

Working in the Connected World:

Book Network



By Valdis Krebs

In the industrial economy, we learned to use rules of thumb to help us understand and solve business problems. Two of the most popular were “linear reasoning” and hierarchical decomposition.” Both took a complex problem or process and broke it down into simple, discrete chunks that can be addressed independently. In the connected world, we still need problem-solving methods that work across a host of problems. Unfortunately these two rules, and many others, no longer work like they used to — often they fail completely in the new economy. The connected world cannot be decomposed into independent, isolated entities. The components that make up a multifarious system (such as an organization) or a complex process (your company’s value web) cannot be totally understood or changed outside of the system, or the context, in which they operate. In a network, you cannot know the nodes without investigating the interconnections the nodes are embedded in.

One of the most successful players in the connected world is Amazon.com. They pioneered many e-commerce concepts and continue to innovate in whatever marketplace they join. We will look at one of their value-added services available for each book or CD that they sell. We will examine both the current implementation and various possibilities for adding even more value with data they already have on customers’ buying patterns. We will see how the network reveals hidden knowledge.

CONNECTED COMMUNITY

One of the cardinal rules of human networks is “Birds of a feather flock together.” Friends of friends become friends; and co-workers of co-workers become colleagues. Dense clusters of connections emerge throughout the social space. The usual pattern found through-

out social structures (and many other complex systems) is dense intra-connectivity within clusters with sparse inter-connectivity between clusters.

One day, while searching for a book on Amazon.com, I started thinking about Amazon’s value-added service — “Customers who bought this book also bought these books.” Amazon lists the top six books that were bought by individuals who also bought the book on the web page you are browsing. I wondered:

The key to understanding the dynamics of networks is reading the emergent patterns of connections that surround an individual, or that are present — within and around — a community of interest.

- ◆ How do these listed books relate?
- ◆ Are they “books of a feather”?
- ◆ Or are they different — complementary?
- ◆ What do these books say about the community buying them?
- ◆ Who are these people?
- ◆ What are their goals and interests?
- ◆ Are these people I should know (obviously our interests overlap)?

Being a student of networks, I knew the inquiry would not stop with the six books listed on one web page. What would happen if I joined these individual lists into a network? What would the book network reveal about this emergent community of titles?

The key to understanding the dynamics of networks is reading the emergent patterns of connections that surround an individual, or that are present — within and around — a community of interest. I wanted to see the network in which my book of interest was embedded. Seeing those connections would give me insight

into the “network neighborhood” surrounding this book and hopefully help me make a better purchase.

I decided to trace the network out one, and then two, steps from the focus book. This is a common procedure in social network analysis when studying “ego” networks — the immediate networks of a chosen individual. An “ego” network allows us to see who is in one’s network neighborhood and how they are interconnected. Sociologists have found

that this model provides many insights into the behavior of the person/group/organization embedded in this network

Figure 1 is a network composed of a focus node (yellow node), with links (red lines) to each of its immediate neighbors (olive nodes) and further links to their neighbors (gray nodes). The olive nodes are one step away from the focus node (ego). The gray nodes are two steps away. The yellow node is referred to as “ego”, and the olive and gray nodes are often called “alters”.

We notice that not every node has unique neighbors. Some nodes have neighbors in common. There is some redundancy in the connections. Some clusters are interconnected, another is basically isolated from the rest except through the focus node. The large cluster at the bottom right of the diagram is actually three densely interconnected clusters.

To continue my exploration I had to choose a book as my focal point, or ego. I chose Tom Petzinger’s *The New Pioneers*.

After all, that book was the reason I had originally visited Amazon.com.

Figure 2 shows the network surrounding *The New Pioneers*. Each node represents a book. The buying pattern of the books has self-organized into emergent

clusters that I have named from the content of each cluster. comes fragmented — the Complexity Science cluster becomes isolated. It is no longer connected to the rest of the network. The other three emergent clusters remain connected through bridging nodes (see Figure 3).

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In analyzing an ego network, it is customary to remove ego and examine the relationships amongst the alters. This is done because the network was built around ego — by definition it will be the most dominant node. We remove ego from the network to see which other nodes are important in the network. The first thing we notice when ego (yellow node) and its links are removed in the network diagram is that the network be-

comes fragmented — the Complexity Science cluster becomes isolated. It is no longer connected to the rest of the network. The other three emergent clusters remain connected through bridging nodes (see Figure 3).

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and *Complexity Advantage* — they received identical scores. The scores in the large network component, in declining order, are as follows:

1. *Management Challenges in the 21st Century*, tied with
1. *Business @ the Speed of Thought*
2. *Dance of Change*
3. *Innovator's Dilemma*
4. *Information Rules*
5. *New Rules for the New Economy*
6. *Customers.com*

These books received the highest scores because they are instrumental in connecting/bridging the three clusters in the large component. Notice that more connections do not necessarily translate to network benefits — *Information Rules* has the most connections but not the highest network score. In networks it is not the number of connections one has, but where the connections lead to that creates advantage. In networks the golden rule is the same as in real estate — location, location, location. In real estate it is physical location — geography. In networks it is virtual location — determined by the pattern of connections surrounding a node.

Another common network measure is “structural equivalence.” It reveals which nodes play a similar role in a network. Therefore, equivalent nodes may be substitutable for one another in the network. As an author, I would not like my book to be substitutable with many other books! But as a reader, I would like equivalent choices. Figure 4 shows a partial list of structurally-equivalent pairs.

Another value-added service that Amazon provides are the reader-submitted book reviews. A person considering the purchase of a particular book may be aided by the many reviews that accumulate over time. Unfortunately, the reviews can be skewed. An author with a large personal network can quickly get a dozen or more glowing reviews of his/her latest book. Customers who are comparison-shopping based on reader reviews only may be misled.

There is a similar phenomenon with web pages. Many webmasters have become quite adept at formatting the content of their web pages and meta tags so that their websites hit near the top in many search engines. The creators of a new search engine, Google, recognized

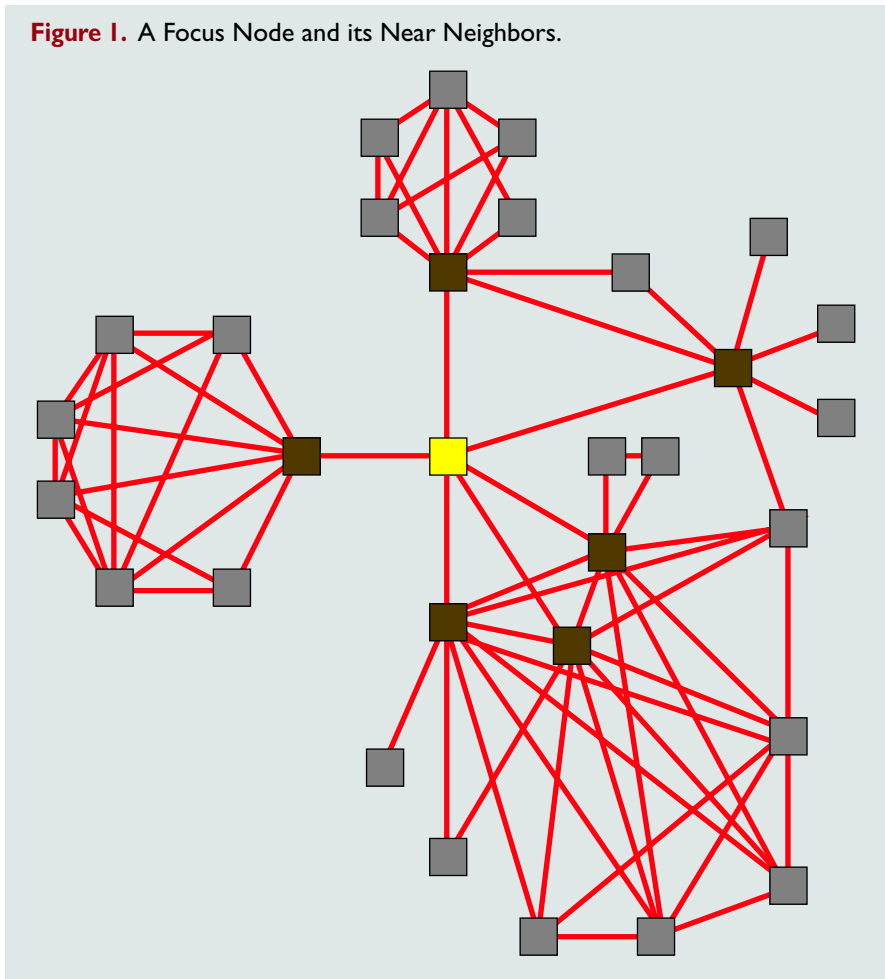
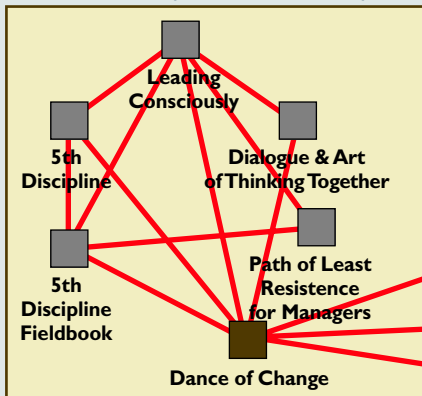


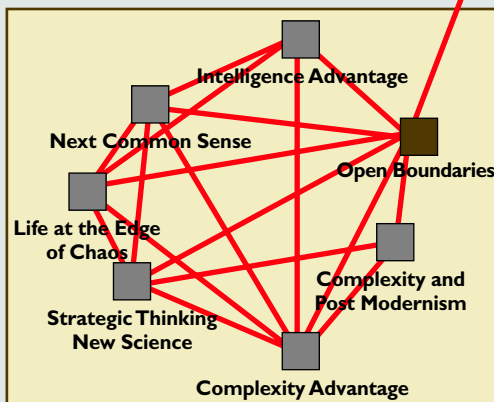
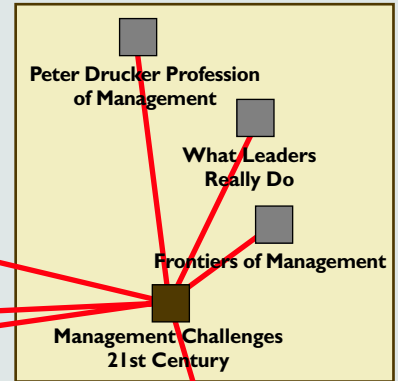
Figure 1. A Focus Node and its Near Neighbors.

Figure 2. A Network with “New Pioneers” as its Ego.

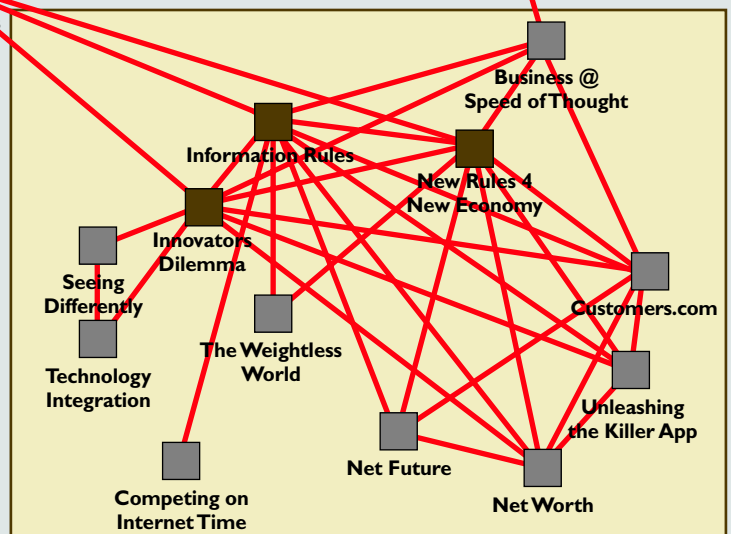
NEW SCHOOL (SENSE FAN CLUB)



OLD SCHOOL (DRUCKER FAN CLUB)



COMPLEXITY SCIENCE



INTERNET ECONOMY

this trickery. They created algorithms that scored a web page based on the number of other pages hyperlinked in to it and the popularity of those other pages. This severely limits the alchemy of content to score better with search engines. The social network analysis community has had such a measure for many years. It was developed to trace the diffusion of innovation in a professional community.

In Google, if no one else points to your web page then you get bottom billing. If many popular web pages (those that have many links pointing to them) point to yours then you get top billing in the Google search results. It is easy for the webmaster to alter content, but not context (the pattern of connections around a web site). This social network approach to searching the web usually lists the most useful pages in a community of interest right at the top of

the returned search results. IBM is developing a similar search engine — that looks at hubs and authorities in the webspace — under its CLEVER project.

NEW RULES OF THUMB

Could these community-of-interest maps work in a similar capacity with books or other consumer items? If I am not familiar with an author or a title, I would like to judge a book by the company it keeps — its network neighborhood.

- ◆ Who points to it?
- ◆ What communities is it a member of?
- ◆ Is it central in the community?
- ◆ Does it bridge communities?
- ◆ Are there equivalent alternatives?

A picture is worth a thousand words. It appears that, as a customer of Amazon.com, I could make better decisions by viewing the embeddedness of various books in communities of interest — es-

pecially if I were a beginner in an area of knowledge.

So, what network rules-of-thumb can we distill from this analysis? I suggest that there are at least four:

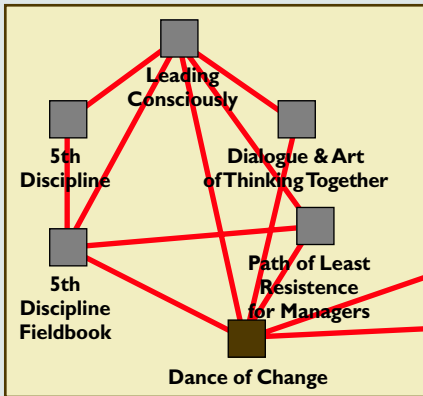
- 1) If you have read one book of a structurally-equivalent pair, then you may not be in a rush to read the second.
- 2) If you liked books A, B and C — and want to read something similar — then find which books are linked to A AND B AND C.
- 3) If you want to read just one book about topic X, find which book is most central in the cluster of topic X books.
- 4) If the book you are looking for is not in stock, find which books are structurally- equivalent to the book you were searching for.

OPPORTUNITIES IN NETWORKS

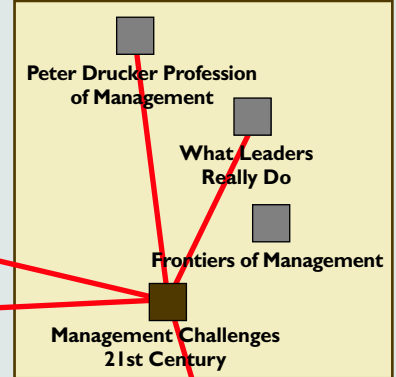
An irony in Amazon’s drive to sell more books to its existing customers

Figure 3. A Network with the “New Pioneers” Ego Removed.

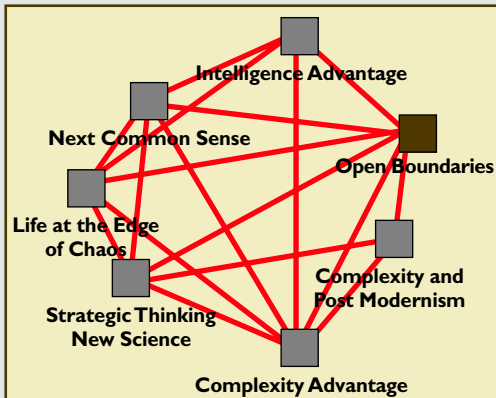
NEW SCHOOL (SENSE FAN CLUB)



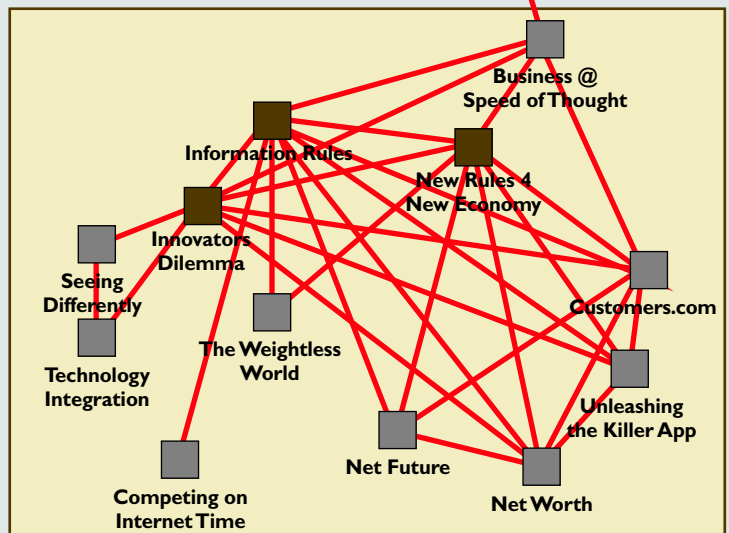
OLD SCHOOL (DRUCKER FAN CLUB)



First Break
All the Rules



COMPLEXITY SCIENCE



INTERNET ECONOMY

Figure 4. Partial List of Structurally-Equivalent Pairs.

- The Next Common Sense <-> Life at the Edge of Chaos*
- New Rules for the New Economy <-> Information Rules*
- Net Worth <-> Customers.com*
- Open Boundaries <-> Complexity Advantage*
- Unleashing the KillerApp <-> Net Future and Net Worth*

through value-added information is that these services could also provide an opportunity to Amazon’s competitors. Local booksellers that have been going out of business from the onslaught of mega-retailers such as Borders, Barnes & Noble and Amazon can now “mine the data” on Amazon.com and nn.com websites to create smarter book orders for their own

clientele. Rather than compete on discounting best-sellers — a game they cannot win — local booksellers can show their clients other options using the book networks. With this data, and the ability to adapt their marketing rules of thumb, local booksellers may again thrive in their niche. Just as in a balanced ecosystem, maybe the larger species

(i.e., Amazon, B&N, etc.) can help form a niche for the smaller species (i.e., the local booksellers).

Networks form new and interesting relationships. If you don’t follow the connections, you will not know which way the wind is blowing. In this fluid economy the ability to monitor the environment and adapt is mandatory. What does your network tell you?

See author’s biography on page 117.

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