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Abstract

This article examines loc ocal governments plan for information technology (IT) operations. Many local governments lacked concrete plans and failed to think strategically about the Y2K problem at the beginning of 1999. A logistic analysis shows that the decision to form a concrete Y2K strategy depended on management attitudes and the technological sensitivity of local decision makers rather than on resource constraints or system characteristics. However, insufficient resources, not management attitudes and system characteristics, were the key determinant of the eventual outcomes of planning. This study concludes that local governments should think more strategically in IT planning and that senior management should take a more active role in the planning process. Local governments, especially counties, may need state assistance to improve IT planning for the information revolution in the new millennium.

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1.

1. The federal government alone planned to spend more than $30 billion on the Y2K problem (U.S. House of Representatives, Committee on Science, Subcommittee on Technology, and Committee on Government Reform and Oversight, Subcommittee on Government Management, Information, and Technology, 1996, p. 6). Individual state governments took serious actions (Barrett & Greene, 1999) and invested millions of dollars in code conversion on top of their routine IT spending. State costs varied significantly due to differences in

computer systems and the number of codes that needed to be fixed. According to testimony by the National Association of State Information Resource Executives, the number of codes in state government computer systems that needed conversion ranged from 300,000 to 97 million (U.S. House of Representatives, Committee on Science, Subcommittee on Technology, and Committee on Government Reform and Oversight, Subcommittee on Government Management, Information, and Technology, 1996). Large states obviously had more difficult tasks and spent more. For example, New York budgeted more than $300 million for the Y2K problem, compared with $83 million budgeted by Washington and $57 million by Missouri (McCann, 1998, p. 32; "State CIOs share strategies," 1998, p. 1).

2.

2. Readers should note that we finished our survey in January 1999. Y2K awareness could have become stronger among local governments, and planning strategies could have been changed by the spring of 1999, after the publication of the preliminary results of this survey study; a series of legislative hearings by the Iowa legislature; and the Y2K awareness campaign by the Iowa League of Cities, the Iowa State Association of Counties, and the state government in January and February 1999.

3.

3. The survey instrument is available from the authors on request. Please contact Alfred Ho at Iowa State University by e-mail (alfredho@iastate.edu).

4.

4. Cass, Van Buren, Henry, O'Brian, and Allamakee Counties gave two responses: one each from their treasurer's and auditor's offices. This raises some concerns about the independence of observations because phone interviews with officials from these counties revealed that their auditor's and treasurer's offices share the same mainframe systems. However, we also found that individual departments are still responsible for managing their own PCs, making purchase plans, and preparing budgets for PC-related spending. The survey responses from these auditor's and treasurer's offices about system characteristics, IT budgets, and other IT management issues were also quite different, even though the respondents were from the same counties. Therefore, we decided not to unify the responses from these five counties. The remaining 38 counties gave only one response each, so independence of observation should not be a concern.

5.

5. Because all counties and cities with populations greater than 3,000 were included in our analysis, the population variances were known. A *Z* test was done to determine whether the population mean differences between respondents and nonrespondents were statistically significant (Wonnacott & Wonnacott, 1990). The population averages and variances were as follows:

	Number of Observations	*Population Mean*	*Variance*
Responding county departments	100	31,271	3,123,864,157
Nonresponding county departments	98	26,238	653,123,731
Responding cities	72	17,586	796,870,115
Nonresponding cities	40	13,078	380,705,891

At the 95% confidence level, we rejected the hypothesis that the population mean differences between respondents and nonrespondents were significant for cities and counties, respectively. Responding and nonresponding counties also had a similar level of managerial professionalism: Twelve percent of responding counties and 16% of nonresponding counties had professional managers or administrators. There was a relatively bigger difference among city respondents and nonrespondents in professionalism. Whereas 76% of city respondents had city managers or administrators, only 55% of city nonrespondents had one.

6.
6. We benefit from an anonymous referee's comments about this argument.
7.
7. The logistic model assumed that the probability of having concrete plans (*P*) was a logistic function, which is specified as follows:$P=F(\alpha+\beta x)\ e^{\alpha+\beta x}/1+e^{\alpha+\beta x}$ (1)
Equation 1 can be transformed to estimate the odds of having concrete plans, $P/(1-P)$, in a natural logarithm. The result is as follows:$\log(P/1-P)=\alpha+\beta x$ (2)
This method is better than using ordinary least squares regression to calculate the predicted probability of having concrete plans because the linear prediction may lay outside the 0 to 1 range. It is also better than the constrained regression method (constraining the prediction to be between 0 and 1), which may give biased estimates. For more discussion of the methodology of logistic modeling, please refer to Pindyck and Rubinfeld (1998) and Greene (1993).
8.
8. Among the independent variables, the only significant correlation was found between population size and the use of professional administrators. The Pearson's correlations were 0.73 for counties and 0.27 for cities; both were statistically significant. Because it was most likely that population size was the causal factor for having a professional administrator, we used a two-step method to "purge" the population effect. First, we ran a logistic regression on the use of professional administrators and estimated the population effect for cities and counties respectively. Then, we estimated the predicted probability of having professional administrators based on the population estimate and calculated the residuals from the prediction. These residuals, being free of the population effect, were used in the logistic models. We also found that senior management attitudes toward the Y2K problem (measured on a scale ranging from 1 [*very serious*]to5[*very not serious*]) and population size were slightly correlated (the Pearson's correlations were -0.26 for counties and -0.15 for cities). The result is consistent with the findings by Fletcher et al. (1992) that top officials in larger counties tend to be more sensitive to IT concerns. We also found a weak correlation between senior management attitude, the centralization of IT management, and the consideration of new technology in budgeting (the absolute values of the Pearson's correlations between these variables are less than 0.20). Because the correlation of these variables was not very strong, we did not include any statistical remedies to purge the correlation.
9.
9. The calculation assumed the following: mainframe servers = 0, percentage of direct purchase of PCs = 29% (mean), central staff = 2, Y2K fix by contractors = 1, senior management attitude = 2.29 (mean), professional

administrator = 0, staff members per PC = 0.17 (mean), and log (population) = 9.56. For the details of the calculating methodology, please refer to Pindyck and Rubinfeld (1998).
10.
10. The change represented a decrease from 3 (*neutral*)to1(*very serious*). The assumptions of the calculation are similar to those in Note 9 except that the mean assumption of senior management attitude is taken away, and the value of technology availability consideration is assumed to be positive (i.e., 1).
11.
11. We confirmed that the population effect was not correlated with the impact of other variables. For example, the correlation between population size (in natural log) and other independent variables in the logistic models was not significant after we corrected for the population effect on the presence of professional administrators. We also tested the population effect on other variables by omitting the population variable from the models. The change had no significant impact on the parameters and statistical significance of other variables.
12.
12. We assumed the following: mainframe servers = 0, percentage of direct purchase of PCs = 29% (mean), consideration of new technology availability = 1, central staff = 2, Y2K fix by contractors = 1, senior management attitude = 2.29 (mean), professional administrator = 0, and staff members per PC = 0.17 (mean).
13.
13. The details of the results are available from the authors on request.
14.
14. We suspect that the significant relationship between the ratio of staff members to PCs and the odds of having any action planning in cities may be a residual, indirect effect of population size, because the ratio of staff members to PCs was negatively correlated to population size among cities with populations between 5,000 and 10,000 (with Pearson's correlation at -0.39 and statistically significant at the 5% level). Due to the small number of observations (*n* = 26), this potential problem was not easily correctable.
15.
15. The survey results and remarks about the survey can be obtained from the State of California, Department of Information Technology (1998).
16.
16. New York's guidebook is available from the New York State Office for Technology (n.d.). Texas's local guidebook is available from the State of Texas, Department of Information Resources (1998). Finally, New Jersey's information is available from the New Jersey Department of Community Affairs, Division of Local Government Services (1999).
17.
17. We appreciate the comments of an anonymous reviewer about this point.
18.
18. In our nonsystematic phone follow-ups, we found that many survey respondents referred to senior management as city mayors, county commissioners, and city and county administrators. These responses are consistent with the definition of local top management in Kraemer et al. (1989). A few of our respondents also suggested that department heads were the senior management, but their opinions were not the majority opinion.

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