Managing Technology Information Overload; Which Sources of Knowledge are Best?

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The purpose of this research is to establish whether or not the type or number of sources of knowledge used by the decision maker about information technology impacts how effectively an organization utilizes information technology. A one sample chi-square test showed that organizations that used local consulting firms for their knowledge or read print or web publications used technology more effectively. Decision makers who relied on the advice of friends and family did not utilize technology as effectively. On the other hand, there was no difference in the effectiveness of technology use among organizations where the decision maker used top research vendors (such as Gartner Group, Meta Group, Forrest, etc.) for their knowledge or directly from the technology vendors themselves.

INTRODUCTION

When an organization invests in technology, they are often inundated with a wide variety of options that they don't know where to turn for information. Research often does not help, as early research (from the 80s and early 90s) failed, time and time again, to find any relationship between the amount of money spent on technology and the benefits obtained from technology (Dehning & Richardson, 2002; Schrage, 1997; Strassmann , Paul A., 1999; Tallon, Kraemer, & Gurbaxani, 2000). Many called this the "Productivity Paradox"(Black & Lynch, 2001; Lucas, 1999; Strassmann , Paul A., 1999; Thorp, 2003; Willcocks & Lester, 1999).

Some research concluded the exact opposite.. Brynjolfsson et al (Brynjolfsson, Hitt, & Yang, 2002) conclude that for each dollar of installed computer capital in a firm, the market value of the firm rises at least five dollars - supporting the irrational exhuberance of the dot-com era. (Frank Bannister, Dan Remenyi, 2000; Plotnick, 2000; Poston & Grabski, 2000; Remenyi, Money, & Sherwood-Smith, 2000) Dedrick, Kraemer, and Gurbaxani (2003) conducted a review of more than 50 empirical research articles on IT and its economic performance between 1985 and 2002 (Dedrick, Gurbaxani, & Kraemer, 2003). Dedrick et al, feel that newer research strongly supported productivity gains of IT. Interestingly enough, they found that most gains came from the capital investments of a decade earlier. Dedrick et al considered the possibility that new econometric techniques combined with firms learning to measure IT expenses more accurately and apply IT capital more productively was the cause for the change.

The biggest key was not in spending money on technology, but in using it effectively - especially in small businesses (Bucatinsky, 1996). Tallon (Tallon et al., 2000) surveyed 304 business executives and concluded that firms with IT that pays off economically for the company have more focused goals and utilize the technology more effectively.

Intuitively, one of the keys in using technology effectively has to be the knowledge of the decision maker regarding which information technologies to purchase and how to implement them within the organization. The question is: How do decision makers get their knowledge about information technology?

The leadership in most organizations are experienced executives - which requires that they've been in business for a number of years. Often, executives went through school and were well into their careers when information technology was still behind glass windows and touched only by systems specialist. Those days are gone, and decision makers in every organization must learn enough about information technology to make good decisions about business strategy - which is inexorably linked to information technology. But where do they go for IT knowledge? Do they rely upon free advice from their family and friends? Do they pay top dollar for information technology research groups such as Gartner Group, Meta Group, Forrester, McKinsey, IDG, and many others? Do they trust the vendors such as Microsoft, Hewlett-Packard, Dell, Gateway, Oracle, SAP, Intuit, or any other manufacturer or publisher of information technology? Do they read publications such as Computerworld, CIO magazine, Optimize, Informationworld, Informationweek, or any one of hundreds others? Do they obtain knowledge via the web either through sites related to the publications, or through any one of the hundreds of consumer product comparison sites such as Consumer Reports or Tech Republic? And does the source of their knowledge have any relationship at all with whether or not they are using information technology effectively?

LITERATURE REVIEW

There have been quite a few studies on decision making that includes IT influences. O'Donnell and David (2000) studied 15 journals and came up with 57 articles on decision making being influenced by information technology. (O'Donnell, E. and David, J. S., 2000)

Bergman and Feeser (2001) finds that cultural communication preference impacts the use of information technology within the decision making process. They identify and study 17 decision attributes that are related to IT usage. (Bergman & Feser, 2001)

Information overload	Alternatives generated
Routinization of decision making	Problem identification
Forecast accuracy	Data availability
Decision time horizon	Job complexity
Problem formulation	Timeliness of data
Data quantification	Data accuracy
Decision effectiveness	Decision communications
Extent of analysis	Decision participation

Benamati (2001) includes decision making styles as a factor on the level of technology knowledge transfer (which could be construed as highly correlates with reported use of technology). Benamati finds that corporations with more formalized mechanistic structures and more stable direction-oriented cultures are associated with higher levels of knowledge transfer of technology. Conversely, research organizations with more organic structures, more flexible change-oriented cultures, and more customized university policies for intellectual property rights, patent ownership, and licensing are associated with higher levels of technology transfer. Another major impact is the partnership between the corporation and research organization. A trusting relationship in its university research center partner increases technology transfer.(Benamati & Lederer, 2001).

One research project studied the effects of using a hypermedia-based prototype of collective memory (i.e. a virtual meeting collaboration system called *VisionQuest*) on cognitive-conflict type of decisions (in this case, investigating MBA programs). The results indicate that the use of collective memory information provides the study participants focused attention on the cognitive-conflict task domain and leads to faster decision-making. One of the factors studied was how thorough the analysis was prior to making the decision, which included how many web pages of information were read and how many attributes were identified. The study found that the control group (the one that did not use the collaboration system) read more web pages and investigated more attributes before making the decision. However, the study restricted the source of information to web sites, however, and did not allow other sources of information. (Paul, Haseman, & Ramamurthy, 2004)

Yu and Chang (2002) were interested in how information technology can help decision makers, and so they investigated the decision making process itself. One of the issues they noted was in agreement with top issue listed by Bergman: information overload. The fact that although information technology may be able to make the process of making a decision easier, the existence of too much information has caused a problem. Yu and Chang define information overload as *"a perception by a person that the information associated with work task is greater than that can be managed effectively, and a perception that such overload creates a degree of stress for which the coping strategies are ineffective."* They felt using information technology may help mitigate the effects of information overload, but they did not discuss how decisions about the information technology were made. They mentioned various sources of information utilized by decision makers, friends and family, professionals in the field, personal experience (in the buying a house example, they mentioned touring the house), but they did not include the number or types of sources of information in their research. (Yu & Chiang, 2002)

While it was relatively easy to find studies on the use of information technology within the decision making process, what seems missing from *academic* publications is research on where decision makers go for information on information technology, although there is a proliferation of this type of research in industry magazines. This is also one of the research topics that is available for a price from any one of the numerous research organizations catering to the vendors of information technology products and services (so that they can sell more products and services, of course). In addition to the basic problem of bias, the biggest difficulty with these studies is the source of the sample. In general, they pull from the readers of technology publications or buyers of the vendor's technology. Furthermore, the most common methodology itself (web based surveys involving a URL sent out in email) introduces another bias. There have been studies that identify ways to decrease the impact that the technology bias produces on the results (Burkey & Kuechler, 2003). However - when the topic of study is the source of

information in technology decision making or effective technology use, web-based surveys would have a tendency to attract more answers from technology-literate organizations, introducing an inherent bias within the sample itself. In any case, the existing information on where decision makers go for information on information technology is for the most part unusable.

Lack of unbiased empirical research on the use of various sources of knowledge within the decision making process may be a side effect of the relative newness of information technology. However, the existence of the same problem in more established fields such as healthcare might refute that claim. Clancy and Cronin (2005) noted that, despite a proliferation of sources of information, getting access to information to enable evidence-based decision making in health care decisions was difficult.(Clancy & Cronin, 2005) One can envision the same difficulty in operations, or sales, or finance. Sources of unbiased information are rare, and it is difficult to know where to turn. The problem, however, is especially acute in the information technology field due to the magnitude of the impact of a wrong decision along with the lack of standards and general level of "hype" in the information technology field.

This study, therefore, attempts to apply scholarly rigor to a topic that seems to generate an easily bought and sold opinion from many, but seems to have little published specifically on this topic: Where do decision makers go to obtain knowledge about information technology? Is there a relationship between their sources of knowledge and whether or not they utilize technology effectively?

RESEARCH METHODOLOGY

Data was gathered over a two year period. The questionnaires were mailed to the top decision maker in all businesses listed as members of the local Chamber of Commerce, and all the businesses listed in the database of the local newspaper. The results could be faxed back, although the address was included if the respondent wished to send the response in the mail. The response rate was 10% the first year, and 7% the second year (reflecting a different and larger sample population than the first year).

Data Preparation

There were 584 responses received. The responding organizations were compared to national averages based upon company size, number of employees, and types of industries.   No significant differences were found. It was therefore determined that the sample adequately represented a typical population of business organizations. The breakdown of industries can be found in Figure 1.

FIGURE 1. TYPE OF INDUSTRY BREAKDOWN

Type of Industry	# in Sample
Education	19
Healthcare	29
Manufacturer	80
Media & Publication	6
Non Profit	53
Retail	51
Service	333
unknown	13

Nineteen responses were eliminated (3.3%) due to duplication. Missing data was filled in utilizing the mean, and accounted for less than .5% of the responses.

The data was screened for multicolinearity, and was found to fulfill orthogonality assumptions. Tolerance is greater than .1 for all variables, and variance inflation factor is less than 10 for all variables. Data was also screened for outliers using Mahalanobis Distance analysis, and 10 outliers were eliminated ($\chi^2 = 67.66$ with 34 degrees of freedom). A chi-square analysis was done on each of the questions from each of the years to assess whether or not there was a significant difference between the responses based on which year the survey was completed and no difference was found. After eliminating duplicates and outliers, the cases were combined for a total of 555 responses.

Effective Use of Technology

Effective use of information technology is difficult to operationalize. Any self-assessment of technology effectiveness would introduce bias into the answer. Building upon an earlier study, (Rhoads, 2005) effective use of information technology was defined utilizing a number of component responses from the questionnaire.

Based on the answers, an organization is characterized as "Savvy, Blossoming, Base, or Unversed" in the effectiveness of their use of information technology. The rules utilized to characterize an organization are listed in Figure 2.

FIGURE 2.
RULES FOR USE OF TECHNOLOGY INDEX SCORE

Effectiveness of Technology Use Category	Description	Operational Definition
Savvy	Utilizes technology well. Pays attention to both end user and infrastructure needs. Not afraid to try new technologies, but not on the bleeding edge either.	Email >=4, Web = 1, Ecommerce <>2, WebDevel <> 4, Connection <>1 or 5, Unfilteredspam > 0 or FilteredSpam > 0
Blossoming	Pays attention to technology - both end user and infrastructure needs. Just learning about it - doesn't jump in, but doesn't shy away either.	Email >2, Web = 1, Ecommerce =1, WebDevel <> 4, Connection <>5, Unfilteredspam > 0 or FilteredSpam > 0
Base	Uses technology when necessary, but doesn't always pay attention to both infrastructure and end user needs. Resists new technologies.	Email <4 and >1, Web = 1, Ecommerce =1, WebDevel <> 4, Connection <>2, Unfilteredspam > 0 or FilteredSpam > 0
Unversed	Does not generally use information technology in business planning and operation beyond the bare minimum.	Email <=1, Web = 2, Ecommerce 2, WebDevel = 4, Connection = 1 or 5, Unfilteredspam = 0 or FilteredSpam = 1

The dependent variable, Effective Use of Information Technology, therefore, is not a self assessment of effective use, but an independently derived variable based upon quantitative responses. The results of this variable did not differ significantly from the judgment of the researchers based upon personal experience with 23 of the organizations.

The question is whether or not there is a relationship between this variable (effective technology use) and either the number or sources or the type of sources of knowledge used by

the decision maker about information technology. The decision maker was asked which were trusted sources of information, or how they kept up to date with technology. The choices were (more than one could be chosen): Top Consulting Firm (Gartner, Giga, Meta, Forrest, other); Friends & Family; Publications & Web; Vendors (Microsoft,Oracle,CompUSA,Staples,Dell,Gateway,etc.); or Local Consulting Firm. Each one gives rise to a null hypothesis:

H1: Decision makers who seek and trust knowledge from Top Consulting Firms will not use information technology more or less effectively than those who didn't.

H2: Decision makers who seek and trust knowledge from Friends & Family will not use information technology more or less effectively than those who didn't.

H3: Decision makers who seek and trust knowledge from Publications & Web will not use information technology more or less effectively than those who didn't.

H4: Decision makers who seek and trust knowledge from Vendors will not use information technology more or less effectively than those who didn't.

H5: Decision makers who seek and trust knowledge from Local Consulting Firm will not use information technology more or less effectively than those who didn't.

Furthermore, it may be that rather than the actual source of information, there might be a relationship between the number of sources of information and effective technology use. It might be posited, for example, that decision makers who use more sources of knowledge might use information technology more effectively than a decision maker who uses fewer sources of knowledge. On the other hand, it may be that information overload takes place with too many sources of knowledge, and decision makers who use fewer sources of knowledge will be the more effective information technology users.. The null hypothesis in this case would be:

H6: Decision makers who seek and trust information from a variety of sources will not use information technology more or less effectively than those who only used one source.

All hypothesis were subject to two tailed tests of significance. A chi-square analysis was conducted for each hypothesis.


Descriptive Results

One of the interesting results surrounding who within the company made the information technology decisions. This aspect was more fully investigated in another research paper (Rhoads, 2005), but the descriptive statistics regarding which roles were part of the decision making team is included here for informational purposes. In over fifty percent of the cases, the owner, President, or CEO made the technology decisions, perhaps leading us to the conclusion that decision makers on technology decisions cannot be said to always have a technology background. The person in the technology-experienced role was involved in the decision only 19% of the time. In only 20 organizations were both the CEO/President/Owner and the CIO/IT Director/IT manager involved in technology decisions. This lends additional importance to the sources of knowledge for the decision. The percentage of all answers is shown in Figure 3 and the number of organizations including each role in the decision making team for technology is shown in Figure 4.

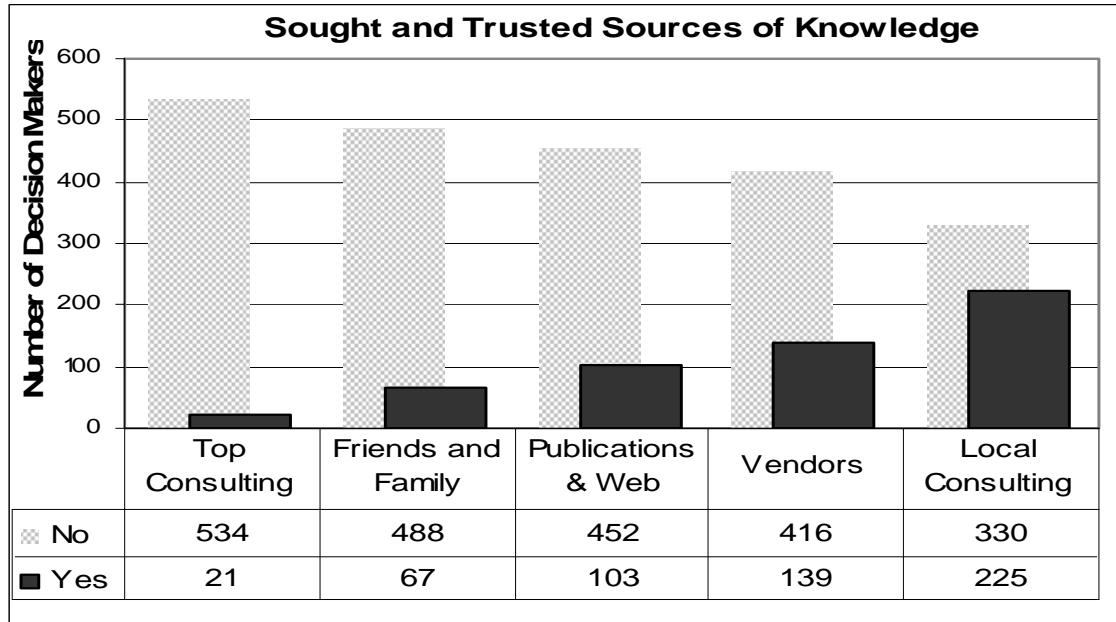**FIGURE 3.**
DECISION MAKING PERCENTAGE
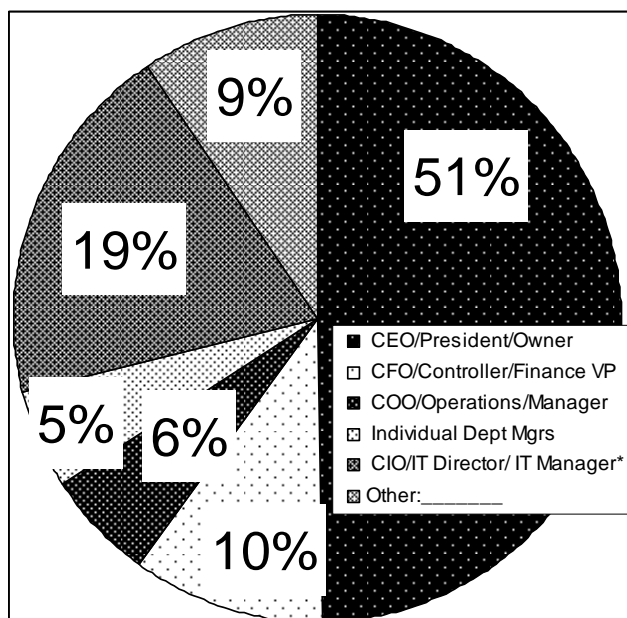
FIGURE 4.
NUMBER OF ORGANIZATIONS INCLUDING ROLE IN DECISION MAKING TEAM
(NOT MUTUALLY EXCLUSIVE)
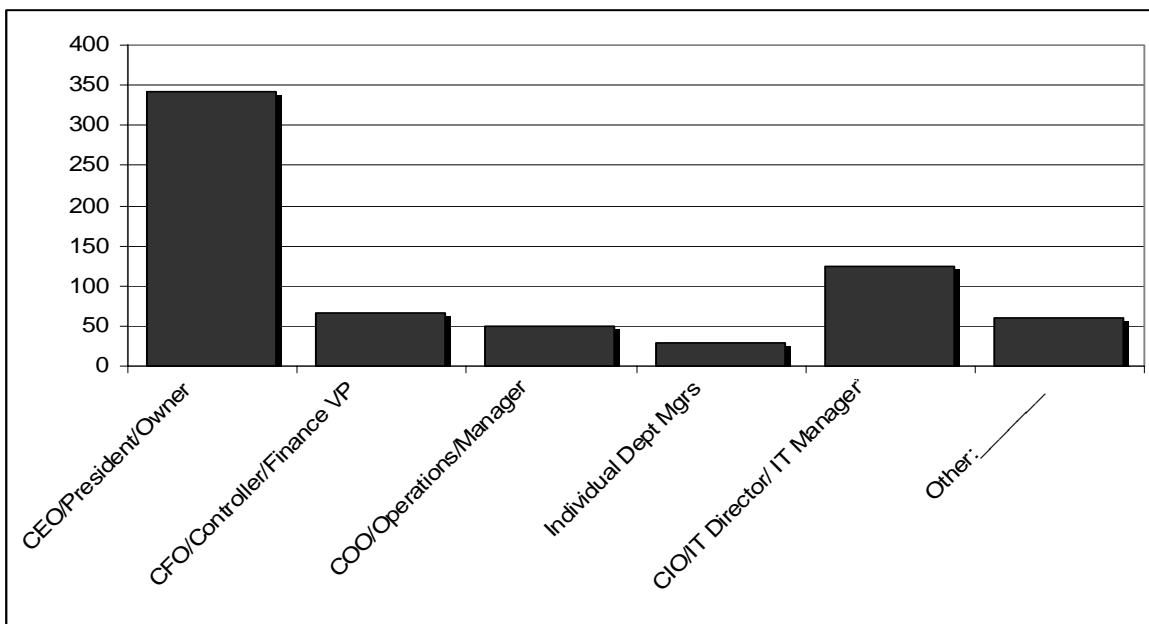
The graph and table in Figure 5 shows how many respondents included each of the choices in their list of trusted sources of knowledge about information technology.

FIGURE 5.
RESPONSE COUNT FOR SOURCES OF KNOWLEDGE

Sought and Trusted Sources of Knowledge

	Top Consulting	Friends and Family	Publications & Web	Vendors	Local Consulting
No	534	488	452	416	330
Yes	21	67	103	139	225

Clearly the most common trusted source of knowledge are local consultants, with almost half of the decision makers including Local Consulting among the most trusted sources of information. Surprisingly, vendors are the second most listed, while publications and the web coming in third. Not surprisingly, few companies paid for the top consulting firms.

The question, of course, is whether or not the source of knowledge is related to whether or not the organization has been classified as Savvy, Blossoming, Base, or Unversed in the effectiveness of their use of Information Technology.

Analytical Results

The results show that decision makers who listed Local Consulting Firms as their trusted source of knowledge about information technology were significantly (chi-square = 16.9, p = .001, df = 3) different in a two tailed test. Review of the data shows that more organizations were classified as Savvy in the effectiveness of their use of information technology. Publications and Web also showed as significantly different (chi-square = 12.7, p = .005, df = 3), with a higher-than-expected number of Savvy and Blossoming among decision makers who sought information from either publications or the web.

Decision makers who sought and trusted the advice of family and friends were also significantly different (chi-square = 13.3, p = .004, df = 3), but the results showed the exact opposite effect. Decision makers who relied upon family and friends were more likely to be classified as Base or Unversed, and much less likely to be in the Savvy or Blossoming group. In all three of these cases, the null hypothesis was rejected.

Neither Top Consulting Firms, nor Vendors showed a statistical difference, indicating that decision makers who relied upon vendors or paid top consulting firms were not likely to be classified as either more or less effective in their information technology use. The null hypothesis was accepted in this case.

All the results of the chi-square analysis for each source are shown in Figure 6.

FIGURE 6.
SUMMARY OF CHI-SQUARE RESULTS

Source of Knowledge	Pearson Chi-square	Significance (*p*)	Number of cells with <5 expected count
Top Consulting Firms	6.2	.102	3
Friends and Family	13.27	.004	2
Publications & Web	12.731	.005	1
Vendors	2.076	.557	0
Local Consulting Firms	16.891	.001	0

*N = 555 and df = 3 for all tests

   The last hypothesis, the number of sources identified by the decision maker, was also accepted. How many sources of information the decision maker utilized did not impact the effectiveness of their use of information technology. Furthermore, the frequency chart clearly shows that the majority (494 out of 555, or 89%) of the organizations trusted only one source of knowledge. Due to this fact, 8 cells (50%) have an expected count less than 5, which would have forced us to question the results even if it had been significant, since a high number of small values tends to inflate the chi-square and constitutes a too-liberal test of significance.
   The 2 X 2 contingency tables of the chi-square analysis clearly indicate which direction the difference occurred. The table for the Local Consulting Firm source shows a higher than expected count (60 instead of 44) for the Yes column for groups classified as Savvy, and a lower than expected count (6 instead of 9) in the Yes column for the group classified as Unversed in the effectiveness of their information technology use. This can be seen in
Figure 7.

FIGURE 7.
LOCAL CONSULTING FIRM BY IT USE EFFECTIVENESS CROSSTAB

		No	Yes	Total
Savvy	Count	49	60	109
	Expected Count	64.8	44.2	109.0
Blossoming	Count	28	8	36
	Expected Count	21.4	14.6	36.0
Base	Count	236	151	387
	Expected Count	230.1	156.9	387.0
Unversed	Count	17	6	23
	Expected Count	13.7	9.3	23.0

Figure 8 shows the contingency table for the Publications and Web group - with a higher than expected count in Savvy and Blossoming, and a lower than expected count in Base and Unversed.

FIGURE 8.
PUBLICATIONS & WEB BY IT USE EFFECTIVENESS CROSSTAB

		No	Yes	Total
Savvy	Count	85	24	109
	Expected Count	88.8	20.2	109.0
Blossoming	Count	22	14	36
	Expected Count	29.3	6.7	36.0
Base	Count	326	61	387
	Expected Count	315.2	71.8	387.0
Unversed	Count	19	4	23
	Expected Count	18.7	4.3	23.0

In Figure 9, the Friends and Family contingency table shows a higher count than expected in the Yes column for both Base and Unversed, while showing a lower than expected count for Savvy and Blossoming.

FIGURE 9.
FRIENDS AND FAMILY BY IT USE EFFECTIVENESS CROSSTAB

		No	Yes	Total
Savvy	Count	105	4	109
	Expected Count	95.8	13.2	109.0
Blossoming	Count	33	3	36
	Expected Count	31.7	4.3	36.0
Base	Count	333	54	387
	Expected Count	340.3	46.7	387.0
Unversed	Count	17	6	23
	Expected Count	20.2	2.8	23.0

The next two contingency tables show a fairly close to expected count. Figure 10 shows the results for using Vendors (Microsoft, Oracle,CompUSA,Staples,Dell, & Gateway were given as example) as a trusted knowledge source.

FIGURE 10.
VENDORS BY IT USE EFFECTIVENESS CROSSTAB

		No	Yes	Total
Savvy	Count	83	26	109
	Expected Count	81.7	27.3	109.0
Blossoming	Count	27	9	36
	Expected Count	27.0	9.0	36.0
Base	Count	286	101	387
	Expected Count	290.1	96.9	387.0
Unversed	Count	20	3	23
	Expected Count	17.2	5.8	23.0

For the Top Consulting Firms, (Gartner, Giga, Meta, & Forrest were given as examples) shown in

Figure 11, the counts and the expected counts for each group of technology use are also fairly close.

FIGURE 11.
TOP CONSULTING FIRM BY IT USE EFFECTIVENESS CROSSTAB

		No	Yes	Total
Savvy	Count	108	1	109
	Expected Count	104.9	4.1	109.0
Blossoming	Count	36	0	36
	Expected Count	34.6	1.4	36.0
Base	Count	369	18	387
	Expected Count	372.4	14.6	387.0
Unversed	Count	21	2	23
	Expected Count	22.1	.9	23.0

In Figure 12 we can see that eight of the cells had values of less than five.

FIGURE 12.
NUMBER OF SOURCES BY IT USE EFFECTIVENESS CROSSTAB

		No Sources	Few Sources	Some Sources	Many Sources	Total
Savvy	Count	3	98	7	1	109
	Expected Count	6.3	97.0	5.1	.6	109.0
Blossoming	Count	5	28	3	0	36
	Expected Count	2.1	32.0	1.7	.2	36.0
Base	Count	22	347	16	2	387
	Expected Count	22.3	344.5	18.1	2.1	387.0
Unversed	Count	2	21	0	0	23
	Expected Count	1.3	20.5	1.1	.1	23.0

DISCUSSION

Our findings display solid empirical evidence that decision makers who effectively use information technology more often seek the advice of local consultants as well as doing their own reading of web and print publications. This is not surprising unless taken in the context of the lack of support for seeking the advice for top consultants and vendors information. There is obviously a qualitative difference in the usefulness of these three different sources of knowledge.

Nor is it surprising that decision makers who trust friends and family tend to do less well in effectively utilizing information technology. Friends and family are the "easy" route to obtain knowledge, and chances that the friends or family happen to have the specific information technology knowledge needed by the decision maker are remote.

The lack of support for Top Consultants having an impact on effective IT use may be a factor of the low incidence for seeking this source. After all, top consultants are very expensive, and our sample matches the typical population of businesses, 85% of which are on the smaller side. However - one would think that even among the non-significant findings there would be a higher than expected count to Top Consultants among the Blossoming and Savvy, and that does not seem to be the case.

It also does not appear that effective IT use has any relationship with seeking or trusting information from Vendors, and this source does not suffer from low incidence. It would appear that obtaining IT knowledge from vendors does not help in becoming a more effective IT user.

Seeking additional sources of knowledge also does not seem to impact IT effectiveness. It may be, especially among the organizations who utilize technology more effectively, that a single source of knowledge, if trusted, is good enough.

Limitations

Before itemizing our conclusions and implications of our results, it should be noted that there are several limitations to this study.

What we cannot establish with this research design is whether the surveyed decision makers utilize technology more effectively *because* they seek out and trust local consultants as sources of knowledge, or if they seek out and trust local consultants as their source of knowledge *because* they utilize technology more effectively. Similarly, we cannot say that reading print and web publications about information technology **cause** more effective use of information technology. Both of these findings could be explained by a third variable for which we have not controlled. One example might be simply good leadership or decision making skills. It would make intuitive sense that good decision makers spend time and energy seeking out information on topics before making decisions, and therefore become more effective at utilizing that knowledge. Not so successful decision makers don't tend to expend the effort, and therefore would not be as effective at utilizing the knowledge. The fact that not all sources of knowledge were found to have a significant impact, however, leads credence to the idea that there is something qualitatively different about these two sources of knowledge.

Another limitation could be the localization of the sample. Even though our sample seemed representative in terms of size and industry of the nation's business as a whole, these businesses were all from one geographic location, a region of about 100 square miles in southeastern Pennsylvania just northwest of Philadelphia. There may be some unseen geographic or cultural element that would limit the generalizability of our findings.

Secondly, the operationalized definition of Effective Information Technology Use has not been heavily validated beyond the judgment and experience of the researcher's personal knowledge of a small sample of the companies. The variable was not defined prior to the study - but rather indirectly established using existing questions and responses. Although we feel this method is superior to more subjective assessments of the decision makers being surveyed, it may limit our ability to infer more broadly based conclusions.

Lastly, although multiple sources of knowledge were possible and encouraged in the instructions, respondents may have interpreted the question to be looking for one primary source. This limits the usefulness of the sixth hypothesis, and may be the reason for the large number of decision makers who only reported one source of trusted knowledge.

CONCLUSIONS AND IMPLICATIONS

The results of this study have implications for both researchers and managers.

Research Implications

There are several implications for researchers based upon this study. The relatively high chi-square value of the impact of using local consultants as a trusted source (Pearson chi-square

16.89, *p* = .001) provides strong empirical evidence that seeking the advice of local consultants makes a difference. The fact that there is an impact on effective IT use when decision makers use print and web sources of knowledge is also an important finding. Both directions would benefit by more specific research. As noted in the limitations, our research cannot adequately determine whether effective IT users use local consultants or if local consultant cause more effective IT use. This finding may spur future research of many questions. Which is the cause and which is the effect? What characteristics of decision makers led them to these sources of knowledge? What type of help did the local consultants provide which impacted the effectiveness of IT use the most? The same questions could be asked of web and print resources.

It would also be useful to reproduce the results of this survey among a more geographically disbursed sample of businesses. Further validation of the effective information technology use variable would also be helpful. Finally, observation of a number of actual decision makers in the midst of the decision making process would provide more direct insight into the number and type of sources used, which may correlate with effective use of information technology.

Managerial Implications

Perhaps the most important aspect of this research, however, is the practical implications for managers. Pending future contradictory studies, it would not seem to be a good idea to invest in expensive top consultants. Local consultants seem to do a measurably better job. This research would imply that decision makers should do their own readings of print and web information about the IT they are considering using.

Even more specifically, asking friends and family for advise would seem to be contraindicated. Doing so may lead the decision maker astray, leading to less effective It use within their organizations.

Further implications from this research is that once a decision maker has a trusted source, they don't necessarily need to find many other confirmations of that source. It doesn't appear to be necessary to obtain further knowledge from the vendor or from the top consultants.

In conclusion, it does appear to make a difference which sources of knowledge are used by decision makers regarding information technology. Local consultants as well as print and web sources of knowledge seem to have the best impact on utilizing information technology effectively within the organization. Friends and family impact effective IT use negatively, and should probably be avoided. Seeking advice from top consultants and vendors had no impact on effective IT use.

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