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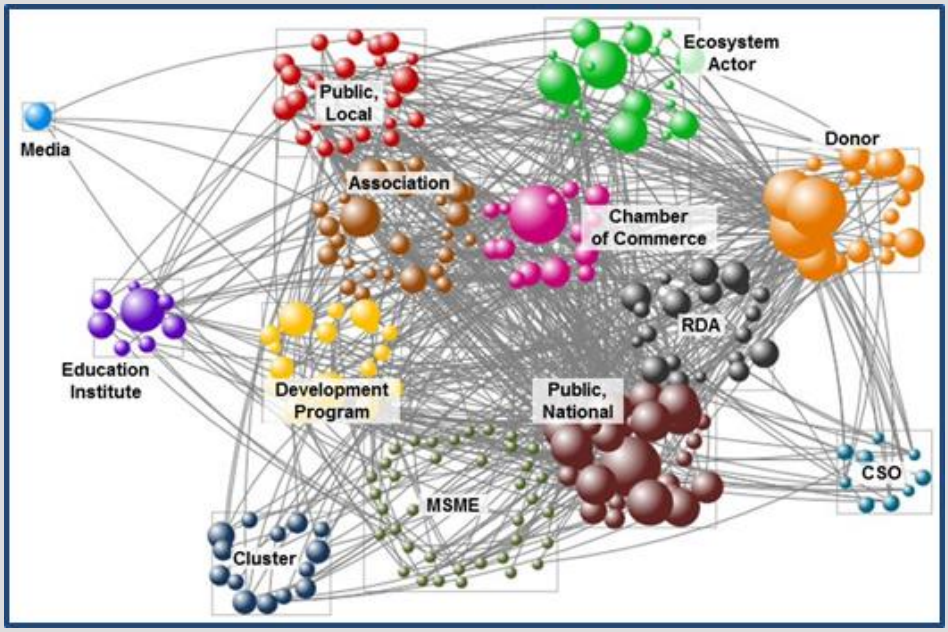
# SERBIA COMPETITIVENESS ASSESSMENT & POLITICAL ECONOMY ANALYSIS

## ORGANIZATIONAL NEWORK ANALYSIS (ONA)

LEO
Leveraging Economic Opportunities

**LEO REPORT # 34**




**JUNE 2016**

This publication was produced for review by the United States Agency for International Development. It was prepared by Craig Hempfling, Richard Danicic, Edi Majstorovic and Branislav Savic for ACDI/VOCA with funding from USAID/E3's Leveraging Economic Opportunities (LEO) project.

# SERBIA COMPETITIVENESS ASSESSMENT & POLITICAL ECONOMY ANALYSIS

## ORGANIZATIONAL NETWORK ANALYSIS (ONA)

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# CONTENTS

# ACRONYMS

| | |
|---|---|
| CSO | Civil Society Organization |
| MSME | Micro-, small and medium-sized enterprise |
| ONA | Organizational Network Analysis |
| PEA | Political Economy Assessment |
| RDA | Regional Development Agency |
| USAID | United States Agency for International Development |

# I. INTRODUCTION

## 1. THIS REPORT

This report was prepared in conjunction with the *Competitiveness Assessment & Political Economy Analysis* for USAID-Serbia, conducted from March-May 2016. The overall assessment, conducted under a Political Economy Analysis (PEA) framework, set out to identify the major factors influencing Serbia's private sector's ability to grow, export and compete in EU and global markets. The assessment utilized the Applied Political Economy Analysis (PEA) methodology to identify the constraints and establish the causal factors for those constraints. This Organizational Networking Analysis (ONA) was conducted in parallel with the main research assignment; as agreed upon by relevant parties, this report is being submitted as a separate deliverable.

## 2. OBJECTIVES

At the outset of this assignment, ONA was identified as a tool to contribute to the overall assessment to assess the nature and context of relationships between key actors mandated to support MSME development. To that end, numerous findings are presented in this report. Additionally, and equally important, can be to use this opportunity to apply ONA to a new field and environment, document lessons learned in conducting ONA in tandem with other assessment frameworks, and contribute to the growing body of ONA practice in international development. To this end, this report presents a summary of lessons learned that can be applied in future undertakings, and provides the reader with an overview of ONA analysis, capabilities and potential indicators. The database prepared for this assessment may also be applied as a starting point or preliminary baseline for future USAID program(s).

## 3. ORGANIZATIONAL NETWORK ANALYSIS (ONA)

Organizational (or Social) Network Analysis is a tool that provides a quantitative means of measuring the strength and dynamics of networks and their actors; ONA has found recent interest and application in the development community, including by USAID, as a means of measuring our impact on the relations and cooperation between networks of actors. ONA enables practitioners to illustrate network maps, or "sociograms," as well as to quantify network characteristics through calculable indicators, or "metrics."

## 4. USE IN COMPETITIVENESS ASSESSMENT

Defining the "network" is a key element in ONA; the network should include organizational actors sharing a common mandate, but possibly restricted by certain boundaries, for instance by role or geography. Ideally, an ONA would seek to survey all actors meeting the criteria for inclusion. For the purposes of this assessment, our "network" is defined to encompass those actors directly engaged in the support of micro, small and medium enterprise (MSME) development at national, regional or local levels. These include relevant public institutions, donors, business associations and other actors; Table 1 provides a full summary of the types and numbers of actors interviewed as part of this analysis.

**Table 1**
**Actors Interviewed**

| Actor Type | Actors |
|---|---|
| MSMEs | 43 |
| Public Sector, National | 10 |
| Public Sector, Local | 15 |
| RDAs (Reg Dev Agency) | 10 |
| Chambers of Commerce | 10 |
| Ecosystem Actors | 12 |
| Donors | 2 |
| Development Programs | 10 |
| CSOs (Civil Society Org) | 4 |
| Associations | 12 |
| Clusters | 5 |
| Educational Institutions | 3 |
| Experts & Consultants | 13 |
| **TOTAL** | **149** |

## 5. DATABASE & ATTRIBUTE DATA

Various attributes can be assigned to organizational entities, allowing the user to disaggregate respondents by a host of characteristics related to functional roles, sector affiliation, geographic regions or other characteristics. In this assessment the following attribute data were collected for each organizational entity interviewed: i) organizational and registration data; ii) number of staff and leadership gender; ii) geographic coverage; iii) clients and beneficiaries served; iv) targeted economic sectors; v) principle support activities. For MSMEs we also sought to define their markets and number of direct buyers. The ONA database in Excel format will be submitted separately to USAID.

## 6. CHALLENGES & CONSTRAINTS

Collecting ONA data in tandem with the PEA was challenging, as it required varied lines of questioning and the commitment of the interviewee. The team allocated 60-90 minutes per interview, but due to varying levels of cooperation and time commitments of interviewees, it was challenging to acquire thorough information, particularly since ONA data was mostly gathered near the conclusion of the interview. Furthermore, the four members of the assessment team were not entirely consistent in the methodology and diligence in collecting the data. In some cases, it simply wasn't practical to get at all of the ONA data. Add to that the fact that this assessment never sought out to include 100% of relevant actors in the analysis. This leaves us with a dataset that, while containing a respectable amount of data and allowing a degree of analysis, is not complete. While sound and effective ONA requires a focused and dedicated effort, ideally over a period of time, the team has succeeded in applying ONA to a new case study that we hope will contribute to USAID's community of practice in the field. To this end, the key challenges and corresponding recommendations are discussed in further detail in the Lessons Learned section of this report.

## 7. TERMINOLOGY

A brief overview of terms relevant to ONA will be useful to introduce the reader to some of the terms used in this report, including definitions for all metrics used. A quick review will also provide an overview of some of the measureable network characteristics.

**Node (Vertex):** Any surveyed or named (source or target) organizational actor, for each of whom relevant attributes are collected, allowing analysis by various sub-networks meeting defined criteria.

**Edge:** Linkage or relationship between actors (vertexes); in ONA edges can include attributes indicating the type of relationship (e.g. financial, membership); strength of linkage; and directionality.

**Directionality:** The direction of the relationship, indicated as a forward arrow from the direction of source to target actor. A "directed" graph or analysis indicates direction; while an "undirected" graph does not consider directionality, but rather the fact that a relationship was indicated by one or the other party. Except where indicated, the analysis for this report is undirected, since the presence of a connection by one or the other party is considered sufficient to establish a relationship. [Relative consistency on this issue throughout an ONA is typical, since the values of some metrics change when considering directionality.]

**In-Degree:** The number of edges coming into a (target) node in a directed analysis (in our case, the number of times an organizational entity is named by a surveyed actor).

**Out-Degree:** The number of edges leaving a (source) node in a directed analysis (in our case, the number of organizational entities named by a surveyed actor).

**Degree:** In an undirected analysis, the total number of edges connecting a node to the network; in a directed analysis, this is equal to the sum of In-Degrees plus Out-Degrees.

**Reciprocity:** In a directed analysis, a measure relating the number of instances that the linkages are reciprocated between actors (where actors name one another).

**Diameter (Geodesic Distance):** The distance between two nodes measured by the number of edges in a shortest path connecting them; the average of all distances for all actors is the Average Geodesic Distance. Obviously, directionality affects this metric.

**Density:** The portion of the potential connections in a network that are actual connections; a network where each actor is directly connected to every other actor with an edge has a density of 100%.

**Modularity:** A measure of the structure of networks or graphs, measuring the strength of division of a network into modules (e.g. groups, clusters or communities). Networks with high modularity have dense connections between nodes within modules but sparse connections between nodes in different modules.

**Centrality:** Centrality is an ego-level metric (meaning that it applies to individual actors, not the entire network). Centrality refers to the importance of a node in providing a bridge between different parts of the network; it highlights the nodes that, if removed, would cause a network to fall apart. This report presents four different centrality metrics. Betweenness Centrality is calculated as the number of shortest paths from all vertices to all others that pass through that node. Closeness Centrality is the shortest distance from each vertex to each other vertex. Eigenvector Centrality assigns relative scores to all nodes based on the concept that connections to high-scoring nodes contribute more than equal connections to low-scoring nodes; Google's PageRank is a variation on Eigenvector Centrality.

**Clustering Coefficient:** A measure of the degree to which nodes in a graph tend to cluster together, characterized by a relatively high density of ties.

# II. ANALYSIS

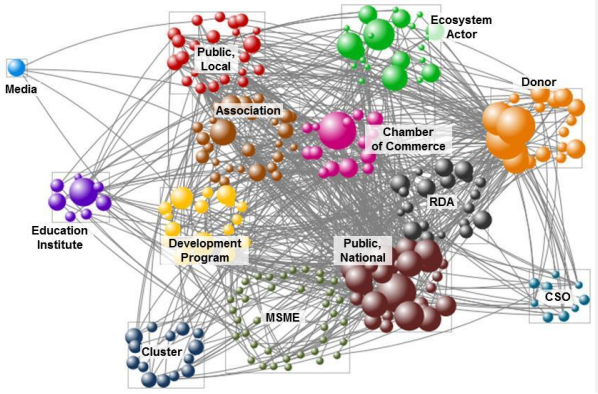
## 1. DATA PRESENTATION & ANALYSIS

This section of the report presents some of the results and findings of the ONA, going from the overall network to analysis via sub-networks of actors. In addition to presenting relevant or interesting findings, this analysis intends to provide the reader with an overview of some of the capabilities and methods of disaggregating and analyzing network data. Organizational types are color-coded consistently throughout this report. Unless otherwise indicated, the node size in all graphs is based on in-degree (the more times the actor was named, the larger its symbol). Also unless otherwise indicated, all graphs and their metrics are undirected (a naming by either actor in a pair constitutes a linkage).

## 2. OVERALL NETWORK

Figure 1 presents all of the node and edge data contained in the ONA database, including MSMEs (all MSMEs appear as small dots since they logically have no in-degrees as they are not a part of the MSME-support network of actors). A few things may be noted by analyzing the network at this level. First, all individual media targets were recorded as a single node, "Media;" despite this, there were only five mentions of media as collaborators or partners by any of the surveyed actors. When considering outreach and initiatives like awareness-raising of private-sector opportunities, the role and relationships of actors with local and national media outlets can be key. It is also worth noting that under Serbian law, associations, clusters and CSOs are the same legal form, but are differentiated here in line with their identities and names. Development programs as well can overlap with CSOs; the distinction centering on whether or not the legal registration is based on a single funded project or if it is a CSO implementing numerous or consecutive projects.

**Figure 1**
**Overall Network**




*This network graph displays all actors surveyed and named in this assessment, including individual MSMEs. In this graph, there are 244 nodes (actors), 144 of whom were interviewed for the purposes on ONA, and 650 edges (linkages).*

*Different graphing options will be presented throughout this report to provide readers with a notion of different visual options and capabilities.*

## 3. INTRA- AND INTERGROUP LINKAGES

Table 2 below summarizes the number of intergroup linkages between the types of network actors. A wealth of information can be gleaned from this data, as it indicates communication and collaboration trends between types of actors. For instance, if we look at the actors who MSMEs cited most often as support actors (first row, highlighted yellow) we see that they named national public institutions, RDAs and Chambers of Commerce, plus donors and development programs (logical, since MSMEs with some experience working with development programs were targeted in the assessment). Interestingly, they did not indicate any linkages with local public institutions (for example, an LED Office). A similar trend holds for business associations (highlighted), but in this case, they more often cited local public institutions; also perhaps a logical result since

most associations are locally-based and more likely to be connected to institutions than individual MSMEs. Ecosystem actors –incubators, technology hubs and other business startup and innovation support initiatives – (highlighted row and column) are also highly linked to public institutions, donors and one another. Looking at the Ecosystem column (ecosystem actor as a target) and the linkages with donors and development programs (as sources) one can see a strong indicator of donor support. With complete ONA data tracked over time, perhaps representing varied types of linkages, data in tables like this can be highly revealing.

**Table 2**
**Intra- & Intergroup Linkages**

| | | Target | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MSME | Pub. Nat'l | Pub. Local | RDA | Chamber | Ecosys. | Donor | Dev. Program | CSO | Assn. | Cluster | Educ. | Media |
| Source | MSME | --- | 30 | --- | 10 | 12 | 2 | 13 | 10 | 1 | 5 | 5 | 6 | 1 |
| | Public, Nat'l | --- | 10 | --- | 2 | 5 | 3 | 10 | 5 | --- | 1 | --- | 2 | --- |
| | Public, Local | --- | 39 | 3 | 6 | 6 | 7 | 18 | 3 | --- | 11 | 3 | 4 | 1 |
| | RDA | --- | 20 | 5 | 18 | 6 | 3 | 22 | 7 | 1 | 7 | 9 | 1 | --- |
| | Chamber | | 34 | 6 | 3 | 7 | 4 | 17 | 7 | 1 | 7 | 9 | 3 | 1 |
| | Ecosystem | --- | 13 | 7 | 1 | 5 | 13 | 8 | 4 | --- | 3 | --- | 6 | --- |
| | Donor | --- | 3 | --- | 6 | --- | 16 | 4 | 5 | --- | --- | --- | --- | --- |
| | Dev. Program | --- | 19 | 4 | 1 | 4 | 11 | 11 | 3 | 2 | 5 | 3 | 1 | 1 |
| | CSO | --- | 1 | --- | 1 | 5 | --- | 15 | 8 | 1 | 1 | --- | --- | --- |
| | Association | --- | 28 | 4 | 4 | 11 | --- | 9 | 5 | --- | 12 | 2 | 1 | 1 |
| | Cluster | --- | 1 | --- | 1 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | Education | --- | 1 | --- | --- | 1 | --- | --- | --- | --- | --- | --- | 1 | --- |
| | Media | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |

*This table, while perhaps a bit cumbersome, details a relative wealth of information with respect to reported linkages. Groups of source actors appear in rows, while the same actors appear as targets in columns; the highlighted diagonal represents intragroup linkages. For example, logically no one reported an MSME as a collaborative MSME-support actor; therefore, the MSME column has no entries. Similarly, no media actors were interviewed; hence, the Media row is empty. Note that differentiating between source and target nodes necessitates directional analysis. (If the table presented undirected data, all cells below the blue diagonal would be empty.) Yellow-highlighted content is discussed in some detail in the narrative.*

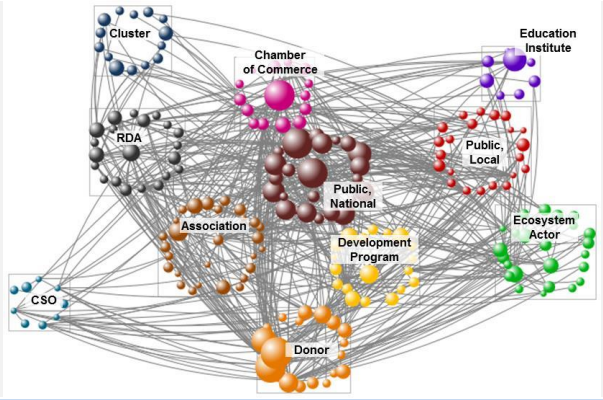
It is important to note some key points regarding this data, especially in the context of this assessment. First, not equal numbers of the various types of actors were interviewed, so it is important to consider the *relative* numbers of target connections for a given source. Second, due to a number of issues, there were few restrictions on the type or number of responses from interviewees, so that the figures can be skewed by a few actors who cite numerous targets, especially if they are of the same type. Also, previously-noted differences and diligence in team members' survey practices plays a role. Collected and tracked over the course of an implemented project would allow these and other issues to be corrected.

## 4. BASE NETWORK

Defining a base network is a convenient way of comparing the metrics when analyzing sub-networks. In an ideal case, network actors can be clearly identified and limited to essentially a closed network of actors, 100% of whom are surveyed and tracked over time. In most cases, especially when relying on surveys, this condition is difficult to achieve. One method of defining group actors is to survey a set of actors informed by experience or other sources, and then to survey each "new" actor named by the initial interviewees, so that actors are identified through an iterative process; such a methodology was, of course, not conducted during this assessment. Thus, we have two logical alternatives for defining our "base network:" i) include only surveyed (source) actors and show only the linkages between those actors; or ii) include all source and target actors, (eliminating MSMEs, as individual MSMEs are not support actors). Since this assessment did not intend to

identify and survey 100% of actors, the base network will be defined by the second method (with Media also filtered out).

**Figure 2**
**Base Network Graph & Metrics**




| Network-Level Metrics | | Ego-Level Metrics | |
|---|---|---|---|
| **Metric** | **Value** | **Metric** | **Value (avg)** |
| Nodes | 204 | Degree | 5.70 |
| Edges | 551 | Betwn Cent | 225 |
| Components | 1 | Close Cent | $1.57 \times 10^{-3}$ |
| Diameter | 7 | Eigen Cent | $4.90 \times 10^{-3}$ |
| Density | 2.81% | PageRank | 0.640 |
| Modularity | $7.54 \times 10^{-3}$ | Clust Coeff | 0.159 |

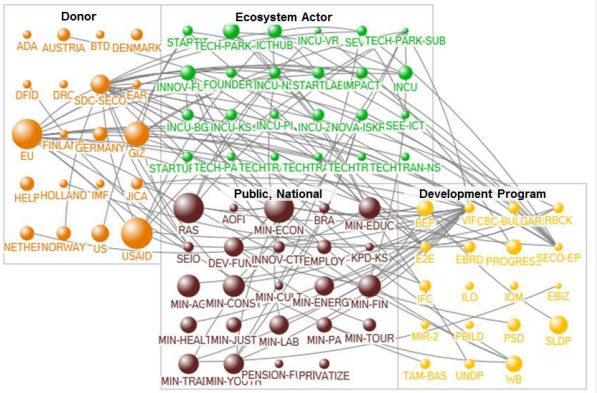
*This network graph and metrics present what we have defined as our base network of actors – essentially all surveyed and named actors excluding MSMEs and media, for a total of 204, of which 144 of whom are sources (interviewed and recorded in ONA database). There is only one component, so all actors can be connected through the network. The low density (2.81%) is typical of most ONA done in the development field; keep in mind that for a density of 100% each actor would have to name every other actor, in this case 204 of them. Reciprocity can be measured if the graph is changed to directional, but wasn't considered relevant for our purposes.*

The Base Network sociogram and its associated metrics are summarized in Figure 2; the network is comprised of 204 actors connected by 551 linkages, resulting in a network density of 2.81% (network density with all possible actors connected equals 100%). Densities lower than 5% are typical in networks analyzed in other USAID ONA analyses, which is fairly expected since connections were identified through surveys (i.e. it wouldn't be feasible for an interviewee to name tens or hundreds of past connections). The low modularity implies few connections between actors in different groups, again fairly typical due to the low overall density. In the Ego-Level Metrics column, the average degree (in-degree plus out-degree), or average number of connections to or from each node, is 5.7.

## 5. NATIONAL-LEVEL MSME-SUPPORT ACTORS

As many node and edge attributes are recorded, ONA data can be sorted and filtered along those lines. Figure 3 below represents a network of national-level MSME support actors: National Public Institutions, Donors, Development Programs and Ecosystem Actors – a sub-network of 87 actors connected by 122 linkages. To facilitate the reader, the metrics are compared with the Base Network metrics presented in Figure 2. The density of connections between the National-Level Actors is 3.48%, somewhat higher than the Base Network, while the modularity is roughly an order of magnitude higher (ten-fold), indicating higher intergroup linkages. As applied in a development program, this data can be useful in identifying and facilitating strategic linkages between specific actors and groups.

**Figure 3**
**National-Level MSME-Support Actors**



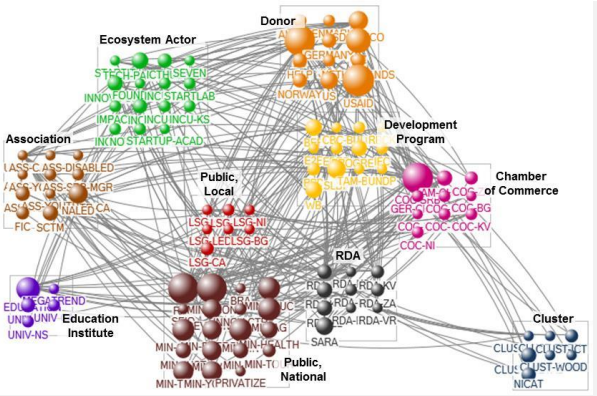

| Network-Level Metrics | | | Ego-Level Metrics (avg) | | |
|---|---|---|---|---|---|
| **Metric** | **Base Network** | **This Network** | **Metric** | **Base Network** | **This Network** |
| Nodes | 204 | 87 | Degree | 5.70 | 2.99 |
| Edges | 551 | 122 | Betwn Cent | 225 | 53.5 |
| Components | 1 | 19 | Close Cent | $1.57 \times 10^{-3}$ | $4.03 \times 10^{-3}$ |
| Avg Geo Dist | 3.20 | 2.94 | Eigen Cent | $4.90 \times 10^{-3}$ | $11.5 \times 10^{-3}$ |
| Density | 2.81% | 3.48% | PageRank | 0.640 | 0.793 |
| Modularity | $7.54 \times 10^{-3}$ | -0.0236 | Clust Coeff | 0.159 | 0.165 |

*This sub-network illustrates a network of national-level MSME support actors consisting of donors and their programs, national public institutions and ecosystem actors. The graph has 19 components, visibly seen by the numerous unconnected nodes.*

## 6. PROMINENT ACTOR NETWORK

The prominence of actors as defined by any of the available metrics can also be used to analyze a sub-network. Figure 4 below filters out all actors from the base network that were cited as targets either only once or not at all (In-Degree<=1). The sub-network generated from this condition should therefore include the more prominent actors in the network; this network includes 109 actors connected by 300 linkages, and with correspondingly higher densities and modularities. Sub-networks can be defined based on any combination of calculated ONA metrics, which is useful in assessing relationships between groups of actors with similar relational characteristics.

**Figure 4**
**Prominent Actor Network (In-Degree ≤ 1)**




| Network-Level Metrics | | | Ego-Level Metrics (avg) | | |
|---|---|---|---|---|---|
| **Metric** | **Base Network** | **This Network** | **Metric** | **Base Network** | **This Network** |
| Nodes | 204 | 109 | Degree | 5.70 | 5.98 |
| Edges | 551 | 300 | Betwn Cent | 225 | 95.3 |
| Components | 1 | 1 | Close Cent | $1.57 \times 10^{-3}$ | $3.42 \times 10^{-3}$ |
| Avg Geo Dist | 3.20 | 2.74 | Eigen Cent | $4.90 \times 10^{-3}$ | $9.17 \times 10^{-3}$ |
| Density | 2.81% | 5.54% | PageRank | 0.640 | 0.663 |
| Modularity | $7.54 \times 10^{-3}$ | 0.0199 | Clust Coeff | 0.159 | 0.273 |

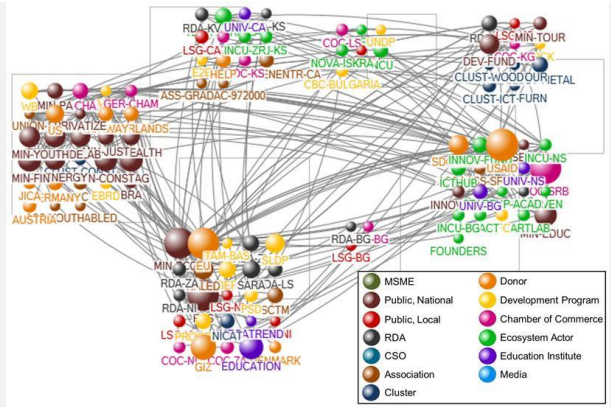
*This sub-network illustrates the use of metrics to filter data into sub-networks. This graph and data include only those actors that were named as targets at least twice, thereby filtering out 95 actors from the Base Network that were named only once or not at all. Any combination of multiple criteria, either attribute or metric, can be used to filter data into more refined sub-networks.*

## 7. CLUSTER ALGORITHMS

ONA software utilizes various algorithms to analyze networks, including algorithms used to organize actors into "clusters" or "communities" based on how vertices are connected to one another. Figure 5 contains the same actors as those in Figure 4, but organized into "clusters" using one of three algorithms (in this case Clauset-Newman-Moore). In this graph, the actors retain their color-coded organization type; this allows the

reader to observe some trends in the composition of the groups generated by the cluster algorithm, as many of the actor types naturally fall into one of a few clusters (e.g. all of the Ecosystem Actors appear in three clusters). This is notable since clusters are generated based purely on their relationships, not on organizational attributes. Algorithm clustering may lead to improved methods of targeting groups of actors and facilitating collaboration.

**Figure 5**
**Cluster Algorithm: Clauset-Newman-Moore (In-Degree ≤ 1)**



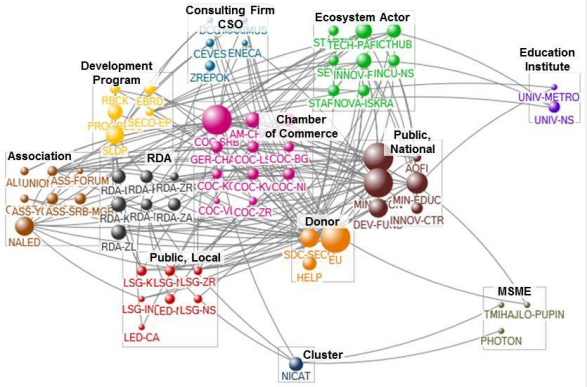

| Network-Level Metrics | | | Ego-Level Metrics (avg) | | |
|---|---|---|---|---|---|
| **Metric** | **Base Network** | **This Network** | **Metric** | **Base Network** | **This Network** |
| Nodes | 204 | 109 | Degree | 5.70 | 5.98 |
| Edges | 551 | 300 | Betwn Cent | 225 | 95.3 |
| Components | 1 | 1 | Close Cent | $1.57 \times 10^{-3}$ | $3.42 \times 10^{-3}$ |
| Avg Geo Dist | 3.20 | 2.74 | Eigen Cent | $4.90 \times 10^{-3}$ | $9.17 \times 10^{-3}$ |
| Density | 2.81% | 5.54% | PageRank | 0.640 | 0.663 |
| Modularity | $7.54 \times 10^{-3}$ | 0.0199 | Clust Coeff | 0.159 | 0.273 |

*This sub-network contains exactly the same data set as in Figure 4, but with actors grouped into clusters by one of the software algorithms. In this case, actors are organized into seven clusters. The other cluster algorithms, when applied, generate 12 and 27 clusters, respectively. Clusters are generated based solely on their linkages in the network, not on organizational attributes, so clustering may provide a mechanism for targeting groups of actors to strengthen the network.*

## 8. SECTOR ANALYSIS

ONA is useful in analyzing networks based on economic sector. In more advanced analyses, financial transactions between MSMEs and others can represent one type of linkage; service provision another; and credit or other financial relationship a third. Linkages can as well be "weighted" to reflect higher strength or value. In this way, a user can compare the MSME-support network in, for example, the metal sector versus those in the wood sector. Where applicable in this assessment, the team recorded the economic sectors targeted by the MSME-support actors; however, since this assessment does not constitute a comprehensive examination of any single sector, analysis is largely incomplete. Figure 6 (see following page) illustrates actors working in the ICT sector.

**Figure 6**
**ICT Actor Sub-Network**




| Network-Level Metrics | | | Ego-Level Metrics (avg) | | |
|---|---|---|---|---|---|
| **Metric** | **Base Network** | **This Network** | **Metric** | **Base Network** | **This Network** |
| Nodes | 204 | 65 | Degree | 5.70 | 5.29 |
| Edges | 551 | 155 | Betwn Cent | 225 | 51.7 |
| Components | 1 | 1 | Close Cent | $1.57 \times 10^{-3}$ | $6.16 \times 10^{-3}$ |
| Avg Geo Dist | 3.20 | 2.58 | Eigen Cent | $4.90 \times 10^{-3}$ | $15.4 \times 10^{-3}$ |
| Density | 2.81% | 8.27% | PageRank | 0.640 | 0.781 |
| Modularity | $7.54 \times 10^{-3}$ | $8.26 \times 10^{-3}$ | Clust Coeff | 0.159 | 0.340 |

*This sub-network includes all actors working in or targeting the ICT sector (to the extent that this information was consistently collected in the assessment). More comprehensive application of ONA over a period of project implementation would allow users to develop more complete network definitions and monitor and evaluate network metrics and performance of support actors over time. If applied strictly to supply chains, linkage could represent, for example, financial transactions (to the extent of course that participants are willing to provide that information).*

## 9. CENTRALITY MEASURES

Centrality metrics measure the importance of individual nodes in providing bridges to other actors in the network; the principle of centrality is used to calculate degrees of separation between individual actors in social networks. There are different types of centrality measures (at least five common, four of which are included in the software used for this assessment: Betweenness, Closeness and Eigenvector Centralities, plus PageRank (developed by Google for use in its search engine). The principle for different centralities is that some centralities are more applicable to certain types of networks than others. Since centralities are ego-level metrics, reporting their averages as we have in the discussion above, does not provide much meaning. In Table 3, we compare the top five actors for each centrality measure, alongside the top five actors based on In-Degree and Degree for the Base Network and the ICT Network presented in Figure 6. Again, applying this sort of analysis to more complete data sets over time may help practitioners to standardize ONA and the use of common metrics.

**Table 3**
**Top 5 Centrality Ego-Metric Actors**

| Network | Centrality Metrics | | | | Degree | In-Degree |
|---|---|---|---|---|---|---|
| | **Betweenness** | **Closeness** | **Eigenvector** | **PageRank** | | |
| **Base Network** | EU<br>USAID<br>SDC-SECO<br>COC-SRB<br>GER-CHAM | EU<br>MIN-ECON<br>RAS<br>USAID<br>GER-CHAM | MIN-ECON<br>UNION-EMPL<br>EU<br>COC-SRB<br>RDA-ZR | EU<br>GER-CHAM<br>COC-SRB<br>UNION-EMPL<br>MIN-ECON | EU<br>GER-CHAM<br>UNION-EMPL<br>MIN-ECON<br>COC-SRB | EU<br>COC-SRB<br>MIN-ECON<br>USAID<br>RAS |
| **ICT Sector** | EU<br>COC-SRB<br>MIN-ECON<br>SDC-SECO<br>NICAT | EU<br>COC-SRB<br>MIN-ECON<br>RAS<br>SDC-SECO | EU<br>COC-SRB<br>MIN-ECON<br>RAS<br>UNION-EMPL | EU<br>COC-SRB<br>MIN-ECON<br>SDC-SECO<br>MIN-EDUC | EU<br>GER-CHAM<br>COC-SRB<br>UNION-EMPL<br>MIN-ECON | EU<br>COC-SRB<br>MIN-ECON<br>RAS<br>MIN-EDUC |

*This table lists the top five actors based on the various centrality measures, together with degree and in-degree. Logically, those actors with the most linkages are likely to have higher centralities, as is observed with this data. Again, data gathered consistently and over time may allow development practitioners to better define which centrality measures are most applicable to networks common to the development field.*

# III. LESSONS LEARNED

## 1. ONA DATA COLLECTION

Collecting ONA data was at times a challenge. The team allocated 60-90 minutes per interview, and collecting the ONA data (typically near the end of the interview) may have been a bit intrusive, particularly in cases where the interviewee was hurried or where a particularly productive interview was extended even longer. Team members accommodated this in varying ways and varying levels of consistency; in general, we attempted to collect and record as much ONA data as possible during the interview, minimizing the need for much of the ONA-specific data at the end. In some cases, it simply wasn't feasible to collect the linkage data; in these cases, we either contacted the interviewee later or attempted to gather the information as much as possible via other sources.

## 2. DEFINING THE NETWORK

Defining the network at the outset of ONA is a key consideration. In this assessment, the network was defined to include those actors who have a direct mandate to support private sector and MSME development. As these actors are fairly clear in Serbia's institutional framework, our definition proved adequate and the team was able to survey representative actors from all groups. The data collected does not, however, constitute the complete network. Two under-represented actor groups, whose inclusion might be considered going forward, are education and media. Related to education, there are many levels to consider: higher, vocational and secondary; these should be defined. No media actors were interviewed, but they were cited as targets five times; if and how to include different national and local media outlets should also be considered. A larger issue to consider in a future project is whether to use ONA for MSME-support actors, supply chains, or both; these networks would constitute different sets of actors.

## 3. DEFINING LINKAGES

As previously discussed, collecting data for this assessment presented numerous challenges, resulting in a dataset that is not completely consistent or thorough. One challenge is defining precisely what is meant by a "linkage." At the outset of this assessment we intended to identify and categorize actor linkages as one of four types: i) donor-grantee; ii) formal partner; iii) associate, representing high-level, but perhaps non-formal, cooperation; and iv) collaborator, an actor with whom they functionally collaborate without a formal agreement. These linkages proved ambiguous to apply and simply did not fit all types of actors and relationships; they were therefore not used in this analysis. Other practitioners have used a "strength scale," for example from 1-5, which is fairly subjective and tends to skew toward the high end of the scale. Financial linkages in supply chains would need to be provided by actors, an unlikely scenario, or else calculated or estimated from available data. Actors with very high numbers of linkages, for example donors – who may have tens or even hundreds of actors with whom they have worked – would constitute a different kind of challenge as well. Defining what constitutes a linkage is likely to be more challenging that defining the network.

## 4. ACTOR ATTRIBUTES

In this assessment, we attempted to collect the following attribute data from surveyed MSME-support actors: i) Organization Identity & Respondent Contact; ii) Legal Form & Registration; iii) Geographic Coverage; iv) Priority Sectors; v) Number of Clients; vi) Staffing & Leadership Gender; and vii) SME-Support Services. For

SMEs we attempted to record their market coverage and numbers of direct buyers. Given the challenges in implementing this ONA during the overall assessment, as might be expected there are considerable gaps in the data. That being the case, it isn't viable to utilize much of the attribute data to filter network actors for more detailed analysis; these gaps could certainly be filled over the longer-term. All that said, the current database is considerably populated and contains a wealth of actor data and contact information, and was of course used to generate all of the analysis in this report.

## 5. DATA ANALYSIS

Having consistent, complete and clean data is perhaps the most challenging aspect of utilizing ONA – at least from a technical standpoint – over the life of a project. With clean data, much analysis can be performed simply and quickly. It will be up to future users and management to best determine how to manipulate and apply the available data and analysis over the project lifecycle. Again, the use of ONA in international development is a relatively new field of application and much can be learned in an environment that solicits input and critically questions findings and methodologies.

## 6. LOCAL CAPACITY-BUILDING

Operating ONA software requires some level of technical software competence (there are numerous software programs which vary considerably in their use and use-ability). Incorporating ONA into future programming will be most effective if capacity is developed locally, perhaps providing future opportunities for collaboration and synergy with development practitioners in other countries. This is true not just for the technical capacity of operating ONA software, but also for a specialized sociologist trained in advanced metrics and interpretation as effective use of ONA requires a fair amount of critical thinking.

## 7. M&E TOOL

This recommendation is excerpted from the main report. A potential future program incorporating ONA can serve as a pilot under which to apply new tools and solutions to strengthen, advance and objectify M&E, drawing on USAID and international communities of practice to apply tools like ONA and other advanced instruments to improve measurement effectiveness and more accurately attribute impact. M&E support to local partners should be an integral element of future programming.

# IV. METHODOLOGY

## 1. ACTORS SURVEYED & ASSESSMENT TEAM

The assessment team was comprised of four members: Craig Hempfling (Team Leader), Richard Danicic, Edi Majstorovic and Branislav Savic. The survey phase extended for roughly 2-1/2 weeks. During the first week, all team members interviewed actors in Belgrade; in the second week, the team split to cover the regions: Danicic – north; Hempfling – central; Majstorovic – east; Savic – west. In Week 3 the team returned to Belgrade to complete any additional priority interviews or with actors previously unavailable. In total, the team interviewed 149 MSMEs and support actors. A more complete description of the methodology of the entire assessment is presented in the main report.

## 2. INTERVIEW STRUCTURE

The team standardized the interview structure to the extent possible, recognizing the need to work within the demands and constraints of the interviewees. In general, interviews included: i) overview of the actor and their activities; ii) challenges and constraints facing SME development; iii) opportunities and examples of success; iv) history of cooperation with USAID or other donors; and v) ONA attributes and linkages. Attribute data included: i) organizational and registration data; ii) number of staff and leadership gender; ii) geographic coverage; iii) clients and beneficiaries served; iv) targeted economic sectors; v) principle support activities. For SMEs we also sought to define their markets and number of direct buyers.

## 3. ONA DATA COLLECTION

ONA was gathered primarily through two channels: the surveys and via actor websites. As mentioned elsewhere in this report, collecting ONA data in tandem with the PEA assessment presented several challenges. The team utilized the hired assistant, Bojan Jakovljevic, to enter contact and attribute data, relying first on business cards and websites, and then filling in gaps with the individual team members. In a longer-term scenario, data collection could become more exact and consistent; having good data must be a priority if ONA is to be worthwhile.

## 4. ONA ANALYSIS

ONA was analyzed exclusively with NodeXL. Team member Edi Majstorovic combined data from the three co-assessors into a single document, "coding" a specified portion (to simplify sorting and filtering). Team Leader, Craig Hempfling, then integrated the data into the NodeXL file, then coded the remaining data, cleaned the dataset and prepared this analysis.

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