

Scale-Free Network Business Development Strategy

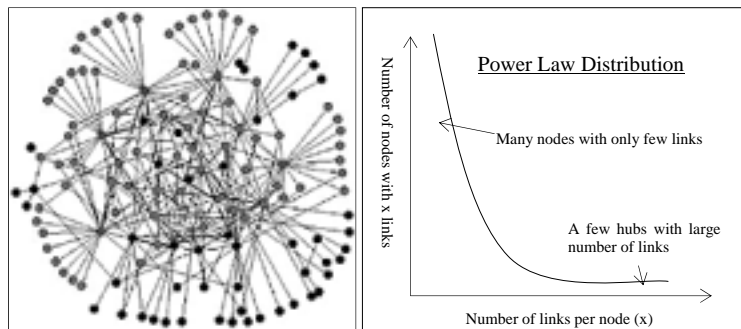
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This paper examines how to apply scale-free network in business development, and use it to grow the business into unbeatable success.

Introduction

Human society, Internet, interaction of protein, and the business community have one thing in common. They are all networks of nodes that interact with each other and the shape of these networks all have the same scale-free characteristics. Scale-free network has few hubs that connect vast numbers of nodes and a large number of nodes that has very few connections. You can spot it by plotting a graph of number of nodes verses number of links. (graph 1) Scale free always has a distribution that follows the power law. It is the network topology of choice because of its robustness, fast communication and ability to evolve.

This paper examines how to apply scale-free network in business development, and use it to grow the business into unbeatable success. It is based on the author's experience as Windows Product Manager at Microsoft Japan during the Eighties and two ground breaking books, Linked by Prof. Albert-Laszlo Barabasi at Univ. of Notre Dame and Tipping Point by journalist Malcolm Gladwell.



In the scale-free network, the five most connected hubs (red) are connected to 60% of all nodes (green) while most of the nodes have only few links.
Source the journal Nature and Computer world and Linked by Albert-Laszlo Barabasi

Strength of the Scale-Free Network

Scale Free Network has three important features

1. Communications

By having few hubs that are connected to vast number of nodes, communication between nodes takes only few hops from one node to another.

A. Stanley Milgram in 1967 showed that in human society, everyone

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is connected via average of “Six Degree of Separation.”

- B. Because of the shortness of distance between the nodes, within the scale-free network of human society, fads, rumors, news, and virus spreads very fast.

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is hard to break by
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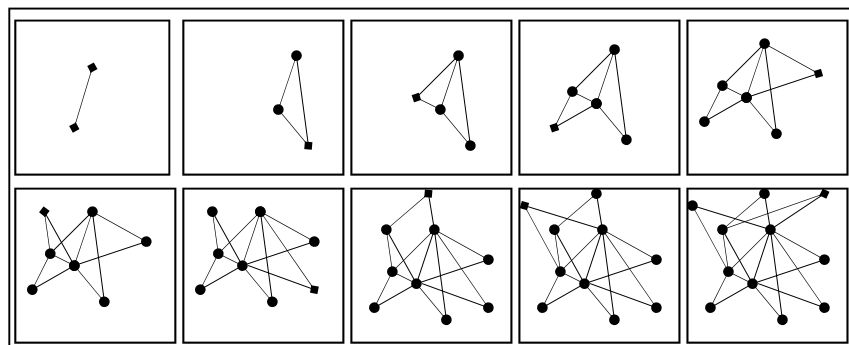
2. Robustness

Scale-free network is hard to break by random errors and failures. It takes a significant amount of nodes to be disconnected in order to break the network.

- A. Internet is a gigantic scale free network that experiences many hubs and router failures everyday but without affecting the overall function of the network.
- B. In business world, once a company grows to a certain size, the business stabilizes.
- C. It requires a coordinated attack on the key hubs to break the network.

3. Evolution

Scale-free network can grow from few nodes to a large network while keeping the same topology. Even as the network increases the number of the nodes, the distribution of the nodes that have many links, and those that have few, stays the constant.



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business world

Square dots are new nodes. Notice as the number of nodes increase, central hubs increases its links.

From [Linked](#) by Albert-Laszlo Barabasi

- A. Once you are the hub, it is likely that you remain a hub throughout the life cycle of the network. This indicates a first mover advantage.
- B. Another characteristic is that as number of nodes in the network increases, the hubs gets preferential attachment and grows even larger. i.e. rich gets richer in business world.
- C. At certain points in the evolution of the scale-free network, one of the hubs gets connected to every node in the network and then, it flips the network into a star topology. Barabasi describes this phenomenon as ‘network’ version of Bose-Einstein condensation. Once this happens, the hub gets all of the business in the network suffocating the rest of the hubs. That is- Winner takes all, a la Microsoft. (Bose-Einstein Condensate is a state of matter when a gas is sufficiently cooled, atoms are forced into their lowest energy level at critical temperature above absolute zero. See [Linked](#) for more explanation.)

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In his book Linked, Barabasi tells us that scale-free networks are prevalent in all walks of life and science, from Internet, Airline connections, reaction of protein, business community, and social network and so on. The reason why it is used so widely is that when it comes to having a network structure, it seems, Scale-Free network is the network topology of choice.

Putting it into business terms: when creating a business that requires a network of strategic alliances, licensees, distributors or retailers, or whatever business structure that involves a lot of outside people and companies, it should be created upon a scale free format.

How the Windows network was created in Japan

In early Eighties, Microsoft had an exclusive distributor in Japan, ASCII. The company was involved in software and magazine publishing and was growing rapidly. As Microsoft's representative, ASCII licensed BASIC and MS-DOS to Japanese computer companies such as NEC and Fujitsu. But problems began when ASCII started to produce its own brand of word-processing software, thus competing against Microsoft WORD for MS-DOS which was still to be translated into Japanese. Microsoft business topology in Japan had a star structure with ASCII in the middle and that hub suddenly became a major road block.

So in 1986, Microsoft established its Japanese subsidiary and parted company with ASCII in a very public bust up. That is when I arrived back in Japan after 12 year stay in London England where I was a product manager of 8 bit home computer system (MSX) at Microsoft UK.

Microsoft business model was to license software to computer makers. Microsoft's licensing approach was established from the beginning, when Paul Allen successfully licensed BASIC to Altair, the very first 8 bit computer. Although at 1986, Microsoft was significant company within software industry, it was by no means as powerful as it is today. Those days, IBM dominated in the US and in Japan NEC had over 70% of the marketplace. When Microsoft could not sell Windows to IBM, they had to compromise and signed a joint development deal for OS/2 with IBM to ensure their future. However, it was Windows that won the day.

Now let me describe the scale-free structure of the computer business in Japan, circa 1985. NEC was a super hub with vast regional and development subsidiaries. Fujitsu, Matsushita, Toshiba and many others were sub hubs with their smaller number of member companies. Scattered around Japan were independent software houses and retailers. In the hardware business, there were great numbers of printer, HDD, and peripheral companies. The software companies were growing but their distribution was handled by wholesalers, Softbank, Software Japan and Soft Wing.

When Microsoft shipped Windows 1.03 in 1986, it hardly functioned. It required many extra peripherals, such as a hard disc drive and a mouse, which weren't a standard at that time. 286 based PC cost more than \$5000. In Japan, only two companies had licensed Windows; NEC and MGCS which was a small computer subsidiary of Matsushita. NEC got it because they licensed everything Microsoft had. Windows was offered as a token option.

Soon after my transfer to Microsoft Japan in Autumn 1986, I was appointed product manager for BASIC and Windows. Licensing Windows was difficult. Even when Microsoft released Windows 2.01, it was poorly received. Japanese PC makers were all skeptical but Microsoft Japan's OEM sales group persisted. Opportunity came when Microsoft decided not to ship GW-BASIC which was bundled with MS-DOS 3.01. GW-BASIC was a very poor implementation of BASIC that could only access 64K bytes of memory. So the OEM sales decided to offer Windows as an alternative, pricing it very low.

Around 1988, smaller Japanese PC makers started to ship IBM AT compatible PCs. In Japan, they modified the graphics hardware to display Japanese characters. The standard was called AX and around 10 companies followed it in order to compete against NEC. Since there was no GW-BASIC for AX machines, Microsoft offered Windows and suddenly, we had whole bunch of Windows OEMs. By the end of 1989, Microsoft had at least 20 Windows OEMs in Japan, far more than the number of licensees in the US. This was just prior to launch of Windows 3.0 in the US.

Much of 1989 was spent shipping Windows OEM kits and persuading printer makers to bundle Windows device drivers. This was no easy task as there were as many printer makers as PC makers, then. And besides the printer makers, we had to go to memory board makers and graphics card makers and so on. Then we had to persuade software companies to ship Windows based software. Windows team was still tiny at the time and amount of developer support work had suddenly 10Xed. It was nuts!

Around the same time, a Windows & Presentation Manager Association had formed in the US, and having met the organizers, we felt it was good idea to create a consortium in Japan. The Problem was how to organize such an association. I had done it in Europe with MSX but, Japan had two many OEMs by then and getting them into one room seemed too difficult. I looked at what was missing from the picture and it was clear that Microsoft had not the support of software developers. But instead of going direct to hundreds of software companies to form the Consortium, an unexpected offer to gather these software houses came from a manager at Software Japan, the second largest software wholesaler in Japan. There were only three large wholesalers in Japan at that time, and we had a good relationship with all of them. So we asked the Presidents of three companies to be the founders of the Windows Consortium.

November 1989, I organized a meeting between Microsoft CEO, Bill Gates, Mr. Son of Softbank, Mr. Konno of Software Japan, and Mr. Suzuki of Soft Wing. With three Presidents of key wholesalers as founders of Windows Consortium, we then went to the PC manufacturers. We had only one more important person to persuade; the key manager of PC division at NEC. This was done by the three Presidents. They visited the home of the manager at the new year together as traditional Japanese greetings and then and there, asked him to give a key note speech at the launch of Windows Consortium.

Windows Consortium was launched January 1990. Around 200 people from the PC industry came. Almost every one of key managers at PC companies came. Software companies gathered in huge numbers. It was at this meeting that Windows "tipped" in Japan. Malcolm Gladwell in his

book describes this as the “Tipping Point” when suddenly a trend or product catches on and become a huge movement. At the Windows Consortium launch, Japanese PC executives realized for the first time that practically all Japanese PC companies had licensed Windows and that the key wholesalers were ready to distribute Windows application software. Software developers realized that the market was right in front of them. They saw business opportunity and that is when the Windows scale-free network started to function in Japan.

Now, the Japanese PC industry at that time was quite a Small World and word traveled very first. Industry was convinced. There was one major problem. Microsoft had not released the Japanese version of Windows 3.0. So they did the next best thing and exported. You may remember from early 1990's, whole bunch of Japanese PC makers shipped IBM clones with Windows bundled. You may also remember that laser printers and color ink jet printer from Japan all had Windows device drivers. This fueled the success of Windows 3.0 in the US. Windows tipped in the US.

In 1995, Microsoft upgraded Windows. It was a media event. It was also a great opportunity for PC makers and software companies to sell upgrades. Windows 95 posed the biggest sales chance for the industry. Prior to Windows 95, the industry was in scale free topology. PC makers were the key hubs. But when Microsoft launched Windows 95, it 'condensed' the network into star topology with Microsoft at the center. After that, Microsoft took over the industry and hub software companies such as Lotus, WordPerfect disappeared. Winner takes all.

I must state, here for the record that although I was the Windows Product Manager at Microsoft Japan, it was the effort of Windows R&D and Windows OEM sales team that played the large part in weaving the scale-free web of Windows. Also, Microsoft always had the OEM licensing strategy from the BASIC days.

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Entrepreneurial Business Development

Albert-Laszlo Barabasi's book [Linked](#) shows us that the scale free topology develops very early on in the foundation of a network. This means, the entrepreneur has to have a business development strategy with scale free network structure in mind, right at the beginning. Weave the web of scale free network and you'll get a robust and fast growing business.

Let me summarize the scale-free business strategy.

1. First, you weave the scale free web by licensing your products to key hubs in the industry. Important point here is to have a clear understanding of the map of the industry and license it to every major player so that you can reach every node within few steps.
2. Once you have woven the scale free web, that network has to function. So you “tip it” by creating an event that everyone understands there is a network to do business. Once they realize that, they will communicate with each other and start to spread the word. It is also important that nodes can do business with other nodes. Otherwise, nodes will see no reason to be connected and dissipate. If nodes think that there is money to be made within the network, the network will thrive and bring in new nodes.

3. Once the scale free network is working and thriving, you will find that every node in the network is using your product and that they are connected direct to you. Then you are omnipresent. You've created the star topology on top of the existing industry scale free network. This is when you condensate the scale free network into star network and winner takes all. How do you do it? Just announce an upgrade.

The name of the game is omnipresence

Weaving the scale free net is ever moving forward business until you achieve market domination. There are two ways to reach omnipresence in a scale free network.

1. The first method is as Microsoft, license to as many hubs as possible that you can reach the furthest part of web.

2. The second is to acquire the key hubs until you gather enough to reach everyone in the network. Identifying the key hub is important. If you make a mistake of paying for a hub that has few links to the space in which you want to grow, the strategy does not work.

Choosing one of the above two strategies depends on the strength of the initial product that you have. If your product is strong and that there is a high threshold of entry, then you license out. If your product is weak and has low level of market entry, you gather as much money as fast as possible and go on acquisition binge.

Let's compare Yahoo and Google on this point. Yahoo's initial service was web directory. It was a list and although it was huge, given enough students to work for you, you could create your own directory. Low level of entry. So Yahoo went on acquisition binge and bought Geocities, E-Group and so on. More hubs they acquired more nodes they got and more users. On the other hand, Google strategy was to create unbeatable web crawler and the search engine software. They licensed their service to Yahoo first then to a whole array of Japanese companies such as NEC and NTT. Google now reaches a world wide audience through their licensee. Google has done little acquisition since their licensing strategy weaved the scale free network for them.

Weaving the Scale-free net

There are some ground rules you will have to remember when developing scale-free network business model.

1. Just because you have a scale-free strategy, it doesn't mean that you can sell poorly made product. The Core technology must be of excellent quality.
2. Nodes in a scale-free network have to have a consistent reason to be networked. Like let's do business with Windows platform.
3. Know your hubs. No point approaching the entire node with the industry when you know that you can reach them efficiently via hubs. For a dot com company, advertising in Super ball is inefficient while placing a banner on Yahoo and Google makes sense.

4. Have clear understanding of two types of hubs, connectors and mavens. In Malcolm Gladwell's Tipping Point, he describes connectors as someone who knows a lot of people and have the ability to deliver information to them. Mavens are depository of information that many people goes to them to seek information. Connectors are hubs that information goes out to other nodes, while mavens are hubs that many nodes go to get information. The difference is the direction of the flow of the information.
5. Unless you "Tip it", you cannot start the scale-free network to function. Scale-free net has to function in order to keep its network structure. You have to have a big conference organized and get the nodes to understand that there is a network to do business in.
6. Nodes within the scale-free network have to be able to do business, independent of the core. If you are the only one making money, then you will find that the nodes will move away to find a new scale-free net which offers better business opportunity. (Node dissipation)
7. Just because you have a visual image of a given scale-free network, it does not mean that you have a business. This is why so many recent social network companies are still not making money. They created a map of the network but they have failed to create their scale-free network of their business. All they have is a map.
8. Each scale-free network has a specific reason to be connected and just because you merged two sets of scale-free network, if the reason isn't consistent, then the network do not merge. This is why AOL and Time/Warner merger failed. Merger of a two companies of this magnitude is a merger of two networks and for it to work; the nodes in the two networks have to be able to connect. However, if the reason to link is inconsistent; nodes do not see any reason to connect. In case of AOL and Time/Warner, AOL has Internet access and content, while Time/Warner was entertainment and publishing. Two may have become one company but their nodes never merged and synergy was never created.
9. Hubs within your scale-free network are your ticket to success. But also it can work the other way. A coordinated attack on your key hubs can destroy your network. Key hubs must be maintained at all cost.
10. When you reach almost every node in the network, condensate it. Announce that you have a de-facto standard and you are upgrading it.

Scale-free Network simulation

Scale-free network can be described in a mathematical formula. That means that it can be simulated on a computer. Programs are available to analyze a network to find if given network has a characteristic of scale-free. You can also create a virtual scale-free network and simulate variety of scenarios. Let's say that you have a data of movie goers in Tokyo from a questionnaire you've carried out. Throw in that data into the computer and run a simulation of marketing of brand new movie. You can predict how the scale-free network of movie goers would react to that movie. (Tsutsui et al, at Tokyo University of Science 2003)

The important point is that it doesn't matter what it is as long as it has the scale-free topology and a set of good data, you can do simulation on any situation.

Who should use the scale-free strategy?

Entrepreneur

Building a product is not enough. You have to create the business and that means you have to weave your scale-free network of customers, distributors, licensees and alliances.

Marketing and PR manager

If you have a good understanding and data of the marketplace you should be able to run simulation of marketing and PR strategy. It also means that if you target your marketing to hubs, (that is connectors and mavens in Malcolm Gladwell's Tipping Point) you should be efficiently get the message across to the entire marketplace.

Securities research analyst

Within a given industry and assuming that it has a scale-free structure, you can find out the position of a company as a core, hub or a tiny little node. It is also important to understand the structure of the industry in order to understand the future potential of a growing company.

M&A advisors and analyst

Observe the scale-free network that surrounds the two merging companies. If the reason to link into a network is different between the two, merger is likely to fail.

Venture Capitalists

Invest in entrepreneur who can weave the scale-free net. If someone comes to you and say, "I'll take 1% of \$10 billion marketplace" explain to them that in a scale-free network the distribution of the nodes follows the power law distribution and tiny nodes stay tiny. Always invest in hubs.

Human Resources Experts

If you are a head hunter, it pays to retain hubs (connectors) on an exclusive basis. If you collect enough hubs, you can keep out the competition while getting introduced very efficiently to candidates.

Academics

Many scientists have spent hours finding scale free structures in all walks of life but have yet to apply it. If it is so prevalent and useful, why not use it. I think business community has money to spend on new technology like this.

Scale Free network business development is simple.

Scale it! Tip it! Condensate it!

Now that you know how to make your own hegemony, well, get on with it.

Tom Sato

Required reading and references

Linked by Alberto-Laszlo Barabasi (Plume Books, 2003)

Tipping Point by Malcolm Gladwell (Little Brown, 2000)

About the author

Tom Sato is a serial entrepreneur with startup experience in Tokyo and Silicon Valley. Late Eighties, he was the original Windows Product Manager at Microsoft Japan. His 1995 Internet startup Bargain America Corp, San Jose CA, (Online shopping company that offered America products to Japanese consumers) ran for 7 years, going through 4 rounds of venture financing. In Japan, he started IPO web portal, Tokyo IPO Corp. which became the most visited IPO information site in Japan. His “Startup Story of Bargain America” became the textbook for startups in Japan and pointed out several regulatory issue that were later incorporated in amendments to the Japanese Commercial Law. Over the past 10 years, he consulted for Kleinwort Benson, Technologic Partners and Japanese VCs and reviewed over 500 business plans. He is the one of the very few experts on Entrepreneurship, Venture Financing and Japan Entry in Tokyo.

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He is not married with no kids and does not smoke and is fluent in Japanese and English but wishes to learn Korean.

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When emailing, please make sure you include detail of your organization and contact info.

