V-LINC Visualisation of Linkages in Networks and Clusters

- Listed as a Good Practice on the Interreg Europe Policy Learning Platform
Agenda

• Introduction to V-LINC
  – Analysis Tool
  – Methodology

• Application to Clustering and Regional Planning
  – BeWiser
  – Pyhäsalmi Mining Services

• Inter-clustering approach and how this is applicable to a region with smaller business base
  – BeWiser Connect
  – EuroTech Connect
  – IN4.0 Connect

• Conclusions
Visualisation of Linkages in Networked Clusters

V-LINC is an expert research group which informs and develops policy recommendations through mapping, visualising and analysing the strength of key relationships within Cluster Ecosystems.

Measure Global Impact
Measure Levels of Internationalisation
Develop Targeted Strategy and Policy

Applied across Europe and in the US via Be Wiser, and ERASMUS+ projects.
Visualisation of Linkages in Networked Clusters

Linkages between firms and other organisations are at the heart of how clusters function.

The key components of V-LINC data are:

1. Define the linkage category,

These linkage categories are derived from Marshall’s (1890) ‘Triad of External Economies of Industrial Localisation;’ Porter’s (1998a) ‘Diamond of Local Industrial Clustering,’ and Leydesdorff’s (2012) ‘Triple Helix Cluster configuration’ each of which recognise the role of knowledge, innovation, collaboration, administrative supports and specialised inputs.
Visualisation of Linkages in Networked Clusters

• **Government Agency linkages:** includes links to International, national and local agencies e.g. city or county councils, state agencies, Environmental Protection Agency (EPA) etc.

• **Industry Association linkages:** this category includes membership of industry association groups.

• **Industry Peer linkages:** with other companies within the sector; noted to be key drives of a cluster in regard to innovation and economic growth (Porter, 1998).

• **Input linkages:** included are links with suppliers of raw material, goods and services which have a decisive importance with respect to the final product or on the market performance of the company.

• **Output linkages:** with customers of the firm.

• **Research and Development linkages:** from the work of Porter (1985) we understand the basic rationale for innovation is to improve the long-run competitive position of a firm. These linkages include joint research projects between companies and also research relationships with academic institutes.

• **Specialist Service linkages:** with vendors who supply essential services to the organisation e.g. analytical services, automation, engineering, I.T., legal services, out-sourcing of particular processes and validation etc.

• **Training linkages:** with third parties who provide specific training for employees. The training may take the form of safety courses, training on machinery or software, diploma or degree courses.
Visualisation of Linkages in Networked Clusters

Linkages between firms and other organisations are at the heart of how clusters function.

The key components of V-LINC data are;

2. Define geographic scope

Markusen (1996) recommends a broader institutional approach which encompasses the degree of embeddedness across district boundaries.

The methodology distinguishes itself from Porter’s (1990, 1998) work in that it recognises that clusters are dynamic and have linkages which occur with partner’s external to a cluster.
Linkages between firms and other organisations are at the heart of how clusters function.

The key components of V-LINC data are;

3. **Assess the business impact of each linkage as perceived by a respondent firm.**

V-LINC provides a consistent method to reveal the significance of business linkages as perceived by company personnel involved in those linkages in a structured and replicable format. The importance of the linkages is collected through a series of Likert scale questions during structured interviews. The Likert scale used converts qualitative judgements into quantitative data which can be compared and subject to further analysis. V-LINC measures the perceived significance of linkages.

Each individual linkage is analysed across four dimensions; Intensity, Importance, Involvement and Investment. As each dimension is scored from 1 - 10, the summation of results, provides the perceived significance score for a linkage, out of 40.
V-LINC Visualisation of Linkages in Networks and Clusters

- Application to Clustering and Regional Planning
  - BeWiser
  - Pyhäsalmi Mining Services
This project has received funding from the European Union’s Seventh Framework Programme for research, technological development and demonstration under grant agreement no. 319907.

Be Wiser (Building Enterprises – Wireless and Internet Security in European Regions) was a 36 month project funded under the Seventh Framework Programme (FP7) of the European Commission.

Analysed 7 Different Clusters to Map their Local, National, European and International ecosystems

The images showcase
1) the National R&D links in each cluster
2) The Pan-European R&D linkages from each cluster
The Data was used to develop BeWiser Connect (an online matchmaking platform) a platform developed to connect ICT clusters and B2B connections across Europe.

### Research & Development Linkages

<table>
<thead>
<tr>
<th>Country</th>
<th>Cyprus</th>
<th>France</th>
<th>Germany</th>
<th>Ireland</th>
<th>Slovenia</th>
<th>Spain</th>
<th>United Kingdom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Region</td>
<td>Nicosia</td>
<td>Paris</td>
<td>Karlsruhe</td>
<td>Cork</td>
<td>Ljubljana</td>
<td>Barcelona</td>
<td>Northern Ireland</td>
</tr>
<tr>
<td>Firms</td>
<td>6</td>
<td>10</td>
<td>8</td>
<td>16</td>
<td>10</td>
<td>11</td>
<td>10</td>
</tr>
<tr>
<td>Total Linkages</td>
<td>133</td>
<td>393</td>
<td>382</td>
<td>571</td>
<td>339</td>
<td>318</td>
<td>222</td>
</tr>
<tr>
<td>Research &amp; Development</td>
<td>12.7%</td>
<td>23.9%</td>
<td>21.5%</td>
<td>7.2%</td>
<td>10.3%</td>
<td>16.4%</td>
<td>8.6%</td>
</tr>
</tbody>
</table>

[Map Image]
Pyhäsalmi Mine V-LINC Analysis

Pyhäsalmi Mine is closing in September 2019 – with a loss of jobs for up to 2,000 people. To prepare for this closure a V-LINC analysis of the connections of the mining supply cluster were analysed in January 2018. A further analysis looked beyond the closure to a January 2021 and considered the portfolio of customers firms would see replacing lost revenues.

After identifying the ideal New Output Linkages – respondents were then asked what supplementary linkages would be needed to help them connect with these new customers.
1st Phase V-LINC Results - Pyhäsalmi Mine

\[
13 \times 13 = 175
\]

<table>
<thead>
<tr>
<th>Category</th>
<th>GA</th>
<th>IA</th>
<th>IP</th>
<th>IN</th>
<th>OU</th>
<th>RD</th>
<th>SS</th>
<th>TN</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>11</td>
<td>5</td>
<td>15</td>
<td>57</td>
<td>44</td>
<td>9</td>
<td>27</td>
<td>7</td>
<td>175</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Location</th>
<th>Nihak</th>
<th>N. Ostrobothnia</th>
<th>Finland</th>
<th>International</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>64</td>
<td>31</td>
<td>72</td>
<td>8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Impact</th>
<th>Tenuous</th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>7</td>
<td>38</td>
<td>98</td>
<td>32</td>
</tr>
</tbody>
</table>

Note: Government Agencies (GA); Industry Associations (IA); Industry Peers (IP); Inputs (IN); Output (OU); Research & Development (RD); Specialist Services (SS) and Training (TN).
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Total Linkages = 175 (Nihak= 64; Northern Ostrobothnia = 31; National = 72 and International = 8)
HIGHLIGHTS OF the 2018 RESULTS

Pyhäsalmi All Links
n = 175

Pyhäsalmi Output Links
n = 44

Pyhäsalmi Input Links
n = 57

- Low number of linkages across all support categories
- Limiting factor for creation of New Links (Especially International)
2nd Phase V-LINC Results - Pyhäsalmi Mine
This project has received funding from the European Union’s Seventh Framework Programme for research, technological development and demonstration under grant agreement no. 319907.

Total Linkages = 23 (Nihak= 2; Northern Ostrobothnia = 1; National = 14 and International = 6)
This project has received funding from the European Union’s Seventh Framework Programme for research, technological development and demonstration under grant agreement no. 319907.

Total Linkages = 25 (Nihak= 1; Northern Ostrobothnia = 9; National = 12 and International = 3)
Having reviewed the Anticipated Structural Change planning in Pyhäjärvi, the following policies are suggested to support the development and re-alignment to external markets of the mining services sector in Pyhäsmi.

1. It is evident that an opportunity exists to develop a cluster organisation (Estévez, 2015; Hobbs et al., 2015) to represent the mining services sector in Pyhäsmi as part of the regions RIS3 strategy (ecoRIS3).

2. An opportunity exists to develop export consortia through co-operation and collaboration between Pyhäsmi Mining firms where companies bring their product and service offering together to compete with larger suppliers (Hoegler et al., 2015) via the cluster through Clusterize, IN4.0 Connect or a model similar to the Interreg Atlantic Area project Consortex.
V-LINC Visualisation of Linkages in Networks and Clusters

- Inter-clustering approach and how this is applicable to a region with smaller business base
  - BeWiser Connect
  - EuroTech Connect
  - IN40 Connect
Be Wiser Connect is an online matchmaking tool which showcases over 80 ICT firms & 20 RTD Centres across Europe and the US who participated in a V-LINC analysis.
Linking and Connecting SMEs

Step 1: Analyse

Step 2: Link

Step 3: Connect

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Tangible EuroTech Connect Outputs:

- Twenty seven connections were made at the face-to-face ‘Be Wiser Connect’ event between the visiting SMEs and IT firms and Research Centres located in Cork.
- Two NDA’s have been signed between visiting and Cork based firms.
- Two research centres in Cork are being supplied with IOT sensor technology from Spain.
- One visiting firm has had formal meetings with IDA Ireland re: opening an office in Cork.
- Visiting firms and cluster managers established connections with EMC, DePuy, Janssen and Johnson Controls at a decision making CEO level.

David Marí Martínez (Eurecat), who accompanied two Spanish firms to Cork believes “EuroTech Connect has been a very good example of what clusters should be doing in Europe right now in terms of endeavouring to get companies together: fostering collaboration across regions and sharing knowledge and experience through real face to face interaction with clear institutional support. Zolertia and Sensing & Control were delighted with the opportunity to expand their connections and collaborate with Irish firms”.
IN 4.0 Connect is an online matchmaking tool which showcases 100 Naval firms & 100 IN 4.0 technology specialists across the Atlantic Area of Europe.
IN4.0 Connect

France

Please browse the participating firm’s websites, search their product and service offerings and read about their R&D capabilities through the links below.

If you wish to make a facilitated connection with an individual firm, click on the Connect button, this will redirect you to our online registration form. Enter your contact details to allow the local IN 4.0 co-ordinator to facilitate an introduction for you.

- **Ship ST**
  - **Small (<50)**
  - www.shipst.com
  - EST. 2000
  - Marine engineering & naval architecture

- **AMPLEXOR**
  - **Large (250+)**
  - www.amplexor.com
  - EST. 1980
  - Engineering, technical documentation, maintenance studies, KM documentation

United Kingdom

Please browse the participating IN 4.0 specialists websites, search their service offerings and read about their R&D capabilities through the links below.

If you wish to make a facilitated connection with an individual firm/centre, click on the Connect button below, this will redirect you to our online registration form. Enter your contact details to allow IN 4.0 regional co-ordinators to facilitate an introduction for you.

- **Imagination Factory**
  - **Small (<50)**
  - www.imaginationfactory.co.uk
  - EST. 2010
  - Product design and creative engineering agency with experience in light-weight heads-up displays

- **Innoactive.**
  - **Small (<50)**
  - www.innoactive.de
  - EST. 2013
  - VR Enterprise platform for effective creation, deployment and management of VR Training apps

- **Cloud Security Consultants**
  - **Small (<50)**
  - www.cloudsecurityconsultants.net
  - EST. 2018
  - Specialist firm dedicated to maximising protection against cyber threats for SMEs.
Conclusions

• Useful for understanding the needs of firms within a region
• Mapping and identifying elements of:
  – Strength
  – weaknesses
  – Missing elements within value chains
• Recognising Key Connectors within a cluster/network
• Empowering firms to participate to strengthen their regional ecosystem.
Thanks for your attention!

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