Social Network Analysis as a Tool to Assess Nicaragua’s Labor Markets

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Washington DC

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Workforce Connections

- USAID-funded, FHI 360-led Community of Practice promoting evidence-based learning & peer-to-peer knowledge exchange
- Improving the quality of workforce development programming
- Awarding competitive learning grants on systems thinking and soft skills

LINC

- Dedicated to strengthening local systems
- Working in 8 countries with local and international partners
- Organizational Development, Training, Design & Evaluation, and Consulting Services
- Committed to learning and sharing to improve results
SNA (in general)

- A way of thinking about social systems that focus attention on the relationships among actors in a system.
- A classic systems approach, measuring complex interactions of actors at multiple levels.
- Utilizes nodes (actors) and edges (relations).
- Attributes can be assigned to nodes (e.g. org type, sector, etc.).
- Analysis is conducted at the whole network and individual organizational level.
- ONA is a sub-set of SNA (organizational mode)

An actor’s position in a network determines in part the constraints and opportunities that s/he will encounter, and therefore identifying that position is important for predicting actor outcomes such as performance, behavior or beliefs.

-Borgotti, “Analyzing Social Networks” (2013)
SNA (international development programs)

Key Applications

• Systems Mapping / Stakeholder Analysis
• Adaptive management
• Impact measurement
• Can be applied to multiple sectors whenever there is a need to better understand local systems.

Potential Limitations

• Census-based instrument, usually open-ended, leading to recall bias
• Network must be carefully defined in advance
• Measurement typically in one mode (e.g. orgs, not individuals).
• Measures relationships between actors, not the nature or perceptions of actors themselves.
SNA in the context of LMA

- Institutional and systems maps
- Causal loop analysis
- Social network analysis

Policy:
- Macroeconomic
- Trade & investment
- Labor & social protection
- Education
- Structural factors

Supplies of Skills:
- USE (Understanding Skills for Employment)
- Stocks and flows data and diagram

Economic Context and Analysis:
- Assessment of export and investment data
- Product space analysis

Demand for Skills:
- Sector selection
- Employer interviews
- Value chain analysis: occupations, processes, and requirements

Alignment:
- Youth and gender assessments
- Champion validation
Nicaragua ONA – hypothesis and learning objectives

Research Hypothesis
The ONA approach to systems mapping/stakeholder analysis provides an important value-add to labor market assessment activities, enabling program designers to more accurately identify systems-level constraints and visually map priority pathways for assistance.

**Test relevance to workforce development** – Assess strengths and weaknesses of applying ONA to workforce development program design.

**Address critical informational needs** – Weak collaboration within Nicaragua’s WFD system is apparent, but evidence anecdotal. Analysis is required to determine network structure, pivotal actors and constraints.

**Provide comparative insight** - Each of the three networks to be surveyed have differing characteristics. We hope to make correlations between different network types, and results of our mapping.
ONA answers network and partner questions

**Whole Network / System**
- What is the state of overall relations and information dissemination across the network?
- Is the network conducive to dynamic collaboration between diverse actors, new entrants and groups?
- Are there clusters in the network, and how well are they bridged?
- Is the network hierarchical or cohesive?

**Ego (focal actor) Network**
- Who are the most central actors?
- Where are the key gatekeepers or bottlenecks to collaboration?
- Who are the information brokers, entrepreneurs, and organizations that might connect otherwise unconnected actors?
- What is the extent of network constraint on focal actors?
ONA helps program design

*With whom should we work?* – Identify actors best positioned to positively impact the network, and those that impede it.

*Facilitation or direct intervention?* – Determine realistic possibilities for facilitation-based program strategies where there are high levels of social capital and opportunity.

*Support to the many, or few?* – Central actors are powerful agents of change in healthy networks, but key constraints in hierarchical or unbalanced ones.

*Bolster resource hubs, or incubate new relationships?* – Strengthen existing ties or forge new ones to most quickly diffuse information and network change.
Nicaragua ONA: activity overview

Activities & Timeline

Consultations
Customization
Field Survey
Data Analysis
Reporting

Consultations in Washington and Nicaragua will help to:

Identify learning priorities
Define the network and actor attributes
Refine census techniques
Share meaningful results
three networks

**Managua**
- Complex
- Urban
- 100+ training centers

**Leon / Chinandega**
- Small urban
- Industrial / technical
- 10-20 training centers

**Esteli or Matagalpa / Jinotega**
- Small rural
- Agricultural & small cmtty needs
- Entrepreneurship
comparative learning opportunities

**Urban vs. Rural**
- Are urban networks denser?
- Are rural networks more or less entrepreneurial?
- Which networks place greater constraint on individual actors?
- Which networks have apparent higher levels of cohesiveness?

**Agricultural vs. Industry / Service**
- Which network has more clusters and cliques?
- Is one network more centralized or hierarchical than another?
- Are industry / service networks denser than agricultural?

**Complex vs. Simple**
- Does network size and actor diversity reduce constraints?
- Are simple networks more dominated by central actors?
defining the network

**Open-response snowball census presents challenges:**
- Capture 100% of network
- Respondents identified thru referrals
- Census stops at network boundary

**Network members should:**
- Consist of actors with a common goal
- Be organizations, not individuals
- Operate within appropriate geographic boundaries

**Proposed Network Definition:**
The workforce development network is defined to consist of actors that:
1. Operate within relevant geographic boundaries of the network (Managua, Leon, Matagalpa).
2. Work to increase quality or quantity of jobs and/or labor supply.
3. Are formally registered as entities to operate in Nicaragua.
4. Do not simply employ job-seekers (no employers that are just hiring).
5. Are not simply job-seekers.
assigning attributes

**Attributes:**
- Actor characteristics related to learning priorities.
- Enable us to segment data and project maps on the basis of characteristics.
- Must be built into questionnaire.

**Proposed organizational types:**
- Private Sector Employer
- Workforce Education and/or Training Provider (public / private)
- Policy / Regulatory Authority (local govt / national govt)
- Employment Service Provider (public / private)
- Labor / Trade / Worker Rights Union
- Industry / Business Association
- NGO (advocacy / job-seeker support / skills)
- Donor / Funder

**Proposed network types:**
- Complex vs. simple
- Urban vs. rural

**Proposed sectors:**
- Agriculture
- Industry
- Services
structuring the questionnaire

**Questionnaire should:**
- Capture # of directed ties
- Measure strength of ties
- Be open-ended, not roster
- Minimize potential for recall bias
- Be administered by trained enumerators
- Be time-bound
- Account for multiple names of a single actor

**To measure strength of ties:**
- Assign values to relationship type
- Include Likert scale ranking of perceived strength

**To minimize recall bias:**
- Can be completed by multiple representatives of one organization
- Enumerator prompting techniques

**To be time-bound:**
- Only refer to connections that have taken place within the past year

**To reduce potential for entry errors:**
- Questionnaire includes “other names of organization” field
- Naming protocols updated daily
analysis and reporting

Report Content
• Results and findings from three separate networks (whole network and ego-level), including scores, maps, and social capital inferences.
• Comparative analysis of distinct network attributes (e.g. sector, network size, urban / rural) and composition of networks.
• Recommendations for future workforce development programming.

Illustrative Metrics

Whole Network
• Size (# of nodes)
• Density (actual / possible ties)
• Reciprocity (balanced vs. unbalanced)
• Transitivity (cohesion vs. hierarchy)
• Centralization (clustering)
• Components / Subgroups (disconnected groups)

Ego-level
• Size (# of nodes)
• Degree scores (in / out)
• Brokerage
• Betweenness
• Closeness
• Constraint
Nicaragua: labor market network challenges

• Weak alignment: youth interest, TVET offering, industry need
• Weak connections: employers <-> training institutions
• Private sector complains about TVET results, wants to change system, but not actively engaged
• Donor-funded private TVET centers not financially sustainable
• Low job placement rates
• Youth employment / training needs vary by geography
• No labor market demand study (in progress – expected July)
• General absence of data
**Example map (before)**

**Observations:**
- Diffuse relations
- Presence of cliques
- Centrality of the few
- Weak reciprocity
- Presence of gatekeepers
- Structural holes

**Illustrative Program Strategy:**
- Engage Business Association to diversify services and relationships
- Link employers to TVETs via NGO 1 and Business Association
- Create alternative pathways, especially to government, employers and TVETs
- Promote reciprocated / balanced relations across the network, especially for central actors
**Example Map (after)**

**Change Data:**
- Density: 6% to 11%
- # of Ties: 73 to 144
- Reciprocated ties: 67% to 72%
- Average distance: 2.8 to 2
- Median betweenness centrality: 0 to 1.6

**Network Impact:**
- Increased network density
- More reciprocated relationships overall, but not with every actor (e.g. Business Assn)
- Diversified ties among and between sub-groups
- NGO-1 becomes more central than INATEC, actively linking TVETs to Employers
- Business Association broadening reach (e.g. degree score = 12 to 22), notably connecting Employers to Government
- Govt-1 centrality reduced (e.g. betweenness = 354 to 188)
thank you

Looking forward to our discussion...

For more information, comments and questions please visit LINC’s website or send an email to Patrick Sommerville.

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