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Thang Minh Nguyen
University of Wisconsin - Eau Claire, nguyentm@uwec.edu

Bruce W. N. Lo
University of Wisconsin - Eau Claire, lobw@uwec.edu

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Thang Minh Nguyen
University of Wisconsin – Eau Claire
nguyentm@uwec.edu

Bruce W.N. Lo
University of Wisconsin – Eau Claire
lobw@uwec.edu

ABSTRACT

Information and communications technology played a significant role in the recent economic growth of China, which now ranks as the second largest economy in the world. As a result, China faces many social and ethical challenges common to technology-advanced countries. Ethical reasoning and practices are often influenced by cultural expectations and regional norms. The purpose of this study is to investigate ethics decision making by IT professionals in different regions of China. In contrast with many previous studies on comparisons across different countries, this research focuses on intra-country differences.

An IT ethics survey was developed and administered in four regions in China with different degrees of westernization. The data were analyzed using standard cross tabulation and Chi-square test techniques. Preliminary results reveal observable differences among subjects from the four regions with respect to their decision choices, reasons for the choices, the scope of consideration, and the stage of their moral development. In particular, the subject group that was exposed to the strongest western influence, showed the highest degree of individualism in ethics decision making.

Keywords

IT ethics, ethics decision makings, cultural factors, regional difference, China

INTRODUCTION

Since the second quarter of 2010, China became the second largest economy in the world next to USA (New York Times 2010). According to Bloomberg (2010), China is expected to surpass USA and may become the leader of the world economy by about 2030. Many experts believed that China's ICT (Information & Communication Technology) industry has been the driving force behind the country's phenomenal economic growth (Luk'yanenko 2009). As a result of this rapid technological and industrial expansion, China faces many social and ethical challenges common to technology-advanced countries in the West. At the same time, increase participation in global trade creates greater variety of situations that require ethical reasoning and decision making in business and technology contexts. The purpose of this study is to examine how traditional culture and western influence may have affected the way Chinese IT professionals (or pre-professionals) execute ethical reasoning and decision making in IT situations. In contrast to many studies that compared China with other countries, this research focuses on the difference among people from different regions of China that are subject to different degree of Westernization? We seek not only to answer the question what decisions choices are Chinese people making in certain IT ethical dilemmas, but also to answer how and why they make these decisions.

To study the what, how, and why questions, the researchers travelled to four different regions in China: Hong Kong, Guangzhou, Wuhan, and Changshu, to conduct this investigation. It was assumed that the IT pre-professionals in these regions may have different approach to IT ethics decision making because their culture expectation and traditional values may have been affected by the different degrees of Westernization: Hong Kong, having been a British colony for 99 years, is expected to be the most Westernized city among the four, Guangzhou and Changshu are regarded as in the transition regions because of their proximity to the metropolis of Hong Kong and Shanghai respectively, while Wuhan is expected to be the most traditional as it is located in central China with minimal Western influence. The same survey was administered in all four regions to about 950 subjects.

The remainder of this paper will be organized into four sections. The next section provides a brief review of the literatures and the theoretical background. This is followed by a description of the methods used. Next the results and findings will be reported. The paper concludes with a discussion of the findings and their implications for future IT ethics research.

THEORETICAL BACKGROUND

Early studies of IT ethics were conducted within the context of western ethics framework (Lo & Doak 1996; Davison 2000; Hilton 2000). With China, India, and Japan playing increasingly important roles in the global ICT industry, more attention is being paid to IT ethics in Asia. Davison et al. (2006) investigated ethical values of IT professionals in Hong Kong; Davison et al. (2009a) studied the ethics of IT professionals in China; while Davison et al. (2009b) compared the ethics of IT professionals in Japan and China. Patel & Schaefer (2009) investigated the diversity of ethical decision making in India.

There is a clear recognition among scholars that cultural perspectives have a strong influence in shaping ethical positions of IT professionals in different parts of the world (Hongladarom & Ess 2007). Hilton et al. (2006) specifically investigated information systems ethics in developed and developing countries. Other scholars recognized that a developing economy like China is undergoing gradual cultural changes due to effect of globalization. As a result, different parts of the country may be at different stages of cultural transformation. Crawford, & Redfern, (2007) studied the effects of modernization by

considering regional differences in business ethics in People's Republic of China. Martisons & Ma (2009) examined sub-cultural differences in information ethics across China.

IT ethics decision making may be analyzed from many different perspectives. In this research we shall focus on three: (a) Normative ethics principles, (b) Scope of consideration, and (c) Stage of psychological development.

The first is related to classical ethics theory. Classical ethicists assume that human are rational being, who make ethics decisions according to normative principles that reflect the decision makers' value systems. Since the time of the early Greek many different ethics theories had been proposed, e.g. ranging from Aristotelianism, Kantian deontology, and consequentialism (Brown 2001). Because in this research most the subjects that we surveyed did not have formal classical ethics training, rather than using abstract theoretical ethics concepts, we focus in how IT professionals apply ethics principles in practice. Here we make use of the 5-fold classification of ethics principles by the Markkula Center for Applied Ethics (Velasquez et al. 2007): virtue, utilitarian, fundamental rights, fairness, and common good.

The second perspective concerns the scope of consideration of the decision maker. This means whose interests or benefits did the decision maker considered when he/she made that ethics decision choice. Or how wide is the decision maker's "circle of significant others" with respect to that ethics decision process? Again we use a 5-fold classification: the decision maker him/herself, work team, company to which the decision maker belongs, the local community, and the society at large.

The third perspective is based on the "Stages of Moral Development" proposed by the psychologist Kohlberg (1969). An individual making ethics decisions may be classified into six stages. These six stages exhibit an increasing degree of maturity on the part of the individual, and may be further grouped into three levels:

Level 1 – Preconventional Morality	Level 2 – Conventional Morality	Level 3 – Postconventional Morality
Stage 1: Obedience and punishment orientation	Stage 3: Good interpersonal relationships orientation	Stage 5: Social contract orientation
Stage 2: Self-interest orientation	Stage 4: Maintaining authority and social order orientation	Stage 6: Universal principles orientation

Again rather than describing these stages in abstract terms, we have adopted a series of questions to describe the different development stages of the decision maker. Table 1 below provides a summary of the descriptions of these developmental stages in "question form" together with a summary of the classifications in the first and second perspectives.

	The Three Ethics Perspective		
	Normative Ethics Principle	Scope of Consideration	Stage of moral development
Classification	• Virtue principle • Utilitarian principle • Basic right principle • Fairness principle • Common good principle	• Self • Peers • Company • Community • Society	• Will I get punished? • Will I get any benefits? • Will my peers approve? • Will the community accept it? • Will the society benefit from this? • Does it help formulate ethics principles?

Table 1: Taxonomy of Ethics Decision Perspectives

How ethics decisions were made are often affected by the cultural expectations and value systems of the society to which the decision makers belong. Hofstede's (2005, 2010) delineated six cultural dimensions: PDI power distance, IDV individualism versus collectivism, MAS masculinity versus femininity, AVI risks avoidance, and LTO long term orientation. The actual value for China and Hong Kong are shown in Table 2. We shall attempt to relate our findings with Hofstede's concepts.
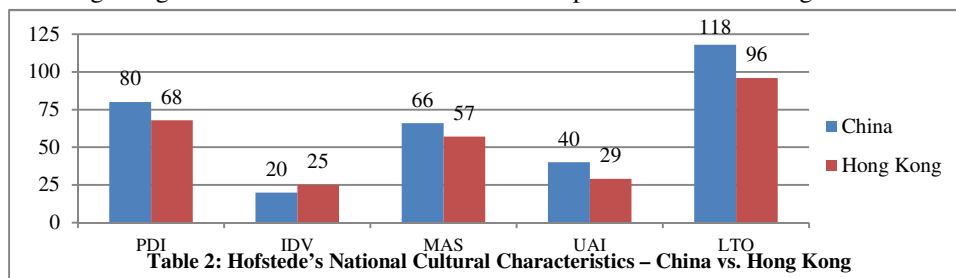

Table 2: Hofstede's National Cultural Characteristics – China vs. Hong Kong

METHODOLOGY

A survey questionnaire was adopted from an earlier version of a similar study by one of the authors (Lo et al. 2011). The questionnaire contains three parts: (a) demographics, (b) questions on what decision choices a subject would take in an IT ethics scenario and the reasons for making that choice, and (c) a similar set of questions on a second IT ethics scenario. The questions in parts (b) and (c) aim to probe the subjects' reasoning along the three perspectives mentioned above. Scenario 1 involves a choice whether to blow the whistle with respect to certain questionable program coding practices, while Scenario 2 involves a choice on whether to take on an IT project from a client with questionable environmental records. Details of the two scenarios and the survey questions are described in Table 3.1 and Table 3.2 respectively.

	Scenario 1	Scenario 2
Question	Suppose you are employed as a programmer in a project team to fix a specific coding problem in a software system for a financial company due to a recent operating systems upgrade. When analyzing the program codes, you accidentally	Suppose you are a project leader working for a software company that help business develop information systems. Your job is not just managing a given project, but also

	discover that in another part of the system, every time when an interest amount that is due to the company is calculated, the program will round a fraction up to the next nearest whole cent while when an amount due to the customer is calculated, it will truncate down to the next whole cent. This appears to be one way to handle the computation because it is not possible to credit or debit fractions of a cent in a single transaction. While this is not a large amount for each individual case, it can accumulate to something significant over large number of transactions. Although this is not part of the coding error that you were asked to fix, you wonder about this However, you recognized that this is somewhat similar to what the cell phone company does to you, because every time you use a fraction of a minute, the company will charge you for the full minute. That seems to be a widely accepted practice. Looking it from another angle, as a programmer you are employed as a technical employee to fix the codes. Should you be concerned with business procedures which are not really part of your responsibilities?	involved in finding new projects for your company so that the project members get paid. After much searching during an economically challenged time, you found two projects. Project A, which pays better, is from a company which has questionable environmental records. Project B, which yields a lower financial gain, is from a company with an unblemished ethical background. Due to high competition in the marketplace, you know you will only be able to get one of these projects. Which of these projects would you choose? Should you be concerned with the past records or behavior of your client company? Do you have an obligation to maximize your own company's revenue and make sure your project members have employment?
Action Choices	▪ I would not raise this issue ▪ I would change the other part of the program to something more acceptable (e.g. Rounding up the case of 0.5 cents or above, otherwise truncate down) ▪ I would report this issue to my immediate supervisor (e.g. The chief programmer or project leader) ▪ I would alert higher level of management because this is a business issue ▪ I would make this public by reporting to a regulatory agent or the media (newspaper, radio talk host, a blog etc.) ▪ Other action (please specify _____)	▪ I would pick project A ▪ I would pick project B ▪ I would spend a little time to find out more about the company before picking project A ▪ I would examine in greater details among public and legal records before I pick project A ▪ I would check both companies before I pick any ▪ Other actions (please specify _____)

Table 3.1: Scenarios Description

The survey was administered in the four regions mentioned above under control conditions. The researchers secured the assistance of colleagues from the Hong Kong Institute of Technology, Jinan University in Guangzhou, Wuhan University of Science and Technology, and Changshu Institute of Technology in the administration of this survey. With the exception of Jinan University where paper surveys were used, all surveys were conducted online using the Qualtrics Survey System. To overcome the language issue, the survey was translated into traditional and simplified Chinese.

The raw data were carefully reviewed. Data values that are obviously wrong or do not make sense were discarded. This yielded 708 usable data sets. The resultant data were analyzed using cross-tabulation and Chi-square tests by SPSS.

Since the purpose of our research is to determine whether there is any difference in ethics decision making for subjects from the four different regions, the independent variable is the "Survey Center". The dependent variables being measured for the two scenarios are shown in Table 3.2.

Dependent Variable Names		Explanation
Scenario 1	Scenario 2	(Survey question to which the dependent variable corresponds)
Ethic_1	Ethic_2	Does this scenario depict an ethical issue?
Choice_1	Choice_2	Which choice of action would you pick?
Reason_1	Reason_2	What normative principle represents the reason for your choice?
Scope_1	Scope_2	What is the scope of consideration for your choice?
Punish_1	Punish_2	How relevant is "Punish-orientation" to your choice?
For Me_1	For Me_2	How relevant is "self-benefit" to your choice?
Peers_1	Peers_2	How relevant is "peer approval" to your choice?
Community_1	Community_2	How relevant is "community order" to your choice?
Society_1	Society_2	How relevant is "society benefit" to your choice?
Principle_1	Principle_2	How relevant is "formulation of ethics principle"?

Table 3.2: Dependent Variables in This Study

The general form of the hypotheses to be tested is:

H_0: *There is no significant difference in the value of the dependent variables for subjects coming from different survey centers.*

RESULTS

Table 4 summarizes the demographics characteristics of the sample sets from the four survey centers.

	Hong Kong	Jinan	Wuhan	Changshu	Total
Sample Size	182	80	254	192	708
Gender (M-F)	55% - 45%	43% - 58%	69% - 31%	78% - 22%	65% - 35%
Major (IT-Business-Other)	33% - 54% -13%	0% - 99% - 1%	98% - 0% - 2%	100% - 0% - 0%	71% - 25% - 4%
Age (24 or less-25 or more)	80% - 20%	98% - 3%	99% - 1%	100% - 0%	94% - 6%
Percentage of People who had work experience	69%	25%	20%	11%	31%

Table 4: Sample Demographics

The Chi-square values of the cross tabulation between the independent variable and dependent variables were examined. Out of the 20 sets of cross tabulation, 11 of the dependent variables showed Chi-square values that are significant different with respect to the region (survey center) variable. Table 5 lists all variable-pairs that show significant differences, $p \le 0.05$. To conserve space, the remaining 9 "non-significant" cases are not shown here.

			Chi-square	df	p

Scenario 1	Centers vs.	Choice_1	44.738	15	0.000
		Reason_1	41.825	15	0.000
		Scope_1	21.246	12	0.047
		Punish_1	17.287	6	0.008
		ForMe_1	18.591	6	0.005
		Society_1	12.828	6	0.046
Scenario 2	Centers vs.	Choice_2	45.099	15	0.000
		Reason_2	42.572	15	0.000
		Punish_2	18.343	6	0.005
		ForMe_2	13.919	6	0.031
		Society_2	17.955	6	0.006

**Table 5: Dependent Variable with Significant Differences**

We now proceed to examine in more details each case where significant differences were observed.

Choice of action: This variable was found to show significant regional difference in both Scenario 1 and in Scenario 2 ($p \leq$ 0.000). A closer examination reveals that the action choices of the Hong Kong subjects are very different (see graph on left) from those subjects in the other three regions in China mainland. The graphs on the right bear out the differences. In Scenario 1, the Chinese (mainland) subjects have a much greater tendency to alert a HIGHER level of management as oppose to Hong Kong subjects who tended to report to the immediate supervisor. This seems to reflect the greater "power-distance" characteristics of Chinese subjects as reported by Hofstede (2010). In Scenario 2, again the action choices of the Hong Kong subjects are significantly different from those of the Chinese subjects. The graph on the right indicates that a greater percentage of subjects from China would choose to conduct further research and checking before making a decision, reflecting the greater "uncertainty avoidance" characteristics of Chinese subjects compared to Hong Kong (Hofstede 2010).
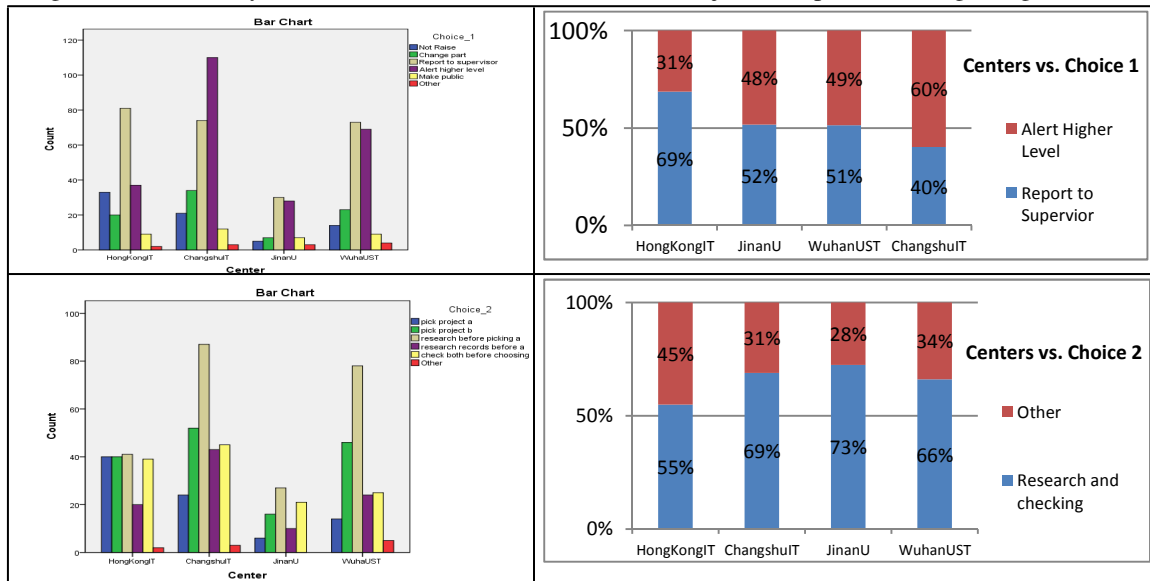

Graph 1: Centers vs. Choices

Reason for Action Choice: In this question, subjects were asked on which of the normative ethics principle(s) that they base their decision. The reasons given by the Hong Kong subjects are significantly different from those by the Chines subjects. The two radar charts in Graph 2, show very different profiles for the four regions. The chart on the left is for Scenario 1 and that on the right is or Scenario 2. In Scenario 1, the Chinese subjects regarded "Fundamental rights" as the most important reason for their decision choice, while the Hong Kong subjects regarded "fairness" as the dominant reason. Noting the drive of the Chinese people for democratic reform during the past few decades, this finding is not difficult to understand. On the other hand, in Scenario 2, where an environment issue is involved, utilitarian principle was considered the dominant reason by the Chinese subjects, while the virtue principle was considered the dominant reason by the Hong Kong subjects.
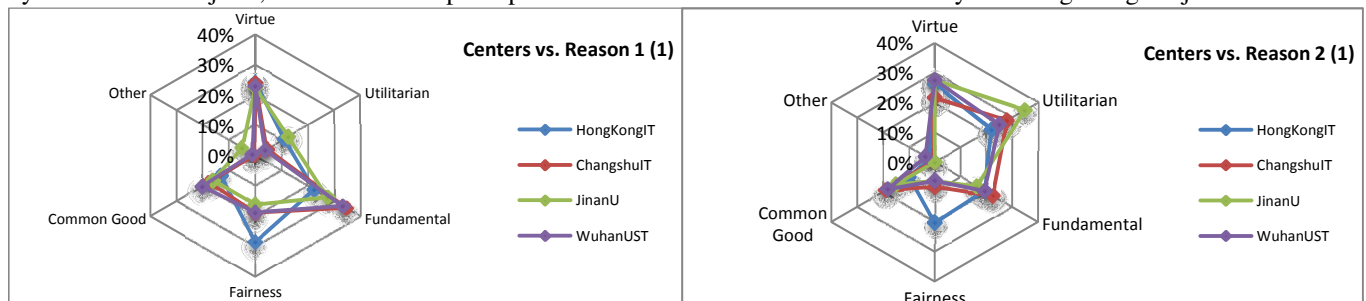
Graph 2: Centers vs. Reasons

Scope of Consideration: Significant regional differences at the 0.05 level were found in Scenario 1 but not in Scenario 2. Graph 3 shows that for subjects from China mainland, the most prevailing scope of consideration is "whether the decision

will affect my work team". In other words, the "team" factor is the most important consideration. For subjects from Hong Kong, the "company" or the "personal interest or career" factors are more important. This is not unlike what were reported by Hofstede (2010), who found that the Chinese culture is more towards the "collectivistic" end of the continuum, while the Hong Kong culture is more towards the "individualistic" end of the continuum.
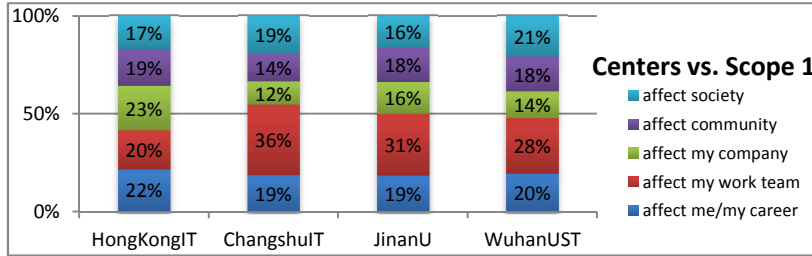
Graph 3: Centers vs. Scope

Stage of Development: Graph 4 reports the profile of the Kohlberg stages of moral development for subjects coming from the four different regions. The left chart is for Scenario 1, while the right chart is for Scenario 2. The horizontal axis shows the region, while the vertical axis represents the "average" measure of "degree of relevance" attached to that factor by the subjects. A value of 0 was assigned to the "least relevant" option, and a value of 2 was assigned to the "most relevant" option. Thus the higher the numeric value, the more relevant is that stage.

The remarkable result is how similar the two profiles are for Scenario 1 and Scenario 2. Firstly, the Guangzhou (Jinan U) subjects scored low for the two early stages (Punish, ForMe) in the "Preconventional" level, but scored high for the two last stages (Society, Principle) in the "Postconventional" level. While the Hong Kong subjects showed exactly the opposite trends. In fact, the actual value of the "average measure of the degree of relevance" for Hong Kong subjects lies mostly around 0.8 for all stages, but for the Guangzhou subject there was a clear "low" value for the "Preconventional" level, and the clear "high" value for the "Postconventional" level. Thus the "development stage" profiles for Hong Kong and Guangzhou are very different. The second observation we wish to make is, how similar the profiles are for the Changshu subjects and the Wuhan subjects. This is somewhat unexpected because, as argued in the early part this paper, we were expecting Chugnshu subjects to be more similar to Guangzhou subjects. Further research is needed to determine whether this observation is statistically real. The third observation to make relates to the overall profiles from the four regions. In this case, the "developmental" profile of the Hong Kong subjects is found to be very different from the profiles shown by the subjects in the other three regions. The similarity of the developmental profiles of the Changshu, Wuhan, and Guangzhou subjects can be clearly seen, but they are very different from that of the Hong Kong.
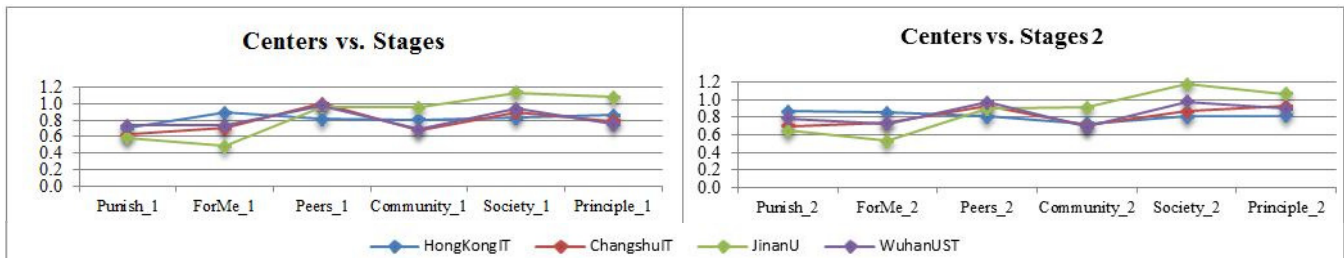
Graph 4: Centers vs. Stages of Moral Development

DISCUSSION AND SUMMARY

Base on the above results, there are clear differences in the way IT ethics decisions are made among subjects from the four different regions. For the 20 dependent variables we measured in this investigate, 11 of them showed significant differences (3 at the 0.05 level and 8 at the 0.01 level or beyond). Therefore we can reject the null hypotheses with respect to these 11 variables as indicated in Table 2: action choices (both scenarios), reason for choices (both scenarios), scope of consideration (scenario 1 only), Punish (both scenarios), ForMe (both scenarios), and Society (both scenarios). As pointed out in the previous section, although there are some differences among the China mainland subgroups, most of these significant differences are the result of Hong Kong subjects responded differently than Chinese subjects from the other three mainland regions. Thus it is reasonable to conclude that regional differences do exist with respect to IT ethics decision making. In particular, the Hong Kong subjects showed a very different pattern than the Chinese mainland subjects.

A more interest comparison is to consider the IT ethics decision choice findings in this research to the national cultural characteristics put forward by Hofstede (2005, 2010) in Table 2. There are at less four instances where there appear to be observable correlation:

- In Scenario 1, the Chinese subjects, which have a larger PDI measure, were found to prefer to report to a HIGHER level manager than the immediate supervisor, while the Hong Kong subjects with a lower PDI value, were found to prefer to report to an immediate supervisor.
- In Scenario 1, the Chinese subjects, which have a higher AVI measure, were found to prefer to do more research to find out more about the two companies, before making a decision choice.

- In terms of the scope of consideration, the Chinese subjects' main focus was to consider their own workgroup or peers, while Hong Kong subjects' focus was on self-benefits and career, or the company. This is consistent with the greater IND score for Hong Kong as compared to China.
- The higher IND index for Hong Kong subjects compared to the Chinese subjects was also reflected in the measure on the developmental stages. In this case, the Hong Kong subjects score higher on Preconventional level (reward and punishment orientation), while the Chinese subjects score higher on the Postconventional level (society and principle orientation). The stronger western influence on Hong Kong subjects can be clearly seen.

With the trends an increasing globalized workforce in many companies, the implications of our findings are very relevant for IT managers managing IT projects. In matters relating to IT ethics practices and decision making by IT professionals and pre-professionals, managers not only have to be cognizant of the intercultural differences between people from different countries but also people from different regions of the same country who may have experienced different degree of globalization influences.

Lastly, these preliminary findings provide motivation for future investigations. The next step in our research may involve an exploration into the interaction among more than one dependent variable, and the relationship to other demographics variables. Also the qualitative results from the interviews conducted in the 4 regions will also be analyzed.

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