

Online Appendix

INSTITUTIONAL FACTORS INFLUENCING KNOWLEDGE PRODUCTION FOR PRACTICE: EVIDENCE FROM NONPROFIT STUDIES

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A Methods

A.1 Nonprofit scholarship by U.S. universities with an NME focus

We followed these steps to compile a dataset of the nonprofit scholarship published by universities with a nonprofit management education (NME) focus.

1. Obtained a list of authors who published at least once in nonprofit journals, treating these researchers as “nonprofit scholars” (Walk & Andersson, 2020). This step generated 17,945 authors from all over the world.
2. These nonprofit scholars may publish articles on nonprofits and philanthropy (or articles that are not relevant to the field) elsewhere. Therefore, we retrieved all the articles published by these authors, generating 307,935 publications.
3. Refined these articles to those with affiliations in the NME dataset (i.e., U.S. universities with an NME focus). This step reduced the literature pool to 101,580 articles.
4. These articles, even though written by nonprofit scholars with affiliations with an NME focus, are still too broad and might be irrelevant to the field. We further restricted the articles to those having at least one of these keywords in their abstracts according to the keyword lists used by numerous studies (Ma & Konrath, 2018; Shier & Handy, 2014; Smith, 2013): “nonprofit,” “non-profit,” “third sector,” “donation,” “donate,” “giving,” “philanthrop,” “prosocial,” “altrui,” “charity,” “charitable,” “volunteering,” “volunteerism,” “NGO,” “nongovernm,” “civil socie.”

The final dataset has the bibliographical details of 6,201 unique articles published between 1951 and 2022, from 245 U.S. universities with an NME focus.

39 **A.2 Semi-automated approach to coding publications**

40 The semi-automated approach identifies three types of information essential in human coding: (1)
41 informative keywords that present the articles' main ideas, (2) the keywords' semantic contexts,
42 and (3) the relevance of keywords and contexts to practice-oriented topics.

43 *A.2.1 Extract topics and topic keywords*

44 For a computer to analyze texts, the texts need to be converted to vectors, a process often referred
45 to as "encoding." There are primarily two approaches to encode texts: the Bag-of-Words
46 approach, which relies on word frequency; and word semantics, which tries to semantically map
47 words in high-dimensional vector spaces (Jurafsky & Martin, 2022; Ma, 2021). We adopted the
48 latter because it is one of the most recent advances in computational linguistics and the basis for
49 many state-of-the-art (SOTA) natural language processing algorithms.

50 We used the SOTA algorithm devised by Angelov (2020) to extract the topics from the
51 scholarly articles. These topics are represented using keywords. Two technical caveats warrant
52 attention:

- 53 1. The number of topics. Running the algorithm with different parameters can generate
54 different numbers of topics, but how many topics make the "correct" number? Defining the
55 "ground truth" of research topics is hardly possible. According to Frumkin (2002, p. 25), it
56 is possible to group the modeled topics into four main categories in order to establish
57 content validity (i.e., service delivery, social entrepreneurship, civic and political
58 engagement, and values and faith). To ensure discriminant validity, the representative
59 keywords within each category should be as far apart as possible in the trained semantic
60 space. For example, if the modeled topics are divided into four categories, the word
61 "political" should be closely associated with one of the four topic vectors, but distinct from
62 the other three. An ideal classification of research topics would produce values such as
63 [0.98, 0.99, 0.92, 0.99]. To evaluate these values, three criteria can be used: 1) the four

64 numbers should be evenly distributed, which can be assessed using a variant of the
65 Herfindahl–Hirschman index; 2) the average of the four numbers should be high; and 3) as
66 many topics as possible should be retained in order to retain more information and better
67 differentiate articles. The harmonic mean of these three criteria was calculated to determine
68 the optimal number of topics. Based on these strategies, we identified 29 topics from the
69 corpus.

- 70 2. The number of keywords. The keywords are not equally helpful, and less informative
71 keywords may introduce noises. The keywords for each topic are ranked according to their
72 centrality to the contents of topics (i.e., the first keyword is more informative than the
73 second keyword in determining what a topic is about; the second is more informative than
74 the third, and so on). The algorithm returns 50 keywords and their centrality values for each
75 topic. This technical caveat is important in informing our analysis, as Appendix A.2.3
76 elaborates.

77 *A.2.2 Determine practice-oriented topics*

78 It can be hard to draw the line between theoretical and practical scholarship because practitioners
79 and scholars may see the distinction differently. Even among scholars, interpretations can vary
80 because of differences in disciplinary background and research context.

81 Table A1 lists all the themes found by the authors of the two most-cited articles on this
82 research topic and show how these topics are coded in respective studies (Brudney & Kluesner,
83 1992; Bushouse & Sowa, 2012). The table shows many inconsistencies, especially for topics
84 concerning the political aspects of nonprofits, government-nonprofit relations, interorganizational
85 relations, and international and macro perspectives. Some similar topics are coded differently in
86 different studies. For example, “government-voluntary sector relations” is labeled as
87 theory-oriented in Brudney and Kluesner (1992), while “government-nonprofit relations” is
88 labeled as practice-oriented in Bushouse and Sowa (2012). These differences mainly reflect the
89 authors’ disciplinary backgrounds and contexts (e.g., sociology and political science versus public

90 administration and management). Therefore, when coding the extracted topics, we used Table A1
91 as a reference but also considered the disciplinary background of the keywords.¹

92 *A.2.3 Code articles using topic keywords*

93 The next step is to calculate the textual similarity between articles' abstracts and topic keywords
94 using the methods applied in Kozlowski et al. (2019), Kusner et al. (2015), Ma (2022), and Ma
95 and Bekkers (2023). The topic with the greatest similarity to an abstract is assigned as the theme
96 of that article. The article is then labeled as practice-oriented or not according to the topic's
97 category.

98 In a nutshell, we coded the research articles using topic keywords as an instrument. Readers
99 may naturally wonder, since each article is already grouped into one of the topics at the preceding
100 step (i.e., "A.2.2 Determine practice-oriented topics"), why not directly assign the practice label
101 to respective articles? Why do we need to add a step calculating the similarity between topic
102 keywords and research abstracts? There are two principal reasons. 1) As Appendix A.2.1
103 describes, not all keywords are equally informative, and less informative keywords can introduce
104 errors. Therefore, we only kept keywords with centrality values above the 50th percentile (i.e., the
105 first 25 keywords) at this step. 2) As Appendix A.2.5 describes, some articles may be grouped
106 into non-relevant topics. These topics must be excluded from analysis, and some articles need to
107 be reassigned to nonprofit-relevant topics.

108 *A.2.4 Evaluate coding results*

109 We randomly selected 296 records from the 6,603 total abstracts to manually estimate the quality
110 of the dataset and coding results (confidence level $\approx 95\% \pm 5.6\%$). Among the 296 records,
111 21.62% of them (64 articles) were not relevant to nonprofit studies. For the 232 articles that were
112 relevant to nonprofits and philanthropy, the consistency of coding between human and algorithm
113 was 84.05% (195 out of 232 records).

114 A.2.5 Remove non-relevant articles

115 The dataset contains many non-relevant articles (21.62%, with a confidence level $\approx 95\% \pm 5.6\%$).
116 Although our initial analysis with all topics showed a fair instrumental validity, we could still
117 improve the data quality by removing noisy references.

118 The 64 non-relevant articles manually checked out primarily include keywords or themes such
119 as “caregiver,” “organ donor,” and health industries. These articles correspond to the five
120 non-relevant topics extracted in Appendix A.2.1. We can exclude these articles (Table A2) from
121 further analysis.

122 In total, 387 articles were excluded at this step, and the final dataset had 6,201 articles for
123 further analysis. We randomly selected 117 records from the excluded articles and 163 records
124 from the nonprofit studies-relevant articles to manually validate the quality of the final dataset.
125 Table A3 shows the validation results. The precision is 82.82% ($\frac{TruePositive}{TruePositive+FalsePositive}$, i.e.,
126 articles identified as relevant to nonprofit studies really are relevant), and recall is 90.60%
127 ($\frac{TruePositive}{TruePositive+FalseNegative}$, i.e., articles that should be identified as relevant to nonprofit studies are
128 categorized as such).

129 B Robustness analysis

130 B.1 Statistical robustness

131 Table B4 shows the correlation matrix of continuous explanatory variables and suggests that the
132 poverty rate, one of the primary variables of interest, has only weak correlations with other
133 variables. The values of the variance inflation factor of all the explanatory variables is less than 2
134 ($Mean = 1.47$). Taken together, the risk of multicollinearity is low, and the estimation coefficients
135 should be statistically robust.

136 **B.2 Measure robustness: Community needs**

137 Poverty rate is an intuitive measure of community needs with the assumption that disadvantaged
138 communities should have more social issues that need to be addressed through research. An
139 alternative measure of a community's well-being is median household income (MHI). Unlike the
140 poverty rate, which measures the percentage of individuals in a community living below the
141 poverty line, MHI is a measure of the income of a community's households. It is not affected by
142 changes in the number of individuals in a household, whereas poverty rate is. As a result, MHI
143 may be a more robust measure for getting a complete and accurate picture of a community's
144 well-being, and may be a better indicator of community needs in some cases.

145 Table B5 shows the results of running the main regressions by replacing poverty rate with
146 MHI. The results are largely consistent with those of the main regressions in Table 6, and the
147 coefficients in Model 6 show more statistical significance. According to the updated estimation
148 using MHI (i.e., Eq. 1), universities with NPS centers will publish $-0.082 \times MHI + 0.12$ more
149 articles on practice-oriented topics than those without.

$$TotArt = \begin{cases} 0.079 \times Grad + (-0.088) \times RU + (-0.035) \times MHI & \text{if } Center = 0 \\ 0.079 \times Grad + (-0.088) \times RU + (-0.117) \times MHI + 0.12 & \text{if } Center = 1 \end{cases} \quad (1)$$

Table A1: RESEARCH TOPICS IN BRUDNEY AND KLUESNER (1992) AND BUSHOUSE AND SOWA (2012)

		Practice	Theory	BK1992	BS2012
<i>Volunteers</i>					
1	Motivation, recognition, retention of volunteers	x		x	
2	Recruitment of volunteers	x		x	
3	Director of volunteer services	x		x	
4	Nontraditional volunteers	x		x	
5	Supervision and management of volunteers	x		x	
6	Human resource management / volunteer administration	x			x
<i>Professionalization</i>					
7	Professional skills	x		x	
8	Information technology	x			x
9	Governance / boards	x			x
10	Organization change and development	x		x	
11	Planning and evaluation of program	x		x	
12	Effectiveness/performance	x			x
13	Financial management	x			x
14	Accountability	x			x
15	Capacity building	x			x
16	Fund development / fundraising / marketing	x			x
17	Substantive areas	x		x	
<i>Political aspects</i>					
18	Political factors / empowerment	x		x	
19	Citizen participation		x	x	
20	Civic engagement/social capital		x		x
21	Advocacy	x			x
22	Citizen participation in self-help, coproduction		x	x	
<i>Government-nonprofit relations</i>					
23	Government-voluntary sector relations		x	x	
24	Government-nonprofit relations	x			x
<i>Interorganizational relations</i>					
25	Interorganizational relations		x	x	
26	Interorganizational relationship	x			x
<i>International aspects</i>					
27	International voluntary sector		x	x	
28	International development / microfinance	x			x
<i>Research</i>					
29	Information/literature sources		x	x	
30	Framing research questions		x	x	
31	Methods		x		x
<i>Macro perspectives of nonprofits and philanthropy</i>					
32	Voluntary associations / sector (general)		x	x	
33	Auspices/nature of the sector		x		x
34	Women and voluntary sector		x	x	
35	Structure of voluntary associations		x	x	
36	Philanthropy	x			x
37	Social policy	x			x
38	Faith-based organizations	x			x

Note: BK1992 = Brudney and Kluesner (1992); BS2012 = Bushouse and Sowa (2012). Using exact topic names from original studies. Text in italics indicates major themes and is re-categorized by current study. To read the table: in Line 24, for example, “government-nonprofit relations” is a topic labeled as practice-oriented in Bushouse and Sowa (2012).

Table A2: NON-RELEVANT ARTICLES BY TOPIC

	Top 5 keywords of topic	#Articles	%Articles
0	facility_nursing_chain_ownership_medicare	164	2.48%
1	caregiving_grandparent_caregiver_grandchild_caregive	78	1.18%
2	organ_procurement_consent_transplant_shortage	55	0.83%
3	covid_pandemic_berlin_gruyter_response	50	0.76%
4	stebbins_jurgen_grotz_horton_smith	40	0.61%

Table A3: VALIDATION OF THE CLASSIFICATION OF ARTICLES

		NPS relevant (validated)	
		Yes	No
NPS relevant (predicted)	Yes	135 (TP)	28 (FP)
	No	14 (FN)	103 (TN)

Note: T, F, P, and N represents True, False, Positive, and Negative, respectively. NPS = Nonprofit and philanthropic studies.

Table B4: CORRELATION MATRIX OF CONTINUOUS EXPLANATORY VARIABLES

	P. R.	I. S.	T. A.	Popu.
Poverty rate	1.0			
Inst. size	0.15	1.0		
#Total articles	0.086	0.54	1.0	
Population	-0.011	0.082	0.030	1.0

Table B5: CHECKING ROBUSTNESS: REPLACING POVERTY RATE WITH MEDIAN HOUSEHOLD INCOME

	(1)	(2)	(3)	(4)	(5)	(6)
<i>Program level</i>						
Graduate	0.055*	0.054*	0.060*	0.060*	0.077**	0.079**
	(1.7)	(1.7)	(1.9)	(1.9)	(2.4)	(2.4)
<i>Organization level</i>						
Research univ.			-0.088**	-0.088**	-0.097**	-0.088**
			(-2.3)	(-2.3)	(-2.6)	(-2.4)
NPS center		0.097*	0.10*	0.10*	0.11*	0.12**
		(1.7)	(1.8)	(1.8)	(2.0)	(2.1)
<i>Community level</i>						
MHI					-0.060***	-0.035*
					(-3.1)	(-1.8)
<i>Shifting logics</i>						
Center × MHI						-0.082*
						(-1.9)
<i>Controls</i>						
Inst. size	-0.0024	0.00090	0.022	0.022	0.019	0.021
	(-0.10)	(0.10)	(1.3)	(1.3)	(1.1)	(1.3)
#Total articles	0.97***	0.96***	0.97***	0.97***	0.98***	0.97***
	(21)	(20)	(20)	(20)	(22)	(22)
Population	-0.019	-0.023	-0.021	-0.021	-0.0059	-0.0082
	(-1.4)	(-1.5)	(-1.4)	(-1.4)	(-0.50)	(-0.60)
Observations	220	220	220	220	220	220
Adjusted R^2	0.94	0.94	0.94	0.94	0.94	0.94

Note: DV = number of practice-oriented articles; MHI = Median household income. All continuous variables are normalized using z-score. t statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < .01$

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