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The Financial Benefits of Nonprofit Technology Adoption

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Background

- Nonprofits face challenges
- COVID-19 reshape the nonprofit sector
- Expensive IT and lack of funding
- **Is allocating resources on information technology a worthy decision?**



Research Questions

What are the financial returns on IT investment in nonprofit organizations?

- How does IT expense **bring revenues** in nonprofit organizations?
- How does IT expense **improve efficiency** in nonprofit organizations?

What is Information Technology

- **Definition:** The use of computer systems, including hardware, software, and networks for the creating, processing and exchanging of information.



What is Information Technology

- **Information technology in nonprofit organizations**

(Bennett & Fielding, 1999; Cole-Lewis & Kershaw, 2010; McCarthy, 2012; Waters & Jones, 2011; Guo & Saxton, 2013; Guo & Saxton, 2014; Obar, Zube, & Lampe, 2012; Lampkin, & Hatry, 2003; McNutt, Guo, Goldkind & An, 2018)



Why Information Technology

- **Benefits of IT adoption in private sector** (Dehning & Richardson, 2002; Mahmood & Szewczak, 1999)
- **IT benefits for nonprofit organizations**
 - To clients (Geller, Abramson & de Leon, 2010; Goldkind & McNutt, 2014; Lampkin & Hatry, 2003; Le Clair & Moore, 2009)
 - To donors (Belleflamme, Lambert & Schweinbacher, 2010; Dumont, 2013; Lee & Joseph, 2013; Leland, 2008)
 - To organizations
 - Internally (Gahran & Perlstein, 2012; Munizu, 2010; McNutt, Guo, Goldkind & An, 2018)
 - Externally (Bogner, Tharp, & McManus, 2013; McNutt, 2008; McNutt & Goldkind, 2018)
- **Business Literature vs. Nonprofit Literature**

Why Information Technology

- **Return on IT investment in private sector**
 - **Productivity Paradox** (Brynjolfsson, 1993; Strassmann, 1990,1997)
 - **Payoff Puzzles** (Mahmood & Mann, 1993; Brynjolfsson & Hitt, 1995, 1996; Dewan & Min, 1997; Hitt & Brynjolfsson, 1996; Lichtenberg, 1995; Stratopoulos & Dehning, 2000; Khallaf, Omran & Zakaria, 2017)
- **Return on IT investment in nonprofit sector?**

Theoretical Foundation

- **Resource-based view (RBV) theory** (Jay Barney, 1991)



Logic Model

Input

IT expenditure

Activities

IT adoption projects:

- Managerial
- Fundraising
- Program service

Output

Revenue:

- Total revenue
- Charitable donations
- Program service income

Efficiency:

- Management
- Fundraising
- Program service

Outcome

Overcome challenges

Improve performance

Deliver public service

Hypotheses

H1

IT Expenditure

+

Revenue:

H1a Total Revenue

H1b Charitable Donations

H1c Program Service Income

H2

IT Expenditure

+

Efficiency:

H2a Management

H2b Fundraising

H2c Program Service

Methodology

- **Longitudinal study through panel data analysis**
- **Data:** 990 data 2010 - 2017 (download from open990.org)
- **Sample:** NPOs that reported detailed IT expenditure in their Form 990
 - 62,000 + observations
 - 9,400 + organizations

Model

- **Fixed effects model**
- **Unit of analysis:** Individual organizations

$$Revenue_{it} = \alpha + \beta_1 ITCost_{it-1} + \beta_2 Asset_{it} + \beta_3 Age_{it} + \beta_4 Employee_{it} + \beta_5 Type_i + \mu_i + \nu_t + \varepsilon_{it}$$

$$Efficiency_{it} = \alpha + \beta_1 ITCost_{it-1} + \beta_2 Asset_{it} + \beta_3 Age_{it} + \beta_4 Employee_{it} + \beta_5 Type_i + \mu_i + \nu_t + \varepsilon_{it}$$

Variables

Dependent Variables

- Total revenues
- Total donations
- Program service revenues

- Fundraising efficiency = fundraising expenses / total donations
- Program efficiency = program expenses / total expenses
- Management efficiency = management expenses / total expenses

Independent Variables

- Total information technology expenses
- Program service IT expenses
- Management and general IT expenses
- Fundraising IT expenses

Control Variables

- total assets, # employees, org age, org type

	Descriptive Statistics	N	Min	Max	Mean	Median
IV	Total IT Expense	62,175	0	224M	342K	1,591
	Program Service IT Expense	62,175	0	224M	223K	0
	Management and General IT Expense	62,175	0	95M	115K	0
	Fundraising IT Expense	62,175	0	3.4M	4K	0
DV	Total Revenue	62,175	0	10,190M	36M	3M
	Total Donation	62,175	0	1,969M	7M	389K
	Total Program Service Revenue	62,175	0	9,792M	26M	775K
	Fundraising Efficiency	50,565	0	4738	0.423	0.013
	Program Service Efficiency	62,175	0	1	0.106	0
	Management Efficiency	62,175	0	1	0.868	0.988
CV	Total Asset	62,175	-72082	24,780M	82M	4.5M
	Age	58,058	0	818	44	33
	Number of Employees	62,175	0	53,526	358	29

Organization Type	Number of Orgs	Total IT Expense Mean (\$)	Total IT Expense Median (\$)
Art	3,270	92,716	2,540
Education	10,753	459,590	25,521
Environmental and Animals	1,517	63,569	686
Health	10,417	899,718	7,313
Human Service	15,261	42,597	0
International, Foreign Affairs	670	296,057	9,278
Public, Societal Benefit	7,207	119,396	0
Religion Related	1,591	36,082	0
Mutual/Membership Benefit	1,186	14,813	0
Others	10,303	463,461	5,383



	Total Revenue		Total Donation		Total Program Service Revenue	
	(1)	(2)	(3)	(4)	(5)	(6)
Total IT Expense_t-1	4.167***		0.218***		3.737***	
Program Service IT Expense_t-1		3.674***		0.249***		3.140***
Management and General IT Expense_t-1		5.809***		-0.196**		6.040***
Fundraising IT Expense_t-1		31.957***		47.616***		-12.484**
Total Asset_t	0.139***	0.136***	0.019***	0.016***	0.072***	0.070***
Age_t	287110.3***	279255.9***	58653.04***	48782.63***	205884.8***	206892.2***
Number of Employees_t	19532.9***	19635.71***	2079.482***	2063.761***	17947.72***	18081.56***
Art	1136999	1155274	30053.91	37194.91	581839	595550.3
Education	-362974.8	-317569.8	-209992.4	-115988.3	-1898673***	-1941979***
Environmental and Animals	2433.11	71763.09	-829474.4	-691659.9	334115.4	273797.1
Health	-7035509***	-7106374***	-517600.6**	-546816.6**	-7928459***	-7980079***
Human Service	135196.6	142435.2	-203470	-193254	238962.4	236898.2
International, Foreign Affairs	-127228.1	-97672.89	-2302922***	-2327181***	1399569	1458071
Public, Societal Benefit	1071881*	1052458*	-456842.1	-466419.3	1063067**	1050510**
Religion Related	656842.7	648645.9	-169821.5	-169108.1	429298.5	419175.4
Mutual/Membership Benefit	-913022.8	-953407.3	156208.5	112222.5	-1752225	-1753908
N of Obs	58,058	58,058	58,058	58,058	58,058	58,058
N of Groups (orgs)	9,403	9403	9,403	9,403	9,403	9,403
R square	0.4219	0.4248	0.0363	0.0479	0.3341	0.3414

Note: * p<0.1; ** p<0.05; ***p<0.01



	Management Efficiency (log)		Fundraising Efficiency (log)		Program Service Efficiency (log)	
	(7)	(8)	(9)	(10)	(11)	(12)
Total IT_t-1 (log)	-5.95e-06		0.0181*		0.0125	
Program Service IT_t-1 (log)		-0.0049**		-0.0083		0.0124
Management and General IT_t -1 (log)		-0.0001		0.0136		0.0015
Fundraising IT_t-1 (log)		0.0001		0.0355***		0.0047
Total Asset_t (log)	-0.0046*	0.0113**	-0.3802***	-0.4123***	0.0871***	0.0552
Age_t (log)	-0.0118*	-0.0237	0.2454***	0.2599***	-0.1053	-0.0583
Number of Employees_t (log)	0.0160***	0.0284***	0.0811***	0.0502	-0.0518*	-0.0332
Art	-0.0032	-0.0085	0.0040	-0.0482	0.0939	0.1374*
Education	0.0083***	0.0091*	-0.0299	0.0072	-0.0444**	-0.0249
Environmental and Animals	-0.0015	0.0016	-0.0245	0.0069	-0.0648	0.0555
Health	0.0007	0.0008	0.0050	-0.0056	-0.0168	0.0914
Human Service	0.0031	0.0014	-0.0226	0.0006	0.0074	0.0123
International, Foreign Affairs	-0.0010	0.0153	-0.0095	-0.0861	0.0002	0.0586
Public, Societal Benefit	-0.0090*	-0.0138	-0.0621	-0.1041**	0.0885**	0.0291
Religion Related	-0.0013	-0.0120	-0.1059	-0.0889	-0.1960**	-0.1428
Mutual/Membership Benefit	0.0208	omitted	-0.3480	omitted	0.0136	omitted
N of Obs	29,058	8,899	17,433	8,846	14,835	5,746
N of Groups (orgs)	5,530	2,045	3,446	2,030	3,151	1,385
R square	0.0021	0.0052	0.0182	0.0409	0.0027	0.0032

Note: * p<0.1; ** p<0.05; ***p<0.01; omitted because of collinearity

Findings



H1

IT Expenditure

- + Total Revenue
- + Charitable Donations
- + Program Service Income



H2

Program Service IT
Total IT Expenditure
IT Expenditure

- + Management Efficiency
- Fundraising Efficiency
- ? Program Service Efficiency

Possible explanation

- Nonprofit starvation cycle
- Switching cost offsets benefits

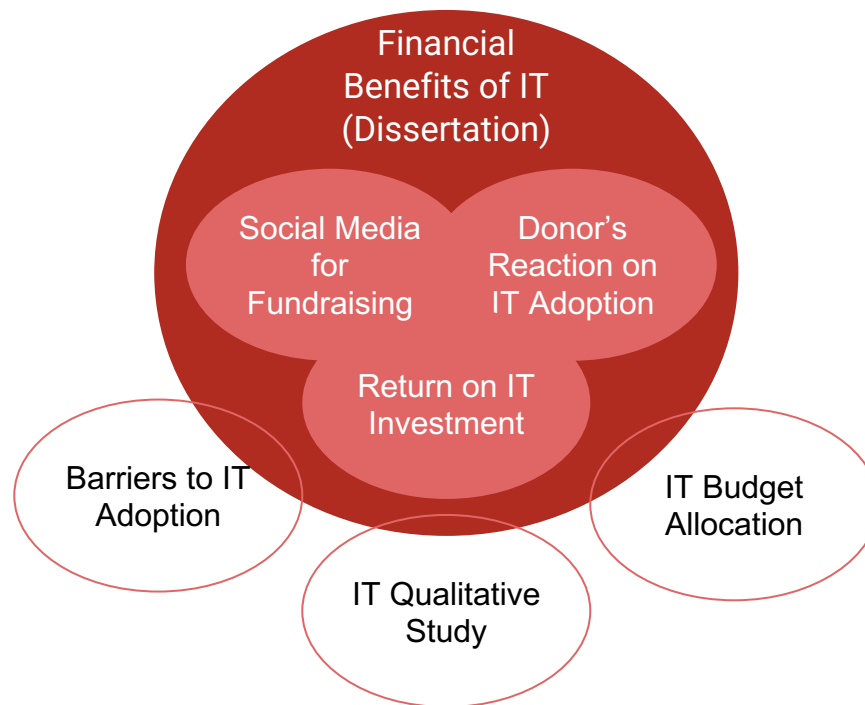
Contribution

- Measure and evaluate the benefits of IT in nonprofit
- Investigate neglected IT expenditure as part of functional expenses
- Include nonprofit sector to the conversation of MIS literature on IT payoffs

Limitation

- Sample bias
- 990 data accuracy

Future Study





Thank you

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