Data, Analytics and Community-Based Organizations: Transforming Data to Decisions for Community Development

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DATA, ANALYTICS AND COMMUNITY-BASED ORGANIZATIONS: TRANSFORMING DATA TO DECISIONS FOR COMMUNITY DEVELOPMENT

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How can community-based organizations create information and make decisions to better fulfill their missions?

• How do CBOs access and use data for operations and strategy design?
• What challenges do CBOs face in making best use of data and analytics?
• How can data and analytics enable CBOs to identify and solve mission-aligned decision problems?
Presentation topics

- Unique characteristics of CBOs
- CBO-appropriate technologies and methods
- Alternative perspectives on big data/analytics research for CBOs
- Key propositions for CBO data and analytics
- Principles for research and practice in CBO data and analytics
- Research agenda
Community-based organizations are distinct within the nonprofit sector

- ‘Grassroots’ and ‘safety net’ organizations (The Boston Foundation 2007)
- Address needs of low-income and underserved populations
- Constituents often defined by explicit spatial or social boundaries
- Specialize in community development, human services and advocacy
CBOs understand ‘big data’ differently

Much of the literature on big data reflects the resource-rich corporate private sector

• “High volume, velocity, and variety information assets that demand cost-effective, innovative forms of information process for enhanced insight and decision making” (Gartner 2013)

• “Data unprecedented in its scale and scope in relation to a given phenomenon” (Schroeder, Meyer and Taylor 2013)

CBOs constraints limit use of ‘big data’:

• Funders
• Multiple performance metrics
• Technological capacity
How large is the CBO IT resource gap?

• 84% of nonprofits surveyed have a full-time staff person to provide tech support, however:
  • 86% of small organizations rely on volunteers
  • Only very large organizations have full-time IT support staff (Hackler & Saxton 2007)

• Nonprofits often face an IT ‘brain drain’:
  “It’s been my experience that as soon as we trained someone in the GIS and they became fairly good at it, that person would be offered a salary three times higher by someone in the private sector” (Al-Kodmany, 2012).
Summary: CBO characteristics

- Mission-driven
- Representative
- Profit maximization

Size of data

Type of mission

Capacity to apply theory to practice

Nature of technology

- ‘Big’ data
- ‘Little’ data

Difference is relative

High (for-profits)
- Human resources
- Financial resources
- IT resources

Low (CBOs)

‘Big’ technology
- ‘Appropriate’ (available, affordable) technology
Data and analytics can assist CBOs in particular ways

Analytic tools must be adapted to enable:

- Discussions among diverse stakeholders
- Consensus building
- Resident and community empowerment (Ferreira 1998)

Data’s greatest contribution to CBOs may not be in finding solutions, but better understanding:

- Missions
- Communities served
- Organization capabilities
- Stories they wish to tell to the world (Taylor, 2014)
Multiple types of data and technologies can meet CBO needs

Primarily visualization-based

Primarily database-driven

Primarily model-driven
Visualization-based technologies: PolicyMap

Source: http://www.policymap.com/
Visualization-based technologies: MyNeighborhood Census Viewer

Source: http://hubmaps.cityofboston.gov/myneighborhood/
Visualization-based technologies: Boston Research Map

Source: http://worldmap.harvard.edu/boston/
Visualization-based technologies: Weave

Source: http://oicweave.org/
Database-driven technologies: Boston Indicators Project

Source: http://www.bostonindicators.org/
Database-driven technologies: American FactFinder

Source: http://factfinder2.census.gov/
Model-driven technologies: Community-Based Operations Research

Source: Johnson (2011)
What alternative approaches to data and analytics research and practice are most relevant to CBOs?

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Nature of organization doing research matters: Centralized approach

- Boston Area Research Initiative (BARI)
  - **Goal**: Perform original urban research using innovative methods and large data sets by better connecting academic researchers with service providers via city agencies
  - **Participants**: Harvard and other local member universities, City of Boston agencies
  - **Example projects**: Data Swap; 311 call analysis; Citizen Relationship Management System; Boston Cyclist Safety Report; Ecometrics Study; Data Library
  - **Reference**: http://www.bostonarearesearchinitiative.net/
Nature of organization doing research matters: Decentralized approach

- **Urban Research-Based Action Network (URBAN)**
  - **Goal**: Create a community of scholars, practitioners and community members to support learning across disciplines, geographies and institutions that is transformative and social justice-focused
  - **Participants**: MIT CoLab; Local nodes (Boston, Los Angeles, others); Discipline nodes (Sociology, others)
  - **Example projects**: Community-based networking events; Community discussion on education crisis; Community-engaged scholarship
  - **Reference**: http://urbanresearchnetwork.org/
Nature of organization doing research matters: Decentralized approach

- **Code for America**
  - **Goal**: Localized collaboratives to create applications for social good
  - **Participants**: City experts, tech industry leaders, citizen volunteers
  - **Example projects**: Code Across America; Brigade Network; Civic Startups
  - **Reference**: http://codeforamerica.org/
Alternative organizational approaches have different types of impacts

- Centralized approach yields large datasets, high-visibility studies, direct contributions to scholarship, but is not designed to transform local relationships and institutions
- Decentralized approach builds relationships and technical capacity and supports local engagement, but may not yield datasets or applications of immediate use to CBOs

Centralized approach is more visible, better-funded, influential
Nature of inquiry: Model-based vs. Data-based

- "Model-based" approaches
  - Primarily deductive
  - Stylized representation of relevant phenomena and systems
  - Traditional statistics, social sciences, decision sciences

- "Data-based" approaches
  - Primarily inductive and exploratory
  - Accommodates large datasets, many variables
  - Computer science and information science

‘Analytics’ encompasses both approaches (descriptive, predictive, prescriptive) (Liberatore and Luo 2010, INFORMS 2014)
Data available to CBOs varies greatly

- **Type:**
  - Primary
  - Secondary

- **Source:**
  - Publicly-available
  - Proprietary

- **Representation:**
  - Qualitative
  - Quantitative

CBOs have deep understanding of local areas not well-represented in freely-available datasets
Can we validate these insights through data from the field?

Some initial propositions:

- CBOs can **effectively articulate** their information needs
- CBOs **lack knowledge of and access to** expertise and technology to create appropriate information
- CBOs **lack capacity to identify and solve** mission-aligned decision problems
Field research: Key informant interviews

- Sources: 10 informants (6 CBOs, 1 government, 1 academic, 1 large NPO)

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| • Funders require irrelevant data  
  • Hard to integrate multiple applications  
  • Want outcomes, not outputs  
  • What’s necessary beyond descriptive stats and maps?  | • ‘Big data’ not relevant  
  • Lack of training and awareness  
  • Low interest in acquiring skills  
  • What is the ‘real problem’, ‘story’, ‘benchmarks’?  
  • Some interest in decision modeling  | • Financial and time constraints limit hiring and retention of skilled staff |

‘Big data’ and IT not seen as a solution
Field research: Data/application trainings

• **Sources:**
  - NPO-provided software; U.S. Census; data methodology training

• **Observations:**
  - Moderate level of knowledge about how data is organized is assumed/expected
  - Applications are difficult to master by typical CBO staff
  - If used correctly and customized appropriately, could substantially improve data-analytic skills and quality of data for decision-making

Use of data-intensive applications will add value only if staff have appropriate training and organization has ‘theory of change’
Field research: focus group

• Source: Economic development organization with multiple neighborhood branches

• Observations:
  • Dissatisfied with applications for knowledge transfer and sharing
  • Required output measures do not capture neighborhood impacts
  • Want to quantify desired outcome measures, not sure how
  • Strong interest in data sharing and ‘dashboards’
  • Some potential solutions are low-tech and inexpensive; other solutions require training; none require advanced degrees

There may be strong demand for CBO-focused data and analytics projects that reflect community-based participatory research principles
Did field research validate our understanding of the problem context?

• Assumptions:
  • Mismatch between CBO needs and perceived resource availability - YES
  • Missed opportunities due to lack of data expertise - YES

• Propositions:
  • CBOs can articulate information needs - Supported
  • CBOs lack knowledge of and access to expertise and technology to create information – Supported
  • CBOs lack capacity to identify (Not supported) and solve (Supported) mission-aligned decision problems
Principles for applied research in community-focused data and analytics

- Values-driven
- Collaborative
- Distributed
- Inductive
- Multi- and mixed-methods
- Appropriate use of resources and capacity
- Iterative and constructive
A research agenda for CBO data and analytics

• Survey
  • Organization size, type, service area
  • Primary data needs and uses
  • Problem types and analytic methods
• Participatory solution-building
  • Organizational management and IT:
    • Data concierge
    • Circuit rider
    • Low-tech, small-data IT solutions
• Decision modeling:
  • Values elicitation
  • Service and catchment area design

Research goals:
  Support collaboration, appropriate technology and shared resources
Policy recommendations

• Increased willingness of funders to support IT and decision modeling training, infrastructure and solutions

• Increased access by CBOs to training, software and technical support to improve access to and use of data and analytics

• Increased collaborations, using PAR and CBPR principles, between researchers and CBOs, to develop solutions and build theory
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