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Exploring I.T. Innovation in a Sample of Kentucky Nonprofits

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Exploring I.T. Innovation

In a Sample of Kentucky Nonprofits

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Executive Summary

Nonprofit organizations today face an increasingly competitive landscape and often operate under the motto of “doing more with less.” As nonprofits struggle to balance mission fulfillment with financial support, information technology [IT] is usually deemed a luxury or acquired as-needed. I posit, however, that technological innovation must be considered a crucial element to staying competitive, efficient, accountable, and engaged with supporters.

After conducting a survey of a sample of Kentucky nonprofits [NPOs], I explore a number of organizational characteristics that might predict the information technology budget, especially with respect to IT innovation. I combine a set of explanatory variables in bivariate and multiple regression analyses. Of my observed variables, the number of employees, number of volunteers, and the frequency of introducing new IT items all correlate positively with IT expenses. Nonprofits with a board that sets the IT budget on the other hand, reported significantly lower amounts for their IT expenses.

As significant as these variables are, I also discuss explanatory variables that did not always correlate with IT spending—mainly process innovation (introduction of new methods) as well as strategic and operational planning. While the results of this study are limited to the sample surveyed, I outline recommendations for two primary types of organizations: those wishing to secure more funds for IT budgeting and those wishing to prepare for future uses of information technology.

Introduction

To say that information technology [IT] has changed nearly every aspect of modern life is potentially an understatement. In addition to improving processes and efficiency of producers, technology has transformed the very ways in which humans communicate on a daily basis. Phone calls and face-to-face conversations are increasingly replaced with instant e-mails or text messages. Today, roughly 50-54 percent of Americans have internet access at their fingertips on a cellular “smartphone” (Nielsen, 2012) while just about anyone can access the web for free at a local library or café. With the number of mobile internet devices predicted to outnumber people on the planet this year (Arthur, 2013), it will soon be hard to imagine a world not so thoroughly connected.

Nonprofit Organizations in a Digital Age

The not-for-profit sector is likely most impacted by the electronic arena since it often operates under limited or restricted resources. Although physical access to the internet has increased dramatically in the past decade, individuals served most by nonprofits are the least likely to use technology—especially illiterate, disabled or indigent populations, persons with English as a second language, and senior citizens (Zickuhr & Smith, 2012). Continual shifts in the technology landscape and the ubiquitous nature of instant access, however, greatly impact nonprofit “branding” and the funding mechanisms which help sustain services (Hoffman, 2013).

Perceptions and Expectations

With a substantial portion of the charitable sector funded by the government—hundreds of billions of dollars each year in direct grants and the equivalent amount through indirect tax exemption savings (Smith, 2006)—many nonprofit organizations [NPOs] are beholden to the reporting and evaluation methods of federal administrations. In May, 2012, the White House

issued a new budget directive to go into effect in 2014 requiring grant-making agencies to increase the use of evidence in grant formulas, forcing them to prioritize programs with greater levels of verification and proof of outcomes (Stern, 2013, p. 209-210).

Beyond answering to federal agencies, nonprofits also face increased public scrutiny and expectations, especially in light of prominent scandals. Surveys of Americans often highlight the distaste for excessive fundraising and overhead compensation as well as a lack of confidence in effective performance (Ellison Research, 2008; Light, 2008). With a minority believing charities to be honest and ethical, the burden of trust will rest primarily on showing results and increasing transparency (Rhode & Packel, 2009). What is more, connected datasets will soon aid local funders in their decision-making process, requiring more strenuous reporting for grant recipients (Leczner, 2012). Since the internet is omnipresent and relatively inexpensive to access, nonprofit agencies should consider information technology an essential component in tracking and reporting results to investors.

Workload and Efficiency

In addition to effecting revenues, digital information also impacts efficiency as items are quickly retrieved, tagged, saved, filed, and renamed in convenient folders and formats. “Access to information can change the location and nature of decision making, entire job classifications disappear while new ones are created, layers of management are eliminated, organizational politics take on new dimensions and jobs can become more or less satisfying to workers,” (Kraemer & Dedrick, 1997). Technology continues to streamline the real-time and remote access of data. In all sectors of the economy, the diffusion and pervasive uses of IT (hardware, software, applications and telecommunications) have created new ways to transmit, store, arrange, manipulate, and act on information exchanged between organizations, consumers and citizens.

Moreover, the core parts and accessories of computers, “continue to get better, faster, cheaper, and easier to use, enabling new applications to be introduced on a regular basis,” (Atkinson & McKay, 2007).

In 2003, Saidel and Cour conducted in-depth interviews with twenty-three employees at three nonprofit agencies to explore ways in which information technologies have changed the nature and distribution of work and workplace relationships. Although the larger human service organizations were chosen to control for size, age, service area, and involvement with government contracts, all employees—ranging from executive directors to administrative support staff—described complex alterations in job satisfaction, workload and distribution of power with the introduction/expansion of a technological process. Many stated continuous IT learning boosted their job satisfaction while others pointed to the immediate gratification of task completion, access to information, report designing and workflow control as contributors to increased interest and satisfaction (Saidel & Cour, 2003).

Activism, Community and the Net

More than just an internal operations mechanism, the internet serves as a dynamic medium for “human service organizations to build coalitions and networks and to advocate for their clients, causes and principles.” Public education, awareness, reminders and notifications, databases, mapping, fundraising, and community discussions are all produced in digital formats and perpetuated with minimal effort. Technology facilitates nearly all of the traditional methods for community activism and agencies can both engage supporters more frequently and publish information faster than ever before. NPOs may even reach individuals that otherwise would not participate or voice their opinions publicly (Hick *et al*, 2002). The general public is connected

electronically now more than ever and nonprofits can (and do) seize opportunities to engage supporters online.

Innovation and Survival

With 1.1 million unique nonprofit organizations in America alone (Stern, p.2), there has been a shift in focus to marketization and competition. In nearly all sectors of the economy, innovation and reinvention are praised as ways to maintain a competitive edge. A number of authors have discussed innovation as key to survival in both nonprofit and for-profit organizations (Choi, 2012). In describing their research on information technology adoption, Burt and Taylor reiterate, “heightened competition for both funding and volunteers, accompanied by acute pressures to deliver performance improvements, bring strong imperatives for organizational transformation,” (Burt & Taylor, 2003).

In a 2001 survey, Durst and Newel interviewed 87 nonprofit employees across 27 states to discover just how and why the organizations underwent reinvention. Central to each change was the introduction of new processes and technologies, strategic planning, and increased opportunities for employee participation. Executives and governing boards were listed as the two most influential actors in driving reinvention, and leadership is often cited as the catalyst for successful change (Durst & Newell, 2002). Innovation supported from a top-down charge is also realized most in nonprofits with senior management and the board of directors supporting a range of IT decisions, since leadership support often translates IT resources into strategic organizational results (Hackler & Saxton, 2007).

In regards to the development and usage of resources, it is important to define strategic and operational plans. A strategic plan is often considered, “a tool that provides guidance in fulfilling a mission with maximum efficiency and impact” while an operating plan is, “a

coordinated set of tasks for carrying out the goals delineated in a strategic plan.” Planning for the organization’s strengths and weaknesses in the short term operationally and longer-term strategically can pinpoint new opportunities for growth or root causes for innovation (Mittenthal, 2002).

Research Design

Problem Statement

The acquisition and use of information technology has ramifications in the nonprofit sector for community activism, workplace efficiency, organizational survival, and accountability. The limited, and at times restricted, nature of funding can push technology purchases into an ‘as needed’ or ‘luxury’ category. The total IT budget, however, is likely a practical gauge of whether or not nonprofits are purchasing and/or maintaining equipment that facilitates more efficient operations. I define the primary research questions:

Which organizational characteristics predict the IT budget of a NPO?

Do frequent innovators spend more or less on IT?

Following the literature discussed already, both information technology and innovation are important factors for the efficiency and continued existence of a nonprofit organization.

Method and Sample Selection

In order to gain a more comprehensive picture of Kentucky nonprofits than what is available on public documents such as the IRS 990, I conducted an original electronic survey utilizing five primary sources: volunteermatch.org, idealist.org, United Way of the Bluegrass [Central Kentucky], Metro United Way [Louisville area] and United Way of Greater Cincinnati [Northern Kentucky region]. The survey was sent to roughly 1,224 individual contacts found online through these networked/hub sites. The focus of my study is the nonprofit organization,

which was specified as the local chapter or immediate physical location of the 501(c)(3). This convenience sample technique was combined with a snowball method in that each respondent was asked to forward the survey link on to other 501(c)(3) organizations in their network. Table 1 details the number sent and returned.

Table 1 – Sent & Returned Surveys

	<i>Estimated Total #</i>	<i>% of Total</i>
Sent – via network or hub	738	60.3%
Sent – Direct E-mail	329	26.9%
Sent – Direct Website	157	12.8%
Return – <i>Failure/ Failed</i>	95	7.8%
Return – <i>Out of Office</i>	22	1.8%
Return – <i>Undeliverable</i>	11	0.9%
Partial Response	78	6.4%
Submitted Response	51	4.2%
Total Sent	1,224 †	100% †

† The sample was not probabilistic and a snowball sampling technique used. It is difficult to estimate a total number that may have seen the survey link yet dismissed it.

Table 1: Summary of the number of electronic surveys sent and returned.

The snowball technique, while expedient and used to capture “hard to reach” nonprofits, limits my ability to estimate a total population. There is no way to tell which nonprofits received the email invitation (from a survey respondent) yet dismissed the link. To prevent early survey abandonment, each question offered “unsure” or “not applicable” as an answer and every response was optional. A complete inventory of questions, with aggregate response rates and end notes, is available in **Appendix A**. The least answered question (n=32) involved IT expenses, my dependent variable.

Literature suggests that the size of an organization, mainly revenues and employment capacity, positively correlates with IT adoption (Finn, 2006) but there is very little academic research regarding factors that may influence technology *spending* at the organizational level. As such, I modeled much of my questionnaire around field surveys inquiring about nonprofit IT expenses, planning and usage—especially the Bayer Center for Nonprofit Management and the

Nonprofit Technology Enterprise Network surveys. For this study, I will attempt to predict the IT budget by synthesizing organizational variables in a stepwise multiple regression analysis, using Stata 12 software, building from single variable relationships to many. The investigative nature of stepwise estimation is acceptable here since the non-probabilistic convenience sample already limits the generalizability of results.

Variables and Measurement

For my survey, information technology [IT] was defined as the usage, planning, and upkeep of electronic communication across computer systems, with portable internet devices such as smartphones, laptops and tablets included as computers. Examples of IT infrastructure were provided and *expenses* defined as any *hardware, software, and/or network* purchase price, license/use/administrative fees, maintenance/repair fees, staffing/consulting, certification and training.

Although a majority of 501 corporations [nonprofits] reconcile their operating budgets and assets through some version of the IRS 990 form each year, I found this to be an insufficient source for IT expenses (analyst search of a number of large organizations that did not report an amount in line 14 of Section IV; see **Appendix B**). Moreover, the 990 categorizes IT employee compensation on separate lines, and the 990-EZ does not address information technology at all. Since tax forms do not reflect the full IT budget in a standardized way, it is estimated in the survey as the sum of both equipment and human capital, averaged over two years. The dependent variable of annual IT expenses was estimated to the nearest \$100 for 2011 and 2012, for both devices/fees and human resources/expertise.

The first set of explanatory variables measure the organizational size and include the annual revenues, employment capacity, age, and number of volunteers working with the agency.

Total annual revenues were averaged over 2011 and 2012, rounded to the nearest thousand. Since I have a relatively small sample set, 2011 budgets were reconciled for seven agencies when no operating budget was given for either year (Foundation Center's online *990 Finder*, search name and state). With respect to the mean [averages] of revenues and IT expenses, non-response was treated as missing data and only entered as zero when explicitly stated.

Total employment was measured as the number of full-time and part-time workers, both paid and unpaid. The number of volunteers that work with the organization annually is defined as a categorical variable (under 50, 50 to 200, and over 200). Because information technology can be used to improve efficiency and expedite communication, I expect a positive correlation with the management of larger human resources (both employee and volunteer) to the IT budget. As a final size variable, I also include a number of years in existence to account for the "new" versus "established" characteristics that may impact all aspects of budgeting, including IT.

Another explanatory variable of interest relates to the organization's dependency on IT and is measured through three questions: what percentage of internal operations requires the use of *computers* and the *internet* (each a percentage of daily tasks, from 0-100) and *how important is IT infrastructure to maintaining delivery of services to clients* (interval scale 1 to 5 rounded to the nearest tenth, one being not important or not applicable, five being very important to service delivery). I expect higher scoring for these questions to correlate positively with IT spending since the organization is more reliant on continued access and upkeep of their computer systems.

The survey also asked if written strategic and/or operational plans were in place, and if either addressed the use of information technology (which translates to a single categorical variable of operational/strategic/both addresses IT). Additionally, since leadership decisions greatly impact an organization's focus and use of resources, whether or not the agency's board

determines the IT budget is also included as a dummy variable (1 = yes, 0 = no). Though this answer choice was only available for those answering yes to having a board, and belonged to a multiple-response question (*who sets the IT budget for the organization?*), I include the board influence as well as planning variables to examine whether or not supervisory preparation plays a role in IT expenses.

My final set of explanatory variables attempt to measure how innovative the organization is, with innovation defined as *the introduction of a new item, method or process*. Respondents gauged how often software, hardware and network/databases underwent changes for both *new products (items)* and *new processes (methods)*. A total of six IT innovation scores were measured using 1 to 5 interval scales, rounded to the nearest tenth, one meaning never or not applicable and five meaning very frequently. Since an IT innovation score suggests a level of technology adoption for the agency, I am interested in how the variable correlates with IT spending. Table 2 summarizes the variables considered in my analysis.

Table 2 – Primary Variables Considered

Variable	Type	Measurement
IT Expenses	Interval	\$ Thousands, mean of 2011 and 2012
Revenues	Interval	\$ Millions, mean of 2011 and 2012
Total Employment	Interval	# Employees, PT + FT (paid + unpaid)
Age	Interval	# Years in existence
Volunteers	Categorical	Under 50, 50-200, Over 200
Computer/Internet Use	Interval	Percent, 0-100
Delivery Reliance on IT	Interval	Importance scale, 1-5
Planning for IT	Categorical	Operational, Strategic, Both
Board Influence on IT	Dummy	Board sets IT budget, 1= yes
IT Innovation	Interval	Frequency of introduction, 1-5
Concepts to mission	Interval	Importance scale, 1-5

Table 2: Summary list and measures of the observed variables included in this study.

Lastly, interval scales are used when asking *how important are each of the following concepts to fulfilling the organizational mission*: innovation, flexibility, strategy and technology,

one meaning not at all important or not applicable, five meaning very important to the mission. I expect agencies scoring higher on these four concepts to be more adaptable overall (aside from IT innovation) but am uncertain of any directional correlation to IT expenses. Since the primary concern is with organizational characteristics, I do not include any institutional variables such as management style, internal culture, and performance/assessment.

Results

Descriptive Context

One hundred and fifty-nine years separate the youngest and oldest nonprofits in my dataset while \$40.1 Million dollars separate the largest and smallest. Fifty one percent identified as human service agencies (detailed summary statistics regarding age and categorical selection are available in **Appendix C**). With such a wide range of responses in the sample set, I define three categories for ease of comparison in analyzing budgetary statistics: *small* is less than \$1 million annually, *medium* is \$1 - \$5 million, and *large* is greater than \$5 million.

Table 3 – Annual Revenues (in \$ millions) by size

	n	Min	Max	Mean	Median	Std. Dev
<i>Small</i>	24	0.001	0.872	0.267	0.103	0.293
<i>Medium</i>	14	1.100	4.798	2.442	2.308	1.247
<i>Large</i>	10	5.625	40.769	18.191	17.477	10.586
All	48	0.001	40.769	4.626	0.986	8.498

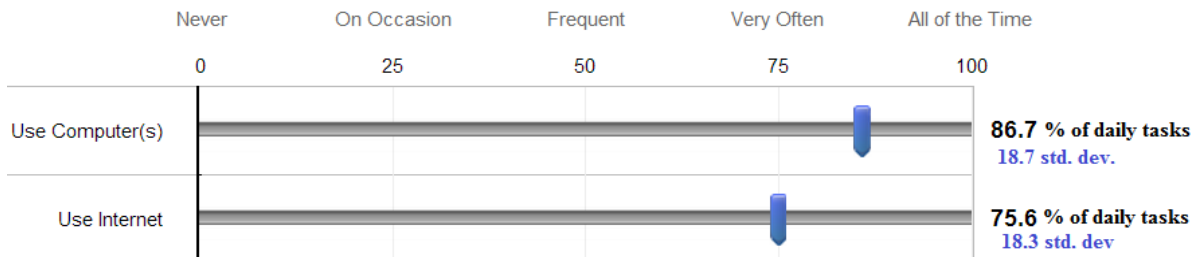
Table 3: Summary of annual revenues, by size of organization (n=48). Seven budgets (2011) were reconciled using publicly available 990 forms but were inaccessible for three organizations.

Seventy-eight percent (or 40) organizations have either a written or strategic plan in place, while 57% of these (or 29) report at least one of the plans did address the use of information technology. When known, the strategic plan most often spanned five years (40%) but is closely followed by a length of three years (31%). All but two organizations had an active

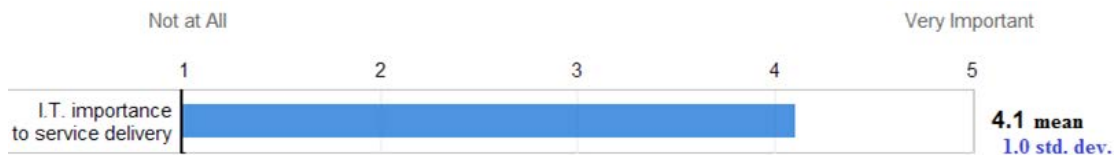
website. Figure 1 offers a visual representation of the scales used to measure other variables and also provides the mean and standard deviation for submitted surveys.

Figure 1: Importance Scaling

a. *What percentage of internal operations require computers and the internet?*



b. *How important is IT infrastructure to maintaining delivery of services to clients?*



c. *How important are the following concepts to fulfilling the organization's mission?*

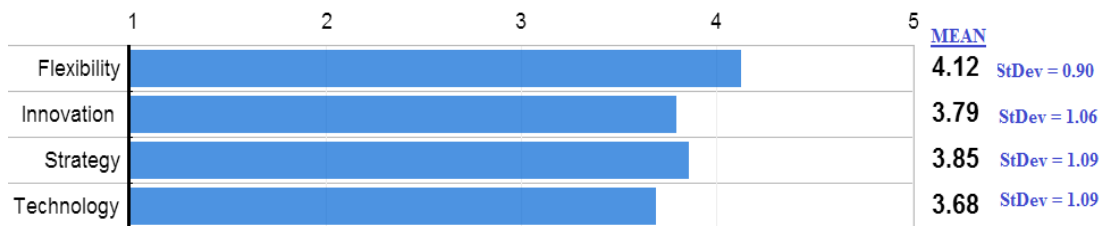


Figure 1 a-c: Mean scores (n=51) and examples of how respondents used scales on the survey.

The average organization reported using computers 86.7% of the time (for internal operations and daily tasks) while the internet is used about 75.6% of the time. Although at first glance this may seem alarming for a *service* sector such as nonprofits, these numbers support the omnipresent nature of the web and technology in their priorities and activities, as was discussed earlier. Instructions were not specified for what should be included or excluded with “internet” so responses may have combined a variety of functions, such as communications, e-mails, research, grant funding, marketing, and advocacy into this category.

There was very little variance in a number of the 1-5 scaled responses. A factor analysis of the reliance on IT service delivery (Figure 1a) with the importance of strategy, flexibility, innovation, and technology to mission fulfillment (Figure 1c) produces very little uniqueness between each measure. Therefore, I have summed the importance scales to redefine a variable *Importance_{all,adaptive}*. A separate factor analysis of the innovation variables (product and process, each containing the components of software, hardware and network/database) yields little uniqueness across the three subcategories. I create summed variables for *Innovation_{product}* and *Innovation_{process}* in an attempt to decipher new items from new methodologies.

Only 62.7% of agencies answered the question regarding IT expenses (n=32), limiting my final analysis to an even smaller subset of responses. Table 3 outlines the expenses reported, by annual budget size small, medium and large.

Table 3 – IT Expenses by size

	Devices Small (20)	Expertise Small (15)	Devices Medium (9)	Expertise Medium (7)	Devices Large(3)	Expertise Large(3)
<i>Min (\$)</i>	0	0	700	725	0	200
<i>Max (\$)</i>	6,660	6,500	50,000	67,500	64,800	135,000
<i>Mean (\$)</i>	1,640	807	19,388	22,704	17,706	34,200
<i>Median (\$)</i>	1,000	300	13,089	9,125	3,012	800
<i>Std Dev (\$)</i>	1,902	1,699	18,578	27,939	31,470	67,201

Table 3: Reported IT expenses for [Devices + Fees] and [Expertise + Human Resources], averaged for 2011 and 2012. N = 32

Due to the number of non-responses for my dependent variable, I ran a series of t-tests to see if characteristics of both populations were considerably different (1 = reported at least one IT expense, 0 = did not report any). The only variables with statistical significance between the two populations is total employment (t=2.38, p=0.02) and total revenues (t=2.72, p=0.009), indicating that organizations with much smaller capacity—on average 111 less employees and \$6.1 million less in revenues—responded to the IT expense question more often. I continue my

analysis with an understanding that larger nonprofit organizations are not as well represented in the regression estimation.

Regression Analysis

Before attempting a stepwise multiple regression, I first ran a series of bivariate analyses, regressing each of my observed variables onto the dependent variable, IT expenses. The coefficient estimations are crude since they do not simultaneously control for one another, but this approach is a good starting point for discovering the most important interactions with IT spending. Table 4 lists the coefficients of robust correlation, p-values, and R² values.

Table 4 – Bivariate Regression on IT Expenses (\$1,000s)

<i>Explanatory Variable</i>	<i>Coeff.</i>	<i>P-Value</i>	<i>R²</i>
Annual Revenues (\$M)	2.37	0.37	0.070
Age (years)	0.37	0.03 **	0.116
Total Employment(#)	0.83	0.01 **	0.356
Volunteers_under 50	-23.00	0.03 **	0.070
Volunteers_51-200	-14.75	0.20	0.031
Volunteers_200 plus	37.21	0.06 *	0.192
Use of Computers	0.20	0.29	0.012
Use of Internet	0.14	0.53	0.004
Importance _{all, adaptive}	1.89	0.18	0.031
IT Innovation _{product}	4.80	0.04 **	0.095
IT Innovation _{process}	2.62	0.16	0.032
Strategic Plan has IT	25.80	0.09 *	0.103
Operational Plan has IT	30.24	0.06 *	0.139
Both Plans have IT	25.94	0.05 **	0.104
Board Sets IT budget	-34.00	0.03 **	0.176

Table 4: Robust statistics for bivariate relationships with IT. N=32, p < 0.1* p < 0.05**

Shaded cells indicate a 95% confidence levels; three largest R² values are in bold.

Age, total employment, and having either less than 50 or more than 200 volunteers are four *size* variables that have the most bivariate significance. Product innovation, planning for IT at any level, and board decision also have some significance for IT spending.

Keeping these correlations in mind, and utilizing the descriptive inferences of higher R^2 values, I then ran a series of multiple regressions, adding the most significant variables first and removing some when there was evidence of multicollinearity (using variance inflation factors). The stepwise building methodology helps to refine the model because a small number of observations ($n=32$) limits the degrees of freedom. Total revenues, while not significant, are kept in because it must be controlled for given the inclination for smaller organizations to respond to the IT question in the first place. The final regression model, with summary statistics is presented in Table 5.

Table 5 – Multiple Regression on IT Expenses (\$1,000s)

<i>Explanatory Variable</i>	<i>Coeff.</i>	<i>Std.Error</i>	<i>P-Value</i>
Annual Revenues (\$M)	0.414	1.51	0.786
Total Employment (#)	0.451	0.22	0.049 **
Volunteers, 200 plus	22.96	11.44	0.056 *
Use of Computers (%)	- 0.22	0.206	0.302
IT Innovation _{product}	4.48	2.00	0.035 **
Operational Plan has IT	11.52	9.16	0.221
Board Sets IT budget	- 21.34	9.37	0.032 **

N=32 $R^2 = 0.557$ $p < 0.1^*$ $p < 0.05^{**}$

Table 5: Robust multiple regression statistics for IT expenses; $n=32$,

Age was excluded from the final model due to collinearity with total employment. Importance_{all, adaptive} and working with fewer than 50 volunteers were not significant in any of the stepwise estimations and were subsequently dropped. Use of *computers* ran collinear with use of the *internet*, as did *process* innovation with *product* innovation (only one from each pairing is retained in the final regression). It is interesting to note, however, that innovation is statistically significant only when *product* is included, but not *process*.

Discussion and Analysis

Statistical Interpretation

The robust regression model presented in Table 5 has descriptive power for the sample set with an overall P-value of 0.0196—implying there is roughly a 2% chance that my results are due to random error, or noise. Approximately 56% of the variation in IT expenses can be explained using the variables I have incorporated ($R^2 = 0.557$). Significant explanatory variables of note are total employment, having 200 or more volunteers, product innovation, and board decision over IT spending.

Since the IT budget was converted to thousands, interpretation of the coefficients should be put into a clearer context. At 94-95% confidence levels, and holding all other explanatory variables constant, organizations spend more on employees and large numbers of volunteers. For every one employee the average organization spends \$451 on IT. Nonprofits that collaborate with 200 or more volunteers annually, on average, spend \$22,960 more on their IT infrastructure than nonprofits working with fewer volunteers. Given the human service orientation of the majority of nonprofits in my sample, both of these relationships make intuitive sense. The implication is that organizations spend more for IT when they have an increasing number of individuals they must manage.

The introduction of new products and the board's influence over IT budgeting are both significant at the 96-97% confidence level. That is where the similarities end however, since they have very different magnitudes and opposing directional influence. Product innovation is difficult to interpret because it was a subjectively scaled response but the inference here is that organizations that introduce hardware, software, and network/database *items* more frequently spend an additional \$4,480 per one unit increase on the 1-5 frequency scale. This result is not all

that surprising since the acquisition of new technology items typically comes with a price tag.

When the product innovation variable is replaced by process innovation, however, the statistical significance is lost, implying that IT innovation, by itself, does not always translate into more IT spending. Upon reviewing responses to an open-ended survey question *briefly describe a new IT item, method or process the organization has undertaken in the last year*, a number of nonprofits stated they were revamping their client and donor databases, upgrading software, acquiring physical equipment and/or taking advantage of new processes through the use of cloud services.

Lastly, the board decision over IT budgeting is significant and negatively correlated. Organizations with a board determining (or at least contributing in the setting of) the IT budget spend, on average, \$21,340 less than those with no board influence. This relationship was particularly surprising but is likely a result of smaller organizations—which are more heavily weighted in the sample—having less autonomy over their budgeting practices, including IT.

Error and Limitations

There are limitations to the study in a few ways, mainly with respect to generalizability (external validity) and the subjective nature of scaled responses (measurement error). The high correlations between all importance scales (1-5) as well as between internet and computer usage may indicate an amount of response error, or a misunderstanding of my survey questions. Administering the questionnaire once more in the future would help to tease out the high or low rating tendencies that are unique to each respondent. A panel data set [repeat to the same respondent] would help to eliminate some of the measurement bias but is not available at this time. In addition, omitted institutional variables such as management style, internal culture, and “tech knowledge” may very well play a role in IT budgeting but were left out of this survey.

Nonprobabilistic sampling restricts my ability to draw conclusions about NPOs outside the dataset. Although the convenience sample and snowball technique limit the applicability of results, the exploratory analysis is still a unique contribution in deciphering which organizational characteristics contribute to IT spending.

Recommendations

When asked to indicate a challenge to IT innovation, twenty-five of the thirty-two organizations (78%) included in the regression analysis, and 84% of all respondents, admitted the general costs of IT (i.e. funding) played a role. I believe my findings are useful for pointing out some recommendations in this area. Mainly, if organizations would like to secure more funds for information technology, they should encourage leadership support for IT at the board level. Since a nonprofit board is meant to ensure responsible investment of public and private dollars into the agency, convincing these decision makers of technology's significance is key.

A step toward obtaining stakeholder buy-in will likely include the advanced planning for IT uses. Since planning for IT on any level did not significantly impact IT expenses when holding other characteristics constant, nonprofit agencies with [or without] limited funding could benefit from operational and strategic preparation.

Similarly, the introduction of new methodologies, or process innovation, also did not significantly impact the IT budget. Organizations may consider revising their current IT practices and take advantage of internet engagement, cloud-based services such as Google Docs, and/or open source [free] software applications. While new processes usually require an investment of time and development, IT may very well streamline existing practices to conserve considerable resources in the longer term.

References

- Arthur, C. (2013). Mobile internet devices will outnumber humans this year. *Guardian*. Retrieved from <http://www.guardian.co.uk/technology/2013/feb/07/mobile-internet-outnumber-people>
- Atkinson, R.D. & McKay, A.S. (2007). Digital Prosperity: Understanding the Economic Benefits of the Information Technology Revolution. *The Information Technology & Innovation Foundation*. www.innovationpolicy.org
- Burt, E. & Taylor, J. (2003). New Technologies, Embedded values, and Strategic Change: Evidence from the U.K. Voluntary Sector. *Nonprofit and voluntary Sector Quarterly*, 32(1), 115-127.
- Choi, S. (2012). Learning Orientation and Market Orientation as Catalysts for Innovation in Nonprofit Organizations. *Nonprofit and Voluntary Sector Quarterly*, (Summer) 1-21. DOI: 10.1177/0899764012465491
- Durst, S.L. & Newell, C. (2001). The Who, Why, and How of Reinvention in Nonprofit Organizations. *Nonprofit Management & Leadership*, 11(4), 443-457.
- Ellsion Research (2008). Most Americans Believe Non-profits Spend Too Much on Overhead. Retrieved from <http://www.charitynavigator.org/index.cfm?bay=content.view&cpid=727>
- Finn, S., Maher, J.K., & Forster, J. (2006). Indicators of Information and Communication Technology Adoption in the Nonprofit Sector: Changes Between 2000 and 2004. *Nonprofit Management and Leadership*, 16(3), 277-295.
- Forster, J.J., & Ruzanic, R.G. (2010). Nonprofit Technology Survey 2010. *Bayer Center for Nonprofit Management*.
- Foundation Center. (2012). 990 Finder. Retrieved from <http://990finder.foundationcenter.org/Default.aspx>
- Hackler, D. & Saxton, G.D. (2007). The Strategic Use of Information Technology by Nonprofit Organizations: Increasing Capacity and Untapped Potential. *Public Administration Review*, 67(3), 474-487.
- Hick, S.F., & McNutt, J.G.(Eds.). (2002). *Advocacy, Activism, and the Internet*. Chicago, IL. Lyceum Books, Inc. Chapters 1-6.
- Hoehling, A. (2012). 2011 Nonprofit Technology Staffing and Investments Survey Report. *NTEEN* with *The NonProfit Times*.

- Hoffman, H. (2013) Brand New World: Nonprofit Branding in a Changing Tech Landscape. *Nonprofit Quarterly*. Retrieved from <http://nonprofitquarterly.org/management/21790-brand-new-world-nonprofit-branding-in-a-changing-tech-landscape.html>
- Kraemer, K. L, and Dedrick, J. (1997). Computing and Public Organizations. *Journal of Public Administration Research and Theory*, 7(1), 89-113.
- Lenczner, M. & Phillips, S. (2012). From Stories to Evidence: How Mining Data Can Promote Innovation in the Nonprofit Sector. *Technology Innovation Management Review*, (July), 10-15. DOI: 10.1177/0899764012465491
- Light, P.C. (2008). How Americans View Charities: A Report on Charitable Confidence. *Issues in Governance Studies*. (18). Retrieved from http://www.brookings.edu/~media/research/files/papers/2008/4/nonprofits%20light/04_nonprofits_light.pdf
- Mittenthal, R.A. (2002). Ten Keys to Successful Strategic Planning for Nonprofit and Foundation Leaders. *TCC Group*, Briefing paper, 1-12.
- Nielson. (2012). Smartphones Account for Half of All Mobile Phones, Dominate New Phone Purchases in the US. Retrieved from <http://www.nielsen.com/us/en/newswire/2012/smartphones-account-for-half-of-all-mobile-phones-dominate-new-phone-purchases-in-the-us.html>
- Rhode, D.L. & Packel, A.K. (2009). Ethics and Nonprofits. *Stanford Social Innovation Review*. Retrieved from http://www.ssireview.org/articles/entry/ethics_and_nonprofits
- Saidel, J.R. & Cour, S. (2003). Information Technology and the Voluntary Sector Workplace. *Nonprofit and Voluntary Sector Quarterly*, 32(5), 5-24. DOI: 10.1177/0899764002250004.
- Smith, S.R. (2006). The Government-Nonprofit Relationship in the United States. *The Journal of Turkish Weekly*. Retrieved from <http://www.turkishweekly.net/article/158/>
- Zickuhr, K., & Smith, A. (2012). Digital Differences. *Pew Internet & American Life*. Retrieved from <http://pewinternet.org/Reports/2012/Digital-differences>
- Zorn, T.E., Flanagan, A.J. & Shoham, D.S. (2011). Institutional and Noninstitutional Influences on Information and Communication Technology [ICT] Adoption and Use Among Nonprofit Organizations. *Human Communication Research*, 1-33.

Appendix A –I.T. Innovation Questionnaire

{see end notes for * ** *** }

(A) Organization Context + Capacity		Total responses		# in sample
1) Is this 501 (c)(3) organization located in the state of Kentucky?		73		51
	<i>Yes</i>	72	99%	51
	<i>No*</i>	1	1	0
*1a) In which state is the organization?		0		0
2) Does the organization have an active website?		78		51
	<i>Yes</i>	75	96%	49
	<i>No*</i>	3	4	2
	<i>[Unsure]</i>	0	0	0
* 2a) Who manages website content on a routine basis? Mark any that apply		75		51
	<i>Director / Executive</i>	27	36%	20
	<i>Marketing / Development</i>	25	33	13
	<i>Other (describe)</i>	18	24	10
	<i>Volunteer(s)</i>	12	16	10
	<i>IT Employee(s)</i>	9	12	6
	<i>Contract or Consultant</i>	8	11	7
	<i>Regional / Other Chapter</i>	1	1	1
	<i>[Unsure] [Friend or Family]</i>	0	0	0
3) What is the name of the organization?		70		50
	<i>Response</i>	75	96%	50
	<i>No response</i>	3	4	1
4) How many years has the organization existed? This chapter if applicable		73		51
5) The organization is related primarily to: Mark any that apply		68		51
	<i>Human Services</i>	36	49%	27
	<i>Education</i>	25	34	19
	<i>Other (describe)</i>	20	27	17
	<i>Health Services</i>	14	19	11
	<i>Community Development</i>	12	16	10
	<i>Advocacy **</i>	13	18	9
	<i>Environment**</i>	6	8	5
	<i>Charitable / Philanthropic **</i>	5	7	3
	<i>Religious **</i>	3	4	2
	<i>Arts **</i>	3	4	2
	<i>Foreign / International **</i>	1	1	1
6) How many individuals work for the organization? [# of responses]		68		51
	<i>Paid FT</i>	50	74%	39
	<i>Paid PT</i>	43	63	34
	<i>Unpaid PT</i>	18	26	14
	<i>Unpaid FT</i>	5	7	4
7) How many volunteers work with the organization each year?		64		51
	<i>More than 500</i>	13	20%	10
	<i>201 – 500</i>	10	16	8
	<i>101 - 200</i>	14	22	10
	<i>51 – 100</i>	7	11	6
	<i>26 – 50</i>	4	6	3
	<i>11 – 25</i>	10	16	10
	<i>1 – 10</i>	1	6	3
	<i>Unsure</i>	2	3	1

8) Does the organization have an official governing body, such as a Board of Directors or Board of Trustees?		64	51	
	Yes*	62	96%	49
	No	1	2	1
	Unsure	1	2	1
9) Estimate the annual operating budget ***		61	48	
	*** 2011 Revenues	50	82%	43
	2012 Revenues	49	80	40
	*** 2011 Expenses	50	82	43
	2012 Expenses	49	80	40
	No response (all)	11	18	3
(B) Importance of Technology + Budgeting		Total responses	# in sample	
10) How important is I.T. infrastructure to maintaining delivery of services to clients? 1 = not at all important [n/a], 5 = very important		62	50	
11) What percentage of internal operations requires computers? 0-100%		63	50	
12) What percentage of internal operations requires the internet? 0-100%		61	49	
13) Who determines which I.T. products to use in the organization?		63	52	
	check any that apply			
	Director / Executive	51	81%	41
	(Q8)* Board of Directors / Trustees	21	33	19
	Management	18	29	15
	IT Employee(s)	14	22	11
	Contract or Consultant **	11	17	10
	Finance Department	6	10	5
	Other	5	8	3
	Volunteer **	3	5	3
	[not applicable] [unsure]	0	0	0
13) Who sets the I.T. budget for the organization?		59	51	
	check any that apply			
	Director / Executive	41	69%	37
	(Q8) * Board of Directors / Trustees	33	56	28
	Management	11	19	9
	Finance Department **	10	17	10
	IT Employee(s) **	4	7	3
	Other	4	7	3
	Contract or Consultant **	2	3	1
	Unsure	1	2	1
	Does not apply	1	0	1
	[Volunteer]	0	0	0
14) Estimate the I.T. expenses for:		34	32	
	2012 Devices + Fees	34	100%	32
	2011 Devices + Fees	30	88	30
	2012 H.R. / Expertise	26	76	26
	2011 H.R. / Expertise	25	74	25
	No response (all)	22	X	18
(C) Strategic and/or Operational Planning		Total responses	# in sample	
15) Does the organization have either a written operational or strategic plan in place?		57	51	
	Both plans in place	31	54%	28
	Neither plan	9	7	8

	<i>Strategic Plan Only</i>	9	7	8
	<i>Operational Plan Only</i>	4	16	4
	<i>Unsure</i>	4	16	3
16)	How often does the operational plan align with daily activity?	54		51
	<i>All of the time</i>	9	17%	9
	<i>Frequently</i>	21	39	20
	<i>Sometimes</i>	2	4	2
	<i>Unsure</i>	6	11	4
	<i>Not applicable</i>	16	30	16
17)	Does the operational plan address the use of information technology?	53		51
	<i>Yes</i>	24	45%	22
	<i>No</i>	4	8	4
	<i>Not applicable</i>	15	28	15
	<i>Unsure</i>	10	19	10
18)	Does the strategic plan address the use of information technology?	55		51
	<i>Yes</i>	27	49%	23
	<i>No</i>	10	18	10
	<i>Not applicable</i>	11	20	11
	<i>Unsure</i>	7	13	7
19)	How many years are included in the strategic plan?	51		51
	<i>Does not apply</i>	11	22%	11
	<i>1 year</i>	3	6	3
	<i>2 years</i>	3	6	3
	<i>3 years</i>	10	20	10
	<i>4 years</i>	1	2	1
	<i>5 years</i>	13	25	13
	<i>More than 5 years</i>	3	6	3
	<i>Unsure</i>	7	11	7
(D) I.T. Innovation + Challenges		Total responses		# in sample
20)	How often is <i>product</i> innovation (a new item) applied to <i>1 = never or not applicable; 5 = very frequently</i>	51		51
	<i>[Hardware] [Software]</i> <i>[Network + Database]</i>	51	100%	51
21)	How often is <i>process</i> innovation (a new method or procedure) applied to <i>1 = never or not applicable; 5 = very frequently</i>	51		51
	<i>[Hardware] [Software]</i> <i>[Network + Database]</i>	51	100%	51
22)	Briefly describe a new I.T. item, method or process the organization has undertaken in the last year	40		40
23)	A challenge to I.T. innovation for the organization is <i>check any</i>	51		51
	<i>Costs, Funding in general</i>	43	84%	43
	<i>Education / Expertise</i>	25	49	14
	<i>Time / Availability</i>	14	27	25
	<i>Restricted use of funds</i>	14	27	14
	<i>Vision of leadership</i>	4	8	4
	<i>Other (describe) **</i>	3	6	3

	Board influence or control **		
	1	2	1
24) How important are the following concepts to fulfilling the organizational mission(s)	51		51
<i>1= not at all important; 5 = very important</i>			
<i>[Flexibility] [Innovation]</i>	51	100%	51
<i>[Strategy] [Technology]</i>			
<i>[other – describe]</i>	7	14	5
25) Additional comments you would like the researcher to know	20		20
26) Are you interested in seeing a summary of the results?	51		51
Yes, email is above in comments	26	51%	26
No thanks	25	49	25

Unique but Partial Responses = 78, final sample size n = 51

- * Questions/responses marked with * have logic steps built in and only appear if a condition is met.
- ** Answers marked with ** (in the sample set of 51) always appeared with another choice.
- *** 2011 operating budgets were reconciled for seven organizations using open 990 forms (When available through CharityFoundation.org and Guidestar.org, search name and state)

I.T. = Information technology. H.R. = Human resources. Introduction [first page] of survey reads:

Note for (A)

Throughout the survey, "organization" refers to the immediate, physical location of the nonprofit. If this location is a subsidiary or chapter of a larger entity, respond as questions apply to the local level and day-to-day operations.

Note for (B)

"Information technology" (I.T.) refers to the usage, planning, and upkeep of electronic communication across computer systems.

(include laptops, smart phones, tablets and other portable technologies as "computers")

Examples of I.T. Infrastructure

- Hardware** - tangible items, such as computers, printers, laptops, drives, and modems.
- Software** - programmed experiences for users of the hardware. Examples include: Microsoft Office Suite, operating systems, email applications, and video games.
- Network** - the connectivity of devices to other items (printers, computers) or the world wide web. It uses both *hardware and software* to communicate with other items and the Internet.

I.T. expenses include hardware, software, and/or network:

- Purchase price
- License / Use / Administrative fees
- Maintenance / Repair fees
- Staffing / Consulting
- Certification and Training

Note for (D)

"Innovation" is the introduction of a new process, method or item to the organization.

Appendix B – IRS 990 Forms

Part IX – Statement of Functional Expenses, Line 14 – Information Technology:

Enter amounts for information technology, including hardware, software, and support services, such as maintenance, help desk, and other technical support services. Also include expenses for infrastructure support, such as web site design and operations, virus protection and other information security programs and services to keep the organization's web site operational and secured against unauthorized and unwarranted intrusions, and other information technology contractor services. Report payments to information technology employees on lines 5 through 10. Report depreciation/amortization related to information technology on line 22.

Source - Pages 44-45 of <http://www.irs.gov/pub/irs-pdf/i990.pdf>

For tax years 2010 and later, nonprofit organizations with gross receipts of more than \$200,000 or total assets of more than \$500,000 must file the Form 990. Organizations with gross receipts of less than \$200,000 and total assets less than \$500,000 may file Form 990-EZ. Organizations with annual gross receipts of \$50,000 or less must file a Form 990-N.

Source - http://www.independentsector.org/irs_990_filing_requirements

Appendix C – Summary Statistics

Annual Operating Budget^a (in \$ millions), by size

<i>n</i>			<i>Min</i>	<i>Max</i>	<i>Mean^b</i>	<i>Median</i>	<i>Std. Dev</i>
24	Small	Rev	0.0005	0.872	0.267	0.103	0.293
		Exp	0.0005	0.856	0.244	0.108	0.251
14	Medium	Rev	1.100	4.798	2.442	2.308	1.247
		Exp	1.100	5.134	2.470	2.307	1.324
10	Large	Rev	5.625	40.769	18.191	17.477	10.586
		Exp	5.848	35.086	17.540	17.436	9.254
48 ALL		Revenues ^a	0.0005	40.769	4.626	0.986	8.498
		Expenses ^a	0.0005	35.086	4.497	0.978	7.973

a. Seven budgets (2011) were reconciled using publicly available 990 forms.

b. Average of 2011 and 2012. When only one year was listed, the mean of two years was taken to be that value. Zero values were included only when specified “0” dollars.

IT Expenses, by revenue size

	Devices	H.R.	Devices	H.R.	Devices	H.R.
<i>Size (n)</i>	Small (20)	Small (15)	Medium (9)	Medium (7)	Large(3)	Large(3)
<i>Min (\$)</i>	0	0	700	725	0	200
<i>Max (\$)</i>	6,660	6,500	50,000	67,500	64,800	135,000
<i>Mean (\$)</i>	1,640	807	19,388	22,704	17,706	34,200
<i>Median (\$)</i>	1,000	300	13,089	9,125	3,012	800
<i>St Dev (\$)</i>	1,902	1,699	18,578	27,939	31,470	67,201

Organization Age, by revenue size

Revenues	Small	Medium	Large	Unknown	All
<i>n (#)</i>	24	14	10	3	51
<i>Min (yrs)</i>	1	12	10	1	1
<i>Max (yrs)</i>	50	160	150	4	160
<i>Mean (yrs)</i>	19.3	59.4	66.0	2.7	38.5
<i>Median (yrs)</i>	21.5	50.0	48.5	3.0	29.0
<i>St Dev (yrs)</i>	14.3	44.8	43.0	1.5	38.4

Written Plans In Place

<i>Strategic &/or Operational</i>	<i>Total Count</i>		<i>Plans Address I.T.</i>	
	<i>#</i>	<i>%</i>	<i>#</i>	<i>%</i>
Both Plans	28	54.9	16	31.4
At Least One Plan	40	78.4	21	41.1
Neither Plan	8	15.7	2	3.9
Strategic Only	8	15.7	3	5.9
Operational Only	4	7.8	2	3.9
Unsure / N.A.	3	5.9	15	29.4
Total	51	100	51	100

Categorical Service Area, frequency of each choice selection (multi-reponse)

	<i>Human Services</i>	<i>Other</i>	<i>Health Services</i>	<i>Advocacy</i>	<i>Com. Develop.</i>	<i>Education</i>
% of total	52.9%	33.3%	21.6%	17.7%	19.6%	37.3%
<i>Category only</i>	13	6	2	0	1	2
<i>2 categories</i>	5	5	0	3	1	6
<i>3 categories</i>	3	2	3	2	3	4
<i>4 + categories</i>	6	4	6	3	5	7
All, this group	27	17	11	9	10	19

	<i>Environment</i>	<i>Charitable</i>	<i>Religious</i>	<i>Arts</i>	<i>Intern't'l Foreign</i>	Total 51
% of total	9.8%	5.9%	3.9%	3.9%	2.0%	
<i>Category only</i>	0	0	0	0	0	
<i>2 categories</i>	2	1	1	0	1	
<i>3 categories</i>	1	1	0	1	0	
<i>4 + categories</i>	2	1	1	1	0	
All, this group	5	3	2	2	1	