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The Year 2000 Problem: An Ethical View

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Abstract

After years of avoidance, many organizations are struggling to make their computer systems year 2000 compliant. There is little question that meeting the year 2000 challenge is important from a business perspective since the survival of organizations may depend on it. However, a second, more neglected concern is whether system developers and their organizations have an ethical obligation to address the year 2000 problem. This paper examines three codes of ethics for information systems professionals to draw conclusions about this issue.

Introduction

The year 2000 problem results from the use of two digit year fields in computer systems instead of four. Historically, this approach has worked since it could be rightfully assumed that the initial two digits for years were "19." However, it fails at the dawn of the next century when these digits change to "20." If systems are not corrected to become year 2000 compliant, many significant problems could result. For example, a bank program could calculate the time period for a 30 year mortgage begun in 1996 to be in negative years based on the subtraction 26-96.

Beyond financial losses, the year 2000 issue raises a threat to public safety, since computer programs that utilize dates also control nuclear power plants, water and sewer plants, chemical factories, petroleum pipelines, and weapon systems (Scheier et al. 1996/1997). Any computer system that makes use of dates is potentially at risk, and that is most of them.

The cost and scope of correcting this problem is staggering. Most large organizations have millions of lines of program code affected. For example, at Consolidated Edison, the year 2000 problem is estimated to impact 24 million lines of code (Vijayan 1997). The State of Ohio puts the price tag of its year 2000 conversion efforts at \$60 million (May 1996). In total, the Gartner Group estimates that organizations worldwide will spend

between \$300 and \$600 billion on the year 2000 problem. Capers Jones (1996) estimates that the global costs could exceed \$1.5 trillion.

Given the vast effort required for a year 2000 conversion and the disappointing progress made by many organizations to date on this issue, some experts have predicted disastrous consequences. Peter de Jager (1996), a year 2000 consultant, forecasts that shortly after January 1, 2000 a major company will go out of business based on financial losses resulting from a year-2000-related failure in a mission-critical system. A survey conducted by the Society of Information Management (SIM) Year 2000 Working Group in Summer 1996 revealed that organizations' responses to the year 2000 issue have been uneven at best. The SIM Working Group concluded that that about one-third of enterprises are making reasonable progress in their year 2000 efforts, one-third are running behind but will eventually catch up, and the remaining third are "simply headed for disaster" (Kappelman et al. 1996). Not surprisingly, business disaster insurance for the year 2000 issue is now available (Hoffman 1997).

The year 2000 issue clearly presents an important business challenge since the very survival of organizations may depend on it. However, a second, more neglected concern that is raised in this paper is: do businesses (and, specifically, IS professionals) have an *ethical* obligation to respond to the year 2000 issue? That is, is the year 2000 matter also an ethical issue? To consider whether computing professionals have an ethical obligation to respond to the year 2000 issue, this paper examines three codes of ethics for information systems (IS) professionals to determine whether any of their provisions appear to be applicable.

ACM Code of Ethics

The Association of Computing Machinery (ACM) Code of Ethics, adopted in 1992, is a fairly detailed code that stipulates "general moral imperatives" and "specific professional responsibilities" for computing professionals in confronting ethical dilemmas in the workplace. While it should be recognized that general codes of conduct such as this are subject to different interpretations by different people who have good intentions, at least several provisions of the ACM code suggest that systems developers may have an ethical obligation to act on the year 2000 problem.

General Moral Imperative 1.1, Contribute to society and human well-being: "An essential aim of computing professionals is to minimize negative consequences of computing systems, including threats to health and safety."

General Moral Imperative 1.2, Avoid harm to others: "The computing professional has the additional responsibility to report any signs of system dangers that might result in serious personal or social damage. If one's superiors do not act to curtail or mitigate such dangers, it may be necessary to 'blow the whistle' to help correct the problem or reduce the risk."

Specific Professional Responsibility 2.1, Strive to achieve the highest quality, effectiveness and dignity in both the process and product of professional work: "The computing professional must strive to achieve quality and to be cognizant of the serious negative consequences that may result from poor quality in a system."

Specific Professional Responsibility 2.5, Give comprehensive and thorough evaluations of computer systems and their impacts, including analysis of possible risks: "Computer professionals are in a position of special trust, and therefore have a special responsibility to provide objective, credible evaluations to employers, clients, users, and the public... As noted in principle 1.2 on avoiding harm, any signs of danger from systems must be reported to those who have opportunity and/or responsibility to resolve them."

AITP Codes of Ethics

The Code of Ethics of the Association of Information Technology Professionals (AITP), formerly the Data Processors Management Association (DPMA), stipulates various obligations that information technology professionals have to their fellow members and their profession, their employer and its management, their community, and society in general. Among these responsibilities are an obligation to management "not to misrepresent or withhold information concerning the capabilities of equipment, software, or systems" and an obligation to "protect the proper interests of my employer at all times".

ASM Code of Ethics

The Association of Systems Management (ASM) Code of Ethics is a succinct code that identifies ten responsibilities of its members. Included in this code is the responsibility "to maintain and improve sound business practices and foster high standards of professional conduct."

Ethical Implications

As indicated in the ACM code, malfunctioning computer systems have the potential to cause significant harm to organizations and their constituents. In business enterprises, the lack of a timely response to the year 2000 problem can lead to significant financial losses or even business failure. Inaction compromises systems' quality, and it can result in serious harm to stockholders, employees, customers, trading partners, the general public, or other parties. In governmental organizations, the year 2000 problem can lead to losses to taxpayers and hardship to citizens. Even more dangerous are the year 2000 impacts that could occur in systems that control nuclear power plants, utilities, factories, and weapon systems which may lead to serious injuries or the loss of human life as well as environmental damage.

Thus, a key question is: who in organizations is responsible for acting on the year 2000 issue -- top management or IS professionals? The answer is both. According to agency theory, which recognizes that the owners and managers of a business are often separate

and distinct parties, top management has a fiduciary responsibility to exercise reasonable care and diligence in managing the business and safeguarding assets (Sawyer 1988). Since the year 2000 problem threatens the viability of organizations, top management, as the agents of owners, has a duty to provide adequate resources for year-2000-conversion efforts and to ensure that they are accomplished in a timely, effective manner.

An analysis of the professional codes reveals that IS professionals also have an ethical duty to act on the year 2000 problem. These codes, considered together, point out that IS professionals have a duty to: avoid doing harm to others, strive for high quality systems, thoroughly evaluate the impacts and risks of systems, look out for the business interests of their employer, maintain sound business practices, and communicate any significant systems' risks to management. These duties all suggest a need for IS professionals to address the year 2000 problem. Perhaps most importantly, since IS professionals are technical experts in positions "of special trust," they need to make a concerted effort to educate management about year 2000 risks and create a sense of urgency to act on this issue. Without adequate resources, a year 2000 conversion effort will fail. If top management refuses to take appropriate action, despite the best efforts of IS management, the ACM code even suggests that some "whistle blowing" might even be in order; however, the specific responsibilities of IS professionals in this regard are uncertain and controversial.

Conclusions

There are many ways to view a complex reality such as the year 2000 problem. In the literature to date, this issue has been seen largely as a business problem. However, this paper presents evidence from three professional codes of ethics to indicate that IS professionals have an ethical obligation to address the year 2000 issue. The sad reality is that too many organizations are still running behind on their year 2000 conversion efforts. The arguments presented here serve as an important "call to action" for those organizations. They also suggest a possibility of legal liability for year 2000 inaction since ethically questionable actions are also sometimes illegal.

Finally, the ethical analysis raised here has value from a pedagogical perspective. It can serve as a springboard for discussion about the ethical obligations of IS professionals with respect to developing and maintaining systems. The year 2000 problem is a high-profile issue that virtually all companies are facing. While students may know something about it, they probably have not considered it in ethical terms. Consequently, students could be given an assignment to consult one or more computing codes of conduct (similar to what was done in this paper) to determine which, if any, of their provisions apply to addressing the year 2000 issue. In addition, since organizational responses to this issue have been uneven, students could be asked to explore what factors are responsible for why some enterprises are so much further ahead than others on this issue. This could be accomplished through applying one or more popular models of ethical decision making (Jones 1991; Bommer et al. 1987) to organizational responses to the year 2000 issue. A few of the factors that have inhibited an effective year 2000 response, for example, have been organizational culture, supervisory pressures, other systems development projects

and priorities, and the lack of enforcement power of professional codes of conduct (Cappel and Kappelman 1997). Thus, the exploration of the year 2000 issue through an ethical lens can serve as an important "event study" of information systems ethics.

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