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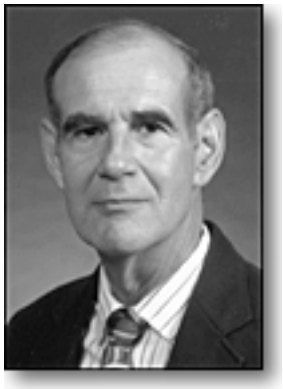

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Introduction

The task of preparing for the Year 2000 (Y2K) computer transition is potentially one of the biggest non-product related problems facing many businesses and organizations. Many manufacturing firms, financial institutions, accounting firms, airline reservation systems, and other service industries are scrambling to meet the looming deadline of January 1, 2000. If the changes are not made on time and bug free, software codes that include dates for payrolls, shipments to customers, orders from suppliers, insurance policies, and other financial and non-financial instruments may collapse with the change from year 1999 to 2000.

What is the Problem?

As most everyone knows by now, most computers are not currently equipped to properly process date information as of January 1, 2000. The problem is mainly caused from 1960s and 1970s era programming code when programmers were first writing code for mainframe computers that kept the business world on course. Since computer resources were scarce and expensive, programmers used two-digit date codes rather than four-digit codes to identify years in data fields. For example, "98" was used to mean "1998." Unfortunately, two-digit date codes are still used in countless computers around the world, and when the transition is made from "99" to "00," the computers may read the latter year as 1900 rather than 2000. As a result, programs which use date sensitive information to perform calculations or other procedures will generate errors with every computation involving a date beyond the year 1999, or the program may simply fail (Hammond, 1998). Additionally, errors caused by the "bogus" date could cause a diminution in decision support data quality and result in unsound business decisions and substantial business disruption (Bylinsky, 1998).

The transition will involve a significant amount of human, technical, and financial resources for firms in every size and industrial category. However, small firms may be especially vulnerable to Year 2000 problems in that they may not have adequate staff and/or financial resources to implement a rigorous plan for proper conversion, or may not foresee the impact that disruptions may have. Some observers have suggested the manufacturing sector will have more difficulty in resolving Year 2000 issues than other sectors. One reason for this is that some manufacturing companies were slow in beginning the renovation process. Plus, the renovation process may be slower because a more widespread and complex effort will be required for them to fully remedy their Y2K problems. Manufacturers use millions of computerized devices such as measuring instruments, computerized valves, and machine tools—sometimes very aged ones—whose software is tainted with the so-called "Millennium Bug". For many of them, sifting through countless source codes to find unreliable routines will be an expensive, slow, and dilatory process ("Y2K costs...," 1998).

If businesses have not already undertaken remediation, they should begin immediately to implement a strategic plan for dealing with the millennium conversion. In-house programming errors or mistakes by third-party business partners will likely result in increased administration and information technology costs, system outages, and significant property losses to many companies. They may also spark customer and shareholder lawsuits due to failed products, curtailed operations, or poor profit performance (Wolters, 1998).

Older mainframe business applications programmed with the common business-oriented language (COBOL) will likely present the biggest challenge for businesses. However, the potential

is also great for Year 2000 problems in state-of-the-art client server systems as well as embedded computer chips that are found in almost all modern devices and equipment such as pagers, elevators, and automobiles. Even if a computer package is Year 2000 compliant, it may be adversely affected by the legacy data extracted from the mainframe if the older source code is not repaired (Roberts, 1998).

Why Are Companies Procrastinating?

Some analysts and risk managers who sense the immediacy and foresee the significance of the Year 2000 problem have labeled the year 2000 as the "Year of the Lawsuit." Firms without a Year 2000 strategic plan may find themselves exposed to lost profits from business interruptions, increased costs of inadequate computer conversions at a later date, and third-party liability claims. As noted later, general liability and property insurance policies may not cover these exposures. Typically, insurance carriers insist that their disaster recovery and liability insurance policies only cover fortuitous events rather than foreseeable and expected ones such as the millennium transition.

While Chief Information Officers are aware of the impact of the conversion dilemma, many Chief Executive Officers are not taking it seriously, or at least have not been motivated sufficiently to devote adequate resources to this "nonproductive endeavor." A recent study showed that among companies with fewer than 100 employees, 84 percent have done virtually nothing to ensure that their systems are Year 2000 compliant ("It's 1998...," 1998). Another study showed that among the nation's 250 largest companies, most with networked or mainframe computing environments, 58 percent had not completed an assessment of the dimensions of their Year 2000 problems; only 36 percent had begun converting their systems; and a mere six percent were far enough along in the process to begin the testing phase ("Study: 2000 work lags," 1998).

A disturbingly large amount of work remains to be done in many companies. Some alarmists say that as many as 20 percent of all businesses may be forced to shut down because of failure to modify their computer software to cope with the impending date change. (Trembly, 1998). These businesses may not have enough trained people, and given this late starting date, not enough time to verify millions of lines of source and object code, identify the problems, remedy them, and test them before January 1, 2000 (Bordwin, 1998).

One reason that companies have not moved faster in the conversion process is the size of the financial burden involved (Gomes, 1998). The cost for hardware replacements and other conversion expenses is staggering. Lloyd's of London has estimated the cost of eradicating the Millennium Bug from the global economy at $1 trillion (Bylinsky, 1998). Others say the bill could be pushed as high as $1.3 trillion, which amounts to about 16 percent of the 1997 U.S. GNP ("Y2K costs...," 1998). Corporate profits could suffer over a several year period.

Conversion costs for individual companies vary by size of firm, type of operation, and types of hardware and software used. However, several large companies are spending hundreds of millions of dollars for assessment, remediation, and testing. General Motors, the largest manufacturing company in the world, is expected to spend up to $500 million dollars analyzing billions of computerized instructions regarding dates, and then rewriting them to accept 2000 as a year designation (Simison, 1998). Companies in the telecommunications, utilities, and health-care industries are also making big outlays. Of course, smaller companies with less complex operations and with lesser amounts of date sensitive information will spend less, but they too face possible disruptions in their performance and productivity and their remediation tab may be as great on a proportionate basis.

Estimates of the impact of the Year 2000 bug indicate this may be the single biggest business crisis faced in the lifetime of the current working generation. Standard and Poor's estimates that in 1999, Y2K costs will slow U.S. economic growth by 0.3%, and that in 2000 and early 2001 growth will slow by 0.5% (Mandel, 1998). The impact on individual firms is also significant although there have been discrepancies in estimates for individual firms within an industry. For example, projected expenses in the air transportation industry range from $12 million for Continental Airlines to $160 million for American Airlines (Barr, 1998). This range could be due to actual cost differences, underestimating or overestimating costs, or inconsistencies in the reporting of certain ongoing costs. A recent study showed that 85 percent of companies that had begun repair had underestimated their Year 2000 costs ("Y2K costs...," 1998).

Obviously, firms of almost every size who have not readied their computers for the millennium are urged to do so. The longer a company waits to undertake the initiative, the worse the situation will get. Even if a company plans to out source the conversion to a Year 2000 service provider, there may be problems due to a technician shortage. Estimates of the nationwide programmer shortage range from 190,000 to 340,000 (Roberts, 1998), and the gap between the number available and the number needed is widening due to the rising surge in

Y2K Resources on the Web

The Information Technology Association of America offers an extensive Web site for helping companies make their systems Y2K compliant.

Certified software and hardware vendors
www.itaa.org/2000cert.htm.

Success stories
www.itaa.org/success.htm.

Legal resources
www.itaa.org/Y2Klegal.htm.

Conversion service providers
www.itaa.org/script/2000vend.cfm.

Publications
www.itaa.org/public/htm.

Congressional hearings
www.itaa.org/congress.htm.

demand for their services. Programmers are commanding handsome salaries, sometimes as much as $75,000 to $100,000 per year, as well as sign-on bonuses and perks (Roberts, 1998). One reason for the acute shortage of technicians is that many programs were built with computer languages that are now obsolete, and few programmers possess the required knowledge to work with them. Hence, it will become increasingly more costly and more time consuming to solve problems as we edge closer to the Year 2000.

Collateral Negative Impact

Let's suppose that the conversion process for your company is finished, tested, and debugged before January 1, 2000. Your manufacturing and delivery processes and accounting systems function perfectly. Orders can be placed, acknowledgments received, payrolls met, and bills paid. Do you have reasonable assurance that a millennium mess can be avoided? You may not, since anything with an embedded computer chip or microprocessor may cease to function on January 1, 2000 because it does not recognize the new date (Samuelson, 1998). This includes electricity, phones, fax machines, pagers, elevators, maintenance systems, climate control systems, microwaves, coffee makers, cars in the motor pool, and smart cards used in building security.

Further, you should remember that your software programs may be interlinked with those of other companies such as your customers, suppliers, vendors, distributors, and other companies that conduct business with you through electronic interchange. If your third-party business partners have not corrected their computer glitches, then you are not immune from massive disruption. The supply chain for most large companies is so streamlined that it is highly sensitive to any disruption. Therefore, the links between connected software programs (such as just-in-time parts delivery systems) must be verified to ensure that a business partner's program does not corrupt a program that you have already revamped. Hence a critical part of being compliant is to be sure that all those with whom you do business are also compliant (Corrigan, 1998).

The areas of potential negative impact due to noncompliant business partners or to disruption of governmental or business-provided services are pervasive, innumerable, and in some cases outside the control of the firm. Here are some examples:

(I) Even if your autos function, which they may not if embedded computer chips in them are not corrected, it may be dangerous to drive them on the road because traffic lights don't work.

(II) Airline flight operations may be disrupted, because airlines are part of a complex web of interlocking computers, such as air-traffic control and radar systems; a weak link anywhere in that chain may mean that employees will not be able to fly and the company will not be able to ship or receive goods by air.

(III) You may not be able to use credit cards for personal or business purchases because your credit card company is not Year 2000 ready.

(IV) You may not be able to track your company's stock, or any stock listed on the exchanges or OTC markets, due to financial meltdown in the securities markets.

(V) Your insurance company may not be able to determine your premium, bill you, pay a claim, or even communicate with you.

(VI) Your mortgagee may not be able to bill you, draft the monthly installment from your bank account, or acknowledge your payment if you pay by mail or in person.

(VII) Salaries, commissions, and benefits for your employees, as well as pension checks or Social Security benefits for retired employees, could be incorrectly calculated or go unpaid.

(VIII) The automated teller machines at your bank may not work, so that you cannot make deposits or withdrawals, and your bank could start calling in business loans, threatening your credit rating (Rupley, 1998).

The problem is complicated for companies that conduct business abroad. Foreign companies are often behind their U.S. counterparts in Year 2000 remediation and testing. This is true of companies in Europe, Asia, and other parts of the world. Some countries, like England, are providing grants to hurriedly develop information technology and to train technicians ("bug-busters") to assess and fix systems that are affected by Year 2000 problems (Howard, 1998). For U.S. firms with business links in those countries, the question is whether the companies can become compliant on time, or if funding is too little and coming too late.

Thus resolving your own company's internal exposure to the Year 2000 problem may not be enough. You have to be concerned that government and service providers are ready, which you may not be able to control, and you need to evaluate the compliance readiness of your most crucial business partners. How can you limit your exposure to the risk that your business partners may not be compliant? First, you must identify those companies whose Year 2000 problems and compliance efforts could adversely impact your company. This may include an inspection of a supplier's or customer's system with whom your system is interfaced. Addressing the foreseeable problems (such as noncompliance of a distributor) early can mitigate the seriousness of the consequences (Seymour, 1998). Second, you must put the companies on written notice of your concern and seek assurances that they can live up to their obligations well into the next century. It is prudent to detail any economic losses you may suffer if they fail to

comply. This puts you in an advantageous position if litigation develops later. It may also let your business partners know that you are serious about resolving the Y2K problem in an efficient and timely manner, and it may encourage them to evaluate their Year 2000 risks and implement corrective measures.

Your business partners may say, or you may be able to infer, that they likely will not be able to comply, in which case you will likely still have time to find alternative solutions. Of course, they may say that they are Year 2000 prepared and will be able to perform their contractual obligations without interruption. If they say they are in the process of remediation and expect to be compliant, you should follow up to see that the project is completed. If they don't respond, or over-qualify to the point that they promise essentially nothing, you at least know where you stand and can plan accordingly. You can then demand adequate assurance of future performance, and if you do not receive such assurance in a timely manner, you can suspend your relationship and find another vendor or service provider. With a properly written notification letter, and with a list of the economic damages you can reasonably foresee due to their noncompliance, you are in a position to deal with them appropriately if the need arises (Corrigan, 1998).

How Can Businesses Prepare Themselves?

Business owners, managers, and information systems experts can alleviate possible litigation by taking inventory and conducting early inspections of all date sensitive systems. Then businesses and organizations can estimate the impact of potential failures, begin the remediation and renovation processes, and finally test and certify their programs. The process is long and drawn out. One analyst as recently as mid-1998 estimated that approximately half of all companies worldwide with date-sensitive data will experience computer system malfunctions on January 1, 2000 (Trembly, 1998). Here are some steps that companies can take to prepare for the Year 2000 conversion.

1. Firms usually think that solving Year 2000 problems involves only computer applications, and that the answer lies solely with the Information Technology Department. But the solution involves business as well as computer knowledge. Hence the burden to resolve the Year 2000 dilemma rests primarily with managers and executives, not technicians. The first step is for top management to form a multi-functional task force to identify technical issues and inventory human resources that are on staff or should be brought in to solve the problem. Then, responsibilities can be assigned, strategies formulated, and priorities set to reach the conversion goals on time and on budget (Roberts, 1998). Of course, fully developed contingency plans should be implemented to deal with unforeseen problems. A recent study showed that 80 percent of firms that have undertaken remediation have had to change their overall approach since starting their initiatives ("Y2K costs...," 1998).

2. Companies must set a firm timetable and stick to it. System audits of hardware and software should be completed as soon as possible, allowing a plan to be fully operational by year end 1998. This would allow, at best, one year to perform system testing. The earlier the audit, the more time there will be to make the conversion and the less expensive the repair will be. In some cases, manual conversion of individual data entries may be permissible as long as the quantity of data is not too massive.

3. With the deadline fast approaching, some companies who would like more time to address the Year 2000 issue may obtain a temporary patch by masking or encapsulating their computers. This procedure is called "windowing" and it basically tricks a computer into believing it is performing in some year other than the current year. For example, since the calendar was the same in 1969 as in 1997, a mainframe could be programmed to operate as if it were 1969 rather than 1997. A subsequent update in the program will correct the dates for users, with the "windowing" process giving the firm more time to correct Year 2000 problems. While this may not be an option for all companies, it could provide relief to some companies who are unable to meet the Year 2000 deadline.

4. Even a well-devised plan for the millennium computer conversion may not be completely error free and a firm may find a need to purchase Year 2000 insurance policies, sometimes called millennium coverage. Purchasing an insurance policy to cover losses from disruptions in business and possible litigation costs incurred due to the Year 2000 computer bug will, of course, swell the ultimate cost of conversion. However, this may be a prudent risk management step for many companies. Given the potential losses a firm could incur due to Y2K problems, millennium coverage may be the most undersold kind of insurance in the 1990s.

Which Insurance Policy Will Cover Y2K Damages?

Several insurance companies have entered the market by designing stand-alone policies to cover unforeseen disruptions and costs that might result from millennial calendar meltdown. A typical policy may offer $100 million in coverage for $60 to $80 million in premiums. If losses are less than the premium charged, the insurer will refund 10 to 15 percent of the total premium charged (Rea, 1997).

The typical millennium coverage policy has three coverage sections. They are direct business interruption, to cover loss of profits due to problems the insured has with its own computer; contingent business interruption, to cover the insured's loss of profits and expenses resulting from a third party's unsuccessful conversion at the millennium; and third-party liability, to protect the insured from its own errors and omissions resulting from its unsuccessful conversion after the millennium. Companies will likely experience increasing difficulties in finding coverage at an affordable cost as the impending date nears (Gjertsen, 1997).

Other companies are offering standardized endorsements to specifically provide or exclude coverage in their commercial general liability, professional liability, and commercial property policies. Such endorsements have been approved for sale in about two-thirds of the states (Souter, 1997).

They will provide flexibility to insurers in the design of policies and help both insurers and insureds to clarify whether coverage is extended in a given policy or circumstance (Lankevich, 1998).

As might be expected, the insurance industry insists that older property or liability policies should not provide coverage for Year 2000 problems. They contend that Year 2000 exposures were not contemplated when policy provisions were drafted. Therefore premiums were not charged for this exposure. However, due to the ambiguity of policy language, it remains an open question as to whether courts will rule that general and professional liability policies will respond to Year 2000 claims. But property policies will likely not cover such claims, since physical damage is required to trigger coverage in property policies. In most instances, there is no physical damage when a Year 2000 loss is sustained (Lankevich, 1998).

Despite the wishes and/or opinions of the industry, the courts may bypass policy wording in the older general and professional liability policies and find insurers liable for Year 2000 losses for "public policy reasons." They will simply look for a way to equalize the risk, i.e., force the insurance industry to absorb a part of the anticipated $1 trillion cost associated with the Year 2000 problem. This is precisely what the courts did with respect to many pollution losses.

Further, the courts could accept the argument by insureds that the exclusions added in 1998 means that the earlier policies, those issued when their computers were installed, surely must cover the problem. Otherwise, why add the exclusions in 1998? If a company explicitly says that it is not covering an exposure after 1998, is it not implying that the exposure was or may have been covered prior to 1998? These questions will be resolved in the courts, but it may be many years before a definitive resolution is tendered.

Many information systems managers may be skeptical of the protection afforded through millennium coverage or standardized endorsements. Underwriters are likely to be extremely selective in accepting risks and to insist on playing an active role with their policyholders' transition activities. Furthermore, the premium for Year 2000 coverage is not affordable for marginal risks. As a result, risk managers should carefully weigh the costs and benefits of purchasing insurance before jumping on the Year 2000 coverage wagon. Legal counsel should be retained to audit applicable language in existing insurance policies as well as those whose purchase is contemplated.

Summary

Year 2000 problems and the approaches taken to their resolution will impact the way companies do business for years to come. Hence firms must cautiously examine their strategic and contingency plans for handling the year 2000 computer transition. Inadequately addressing this issue and not accurately estimating the length of time needed to execute the transition may result in shareholder and customer lawsuits as well as lost revenues and increased expenses from eventually having to confront the problem. While the key to minimizing the pressure of the conversion process is well-devised advanced plans, other alternatives such as millennium coverage or standardized endorsements to commercial liability and property poli-cies are available to many companies.

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