 non-management employees of IT departments in Fortune 500 organisations (Hilton, 2000), another survey of 170 IT professionals in the UK (Prior et al., 2002), studies of the ethical perceptions of public sector MIS professionals (Udas et al., 1996) and of the values of IS designers (Kumar and Bjorn-Andersen, 1990), and a number of other studies investigating specific topics such as software piracy (Taylor and Shim, 1993) and e-mail privacy (Cappel, 1995) among IT workers.

Our study seeks not only to build upon this modest foundation, but also to examine specifically whether the common nature of IT work is leading to a global convergence of ethical values among IT professionals (cf. O'Boyle, 2002), or alternatively, whether long-standing cultural differences, such as those between Western and Confucian philosophies, are evident in the ethical reasoning of IT professionals in China and Japan. Furthermore, we aim to investigate the nature of volatility in ethical reasoning, since this may be related to the stability of ethical development in societies such as China, which are undergoing economic and social transformation (Martinsons, 2005) and have comparatively immature legal systems (cf. Liu, 2005; Martinsons, 2008).

3. Instrument Development

In order to investigate the ethical values of IT professionals in East Asia, we developed a survey instrument that incorporated all six stages of Kohlberg's CMD theory as well as an additional amoral stage, operationalised as being entirely devoid of ethical reasoning. The design of the instrument followed the approach taken by Snell et al. (1997), who paired the front end of an ethical dilemma with a number of possible back end responses, where each of the back end responses corresponds to one stage in CMD theory (or the amoral stage). In considering which topics would be appropriate for the front-end ethical dilemmas, we decided not to limit ourselves to IT themes because we were interested in exploring the general business ethics of IT professionals, not only the IT ethics of IT professionals. In order to identify the topics, we referred to Snell et al. (1997), who had already mapped the ethical reasoning used by managers in Hong Kong onto CMD theory, in the process isolating 11 such general business topic areas. We took these 11 general themes as our starting point and wrote up a short (1-2 line) front-end illustration for each theme. We also included two critical issues in the IT area, i.e., duty to the IT profession and bugs (cf. Langford, 1995). The final set of 13 scenarios is, thus, designed to illustrate a broad range of practical and business-related ethical dilemmas that IT professionals experience at work, but not topics that would only be of interest to IT ethicists (cf. Floridi and Sanders, 2002).

In the second phase of the instrument development, i.e., establishing the back end responses, we referred to Snell's work (Snell, 1995; Snell et al., 1997) on real-life ethical reasoning, in which he adapted Kohlberg's CMD to a coding scheme of six moral stages. Grounded on his conceptual categorisation of the six moral stages (plus the additional amoral stage, known as Stage 0) we established seven back-end responses for each scenario. Thus, each of the 13 scenarios had one back-end response option for each of the seven stages, for a total of 91 response options.

We summarize the conceptual basis, i.e., Kohlberg's CMD theory and Snell's studies (1995, 1997), for the two-phase instrument development in Table 1. For illustrative purposes, we also present seven responses (i.e., stages 0-6) to the first ethical dilemma: "How information is used – If you discover some confidential information on the Internet that may damage the organisation, you...".

In order to assure ourselves of the validity and reliability of the front-end ethical scenarios and corresponding back-end responses developed in the current study, we asked two independent academic researchers and two working IT professionals in China to categorise these 91 responses, following the method suggested by Moore and Benbasat (1991). We gave each of these four individuals a brief introduction to CMD theory, and indicated that they should map each response onto a single stage description. We conducted two rounds of response categorisation. In each round, we used a different panel of judges, consisting of one academic researcher and one working IT professional. A correct placement rate of 78 percent was achieved in the first round. We used the panel's input to revise the ambiguous items and put them into a second round of category sorting. The overall correct placement rate of 91 percent in the second round indicates that most item responses were placed under the appropriate stages. This suggests a satisfactory level of reliability for the items (c.f. Moore and Benbasat, 1991) to correspond to all seven stages.

In the last stage of the instrument development, we translated the English instrument into both simplified and traditional Chinese and Japanese, and back-translated each version into English to ensure consistency of meaning across the four language versions. Before we started the formal large-scale survey, we invited two native Chinese and Japanese IT professionals to check the face validity of the Chinese and Japanese questions, respectively.

Table 1: The Conceptual Basis for Instrument Development and an Illustrative Example

Thirteen Ethical Scenarios Developed in this Study, Based on Snell et al. (1997)	Stage	Standard Kohlbergian Model	Abstract of Snell's Adapted Model (1995)	Back-end Responses to the 1 st Scenario (An Illustrative Example)
1. How information is used	Zero	Not present in CMD	Not present in Snell's Model	Use it however you feel like
2. How mistakes are handled	One	Avoid breaking rules out of fear of punishment	Self preservation; or unquestioningly obeying the wishes of those in authority	Pretend you know nothing about it & avoid getting involved
3. How opinion is expressed	Two	Individual instrumental purpose and exchange	Personal gain, narrow interest; or serving the narrow imperatives of one's organization regardless of other considerations	Use the information for personal advantage
4. How disagreements are handled	Three	Interpersonal concordance; living up to the expectations of others who are close	Fitting with close ties and friendship obligations; being loyal and grateful to those seen as having legitimate authority or affiliation	Gossip about it with your friends/colleagues
5. How changes are experienced	Four	Maintaining one's conscience and the social system	Maintaining law and order, obeying the regulations, meeting obligations and promises, loyalty to organizational duties and instructions where they are legal	Report it through proper channels
6. Impact of the organization on employees	Five	Upholding particular values and societal standards for the sake of consensus and best interest of the great majority	Holding to robust principles which represent human needs	Ask whether shared values & principles have been violated
7. How power is used	Six	Commitment to universal ethical principles of justice, based on the understanding that people are ends in themselves	Philosophical, continual self questioning concerning the basis for one's own principles	Initiate discussion about whether the organisation has a right to confidentiality
8. Why rules, regulations and codes are followed				
9. How agreement is achieved				
10. Trust levels among employees				
11. What motivates people				
12. Duty to the IT profession				
13. The inevitability of bugs				

These 13 dilemmas are not conceptually related, except in the broadest of senses. Thus, it would not be appropriate to analyse them with statistical techniques such as Factor Analysis, Cronbach's Alpha or other independent-dependent variable analyses. The dilemmas are designed to be indicative of the level of ethical reasoning attained by an individual IT professional, but not to contribute towards a dependent variable.

4. Research Methodology

We chose the survey method to collect responses for our online questionnaire. The four language versions of the instrument were implemented on websites at a university in Hong Kong (for the respondents from China) and in Japan (for the Japanese respondents). We then identified appropriate populations of IT professionals in different ways in each country. In both countries, email was used as the invitation medium. In China, we employed the services of the China Centre for Information Industry Development (CCID), paying them RMB0.20 per email to contact 5,000 randomly selected IT professionals out of the 1.2 million members in their membership database. These members are distributed across the whole country and are not limited to large cities such as Beijing and Shanghai. This contact email was sent directly from CCID and was written in Chinese. The text of the email explained the nature of our study, the identity of the researchers and indicated the URL where the survey instrument was located.

In Japan, a mechanism similar to that used in China was not available. Therefore, in order to ensure reliable data collection, we emailed approximately 100 IT professionals, almost all of whom were members of the Japan Society for Management Information. Several of these people were senior executives of Japanese IT industry firms. We requested that they both respond to the survey and encourage their colleagues and subordinates to do so. We believe that this is both an acceptable practice in the Japanese context and an appropriate method of contacting members of a professional group. Such IT professionals would, we argue, be far more likely to respond to an invitation from their superiors or colleagues than from unknown outsiders. Indeed, this may explain much of the variance in the response rates. Both the email invitation and the web page indicated our willingness to provide feedback to any respondents who requested it.

Potential respondents who accessed the survey website were invited to read a short introduction to the project (in each language) and then to select a language version to complete. The online survey was preceded by a sample item with alternatives that illustrated how to complete the survey. The survey respondents were asked to rank the likelihood of performing the seven responses for each of the 13 ethical dilemmas. The sequence of response choices did not proceed from the lowest stage (0) to the highest stage (6), but rather, the choices were randomly ordered (as shown in the Appendix), making it very hard for respondents to guess which response choice might be "more ethical" or "correct". For each item, respondents were asked to indicate not only their most likely choice, but also their second most likely choice. When respondents submitted the survey, the data was captured in a database for subsequent analysis.

5. Results

Data Collection

In China, we collected data in September 2003. Of the 5,000 individuals invited to participate, 337 submitted the survey. Of these 337 submissions, 15 were entirely empty of data (i.e., the submit button was clicked without any data being entered), five were duplicate submissions, and 27 others were incomplete. This left 290 valid responses (all scenarios have at least a first choice response), an overall response rate of 5.8 percent. In Japan, we collected data from May to July 2006 from a total of 650 IT professionals who were invited (directly and indirectly) to participate in the survey. We received 289 valid responses, representing a response rate of 44.5 percent. Tables 2 and 3 below summarize the demographic makeup of the populations we sampled.

Non-response bias was verified by a t-test comparing the demographic data (age, gender, income, education, and years of working experience) of the participants who responded in the first two weeks and those who responded in the last two weeks. The t-test results indicate no significant differences.

Table 2: Demographics

	Demographics	Chinese Responses n=290	Japanese Responses n=289	Total n=579	Aggregate Percentiles
AGE	30 or below	197	51	248	43%
	31-50	82	185	267	46%
	51 or above	11	37	48	8%
	NA (missing data)	0	18	18	3%
GENDER	Male	230	241	471	81%
	Female	60	31	91	16%
	NA	0	17	17	3%
EDUCATION LEVEL	Secondary School / High School	29	19	48	8%
	Diploma	3	30	33	6%
	Bachelor's Degree	197	168	365	63%
	Master's Degree	46	44	90	16%
	PhD	9	7	16	3%
	NA	6	21	27	5%
YEARS OF WORKING EXPERIENCE	0 – 10	249	117	366	63%
	11 – 20	32	102	134	23%
	21 +	9	49	58	10%
	NA	0	21	21	4%

Table 3: Responses by Industry Sector (Percentages) China and Japan

INDUSTRY SECTOR	China n=290	Japan n=289	Aggregate	INDUSTRY SECTOR	China n=290	Japan n=289	Aggregate
Communications and Media	17.2	4.8	11.2	Health Care	1.4	0.0	0.7
Computing and IT Services	44.8	50.0	47.3	Logistics	0.7	0.0	0.4
Consumer Sector	2.1	0.7	1.4	Manufacturing	7.9	1.5	4.8
Education	5.2	1.5	3.4	Telecommunications	4.8	17.3	10.9
Engineering	5.2	7.7	6.4	Travel and Transportation	1.7	0.0	0.9
Financial Services/Insurance	2.4	0.4	1.4	Utilities (Electricity, Gas, Sanitation, Water)	0.7	1.4	1.8
Government	3.1	0.0	1.6	Others	2.8	6.2	7.8

Ethical Reasoning

According to Robin and Babin (1997), a person's background may influence his/her ethical reasoning. For example, they observe that undergraduate students make poor surrogates for working professionals. Similarly, IT professionals may undergo different forms of ethical development, in part because of factors such as age, income, and working experience. Given such considerations, we conducted an ANOVA analysis in order to verify the existence of any significant differences in the ethical responses (i.e., stages 0-6) between different groups in terms of age, gender, education level, and working experience. Table 4 summarizes the results of the ANOVA tests.

Table 4 indicates that most stage responses (91 out of 104; 87.5 percent) are consistent between different groups with only a few exceptions (see also Figure 1.1). For example, the analysis suggests no significant difference in the ethical reasoning between males and females, except on the issue of trust in Japan.

Table 4: ANOVA tests

Ethical dilemma/Sig. level between groups	China				Japan			
	Age	Gender	Education Level	Working Experience	Age	Gender	Education Level	Working Experience
1 (Information Use)	.857	.969	.015*	.015*	.139	.434	.602	.017*
2 (Mistake Handling)	.790	.498	.332	.332	.435	.868	.590	.981
3 (Expression of Opinions)	.379	.527	.383	.383	.113	.723	.258	.753
4 (Handling Disagreements)	.509	.725	.065	.065	.106	.336	.636	.344
5 (Obtaining Rewards)	.570	.747	.936	.936	.268	.761	.881	.691
6 (Relationships with Customers)	.779	.059	.811	.811	.459	.086	.190	.434
7 (Org Impact on Employees)	.223	.765	.739	.739	.514	.914	.069	.413
8 (Use of Power)	.090	.324	.449	.449	.006**	.628	.089	.485
9 (Following Rules & Regulations)	.010**	.440	.646	.646	.271	.617	.928	.953
10 (Trust among Colleagues)	.699	.305	.019*	.019*	.098	.026*	.012*	.815
11 (Motivating People)	.075	.323	.096	.096	.005**	.105	.026*	.685
12 (Duty to the IT Profession)	.230	.948	.280	.280	.007**	.459	.033*	.209
13 (Inevitability of Bugs)	.245	.772	.274	.274	.323	.925	.558	.728

* Significant at *p<0.05 level; **p<0.01 level

In order to have a holistic view of the cognitive moral development in these two countries, we summarize the scores for all 13 items across all seven stages for China and Japan in Table 5. The most popular first choice for each item is highlighted in bold. This analysis shows that for Chinese IT professionals, there are only two exceptions to the preferred selection of stage 4 or above reasoning, on scenarios 7 and 13, though for scenarios 6 and 12, a significant minority choose stages 1 and 2, respectively. For Japanese IT professionals, meanwhile, stage 4 or above reasoning is invariably the preferred stage. Nevertheless, a significant minority choose stages 0, 2, and 3 on scenarios 3, 6, 10, 11, and 13.

Table 5: Overall Responses (First Choice) (Percentages)

Item \ Stage	China							Japan						
	0	1	2	3	4	5	6	0	1	2	3	4	5	6
1 (Information Use)	6	3	2	3	65	13	8	0	1	2	3	4	5	6
2 (Mistake Handling)	2	0	1	2	12	73	9	0	1	0	3	80	15	3
3 (Expression of Opinions)	5	0	4	2	53	7	28	1	0	0	2	5	52	39
4 (Handling Disagreements)	7	2	4	22	40	4	20	12	1	1	0	37	8	41
5 (Obtaining Rewards)	1	1	1	2	62	11	22	1	1	2	6	36	13	42
6 (Relationships with Customers)	1	12	32	4	5	35	12	0	0	0	9	18	35	38
7 (Org Impact on Employees)	3	5	38	26	26	0	2	4	1	11	1	17	58	7
8 (Use of Power)	5	2	1	4	49	12	26	1	1	1	10	38	37	12
9 (Following Rules & Regulations)	0	5	3	3	44	34	11	6	4	3	1	23	23	40
10 (Trust among Colleagues)	11	3	0	20	15	37	14	2	3	1	0	45	30	19
11 (Motivating People)	4	1	18	10	56	9	1	24	1	5	10	11	28	21
12 (Duty to the IT Profession)	1	25	5	4	42	8	15	21	0	20	22	27	8	3
13 (Inevitability of Bugs)	14	17	18	9	14	15	14	0	9	1	4	35	21	29
Average	5	6	10	9	37	20	14	6	2	4	6	32	26	23

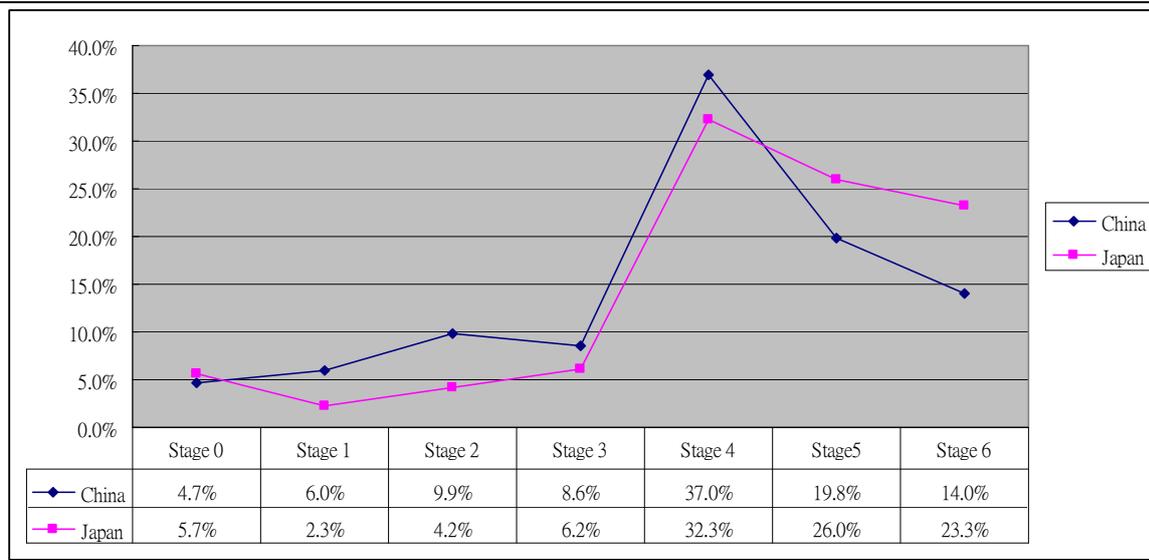


Figure 1: Summative Responses (First Choice Response) By Stage

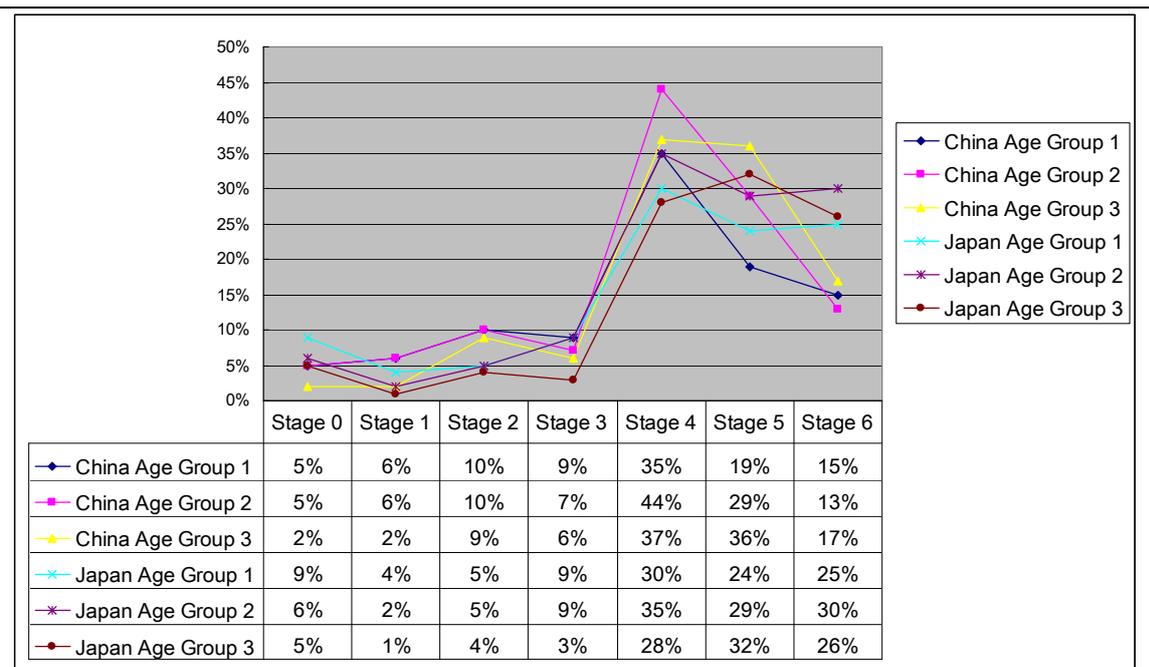


Figure 1.1: Summative Responses (First Choice Response) By Stage and Age Group

Note: Age group 1 – age below 30; Age group 2 – 30 - 50; Age group 3: 51 and above.

When the first choices of respondents are analysed across all 13 items, it is clear that Stage 4 is the most common and that 73 percent of Chinese respondents and 82 percent of Japanese respondents achieve Stage 4 reasoning or above (see Figures 1 and 1.1).

In order to measure the significance of the difference in the responses from China and Japan, we conducted an independent-samples T-test. Table 6 indicates that all the first choices from China and Japan vary significantly (most of them are significant at the $p < 0.01$ level), except in scenario 3 about the expression of opinions. Among them, the response scores in scenarios 10 and 11 from the

Chinese IT professionals are significantly higher than those from the Japanese IT professionals, while in scenarios 1, 2, 4, 5, 6, 7, 8, 9, 12 and 13, the response scores from Japan are significantly higher than those from China.

Table 6: Independent Samples T-Test Results across Responses (First Choice) from China and Japan

Item		N	Mean	Std. Dev.	Mean Difference	t	Sig. (2-tailed)
1	China	285	3.91	1.322	-.244	-2.821	0.005**
	Japan	275	4.15	0.563			
2	China	289	4.76	0.972	-0.462	-5.799	0.000**
	Japan	274	5.23	0.914			
3	China	290	4.31	1.469	-0.067	-0.466	0.641
	Japan	273	4.37	1.910			
4	China	290	3.79	1.594	-1.015	-8.429	0.000**
	Japan	272	4.81	1.225			
5	China	285	4.43	1.041	-0.580	-6.715	0.000**
	Japan	265	5.01	0.979			
6	China	284	3.52	1.782	-0.752	-5.471	0.000**
	Japan	271	4.28	1.428			
7	China	262	2.73	1.093	-1.678	-17.881	0.000**
	Japan	270	4.41	1.072			
8	China	274	4.30	1.480	-0.316	-2.333	0.020*
	Japan	265	4.62	1.693			
9	China	273	4.30	1.172	-0.200	-1.964	0.050*
	Japan	270	4.50	1.197			
10	China	279	3.91	1.791	0.409	2.355	0.019*
	Japan	273	3.50	2.264			
11	China	279	3.44	1.204	0.765	6.164	0.000**
	Japan	271	2.68	1.677			
12	China	277	3.43	1.751	-1.024	-7.447	0.000**
	Japan	271	4.46	1.452			
13	China	274	2.94	2.023	-0.728	-4.851	0.000**
	Japan	260	3.67	1.361			

* Significant at *p<0.05 level; **p<0.01 level

For each item, respondents were asked to provide not only their first choice but also their second choice. The choice-shift that is indicated can be examined by using volatility analysis (Snell et al., 1997), i.e., the extent to which an individual may be governed by reasoning at different stages. Not all respondents indicated both a first and second choice on all 13 items, so our analysis here is restricted to those who did (see Tables 5 and 6). For the purpose of this analysis, we identify a volatile choice-shift when the first choice and the second choice are at least two stages apart, e.g., first choice is for stage 4 and second choice is for stages 0, 1, 2 or 6. A two-stage gap between the first and second choice is sufficient to indicate volatility since, from a theoretical perspective, this is clearly not indicative of transitional morality (where stages would be proximate). Table 7 below indicates that significant levels of volatility are found in seven items from China, viz: items 1, 2, 4, 5, 9, 10 and 11, as well as five items from Japan, viz: items 4, 5, 6, 10 and 12.

Table 7: One-Sample Test of Volatility across 13 Items

Volatility in the First Choice and Second Choice in 13 Items		Test Value = 0					
		T	Df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
						Lower	Upper
China	1	-4.368	250	0.000**	-0.681	-0.99	-0.37
	2	-7.091	266	0.000**	-1.240	-1.58	-0.90
	3	-1.441	256	0.151	-0.292	-0.69	0.11
	4	-2.303	258	0.022*	-0.398	-0.74	-0.06
	5	-4.920	250	0.000**	-1.032	-1.44	-0.62
	6	-1.624	259	0.106	-0.250	-0.55	0.05
	7	0.239	180	0.812	0.017	-0.12	0.15
	8	0.268	252	0.789	0.051	-0.33	0.43
	9	-2.488	251	0.013*	-0.361	-0.65	-0.08
	10	-2.146	239	0.033*	-0.413	-0.79	-0.03
	11	-3.637	242	0.000**	-0.342	-0.53	-0.16
	12	-0.219	246	0.827	-0.036	-0.36	0.29
	13	-0.457	228	0.648	-0.070	-0.37	0.23
Japan	1	1.921	228	0.056	0.083	0.00	0.17
	2	-0.904	258	0.367	-0.035	-0.11	0.04
	3	0.332	252	0.740	0.036	-0.18	0.25
	4	-2.738	237	0.007*	-0.206	-0.35	-0.06
	5	-4.460	245	0.000**	-0.272	-0.39	-0.15
	6	-2.619	248	0.009*	-0.265	-0.46	-0.07
	7	-1.657	259	0.099	-0.100	-0.22	0.02
	8	-1.661	245	0.098	-0.159	-0.35	0.03
	9	-0.217	248	0.828	-0.016	-0.16	0.13
	10	3.087	249	0.002**	0.436	0.16	0.71
	11	1.230	255	0.220	0.137	-0.08	0.36
	12	-2.182	243	0.030*	-0.193	-0.37	-0.02
	13	-1.734	215	0.084	-0.162	-0.35	0.02

* Significant at *p<0.05 level; **p<0.01 level

In order to check the volatility differences between the Chinese and Japanese responses, we conducted paired samples T-tests across all 13 scenarios. Table 8 below shows the significance of the differences when comparing the data from the two groups. Among them, significant volatility differences (p<0.05) between the two groups are found in scenarios 1, 2, 5, 9, 10 and 11, where the Chinese mean shifts (the gap between the first choice and the second choice) are all negative. For example, in S1, the Chinese mean shift is -0.68, whereas the Japanese mean shift is +0.08, i.e., the Chinese responses are significantly more (negatively) volatile than the Japanese responses.

Table 8: Independent Samples Test Results of Volatility across the Responses

Volatility in Responses		N	Mean	Std. Dev.	t	Sig. (2-tailed)
S1	China	251	-0.68	2.471	-4.722	.000**
	Japan	229	0.08	.654		
S2	China	267	-1.24	2.857	-6.732	.000**
	Japan	259	-0.03	.618		
S3	China	257	-0.29	3.246	-1.429	0.154
	Japan	253	0.04	1.705		
S4	China	259	-0.40	2.779	-1.018	0.309
	Japan	238	-0.21	1.160		
S5	China	251	-1.03	3.322	-3.477	.000**
	Japan	246	-0.27	.958		
S6	China	260	-0.25	2.483	0.082	0.935
	Japan	249	-0.27	1.597		
S7	China	181	0.02	.934	1.258	0.209
	Japan	260	-0.10	.973		
S8	China	253	0.05	3.054	0.979	0.328
	Japan	246	-0.16	1.497		
S9	China	252	-0.36	2.304	-2.118	0.035*
	Japan	249	-0.02	1.167		
S10	China	240	-0.41	2.978	-3.557	.000**
	Japan	250	0.44	2.233		
S11	China	243	-0.34	1.464	-3.287	.001**
	Japan	256	0.14	1.778		
S12	China	247	-0.04	2.615	0.829	0.408
	Japan	244	-0.19	1.379		
S13	China	229	-0.07	2.312	0.515	0.607
	Japan	216	-0.16	1.373		

* Significant at $p < 0.05$ level, ** Significant at $p < 0.01$ level

6. Discussion

The data analysed above indicate that the fundamental tenets of Kohlberg's CMD theory are generally applicable in the context of IT professionals in China and Japan. Stage 4 was found to be the most commonly-achieved stage of ethical reasoning: 73 percent of Chinese IT Professionals and 82 percent of Japanese IT professionals achieved stage 4 or above reasoning in their first choices. This finding was unexpected, given that several prior studies (Lau and Kuan, 1988; Snell, 1999; Martinsons and So, 2000; Yabuuchi, 2004) indicated that individuals from East Asian cultures are more influenced by Confucian-derived, relationship-based ideas, rather than universal principles of justice, and so would be more likely to reason at "lower" levels. We suggest that, consistent with the principle of cultural convergence (Ogbor and Williams, 2003), the ethical reasoning of IT professionals in both China and Japan is based more upon an international set of professional norms rather than norms derived from societal or organisational affiliations.

The Japanese respondents commonly achieved a higher percentage of stage 4 and above responses than their Chinese counterparts. Remarkably, the dominant response of the Japanese was significantly higher than that of the Chinese respondents by two Kohlberg stages on all dilemmas except three (S3, S10 and S11). This suggests that the ethical reasoning employed by Japanese IT professionals has developed further across most (10 out of 13) ethical situations. Our data also

suggests that the Japanese also had a lower degree of stage volatility in their responses.

Both the higher stage of ethical development and the lower degree of stage volatility exhibited by the Japanese IT professionals may be explained by the relative development and stability of the economic, social and legal systems in Japan. The substantial economic and social reforms taking place in China since 1979 resemble the social and economic development that occurred in Japan from the 1950s until the late 1980s. Japan now has comparatively mature legal institutions and a very stable society, but over the last two decades it has experienced the low economic growth that is characteristic of a developed economy.

In contrast, China has enjoyed the high growth rates associated with a fast developing economy, but its institutional frameworks and particularly its legal system remain comparatively immature (Martinsons, 2008). Consequently, Chinese IT professionals may be subjected to competing ethical and competitive tensions as they reason: relationship-based (lower stage) arguments about their *guanxi*-linked (i.e., Confucian) obligations, as well as justice-based (stage 4) arguments about expected professional behaviour in a post-WTO-accession economy. Alternatively, the higher stage reasoning by Japanese IT professionals on a few specific dilemmas may reflect greater consciousness raising specific to these dilemmas in Japan than in China. Further study could determine the levels of awareness and activity specific to the four dilemmas (expressing opinions, trust among colleagues, and motivating people) where two-stage differences were found between IT professionals in Japan and China.

Our application of CMD theory in East Asia is important for several reasons. First, as indicated in the literature review, Kohlberg's theory has been criticised for a number of reasons, not least its origins in Western philosophical traditions. This gave rise to Snarey's (1985) meta-finding that stage four (or above) reasoning may not be universally achieved. Given the inherent differences between Confucian-based and Western thinking (Nisbett, 2003) and especially previous studies of Chinese managers (Snell, 1999; Martinsons and So, 2000), Chinese and Japanese IT professionals may be expected to reason differently from Westerners. Nevertheless, our data from China and Japan indicates a high degree of applicability for Kohlberg's Western-based theory.

Nevertheless, it is useful to add stage 0 reasoning to the CMD model, approximately 5 percent of IT professionals from both China and Japan were found to reason at this *amoral* stage. Stage 0 reasoning suggests that people make decisions without any moral or social basis: they act entirely according to impulse or whim, doing whatever they feel like at that moment. We deliberately built this notion of "whatever" or "however" into the scenarios — we did not try to disguise the amorality of the choices or otherwise beguile respondents into selecting this response. However, small minorities of both Chinese and Japanese IT professionals did so. Theoretically, stage 0 reasoning is important because it is unexpected: it violates both Confucian ideals and Western justice-driven principles. It may be unpleasant to admit that supposedly mature individuals are capable of such amoral reasoning, the more so when these individuals are working as professionals in a critical sector of the economy, but we suggest that CMD theory should be extended by inclusion of an amoral stage of reasoning.

Apart from a smaller percentage of amoral responses, ethical confusion appeared to surround a few items. For Chinese IT professionals, the most notable confusion exists with respect to dilemma 13 (the inevitability of bugs in software), where stage 2 is the most popular (18 percent of responses), and where 48 percent of responses are at stages 0-2, compared to only 43 percent at stages 4-6. In discussing this response pattern, the CIO of a high-tech firm in the southern Chinese city of Guangzhou said that he preferred the stage 2 choice: bug-free software is possible to achieve but too expensive due to the very competitive nature of the market in China. Software had to be developed as quickly as possible in order for his firm to compete effectively. He indicated that "software had to achieve a certain quality level, but it was practically impossible to ensure that it was bug-free". This attitude may reflect a professional and competitive norm (bugs are not good, but it is too costly to produce bug-free software), rather than an ethical ideal (producing bug free software is an ethical obligation). Such a professional norm is not restricted to China. In other jurisdictions, notably the UK

(Atkins, 2005) and the U.S. (Nissenbaum, 1994; Dalal and Mallow, 1998; Cusumano, 2004), bugs are legally and professionally recognised as a natural hazard of software programmes.

For Japanese IT professionals, dilemma 11 (what motivates people to work) is especially problematic, with 62.4 percent of responses at stages 0-3 (i.e., for no particular reason, so as to avoid punishment, or achieve benefits, and in the context of peer support), but only 27.3 percent because of a professional responsibility (stage 4). However, as one Japanese respondent commented, "In my opinion, many Japanese people are dependant on their company and cannot behave autonomously. Consequently, they tend to prioritize profit-and-loss arithmetic over their conscience". This observation is very much in line with the stage 2 argument for dilemma 11, i.e., 'the promise of benefits and rewards'.

Our results also support Snell's stage volatility thesis (Snell, 1996; Snell et al., 1997). Every respondent displayed some volatility in his or her response choices, with a gap of at least two stages between the first and second response choices for one or more scenarios. High levels of volatility (as shown in Table 7) were observed on seven of the scenarios (viz.: 1, 2, 4, 5, 9, 10 and 11) for the Chinese and five scenarios (viz.: 4, 5, 6, 10 and 12) for the Japanese. Chinese IT professionals were more prone to negative volatility in their decision making than the Japanese for five issues. Significant differences were observed in scenarios 1, 2, 5, 9, 10 and 11, namely information use, mistake handling, obtaining rewards, following rules and regulations, trust among colleagues, and motivating people. The stage volatility thesis directly contradicts CMD theory, which indicates that individuals will always reason at their highest stage, unless they are in transition between two stages.

The high levels of stage volatility found in our sample of IT professionals from China may be a consequence of a breakdown in Confucian traditions (Hong, 2002) during social and economic transformation (Martinsons, 2005). Luo (1991) suggests that moral degeneracy is the inevitable price to be paid for the transformation from one economic system to another, the more so as emotion, rather than reason, seems to prevail in business ethics (Ten and Willmott, 2001). Nevertheless, the picture is not entirely bleak: most individuals (73 percent of Chinese and 82 percent of Japanese) attained stage 4 or above reasoning. This suggests that most IT professionals in both Japan and China have a reasonably well developed sense of ethical reasoning.

7. Conclusions, Implications, Limitations and Future Research

Our study has demonstrated the cross-cultural transferability of Kohlberg's Cognitive Moral Development (CMD) theory by applying it to the context of IT professionals in China and Japan. This is an important contribution given that Kohlberg's theory is based on Western philosophy. In contrast, Confucian doctrine and its associated values have traditionally been important across East Asia. Furthermore, we confirm two important extensions to CMD theory, adding an amoral stage, where no moral or social basis is evident in the reasoning process, and confirming Snell's stage volatility thesis (Snell, 1996; Snell et al., 1997), with respondents apparently reasoning simultaneously at two non-proximate stages.

Our research has implications for both established organisations in China and Japan, and those setting up their operations there. First, given the general validity of CMD theory in the Chinese and Japanese contexts, most IT managers and employees can be expected to reason at a level similar to that employed by their international counterparts.

IT professionals in both Japan and China commonly espoused a willingness to abide by established laws and rules. This response is consistent with stage 4 in Kohlberg's hierarchy and suggests that the traditional importance in East Asia of personal relationships with reciprocal obligations may be receding. Contemporary values in China appear to be changing, with increased focus on quality in a highly competitive market. In Japan, the emergence of numerous corporate scandals, such as Mitsubishi's cover up of vehicle defects (Faiola, 2004) and Livedoor's accounting fraud (Anonymous, 2006), is expected to have promoted awareness of the importance of compliance. They may also have affected the responses of Japanese respondents.

On the other hand, considering the working and social environment of Japanese IT professionals, the survey results show both the perseverance of Japanese IT workers and their fidelity to their profession. Many Japanese IT professionals are titled system engineers (SEs); this job title covers employees who engage in IS analysis, design and development, and project management. They are also often responsible for pre-sales and post-sales technical consulting.

Although Japan is one of the world's leading IT countries, SEs do not necessarily have a high status in Japanese firms or in Japanese society. On the contrary, in Japan, they are often considered to be "disposable" personnel. Indeed, it is often alleged that these IT personnel have to switch to another job by the age of 35, primarily because the job is so physically demanding: they are required to finish their work by a scheduled completion date, which is usually set very tightly. It is plausible that the highly stressful and physically demanding working disrupts the professional outlook of Japanese IT professionals, causing them to have an irresponsible or apathetic attitude toward ethical considerations (Murata, 2005). A survey of 2,214 Japanese IT professionals indicated that one-quarter of them felt that their jobs were not worthwhile, nearly 90 percent considered they worked in stressful situations, and 72.6 percent recognised their profession was unpopular among young people (Nikkei Computer, 2006). Consequently, the Ministry of Internal Affairs and Communications (2006) has estimated a shortfall of a half million IT workers including 350,000 "advanced ICT human resources" such as chief information officers and project managers.

A small minority of both Japanese and Chinese IT professionals appeared to have a poorly developed sense of ethical reasoning. A few even tended to amorality and impulsiveness in their decision making, which is certainly a worrying trend. In both China and Japan, the importance of corporate social responsibility and business ethics has become widely acknowledged, but not always put into practice. In Japan, while business organisations' compliance with laws and ethical codes of conduct (stage 4 of CMD theory) tends to be emphasised, several full-fledged proposals for establishing business ethics have also been made (see e.g., Taka and Donaldson, 1999). However, ordinary people continue to believe that IT is not related to ethics. Indeed, the terms "computer ethics" and "information ethics" as well as the existence of well-established IT professional codes of conduct, are relatively unknown to IT professionals in these two nations (Nagao and Murata, 2007). In this regard, it is not surprising that there are IT professionals in both China and Japan who appear to make decisions amorally, or at the lower stages of moral reasoning.

Consistent with a previous study of trading by Wong and Maher (1997), we also found some significant differences between China and Japan in terms of IT professional ethics. The vast majority of the IT professionals that we sampled in both Japan and China exhibited a high degree of volatility in their ethical reasoning. The Chinese displayed significant volatility on the following seven issues: information usage, mistake handling, disagreements between co-workers, the way rewards are obtained, obedience to rules, regulations and codes, trust and motivation. The Japanese, on the other hand, displayed significant volatility on the following five issues: the way rewards are obtained, obedience to rules, regulations and codes, relationships with customers, trust and the sense of duty to the IT profession. Volatility on most of these issues suggests a tension between traditional Confucian values and Western-based professional standards.

Overall, these findings suggest the need for organisation-wide implementation of ethics awareness programmes involving appropriate incentives (cf. Ip, 2002) in order to ensure that ethical norms are developed and maintained at an appropriate level. The specific issues that are more likely to be appropriate for each context are indicated above. However, consistent with the characterization of the Chinese as resembling grains of sand (Fukuda, 1983), we suggest that it will be easier to implement such a programme in the Chinese context, where there is a natural hierarchy and collectivism at the level of the work group, and strategic decisions tend to involve a directive style (Martinsons and Davison, 2007). In contrast, the Japanese have been characterized as a homogeneous block of granite (Fukuda, 1983) with a strong sense of organizational collectivism. The consensual decision style of the Japanese (Martinsons and Davison, 2007) may make it more difficult to change corporate norms.

Although the 579 IT professionals who participated in our study were almost equally divided between Japan and China, the relatively low response rate in China – just 5.8 percent - may be considered to be a limitation. However, it should be interpreted in light of the sensitivity of the topic matter, as well as the fact that invitation emails of this kind may be viewed as junk mail (Garratt et al., 2003). Not everyone would like to participate in a study like this, and not all of those who did participate would necessarily have seen the scenarios as involving any kind of ethical dilemma. Thus, the respondents are to some extent self-selected. Given this bias, it is impossible to assess if the respondents are representative. However, using a popular technique to check for a non-response bias, we did compare the early and late respondents and found no significant differences in their response patterns.

A second limitation relates to the way that our research design “forced” respondents to select a response from a set of seven for each scenario. We did not permit them to create their own responses or ask them to justify their response choice. The justification for this approach is more pragmatic (in terms of consistency of data and subsequent analysis) than theoretical: in principle, respondents could create their own responses, but these must then be individually evaluated by experts and then assigned a moral reasoning stage. To do this with a large population as in this study would consume a prohibitive amount of resources (primarily researcher time). We certainly recognise the value of a more intensive and qualitative approach and would advocate it for follow-up studies. For example, it would be useful to engage respondents in an open-ended conversation involving analysis of the dilemma, identification of one or more ethical reasonings, reflection on those reasonings, and justification of the final choice.

Third, individual reactions to the ethical dilemmas may be conditioned either by organisational norms/culture or by age/experience. For example, the ethical reasoning of each individual may be informed by the organisational norms of not only the current employer, but also previous employers. Remarkably though, neither the age nor the experience of the IT professionals in either China or Japan had a significant correlation with their responses in our study.

Finally, for future research, we encourage the investigation of the ethical values of IT professionals across a wider range of cultures/societies, and using a variety of complementary research methods. In particular, additional evidence is needed to confirm our tentative conclusion that the degree of ethical volatility across Kohlberg's stages among a professional group reflects the pace of economic and social change taking place in their society. Although comparative empirical investigations of an inclination toward stage volatility in ethical reasoning have yet to be undertaken, the phenomenon is unlikely to be restricted to a particular cultural group: it seems more likely that it is a universal attribute. More studies of this type will also enable us to determine whether there is an emerging set of international norms prevalent in the IT profession that trump the national norms that bring about societal differences in cultural values.

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Appendix: Survey Items³

1. HOW INFORMATION IS USED – If you discover some confidential information on the Internet that may damage the organisation, you...
 - ask whether shared values & principles have been violated (5)
 - pretend you know nothing about it & avoid getting involved (1)
 - gossip about it with your friends/colleagues (3)
 - use the information for personal advantage (2)
 - initiate discussion about whether the organisation has a right to confidentiality (6)
 - report it through proper channels (4)
 - use it however you feel like (0)
2. HOW MISTAKES ARE HANDLED - When you make a serious mistake in your work, you ...
 - try to pin the blame on a rival or competitor (2)
 - admit it & seek to eliminate harm to your organisation (5)
 - subject yourself to formal review procedures (4)
 - report & use the experience as a lesson for others (6)
 - only let your close friends know about it (3)
 - ignore it and keep going (0)
 - try to pin the blame on someone who is weaker (1)
3. HOW OPINION IS EXPRESSED - When you are asked for your views on what should be done, you...
 - actively join in a discussion until everyone else is questioning what the organisation ought to be doing (6)
 - say the same thing as your colleagues (3)
 - are frightened to say anything (1)
 - say whatever you feel like at the time (0)
 - say whatever will benefit you most (2)
 - emphasise the organisation's social responsibilities (5)
 - offer your expert advice (4)
4. HOW DISAGREEMENTS ARE HANDLED - When a disagreement occurs between co-workers, you...
 - discuss the disagreement with your friends (3)
 - remind others of the organisation's social obligations (5)
 - support the side that will offer you the most personal benefits in return (2)
 - are afraid to get involved (1)
 - do whatever you feel like at the time (0)
 - collaborate with one another to work out what is morally right (6)
 - resolve the disagreement by following correct organisational procedures (4)
5. HOW REWARDS ARE OBTAINED - You reward the people who...
 - are concerned with spiritual purpose and values (6)
 - know how to please the people around them (3)
 - obey orders or instructions without thinking (1)
 - do whatever they like (0)
 - stand up for their own interests (2)

³ The sequence of items under each scenario corresponds to the original sequence as seen by survey respondents. The number in parentheses after each choice indicates the stage (between 0 and 6) to which the choice corresponds.

- want to make the world a better place (5)
 - interpret rules and procedures in a professional manner (4)
6. RELATIONSHIPS WITH CUSTOMERS - You give most priority to those customers who...
- are of sufficiently high status (3)
 - are in the greatest genuine need (5)
 - are financially most important (2)
 - could cause damage if not satisfied (1)
 - you feel like at the time (0)
 - respect the ethical purposes of the organisation (6)
 - appreciate orderly, professional service (4)
7. THE IMPACT OF THE ORGANISATION ON EMPLOYEES - Through working in this organisation, you have learned to...
- look after your own self-interest (2)
 - take socially responsible actions (5)
 - adopt a disciplined and orderly approach to solving problems (4)
 - strengthen your own ethical principles by constant self-questioning (6)
 - fit in with others (3)
 - do whatever you feel like (0)
 - do as you are told (1)
8. THE USE OF POWER - You use power...
- to encourage reflection on the organisation's fundamental values (6)
 - to help your friends (3)
 - to control others (1)
 - to do whatever you feel like (0)
 - for your own benefit (2)
 - to ensure that ethical principles are respected (5)
 - to maintain stability and order (4)
9. WHY RULES, REGULATIONS AND CODES ARE FOLLOWED - You obey the rules, regulations and codes...
- only when your colleagues also obey (3)
 - if you can gain some personal advantage (2)
 - because you want an orderly and smooth operation (4)
 - to promote justice and the common good (5)
 - by chance, not by intention (0)
 - because you are frightened of punishment (1)
 - if these are based on thoroughly-examined & justifiable rationale (6)
10. TRUST LEVELS AMONG COLLEAGUES – In your organisation you trust...
- others' integrity & sense of justice (5)
 - no one (1)
 - your friends & close colleagues (3)
 - those who owe you a favour (2)
 - everyone's carefully considered opinion or concern (6)
 - specialists & experts (4)
 - anyone you feel like (0)

11. WHAT MOTIVATES PEOPLE - In this organisation, you are motivated by...
 - the promise of benefits & rewards (2)
 - concern for the common good (5)
 - professional responsibility (4)
 - a need to resolve moral conflicts (6)
 - the support & acceptance of your colleagues (3)
 - whatever you feel like at any given time (0)
 - the need to avoid punishment (1)

12. DUTY TO THE IT PROFESSION – You believe that as an IT professional, you should...
 - constructively challenge the fundamental values of the IT profession. (6)
 - fulfil the minimum requirements of a job. (3)
 - cut corners in order to get a job done in a way that maximises your personal benefit. (2)
 - do whatever you like irrespective of other people (0)
 - do your best, but not worry if your work is imperfect (1)
 - help to develop new standards for professional work (5)
 - promote good practice and high standards in your work (4)

13. THE INEVITABILITY OF BUGS – As an IT professional, you believe that...
 - bug-free software can be produced if everyone tries their very best to achieve it (3)
 - bug-free software is possible to achieve, but too expensive (2)
 - the delivery of bug-free software is an essential responsibility of a high-quality software developer (4)
 - all software developers have an ethical obligation to deliver 100% bug-free software (5)
 - all software has bugs and it doesn't matter (0)
 - all software has bugs, which is not a good thing, but we can't do anything about it (1)
 - the existence of bugs in software is a matter for philosophical debate (6)

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