PUBLIC ACCOUNTING FIRMS AND INFORMATION TECHNOLOGY: ADOPTION, USAGE, AND EXPENDITURES

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ABSTRACT

Investments in Information Technology are a major component of company budgets. The returns on these expenditures are sometimes hard to quantify, yet they seem to be increasing more each year.

This study examines data from over 1500 accounting firms over a two year time period. Analysis of the data yields results about changes in technology expenditures, online access, and technology support areas. Results indicate that accounting firms are spending more on IT.

INTRODUCTION

Investments in technology are becoming a more substantial part of business operating expenses. Increasingly, the literature indicates these investments impact organizational performance. Bender (2) sampled 132 life insurance companies and found that total information processing expenditures were significantly related to the reduction of total operating expenses. In a case study of a life insurance company, Clement and Gotlieb (3) conclude that Information Technology (IT) investment improved productivity and processing time, while Harris and Katz (4) found that IT investments resulted in lower-cost operations.

More recently, Mahmood and Mann (6) studied the Computerworld "Premier 100" list of companies. They found a significant relationship between IT investment and several organizational strategic and economic performance variables.

The widely touted benefits of IT, although difficult to quantify, drive firms to continue to invest large amounts simply to remain competitive. In the United States alone, $316 billion was spent on IT by corporations in 1997 (5). Public accounting firms engaged in providing timely advice to their clients, often regarding technology investments, are one such group of technology users often forced by their list of services to rapid IT adoption in order to remain competitive.

Because of this role, the purpose of this paper is to examine recent IT investment and to investigate the changes from year 1997 to 1998 in IT spending and usage in public accounting firms. Changes from the eleven states and the overall averages will be analyzed.

METHODOLOGY

The Texas Society of CPAs sponsors an annual management of accounting practices (MAP) survey. The survey addresses a number of issues related to office technology usage and technology expenditures. The 1997 survey contains over 1400 firms from across the nation. The 1998 survey resulted in responses from over 1500 firms. Sixteen states were represented in the 1997 sample and 19 states were in the 1998 sample. Only 11 states were included in the samples from both years and therefore used for this study. The respondents from those 11 states accounted for approximately two-thirds of the respondents in each year.

The data were analyzed using a statistical technique that assesses the differences between two population proportions. The test statistic for the differences between two proportions is:

$$z = \frac{(\bar{p}_1 - \bar{p}_2) - (\bar{p}_1 - p_2)}{\sigma_{\bar{p}_1 - \bar{p}_2}}$$

where:

$$\bar{p} = \frac{n_1 p_1 + n_2 p_2}{n_1 + n_2} \quad \text{and}$$

$$\sigma_{\bar{p}_1 - \bar{p}_2} = \sqrt{\bar{p}(1-\bar{p})\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}$$

Where p_1 is the proportion from year 1997 and p_2 is the proportion from the year 1998 for each of the items studied for each of the 11 states (1).

INFORMATION TECHNOLOGY BUDGET

The respondents reported their spending on Information Technology as a percentage of their total budget. Responses were divided into five categories from "less than 1%" to "over 5%." The 1997 and 1998 results are presented in Tables 1 and 2, respectively. Notice that budgets less than 4% of total revenue (bottom three categories) make up close to 80% of all of the firms responding in 1997. In 1998, those three categories accounted for only 75% of the firms' IT budgets.

Table 3 shows the percentage change in each of these categories from 1997 to 1998 for each of the 11 states and the national average. As indicated in the table, the lower two categories have modest decreases in their percentages while the upper two categories show positive changes. The category "4%-5%" shows a significant positive change from 1997 to 1998. This change implies that, across the nation, firms are spending a larger percentage of revenue on IT.

The analysis of individual states shows that eight of the 11 states had no significant changes in the proportion of firms in each category. Although the changes are not significant, in most cases the direction of the changes seems to be consistent with the national averages.

ONLINE SERVICE PROVIDERS

Online service providers allow an individual or organization access to global information and the Internet. Access can be gained in several ways including America Online (AOL), Compuserve, Prodigy, Microsoft Network (MSN), a regional or national Internet Service Provider (ISP), or some other provider. Tables 4 and 5 report the percentage of respondents who gained online access from the listed sources in 1997 and 1998, respectively.

TABLE 1
1997 Information Technology Budget as Percentage of Revenue

State	<1%	1%-2.5%	2.5%-4%	4%-5%	Over 5%
Arizona	9.3%	31.6%	31.6%	13.3%	14.2%
Arkansas	16.7%	39.8%	28.6%	5.1%	7.5%
Iowa	9.8%	44.3%	27.3%	12.7%	5.8%
Louisiana	12.3%	35.6%	28.6%	7.3%	16.3%
Massachusetts	10.8%	37.1%	31.5%	7.8%	12.8%
Minnesota	9.3%	43.3%	28.3%	7.8%	10.9%
Mississippi	6.5%	45.2%	41.9%	3.2%	3.2%
New Jersey	11.8%	40.4%	30.0%	8.3%	9.5%
Texas	14.3%	37.8%	25.5%	9.6%	10.8%
Vermont	0.0%	20.0%	42.3%	13.6%	24.5%
Virginia	7.1%	42.3%	30.3%	7.2%	13.3%
Overall	11.7%	37.7%	29.6%	9.0%	12.0%

TABLE 2
1998 Information Technology Budget as Percentage of Revenue

State	<1%	1%-2.5%	2.5%-4%	4%-5%	Over 5%
Arizona	7.9%	34.1%	30.7%	11.4%	15.9%
Arkansas	10.2%	23.0%	34.7%	16.9%	9.9%
Iowa	10.4%	43.7%	29.2%	8.3%	8.3%
Louisiana	6.7%	33.1%	30.7%	13.1%	16.4%
Massachusetts	9.4%	28.5%	39.2%	6.7%	13.6%
Minnesota	10.2%	30.8%	26.8%	17.5%	14.8%
Mississippi	9.1%	42.4%	29.3%	16.2%	3.0%
New Jersey	16.0%	40.4%	28.0%	5.3%	15.0%
Texas	13.7%	39.1%	25.4%	10.8%	11.1%
Vermont	7.7%	30.8%	23.1%	0.0%	38.7%
Virginia	0.0%	17.0%	55.7%	20.8%	6.6%
Overall	9.9%	35.8%	29.6%	11.6%	13.1%

TABLE 3
Percentage Change from 1997 to 1998 in Information Technology Budget as Percentage of Revenue

State	<1%	1%-2.5%	2.5%-4%	4%-5%	Over 5%
Arizona	-1.4%	2.5%	-0.9%	-1.9%	1.7%
Arkansas	-6.5%	-16.8%***	6.1%	11.8%***	2.5%
Iowa	0.6%	-0.6%	1.9%	-4.4%	2.5%
Louisiana	-5.6%	-2.6%	2.1%	5.8%	0.2%
Massachusetts	-1.4%	-8.5%	7.7%	-1.1%	0.8%
Minnesota	0.9%	-12.5%	-1.5%	9.7%	3.9%
Mississippi	2.6%	-2.8%	-12.6%	13.0%***	-0.2%
New Jersey	4.2%	0.0%	-2.0%	3.0%	5.5%
Texas	-0.7%	1.4%	-0.1%	1.2%	0.3%
Vermont	7.7%	10.7%	-19.2%	-13.4%	14.0%
Virginia	-7.1%***	-25.3%*	25.5%*	13.6%***	-6.7%
Overall	-1.9%	-1.9%	0.0%	2.6%**	1.1%

*p<.01; ** p<.05; *** p<.10

TABLE 4
1997 Online Service Providers

State	Compuserve	Local ISP	AOL	Prodigy	MSN	Other	None
Arizona	7.1%	24.2%	23.2%	3.0%	3.0%	6.1%	32.3%
Arkansas	17.8%	20.9%	11.4%	4.4%	2.3%	2.3%	45.2%
Iowa	7.3%	34.5%	18.2%	3.7%	7.3%	0.0%	30.9%
Louisiana	8.1%	29.1%	31.4%	1.2%	4.7%	3.5%	30.3%
Massachusetts	12.5%	35.0%	35.0%	5.0%	5.0%	2.5%	22.5%
Minnesota	10.7%	16.9%	16.9%	3.1%	6.1%	6.1%	44.6%
Mississippi	16.1%	35.5%	19.4%	6.5%	6.5%	0.0%	19.4%
New Jersey	16.8%	9.0%	35.6%	1.9%	2.6%	7.8%	29.0%
Texas	12.7%	32.3%	15.9%	1.4%	5.5%	5.1%	33.3%
Vermont	26.7%	40.0%	26.7%	0.0%	0.0%	6.7%	6.7%
Virginia	9.4%	31.8%	29.4%	5.9%	3.5%	8.2%	22.4%
Overall	12.8%	27.8%	21.4%	2.4%	4.6%	4.8%	31.2%

TABLE 5
1998 Online Service Providers

State	Compuserve	Local ISP	AOL	Prodigy	MSN	Other	None
Arizona	5.2%	35.7%	29.6%	4.3%	3.5%	11.3%	13.9%
Arkansas	5.3%	35.1%	9.9%	0.0%	0.0%	6.1%	36.3%
Iowa	0.0%	39.6%	18.7%	4.2%	6.3%	8.3%	18.8%
Louisiana	7.3%	38.6%	29.2%	5.2%	8.3%	11.5%	16.7%
Massachusetts	6.5%	47.8%	28.3%	2.2%	4.4%	2.2%	17.4%
Minnesota	1.8%	45.6%	19.3%	1.8%	5.3%	12.3%	22.8%
Mississippi	3.0%	48.5%	21.2%	3.0%	0.0%	6.1%	21.2%
New Jersey	12.0%	27.5%	36.6%	2.8%	9.2%	6.4%	16.9%
Texas	5.9%	45.3%	12.8%	2.9%	7.3%	11.5%	19.0%
Vermont	15.4%	46.2%	30.8%	0.0%	0.0%	15.4%	7.7%
Virginia	39.1%	22.8%	7.2%	0.0%	13.2%	16.5%	6.2%
Overall	8.7%	41.1%	24.8%	2.6%	6.7%	9.1%	16.3%

In 1997, 31.2% of the firms responding did not have any type of online access. In 1998, that number decreased to 16.3%. This decline suggests that more and more accounting firms are using online access in some type of their work. Another interesting item is the number of firms subscribing through a local Internet Service Provider (ISP). In 1997, only 27.8% of the responding firms received online access through a local ISP. In 1998, the number increased to 41.1%.

Table 6 shows the percentage change for each of the online service provider categories from 1997 to 1998 for each of the eleven states and the national average. Compuserve showed a decline in the percentage of firms using its access in all states except Virginia. According to the overall sample, Compuserve's numbers declined throughout the nation.

TABLE 6
Percentage Change from 1997 to 1998 in Online Service Providers

State	Compuserve	Local ISP	AOL	Prodigy	MSN	Other	None
Arizona	-1.9%	11.4%***	6.4%	1.3%	0.5%	5.2%	-18.4%**
Arkansas	-12.6%***	14.2%	-1.4%	-4.4%	-2.3%	3.8%	-9.0%
Iowa	-7.3%***	5.0%	0.6%	0.5%	-1.0%	8.3%**	-12.2%
Louisiana	-0.9%	9.5%	-2.2%	4.0%	3.7%	8.0%**	-13.6%**
Massachusetts	-6.0%	12.8%	-6.7%	-2.8%	-0.7%	-0.3%	-5.1%
Minnesota	-9.0%**	28.7%*	2.4%	-1.3%	-0.9%	6.1%	-21.8%**
Mississippi	-13.1%***	13.0%***	1.9%	-3.4%	-6.5%	6.1%	1.9%
New Jersey	-4.8%	18.4%*	3.1%	0.9%	6.6%**	-1.4%	-12.1%**
Texas	-6.8%*	13.0%*	-3.1%	1.5%	1.7%	6.4%*	-14.3%*
Vermont	-11.3%	6.1%	4.1%	0.0%	0.0%	8.7%	1.0%
Virginia	29.7%*	-9.0%	-22.3%*	-5.9%	9.7%**	8.3%	-16.2%*
Overall	-4.1%*	13.3%*	3.4%**	0.2%	2.1%	4.3%*	-14.9%*

*p<.01; ** p<.05; *** p<.10

Local ISP's usage increased in every state except Virginia. Five if the states showed significant increases in the percentage of firms using an ISP in 1997 versus 1998. As the national average shows, overall ISP usage increased by 13.3% from year 1997 to 1998. Local ISP's appear to be becoming the favored method of obtaining Internet access for public accounting firms.

America Online (AOL) showed a positive, significant change in the number of accounting firm subscribers from 1997 to 1998 at the national level. Prodigy and Microsoft Network (MSN) experienced very moderate changes in their numbers in the two-year period. MSN did see significant changes in two of the 11 states, New Jersey and Virginia.

The largest changes were in the number of firms reporting no online access. From 1997 to 1998, the number of firms with no online service provider decreased from 31.2% to 16.3%. This significant decrease suggests that almost half of the firms reporting no online access in 1997 did have access in 1998. In nine of the 11 states, this number decreased. Six of those nine changes were significant at the α=.05 level.

INFORMATION TECHNOLOGY SUPPORT

The IT support area refers to two particular areas of support for customers. These areas are an organization or firm home page and the option to file taxes electronically. Tables 7 and 8 show data for each state in the IT support categories for 1997 and 1998, respectively. In 1997, only 11.3% of all firms had a home page. This number increased to 17.1% in 1998. Additionally, the number of firms offering electronic filing increased slightly from 24.5% to 26.4%.

Table 9 shows the percentage changes for each of the IT support categories from 1997 to 1998 for each of the 11 states and the national average. The national increase in firms with home pages was significant at the α=.01 level. Electronic filing options did increase at the national level by 1.9%.

TABLE 7
1997 Information Technology Support Functions

State	Home Page	Electronic Filing	Extra Charge for Electronic Filing
Arizona	8.1%	23.7%	13.8%
Arkansas	2.3%	39.5%	29.5%
Iowa	12.7%	61.8%	50.1%
Louisiana	19.3%	23.9%	21.4%
Massachusetts	13.4%	35.4%	25.3%
Minnesota	11.3%	30.8%	22.4%
Mississippi	3.2%	9.7%	8.1%
New Jersey	8.5%	31.3%	23.5%
Texas	9.2%	21.4%	12.4%
Vermont	21.3%	50.0%	42.7%
Virginia	21.3%	22.9%	13.0%
Overall	11.3%	24.5%	15.8%

TABLE 8
1998 Information Technology Support Functions

State	Home Page	Electronic Filing	Extra Charge for Electronic Filing
Arizona	11.4%	27.4%	16.6%
Arkansas	2.6%	35.5%	26.0%
Iowa	14.6%	70.8%	57.3%
Louisiana	18.0%	25.8%	17.2%
Massachusetts	28.3%	19.6%	12.0%
Minnesota	19.8%	41.6%	26.6%
Mississippi	15.2%	27.3%	24.3%
New Jersey	17.9%	24.9%	19.5%
Texas	11.1%	31.5%	20.7%
Vermont	30.8%	46.2%	40.4%
Virginia	29.2%	32.2%	27.0%
Overall	17.1%	26.4%	17.0%

CONCLUSIONS

This study provides evidence of IT adoption and usage for public accounting firms. Public accounting firms appear to be making substantial investments in IT and are doing so at an increasing rate. Competitive pressures will likely continue to drive IT investment and adoption in this industry and those firms investing early might obtain a first mover advantage.

TABLE 9
Percentage Changes from 1997 to 1998 in Information Technology Support Functions

State	Home Page	Electronic Filing	Extra Charge for Electronic Filing
Arizona	3.3%	3.7%	2.8%
Arkansas	0.3%	-4.0%	-3.5%
Iowa	1.9%	9.0%	7.2%
Louisiana	-1.3%	1.9%	-4.2%
Massachusetts	14.9%***	-15.8%***	-13.3%
Minnesota	8.6%	10.9%	4.2%
Mississippi	11.9%***	17.6%***	16.2%***
New Jersey	9.3%**	-6.4%	-4.1%
Texas	1.9%	10.2%*	8.3%*
Vermont	9.4%	-3.9%	-2.3%
Virginia	7.9%	9.3%	14.0%**
Overall	5.9%*	1.9%	1.2*

- p<.01; ** p<.05; *** p<.10

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