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Lessons from the Trenches of Entrepreneurship: From Basic Research to a High-Tech Startup Company

Ever since we can remember, the idea of "technology transfer" has been high on the agenda of company executives and university administrators. In Europe, it has been most common to attempt technology transfer through industry-funded research at universities and research laboratories. Recently, motivated by the success of the US model, startup companies have become accepted as another way of bringing innovation into practice. The startup model often creates real win-win situations that act as strong drivers for innovation and technology transfer.

Having recently founded, built and sold a venture-capital funded software startup company, we would like to share with you some observations on how to make the model work best for all involved parties.

Our own experience: Iconomic Systems SA

In our university research, we had been active for many years in a technology called "constraint programming". Looking for a good example to illustrate aspects of the technology, in 1996 we bought a database of all world airline schedules and started a student on a project to develop a travel planning system using constraint programming. The technique worked very well, and we made most of the software available as a toolkit on our web site (where it has been used by about 250 research groups and companies worldwide, but that is another story).

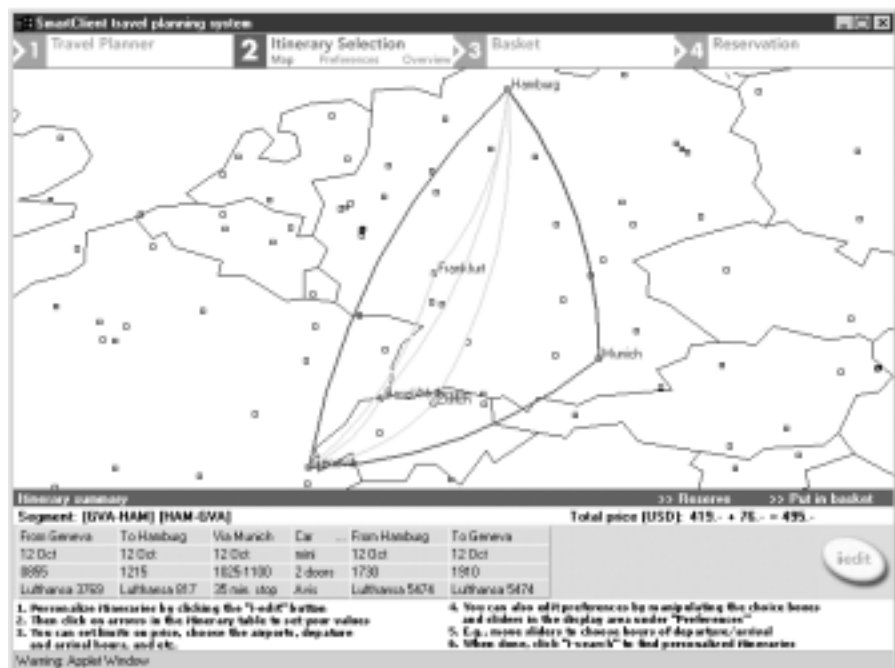
In 1998, we started a project for applying the techniques to electronic product catalogs in general, and linked the prototype to a live reservations system and graphical front-end, developed by the company which we had in the meantime founded with several partners. In 1999, this finally caught the attention of Swissair's e-commerce manager, Andreas Günthard, and we discovered that the technology was both very unique and met an important business need. Encouraged, we entered into negotiations with venture capitalists and finally closed a venture financing deal for Iconomic Systems in April, 2000.

The underlying technology endowed our software with several innovations. To end users looking to plan travel, it provides the possibility of mixed-initiative dialogue: rather than being asked questions, customers state their constraints and preferences in whatever order they wish. By being in control of the navigation process, they find what they want much more quickly than with conventional tools. To operators of e-commerce sites, it offers convenient and scalable ways of personalized customer relationship management. Furthermore, this technology allows the easy integration of many data sources – this rather technical feature has turned out to be a major selling point.

As the results of the project had all been made public, with much of the code available to anyone for downloading, all intellectual property rights were public. The company's strategic advantage over its competitors was the knowledge and education of its founders and employees, who were educated at the École Polytechnique Fédérale de Lausanne (EPFL). We quickly built a team of 6 developers and



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completed a first commercial-strength prototype in September 2000. Mr. Günthard left Swissair to join us as CEO in October 2000, when we began presenting our software to potential customers.

The timing of our market entry could not have been worse, as we faced customers who had just seen their stock prices drop significantly and were under severe pressure to cut costs. We thus adjusted our selling proposition to focus on the cost-saving potential of our solutions, and in December 2000 finally secured our first sale and letter of intent from the leading European travel e-commerce site.

However, customers insisted on buying the software for transaction fees rather than up-front licenses. While this provides much more substantial long-term revenues, it did not fill our coffers in the short term and we started to run low on cash. Our venture capitalists, with many troubled companies on their hands, were not ready to take more risks. On the other hand, it was very difficult to close deals with large customers who asked questions about the financial status of the company. We finally realized that the market situation made it impossible to go on independently, and accepted a buyout offer from I:FAO, a larger competitor headquartered in Frankfurt, Germany. The company now operates as a unit of I:FAO and our product is being readied for marketing as part of the Cytric corporate booking tool sold by I:FAO.

What does it take to make a startup a success?

A startup company is up against many odds and can only survive if it has a clear strategic advantage. For technology-based startups, this advantage lies in a technology that satisfies two conditions:

- It addresses a crucial business need
- It is not available from anyone else

It follows that static business environments offer no possibility for startups to succeed. Opportunities are created by major disruptive changes, such as the emergence of new competitors that change the rules of the game. A major driver for travel e-commerce is the emergence of low-cost airlines that force major airlines to cut costs wherever they can. In the technology arena, disruptive changes often occur when the quality metric changes. For example, cars were once evaluated by their top speeds, then by fuel efficiency; in the future, pollution potential may be the factor. Each change redistributes the cards and offers opportunities for new companies to form. The difficulty is, of course, that such changes are hard to foresee, and that furthermore your startup company has to be the only one that has done so.

Another element is timing. If your company brings its product out before the disruptive change creates a pressing need, it will not be able to sell it, investors will lose patience, and the venture will run out of money. If the product is late, either there will be stiff competition, or businesses will have figured out other ways to accommodate the change.

Only if your company has both the right technology and the right timing does your startup have a reasonable chance of success. In our case, while we had a unique technology, its timing was very unfavorable due to the dot-com meltdown taking place at that time, which lowered the demand for e-commerce solutions.



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The high technology industry, in particular Information Technology, operates with fast-paced dynamics and frequent paradigm changes. We have found very accurate descriptions in the books of Geoffrey Moore, a guru of Silicon Valley. His original "Crossing the Chasm" was oriented towards the startup entrepreneur, and his latest book, "Living on the Fault Line", addresses the impact on large companies whose businesses are affected by IT.

Startups for win-win technology transfer

Given that startups have such a focused goal and limited life span, they should be viewed not as a way to attack established businesses, but rather as an opportunity for them to rejuvenate themselves by acquiring new technologies and development teams. Industry as a whole has an interest in encouraging young employees that cannot rise through the hierarchy to take their ideas to independent ventures. This is a win for all sides: entrepreneurs gain personal fulfillment through the ventures they create, while established companies can innovate without taking large risks within their own organizations.

The biggest hurdle in the startup process

A startup company is created by bringing together a team composed of technology and industry experts. The biggest challenge is to bring the two sides together. In Europe in particular, engineering and business schools have very little contact with one another, and engineers with new technology insights rarely get to meet counterparts who understand how they might revolutionize an industry. We have recently observed the difference in computer science department cultures in a major university in Silicon Valley and a major Swiss Technical University. In Switzerland, most faculty have little interest in the commercial world, and participation in startup companies requires difficult-to-obtain permission from their respective administrations. At the Silicon Valley institution, technical discussions often involve questions of market size and integration with the commercial world. In stark contrast to the European model, many faculty there are in fact partners in venture capital firms, and personally scout for the brightest and most entrepreneurial students to help them start companies. Success clearly shows which is the best-performing model.

In our case, we actually had the technology in 1997, a full three years before product development was started. Had we met our business partner at that time, we could have leveraged this technology to create a leading European travel e-commerce site with very little competition. This delay was the single most important weakness of our venture, and we believe this is the case for many startup ideas in Europe.

What is the lifespan of a startup company and how can we capitalize on the benefits?

While everyone focuses on the well-known success stories of companies such as Hewlett-Packard, Intel, Sun or Cisco, the reality is that the overwhelming majority of successful startup companies are acquired after only a few years of existence (in our case, 3.5 years). This is because a newly created, viable technology company succeeds only against all odds: established companies who will do everything to kill the upstart competitor, customers are skeptical of the new and unproven company, and growth constantly keeps the company close to bankruptcy. In most cases, it is much more reasonable



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for the startup company to focus on a particular technology for a particular problem, introduce it to the market, and then let a more established organization take over its marketing. Therefore most venture capital firms fund companies with the goal of selling their share – the "exit" – about 2-3 years after their initial investment.

In our own case, we pursued a business plan as an independent company, but in hindsight it should have been clear to us much earlier that selling to a larger player, i.e. a tradesale, was a much more likely option. We would have certainly achieved a much better result for ourselves and our investors if we had oriented our plans toward such a sale right from the start.

Venture capital

The venture capital industry in Europe is still in its infancy. Compared with its US counterparts, its biggest weakness is lack of technical competence. Most venture capitalists (VCs) have a business or banking background and are unable to assess whether the company they are considering financing really has a new and competitive technology to sell. As a consequence, they focus most of their investment on businesses with conventional technology. What they should be doing is building companies with revolutionary technology which provides a permanent strategic advantage.

One symptom of this fact is that, while universities and research institutions in the US are full of VC partners looking for interesting new ideas and people to fund, VCs in Switzerland have few such contacts. It is very likely that the VC industry will develop more contacts with academic and research institutions.

With Iconomic Systems, we were very lucky to find VCs that were scouting for innovative technology and appreciated it. And in spite of the difficult times, we almost doubled their investment in one year – not a bad return.

The most important lesson from our experience is that venture capital is very fickle. It is important to take enough financing to allow sufficient time for proper marketing of the product or the company, even if conditions are not very favorable. It is also important to understand that as a startup company your sales cycles are slower than those of established players, and that you need to start marketing even before you have the product. It might also be helpful to do this in cooperation with a large partner, and to let this partner invest in your company early on. Finally, you should always prepare for the option of selling to a larger company – this is the most likely end result anyway and it is better to prepare for it systematically than to slide into it.

Take-home lessons

For entrepreneurs:

1. Ensure technological advantage, and get the timing right.
2. Look for win-win situations where everybody can benefit.
3. Concentrate on removing the biggest hurdle, i.e. bridging the gap between business and technology.
4. Realize that the lifespan of a startup company is limited, and always exit as an option.
5. Be aware that you are taking very big risks, but that the experience is very rewarding and should be fun!

For established corporations:

If you manage a large corporation, we hope that you will see startups in a positive light and encourage ambitious people to get involved in them. They will help you to keep your business up-to-date.

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