15 “Demola Oulu – Ecosystem for Need-Driven Value-Creation Process

Prof. Pekka SILVEN
Head of Demola Oulu, Oulu University of Applied Sciences
Demola Oulu, Finland

In a strong ecosystem, innovation is based on a fusion of ideas, skills, and perspectives. Demola is the base for such an ecosystem by promoting and developing efficient co-creation methods, driving a cultural change towards open innovation, and enhancing innovation competences both on individual and organizational levels. Demola concept is strengthened by a global network that combines the talent of the students with company R&D activities and university research.

Innovation is in focus which makes Demola clearly different from more practice oriented work based projects. Students have a unique possibility to receive real world project practice, industry contacts, and increase their value of being employable. The great potential is also in the fact that Demola may serve as a basis for international student projects

Demola is a common open platform for where students and universities develop new products and services and together with companies create real solutions to existing problems and challenges. This challenge together with desires for similar ecosystems have inspired also other European regions to adopt Demola.

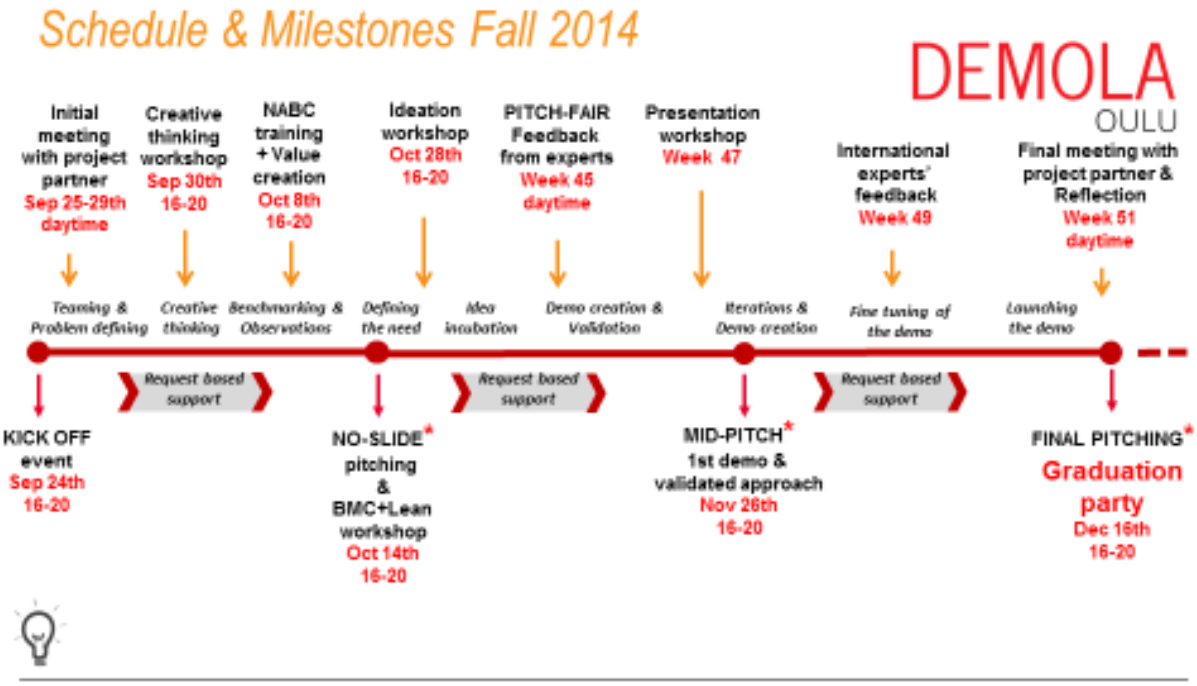
Focus is on students, and innovative multi-disciplinary projects. Students get contacts with possible future employers, and generally improve their values of being employable. Demola provides an ecosystem with several winners and has produced real-world outcomes and ongoing engagement among participants.

Demola, originating from Tampere, Finland, is a collaboration platform with focus on industry supported innovative product developments. Here industry partners contribute with low risk with product ideas, where multidisciplinary student teams meet those ideas in projects, with their own innovative proposals and prototyping Working on multidisciplinary teams equips students with valuable skills for working life. In addition, they learn cross-discipline collaboration. One multidisciplinary team could have students from several universities (currently from Oulu University of Applied Sciences and Oulu University), Finnish and exchange/double-degree students and even post-graduate students. Team members come from different study programs representing different skills. Currently about 60% of the students are international students.

The projects are real, as they have been handed to the teams by companies or public sector organizations, which motivates the students. We strongly believe that participation in Demola work based (co-creation) learning projects improves their employment opportunities.

Demola Oulu has currently (spring 2015) seven projects and 39 students. Five projects and project partners are from Oulu region and two from northern Norway. At the starting phase each project is seen as a great opportunity for new business concept for the students or/and employment. Demola is also a great opportunity for the students to show what they can and without any doubts the companies are also using Demola to find and recruit the best talents to work for them.

Demola is not providing sub-contracting type of projects. Demola is a learning environment based on co-creation of the demo/prototype.

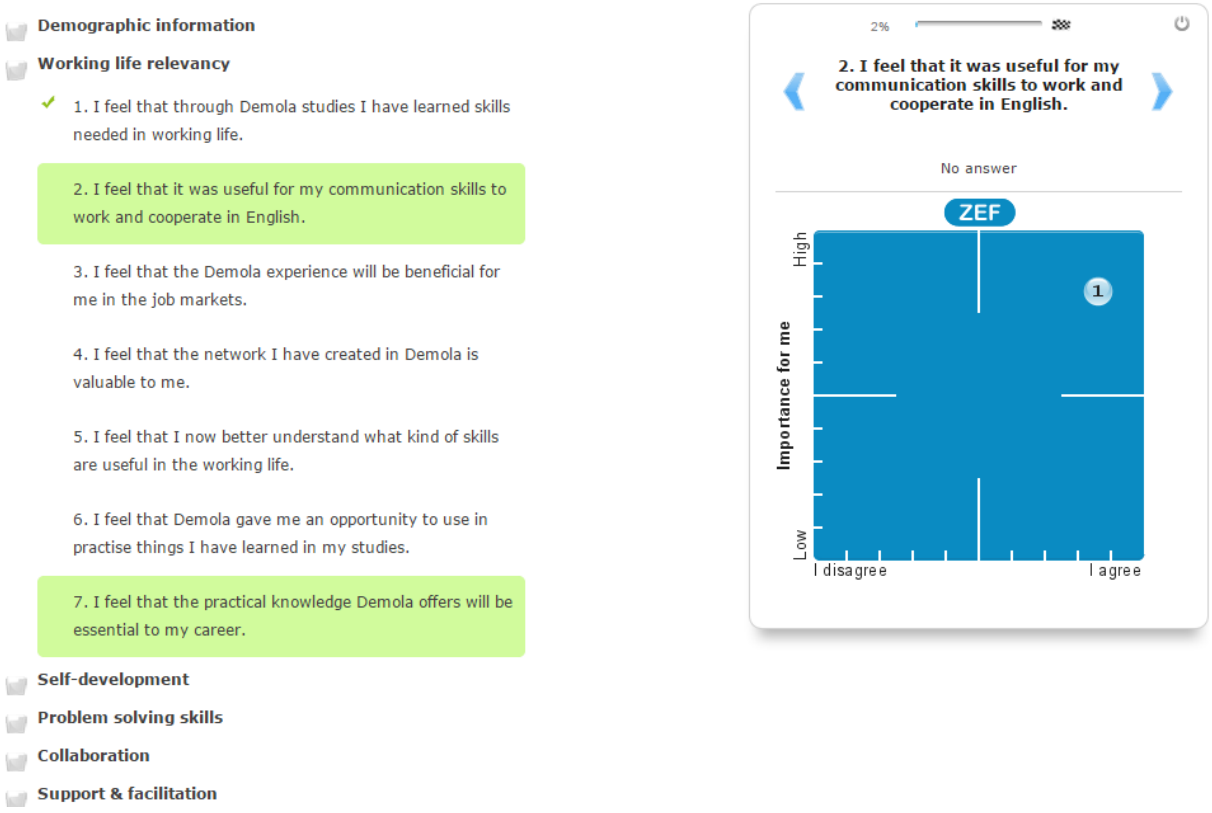


Picture: Demola schedule and milestones (fall 2014).

15.1 Example of the Demola case by the Building Supervision Office of Oulu (BSP)

The brief:
To further improve the maintenance and usage of buildings, the Oulu Building Supervision Office (BSO) is looking for a project group to develop building measurement and monitoring services. A new product concept is to be created around measurement and monitoring system demo to further improve the quality of new buildings and living.
The housing builders and occupants need a tool to better understand the potential in energy savings as well as the importance of healthy indoor air quality involved to the usage and maintenance of buildings. How could building measurements and monitoring serve as a tool to educate, inform and help the builders and occupants to use and maintain building correctly? What kind of economic savings could be achieved with certain operations? What kind of user friendly service could be a solution? How would you incorporate both energy measurements with monitoring and building physical measurements with monitoring to the service? During the project the group will develop a demo version of the desired service. The group should pay

attention to the user friendliness of the service, finding the right platform and the best ways to utilize the service. The demo service should include both energy and building technical measurement and monitoring elements. For example, the end solution could be a social media service or an application for the building occupant utilizing cloud services. The demo service should include at least one building located in the Hiukkavaara pilot area. For more information, please see www.tulevaisuudentalot.fi. The project requires the use of data processing and monitoring tools and methods as well as simulation skills. The project can include also a 3D-model created in previous Demola-project to visualize the solution.
The learning outcomes and expectations of the co-creation skills and self-development are currently under evaluation in Oulu and other Demola network sites globally.



Picture: Example of the feedback survey for the Demola students.

Previous surveys has shown that meeting students from other disciplines and meeting companies have had the greatest value for the students. Both criteria have a direct connections to employment in the short and long perspective.

Demola network: http://www.demola.net

“Case Oulu ICT-Cluster – Short History, Current Era and Future”

Prof. Dr. Risto KIMARI
University of Applied Science, Oulu, Finland
risto.kimari@oamk.fi

Oulu is the leading information and communications technology cluster in Northern Europe. We want to be continuously the leading and most agile ecosystem in Europe. Our expertise will cover the whole value chain from the design of components and devices to producing end products and services.

A city can be called a “Smart City” when investments in the human and social capital and traditional and ICT-based infrastructure fuel a sustainable economic growth and a high quality of life, with a wise management of natural resources, through a participatory government (Rantakokko 2012, Caregliu et al 2009). So far, Oulu has been selected twice among the 7 smartest cities in the world. The main reason for this seems to be the strong influence of early use of digitalization in the local ICT-ecosystem.

Big changes have happened in the Oulu region during the last five years due to the Nokia – Microsoft business and the company closing some part of its R&D operations in Oulu.

15.2 Oulu before the year 1990

In the 1980’s Oulu was a typical Finnish average sized city with a regional average sized university and some tertiary educational institutions. Pulp industry, chemical and cable factories powered the local economy.

During the 1980’s radio technology for mobile telecommunication was one of the key topics at the University of Oulu and in the Technical Research Centre of Finland (VTT). A group of researchers had fresh and advanced ideas on how to make new kinds of phones, but nobody knew what kind of a success story was waiting. A lot of international standardization was needed before the first NMT and later GSM phones came out from the laboratories.

A very important innovation outside the technology research was the total change in the education system from the old subsequent to the new parallel model. All levels of labour were educated and trained simultaneously so that the fast implementation of new technology in R&D and manufacturing was possible when the rapid growth started. This kind of implementation was not typical for the industry in earlier decades. The University of Oulu and Oulu Institute of technology transformed electrical engineering studies to electronics, computer science and radio technology. All these new programmes were successful.

Another enabler for rapid business growth was intensive networking and openness between individuals, which was typical in the Oulu region. Most of the people in business knew each other and they had typically studied at the University of Oulu or in institutions now called Oulu University of Applied Sciences. This human

networking and trust between individuals was the main difference between Oulu and the rest of Finland and in some cases the rest of the world.

15.3 Is it possible for Finnish people or companies to become the best of the world?

The Finns very seldom thought so except for some individual sportsmen, rally drivers or those in the F1 business. This perception had to be changed before the Miracle of Oulu was possible. How this was made is written in the history of Nokia, a company known in the 1970´s for its rubber boots, car tires and toilet paper. This old industrial company tried several strategic changes during the 1980´s. For example, it took over one of the biggest TV manufacturers in Europe, Schaub Lorenz, and was very active in the first years of PC computer business (Mikro Mikko). The financial situation of Nokia at that time was very weak. None of its industrial divisions was successful.

Nokia changed its strategy and decided to be one of the big players in the ICT world. All other divisions were sold. Now Nokia had two main business areas: Mobile Phones and Mobile Phones Base Stations. Both sectors were located in Oulu, where they found enough trained labour and possibilities to do research and testing. Oulu had also agile companies, which were able to create and produce automatic manufacturing and product testing needed in mass manufacturing of mobile phones in a large scale.

Parallel to Nokia's success story, the self-confidence of the people in Finland and in Oulu grew to a totally new level. The European Silicon Valley was de facto located here. The rest of the world asked: "How is it done?" At that time we did not give exact answers, because we did not fully understand what had happened. Now, after several years it seems to be more evident.

15.4 Oulu in a new millennium

During the 10-year period from 1991 to 2000 the economy grew very fast in Finland. Big R&D investments were made. A big part of those investments was made by Nokia. With regards to R&D investments in Finland, Oulu was in the lead. The share of R&D investments in Oulu compared to the GNP was the highest in the EU and amongst the highest in the whole world.

In education, these were interesting times. Nothing was enough. For example, Oulu University of Applied Sciences educated more than half of all engineers for the ICT-sector. They got plenty of project and thesis topics from Nokia and its subcontractors. Work opportunities for new engineers were excellent and salaries and share options were high. At the same time, they lost some of their best teachers to ICT-companies. As a public university the salaries were not flexible enough. From time to time the situation in university education was really critical. More engineers were required, but this requirement could not be fulfilled – luckily, because the first ICT-bubble.

15.5 Regional activities and Nokia's influence to the City of Oulu

The capital growth of Oulu from 1990 to 2008 was the strongest in whole of Finland. Companies and labour paid every year more and more taxes. The costs of unemployment were minor. Some of the money was used to build open test platforms and to create open networks, where new mobile technologies and services were tested before they were commercially published. These platforms were designed, owned and run by open organizations where, both Universities, the Technical Research Centre of Finland (VTT), some companies and the City of Oulu were working together in close co-operation. I have had the possibility to be involved in the administration of these organizations.

Two main enablers should be mentioned. The Octopus network (2002) made it possible to test the newest GSM solutions especially in the Oulu area and also worldwide. The widest free WIFI network at its time called Pan-Oulu (2003) gave the opportunity to see how it influenced users and what kind of business might be created.

When all payers in a certain area put their strategies to the same direction and the timing of both economy and technology is right, a big technological and economical impact is possible. However, not all impacts are positive. The risk level is high. "Do not put all eggs one basket", says an old proverb. This was not done even though this was demanded repeatedly. During the first years of the new millennium many companies in the Oulu region were sold to stock markets. This led to several new rich ex-entrepreneurs, who were ready to put their money to the new SME's in the area. ICTeducation in Universities reached its highest volume in 2002 – one or two years after the top of the ICTbusiness. Suddenly, new engineers could not find work after graduation. The situation was totally new. This shows how difficult it is to regulate education, the length of which is four or five years. It is like trying to change the course of a huge oil tanker.

The welfare of the region still continued to rise. Business went well, even though the growth had slowed down. One of the main indicators, the number of flight passengers at the Oulu airport, grew all the time until the dramatic year 2008. Regional enabler platforms worked well and international co-operation was lively. The City of Oulu did well and was able to make new investments for the welfare of citizens and industrial activities. Nokia and other companies in the ICT-business knew how important it is to create ecosystems and how important it is to put effort to developing new mobile solutions for everyday use. All players did their best, but were not agile enough compared to global development. The economic decline after the year 2008 and some strategic mistakes in Nokia's part made big changes also in Oulu. Some smaller sections of Nokia product development were sold to international companies, and finally Microsoft bought Nokia in its entirety. The new CEO Steven Elop made dramatic changes in Nokia's strategy, which caused the mobile phone R&D in Oulu to be closed down soon afterwards. In a short period of time, there were about 2,500 unemployed R&D engineers, who had big capacity to work in world-class product development. Was it a problem or a huge opportunity? Probably it was both. If those specialists are unemployed, it will cost Finnish society a huge amount of money. If they are able to do what they do best, there is huge potential for entrepreneurship and are able to attract more and more companies to the Oulu region. The later

prognosis seems to be the future. Luckily, Nokia Base Station R&D is still staying in Oulu, and its growth will be a part of the next success story of Oulu. The 5th generation of mobile technology is already waiting in laboratories. The new Nokia grows rapidly also in Oulu.

For years, big changes had been predicted in the ICT industry. Worst case predictions were made on the background. In 2009, a new co-operational network, TERWA was founded. The head of this co-operation was the mayor of Oulu. The universities, research centre, labour officials and other key organizations were also represented. Several plans for future operations were ready for future use. This group got all the information in a very early stage and often even faster than people within the companies. The new strategy of Oulu was formed so that potential was directed in such a way that the impact for economy and business was the biggest possible. One of the first things was to start a new, city-owned organization, Business Oulu, where all separate business support activities were collected.

The development of ICT and its usage has continued after the year 2008 so that by today, Oulu has been selected twice among the world´s 7 most intelligent cities. During the last years, new technologies have been studied and implemented using those methods, which accelerated the growth of the mobile phone industry during the 1990's. The most promising new technology seems to be printed technology, which is mostly used in electronics and sensors. In printed technology, Oulu is the number one in world just now. Printing technology is done roll-to-roll like newspapers. Both the Technical Research Centre of Finland (VTT) and Oulu University of Applied Sciences have their own printing laboratories. This technology and its use is strongly supported by the government. International co-operation is worldwide.

15.6 Oulu in 2015

Many large corporations in Europe are going through a time of transformation. Nokia is a typical example of a company, which owns a lot of patents and innovations that they are not going to use in their core business. Economic circumstances drive corporations to reduce non-core activities and seek for a more dynamic R&D network to meet the future needs of the markets.

This new model of making new business is called Innovation Mill. This type of funding can be used, for example, for integrating new intellectual property into the existing technologies, marketing research, pilot projects, and the development of business operations. Funding is provided by Tekes – the Finnish Funding Agency for Innovation.

Innovation Mill is nowadays driven by a company named Spiverse. It helps corporations to streamline and effectively manage the spin off process to support the core business, and to increase the R&D activities outside the corporation. Clients get help in finding external funding to spin offs from public and private sources and maximizing their probability to successful growth.

The situation in Oulu has been very fruitful for the Innovation Mill procedure due to the large number of well-trained and nowadays free specialists, who want to be more independent entrepreneurs.

Maybe the best bridge between education and companies is the model called Business Kitchen born in Oulu – naturally! Business Kitchen is the first place in Oulu, which truly brings together different actors from entrepreneurial fields under the same roof, presenting a new way for making things happen.

In Business Kitchen, the public sector meets the private sector and the students meet the serial entrepreneurs. They work across organizational boundaries and have found that these crossroads are often the best contexts for creating and trying new ideas. This collaboration does not happen by itself; to engage in the interaction requires a lot of explanation and patience. Their activities are based on co-creation and learning, because what was true yesterday, is not necessarily true tomorrow. The business environment, as well as life itself, is constantly changing.

Today entrepreneurship exists everywhere. Not everyone has to start a company to engage in an entrepreneurial mindset or a feeling of responsibility, these are keys to success in any area of life, whether an employee or a student.

15.7 Conclusion

The development of ICT and its implementation has happened so fast that there has not always been experience enough to handle it. Most agile organizations have earned huge amounts of money. The ICT world has changed very much. There have been bubbles and hype, but also at same time there has been advancement for human welfare and everyday life. During the first years of the ICT boom, R&D and manufacturing was done in very same districts. Later, manufacturing was moved to countries, where labour costs are essentially lower than, for example, in Finland.

Oulu has been and still is the centre of R&D in the field of ICT. There weren't large-scale mobile phone factories so the first phase of change had little impact. The next phase was more serious, because companies in the Oulu region, except Nokia, had not enough own products. Many SME's served Nokia and other similar companies and they were extremely dependent to this very strict business-model. After the crisis of 2008, the situation has now changed very much. The Oulu region gives now birth to more new product and service-oriented companies than any other region in Finland. Support mechanisms for these small companies have been created. Regional and global networking and business support is efficient. New technologies, that is printed technology and 5G will create new business. Many international companies have opened new offices in Oulu. Education is deeply involved in new kind of challenges.

Oulu is and will be among hottest hot spots in future technology!