

Knowledge Management: Forming an Internet Company

Daniel E. O'Leary
University of Southern California
3660 Trousdale Parkway
Los Angeles, CA 90089-1421

oleary@rcf.usc.edu

Abstract

With the advent of the Internet, computer science has exploded on the "entrepreneurial" scene. Now, in addition to technical concepts related to intelligent agents, in some cases, researchers now need to be able to address issues of importance to venture capitalists. For example, computer science entrepreneurs need to know about business plans, venture capital and exit plans.

This paper provides a brief summary of a case study of a firm going from an idea to a public firm. In addition, this paper provides a summary of some major points found in discussions with computer science faculty that have been involved with their own companies.

Introduction

This paper is opinion and many of its sources of information also are opinions of other computer scientists that have either started or are starting their own companies.

A review of the *Los Angeles Times* business section often finds a number of discussions related to "somefirm.com" or how somefirm.com is doing electronic commerce different than all the others because of their unique use of technology. Computer science, artificial intelligence and intelligent agents have exploded on the "entrepreneurial" scene. It is not uncommon to sit down to lunch with computer science colleges and have topics like "venture capitalists," "business plan," "exit strategy" and other issues be the primary focus of the conversation. Rather than about the "good old day," holiday conversations now are about how start-up firms are going.

If you are not starting a firm to pursue venture capital, you might think that you have been left behind. In a sequence of Dilbert comics, even Wally became an entrepreneur and got venture capital funding. If Wally can do it, couldn't you?

It used to be that computer scientists and artificial intelligent researchers were content to build prototypes to demonstrate "proof of concept." Now some feel that in order to demonstrate that a concept is really important and feasible, you have to form a company that sells it or a related item as a product.

Methodology

This paper used two different methodological approaches. First, case study materials for a single company were assembled in order to raise some of the primary issues and to provide the ability to drill down on a common example. The materials from that case study cover a range of materials over the period 1995 - 1998.

Second, this paper conducted a sequence of in person interviews with computer science faculty that are in the process of trying to take their firms public. Those interviews took place on November 26 1998, December 16, 1998 and February 11, 1999. In addition, there was a detailed follow-up with a phone call interview on February 19, 1999. A total of four faculty, regarding three companies, were interviewed.

Case Study: Open Market Inc.

Open Market Inc., founded in 1994 has been a highly successful Internet company with its foundations in computer science. In 1997, *Software Magazine* ranked Open Market Inc. in their top 25 Internet Companies. Open Market Inc. is used to provide a case study of a firm going from an idea to a publicly-held firm.

Formation of Open Market Inc. (Gogan and Applegate 1995)

David Gifford, of MIT's computer science department had done work on security systems for network transactions. Gifford held patents on software that scanned and filtered streams of broadcast data. In the 1980's he developed a system that let users capture newswire stories, based on

their profiles of interest. Gifford approached some venture capitalists, after a successful pilot. However, he was unsuccessful in securing funding at that time.

In 1993, he approached Greylock Management with a five-page summary of an idea. Gifford had seen the need to develop secure transactions on the Internet. Bill Kaiser of Greylock introduced Gifford to Shikhar Ghosh, who had recently been Chief Executive Officer (CEO) of a firm that saw its sales grow from \$3 million to \$90 million. In 1993, Ghosh left Apex, a telecommunications firm, and joined Gifford as the CEO of Open Market, Inc.

Generating Investment in Open Market Inc.

In February 1994, they generated a business plan. Using that business plan, with Kaiser's help, they generated \$1.8 million from investors. Shortly thereafter Open Market hired twelve employees.

In 1996, Open Market indicated (Carl 1996) that it had received a second round of financing for \$25 million from investors including FTP Software, Harcourt General and Goldman Sachs & Co. At the time \$25 million dollars was seen as a lot of money for a pre-IPO offering of stock. Open Markets Inc. announced that the money was intended to be used for funding future product development and to do more marketing, in order to raise their profile.

Open Market Inc. IPO and Other Market Activity

After two rounds of venture capital financing, Open Market Inc. went public with an Initial Public Offering (IPO). In April 1996, Open Market Inc., indicated that they had hoped to sell 4 million shares at an initial offering price of \$14 per share. After the offering, Open Markets would have had about 27 million shares outstanding. Initially at the offering, the price ran up to \$42.25, but by the end of June 1996, it settled back to \$24.375 per share. By this point in time, Open Market Inc. had over 300 employees.

In May 1998, Intel bought a one percent stake in Open Market Inc. Shortly after that, it was announced that Open Market would optimize one of its primary products for high end Intel servers.

Products

Open Market pursued a number of products and services over its early years. They recognized that the industry was volatile and that the product might change many

times. Their original products included a list of companies call the Commercial Sites Index, that had over 1000 companies listed with web pages as of November 1994 (<http://www.i-m.com/archives/9411/0353.html>). They also had client software that retail customers would use to visit home pages on the web and store builder software that would help users build pages for the web. They offered authentication, payment and settlement services and mall services. Finally they offered a digital advertising service that was based on intelligent agents to provide user profile-based information. Ultimately, they did not pursue the agent-based product for commercial processes.

Open Market Receives Patents

Early in 1998, Open Market received three patents commonly used for electronic commerce (Auerbach 1998 and Thurm 1998). Perhaps the most interesting is the virtual shopping cart that has universal use by many companies. In addition, Open Market has received patents for technologies that allow people to pay for goods on-line and receive credit card verification. Further, Open Market has received a patent on technology that can be used to track visitors to a set of pages.

Lessons Learned

There are a number of parts of this story that appear over and over in successful company generation.

- Gifford had the foresight to focus on patenting those ideas that were patentable. He even seemed to press the frontier of what was patentable, since Open Market was one of the first firms to receive a patent on a "a virtual business process."
- Choice of Ghosh as CEO was probably a wise one. Ghosh had previous CEO experience with a start-up technology company.
- Open Market rapidly pursued development of a business plan after Ghosh was hired.
- Open Market pursued multiple objectives and products over its highly volatile early years. Open Market Inc. was flexible enough to evolve with the growth of the Internet.
- Frequently firms will have one or more venture capital financings.

Discussions with Intelligent Agent Entrepreneurs

As part of this research, a number of computer scientists who have either founded companies or are attempting to found companies, were interviewed. The following sections derive from their comments on the following basic issues.

- Intellectual property and inventions
- How does starting a business interface with ongoing research?
- Business models
- Administrative personnel
- Relationship with your university
- Outside Investors and your ownership
- Once you've done it they want you back

Intellectual Property and Inventions

Central to firms based on developments in computer science is the notion of intellectual property and the question as to whether there are there inventions in computer science?

Intellectual Property Rights

Intellectual property rights are fragile. If you give a presentation that details technology then the technology immediately become public knowledge, for international patent purposes. Property rights are less fragile in the United States where you would still have one year after that presentation to apply for a patent.

Does Computer Science Result in Inventions?

One of the interviewees noted when a grant was completed there is a form that is required to be completed that asks if anything was invented. Until recently, he indicated that he always put down "no." However, since he became aware of intellectual property laws he now realizes that some innovations in computer science can be regarded as inventions.

In addition, it seems that one of the roles of the university is to ensure that it protects both its interests and its faculty's interests. One way to begin the process of accounting for inventions is for universities to make sure that faculty understand the real benefit from noting the existence of innovations.

How Does Starting a Business Interface with Research?

If you are going to start a business, how much time would normally be expected to be spent in development of that business? Would we expect to find researchers decreasing their contributions to the research community, because now their time is being spent working at their start-up?

Participation in the Business

Generally, investors in any business will want the entrepreneur participate in the business. Typically that participation is expected be substantial until the business has grown beyond the entrepreneurial stage. As a result, some researchers who find start-up firms particularly interesting, have dived-in head first and are playing active roles in the development of their companies.

Two start-up companies have addressed this issue by having partnerships with other researchers. In each of those partnerships, one of the researchers has played a bigger role than the other. In addition, when the activity of both is combined, it exceeds the capabilities that any one person might contribute. In addition, in the case of each of the partnerships, one partner was more involved in the day-to-day activity, than the other.

Participation in Research

Throughout, the researchers I talked with continued to participate in the research community, even though the companies that they were forming had anchored on particular ideas. For example, some researchers continued to submit papers to the annual meeting of the American Association on Artificial Intelligence (AAAI). Further at the time of my discussions, they fully intended to continue active in the research community.

Ph. D. Students

One researcher expressed particular concern that it was important to separate Ph. D. student research from that of the companies being formed. There was a concern that there would be a fine line between what the company and its participants had done as opposed to the contribution of the Ph. D. students working with the founding members.

Business Models

There are at least three different business models being used to generate companies using agent technology. First, like Open Market Inc., one model is to find a way to

obtain patents on icons, software, etc., that others want to use or are using. In many cases, such as with Open Market, those icons are common everyday items, such as the Virtual Shopping Cart. Computerized business and operational methods can be patented. As noted by Auerbach (1998), not all patents that are given will create value. In some cases the innovations will not be popular. In other cases, patents won't survive challenges on them.

Second, you can generate a community of users using software. In many cases the database of names may be the most valuable aspect of the project. This is particularly the case when the number of names is large and cohesive on some dimensions to form a real community and one that will continue forward if the service changes ownership.

The third approach, perhaps the most likely, is the one of developing software that others can use to create value, e.g., with intelligent agents. That software would then be sold in order to generate revenues. Entrepreneurs would need to identify how the software could be best used, in so doing, develop a "product" view of the software.

Interestingly, venture capitalists are wary of anchoring on any one model. Although they may see a firm founded using one of these approaches, they recognize that at any point in time, any one or all of these approaches will not continue to be feasible.

For those settings where the entrepreneur does not plan on being with the start-up, an additional strategy is necessary: the exit strategy. The exit strategy is a plan to leave the company within some period of time.

Administrative Personnel

Administrative personnel, ranging from CEO's to accountants can make a critical addition to the start-up firm. Discussions with one entrepreneur suggested that administrative expenses could reach into the millions of dollars before a company is made public.

Who The CEO Is Can Make a Difference

Choice of the CEO is one of the most critical decisions that can be made. The right CEO will be able to cut through the bureaucracy. They will be able to pick up the phone and call people that it could take months for others to schedule an appointment.

In addition, the right CEO will signal to the rest of the community that this is a firm to be reckoned with. The

rest of the technology community will understand that this firm is a serious competitor.

In addition, one interviewee was told by a venture capitalist that his start-up would probably not receive financing. Since the market for CEO's was so tight, the venture capitalist thought that it was unlikely that they could hire an appropriate CEO.

CEO's are not Cheap!

As noted by one interviewee, "CEO's are not a dime a dozen." Because of the importance of the CEO and the tight market, a good CEO can be quite costly. Typically, CEO's receive an equity interest in the firm.

When Do You Hire a CEO?

When to hire a CEO is also a critical decision. If you have a CEO then the CEO can help build the business plan, as seen with Open Market Inc. However, as noted in a previous section, who you hire as a CEO can make a substantial difference in the acceptance of your firm and what your firm is able to accomplish.

One interviewee indicated that they were able to hire a CEO although they had not yet put together a business plan, because they had something even more important: clients.

Generally, until you have a business plan, it can be difficult to hire a CEO. It is only when the CEO sees where the firm is going that they are able to commit to your firm.

Accountants and Legal Help

Besides the CEO there can be additional administrative personnel prior to receiving financing from external investors. After any investment money is received, entrepreneurs are accountable for the use of the investments. As a result, it can be critical to have a financial person/accountant to keep track of expenditures and revenues. In addition, legal assistance can prove to be a critical part of a company's success. For example, legal insight is often credited with much of Microsoft's early success at maintaining ownership of intellectual property.

Relationship with Your University

University's relationship with researchers can create an environment either favorable for or against development of startups.

The University's Ownership Percentage

The university's percentage of ownership of firms developed by their faculty, seems to vary substantially. Some universities are reported to request zero ownership, such as the University of Toronto. On the other hand, other universities are requiring over 50%. Still other universities are somewhere in between, negotiating each individually.

In addition, reportedly few universities really understand the unique aspects of starting firms based on computer science innovations, as opposed to innovations in say genetics.

Ultimate Impact on Quality of Faculty

The extent to which a university has administrative personnel that are familiar with computer science-based firms can be critical in ultimately drawing faculty who are interested in creating their own companies. Knowledgeable and helpful administrative personnel can limit the time required by faculty to establish partnerships. Further, by limiting their percentage of ownership, universities can increase the economic incentives to join their faculties.

What Can Your University Do? A Summary of Some Recommendations

Universities can create an environment designed to stimulate development of start-ups. First, universities can take an active role in making faculty aware of intellectual property rights and different forums for capturing those rights. Second, universities can take a small percentage of firms founded by their faculty. If the percentage is too large, it may not be feasible for faculty to follow through on firm development. Third, by taking only a small percentage of any firms founded by their faculty, the university can create an environment that will draw faculty that ultimately may produce such companies.

Outside Investors and Your Ownership

Ultimately, many start-up computer science-based firms seek out external financing, which raises a number of critical questions.

What about Venture Capitalists?

One interviewee noted that although faculty are bright, the venture capitalists that he had met, were among the smartest people that he knew.

Venture capitalists vary in how early they like to become involved in companies. Some like to be there virtually from the beginning, while others specialize at later rounds of financing.

One of the interviewees noted that venture capitalists had been very helpful throughout the process. This observation is consistent with what was seen in Open Market Inc. where the venture capitalist helped identify the ultimate CEO.

An interviewee noted that venture capitalists generally see investments as limited to no more than three years. He noted that venture capitalists seem to begin to get anxious when the investment is still in place eighteen months later.

What Kind of External Investment Can You Expect?

External investors can take a number of different views. You will hear about "angel" financing. Angel financing is financing that comes from some source that is interested in financing innovations in the area. In addition to angel financing there are at least three other terms: walking around money, seed money, and venture capital financing.

"Walking around" money is just that, money designed to help you make presentations to different venture capitalists. Walking around money is roughly of the order of magnitude of \$100,000. One of the interviewees generated some "walking around" money by filing an grant application with the Small Business Administration for a small business grant.

Seed Money is designed to get the start-up going on development of a product. Seed money can be useful in supporting the generation of a business plan, development of a product, or hiring of a CEO and other support personnel.

Venture Capital Financing refers to money committed to the firm from venture capitalists. A given start-up may require multiple rounds of venture capital financing. Typically a first round of venture capital financing is on the order of magnitude of \$1 - \$3 million, while a second

round of venture capital financing might be as high as \$5 million.

What is the Impact on Your Percentage of Ownership?

With every bit of seed money or venture capital financing your original 100% ownership gets diluted. For example, you might start with one hundred shares. For seed money, you might give out ten shares, so the number of shares would then be 110. To hire a CEO you might provide her with 15 shares, upping the number of shares to 125, and decreasing your ownership to 80%, or in the case of partnerships, 40% each. It is not unusual for the original entrepreneur to finish up with between 5-20% of the ownership when the firm ultimately goes public.

Further, the earlier in the process the higher percentage of the firm a dollar buys. Generally, this is because the earlier in the life cycle, the higher the probability that the firm will not fully develop.

Who the Investors Are Can Make a Difference

Who the investors are can make a difference. Recently, Stamps.com, a firm that provides its clients a mini post office in their computer (Vrana 1999). The firm is privately held, with over 60 employees. Although Stamps.com is not engaged in agent technology, they illustrate the importance of the right investor.

Stamps.com recently announced that it raised \$30 million from a group of investors that includes Microsoft's Paul Allen. Generating investment from technically savvy investors gives both the market and other investors confidence in the firm.

Stamps.com got early venture capital funding from three different venture capital firms, Enterprise Partners, Brentwood Venture Capital, and Forest, Binkley & Brown.

Initial Public Offerings -- How Much?

Initial public offerings for technology/Internet companies can be substantial. One of the more recent public offerings of EToys is expected to bring \$115 million.

Although, IPO's can be in the millions of dollars, not all goes to the entrepreneur. Dilution of ownership ultimately can determine whether or not the company will provide the entrepreneur with "life changing money."

Once You've Done It -- They Want You Back!

At least one entrepreneur indicated that venture capitalists are biased to those who have gone from ideas to companies. It is easier for you to take an idea through venture capital to IPO if you have done it before. And there is good reason: You have done it before, you know what you did right and wrong. You know who to contact when you need resources. You are a much better bet of success once you have brought one firm through as a start-up.

Acknowledgments. The author would like to thank the four computer science/artificial intelligence researchers for their comments. I promised not to name them until I got their comments on this manuscript. Unfortunately, because of time constraints, they did not have an opportunity to review this manuscript before the publication deadline.

References

Auerbach, J., "Open Market Inc. Says it will Receive Patents for Internet Commerce Software," *Wall Street Journal*, March 3, 1998.

Carl, J., "Open Market Raises \$25M," *Web Week*, March 1996, p. 3.

Gogan, J., Open Market Inc., Harvard Business School, 1995.

Kaplan, K., "EToys Plans IPO, May Raise \$115 Million," *Los Angeles Times*, February 18, 1999, p. C1.

Moran, S., "In the wake of its bang-up IPO, Open Market has a lot to prove," *Web Week*, July 8, 1996, p. 50.

Thurm, S., "A Flood of Web Patents Stirs Dispute over Tactics," *Wall Street Journal*, October 6, 1998p. B1 and B6.

Vrana, D., "Stamps.com Raises \$30 Million," *Los Angeles Times*, February 18, 1999, p. C2.

Web Week, "Riding on Netscape's Coattails? Tiny Open Market Seeks \$56M IPO," *Web Week*, April 29, 1996.