

# Ethical Values of IT Professionals: Evidence From Hong Kong

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**Abstract**—In the wake of recent scandals involving information technology (IT) professionals, the ethics of this profession deserve more attention. This paper reports on the first phase of an initiative to research the ethics of IT professionals. The ethical values of the IT profession in Hong Kong were investigated using an instrument designed to reflect the stages of moral reasoning present in Kohlberg's theory of Cognitive Moral Development. The vast majority of respondents espoused ethical values consistent with both a high level of reasoning and the prevailing societal culture. At the same time, many respondents exhibited considerable uncertainty in their ethical reasoning, indicating a dynamic tension between high and low moral principles. The implications of these findings for research and practice are discussed.

**Index Terms**—Cognitive moral development, ethical values, information technology (IT) professionals, Kohlberg.

## I. INTRODUCTION

A DISTURBING number of corporate scandals in recent years have not only tarnished the reputation of some of the world's largest companies, but also drawn widespread public and government concern. The need for organizations to maintain their integrity is often countered by the desire to be profitable: the two are not always seen as being compatible and so the very concept of "business ethics" may be both an oxymoron [52] and a tricky concept to define [30]. Most definitions converge on a few key components, viz.: "moral rules, standards, codes, and principles governing individual behavior" [30], but getting broad agreement on a text is problematic, not least because of professional and cultural differences across nations.

A number of scandals in different parts of the world have involved questionable behavior on the part of IT professionals. This is very disturbing given the extent to which we (as individuals and society more generally) rely on IT. Even the world's largest and most successful software developer has been accused of unethical behavior, as illustrated by the October 2003 lawsuit launched against Microsoft which claimed that "Microsoft violated California consumer protection laws by 'selling software riddled with security flaws'" [13]. Ethical

problems also exist in the public sector, as evident in major IT failures with London Ambulance Services' Computer-Aided Despatch System in 1992, and two separate information systems at Hong Kong's airport in 1998.

In the case of the London Ambulance Service's computer-aided despatch system, [4], [17], a public inquiry identified a number of key problems, which we believe exemplify instances of behavior that are both unprofessional and unethical (at least according to the norms appropriate for the IT profession). These problems include "the software was incomplete and effectively untested; the implementation approach was "high risk"; inappropriate and unjustified assumptions were made during the specification process; there was a lack of consultation with users and clients in the development process with knock-on consequences for their "ownership" of the resulting system; the poor fit of the system with the organizational structure of the ambulance service. Subsidiary to these points but nevertheless important were the poorly designed user interfaces; lack of robustness; poor performance and straightforward bugs or errors" [17, p. 3]. These problems quickly led to chaos: one ambulance crew arrived to find that the patient had not only died, but had been taken away by undertakers. Another crew arrived 11 hours after an emergency call and 5 hours after the patient had made his own way to hospital [17].

Likewise, two major system failures—in the Flight Information Display System (FIDS) and in the Cargo Handling System (CHS) of Hong Kong's newly opened Chek Lap Kok airport—should be seen as instances of unethical behavior on the part of the IT professionals involved. These system failures caused the airport to descend into chaos [22]. Failures in the FIDS meant that all users (passengers, baggage handlers, cleaners, catering providers, and aircraft) were equally unable to locate flight arrival/departure gates. Failures in the CHS required operators to use a manual mode, with which they were unfamiliar. Substantial amounts of cargo could not be processed at all, causing significant losses to customers and the whole freight-forwarding business in Hong Kong. The root cause of all problems was time: due to delays in software development, testing and training time were both reduced. The delays in software development were the result of poor coordination between the Airport Authority's Project Division, Airport Management Division, and IT Department.

In the wake of these and other similar scandals, the ethical values of IT professionals deserve closer attention. There is a pressing need to understand more about the moral or ethical reasoning that underlies the decisions that IT professionals make in relatively understudied societies such as those of Asia. In this

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exploratory study, we first review the literature on moral reasoning and on IT ethics in general. We then describe how we developed and validated a survey instrument designed to measure the ethical reasoning employed by IT professionals. The survey instrument, implemented on the web, was completed by 58 current IT professionals in Hong Kong. The results of the survey are then analyzed and discussed. Finally, we make recommendations for both managers of IT professionals, as well as for researchers, and indicate directions for future research.

## II. ETHICAL REASONING

An investigation of ethical values requires an appreciation of multiple stages or levels of ethical reasoning. Kohlberg's [25], [26] theory of Cognitive Moral Development includes a six-stage model of moral reasoning which has been widely applied in the context of measuring the moral reasoning employed by various professional groups. The six stages in Kohlberg's [25] model, which Kohlberg himself viewed as a form of content-free moral thought, 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. Kohlberg himself identified stage four as the point attained by the majority of adults. Snell [44] describes this model 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 judgments." Lower stages, e.g., stage 1, 2, and 3 are generally considered to reflect less well-developed moral reasoning, while higher stages tend to reflect more well-developed moral reasoning.

Kohlberg's work is widely respected and applied in the business ethics domain, but it has also been the subject of criticism, mainly because of its ethnocentrism and "the overarching use of justice as a first moral principle" [19]: it is firmly bound to the Western philosophical tradition (cf. [12]). Snarey [42], in a meta-study of 45 investigations undertaken in 27 countries that used Kohlberg's CMD theory, judged that while the lower three or four stages of the theory appear to be universally valid, the higher two or three stages present some cause for concern. For instance, the cultural values of East Asian countries, with respect to such key attributes as individual rights and duties, differ from those found in Western (European and North American) countries. In the Chinese context, these individual rights and duties are generally conceived such that they are subordinate to those pertaining to society and the state [28]. The very notion "that there are universal norms applicable to all irrespective of conditions ... [is] ... more or less anathema to traditional Chinese" [28]. In this respect, the Chinese traditionally believe that all men are born unequal [5]. This is relevant to the professional behavior of IT professionals in societies influenced by Confucian thinking, such as Hong Kong, because subordinates are expected to be relatively passive, accepting their superiors' ideas and suggestions without criticism. This behavior is regulated primarily by a need not to cause a superior to lose face [11], [14]. As Snell [45] has noted, employees will feel obliged to undertake a superior's request even if the corresponding action is

unethical. From a CMD perspective, this obligation involves a need to comply with a contractual obligation and so avoid punishment (stage 1 reasoning), ensure that their own interests are fulfilled (stage 2 reasoning) and meet interpersonal obligations with their colleagues (stage 3 reasoning).

Notwithstanding the criticisms of Kohlberg's work and its applicability outside the Western context, Snell has successfully adapted and applied it in an extended series of studies [43]–[48] to the ethical reasoning used by ethnic Chinese managers in Hong Kong. Significantly, Snell [44] found in a phenomenological study of ten managers that many individuals exhibit what he terms stage volatility. This means that they simultaneously consider and are influenced by reasoning from two or more stages, e.g., from stage three and stage six (or stage one). In some situations, the reasoning that is derived from lower stages may be in direct conflict with the reasoning derived from higher stages, yet managers were still governed by these different sets of values. As Snell [48] explains, "managers who have attained stage six capacity may still experience and be governed by stage one fears and amoral urges and impulses." This represents a marked distinction to CMD theory (e.g., [25], [53]), which presumes that individuals reason at a single stage unless they are in transition between stages, in which case they reason at the higher of two adjacent stages.

## III. IT ETHICS

Ethical values have been investigated repeatedly. However, a significant shortcoming of many of these studies is that they have considered the ethical values of undergraduate students, e.g., [29], [36], and [39], sometimes acting as surrogate managers and professionals [40]. Furthermore, most of these studies have been undertaken in North America and Western Europe: relatively few consider the values of people in other parts of the world. Notable exceptions to these tendencies are: an information ethics study of American and Chinese business leaders [33], a survey of Chinese auditors [18], an examination of the ethical attitudes and practices of securities analysts and portfolio managers from North America and Pacific Rim countries [2], a survey of the ethical judgments of Chinese consumers [8], a cross-cultural survey of Australian, Hong Kong, and Chinese (PRC) auditors [54], the series of studies conducted by Snell and his associates on the ethical reasoning of Hong Kong managers [43]–[48], the ethics of guanxi (sometimes associated with corruption in the Western mind) for Chinese business executives [9], [31], [58], a firm-level study of a virtuous organization in China [24], as well as studies of attitudes toward software piracy globally [23] and among U.S. business professors and executives [51].

The lack of empirical attention to IT professionals (including programmers, analysts, technicians, project managers, and others who spend much of their working life in close contact with IT) sits rather asymmetrically with a small number of polemical studies [14], [35], [37], [38] which call for more attention to the ethics of IT professionals and the need to develop appropriate ethical standards. Prominent empirical exceptions include a study of 123 junior employees of IS departments in Fortune 500 firms [20], an investigation into the value differences of Canadian and Danish systems designers

[27], the ethical perceptions of public sector MIS professionals [56], and a handful of studies that investigate single topics in the ethics domain such as software piracy [51], intellectual property [50], and e-mail privacy [7], [41], [57].

The majority of these studies are underpinned by Kohlberg's [25] theory of cognitive moral development. The cross-cultural studies are notable for the cultural explanations that they employ to discuss their findings. Banerjee *et al.* [3] modified Ajzen's [1] theory of planned behavior in a scenario survey-based study that measures the intention to behave ethically or unethically. The U.S.-based survey respondents are employees of six firms in the IT and oil industries which agreed to participate in the research.

#### IV. RESEARCH DESIGN AND METHOD

In a qualitative, interview-based study, Snell [44] asked ten managers to identify their own ethical dilemmas and used these cases as the basis for subsequent discussion. Snell's research method incorporated the mapping of the ethical reasoning used by managers onto Kohlberg's CMD theory. Further, Snell [44], [48] detected what he termed stage volatility in the responses of managers, i.e., they could be simultaneously governed by arguments at different ethical stages.

In order to survey the ethical reasoning of a larger number of IT professionals, recognizing the power of a scenario-based survey and also appreciating the opportunity to identify if respondents display stage volatility, we devised a scenario-based research instrument that incorporated all six stages in Kohlberg's [25] model. We also included an additional stage zero, operationalized as a behavior that is entirely devoid of ethical reasoning, i.e., an amoral stage. The scenarios are not drawn explicitly from previous instruments. Rather, they are informed by the authors' extensive research experience in IT ethics and so incorporate issues typically faced by IT professionals. The scenarios are deliberately written in a business context: they are not purely technical in focus. Nevertheless, it should be emphasized that this is an exploratory study of the ethical values of IT professionals in Hong Kong. Following the identification of the relevant ethical topics, the first author wrote up a short scenario for each. The second author independently assessed each of the resulting scenarios, questioning their relevance to IT professionals and suggesting new topics not yet covered. The final list of 16 scenarios was then agreed upon.

The instrument incorporates such issues as: the inevitability of bugs in software; how mistakes are handled in professional work; how authority is wielded; relationships with customers; the use of power; trust; motivation; and duty to the IT profession. For each scenario, the first author developed seven possible answers, corresponding to the six stages of Kohlberg's CMD theory and an additional amoral stage. At this stage, frequent reference was made to the descriptions of the six stages in Kohlberg [25] and Snell [44], so as to ensure that the answers would indeed correspond appropriately to the seven stages. Again, the second author verified that each item corresponded to the intended stage. The instrument appears in the Appendix. For each scenario, respondents were asked to rank the responses corresponding to the likelihood with which they would perform the action. The instrument was developed in English and

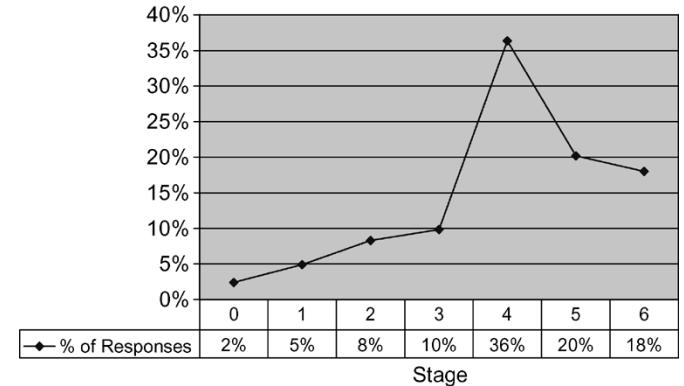


Fig. 1. Summative responses (first choice) by stage.

subsequently translated into Chinese. A professional translator was employed both for the English-Chinese translation, and for the subsequent Chinese-English translation that was used in order to ensure consistency of meaning. Remaining differences between the English and Chinese versions were identified and corrected.

In this initial phase of our research, we used the instrument to survey the community of IT professionals in Hong Kong. This survey may be seen as a complement to previous studies of this population that have examined their motivation [6], skill requirements [10], and reactions to emerging IS practices [32]. In order to identify potential respondents, we contacted major employers in Hong Kong, i.e., organizations known to have large IT departments. These include both public and private sector organizations. Sixteen of these organizations agreed to ask their IT employees to complete the survey, which was enabled on a web site. A contact person in these organizations sent an invitation to relevant employees to complete the survey in their own time and on a strictly voluntary basis. We do not have access to the e-mail distribution lists used (for reasons of data privacy enforced by the participating organizations), but we estimate that approximately 360 employees were invited to participate. A total of 58 valid responses (and zero invalid responses) were received from employees at 16 organizations, a response rate of approximately 16%.

Following the administration of the survey, we conducted two focus discussion groups with different sets of IT professionals. These groups discussed specific ethical issues that the survey analysis identified as being unconventional, i.e., the relationship between an organization and its customers and the inevitability of bugs in software. The pattern of responses on these two topics deviated both from what Kohlberg's [25] theory suggests, and from the pattern of responses on the other topics. This focus group discussion enabled us to collect rich information that helped us understand why the response patterns on these two topics were different and how these differences were manifested.

#### V. FINDINGS

Our overall results support Kohlberg's [25] contention that most adults can reasonably attain stage 4 or above (75%), with 38% reaching stage 5 or 6, and only 25% falling in stages 0–3

TABLE I  
DEMOGRAPHIC STATISTICS

AGE		GENDER		EDUCATION LEVEL		YEARS OF WORKING EXPERIENCE	
Below 30	22	Male	23	Secondary School / High School	3	0 – 5	15
31-50	18	Female	17	Diploma	1	5 – 10	14
Over 51	0	Not specified	18	Bachelor's Degree	24	11 – 20	9
Not specified	18			Master's Degree	10	21+	2
				PhD	0	Not specified	18
				Not specified	20		

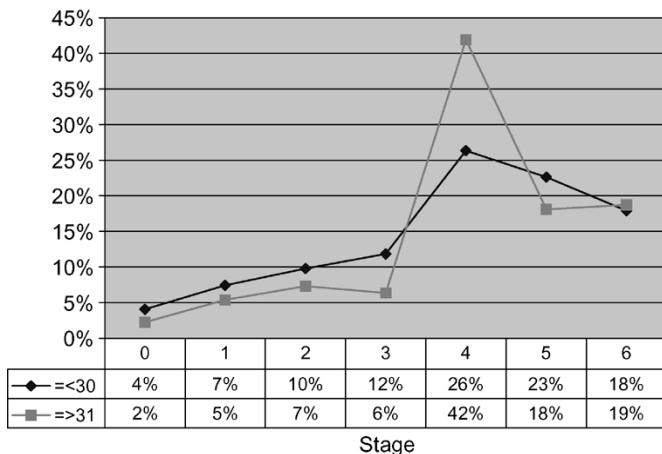


Fig. 2. Impact of age on ethical reasoning.

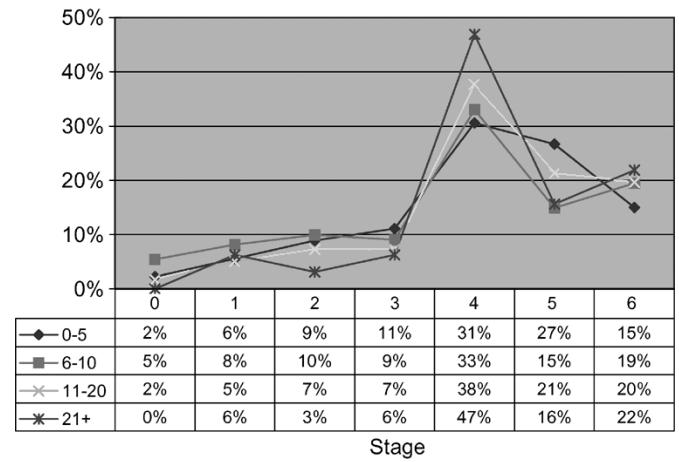


Fig. 3. Impact of years of experience on ethical reasoning.

(see Fig. 1). These results are calculated by examining the response patterns across all sixteen questions and all 58 respondents (a total of 928 possible responses). 7% of responses included only a single item ranked, 8% had two items ranked, 17% had three items ranked, and 48% had all seven items ranked. 5% of responses were blank, i.e., some questions were not answered at all by some respondents. All questions except question 5 were answered by at least 86% of respondents. However, only 75% of respondents answered question 5. This question deals with how subordinates are treated and it is likely that the nonresponses are due to not having subordinates to supervise. The demographic data of the respondents (Table I) indicates a predominantly young population, fairly evenly distributed with respect to gender, that is relatively well educated and has on average less than ten years working experience.

We also found that older (Fig. 2), more experienced (Fig. 3) and more senior (Fig. 4) respondents indicated a preference for higher stages of reasoning than younger, less experienced and more junior respondents. In contrast, gender (Fig. 5) did not significantly distinguish the respondents: 70% of females and 76% of males indicated a preference for stage 4 reasoning or higher.

As Figs. 1–5 indicate, there is a dominant pattern to the responses, with generally low levels of first choice responses for stages 0–3, a peak at stage 4, and a decline through stages 5 and 6. However, for questions 7 and 16, we observe a significantly different pattern of responses—see Fig. 6. In Table II,<sup>1</sup>

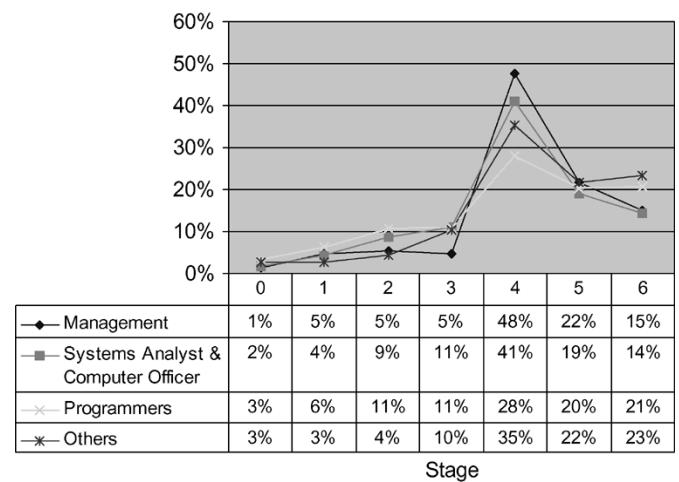


Fig. 4. Impact of job level on ethical reasoning.

we present the entire data set, with the number of first choice responses indicated for each stage on all 16 questions. The most frequently selected stage for each of the 16 scenarios is highlighted in bold face. This analysis indicates that there are six exceptions to the selection of stage 4 as the preferred first choice. On only one scenario (16) is this most preferred stage below stage 4, relating to the inevitability of bugs in software. Nevertheless, it is noticeable that on question 7, a disproportionately large percentage of responses are made for stage 1. Fig. 6 extracts the scores for scenarios 7 and 16 in more detail, comparing them with the baseline average of all 16 scenarios.

<sup>1</sup>Note, not all rows sum to 58 because some respondents did not answer all questions.

TABLE II  
OVERALL RESPONSES (%) BY STAGE

Scenario/Stage	0	1	2	3	4	5	6
1	2%	5%	4%	5%	54%	21%	9%
2	3%	5%	0%	7%	5%	59%	21%
3	3%	2%	3%	3%	61%	5%	22%
4	2%	0%	2%	8%	34%	8%	46%
5	2%	2%	19%	17%	24%	21%	14%
6	2%	0%	0%	2%	60%	18%	18%
7	5%	17%	10%	13%	21%	25%	10%
8	4%	4%	2%	25%	34%	23%	9%
9	3%	12%	3%	13%	45%	15%	8%
10	2%	5%	5%	5%	42%	21%	19%
11	0%	3%	5%	2%	31%	33%	26%
12	5%	3%	5%	20%	13%	20%	33%
13	0%	2%	19%	18%	47%	11%	4%
14	2%	0%	26%	6%	45%	11%	10%
15	0%	2%	6%	3%	42%	21%	26%
16	4%	15%	25%	13%	24%	11%	9%

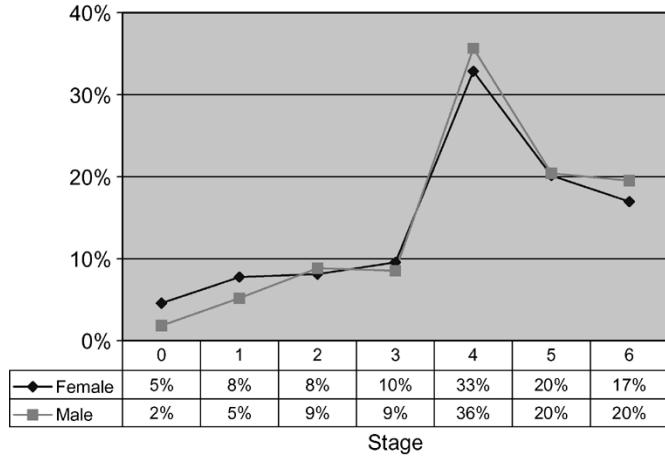


Fig. 5. Impact of gender on ethical reasoning.

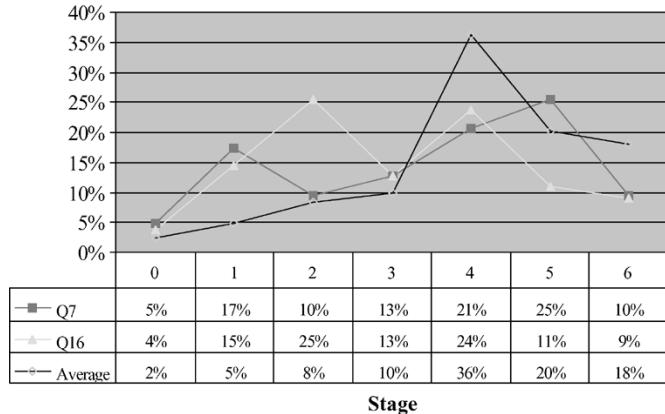


Fig. 6. Responses for first preference on Q7, Q16, and all items.

In order to measure stage volatility, we compared the first preference and second preference of each respondent for each item in the instrument. In the Appendix, the seven possible responses available under each of the 16 scenarios are displayed in the order that respondents saw. The numbers in parentheses indicate the stage corresponding to each response. The choice-shift between the first preference and the second preference indicates to what extent an individual may be influenced by reasoning at

different stages. If the first and second preferences were adjacent, e.g., stage 3 for the first preference and stage 4 (or 2) for the second preference, then the response was considered non-volatile. Otherwise, the response was considered volatile. This definition of volatility was reached as a result of discussions with Snell [49], who agrees that a two-stage gap between the first preference and second preference is sufficient to indicate volatility since, from a theoretical perspective, such a gap is clearly not indicative of a transitional state in one's ethical development. The cumulative data is presented here (see Table III) such that we can see whether the second choice of respondents was higher (positive shift; at least 2 stages higher), lower (negative shift; at least two stages lower) or not volatile (i.e., one stage higher or lower). From Table III, it is clear that positive volatility ranges from 8% to 47% and negative volatility ranges from 6% to 44%, while no volatility ranges from 29% to 87%. All respondents demonstrated some stage volatility (see Fig. 7). Respondents displayed volatility on between four and fifteen questions. The modal value is of ten respondents displaying volatility on 11 questions.

## VI. DISCUSSION AND FUTURE RESEARCH

A consistent pattern of responses, similar to the overall distribution shown in Fig. 1, was observed for 14 of the 16 scenarios. The clustering around stage 4 is consistent with the well-established rule of law in Hong Kong. The strong preference for responses that reflect well-developed moral reasoning (stages 4 and above) on an explicit-rules scenario (scenario 11) reinforces the view that social and professional "rules" strongly influence the behavior of IT professionals in Hong Kong.

According to Tyler [55], individuals are generally more likely to comply with rules when they attribute a higher level of legitimacy to the enforcing agency. This suggests the need for a highly placed ethics officer in an organization, or alternatively for ethics to be central to corporate culture. The strong respect for rules espoused by the Hong Kong Chinese in our study may be related to their general respect for authority, which is evident from their high power distance scores (cf. [21]).

Comparing our results with other professional groups is problematic for a number of reasons. First, as already noted,

TABLE III  
VOLATILITY ANALYSIS ACROSS 16 SCENARIOS

Scenario/Shift	Positive Shift	No Shift	Negative Shift	Number of Responses
1	31%	46%	23%	52
2	8%	87%	6%	52
3	27%	29%	44%	48
4	28%	30%	42%	50
5	34%	49%	17%	41
6	14%	64%	23%	44
7	24%	44%	32%	50
8	30%	45%	25%	44
9	33%	52%	15%	48
10	24%	59%	16%	49
11	20%	56%	24%	50
12	29%	31%	39%	51
13	22%	65%	12%	49
14	47%	35%	18%	49
15	31%	39%	31%	49
16	42%	44%	15%	48

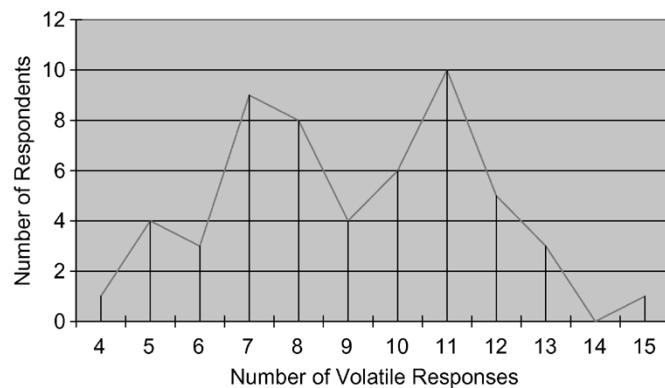


Fig. 7. Volatility levels by respondent.

many studies use student subjects as surrogates for managers, IT people, accountants, etc. Second, studies of managers, accountants, etc., use a variety of measurement techniques, producing results that, while valid, bear little resemblance to those in this study. For example, in a study of Australian and Chinese accountants/auditors [54], the purpose was primarily to compare the relative level of ethical reasoning attained, not the specific level according to Kohlberg's CMD theory. Snell's series of studies on managers in Hong Kong [43]–[48] provides a better basis for comparison, though he primarily works with managers' own dilemma cases, not artificial ones. Nevertheless, Snell [44] found that eight out of ten managers in a phenomenological study exhibited stage volatility, with up to four stages influencing their reasoning. Snell [43] suggests that more personal contexts (e.g., the prospect of financial loss) may result in lower stage ethical reasoning than less personal contexts (e.g., possible environmental damage caused by pollution). In this research, scenario 2 is perhaps the one that comes closest to this form of personal context—how one reacts when one makes a mistake at work—yet the response pattern indicates a much higher level of ethical reasoning (see Table II), with 79% of respondents choosing a stage 5 or 6 argument as their first choice.

#### A. Implications for Practice

Our general finding implies that managers can expect IT professionals in Hong Kong to follow rules that are explicitly artic-

ulated. Businesses and their customers would also have reason to be confident in the quality of both software development processes and the resulting outputs. However, the population of 7.2 million in Hong Kong pales in comparison to the 1.3 billion people residing in the People's Republic of China. Given the implementation of a one country, two systems framework in China upon Hong Kong's change of sovereignty in 1997, we see an important need to examine the ethics of IT professionals in mainland China, where the rule of law is much less well-established. Despite some theorising that guanxi has become a substitute for underdeveloped institutions [cf. [58]], the dynamics of the tension between universal rules and particularistic obligations remain poorly understood. As China assumes an increasingly important role in the global economy and simultaneously becomes increasingly subject to the rules and regulations of the World Trade Organization, there is a growing imperative to improve our understanding of the ethics of its people, including IT professionals, and how those ethics may shape their behavior.

Returning to our Hong Kong study, the responses for two of the scenarios differ markedly from the general pattern (Fig. 6). As a result, scenarios 7 and 16 merit further discussion. Scenario 7 asks about relationships with customers and scenario 16 asks about the inevitability of bugs in software. Responses to both questions indicate that many IT professionals in Hong Kong tend to favor lower stages of ethical reasoning. The attitude that different customers should be treated differently epitomizes a prevailing belief in the Chinese culture (and many other Asian societies) that the members of an in-group should be treated differently (better) than everybody else [15].

Discussions with focus groups of IT professionals in Hong Kong reveal a consensus that longer-term customers become part of one's in-group and, thus, "it is natural to look after their special needs." The differentiated respect for customers may, in a general sense, be considered bad for business. However, the attitude that long-term customers should be treated better than everyone else may be explained in terms of the strong in-group orientation of the Chinese culture. This reflects the prevailing social norms in Hong Kong and, thus, confirms the significant influence of cultural factors on IT-related ethical issues that has been found in other studies [23], [33], [51]. It also suggests that

even with clearly articulated rules that are deeply respected, IT professionals in Hong Kong are likely to give preferential treatment to some of their customers. The general implications of this cultural collectivism have been addressed previously in related contexts, including the use of information systems in the Chinese business culture [34], but this issue certainly warrants further investigation in the context of IT professional activities.

For scenario 16, the stage 4 argument that “the delivery of bug-free software is an essential responsibility of a high-quality software developer” was the first choice for 24% of respondents. However, 40% of respondents selected arguments reflecting stages 1–2 as their first choice: 1) “all software has bugs, which is not a good thing but we cannot do anything about it” and 2) “bug-free software is possible to achieve, but too expensive.” Meanwhile, the argument for stage 5 “all software developers have an ethical obligation to deliver 100% bug-free software” was selected by only 11% of respondents. It is fortunate that only 4% of respondents select stage 0 as their first choice: “all software has bugs and it does not matter.” The responses to this item reflect a defeatist attitude toward bugs across the IT profession. There appears to be little sense that there is any ethical obligation to deliver bug-free software. Such an attitude is likely to result in software that is infested with bugs and, therefore, in negative consequences for the customers who buy software (some of whom are not much respected anyway). The seriousness of this concern should not be underestimated. Certainly, it suggests that there is significant scope for improving the development quality of software and applications in Hong Kong. Such an improvement could be achieved through more extensive or more effective training, more systematic operating procedures and/or the cultivation of a quality culture. Alternatively, we can view the responses to this item as espousing a realistic attitude, with a need for help desks and technical support staff irrespective of how thoroughly software is tested before being turned over to users.<sup>2</sup>

### B. Implications for Research

As a follow-up to this exploratory study, we recommend additional belief-elicitation discussions with IT professionals in Hong Kong. These discussions would provide at least three types of benefits. First, they would enable more detailed investigation of specific unresolved issues, such as the differential treatment of customers and the acceptance of software with bugs. Second, they could be used to get feedback on specific actions that could be taken with the aim of improving the ethics of IT professionals. These actions may include education and training programs to raise awareness of ethical issues and more intensive efforts to socialize young employees into the ethics of the IT profession (cf. [14]). Such programs, if conducted sensitively, are likely to be more effective than the mere development of a code of ethics [16]. In Chinese-dominated societies like Hong Kong, this socialization process is likely to emphasize obligations and duties that promote conformity, collective solidarity, and obedience, while downplaying assertiveness and creativity [33]. It has been suggested that the cultivation of more ethical reasoning can complement the detection of illegal

or undesirable practices to reduce the frequency of unethical behaviors [18]. Finally, belief-elicitation discussions would also be helpful to refine the research instrument in order to reduce its current limitations before sampling IT professionals in mainland China and other places. The use of belief-elicitation discussions could usefully be extended in the direction taken by Snell [44], with the identification and discussion of the dilemmas experienced by IT professionals. In general, the consistent use of one research instrument across many cultures will enable the drawing of comparisons about the relative levels of ethical reasoning attained in those cultures. However, it is expected that given cultural differences, it is likely that while the general precepts of Kohlberg’s theory will be maintained, the specific issues that will be considered important in any one culture may vary considerably.

## VII. LIMITATIONS AND CONCLUSION

### A. Limitations

There are a number of limitations in this study. First, the sample size is relatively small and it is impossible to calculate the exact response rate, though we estimate it to be 16%. Second, the instrument asks respondents not only about their own behavior, but also about the way their organization considers different stakeholders in the environment. The latter type of question is much harder to answer with any degree of certainty. Third, the research instrument used in this study was not designed with specific constructs in mind and, hence, has not been subjected to validity and reliability testing.

### B. Conclusions

Our research is important for several reasons. It upholds the validity of Kohlberg’s [25] contention that the moral reasoning of most adults reaches stage four or above. We have also extended Kohlberg’s fundamental model by identifying a new stage zero—the absence of any kind of ethical reasoning. Our study also supports the stage volatility thesis of Snell [44], with evidence that stage volatility is common among IT professionals in Hong Kong. The existence of considerable stage volatility suggests a need for IT professionals to be informed about the ethical values that an organization seeks to encourage. Stage volatility reflects the degree to which the response on a given issue depends on specific factors. Low volatility suggests that the respondent would apply a consistent set of principles to an issue of a given type. In contrast, high volatility suggests that context-specific factors would be considered in choosing a response.

As an example of high volatility, relationships with customers may be handled very differently based on their status. In some circumstances, financially important or high-status customers may be accorded generous privileges that significantly disadvantage others. This would reflect stage 2 and 3 behavior. In other circumstances, customer treatment may reflect stage 5 or 6 behavior if it is guided by the organization’s preestablished ethical principles, which mandate that every customer is treated equally and impartially. Volatility clearly has significant implications for the way an organization undertakes its business, particularly, if senior management wishes to present a united front

<sup>2</sup>We thank one of the reviewers for proposing this alternative explanation.

to all customers, irrespective of their status. If an analysis similar to that conducted in this paper indicates that many employees within a single company are exhibiting a significant level of volatility in their responses to specific questions, then senior management should clearly be aware of the potential complications that this will cause. This is not simply a matter of employees indicating a low level of ethical reasoning, but rather of being influenced by different levels of reasoning at the same time, suggesting ethical confusion.

Overall, this study indicates that the IT profession in Hong Kong has a level of ethical reasoning that satisfies interpersonal expectations (stage 3) and tends to abide by established laws and rules (stage 4), but our findings suggest that there is room for improvement in terms of conforming to the spirit of social expectations (stage 5) and establishing and upholding more ambitious principles of rights and justice (stage 6).

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#### APPENDIX

##### INSTRUMENT ITEMS INCLUDED IN THE WEB SURVEY

This questionnaire is associated with a funded research project (SRG 7001266) conducted by Dr. Robert Davison, Department of Information Systems, and Dr. Maris Martinsons, Department of Management, City University of Hong Kong. The purpose of the project is to investigate the work values of IT professionals in Hong Kong. By this, we mean the values that shape the actions in which individual IT professionals engage in the course of their normal work.

The questionnaire contains a number of scenarios about life at work. Each scenario begins with a heading, followed by the first few words of a sentence. For each scenario there are seven actions. We would like you to rank the actions so that the first ranked action is the one that most closely corresponds to what happens in your organization. Some of these scenarios refer to what you would do in specific situations. Other scenarios are more general, asking what you think typical employees or colleagues in your department would do. If two or more actions are equally likely to influence or describe what happens your organization, then give them the same score. If you do not understand the meaning of any scenario or action, or if the scenario does not describe any aspect of work with which you are familiar (e.g., for scenario 7, if you do not have subordinates), then please do not rank the action(s) at all—but write/type “Do not understand” or “Not applicable” next to the appropriate scenario or action.

We would like to ask that you rank as many of the actions as you feel are relevant to your work context. At minimum, we hope that you will rank the two actions that you believe are most likely to occur, as well as the one action that you believe is least likely to occur. If you would like to rank all seven, then we will be delighted to see the full picture.

- 1) **HOW INFORMATION IS USED—If you discover some confidential information on the Internet that may damage the organization, you...**
  - a) ask whether shared values and principles have been violated—(5);
  - b) pretend you know nothing about it and avoid getting involved—(1);
  - c) gossip about it with your friends/colleagues—(3);
  - d) use the information for personal advantage—(2);
  - e) initiate discussion about whether the organization has a right to confidentiality—(6);
  - f) report it through proper channels—(4);
  - g) use it however you feel like—(0).
- 2) **HOW MISTAKES ARE HANDLED—When you make a serious mistake in your work, you will...**
  - a) try to pin the blame on a rival or competitor—(2);
  - b) admit it and seek to eliminate harm to your organization—(5);
  - c) subject yourself to formal review procedures—(4);
  - d) report and use the experience as a lesson for others—(6);
  - e) only let your close friends know about it—(3);
  - f) ignore it and keep going—(0);
  - g) 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...**
  - a) actively join in a discussion until everyone else is questioning what the organization ought to be doing—(6);
  - b) say the same thing as your colleagues—(3);
  - c) are frightened to say anything—(1);
  - d) say whatever you feel like at the time—(0);
  - e) say whatever will benefit you most—(2);
  - f) emphasize the organization’s social responsibilities—(5);
  - g) offer your expert advice—(4).
- 4) **HOW DISAGREEMENTS ARE HANDLED—When a disagreement occurs between co-workers, you...**
  - a) discuss the disagreement with your friends—(3);
  - b) remind others of the organization’s social obligations—(5);
  - c) support the side that will offer you the most personal benefits in return—(2);
  - d) are afraid to get involved—(1);
  - e) do whatever you feel like at the time—(0);
  - f) collaborate with one another to work out what is morally right—(6);
  - g) resolve the disagreement by following correct organizational procedures—(4).
- 5) **RESPECT FOR INDIVIDUALITY AND DIGNITY—Do you...**
  - a) ask your subordinates to follow your instructions?—(2);
  - b) support moves to preserve subordinates’ dignity and individuality?—(5);

- c) accept the need for procedures which protect employees' rights?—(4);
- d) constantly strive to enhance subordinates' dignity and individuality?—(6);
- e) treat subordinates like members of the family so long as they fit in?—(3);
- f) force that your subordinates do whatever you want?—(0);
- g) force your subordinates to do something against their wishes?—(1).
- 6) **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);
  - want to make the world a better place—(5);
  - interpret rules and procedures in a professional manner—(4).
- 7) **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 organization—(6);
  - appreciate orderly, professional service—(4).
- 8) **RELATIONSHIPS WITH COMPETITORS—You regard competitors (i.e., those providing similar products or services) as...**
- something to be encouraged, in the best interests of customers—(5);
  - enemies who should be eliminated by any means—(1);
  - partners within the industry—(3);
  - a nuisance, unless they offer employees higher salaries and better career opportunities—(2);
  - responsible members of the community—(6);
  - a vital part of the free enterprise system—(4);
  - irrelevant—(0).
- 9) **THE IMPACT OF THE ORGANISATION ON EMPLOYEES—Through working in this organization, 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).
- 10) **THE USE OF POWER—You use power...**
- to encourage reflection on the organization'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).
- 11) **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 and justifiable rationale—(6).
- 12) **TRUST LEVELS AMONG COLLEAGUES—In your organization you trust...**
- others' integrity and sense of justice—(5);
  - no one—(1);
  - your friends and close colleagues—(3);
  - those who owe you a favor—(2);
  - everyone's carefully considered opinion or concern—(6);
  - specialists and experts—(4);
  - anyone you feel like—(0).
- 13) **WHAT MOTIVATES PEOPLE—In this organization, you are motivated by...**
- the promise of benefits and rewards—(2);
  - concern for the common good—(5);
  - professional responsibility—(4);
  - a need to resolve moral conflicts—(6);
  - the support and acceptance of your colleagues—(3);
  - whatever you feel like at any given time—(0);
  - the need to avoid punishment—(1).
- 14) **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 maximizes your personal benefit—(1);
  - do whatever you like irrespective of other people—(0);
  - do your best, but not worry if your work is imperfect—(2);
  - help to develop new standards for professional work—(5);
  - promote good practice and high standards in your work—(4).

**15) DUTY TO CUSTOMERS—You believe that as an IT professional, you should...**

- a) do what you think the customer wants—(3);
- b) query the customer on specific requirements and ensure that the customer understands the limitations of his/her requirements—(5);
- c) do what the customer wants if it can be achieved easily—(2);
- d) not worry about what the customer wants—(1);
- e) do your job the way you like—(0);
- f) continuously engage the customer in discussions about the functionality and limitations of their product—(6);
- g) clarify what the customer wants and aim to achieve that—(4).

**16) THE INEVITABILITY OF BUGS—As an IT professional, you believe that...**

- a) bug-free software can be produced if everyone tries their very best to achieve it—(3);
- b) bug-free software is possible to achieve, but too expensive—(2);
- c) the delivery of bug-free software is an essential responsibility of a high-quality software developer—(4);
- d) all software developers have an ethical obligation to deliver 100% bug-free software—(5);
- e) all software has bugs and it does not matter—(0);
- f) all software has bugs, which is not a good thing, but we cannot do anything about it—(1);
- g) the existence of bugs in software is a matter for philosophical debate—(6).

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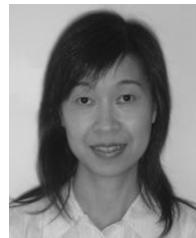
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