SWETREE

Sweden, www.swetree.com

Close collaboration between a university spin-off and a large forestry company and various other lead customers helped to refine their research into a commercial seed product offering higher survival rates and reduced costs across the forest industry

Executive Summary

This is the case of a new science-based company that spun off from research at Umeå University in 1999. It is a project-based company focusing on two core business areas: plant growth and vigour and selective breeding / fibre modification. The main vision is to contribute to an improved environment. When an innovation project is mature enough for the production phase, SweTree's business model is to spin it off into a new firm. This is what happened with the SeedPAD project described in this case. In 2015, SweTree Technologies spun off the SeedPAD project into the newly created spin-off company SweTree Nutrition. SweTree Technologies is still the main owner.

CASE N°: SC28

SECTOR: FORESTRY

TECH INTENSITY: HIGH-TECH

LIFE CYCLE STAGE: ESTABLISHED

INNOVATION VECTORS: PRODUCT, PROCESS, SERVICE, ORGANISATIONAL

OI PARTNERS: PSR, LARGE CORPORATION, LEAD CUSTOMERS/USERS

KEYWORDS: Science-based, plant and forest biotechnology, university spin-off, research collaboration, collaboration with lead customer, patenting, spin-off creation, from service to manufacturing, venture capital

SweTree Technologies
Innovators in Forest Biotechnology

BACKGROUND

SweTree Technologies was founded in 1999 as a joint initiative between Teknikbrostiftelsen in Umeå, Sweden (the regional public agency for the transfer of research into industrial use) and the company Woodheads AB. Woodheads AB was formed to handle the intellectual property of 44 leading researchers at the Umeå Plant Science Center and the Royal Institute of Technology in Stockholm. The majority of these researchers were collaborating in the Populus EST and functional genomics programme – a programme that generated a large amount of commercially interesting innovations in the field of plant and forest biotechnology.

The aim of SweTree Technologies was to assist the individual researchers with legal support to patent and commercialize their innovations. In return, SweTree Technologies received first right of refusal on the innovations. A selection process has been established, whereby discoveries are carefully selected, patented and developed. The CEO of SweTree considers this constellation to be unique in the world.

The company has two core business areas: plant growth and vigour and selective breeding / fibre modification. The first area focuses on added value plant nutrition and the second on developing added value from trees. Outside these core areas the company licenses technologies to strong partners, allowing them to earn an optimal mix of short and long-term revenues. One example of such an area is agriculture.

The results of the SeedPAD project were patented in 2012, and the two main partners, SweTree and Sveaskog, share ownership of the patent. In the future, it is possible that the patent will be licensed to other markets outside Northern Europe. After the technical success of the development SweTree faced new challenges. They now have to start production on a large scale. This is why SweTree decided to spin-off SweTree Nutrition into a separate company in 2015.

Three large Swedish forest companies have been involved in the critical testing of the SeedPAD product. In the summer of 2016, one million SeedPADs were planted by the forest companies and it is now time for SweeTre Nutrition to scale up their production of SeedPAD.

In turn, this product/technology can also have a huge impact outside the forest industry. Initial contacts with several branches of the plant industry and parts of the agricultural sector look promising, but so far SweTree Nutrition is too small to undertake commercialization on their own. For SweTree, this is one important step in the development from being mainly a research-based firm to becoming a product-based one. Their future plan is to continue developing collaborative innovations into commercial products. Several new innovation projects have already been started.

INNOVATION CHALLENGE & MARKET OPPORTUNITIES

Around 2010, the SeedPAD project was initiated internally by SweTree staff. With their experience of research linked to the forest industry they realized that there is a great potential for more effective methods of planting new trees. The strategic challenge for the firm was to take the step from being research-focused to becoming a product-based company.

Today the forest industry relies on either

1. natural renewal
2. digging for plants
3. direct sowing

Especially direct sowing is not very effective: machines spread some 60-80 000 seeds/ha and only 10% of the seeds will grow. SweTree realized that if they could somehow protect the seed in this process there would be a huge potential for improvement, and a huge future market.

SweTree realized that nothing like the product they were envisaging existed in the market. They envisaged a totally new renewal method for plants in the forest industry, especially in northern Europe, but also Canada and the USA. There were already high-quality seeds on the market, but they were very expensive. Digging and planting is even more expensive, but results in a high survival rate of the plants (around 90%) and is labour-intensive. With this method, a worker can plant around 1 500 plants per day, whereas with SeedPad the corresponding figure is 5 500 (survival rate around 70%).

However, to make their vision possible - i.e. to produce and sell high-quality, padded seeds with relatively easy planting methods required considerable work, both in terms of research and testing. On the other hand, if the idea turned out to be successful it could result in a large share of the renewal market, not only in the forest industry, but potentially also in parts of the agricultural sector.

OPEN INNOVATION TRAJECTORY

Concept development

The project started as an internal development project and for the first two years work was carried out internally in the company. One year after initiating the project, in 2011, SweTree worked with a number of different concepts in order to find a suitable solution for protecting the seeds. Two years after the start of the project, in 2012, the large Swedish forest company Sveaskog, became involved in the project. Sveaskog is one of around ten minority owners of SweTree, as well as a large potential customer.

In 2012, SweTree had come up with what they called a "tea-bag" solution for the product. The collaboration with Sveaskog helped them understand that this was not an optimal solution for the packaging of seeds as the compound was not solid enough. At this point SweTree needed help with solving both the packaging, the watering and the nutrition processes, as well as the testing and production of SeedPAD. During the research and testing it became clear that a pressed pad was needed, which led to the testing of vermiculite, a yellow or brown mineral found as an alteration product of mica and other minerals and used for insulation or as a moisture-retentive medium for growing plants.

In 2012, the Berzelii-Centre, a Swedish joint research centre for collaboration between industry and academia, became involved in the product development process. Part of their participation was financed by VINNOVA (the national Swedish Agency for Innovation).

The development process, IPR and competition strategy

As mentioned, SweTree managed the product development on its own for the first two years. The large lead user Sveaskog became involved in the process after two years. Even at that point there were still many challenges in the development process. Questions included:

- Which kind of vermiculit should be used?
- Which were the suitable characteristics of the material to be used?
- How to protect the seed from birds?
- How to create a suitable environment for the seed to grow?
- How to make the planting process effective?
- How to build a production process?

At the same time it was disclosed that an alternative product being developed by a competitor. Sveaskog was involved with that company as well. In the end, the other product failed since it was not possible to scale up the process to make it work in an industrialized setting. The main issue turned out to be how to make the planting process effective.

SweTree and Sveaskog finally patented their technology in 2012 and share ownership of the patent. In future, it is possible that the patent will be licensed to other markets outside Northern Europe. Since then, several other large potential lead customers in the Swedish forest industry have participated in the project. Holmen was one of the first, and in 2015 Bergvik also became a partner. The Finnish company Sedav is currently testing the SeedPAD. This testing of the product prototype is essential for improving both the planting process and the production process.

The concept changed a lot in the early phases, especially the technical characteristics of the product. It can mostly be characterized as a "learning by doing" process. Several new partnerships were established along the way. Partnering with large lead users was especially important in order to understand how these future customers would benefit, and the consequences this had on the development of the planting and production method.

For example a German company (SVET) assisted SweTree in the development of the production process. This company specializes in granulating processes (e.g. beets for sugar production), which proved to be helpful for the coating of the seeds in SeedPAD. Sveaskog has continued to contribute to the development of the project. They are now a customer, buying and testing the SweePAD. The testing – and pricing - of the product is one of the most critical aspects, as it involves the actual planting of the SeedPAD, which is not something that SweTree can do on its own.

With its SeedPAD, SweTree is focusing on one relatively large niche market: the forest industry, and especially in the Nordic climate. Their competitive advantage is to cut costs for their customers through efficient planting procedures and the increased quality of the product. The project showed clearly that it was not only the SeedPad product, but also the planting process, that was critical for the innovation's future success. Ultimately, SweTree's vision is a more sustainable and environmentally friendly forest industry.

Commercialization and follow-up

After the successful testing of both SeedPAD and its planting process, SweTree is facing new challenges. They have to start production on a large scale. This is why SweTree decided to spin-off SweTree Nutrition into a separate company in 2015. Three large Swedish forest companies have tested the product. Mätsä Halitus in Finland (government owned) has also participated in the testing. In the summer of 2016, one million SeedPADs were planted. SweeTre Nutrition is currently in the process of scaling up the production of SeedPAD.

It has become clear that SeedPAD is not only competing with the direct machine-sowing of seeds, but also with plants. This has led to a change in the business concept. It is estimated that SeedPAD can substitute 20% of the manual planting. With time it is estimated that the product/technology can also have a huge impact outside the forest industry. First contacts with several branches of the plant industry and parts of the agricultural sector look promising. However, SweTree Nutrition is currently too small to tackle these other sectors on their own.

On the way, the company undertook a number of organizational innovations. In 2015, SweeTree spun off SweTree Nutrition in order to produce and sell SeedPAD. A venture capital firm, Fort Knox Förvaring, has invested in the company and taken a minority share.

So far, in Sweden, it is mainly large forest industry companies who are the customers of SweTree Nutrition. In future, it is possible that the company will use distributors and forest industry associations to market the product to smaller, private forest industry customers. On the other hand, they are too numerous for the company to handle through direct sales on their own.

SweTree Nutrition is also planning to export SeedPad. In some countries, the company will sell directly to large forest companies. But this will be combined with a distributor strategy. It is possible that SweTree Nutrition will establish production facilities abroad, but an interesting alternative is to license the production rights.

SweTree and Sveaskog own the patent jointly. SweTree's ambition is to start production in the spin-off company SweTree Nutrition. It is also under discussion to license the patent to other markets, in which case Sveaskog will share part of the income.

SweTree continues to develop research-based innovations in the forest industry. It has no ambition to become a large manufacturing company. Instead, when innovation projects become mature enough to start production the idea is to create new spin-off companies in which SweTree is a minority or majority owner.

BUSINESS IMPACT

SweTree managed to develop a new seed pad that competes with both direct sowing and planting in the forest industry. Through this open collaborative process, SweTree spun-off a new firm and attracted venture capital for its development. SweTree has mostly remained a science-based project company, but its new spin-off is moving to become a production company. Both companies have learnt a lot in the process, and SweTree's ambition is to continue spinning off new ventures when they are mature enough to start production on their own.

The company has learned how to identify new market opportunities through working with external bodies and experts. The company has also developed experience in how to switch focus and type of open innovation partnership as the innovation process moves from one stage to another. The most important lesson and advice is to bring in potential customers early in the project development.

Another lesson when you collaborate is never to lose track of what you want to accomplish yourself. Sometimes it is too easy to get carried away with what someone else wants to achieve. It is important for a small science-based company to have a clear link to the production of the product. Without this it is too easy to end up as a consultant. You learn so much more if you have to produce the product yourself.

The new product allowed SweTree to spin-off a new company, SweTree Nutrition. The spin-off has managed to attract external venture capital, but it is still too early to see the final effects on turnover, exports and profits. In 2016, SweTree Nutrition managed to sell one million SeedPads, but this is still only a pilot, and too early to result in any real profits.

LESSONS LEARNED

This case shows how a science-based service firm can manage to create a spin-off company for high-tech manufacturing of a new project. In this case the customer collaboration, as well as the highly-developed research links, have been very valuable. SweTree's advice is to bring in your

potential lead customers early in the project development. This will help to create an understanding of customer needs.

SweTree wanted to advance from being solely a research-based firm, to one with products of its own. Without any own products, a company like this risks ending up as a consultancy firm to others. SweTree has learnt a lot by planning for its own future production process. In open innovation projects, it is important to be aware of your own core skills. This helps to understand where the collaboration with others will be most beneficial. Remember that different partners have different roles. This 'fusion' of high-tech solutions with traditional products creates promising conditions for future growth.

Main lessons learned:

1. Science-based and university-linked service firms can play a critical role in capturing new market opportunities.
2. The process of strategic collaborations may require negotiations and agreements at different levels, e.g. patenting and future licensing out.
3. The creation of a spin-off to take advantage of future production and marketing opportunities can be a beneficial strategy for a science-based service company.
4. A really innovative and radical solution may require a spin-off and additional venture financing. SweTree Nutrition was the second spin-off company from SweTree. More spin-offs might be expected in the future.