

# Poster: Visualizing Converging Business Ecosystems for Competitive Intelligence

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## ABSTRACT

Innovation is critical to today's economic growth. It often emerges as a result of large, complex, and continuously evolving interfirm collaboration networks. However, this makes identification of market leaders, potential disruptors, and new opportunities in a business ecosystem rather difficult. We introduce dotlink360, a visual analytic tool that provides capabilities to gain systemic insight into the complex structure and evolving dynamics of interfirm innovation activities in converging business ecosystems. The tool provides novel and multiple connected views of core and peripheral activities enabling the analyst to interactively explore, discover and understand the entire ecosystem, specific market segments, or a single firm.

**KEYWORDS:** Visual Analytics, Business Ecosystem, Mobile Industry, Convergence, Competitive Intelligence.

**INDEX TERMS:** H.5.2. [Information Interfaces & Presentation]: User Interfaces – Graphical User Interfaces (GUI); H.4.2. [Information Systems Applications]: Decision Support

## 1 INTRODUCTION

Today's business ecosystems are characterized by a large and complex network of firms, from many different market segments, all collaborating, partnering, and competing to ultimately create and deliver products and services to end customers [1]. One such context is the mobile ecosystem. Driven by the convergence of enabling technologies, devices, and applications, the complexity of the mobile ecosystem is increasing multifold as new actors are emerging, new interfirm relations are formed, and the traditional distribution of power is shifted [2]. Firms come from a variety of market segments, including mobile network operators, device manufacturers, platform providers, and application and software providers. Potentially disruptive innovations can therefore also come from a number of areas. An illustrative example is the iPhone as advances in battery technology and user interfaces dramatically transformed the entire ecosystem. In many instances, however, these innovations are very difficult to identify. They often occur in potentially “distant” market segments or by an unknown company. Appropriate levels of competitive insight are thus very difficult to achieve in complex business ecosystems and generally limited to a firm's immediate market boundaries. This, however, has significant business implications as companies may underestimate serious competitive threats and disruptive technologies resulting in a loss of strategic competitive advantage or market share. It is therefore of great value to executives to gain

a better understanding of both core and peripheral ecosystem activities that could impact their company or market segment. Similarly, venture capitalists will find it very valuable to have a tool that maps the innovation space and provides insight to potential investment opportunities. The objective of this research is therefore to design and develop a tool that provides novel and multiple connected views of core and peripheral innovation activities enabling the analyst to interactively explore, discover and understand the entire ecosystem, specific market segments, or a single firm, for the purpose of competitive intelligence.

## 2 DESIGN OF DOTLINK360

### 2.1 Overview of dotlink360

dotlink360 is primarily driven by a database of all mobile ecosystem interfirm relations (e.g. alliances, partnerships, agreements, etc.) over the past two decades. It should be noted that dotlink360 is industry agnostic; the mobile ecosystem was identified as a relevant context due to its complex and dynamic state of interfirm collaboration and high levels of innovation. The dataset was created based on relevant queries on Thomson Reuters' SDC Platinum Database and Northern Light's SinglePoint portal and was complemented by findings in market research and corporate annual reports. Each database entry includes the companies involved in the relation; the market segment(s) companies belong to; the type(s) of connection between two firms (e.g. partner, supplier, marketing, R&D, etc.); relevant dates of agreement (e.g. start, termination, extension); and a description highlighting the specific details of the interfirm relation.

dotlink360 is a multiple view visualization system. The system presents the analyst with three main directions to explore the mobile industry: (1) *Ecosystem*, (2) *Market Segment*, and (3) *Company*. The Ecosystem path provides the analyst alternate views of the entire business ecosystem. The Market Segment and Company path prompts the analyst to choose a segment or company, respectively, and provides views with that element as the main focus. Within each path, a connected set of views is available through a dynamic drop-down menu at the top. The analyst can choose to move to a different visualization to gain a new perspective on the data. The different views share interactive

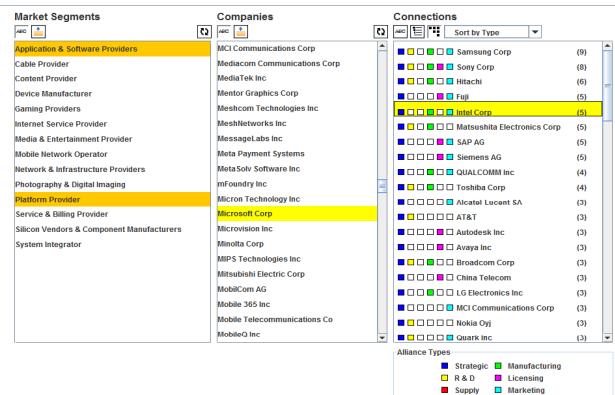


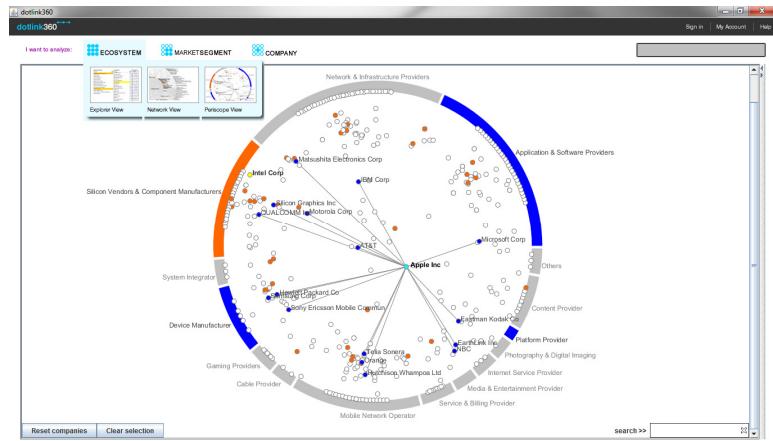
Figure 1: Explorer View

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**Figure 2: Periscope View**

operations, color mappings, and communications for a consistent user experience throughout. Each view has the ability to show relations between companies, differentiate the different types of relations, and provide a summary description in a slide-in panel. Interfirm relations are thus at the heart of the system. Below, we illustrate and describe a few of the current system views in more detail.

## 2.2 The Explorer View

The Explorer View (Figure 1) provides simple list-based access to market segments and companies for initial exploration by the analyst. The view includes a list of the 14 market segments and all the companies. Selecting a segment (or segments) highlights all companies working in that segment. Selecting a company shows the segments in which it operates. Additionally, when a company is selected, all of its connections to other companies appear in the far right list. These connections are color-coded to indicate whether the displayed companies are partners, competitors, suppliers, etc. We envision the Explorer View to be used as the starting point for initial analysis activities.

## 2.3 The Periscope View

The Periscope View (Figure 2) gives the analyst an overview of the ecosystem and shows the relationship between companies and market segments. Market segments are laid out as arcs on a circle sized by the number of companies in them. Companies are positioned inside the circle, pulled by a stronger force towards their market segments and by a weaker force towards their partners. The analyst can select a company and have its market segments and partners highlighted, or select a market segment and

highlight the companies in it. The Periscope View helps analysts understand the competitive position of companies within their market segment, discover in which market segments companies overlap, and enables the analyst to compare company connections.

## 2.4 The Periphery View

The Periphery View (Figure 3) illustrates interfirm relations of a company beyond its immediate connections. The analyst selects a company of interest (e.g. Intel Corp) and it is placed at the center of the view. Its immediate interfirm connections are laid out on an inner circle and the partners of partners are placed on an outer circle around the company in the center. To make a comparison with the company of interest the user can hover the mouse over another company (HP is shown in Figure 3) and highlight the other company's partners (in blue). The Periphery View uncovers who the question “who are my partners working with?” by providing a ripple effect-like representation of a company’s competitive environment. In doing so, the view provides a way of seeing beyond a firm’s immediate relation horizon.

## 3 CONCLUSION AND FUTURE WORK

dotlink360 is research in progress. The views described here and a few others are implemented and fully functional. We are in the process of developing and refining several other views, including a timeline/calendar view and a scatter plot view. We also plan to add a set of global and view-specific filters and controls that analysts can apply to narrow their exploration space.

We have demonstrated the system to a number of executives and market analysts and received useful feedback about its capabilities and functionalities. This market survey suggested the inclusion of more dynamic and real-time market information. We therefore plan to integrate unstructured textual data such as press releases, product announcements, and practitioner articles as well as patent data into dotlink360. Some of the challenges include efficient methods to retrieve, organize, and process the data as well as effective ways to visually alert the user of the different nature and types of data presented (e.g. factual versus speculative).

## REFERENCES

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**Figure 3: Periphery View**

