Complementor Embeddedness in Platform Ecosystems: The Case of Google Apps

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Outline

- Introduction
- Research question
- Google Apps
- Research approach
- Results
- Analysis of quantitative and qualitative data
- Discussion and validation
- Conclusion and future research
Industry Platforms

A product, service or technology, that is developed by one or several firms, that serves as a foundation upon which other firms can build complementary products, services or technologies.

Gawer (2009)
Proprietary Platform Ecosystems

- **Platform ecosystem**: all interlinked developers of complementarities or the interlinked set of products and services they develop.

- **Platform owners** depend on **complementor ecosystem** to:
  - Develop domain-specific applications
  - Appeal the platform to new market segments
  - Co-create and co-innovate
Ecosystem Strategy

**Embeddedness:** The ratio of the number of relationships an actor has to the number of relationships that is theoretically possible.

- Platform ecosystem strategies aim **to increase embeddedness of developers** in the ecosystem

- **Rationale for platform owners:**
  - Foster exchange among developers in the ecosystem (increase innovation speed)
  - Increased commitment to the platform (vendor locking)

- **Rationale for developers of complementary applications:**
  - Increased specialization
  - Increased visibility by partnering with prominent developers
  - Technological complementarity

- Little is known about the **structure of proprietary ecosystems**, accordingly the **effect of ecosystem strategies** remains **unknown**
Research Question

What is the influence of the number of complements developed by an actor on its embeddedness in a proprietary platform ecosystem?
Relevance

Scientific Relevance
- Provide a method to assemble information about, and visualize proprietary platform ecosystems
- Insight in the structure of a proprietary platform ecosystem

Practical Relevance
- Aid managers in analyzing their own ecosystem
- Insight into the factors that shape platform ecosystems
- Insight into partnering strategies of complementors
Google Apps

- Cloud-based office suite platform
- Consists of scalable versions of Google products, Gmail, Google Drive, Google Sites, Google Calendar, ...
- Intended for small to medium-sized enterprises, governmental and educational institutions
- **Third-party app development**: integration with other platforms, cloud migration functionality, CRM and ERP
- **App store**: Google Apps Marketplace
Data Collection

- **Identification of Google Apps vendors:**
  - Automated data collection from Google Apps Marketplace by means of a web crawler
  - Only apps listed under category ‘products’, professional services are excluded
  - SQL Queries and manual verification to compile list of vendors, ‘Google Labs’ and ‘Google Inc.’ → Google

- **Identification of business relationships**
  - Mentions of business and competitive relationships treated symmetric
  - Manual inspection of company websites, news feeds, CrunchBase
  - Identified relationships maintained in adjacency matrix

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<th>Zoho Corp.</th>
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0: Absence of relationship  
1: Presence of business relationship  
-1: Presence of competitor
Data Analysis and Validation

- Data analysis:
  - Network visualization and analysis $\rightarrow$ graphs and network metrics
  - Correlation analysis

- Accuracy and completeness of dataset validated with thirty-five Google Apps vendors, by means of questionnaire
Descriptives

- Data collected at **13-02-2013**
- **1354** applications
- **993** developers
- Google develops **13** applications (*Google Inc, and Google Labs*)
- Average of **1.36 applications per complementor** (Std. Dev 0.61)
- **7.36%** of complementors participates in partnership or certification programs

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Platform Ecosystem

- **1248** business relationships and **143** competitive relationships
- Average of **1.26 relationships per actor**
- Dense lateral connectivity in the bottom right
- Small number of **influential complementors** in the ecosystem

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<td>Density</td>
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<th>Std. dev.</th>
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<td>0.193</td>
<td>0.287</td>
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Underlying Network Topology: Data Cleansing

- Data cleansing to uncover network topology underneath hub-and-spoke network
- Cleansing steps:
  - Remove competitive ties
  - Remove actors solely connected to Google
  - Remove Google
- Cluster detection by means of the modularity algorithm (Blondel et al., 2008)
Underlying Network Topology: Observations

- 73% of complementors are solely connected to Google
- Small clusters → regional partnerships
- Large clusters → technological clusters
- Zoho and Salesforce clusters → hub-and-spoke topology
- Some of the largest vendors are solely connected to Google
Analysis of Quantitative Data

Hypothesis: There is a positive relationship between the number of applications an actor develops and its embeddedness in the ecosystem

- **Significant positive correlation** indicating that development activity and partnership activity coincide

- **Mild correlation** due to:
  - New entrants with existing partnerships in the ecosystem
  - Small companies that focus on continuous app development

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**. Correlation is significant at the 0.01 level (2-tailed).
Analysis of Qualitative Data

- Thirty-five vendors contacted by email, **response rate of 29%**
- Actors are **limitedly aware of the network topology** in the Google Apps ecosystem
  - Aware of their own partnership portfolio
  - Unaware of lateral ties in the ecosystem
- Most actors indicate to be **selective in partnering**, selection based on **technological complementarity**
Discussion and Validation

- 90% of respondents indicated partner listings compiled for their company were **accurate and complete**
- Incomplete listings due to **reliance on proprietary data** or **no access to partner listings**
- CrunchBase and news feeds as additional sources to **mitigate** reliance on proprietary sources
Conclusions and Future Research

- The Google Apps ecosystem is a sparesely connected hub-and-spoke network in which:
  - 992 complementors on average develop 1.36 applications (83% developers one application)
  - Complementors on average have 1.26 relationships (73% of actors are solely connected to Google)
  - A small number of influential actors are found
- Increased development activity and partnering activity coincide

Future research directions:
- Inclusion of service providers for ‘structural hole analysis’: Niche detection for service providers in the ecosystem
- Longitudinal studies to study ecosystem dynamics
- Comparison of proprietary platform ecosystems to uncover influence of platform type, firm characteristics and orchestration on ecosystems
- Towards automation of ecosystem analysis
References

