A meta-analysis on the role of institutions in Entrepreneurial Ecosystems (EE)

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CRETE 2022
July 15, 2022
Growing interest in EE – Institutions arise, BUT…

• The concept of entrepreneurial ecosystems (EE) has attracted **increasing attention**

• Within this context, Cavallo et al. (2019) highlight the importance of **institutional factors** (economic, technological, societal) and social context (culture, social norms) in promoting entrepreneurship.

However,

• Scattered theoretical and empirical underpinnings → the relationship between institutions and EE operation remains **limited and inconclusive** (Stam and van de Ven, 2021; Leendertse et al., 2021; Theodoraki et al., 2021).

• The **lack of a well-defined, commonly accepted, theoretical framework** for EE, the existence of **different environmental settings** and the presence of **multiple interactions** suggest that further research (and evidence) is needed on how and to what extent institutions affect EE (Fernandes and Ferreira, 2021; Johnson et al., 2022).

• The literature examines the impact of distinct elements/institutions on entrepreneurship BUT the ecosystem’s perspective implies that the EE elements are **jointly present, mutually interdependent and co-evolved** (Stam and van de Ven, 2021).
Entrepreneurial Ecosystems

“a set of interdependent actors and factors coordinated in such a way that they enable productive entrepreneurship within a particular territory” (Stam and Spigel, 2016 p. 1)

Several definitions for EE exist in the literature and all of them focus on the interconnectedness of various environmental factors and the embedded actors affecting entrepreneurial activity.
Evolution of the field

Although the literature considers the EE as a relatively novel concept, its roots can be traced back to similar notions.

Based on: Wurth, Stam and Spigel (2021); Mohammadi and Karimi (2021)
Institutions

Institutions are “the rules of the game in a society or, more formally, are the humanly devised constraints that shape human interaction” and regulate economic, political, and social activities (North, 1990).

Institutions can either foster or hinder entrepreneurial activity (Bruton et al., 2010), but better institutions contribute to higher levels of entrepreneurship and of higher quality (Sautet, 2005).
What we do

• We focus on the role of formal and informal institutions in EE performance using meta-analysis.

• Employing meta-analysis for the first time in the relevant literature, we:
  - examine the impact of the institutional factors on EE
  - identify the main factors affecting this relationship

• Understanding which agents (institutions) are more successful and the conditions (factors) supporting this effect can help the development of new frameworks and methodological approaches.
Main Research Questions (Hypotheses)

Informal institutions are social arrangements and norms associated with culture (cultural context, customs, traditions, moral values, religious and political beliefs) and include entrepreneurship culture which influences actors’ behavior and actions (Donaldson, 2021).

→ **Hypothesis 2**: Better informal institutions positively affect EE performance.

Formal institutions are considered as the rules, laws, policies, legislation and regulations that define actors’ behavior.

→ **Hypothesis 1**: Higher quality formal institutions positively affect EE performance.

Networks and collaborations can be either formal (e.g. government grants, collaborations within triple-helix partnerships, incubators and accelerators for entrepreneurship, public-private partnerships, etc.) or informal (knowing angel investors, informal business meetings, business clubs, entrepreneurs’ families, friends, colleagues, relations with other actors) (Audretsch, Belitski and Cherkas, 2021).

Stam and Spigel (2017) add that EE are not only intertwined with institutions and cultures, but also with the (social) networks developed within regions and communities.

→ **Hypothesis 3**: Networks positively affect EE performance.
Moderator analysis & Hypotheses

The moderator analysis can help us understand the potential sources of regional heterogeneity and differential effects.

➢ We focus on four moderating factors and the role they play in the nexus between institutions and EE performance.

→ Hypothesis 4: **Education influences the relationship between institutions and EE performance.**

→ Hypothesis 5: **Economic development influences the relationship between institutions and EE performance.**

→ Hypothesis 6: **The cultural context influences the relationship between institutions and EE performance.**

→ Hypothesis 7: **The spatial context influences the relationship between institutions and EE performance.**
# Records

- **#241** records identified through database searching
- **#76** additional records identified through other sources

# Screening

- **#68** duplicate records removed before screening
- **#249** records screened
- **#116** of records excluded
- **#133** full-text articles assessed for eligibility

# Included

- **#38** studies included in meta-analysis
- **#95** full-text articles excluded with reasons
- **52** irrelevant
- **36** not adequate statistical data
- **7** duplicates

**Identification**

**Screening - Eligibility**

**Included**

**Data & Methods**

- ‘entrepreneur*’ ecosystem*’ AND institution* AND (quantitative OR qualitative OR empirical OR data*) in title, abstract and keywords

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**Dependent variable**

**Independent variables**

**Moderator variables:** education, level of economic development, cultural background and spatial context.

Control for systematic differences in effect sizes or outcomes across studies.

### Group Constructs

<table>
<thead>
<tr>
<th>Constructs</th>
<th>Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE performance (k=38)</td>
<td>Assessed through alternative measures such as firm performance, new firm entry (or firms’ birth rate), entrepreneurship potential and density (e.g., number of firms) or specific EE performance indices.</td>
</tr>
<tr>
<td>Entrepreneurial performance (k=38)</td>
<td></td>
</tr>
<tr>
<td>Government (k=26)</td>
<td>Measured by various indicators (Voice and Accountability, Political Stability, Government Effectiveness; Regulatory Quality, Rule of Law, Control of Corruption, Citizens Rights). Alternative measures include government support, taxation, economic freedom, IPR regulatory framework and protection, procedures required to start a business, employee protection and trade regulations.</td>
</tr>
<tr>
<td>Economic and financial institutions (k=14)</td>
<td>Regulations governing markets (ease of entry, trading) and measures of financial development (financial support, venture capital, access to credit).</td>
</tr>
<tr>
<td>General formal institutions (k=6)</td>
<td>Other measures of formal institutions not uniquely specified.</td>
</tr>
<tr>
<td>Entrepreneurial Culture (k=20)</td>
<td>Measured by a variety of metrics including new firms’ birth rate, the degree to which entrepreneurship is valued in a region, entrepreneurial and sustainability awareness, entrepreneurial orientation, stakeholders’ support, fear of failure and uncertainty avoidance, attitudes against corruption, bribes, tax avoidance, and individualism.</td>
</tr>
<tr>
<td>Social Capital (k=12)</td>
<td>Measured by trust indicators (social, interpersonal, institutional), tolerance and self-efficacy.</td>
</tr>
<tr>
<td>Networks (k=12)</td>
<td>Both formal and informal networks are included. Collaboration for entrepreneurship and innovation, participation in associations. It measures networking and collaboration among the triple helix agents (government, industry, university).</td>
</tr>
<tr>
<td>Collaborations &amp; Networks (k=10)</td>
<td></td>
</tr>
<tr>
<td>Triple Helix (k=2)</td>
<td></td>
</tr>
</tbody>
</table>

### Formal Institutions (k=29)

**Informal Institutions (k=26)**

Stam and van de Ven’s (2021) EE model: ‘institutional arrangements component is captured by the formal institutions, culture and network elements’

### Economic and financial institutions (k=14)

### General formal institutions (k=6)

### Entrepreneurial Culture (k=20)

### Social Capital (k=12)

### Networks (k=12)

| Collaborations & Networks (k=10) | |
| Triple Helix (k=2) | |

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Descriptive analysis of the selected studies

The number of studies where each specific pair-wise correlation is examined.
(Bivariate meta-analysis using HubMeta.)
EE related terms:

- entrepreneurial ecosystem
- rural entrepreneurship
- sustainable development
- governance
- innovation ecosystem
- regional development
- new venture creation
- economic development
- legitimacy
- coopetition
- social entrepreneurship
- networks
- institutional environment
- emerging economies
- incubators
- entrepreneurial ecosystems
- entrepreneurs
- entrepreneurship education
- entrepreneurship
- global entrepreneurship monitor
- entrepreneurship university
- institutions
- networks
- case study
- entrepreneurial intention
- entrepreneurship education
Evolution of the EE concept (VOSviewer overlay visualization over co-occurrence analysis)

Starting from the systemic view of the triple helix, its impact on entrepreneurial activity and the spillover effects of the helices’ interactions, the literature moves to the regional characteristics of the ecosystems and their effect on economic performance (focusing on high-growth firms). The ‘entrepreneurial ecosystem’ term becomes more prominent later along with trust. More recently, the spotlight is placed on institutions, social capital and institutional theory.
Meta-analysis Methodology

Step 1 • Publication bias: We calculate the Fail-Safe N statistic which estimates the number of unpublished studies that would result in insignificant results and reduced reliability.

Step 2 • Heterogeneity and homogeneity: We use Hedges’ Q test for homogeneity and Higgin’s I² to measure heterogeneity.

Step 3 • Bivariate meta-analysis: We assess the relationship between the dependent group construct (EE performance) and the independent ones (formal institutions, informal institutions and networks).

Step 4 • Random effect size model: While the fixed (and homogeneous)-effect model assumes that all sample papers have an identical size effect (Hunter and Schmidt, 2004), the random-effect model (Hedges, 1992) assumes that effect sizes differ among studies. Therefore, the weighted means of effect sizes are used so that even studies with small sample sizes contribute to the effect calculation.

Step 5 • Meta-analytic correlation tables: These tables provide an overview of the relationships between the variables of interest.

Step 6 • Moderator analysis: We employ the moderator analysis instead of meta-regression analysis (MRA) as our ‘characteristic of interest’ is a categorical variable (and not a metric one) (Spineli and Pandis, 2020).

→ All results are robust
→ Significant heterogeneity
**Random Effect sizes** - the strength of the relationship between factors/variables

<table>
<thead>
<tr>
<th>Bivariate Variables</th>
<th>Mean Effect Size ($r$), adjusted, random-effects Fisher's Z model</th>
<th>95% Confidence interval lower bound</th>
<th>95% Confidence interval upper bound</th>
</tr>
</thead>
<tbody>
<tr>
<td>FI- EE [H1]</td>
<td>0.1922</td>
<td>0.1165</td>
<td>0.2656</td>
</tr>
<tr>
<td>Gov - EE</td>
<td>0.1061</td>
<td>-0.0149</td>
<td>0.224</td>
</tr>
<tr>
<td>E&amp;F - EE</td>
<td>0.2421</td>
<td>0.0061</td>
<td>0.4524</td>
</tr>
<tr>
<td>gFi- EE</td>
<td>0.2168</td>
<td>-0.0472</td>
<td>0.4525</td>
</tr>
<tr>
<td>InfI- EE [H2]</td>
<td>0.4381</td>
<td>0.3665</td>
<td>0.5046</td>
</tr>
<tr>
<td>EntCult- EE</td>
<td>0.402</td>
<td>0.3207</td>
<td>0.4772</td>
</tr>
<tr>
<td>SC - EE</td>
<td>0.3866</td>
<td>0.2539</td>
<td>0.505</td>
</tr>
<tr>
<td>N- EE [H3]</td>
<td>0.3924</td>
<td>0.218</td>
<td>0.5426</td>
</tr>
<tr>
<td>C&amp;N - EE</td>
<td>0.4397</td>
<td>0.3123</td>
<td>0.5515</td>
</tr>
<tr>
<td>TrHel - EE</td>
<td>0.1244</td>
<td>-0.7761</td>
<td>0.858</td>
</tr>
</tbody>
</table>

**Thresholds (Steel et al. 2021):**
- **Small** = 0.10
- **Medium** = 0.18
- **Large** = 0.32

$H_3$: Positive & significant

$H_1$: 

$H_2$: 

$H_3$:
## Correlation Table
(correlations among the 4 group constructs)

### Meta-analytic correlation table of group constructs

<table>
<thead>
<tr>
<th>Variable</th>
<th>Entrepreneurial ecosystem performance</th>
<th>Formal institutions</th>
<th>Informal institutions</th>
<th>Networks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entrepreneurial ecosystem performance</td>
<td><strong>1.00</strong></td>
<td>29 (232390**)</td>
<td>26 (968998**)</td>
<td>12 (203352**)</td>
</tr>
<tr>
<td>Formal institutions</td>
<td>0.1182</td>
<td><strong>1.00</strong></td>
<td>18 (37626*)</td>
<td>9 (184008**)</td>
</tr>
<tr>
<td>Informal institutions</td>
<td>0.3237</td>
<td>0.0721</td>
<td><strong>1.00</strong></td>
<td>8 (3830**)</td>
</tr>
<tr>
<td>Networks</td>
<td>0.2687</td>
<td>0.1064</td>
<td>0.4232</td>
<td><strong>1.00</strong></td>
</tr>
</tbody>
</table>

**Notes:** The values above the diagonal indicate: the number of times the specific correlation is examined in the literature and the corresponding total sample size (in parenthesis). ***, * indicate statistical significance at the 0.01 (0.05) level.
Moderator analysis

Hyp. 4: Education influences the relationship between institutions and EE performance.
→ Supported

Hyp. 5: Economic development influences the relationship between institutions and EE performance.
→ Partially Supported

Hyp. 6: The cultural context influences the relationship between institutions and EE performance.
→ Supported

Hyp. 7: The spatial context influences the relationship between institutions and EE performance.
→ Partially Supported

<table>
<thead>
<tr>
<th>Moderator</th>
<th>Moderator Subsample</th>
<th>Relationship examined</th>
<th>n</th>
<th>k</th>
<th>Random effects (RE)</th>
<th>RE.CI low</th>
<th>RE.CI upp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education</td>
<td>Yes</td>
<td>FI-EE</td>
<td>8514</td>
<td>13</td>
<td>0.3829</td>
<td>0.4813</td>
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<tr>
<td></td>
<td></td>
<td>II-EE</td>
<td>931408</td>
<td>16</td>
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<td>0.3983</td>
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<td>N-EE</td>
<td>2690</td>
<td>5</td>
<td>0.5548</td>
<td>0.4813</td>
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<td>No</td>
<td>FI-EE</td>
<td>223876</td>
<td>16</td>
<td>0.048</td>
<td>-0.0256</td>
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<td>II-EE</td>
<td>37590</td>
<td>10</td>
<td>0.4093</td>
<td>0.2645</td>
<td>0.605</td>
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<td>N-EE</td>
<td>200662</td>
<td>7</td>
<td>0.2464</td>
<td>-0.0115</td>
<td>0.5145</td>
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<tr>
<td>Economic Development</td>
<td>Developed</td>
<td>FI-EE</td>
<td>8017</td>
<td>13</td>
<td>0.4808</td>
<td>0.2094</td>
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<td>9612</td>
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<td>0.3988</td>
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<td>N-EE</td>
<td>22255</td>
<td>8</td>
<td>0.4468</td>
<td>0.3693</td>
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<tr>
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<td>Developing</td>
<td>FI-EE</td>
<td>3920</td>
<td>7</td>
<td>0.2385</td>
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<td></td>
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<td>8704</td>
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<tr>
<td></td>
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<td>N-EE</td>
<td>21421</td>
<td>4</td>
<td>0.5501</td>
<td>0.47</td>
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<tr>
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<td>FI-EE</td>
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<td>0.327</td>
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<td></td>
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<td>N-EE</td>
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<td>2</td>
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<td>FI-EE</td>
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<td>0.1621</td>
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<td>Spatial context</td>
<td>Ecosystem</td>
<td>FI-EE</td>
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<td>183798</td>
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<td>0.3211</td>
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<tr>
<td></td>
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<td>FI-EE</td>
<td>1949</td>
<td>4</td>
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<td>-0.5814</td>
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<td></td>
<td></td>
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<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
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<td>19554</td>
<td>3</td>
<td>0.6145</td>
<td>0.702</td>
<td>0.7301</td>
</tr>
</tbody>
</table>

Notes: EE: EE performance, FI: Formal institutions, II: Informal institutions, N: Networks, n: total sample size, k: number of correlations, RE.CI low: Confidence interval lower bound (random effects), RE.CI upp: Confidence interval upper bound (random effects)
Conclusion

Our study

✓ *synthesizes* the emerging literature on EE performance, *captures the complexity of EE* and help towards the systematization and development of an appropriate *theoretical framework*, which is currently lacking.

✓ provides *robust* empirical results.

✓ verifies the *interdependencies* that exist in EE.

→ Formal and informal institutions and networks *positively and significantly* affect EE performance. The strength of these effects depends on the *moderating factors* (economic development, cultural and spatial context). The stakeholders of an ecosystem should account for these factors, comprehend their dynamics and adjust accordingly when aiming at supporting local economies’ performance and sustainability.
Policy implications

• Knowledge regarding the impact of processes and the actors’ and factors’ influence on EE performance.

• Support in the design and implementation of interventions and policies, the allocation of resources, and the identification of tipping points in systems and effective levers.
Future Research Directions

• Additional empirical studies
• More studies including a ‘holistic’ approach (more than one kind of institutions)
• Further examination of the role of trust (social, individual, institutional) as major measure of social capital
• Extended geographical coverage (so as to capture cultural differences); better coverage of less-developed areas; further regional analysis
• Capturing the dynamics of the EEs and the interactions of different actors.
• Work towards the development of a ‘global’ theoretical framework
Thank you!

Any questions?