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Abstract

This paper examines the effects of environmental factors on the ethical behavior of managers using computers at work in Mainland China. In this study, environmental factors refer to senior management, peer groups, company policies, professional practices, and legal considerations. Ethical behaviors include attitudes to disclosure, protection of privacy, conflict of interest, personal conduct, social responsibility, and integrity. A questionnaire survey was used for data collection, and 125 mainland Chinese managers participated in the study. The results show hat peer groups, professional practices, and legal considerations do influence the ethical behavior of mainland Chinese managers in the areas of social responsibility, integrity, and accountability. A discussion of the implications of the results is also provided in this paper.

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1.0 Introduction

An OECD writer in 2005 gave perhaps the most succinct description of the economic growth of China, stating that "the pace of economic change in China has been extremely rapid since the start of economic reforms just over 25 years ago. Economic growth has averaged 9 1/2 per cent over the past two decades and seems likely to continue at that pace for some time." (OECD, 2005). Recent financial reports published by Chinese officials confirm the fact that China has indeed sustained this economic growth rate in recent years. To sustain such a rate, China has had to replace its competitive advantage that came from having a cheap labor force with one which comes from an information technology that enriches business effectiveness and efficiency (Hartman, 1996; CRI, 2007). It is for this reason that China has now entered the information age (Hartman, 1996) and is gradually moving to an information-age economy (Ford, 2007).

Although information technology (IT) is bringing many benefits to the new Chinese economy, the literature currently reveals that new IT users make many moral judgments, and adopt certain standards and rules of conduct when using IT in decision making (Vitell & Davis, 1990). An important reason for doing this is that using IT to do something that is not illegal does not imply that it is ethical (Goldsborough, 2000).

There is an abundance of ethics literature that has documented managerial behavior toward IT users; this literature is, however, primarily concerned with Western societies or societies highly influenced by Western values. For example, Khazanchi (1994, 1995) examined the effect of gender and educational level on IT ethics, Lund (2000) evaluated the ethical behavior of marketing professionals, Chan *et al.* (1998) revealed managerial attitudes to counterfeit products, and Chow and Choi (2003) examined the ethical standard of IT professionals and recommended areas that should be emphasized in IT ethical training programs. There is little in the way of literature that reveals the ethical behavior of mainland Chinese society when using IT at work. Since China is a member of the WTO and represents one fifth of the world's population, and since it is the region with the fastest economic growth in the 21st century, we felt that literature promoting a scholastic understanding of IT ethics in China should be far more prominent. The main contribution of this paper is to examine the managerial behavior with regard to IT ethics in China. In particular, this paper considers ethical behavior include IT attitudes to disclosure, protection of privacy, conflict of interest, personal conduct, social responsibility, and integrity. The environment factors are referred to senior management, peer group, company policies, professional practices, and legal considerations. Since there is more than one dependent variable in our study, a

canonical analysis method is applied to examine the relationship between these environmental factors and the managerial behavior according to the seven IT attitudes.

In the following sections, a literature review of the seven IT attitudes and the environmental factors is first presented. The study design and measures, and the results are then reported separately.   This is followed by a discussion.

2.0 Literature Review

2.1 IT attributes

Parker (1979), who studied the ethical behavior of a group of IT practitioners, matched his findings against a set of codes of conduct of the Institute for Certification of Computing Professionals, and reported that the following seven ethical issues and attitudes were significant: accountability, conflict of interest, disclosure, integrity, personal conduct, protection of privacy, and social responsibility. Khazanchi (1995) used these seven ethical issues and attitudes, which renamed as ethical dimensions thereafter, as explanatory variables in his paper. He (1994) also worked out full definitions of these seven ethical dimensions, and we briefly defined them in the followings:

- Accountability refers to an obligation on individuals to liable and account for one's actions or decisions.
- Conflict of interest refers to an obligation on individuals not to make decisions based on their personal gain.
- Disclosure refers to an obligation on individuals not to share company resources or information to others
- Integrity refers to an obligation on individuals to enhance a code of especially moral at all times.
- Personal conduct refers to an obligation on individuals not to take advantage of others based on their lack of knowledge or inexperience.
- Protection of privacy refers to an obligation on individuals to protect intellectual private-property of others.
- Social responsibility refers to an obligation on individuals to take interests of others into account

2.2 Environmental factors

By environmental factors, we mean a group of influencing factors, which might be described as office conditions, that directly affect daily decision-making processes in organizations. Generally, these influencing factors include referent group influences such as those of senior management and peer groups, and situated standards such as company policies, professional practices, and legal considerations (Ford & Richard,

1994). In the following paragraphs, we will review five environmental variables that are reported in the literature and that we propose to examine in this paper.

2.2.1 Senior management

The literature reports two different methods of modeling the influence of senior management on ethical behavior. The first method treats senior management as the main component of the model. For example, the studies of both Brenner and Molander (1977) and Baumhart (1961) surveyed readers of the *Harvard Business Review* and ranked the behaviors of supervisors as the most important referent group when establishing personal ethical standards. Posner and Schmidt (1984) showed that the ethical behavior of functional managers is strongly affected by their supervisors' behavior. In a personal computing setting, Watson and Pitt (1993a, b) also revealed in their studies that the beliefs of senior management drive the ethical standards of their peer groups. The results obtained by Alam (1995) further confirmed that senior management's attitudes contribute to personal ethical standards in organizations.

The second method of modeling treats senior management as an influencing factor, and examines the role of the reward system in influencing subordinates' behavior. Chonko and Hunt (1985) reported that an effort by senior management to reprimand unethical behavior would reduce the number of ethical problems in organizations. In an accounting context, Finn *et al.* (1988) replicated the work of Chonko and Hunt, and found that accountants commit fewer unethical acts if senior management discourage unethical behavior in their organizations. In the management information systems (MIS) arena, Vitell and Davis (1990) reported that the ethical standards of MIS professionals improve when senior management outlines rules to reward employees who commit to ethical behaviors in organizations, and punish those who act otherwise. However, Murphy *et al.* (1992) suggested that the leadership has only a minimal level of influence on ethical standards in the motor industry.

2.2.2 Peer groups

Some literature documents that the peer group has a positive and significant influence on ethical behavior. For example, Zey-Ferrell *et al.* (1979) showed that the perception of the behavior of peers influences personal ethical standards more than personal beliefs. That is, when an individual's peer group behaves more ethically, the individual will also behave more ethically, and vice versa. This observation is supported by Izraeli (1988), who claimed that business managers also exhibited the same pattern of behavior. Zey-Ferrell and Ferrell (1982) further reported that the significant level of peer influence on individuals is proportionately related to the amount of contact time they have with their peer group. Eining and Christensen (1991) evaluated the influence of peers in the behavior of software piracy, and revealed that the perception of individuals' behaviors in piracy is dependent on the level to which their associates would agree with their behaviors. In addition, when making comparisons of ethical standards between the respondents, the peer group, and senior management, the findings of Izraeli (1988), Jones and Gautschi (1988), and Kidwell *et al.* (1987) were that the respondents always saw themselves to be more ethical than their peer groups or than senior management.

2.2.3 Company policies

Two separate notions are reported in ethics literature concerning the influence of company policies. The first notion considers that company policy is an influencing

factor with regard to ethical behavior.   In a classroom experiment, Hegarty and Sims (1979) showed that graduate students pay significantly fewer kickbacks when an ethics policy is made available in an organization.   In another kickbacks survey, Worrell *et al.* (1985) also showed that ethical behavior is directly related to the nature of the existing company policies.   They also found that respondents may have paid more kickbacks if a profit-oriented policy was applied in an organization.   The second notion is that company policy has little effect on ethical behavior.   In particular, Hunt *et al.* (1984) showed that the existence of corporate policies on ethics had little effect on ethical problems.

2.2.4   *Professional practices*
The literature reports two different branches of study about the influence of professional practices on ethical behavior.   The first branch compares ethical behavior between professional and non-professional IS practitioners.   Paradice (1990) adopted 12 IS ethical dilemmas to evaluate the ethical levels of MIS major students and to compare them with those of non-MIS major students, and showed that those who were being trained professionally exhibited a higher standard of ethical behavior in using IT at work.   Benham and Wagner (1995) examined the ethical standard of full-time MIS professionals and other undergraduate major students by using 20 IS-based scenarios as measuring tools, and reported that the MIS professionals demonstrated a greater level of sensitivity to IS ethical issues than others did.   The second branch of study compares professional ethics with personal ethics.   Eastman *et al.* (1996) showed that insurance professionals were more ethical in their professional insurance activities than in their personal activities.   It may therefore be concluded that professional practices do play a key part in ethical standards of behavior.

2.2.5   *Legal considerations*
As with professional practices, the literature also reports two different kinds of observation about the influence of legal considerations on ethical behavior.   With regard to software piracy, Simpson *et al.* (1994) invited a group of computer and business students to evaluate the potential influence of legal issues on ethical standards and confirmed that legal considerations are a factor influencing the ethical behaviors of individuals in a positive direction.   However, Eining and Christensen (1991) showed in their study that the aspect of "socio-legal attitudes" within legal issues is not a significant influence on behavior in the software piracy environment.

Table 1 provides a summary of the environmental factors presented in this section.

TABLE 1
Findings of environmental factors in ethics literature

Environmental Factors	Findings in Literature	Sample References
Senior Management	Senior management has a minimal influence.	Murphy *et al.* (1992)
	Senior management influences ethical behaviors.	Alam (1995) Finn *et al.* (1988) Watson Pitt (1993a, b)

Peer group	Peer group influences ethical behaviors.	Eining and Christensen (1991) Izraeli (1988) Zey-Ferrell *et al.* (1979)
Company policies	Company policy is an insignificant factor.	Hunt *et al.* (1984)
	Company policy influences ethical behaviors.	Hegarty and Sims (1979) Worrell *et al.* (1985)
Professional practices	Professionalism influences ethical behaviors.	Eastman *et al.* (1996) Paradice (1990)
Legal considerations	Legal considerations are an insignificant factor.	Eining and Christensen (1991)
	Legal considerations influence ethical behaviors.	Simpson *et al.* (1991)

3.0 Study design and measures

3.1 Measures

Two sets of decision variables are included in our proposed model. The first set is the explanatory variables and the other is the predictor variables. The five environmental variables, reviewed in the earlier literature review section, are treated as predictor variables. The seven ethical attitudes, also referred to in the review of the literature, are treated as explanatory variables. A description of the seven IT scenarios that are used to represent each of the proposed seven ethical attitudes is included as Appendix A at the end of this paper.

3.2 Questionnaire design

The questionnaire designed for this study was composed of two parts. Part 1 consisted of the seven IT scenarios outlined in Appendix A. These scenarios all describe unethical situations.

We asked the respondents to read each scenario and then to answer the following question: "In order to seek new employment, to what degree will you be pursuing the action xxxx described above?" The following example will serve to illustrate what "xxxx" might refer to for the scenario of "disclosure" in Appendix A: *The programmer's act of taking a copy of his programming work and showing it to prospective employers."* We asked the respondents to rate this question on a 7-point Likert scale, where value "1" represented "absolutely unethical" and value "7" represented "absolutely ethical." Using questions of this kind, we collected the views of our respondents on whether they would accept certain ideas as ethical. Overall, seven questions were formulated.

Part 2 consisted of five environmental variables, namely, senior management, colleagues, company policies, professional practices, and legal considerations. We asked the respondents to evaluate the degree to which each of these five environmental variables would have influenced their ethical actions described in Part 1. Each of these five environmental factors was evaluated on a 7-point Likert scale, where value "1" represented "completely uninfluenced" and value "7" represented "highly influenced." A complete questionnaire with the Chinese version was distributed to all the respondents in two executive MBA classes in a university in China. The students were all executives studying in the part-time MBA classes. They were to be treated as working business executives rather than students.

3.3 Sampling

The selected samples were MBA students in a business school within a university in China. There are approximately 900 MBA part-time and full-time students currently registered at this business school. With the part-time MBA program, students have a full-time job and attend classes at weekends or in the evenings. To ensure that both the validity and the data were duplication-free, we selected two part-time MBA classes for data collection, one from Year 1 and the other from Year 2. With the permission of the course instructor, questionnaires were distributed during class time and the students were given about 20 minutes to fill them out. The respondents were asked to return the questionnaires immediately after they had completed them. A total of 125 questionnaires were collected.

The 125 respondents constituted a broad array of undergraduate majors with previous backgrounds including business administration, accounting, computer science, economics, engineering, and chemistry. At the same time as studying, the respondents were working in various industries, including 28 in manufacturing; 25 in computers, Internet, or telecoms; 12 in transportation or logistics; and less than 12 in banking, finance, or insurance, in retailing or wholesaling, and in other industries.

3.4 Data analysis

A multivariate model, which was based on canonical correlation analysis, was used for the data analysis. In the model, the proposed seven ethical issues and attitudes were treated as explanatory variables, and the environmental variables were considered as predictor variables. Prior to the data analysis, we tested our proposed instrument using statistical tests for data reliability, validity, and normality.

4.0 Research Findings

4.1 Demographic data on the respondents

We collected 125 useful replies. The gender distribution was 41 males (i.e., 32.8%) and 83 females (i.e., 66.4%), with one missing item of data. The vast majority of the

respondents (108 respondents, i.e., 86.4%) were in the age group 26 to 35 years old, 13 respondents (10.4%) were in the age group 36 to 45, 3 respondents (2.4%) were in the age group 46 to 55, and the response of the 1 remaining respondent lacked data. The vast majority of our respondents (113, i.e., 90.4%) had no religious beliefs.

In terms of working experience, 89 respondents (i.e., 71.2%) had more than 6 years of managerial experience, 27 respondents (i.e., 21.6%) had 1 to 5 years of managerial experience, 4 respondents (i.e., 3.2%) had less than 1 year of managerial experience, and data were missing for the remaining 5 respondents. Three respondents (i.e., 2.4%) held senior management positions, 38 respondents (i.e., 30.4%) held middle management positions, 79 respondents (i.e., 63.2%) held junior to middle level management positions, and data were missing for the remaining 5 respondents. As for the size of their organizations, 22 respondents (i.e., 17.6%) worked for a company with less than 100 employees, 19 respondents (i.e., 15.2%) worked for a company with between 249 and 499 employees, 14 respondents (i.e., 11.2%) worked for a company with between 500 and 999 employees, 14 respondents (i.e., 11.2%) worked for a company with between 1000 and 2499 employees, 38 respondents (i.e., 30.3%) worked for a company with more than 2500 employees on the payroll, and data were missing for the remaining 18 respondents.

All the respondents had worked with computers for many years. Twenty-two respondents (i.e., 18.4%) had between 3 and 5 years of computer experience, 72 respondents (i.e., 57.6%) had between 6 and 10 years of experience, 15 respondents (i.e., 12.0%) had between 11 and 15 years of experience, and data were missing for the remaining 16 respondents. As for the amount of time spent working with computers, 60 respondents (i.e., 48.0%) used computers at least 8 hours a day at work, 39 respondents (i.e., 31.2%) used computers for 4 to 8 hours a day at work, 13 respondents used computers for less than 3 hours a day at work, and data were missing for the remaining 13 respondents.

4.2 Validity tests

The first test was a descriptive statistical test of correlation between the explanatory and predictor variables. Table 2 shows the statistical data. It can be seen that the proposed seven ethical issues and attitudes are mainly significantly intercorrelated, with the highest correlation being between disclosure and protection of privacy ($r = 0.51$, $p < 0.05$). It can also be seen that the environmental variables are also mainly significantly intercorrelated at $p < 0.05$, with the highest correlation being between legal considerations and professional practices ($r = 0.71$). We can thus conclude that all the proposed predictor and explanatory variables are validated and applicable to the development of a canonical model (Hair *et al.*, 1995).

Next, we carried out a test to verify the multivariate normality of the data. Data normality is an essential test of the assumptions of applying multivariate analysis. To test the normality of the data, we performed a statistical test of skewness as suggested by Hair *et al.* (1995). The scores of skewness statistics for our predictor and explanatory variables ranged from -0.1725 to 0.3849 and -0.4274 to 0.0515, respectively. Their critical values ranged from -0.7874 to 1.757 and -1.951 to 0.2355.

None of these critical values exceeded a critical value of ± 1.96. We thus conclude that our data passed the data normality test.

4.3 Modeling

The objective of canonical correlation analysis is to determine a linear combination relationship between the explanatory and the predictor variables such that their correlations are subjected to maximization. There are two basic steps involved in the development of a model (Levine, 1977): (a) determining a set of canonical functions that is significant at $p < 0.05$, and (b) determining its associative variables that explain the canonical functions. The results of these two steps are reviewed below.

Table 3 shows the canonical functions of this study. These canonical functions capture all the correlations between the explanatory and predictor variables. One canonical function, namely Function 1, was reported as significant at $p < 0.05$. Our findings are therefore based on this function.

4.4 Model solutions

The canonical loadings in Table 4 can be interpreted as showing that the higher value of a variable loading represents the higher explanatory power in the proposed model. Green (1978) suggested a more structured method of selecting significant variables for the interpretation of results, and states that we should only select and concentrate on those variables with loadings above ±0.40. Here in this paper, we follow this guideline in analyzing the results. Accordingly, the significant variables for this study are denoted as "*" in Table 4.

In Function 1, the rank orders of a linear combination of significant explanatory variables are: social responsibility (Rank 1), accountability (Rank 2), and integrity (Rank 3). Factors of disclosure, protection of privacy, conflict of interest, and personal conduct are not reported as a significant explanatory variable in this study. The rank orders of a linear combination of significant predictor variables are: peer group (Rank 1), professional practices (Rank 2), and legal considerations (Rank 3). Environmental variables such as senior management and company policies are not reported as significant predictor variables in this study.

Table 3: Results of Canonical Correlations

Root number	Eigenvalue	Wilks' lambda	F	d.f.	Canonical correlation	Significance of F-test
1	0.400	0.492	1.891	35	0.535	0.02
2	0.262	0.688	1.418	24	0.456	0.09
3	0.069	0.068	0.837	15	0.254	0.63
4	0.049	0.928	0.826	8	0.216	0.58
5	0.026	0.974	0.775	8	0.160	0.51

Table 4 shows the canonical loadings of the function 1. The redundancy index is reported as 0.121. The model solution is further elaborated below.

Table 4: Results of Canonical Analysis (N=125)

Variables	Canonical loadings
	Function 1
Explanatory Variables	
Disclosure	0.314
Protection of privacy	-0.052
Conflict of interest	-0.001
Personal conduct	0.303
Social responsibility	0.609*
Integrity	0.513*
Accountability	0.536*
Redundancy index	*0.066*
Predictor Variables	
Senior management	0.245
Peer group	0.734*
Company policies	0.126
Professional practices	-0.562*
Legal considerations	-0.479*
Redundancy index	*0.046*
Canonical Correlation Coefficient R	*0.535*
Canonical R^2	*0.286*

*Loadings above ±0.40

Table 2: Descriptive Statistics and Pairwise Correlations[a] of Study Variables (N=125)

Variables	Mean	1	2	3	4	5	6	7	8	9	10	11
Disclosure [b]	2.41	-										
Protection of privacy [b]	3.85	0.36	-									
Conflict of interest [b]	3.70	0.14	0.04	-								
Personal conduct [b]	4.70	0.24	0.43	0.19	-							
Social responsibility [b]	2.80	0.40	0.12	0.21	-0.03	-						
Integrity [b]	1.95	0.51	0.23	0.15	0.12	0.44	-					
Accountability [b]	4.97	0.31	0.16	0.29	0.16	0.13	0.09	-				
Senior management [c]	4.44	0.02	0.21	-0.09	0.15	-0.03	-0.03	0.24	-			
Peer group [c]	3.43	0.08	0.12	0.00	0.23	0.23	0.19	0.22	0.51	-		
Company policies [c]	4.24	0.07	0.33	-0.18	0.03	0.00	0.06	0.18	0.54	0.31	-	
Professional practices [c]	5.28	-0.14	0.18	-0.03	0.05	-0.19	-0.15	-0.17	0.23	0.17	0.23	-
Legal considerations [c]	5.54	-0.10	0.22	0.06	0.04	-0.10	-0.13	0.09	0.21	0.12	0.23	0.71

[a] Correlation coefficients of $\pm.15$ or above are significant at $p < .05$ (2-tailed).

[b] Variables measured on a 7-point Likert scale; the highest score, 7, indicates a high degree of unethical practice of respective explanatory variables.

[c] Variables measured on a 7-point Likert scale; the highest score, 7, indicates a high degree of influence of respective predictor variables

The first canonical function suggests that the linear combination of environmental variables of professional practices and legal considerations is negatively and significantly correlated with the linear combination of explanatory variables of social responsibility, integrity, and accountability. In addition, peer group is significantly and positively correlated with the above significant linear combination of explanatory variables.

5.0 Discussion

The values of canonical correlation coefficients R and R^2 in Table 4 represent the goodness of fit of the data set for this study. A minimal acceptable value for R^2 should not be less than 0.1 (Thorndike, 1978). Both Functions 1 and 2 reported strong R^2 values, namely 0.286 and 0.208, and thus they are used in our discussion here.

Although our results reveal two significant functions that can be used to explain the managerial behavior when using IT at work in China, the canonical model rule states that Function 1 provides a higher explanatory power than Function 2.

Function 1 shows that all the significant linear combinations of the explanatory variables have positive values. Since the original questions relating to these variables were designed in the form of an unethical situation, these positive values reveal that our respondents have low IT ethical standards in social responsibility, integrity, and accountability. Our results show that the significant linear combinations of predictor variables are peer group (with canonical loadings = 0.734), professional practices (with canonical loadings = 0.562) and legal considerations (with canonical loadings = -0.479). A positive significant canonical loading in this study shows that its corresponding predictor variable is highly influenced by the set of significant explanatory variables revealed in the findings, and the reverse is true for the negative significant canonical loadings. Our results for Function 1 reveal that there are three IT attributes contributing to the unethical actions of mainland Chinese managers toward using IT for decision making, namely social responsibility, integrity, and accountability. The carrying out of these unethical actions is regulated neither by professional practices nor by legal considerations, but is directly dominated by the influence of peer groups such as the colleagues of the managers. This result implies that the present mainland Chinese managers consider that the ethical behavior of society is dictated by the norms and standards of their peer groups rather than by professional practices or legal considerations. The reasons for this may be related to the fact that the business legislation is yet to be fully established in China (Luo, 2007), and that the mainland's professionals are still not required to be certified by any professional societies in China which have an international reputation (ISC, 2002).

6.0 Conclusion

The purpose of this study was to examine the effects of environmental factors on managerial behavior in respect of IT ethical practices in Mainland China. In achieving this objective, we based our results on the findings of a questionnaire survey among the mainland managers who had enrolled in a part-time executive MBA program in China.

A total of 125 questionnaires were collected and the canonical analysis method was used for the data analysis.

The main result can be summarized from this study. The peer group, professional practices, and legal considerations had significant influences on the ethical behavior of Chinese managers in the areas of social responsibility, integrity, and accountability. This result implies that the present mainland Chinese managers consider the ethical behavior of society to be dictated by the norms and standards of their peer group rather than by professional practices or legal considerations. This peer group effect could result from the unique relationship element within mainland Chinese culture. When Hooker explained why China is so different from the West, he said, "The West is rule-based and China is relationship-based. This difference permeates every aspect of life and can be frustrating and demoralizing for a visitor who does not understand its origins" (Hooker, 2003). *He* ("和") and *guanxi*, translated as "harmony" and "relation" respectively, are two of the most famous Chinese words for relationship. In fear of "chaos," a Chinese regards keeping a constant social order as a kind of group complex (Yang, 2004). As a result, mainland Chinese tend to pursue harmony for the sake of harmony itself—this is the ethics of conflict avoidance. A person who destroys the harmonious relationship is considered unethical, no matter whether the action is justifiable or not. On the other hand, as far as *guanxi* is concerned, mainland Chinese may show collectivist inclination within a group but show egoism to strangers with whom no *guanxi* has been established. Therefore, based on the relationship culture, we believe that decreasing unethical behavior in the computer business should be the first goal of training in IT ethics, and that this could be one way to achieve a higher ethical standard (Khazanchi, 1994). The second goal should involve requiring attendance at academic or training programs that would help Chinese managers to think and act more independently so that they could be held to be accountable for the degree of ethicality of their actions when using IT at work (Chow & Choi, 2003). Furthermore, companies should think about establishing company values, company culture, and a company atmosphere that follow on from the business ethics adopted.

A mainland Chinese scholar has pointed out that the study of business ethics in China is in its early stages and that there is still a lot of work for both the Chinese academic community and for enterprises to do (Gao, 2002). According to existing research and to the conclusions of our study, strong human intervention is prevalent in China today with regard to ethical practices when using computers at work, and therefore some unethical behaviors seem to be unavoidable. In order to rectify this deficiency and to reinforce ethical practices in China, training in IT ethics, both in the form of academic courses and training programs, as well as company value building and leadership are suggested.

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Appendix A: Seven IT Scenarios extracted from Khazanchi (1994).

Disclosure: A computer programmer was seeking new employment, unknown to his current employer.   At times when he was unobserved, he made copies of the listings and documentation of programs he had written for his employer, and he used these examples of his work.

In one case, where he knew there would be no direct harm done, he gave the examples as part of his resume to a prospective employer.   However, he also showed them to another prospective employer, who gained from them significant knowledge, which gave him a competitive advantage over the programmer's employer.

Protection of privacy: A commercial time-sharing service offered use of a program at a premium charge, the program to be used only in the service company's computer.   A user obtained a copy of the program accidentally, when the service company inadvertently revealed it to him in discussions through the system (terminal to terminal) concerning a possible program bug.   All copies of the program outside of the computer system were marked as trade secret, proprietary to the service, but the copy the customer obtained from the computer was not.   He used the copy of the program after he obtained it, without paying the usage fee to the service.

Conflict of interest: Company A invited a consultant to submit a proposal to develop a computer program based on explicit program specifications. The consultant is currently programming the same application for Company B, based on far superior specifications that will give it a significant competitive advantage over Company A. The consultant submits a proposal to Company A without mentioning that the specifications are already inferior to the competing product.

Personal conduct: A university student used the campus computer service as an authorized user. The service director announced that students would receive public recognition if they successfully compromised the computer system from their terminals. Students were urged to report the weakness they found.   This created an atmosphere of casual game playing and one-upmanship in attacking the system.

The student found a means of compromising the system and reported it to the director.   However, nothing was done to correct the vulnerability and the student continued to use his advantage to obtain more computer time than he was otherwise allowed. He used the time to play games and continue his attacks to find more vulnerabilities.

Social responsibility: At a time when experts are beginning to question the merits of current agricultural practices, a researcher used computer-modelling techniques to predict that a global agricultural disaster would occur in fifty years.   To stimulate public concern and debate about agricultural practices, he published his prediction in a low-priced, mass-market paperback.   The book emphasized the role of the computer in making this prediction, for example, by including computer-generated graphs and illustrations.   But the book did not discuss the fact that the prediction depended on debatable assumptions and selection of data, and could be radically different, with a slight change of assumptions.   Being unaware of these facts, the general public accepted the dramatic predictions as indisputable and objective, in significant part because it came from a computer, and the public became deeply concerned with agricultural practices.

Integrity: A professor of computer science at a university developed a new computer programming language for a range of computer applications.   Two of his graduate students tested the language for consistency and completeness. They discovered and corrected several significant shortcomings and added several new features.   A programmer on the staff of the university's computer center

programmed the compiler for the language. He discovered flaws in the syntax and corrected them, with the permission of the professor. He also found ways to change the language that improved the compiler performance. The graduate students and programmer documented the language and the compiler, and they wrote a user's manual.

The professor compiled the writings into a scientific paper and published it under his own name alone, with no acknowledgement of the contributions of the graduate students or the programmer.

Accountability: A computer operations manager has responsibilities that include data preparation and entry, computer operation, computer security, report generation and distribution. The top executive officers of the company are engaged in a massive fraud against the stockholders and other investors by inflating company assets. Significant evidence of the fraud is contained in the data files stored and processed by the computer, and computer programs have been developed to assist in the perpetration of the fraud.

The computer operations manager becomes aware of the company's problems and unorthodox methods being used to solve them. He avoids being confronted with information or activities that might make him aware of possible wrongdoing.

The fraud is ultimately discovered and the perpetrators prosecuted. The prosecutor requires the operations manager to make a deposition. He states that he was ordered to perform unorthodox and unexplained acts, such as leaving large numbers of products shipment address or making them all the same in the data entry function. He claims he was not, nor would he be expected to be, aware of the purposes of the acts. He states that he was a neutral service function, not requiring any knowledge of the company's business. He was not prosecuted.