



NOVIA INDUSTRY PARTNERSHIP. FINLAND

NOVIA UNIVERSITY



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Abstract

Novia Industry Partnership (NIP. Fi) is a three-member student research project aiming to integrate industrial activities into educational program. The project can be divided in three parts. Novia 2Ways Development is seeking to integrate real business project to replace specific modules of educational program and give an opportunity to students to complete ECTS credits through a real case. In addition, Service Concept project aims to identify opportunities for Technobothnia laboratory to create another source of revenue. Lastly, Export Education is a project investigating opportunities in foreign countries in order to export Novia educational activities, provide another source of income and strengthen Novia notoriety on the worldwide market. Novia Industry Partnership has been conducted for almost four months and provide relevant examples related to the three distinct projects.

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Introduction

Novia Industry Partnership. Finland project

The NIP. Fi can be identified as a market study with the aim of creating trade opportunities for Novia University and Technobothnia laboratory. As a result, our team has been focused on looking for successful case of integrated industrial activities into education system. The project aims to provide Novia University an overview of what type of partnership it is possible to create between industry/company and universities.

This project can be divided into three different missions. As a matter of fact, the first mission “Project Novia 2Way of Development” the project is to explore market opportunities to create a link between Novia University and industrial companies. On the other hand, the second mission “Project Technobotnia Service Concept” is to define the capability of production of the research laboratory and to determine potential commercial output after having investigated company’s needs. Lastly, the aim of the last mission “Novia Export Project” is to propose a successful and profitable exchange of education model abroad.

As we have three distinct sub-mission included in the NIP. Fi project, we have numerous final clients such as the potential company willing to work with Novia University or students as they are paying their study. However, our project is to deliver an analysis of the market including the competences and knowledge of Novia University and the expectations and demands of industrial companies. In other words, the limit of our project is to submit a report pointing out niches where Novia University can use its resources to cater a need. We have been asked to develop example of potential successful scenarios that could work in the future. However, the purpose of this project is not to build a partnership between two entities.

As a result, the final client of Novia Industry project is our supervisor Mikael Ehlers who has been really involved along our project. Mikael Ehlers is the client as he is the one expecting the final report. He presented the project to our team and has been focusing on defining the scope of our project. Furthermore, we can also consider that Roger is a client as he helped us from a management perspectives besides being the coordinator of the EPS program.

Our mission

The main mission is to succeed integrating industrial activities into Novia University courses and Technobothnia laboratory. However, our mission is to submit a report presenting the potential industrial market opportunities including a benchmarking on what have been already done in terms of industry-education partnership.

As regards the second project Service Concept, the mission is to identify relevant profitable competences from Technobothnia laboratory. Indeed, Technobothnia is mainly focused on teaching and research. Therefore, NIP. Fi has been trying to determine new opportunities or niches where knowledge from the laboratory can be sold in order to generate a new source of revenue.

Lastly, the main mission of the Export Education project is to investigate projects that have involved a university selling its knowledge abroad. Indeed, knowing that the Finnish education is well-known in the world for its efficiency, Novia is willing to export its Finnish education model using its main competitive advantage. Then, NIP. Fi team will have a wide database of export possibilities to propose and Novia University will be able to select an export model that can be implemented.

Our vision

On the long-term run, the vision of the NIP. Fi is to propose real engineering cases that students can work on enhancing their knowledge. Through those partnerships, we hope that not only Novia University but the two parties would take full advantage of the business relationship. Indeed, this project aims to give students an opportunity to learn from their potential future working place and to increase their chance to be hired in their future desired occupation.

Furthermore, Service Concept long term vision is to provide a database of laboratory competences that we can provide. Technobothnia might be able to develop new partnerships with customers interested in our knowledge. The main purpose of this second project is to provide training to companies having lack of resources in certain expert fields. Lastly, diversify the activity of Technobothnia through professional external training would be profitable increasing the fame of the university and laboratory.

On the other hand, the Export Education project's vision slightly differs from the previous ones. The main idea behind the third project is to expand Novia University activity and build

a worldwide position. Novia is willing to provide a better education in less developed areas mainly focusing in Africa or Middle East. The export of its education will also offer an opportunity for students to complete a recognised degree.

Objectives

As mentioned above, the main purpose of Novia Industry is to integrate industrial activities into education program. However, as Novia Industry project can be divide into three distinct sub-project, objectives can slightly vary from one to another. In other words, even if NIP. Fi have an overall objective, each distinct sub-project has its own goal. Thus, the objectives can be divided following the three sub-projects:

Novia 2Ways Development

- Investigate education program propose at Novia University
- Benchmark partnership between industry/company and university that have been done previously by other universities on a worldwide base
- Create of a database of companies related to Novia University field of study
- Determine opportunities and issues in Ostrobothnia companies
- Show an evidence of correlation between Novia University and companies demand
- Develop potential successful scenarios between Novia University and Ostrobothnia companies
- Present profitable long-term partnership providing another source of revenue

Technobothnia Service Concept

- Investigate Technobothnia research laboratory activities and knowledge that can be used to generate profit
- Create database of European engineering universities and contact them to study their ability to use their own asset to create revenue
- Seek for company needs in Ostrobothnia
- Match company needs and Technobothnia research laboratory production capability
- Develop potential successful case that can be profitable for Novia University and companies
- Provide numerous types of partnership that can be used to create a long-term integration between the two entities

Novia Export

- Use Technobothnia research laboratory and Novia University competences to create another source of revenue abroad
- Research all types of distance learning model
- Investigate education export model sold in the world
- Research Novia University competences that can be sell beyond Finnish borders
- Develop potential successful scenario that can be profitable on a long-term base
- Present standard partnership that can be apply to several different export cases

Stake holders

As the NIP. Fi project include three distinct sub-missions, many stakeholders can be identified. Indeed, the main stakeholders are the EPS team working on the project, the two engineering students Karim ZAOUI and Carlos IGLESIAS and one leadership student Martin HOCHART. As another main stakeholder, the supervisor of NIP. Fi Mikael Hers play also a significant role in the project. Lastly, Roger Nylund could also be considered as a main actor as he is in charge of the EPS program.

Some other stakeholders can also be identified according to the three different projects. As a matter of fact, John Dahlbacka having requested a grant for Novia 2Ways Development and Technobothnia Service Concept projects, he is also a stakeholder related to the first and the second project. Knowing that Novia University program had to be investigated for Novia 2Way of Development project, all head program officers are stakeholders. They will be all potentially impacted following outcomes of projects. Furthermore, as Nina Berg and Anna Kietz are directly related to Technobothnia research laboratory, they can also be considered as stakeholders of the Technobothnia Service Concept. The last sub-project, Novia Export model project has been given Orjan Andersson the director of Novia University. Indeed, even if Mikael Ehls is the supervisor of NIP. Fi project, the Export model mission have been required by Orjan Andersson. As a result, he is also a stakeholder of NIP. Fi EPS project. Lastly, all companies that have been identified for further partnership are also stakeholders of NIP. Fi project.

Deliverables

As stated above, the main deliverable of NIP. Fi is a final report presenting a match between Novia University competencies and market opportunities. This report will be useful to have an overview of possible of ways to generate another source of revenue.

However, other deliverables have been created along this project. First, a mid-term report must be submitted in the beginning of April. Then, other deliverables have been required by the leader of the project assuring that the final report will not be written entirely at the end of the EPS program. Setting up sub-deliverables as milestones have also helped keeping on the right direction and scope. The main other deliverables are listed below:

- A database including universities that have been conducting similar projects
- A database mentioning successful projects conducted by students using university resources
- An analysis of Novia University and Technobothnia research laboratory resources that can be sell
- A report of international markets education opportunities
- A proposition of profitable standard education model to export
- A detailed investigation of company needs in Ostrobothnia

Team presentation - Strengths and weaknesses



Martin HOCHART

First name: Martin

Last name: HOCHART

Age: 22

Country of origin: France

Field of study: Leadership Management

University: Metropolitan University of Budapest (Hungary)

Team role: Leader



Karim ZAOU

First name: Karim

Last name: ZAOU

Age: 22

Country of origin: France

Field of study: Microelectronic and Telecommunication

University: Polytech Marseille (France)

Team role: Polyvalent researcher



Carlos IGLESIAS

First name: Carlos

Last name: IGLESIAS

Age: 21

Country of origin: Spain

Field of study: Industrial Designing Engineering

University: Poly technique University of Valencia (Spain)

Team role: Secretary

Belbin study

Working in team and get a proper synergy between all the team members its essential to reach our desired goals. Thus, we must determinate the strengths and weaknesses of the team members and assign tasks for efficiency. In these cases, it is advisable to do the Beblin test, which will give us the information we need about the team members.

In the graphs below we can see our team roles from which assign each profile of the project. Those team roles are built following our reaction to a given situation and other factors not necessary related to our study.

Martin's Belbin graph

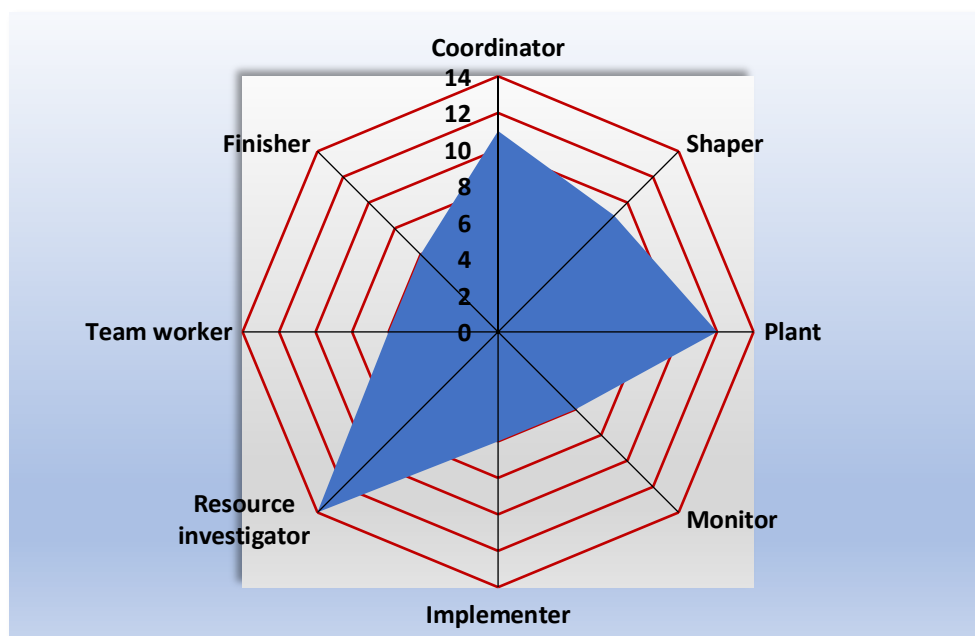


Figure 1: *Martin's Belbin test*

Martin's results shows that his profile is related to Resource investigator, Plant and Coordinator behaviour. Resource Investigator people are mostly extrovert, enthusiastic and communicative, which is useful when the team needs to present the overall project. Indeed, following his profile, he can explain a project attracting audience attention and transmitting information effectively.

Being a Resource Investigator enables also to facilitate team's communication. On the other hand, he is enthusiasm will help the team to be motivated and to be efficient. However, being a Resource Investigator also has its weaknesses. As a matter of fact, a Resource Investigator

tend to be over-optimistic and forget the initial purpose of the project. Furthermore, Resource Investigators are also characterized as people losing interest in the project once initial enthusiasm of creation has passed. Thus, the other team members have to bear in mind that the initial source of enthusiasm comes from Martin as it corresponds to his profile. They also must be aware of his level of motivation as he acts as a pillar of motivation in the team.

Martin is also a Plant person. Following Belbin test, being a plant person means that he is creative and imaginative. Moreover, he is also able to solve difficult problems considering that every problem has its solution. However, as he tends to be creative, he might not always be focused on the core of the project and ignores incidentals. The last aspect defining Martin considering Belbin graph is his coordination. Indeed, Martin is a mature and confident person. In other words, a significant ability to lead people and to fit into a chairman role. Nevertheless, Martin should be careful to not be seen as a manipulator offloading other team members with tasks.

To conclude, Martin is enthusiast, creative and mature but must avoid manipulating his other colleagues.

Karim's Belbin graph

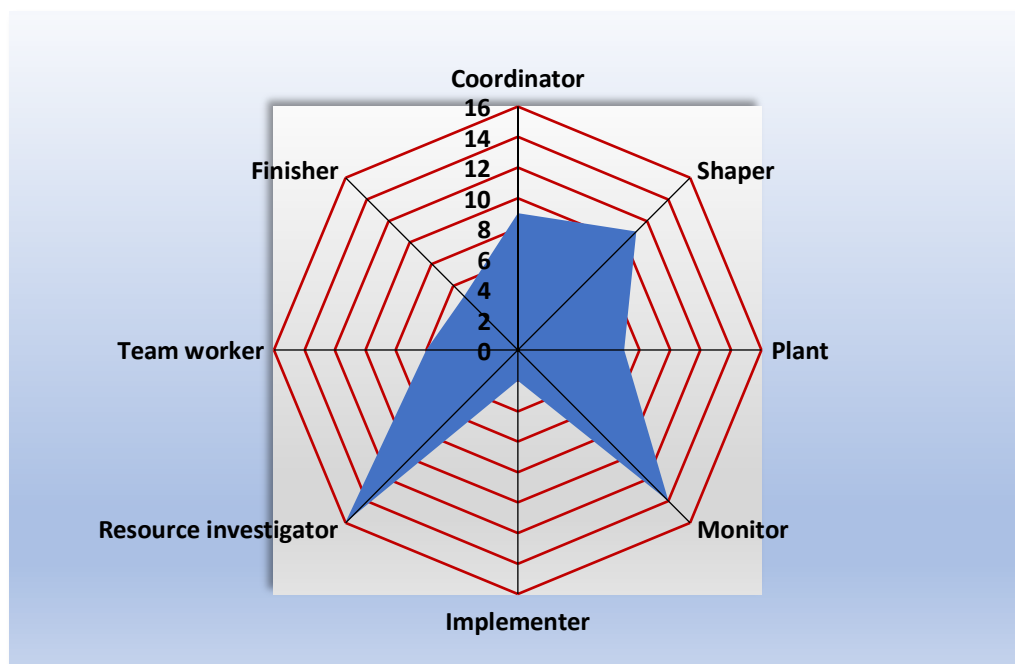


Figure 2: *Karim's Belbin test*

Karim's results are mainly Resource investigator but also Monitor and Shaper.

As Resource Investigator profile is already described for Martin, the description of Karim's contribution will be more focus on his Monitor and Sharper personality aspects. However, Karim is also extrovert and social. He easily develops contacts and using his optimism.

A Monitor behaviour refers to an ability to be sober, strategic and discerning. Keeping a cool head is very important to solve problems and think clearly about the situation. A monitor person also usually knows how to discern what is useful for the project and what is not. This role will be helpful to keep working efficiently and do not waste time on insignificant problems. However, some weaknesses stand out related to that profile. Indeed, being monitor can lead Karim to a lack of inspiration including difficulties to express himself and his thoughts.

As Karim is also Shaper, working with him can help the team when dealing with unexpected situations or unpredicted problems. Furthermore, being Shaper and Monitor usually lead to a challenging attitude enabling Karim to be objective while taking smart choice. On the other hand, as Karim has a strong challenging behaviour he might prone provocation and offend team members' contributions.

To sum up, Karim likes to work and meet people, he is enthusiast, extrovert and courageous to overcome obstacles. However, he might not always be able to inspire others in an appropriate manner.

Carlos' Belbin graph

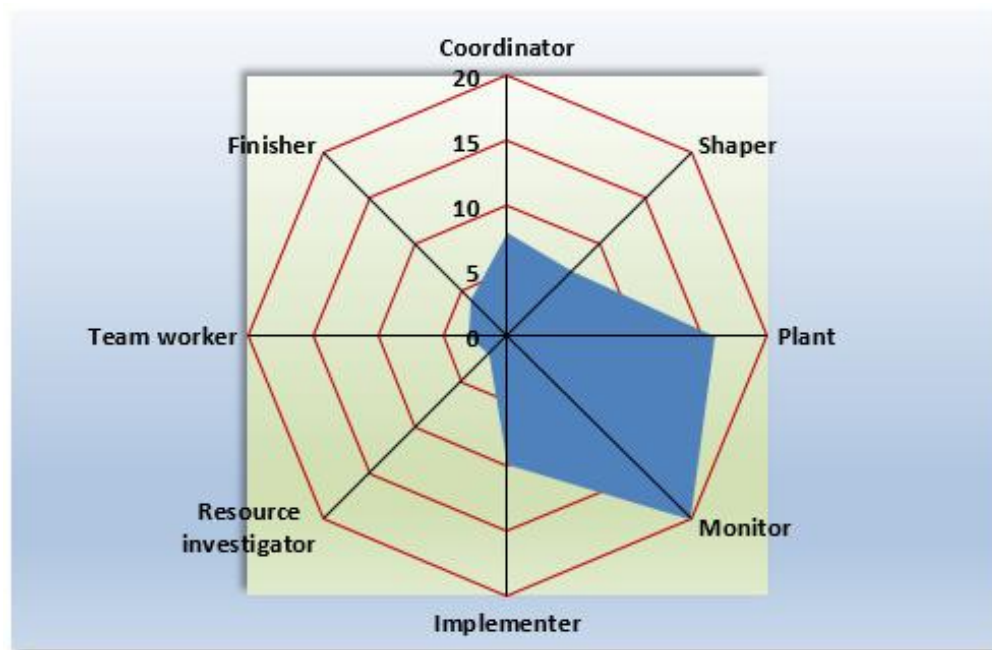


Figure 3: *Carlos' Belbin test*

The two main profiles of Carlos standing out of the graph above are Monitor and Plant. He can also be considered as an Implementer.

Being Monitor Carlos is sober, strategic and discerning. He is capable to evaluate different options and choose suitable decision keeping a cool head in every situation. However, being Monitor can drive him to not be able to inspire others and to not be understood by his team mates.

Carlos is also a Plant person meaning that he is creative, imaginative, unorthodox and capable to solve problems. Being creative and imaginative will significantly contribute to the project as he can also be inspiring strategic leader. Nevertheless, Carlos must be aware of external variables impacting the project and to not close himself into his own creativity. He also should keep in mind that his not always easily understandable as he might encounter difficulties to express his point of view.

The last aspect standing out of Carlos Belbin test is Implementer. An Implement profile can be described as disciplined, conservative and efficient. As a result, this last aspect perfectly match the two previous one as being efficient will help Carlos to transform his ideas and thoughts into actions. On the other hand, Carlos should stay alert to not be inflexible and miss opportunities raising along the project.



Figure 4: *Belbin profiles*

Looking overall, we can classify each team role into three groups depending on its function, action, social and thinking dimension.

Martin mainly presents social characteristics (Coordinator and Resource Investigator) and Thinking (Plant). Karim's roles mainly refers to social and thinking but also action dimensions (Shaper). As his two predominant roles are both related to thinking roles, Carlos is definitely a thinker. Thus, Martin is a balanced person and mostly social. The shape of his chart fulfils slightly all criteria compare to his two colleagues making him able to react rapidly adapting himself to current situation.

Karim's profile it's also quite balanced, because is three roles are related to each group. Thus, Karim can run all type of tasks even if his personality is more related to a social dimension. On the other hand, as Carlos is mostly a thinker, he will be able to step back and make sure which tasks suit more to Karim or Martin. However, Carlos is the only one in the team without any social abilities which must be compensate using Martin and Karim sociable facilities. Lastly, Martin has only few abilities to act. He will need to use Karim and Carlos action competences to be productive which should not be difficult as his main role is to allocate resources according to required tasks.

Considering every role, profiles and their related abilities, the team should be totally able to compensate the lack of each other. They will be able to support others motivating themselves and running their project to achieve their intended objectives.

Choice of group name

To be able to find a proper name reflecting our project, we first isolate ourselves in a different room to use the board and do a brainstorming. We began to choose an acronym with all words linked to our education and industrial activity « EPS, Project, Novia, Lab, Company, Relationship... » However, Martin mentioned that we should not begin with finding an acronym but thought that we should start writing all words related to the project. Then it would be easier to come up with a good acronym using the most important words listed during the brainstorming. The brainstorming lasted for one hour and the team had around fifty words at the end. On the other board, we wrote the name which we thought important and we try to make an acronym.

Discussion

We had some arguments as Martin and Carlos want to do an acronym with:

- Project
- Industry
- Integration
- Finland
- Novia

They thought that Pro-FIIN (Project Finland, Industry, Integration, Novia) it was good to define our project but Karim disagreed and did not say anything. Few minutes later Martin asked Karim if he agreed and Karim thought that it is not a good idea to put Project, Integration and Finland.

We ended up with the following words:

- Industry
- Novia

- Partnership
- Finland

We tried to make an acronym with this word and the team agreed upon « **NIP.Fi** »

N: Novia **I:** Industry **P:** Partnership **Fi:** Finland

We have chosen “**.Fi**” because it refers to the website.

Problems

The first problem is the time the team has spent on finding the projects' name. Indeed, two hours has been necessary to select the group name. Then, the communication as Karim should have said that he disagrees. The team would have been more effective and avoid wasting time. On the other hand, Carlos and Martin could have been more concerned about Karim's opinion.

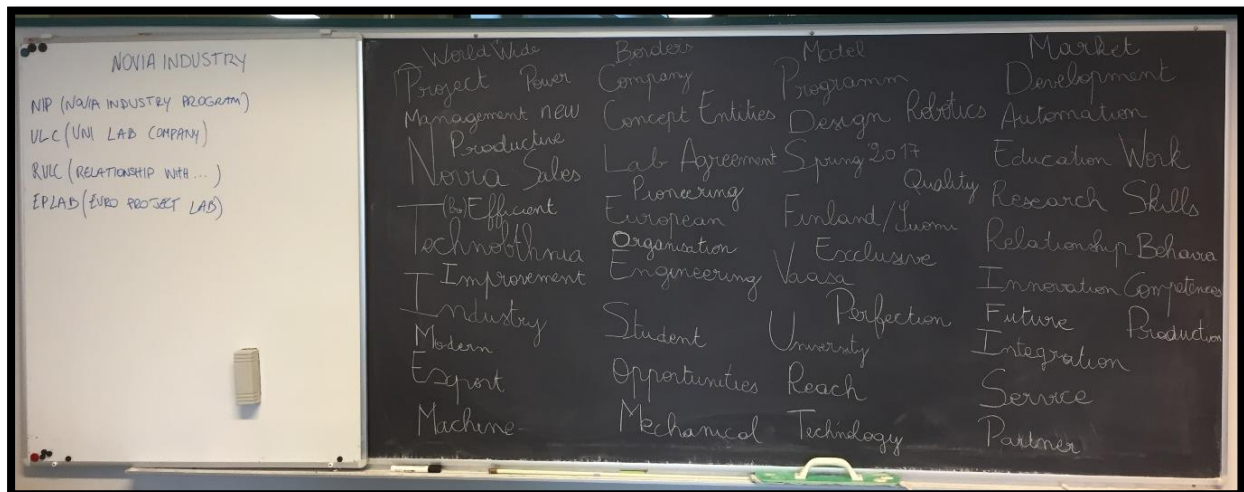


Figure 5: *The first brainstorming with all words*

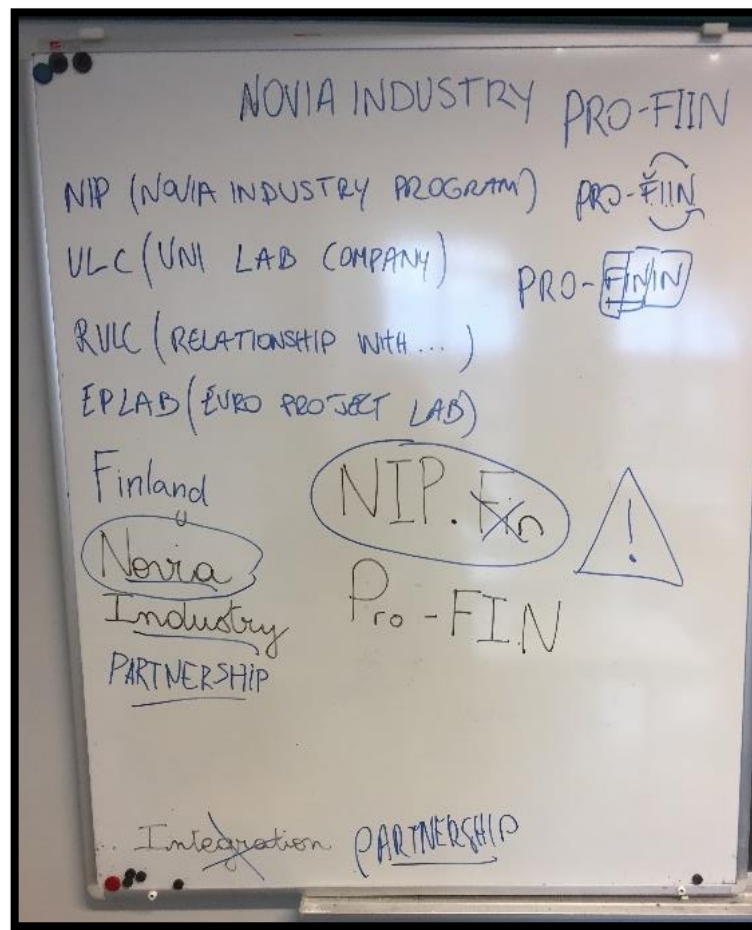


Figure 6: The last brainstorming to find the name

NIP. Fi Logo

The logo has been studied before to be developed. Indeed, when it comes to develop a logo several aspects have to be taken into account. Thus, the colour, the shape and the written parts are the elements we have been focused on.



Figure 7: Logo

Colour

As one of the main aspects of the final project logo, the colour plays a significant role. Indeed, apart from their aesthetics aspect, colours can also help spreading out a message. In other words, the colour of a logo support unconsciously the mission and vision of the project. Following the website Empowered, (Empowered , 2009 - 2017) blue is a peaceful colour. It projects trustiness, responsibility and loyalty. As the long-term mission of NIP. Fi project is to build long-lasting partnership with industries, diffusing loyalty and trustiness has become a priority in colours selection process. Blue is also inspiring while projecting order with a defined scope and direction. NIP. Fi project can be described as inspiring as it proposes new ideas for education. On the other hand, blue is also considered as a wisdom and safe colour strengthening our future partner's trustiness in NIP. Fi. Lastly, blue also enables to create a one to one communication rather than a mass communicating message involving each actor personally in the project.

Shape

Having defined our colour, we were looking for potential shape for NIP. Fi logo. Considering the scope and goals of our project, we have chosen a circular logo for numerous reasons. Indeed using the website (Cheers Creative, 2017) we have realized that circular logo was the most used shape for several motives corresponding with our project vision. First, a rounded logo inspires the endless. In other words, it creates a never-ending trustful relationship in our partners' spirit. Then, having delimited borders, the circular shape induces that the project is safe enough enhancing our future partners to integrate NIP.Fi. Following (Logo design love , 2012) circular logos are also easier to remember than other shapes. It has more impact in customers' spirit at first glance. Lastly, a circular logo can also be interpreted as a globe. As NIP. Fi mission is also to export abroad an education model, the worldwide dimension of the project also had to be integrated.

Written part

The last part of the logo that we had to study was the message written on it. As a result, identified three elements to take into account on our logo: the message included into the logo, the size of the written part and the colour of the text.

When it comes to design a logo, not only the name of the project but also a full explanation should appear on the logo. That is why, we also mention the meaning of NIP. Fin that people can get an idea of the purpose of the project.

The text part had to fit into the circle. However, with letter police enables to stand out the message desired. Thus, “*NIP*” is the biggest part as it is also the easiest to remember. Then, the full name of the project is mention in a smaller size that people can know the main activity of NIP. Fi. Lastly, the colour of the logo statement had to be contrasted enough compared to the blue background. White is a neutral colour but still project positivity. It inspires trustiness as the background colour and is linked to purity. White refers also to two finish aspects: white is a colour of the snow which symbolize Finland and white with the blue background are the two colours on the Finnish flag.

Website and video

Website

Developing a website for Novia Industry Partnership has been crucial in order to give people access to project’s information. Webpage promotes the project and increase its reliability to customers. It also helps to increase worldwide customers being visible across the globe. In addition, a website also allows viral marketing increasing the notoriety of the project. Therefore, Novia Industry Partnership has developed its own website providing information related to the members involved, the content and other aspects of the project. The link to the website is included below.

<https://nipfi.wordpress.com/>



Figure 8: Website Home page

Video

A corporate video also gives chance to show in a visual way their objectives and working process. Customers are usually more likely to watch a video instead of reading a text. Therefore, a corporate video is a proper tool to deliver and share data. It provides rapidly a general vision of the project in an attractive way. The video can also be found on the website.

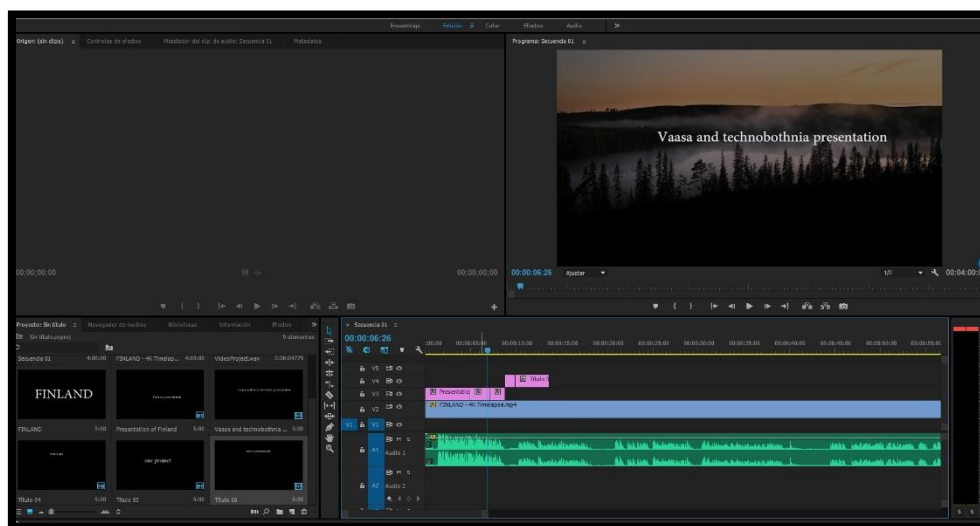


Figure 9: Video process

Teamwork - Rules

To prevent crisis management, it would be useful to create rules. Those allow to establish a discipline in the team. Each member has to agree with it. In the first time, it is simple to define them but in the long term few of them could be transgress for different reasons. Team workers have not the same way of working and these rules will give them a common understanding of working process.

1. Teamwork must have a leader

- A leader must be able to have an overview of the project. He is necessary to give instructions and allocate tasks.

2. Everyone is important and equal in the group

- Even if we have a leader, all members have the same impact and should be listened equally.

3. Must explain

- As we are working in group, each aspect of the project has to be understood by all members. If not, the leader should take time to explain in detail misunderstood items.

4. Work must be distributed equally

- The leader is in charge of allocating tasks and activities. However, he also has to make sure that the amount of work is divided equally.

5. Meeting attendance

- During meetings, all members of the group must plan and attend the meeting. Then, they all should stay after the appointment to make sure that everybody understood all the aspects.

6. Do the schedule together

- The time table must be established together to avoid imposing schedules.

7. Personal work should be shown

- When bringing together personal work every member has to explain clearly what they have been doing. The purpose of this rule is to work in synergy and do not overlap each other's' work.

8. Accept the idea from the others

- Personal ideas are important as much as ideas from other members. Thus, everybody must listen every idea and try to do not interrupt each other's. (James, 2011)

9. Break is important

- When the team has been producing a significant work. The leader should offer a break. Indeed, having a break is necessary to maintain the level of productivity. (Roach, 2014)

10. Never forget the goal

- Even if the main task of the leader is to keep members working according to our common objective, all the members must align our work with final goals. (Professinal, 2015)

11. Express your disagreement

- The communication with the members is the most important in group project.

12. Accept review

- Review of individuals' work must be objective and not negative. Members can criticize each other work but must bear in mind that the purpose of the critic is to improve his work.

Crisis Management

When it comes to work in team, people must consider that some crisis may arise amongst people. As each member works differently, anticipate potential crisis by developing a set of rules can be useful and may help to avoid or solve future team issues. On the other hand, all team members should develop and agree on those crisis management rules to make sure that they will be efficient and suitable. Even if numerous problem related to management can arise, one has selected crisis more likely to happen in this EPS project.

Behaviour affecting productivity

1. Parasite:

- Problem: A member of the team provides less work than the others so he puts the group in difficulty. Others must make more efforts and assume the responsibility of the one who does not produce work enough.
- Solution: To anticipate these issues, other members should inform the parasite that he should be involved in the project. The leader must define the reason why the parasite is not involved before to try solving the issue. Then he should clearly detail the importance of everybody's involvement in the project and try to understand the way the parasite works. If after a certain time, the parasite is still not involved and has nothing to do with the project, the best is to inform the supervisor. Otherwise the parasite will be perceived as a constraint for the group and will have an effect negative. However, the person can also understand what the group has told him and make the necessary efforts to fill his lack of work in this case we can say that the discussion will have been beneficial.

2. Overpriced:

- Problem: A team member thinks he knows everything and can do the job alone and that his ideas prevail over those of others. This reduces productivity and group work. He believes himself superior to others and thus creates an imbalance and a bad atmosphere in the group.
- Solution: The other members of the team must inform the superior of his behaviour to point out that this is detrimental to group cohesion. They must also explain that each person is on equal footing and is not above others. Each member has the same place, the goal of a group work is precisely to show that each idea has the same importance.

3. Individualism:

- Problem: A team member wants to do the work on his own. He thinks that he does not need the others to properly carry out the project. Thus, he believes that working alone allow him to move faster without being delayed by members who do not have the necessary skills.
- Solution: Other members must remind him of what group work is. He should share the work and stop trying to do everything because everyone should find his role within the group. Nevertheless, if the member is not able to work in group, the leader must adapt to the situation and give him time limited tasks that he can perform on his own.

4. 2 vs 1:

- Problem: Two members of group can be very friendly and not with the third one. They might work together in the project and exclude the other partner. The former will work alone and could create a bad atmosphere in the group.
- Solution: The single worker can expose the problem and emphasise the importance of working all together. The leader should try to break sub-units in the group by allocating tasks to pair works. If the problem persists, the team could try to put more effort on dividing tasks in three.

5. Language barrier:

- Problem: Each member of the group speaks different languages and do not make any effort to be understood by others. Members cannot talk in their own mother tongue.
- Solution: The team members must improve their English language to be understood. All members should practice speaking English. It will be beneficial for all and especially for those do not speak properly. However, as the leader is multi-lingual, he would be able to compensate if some problems related to languages arise at the beginning.

Lastly, it is important to state that in any situation, all members should avoid denigrating one member. Most team work issues usually happen when communication is harmful. Furthermore, one has defined a mediator in every situation. Indeed, it is important that someone can get an overview of the problem and implement changes to solve issues. (J. White , 2017)

Risk management

Risk management is the probability or threat of damage, injury, liability, loss, or any other negatives occurrence caused by external or internal vulnerabilities. It might be avoided through pre-emptive actions. Thus, the problem analysis below presents potential issues that might arise in our project.

Possible risks

Management and interaction among teams' members

- Different level of English
- Lack of motivation
- Loss of interest in the project
- No clear objectives
- Miscommunication due to not everybody has a mobile phone able to support WhatsApp.
- Lack of leadership
- Loosing time of work going unnecessary to group meeting

Universities feedback

- No answer from universities
- The universities did not understand the purpose of the questionnaire
- The universities contacts think it's annoying to respond too much questions.
- The contacts don't understand one or more questions
- The contacts receive the questionnaire as SPAM and they will never read it

Technobothnia Laboratory

- The Lab cannot develop what we are expecting
- Lack of communication with the lab
- We give the Lab the information of the project without clarity so the result it's not what we expected it to be

Novia EPS team

- Lack of knowledge
- Not enough time to develop the product

- Language problems
- Technical problems
- Sickness
- Differences in our specialities

Evaluate the risks

Evaluate the probability to become reality and the impact on the project. For the evaluation, the probability and the impact is divided into three different levels. The meanings of each level can be found in the following tables. After rating all possible risks, they are ranked in regard to the risk level. The risk level is a simple calculation: “risk level=probability value*impact value”.

Probability

Rating	Valuation	Meaning
Low	I	Extremely unlikely
Medium	II	Occasional
High	III	Risk is almost inevitable

Table 1: *Risks probability*

Impact

Rating	Valuation	Meaning
Low	I	No/very minor effect on project (small actions can fix the problems)
Medium	II	Moderate/critical impact (causes a loss of primary functions r a lot of additional work)
High	III	Catastrophic (Product becomes inoperative)

Table 2: *Risks impact*

Evaluation

Management and interaction between teams

Failure	Probability	Impact	Risk Level	Prevent (P) Mitigate (M)
Communication problems because not everybody in the team speaks English with enough fluency.	Low	High		M
Getting bored about the project	Low	Medium		M
Not clear objectives	High	High		P

Miscommunication due to not everybody has a mobile phone able to support WhatsApp	High	Medium		M
Lack of leadership	Low	Medium		P
Loosing time of work going unnecessary to group meeting	High	High		P
Bad coordination	High	High		

Table 3: *Team risks*

We are unlikely to experience communication problems even though we do not speak the same language and we do not all have whatsapp. A poor management can cause us problems that have a repercussion in our project ranging from moderately severe to very serious.

Universities feedback

Failure	Probability	Impact	Risk Level	Prevent (P) Mitigate (M)
No answer from the universities	High	High		P
The universities didn't understand the purpose of the questionnaire	Low	Medium		P

The universities contacts think it's annoying to respond too much questions	High	High		P
The contacts don't understand one or more question	High	Low		P
The contacts receive the questionnaire as SPAM and they will never read it	Medium	High		P

Table 4: *Universities feedback risks*

Technobothnia Lab

Failure	Probability	Impact	Risk Level	Prevent (P) Mitigate (M)
The Lab cannot develop what we are expecting	Medium	High		P
Lack of communication with the lab	Medium	High		P
We give the Lab the information of the project without clarity so the result it's not what we expected it to be	Medium	High		P
The laboratory explodes before finishing the project	Low	Huge		P

Table 5: *Technobothnia lab risks*

Depending directly on the laboratory, the problems that concern it have a great impact on our project. The probability of errors is not very high but in case of happening, its impact is very high

Novia EPS team

Failure	Probability	Impact	Risk Level	Prevent (P) Mitigate (M)
Lack knowledge	Medium	High		P
Not enough time to develop the product/service	High	High		P
Technical problems	Medium	High		P
Sickness	Low	Medium		P
Differences in our specialities	Medium	Low		
Wasting time because of the Internet connection	High	High		

Table 6: *Novia EPS team risks*

The probability of an internal problem occurring in the crane is relatively possible, but this also depends on the administration. Therefore, the problems of the administration would have repercussions in internal problems in the group. The problems with more impact would be those related to time-wasting and technical problems.

Prevent

To prevent most of errors and risks it's important to focus on management and to keep reviewing each part of the project. Identifying our weaknesses as a team will help us to anticipate possible problems that may arise and we will find it easier to overcome them. Pointing and recording each of the steps that we are doing helps us to look back and quickly identify the source of an error without wasting time. It is also advisable to do a search for similar works and know about what errors or bad decisions could they make, so we can avoid

it. Constantly posing the possibility that something does not go as we expected can serve to make an alternative plan and thereby solve the errors quickly.

Mitigate

Although with good prevention errors are greatly reduced, they cannot always be completely reduced. Considering unforeseen errors, we must have some methods to face them automatically, quickly and effectively. We need to make decisions quickly, keeping our heads cold and not letting ourselves be chaotic.

Exposure

Exposure refers to the analysis of hazardous risks most likely to occurred. Objectively, there are many risks that although it is important to take them into account, do not prevail over others whose impact affects the project more. These risks affect the project more by combining a high probability of success and a major impact on the project. Those risks are mainly the following listed below.

Not enough time to develop the product

Causes: Due to mainly a bad project managing

Mitigate: Organize and manage time efficiently

To distribute the work in an intelligent way. In other words, to assign each member of the group the task that is going to execute with adequate speed and quality.

Bad coordination

Causes: Due to mainly a bad project managing

Mitigate: Manage the tasks to be carried out from the beginning and assign them clearly, being always open to clarify things in case of doubts.

Lack of communication with the lab

Causes: Unclearly transmit information and requirements to the laboratory, giving things for obvious, that in fact they are not, or not sending enough messages trying to avoid being annoying.

Mitigate: First clarify our priorities, this way we would determine that for us the main thing is to present a project correctly done, so it is better to be sure the laboratory knows exactly what is he supposed to do avoid future problems.

Problem: Carlos and Martin disagree about:

- Schedule
- Research
- Goal

Solutions: (Karim mediator)

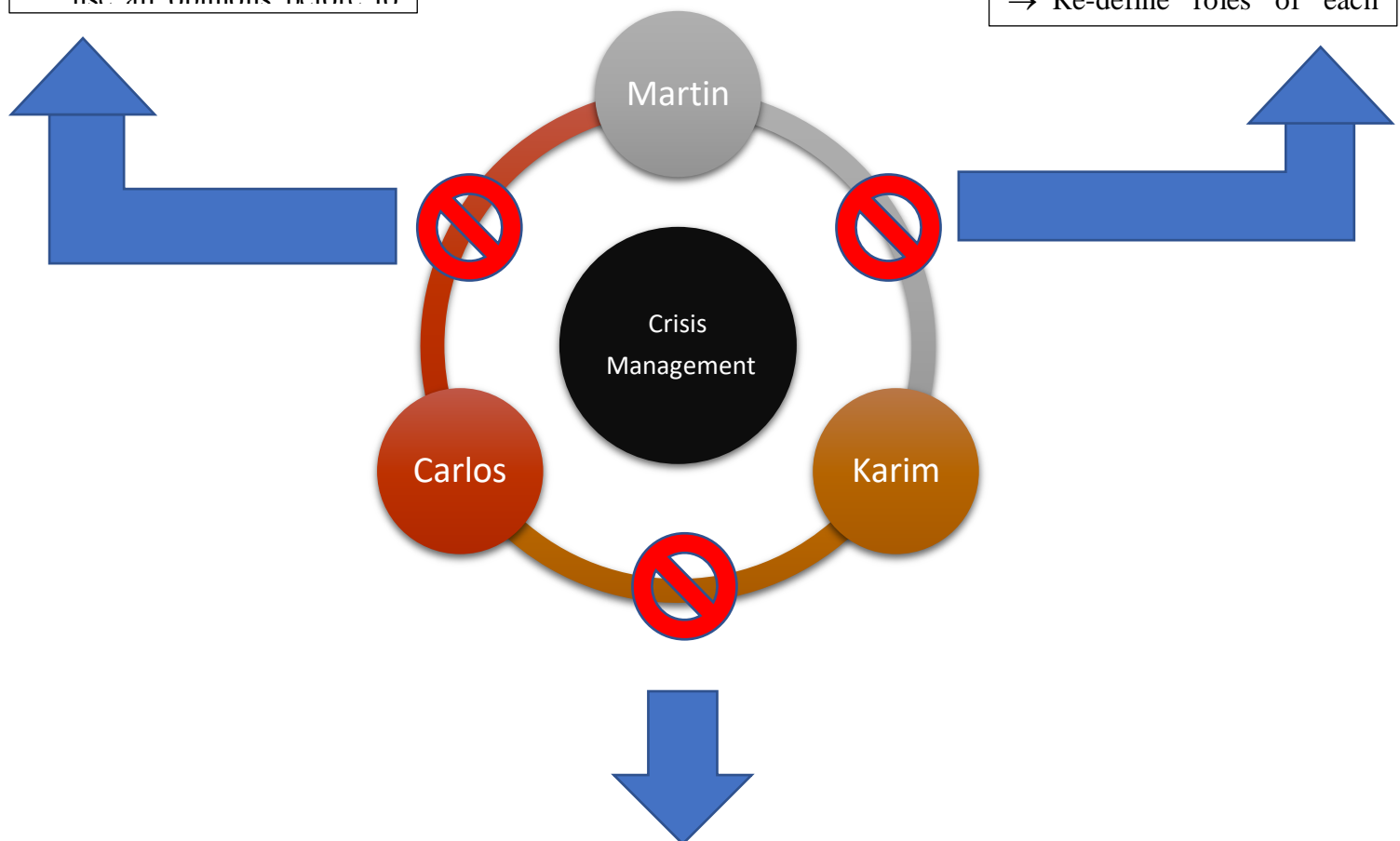
- Assure that schedules are equally divided
- They can discuss and find common ground
- Try to mix both ideas and use all opinions before to

Problem: Martin and Karim disagree about:

- Meeting
- Role of members
- Tasks allocation

Solutions: (Carlos mediator)

- Pay attention that all members are available for every meeting
- Work and time work must be shared
- Re-define roles of each



Problem: Karim and Carlos disagree about:

- Tasks allocation
- Work time
- Communication
-

Solutions: (Martin mediator)

- Review sharing tasks
- Re-organize the working time for all members.
- Mention communication problem once they arise and create an « issue box » that people can fill if they are not able to

Meeting process

Before the meeting

When we have a meeting, we prepare it. Indeed, we always do a summary including the content and a brief description of what we are going to discuss. To make sure that all topics are raised, we settle a check list of the items we need to clarify. The meeting agenda include all other additional information such as where will the meeting take place, at what time and who will attend the meeting. (*see appendix n°21*) We plan a meeting at least once a week with our supervisor, Mikael Ehre usually for one hour. The secretary send a memo one day before every meeting to Mikael Ehre that he can be aware of the content in the coming meeting.

Example of check-list:

- Validate questions related to potential partnership
- Show the questions about internal meeting
- Ask guidelines about Export project
- Take contacts for university meetings

Once the check-list is made, we decide who leads the meeting. Meetings are important as they allow us to make sure with Mikael Ehre that we are still following the right way to reach goals. Furthermore, meetings are also an opportunity for all of us to express freely our opinions and ideas about the project. Even if we try to solicit everyone to get an active participation in meetings, as Martin is the leader of the group, he is the most suitable to run appointments.

During the meeting

At the beginning of the meeting, we mention the time we have to run the meeting and the topics we want to discuss about. Then, we try to sum up to Mikael Ehre what the team has been doing during the last week. He looks after our work and make sure that there is a link between what we are producing and what we have been talking about during the last meeting. Lastly, he also helped us to focus on right tasks at the right time in order to be productive and to work efficiently.

Then, all members explain what their individual tasks including how and why they did it. In every meeting, the important fact is that all members can speak about their own activities in order to value their work. Mikael Ehre can understand what we are working on and can see if the members of the group are involved or not in the project. The main purpose is to keep transparency in the relation with our supervisor. He gives his opinion on what has been done and also look after our organization to improve our performance if needed. He tells us what should we change and gives us guidelines to achieve goals efficiently.

On the other hand, as Carlos is the secretary and he takes note about what Mikael Ehre says that the group can remember and plan the week according to supervisor's requirements. We keep five minutes at the end to summarize what has been discussed during the meeting and what is required for the next appointment. Lastly, we plan the next meeting, define our activities for the coming week and agree on deliverables for next appointment.

After the meeting

After the meeting, the group make sure that all the team has understood supervisor's expectations including tasks to focus on. Martin makes sure that everybody knows his activities and tasks. Lastly, the secretary can fill the meeting report table mentioning how long was the meeting and the conclusion of the meeting. He keeps on the evolution of the project using meetings report.

Timeline meetings	
5 min	<ul style="list-style-type: none"> Introduce topics and remind the content and the time we have
5 min	<ul style="list-style-type: none"> Report of individual tasks of every member
40 min	<ul style="list-style-type: none"> Discussion on the main topics mentioned in the meeting agenda.
5 min	<ul style="list-style-type: none"> Summarize main points standing out of the meeting
5 min	<ul style="list-style-type: none"> Plan the next meeting and validate next week activities'

Table 7: *Timeline meetings*

To conclude this management part all team members had to report their activities in the time statement (*see appendix n°28*) presenting research conducted during the European Project Semester.

Furthermore, the leader has been in charge of planning daily tasks for team workers along Novia Industry Partnership project. (*see appendix n°27*)

Activities timeline included as an appendix address the time allocated per task and define the team member concerned by activities.

Novia 2Ways Development

The overall idea of Novia 2Ways Development project is to bring companies real case into Novia University courses. By contrast to the Service Concept and the Export project, the purpose of Novia 2Ways Development project is to save money and not generate revenue. Indeed, company provides a project that students can work on. The project must be profitable for the company such as a real issue they need to solve. Novia provide students as a workforce and pay them using ECTS credits. In other words, no money is involved: companies invest time and Novia solve their issues allocating project to student groups.

Thus, certain modules of a program can be replaced using companies' project enabling student to face their future working environment. As modules can be substituted through companies' projects, module expenses can be cut off.

Karim has investigated all the courses available at Novia University and our role is to identify common issues in different industries to create a bank of problems to fit in teaching schedules and ECTS credits legislation.

The Bachelor program in Nursing below describes in detail the process of savings in Novia 2Ways of Development project.

As the Finnish companies Vasa Pharmachem Pvt. Ltd and Nightingale operate on the healthcare and biomedical sector, we can use their competences to teach our student. As a result, we do not need teacher for the two following modules and students can validate their credits through companies' projects.

As a result, two options have been identified. The first option is a company training teacher to supervise the project. In this case, the teacher becomes the manager of the company project and has to be well prepared as students have no contact with the company. Novia should pay the supervisor as it is an internal teacher and it will be profitable to students to have an accessible.

The second opportunity is that company supervise directly the project. Thus, students should have a constant communication with the company. Novia saves money as it does not pay any additional teacher. By contrast with the first possibility, this system will enable Novia to replace a module through a company supervisor. However, the supervisor will be less available

for students. They must be more independent and they are expected to possess concrete skills to achieve the project. This system is more dedicated to last semester student.

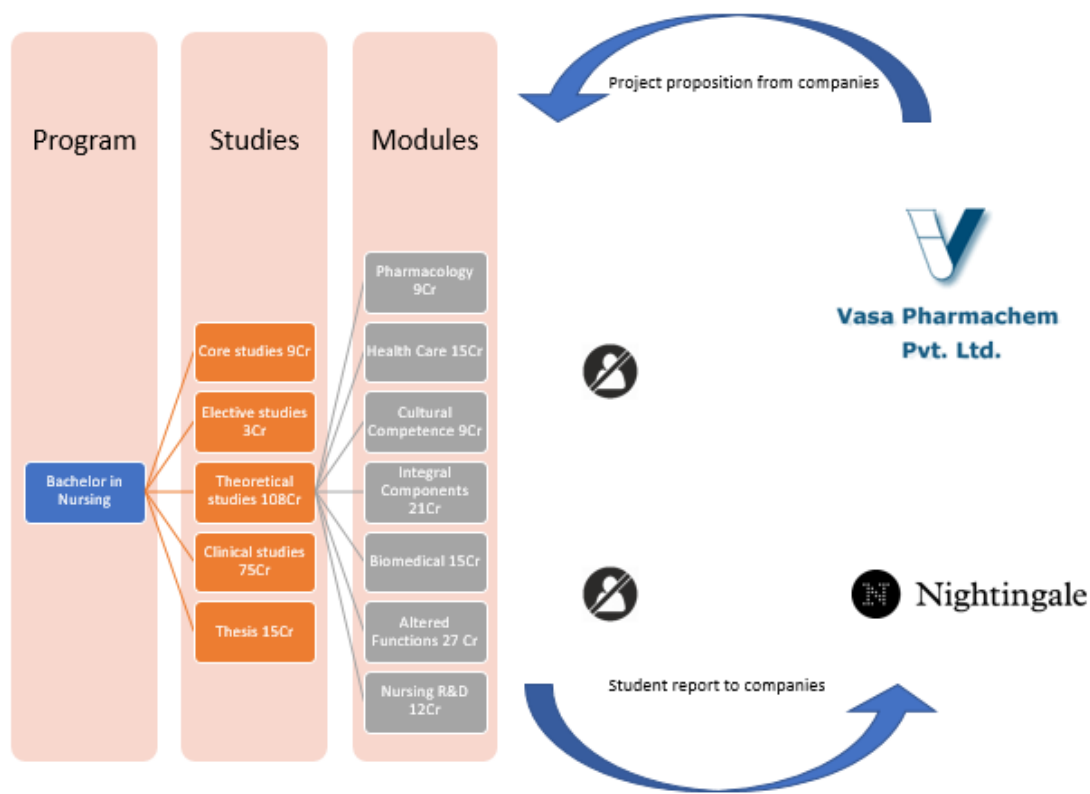


Figure 10: *Novia 2Ways Development example*

Novia courses

To define which program might be interested in integrating companies project into the modules, one has listed the courses at Novia University. Some of the programs are only available in Swedish needing translation. Getting an overview of the degrees at Novia has also enable the group to focus the research of examples on project that would be potentially doable at Novia. The programs have been divided in two categories: First the English degree and the Swedish ones.

Courses in English

Even if Novia is located in four cities in Finland, Vaasa, Turku, Raseborg and Jakobstad, the investigation of courses has been focused on Novia University courses in Vaasa. Novia proposes two degrees in English for student:

→ Bachelor degree

Bachelor degree in Vaasa in Health Care and Nursing. This degree consists in educating culturally competent registered nurses in a multicultural environment. The language of study is especially in English but they want student to have basic knowledge in Finnish and Swedish to be prepared working in Finnish environment. Bachelor's Degree in Nursing is a key for student to do a master level.

→ Master degree

Master degree in Vaasa in Automation Technology consists in learning design, test and implement control, supervisory and automation systems. The study focused on automation and control includes two main perspectives of learning: theory and practical. The language of study is just in English. The programme may also offer an excellent basis for careers in research and academic professions.

(Novia , 2015)

Courses in Swedish

Novia instruction and examination language is Swedish, except for English language training and profiling. Novia propose different degrees and those can be divided in three departments:

- Business Department,
- Health Department
- Industrial Management.

Business Department

• **Bachelor of Business Administration (Polytechnic)**

The goal of the studies of the Bachelor of Business Administration (Polytechnic) in Business is that students become independent, responsible and creative specialist. This means that

students after graduation can create business opportunities and act as an expert in companies and other organizations.

The program includes, inter alia, the following entities:

- Business and entrepreneurship
- Marketing
- Accounting
- International trade
- Law
- Communication and Mathematics
- Selection of profiling

After the first year of study students choose which area they want to specify. They can choose among the following topics:

- Financial administration: focuses on business accounting, legal and internal accounting
- International trade: focuses on international business, marketing and logistics

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Health Department

- **“Estenomen”** (*Manager for work appearance*)

Estenomen affects man's inner well-being by working with human external environment, it means appearance. Estenomen create aesthetic and visual wholes of customers and models in varied working environment. Estenomen has broad expertise in the beauty industry topics such as makeup, style, hair and skin as well as the knowledge and skills to perform various tasks.

Estenomen program includes:

- Expertise in the development of beauty care products and services
- Skin, hair, makeup and style skills
- Cosmetic competence
- Competence in the beauty industry's business and entrepreneurship
- Competence in the beauty industry's research and development

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- **Midwife**

Within midwifery studies deepens and broadens students their basic skills to include Midwifery; maternal, obstetric and gynaecological care and sex education. The program provides a readiness to work that affects women's reproductive health, both independently and in multidisciplinary teams.

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- **Health nurse**

Within health care for studies deepen and broaden student knowledge in health promotion and especially in health nurses work among people of different ages; school children and young people, families, pregnant women, families with children, working age and older. The program provides a readiness to work both independently and in multidisciplinary teams.

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- **Registered nurse**

In education trained nurses for different specialties. Nursing is a human-oriented work in diverse environments in the social welfare and health care. Caring Science is the science that nursing, care work and caring originates. In addition to health sciences, students are learning public health sciences, medical sciences, behavioural and natural sciences such as anatomy, physiology and pharmacology.

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- **Social Worker**

The training of social workers aim to educate expert's professionals in the social field. The training provides not only the skills to meet client groups in need of social support in the family crisis, but also collaboration with working life in the form of project / practice. A social worker operates as a manager or supervisor in social caring. Key competences for social workers is an ethical approach, capable of using different methods and effective treatment to work with different kinds of people, the ability to analyse the community, know the social service system and have a development-oriented approach.

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- **Training in social and health care**

The degree offers the same eligibility for public services as a higher degree. This training is intended for people who are working and who wish to deepen and broaden their expertise. The studies provide an opportunity to develop both their own leadership skills and expertise to develop a multi-professional social and health care. In the path of their previous study, students

pursue one of the following degrees: midwife (Polytechnic), bio analysts (Polytechnic), nurses (Polytechnic), radiographer (Polytechnic), nurses (Polytechnic) or social worker (Polytechnic).

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Industrial Management

- **Engineering (Polytechnic), Mechanical and Production**

The program strives to provide mechanical engineering students a broad knowledge of hardware, energy, operation, production and automation technologies. In addition to these skills, a significant emphasis is focus on giving students a global perspective on sustainable technical, economic and profitable development.

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- **Engineering (Polytechnic), electrical and automation technology**

The goal of the training is to give students a broad-based and diverse technical expertise in both electrical and automation technology in information technology and energy and environmental technology. The expertise is complemented by the ability to creatively solve

engineering problems, develop new products, working on projects and communicate and collaborate with other people. Teaching is adapted to labour market future needs providing a modern laboratory.

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- **Engineering (Polytechnic), technology-based leadership**

This exam gives the same eligibility for public services as a Master's degree. The goal for students after completed studies is to have developed and improved their self-knowledge and insights gained in leadership. The graduates are given the opportunity to operate in demanding leadership, specialist and management roles. The training emphasizes motivation and entrepreneurial spirit that is applicable in the present and future business and other organizational contexts.

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Having investigated the courses at Novia University, NIP. Fi has acquire a deep understanding of the courses available in English and also in Swedish. The research will be necessary to select specific courses to focus on in order to later create possible partnership and give the opportunity

to students to work on company projects. Indeed, the initial idea is to choose few field of study and integrate a company project as a module that they can complete their ECTS credits through practical and real business cases. (Novia , 2015)

Benchmarking universities-companies' collaboration

Tampere University of Technology is located in Finland and proposes a Master's Degree Programme in Industrial Engineering and Management (IEM). This Master offers student the opportunity to work on company project while pursuing their master. The examples listed below are experiences of first-year master's students.

1. Lishan Wu, China

Assisted by a teacher she worked on a project for a Finnish company. Her work consisted in designing and assembling products machine on customers' assembly line. She had to use her competences to achieve the work in time and carry out her project. This experience gave her the opportunity to discover her future work and what the companies require from their employees. All companies work differently especially in another country so she learnt a new way of working.

2. Maryna Govorukha, Russia

She participated in a project with an Italian company specializing in hydraulic components. Her project consisted in developing sell animation. After this project, she realized that the competences acquired at school could be used in many different areas. Now she has a clear idea about what she wants to do in her future job.

3. Yanling Yue, China

Her company project focuses on building machines able to cut house protections' sleeves. She contributed in the project supporting the company investigating potential sources of technology useful for machine building development. On this project Yangling learnt new competences and she also strengthen her skills that enabled her to complete the project.

4. Jayesh Gupta, India

This student has chosen a project with a machine construction company Avant Tecno Oy (USA) making small loaders. Jayesh focused himself in architecture thanks to what he broadens his abilities. It was a beneficial experience for him to apply his knowledge in a specific case, giving him the opportunity to put his skills in service of a company.

5. Navid Karimian Pour, Iran

Navid had to carry out a business development project with a local company. His goal was to develop a machine in order to cap hoses cost efficiently. Navid proposed a solution and the company was impressed concerning his job and he offered him an internship during the summer.

6. Manuel Guada, Venezuela

This student worked with a start-up named KeepLoop Oy in Finland. His project has been focused on the conceptualization of the product for that user segment. Manuel was able to implement what he learnt during the courses. He has been able to use his knowledge in a practical environment.

(Baggström, 2016)

Apart from Tampere University of Technology, collaboration projects between universities and companies have also been identified in other entities. The additional cases mentioned below are also relevant to Novia 2Ways of Development project. This investigation has given NIP. Fi team the ability to identify the benefit of working in collaboration with a company.

Industrial activities integration in university

This section presents several degrees in numerous universities showing that universities across the globe are willing to create collaboration with industries. Indeed, they are trying to implement companies' projects in their degrees. NIP. Fi. Technobothnia is interested in integrating more industry projects into normal course work, and develop some product for companies. The purpose of this section is to figure out how Novia can implement an effective and efficient system in order to develop a long-lasting win-win collaboration with potential industries.

This part of NIP. Fi project presents several examples of partnership between company and student enabling them to strengthen their competences and increase their knowledge about industry. This integration of industrial activities will also enhance students to select an appropriate solution in specific situation. NIP. Fi team would like to use student competences in exchange of a validation of ECTS credits. Researching type of projects that could be integrated at Novia-Engineering organization has been useful to get an overview of possible industrial integration and some feedback from universities.

Thus, investigating university projects where students have been cooperating with companies enable NIP. Fi project to identify potential opportunities and system of integrating industrial activities into education. The examples below provide an overall idea of companies working with universities and proves that this could be beneficial for both companies and universities. As a result, those examples are relevant for project one as it shows a partnership between students and universities.

Public University of Navarra

Those 4 projects have been designed by thirteen students from the Public university of Navarra (UPNA). This project has been created due to a program developed by the university lab of company creations, through the European centre of company's and innovation of Navarra. The four projects are the followings and have been developed between students and company.

Au Real + Solutions: Virtual reality applicated into educational projects to improve student understanding.

Connecsa: Development of a chip aimed at athletes to improve their safety, connecting them with people and allowing their location.

Displaytec: Helmet with Head-Up Display-HUD system, which allows viewing in low visibility conditions and even sending images. Destined to Firemen Helmet for firemen with the Head-Up Display-HUD system, which allows viewing in low visibility conditions and sending images.

Navarra Technological Crops: Technological System Designed to be incorporated in agricultural machines whose function is to detect stones.

(Press, 2016)

Final engineering degree – thesis projects

In Europe, it is common for aeronautical engineering students to perform their Final Project in an Industrial environment, offering educational interest for students. The company proposes topics and, after being accepted by the School through Academic Commission, offer project to students. In this case, outstanding companies came to present their projects, Airbus, EADS, Indra, Aernova, ITP and CTA. The projects from Airbus consisted in finding novelties for certain elements of the passenger transport aircraft. The centre for Aeronautical Technologies (CTA) Foundation requires motivated design students interested in the development of a flight simulator and a navigation, control and guidance system for a UAV-VTOL. ITP, the company specialized in turboprops presented projects focused on the design and analysis of turbines and rotors. Intelliglass presented projects based on its work source, the design of the fluid dynamics installation of active glazing. Meanwhile Gamesa needs students interested in the design of wind shovels. Both Aena and Iberia have work period focused on the environment to reduce fuel consumption, contamination and noise. These university projects, which lasted around four months, are intended for future engineers to have an effective integration into their professional work. (Noticias Universia, 2007)

Seat factory project

CT Engineers present for the university of Catalonia a reverse engineering project carried out with BIM methodology for a car factory in SEAT. The project was made from a prototype to track works through 3D scanning systems and modelled from a cloud of points. These techniques allow to replicate, improve and optimize the product. (Comunicación, 2016)

BP Oil Spain and Banco Caixa

The university-Enterprise Foundation offers 50 summer grants in BP OIL Spain and Banco Caixa General through its START internship program. Engineering, Law, Economics, Business Administration and Management, Actuarial and Financial Sciences, and Political Science and Administration students may opt for those places called. Practices will be developed both in Madrid capital and in different municipalities of Community of Madrid, intensive (morning hours) or full (seven or eight hours), and have an income between 600 and 1,100 euros monthly, depending on company. (Fue , 2010)

Electric vehicles at UPM

Increasingly use of electric vehicles has led UPM to propose a project to students. Indeed, such training can lead to new horizon of development and a generation of strong knowledge and information. This collaboration is made between university of Madrid and companies as Segvauto Order BOCM and SIMCA. An electric vehicle has been used to carry out practices by students of the degrees in Software Engineering and Degree in Computer Engineering by UPM. Students start performing on the project before their internships in companies, developing competences enabling them to be more effective than other graduates.

(Händler, s.d.)

Oviedo technology transfer

Through external practices, students exercise professional activities related to their degree. Students enrolled in official degree offered at university of Oviedo may select these practices. In addition, a scholarship program has been implemented to increase students demand for training practices.

Transfer of knowledge is one of the main objectives of university of Oviedo. Collaborations with companies has increased, especially through the Campus of International Excellence. Business chairs are a good element of collaboration. It is a strategic and lasting union, whereby both sides benefit. Companies share projects with students and students benefit participating in a real work environment. (Uniovi , s.d.)

Internship - University of Santiago de Compostela

USC offers students the possibility of doing internships in companies and other public and private entities as a complement to their academic training. This program covers an educational cooperation agreement, whereby there is no employment relationship with the company. To carry out the external internship, students will have a tutor from both sides, the university and the collaborating entity.

The tutor will evaluate the practices developed, based on the report of the instructor and the thesis of the student. It will complete the final valuation report in Practices, which will serve as an official certification. (Oficina de Informacion Universitaria, 2015)

Mid-term analysis

After the mid-term report, it is also important to mention that Novia Industry Partnership a streamlined its research perspectives using a list of questions that has been developed in collaboration with Mikael Ehlers. (*see appendix n°24*)

Conclusion Novia 2 ways Development

The purpose of this project is to offer a service enabling to solve companies' problems. Therefore, the integration of companies will allow students to complete some of their modules working on companies' real cases and valid their ECTS credits.

The first part on this project was to identify which courses Novia offers to student. Indeed, two types of courses have been identified, in English and in Swedish. Courses in English are divided in two parts, Nursing and Automation technology whereas courses in Swedish are separated in three parts, Business department, Health department and Industry management.

Once courses have been identified, NIP. Fi has defined how the project would be supervised.

Two possibilities have been considered. Company could train internal Novia teacher to supervise the project such as the lecturer of the module related to the company. On the other hand, supervisors can be external such as workers from a company. The choice will be taken by Novia in cooperation with companies determining the better learning support.

The second part of Novia 2Ways Development aims to identify other companies' projects integration into educational program. This benchmarking approached has been necessary for NIP. Fi team to develop a wide overview of what is currently implemented between universities and companies. For instance, Tampere University proposes this learning system to students as they pursue their master while working on company projects. Students feedbacks have been also crucial to defined if such project would be beneficial for them. Most of students agreed that courses were profitable as they gain a real working experience and become more confident and efficient regarding their potential future work. As companies give students an opportunity to operate in professional environment, it also allows students to identify opportunities to integrate industrial activities.

Several companies such as Airbus, EADS, Arenova offer universities projects that students can work on to complete final engineering degrees. Different forms of integration have also been identified such as internship. The purpose of study would be achieved and students access to work places with tangible practice and effective knowledge.

As NIP. Fi has been willing to investigate the project from different sides, a research on companies' motivations has also been conducted. Indeed, having considered students and universities feedback, a focus has been put on firms' educational integration interests. In

addition, investigation of university and students have not led to significant valuable results. Therefore, NIP. Fi has put more emphasis on companies leading to better results.

As a matter of facts, several meetings have been settled with numerous companies such as Festo. Festo is a German world-wide company operating on motion and automation systems using pneumatic or electrical energy.

Festo proposes to INSAA French university two projects lasting one semester where group of students can work on. The main project consists in 32 hours including two visits on site where students obtain an overview of companies' expectations. Moreover, INSAA offers students the opportunity to work on a real company project lasting also for one semester but requiring more motivation and self-autonomy. Indeed, the second project proposed by INSAA aiming to develop whether the commercialization or the production, demand 320 hours of work loads.

The second relevant meeting has been settled with ORA company. This French company offer almost the same system has INSAA, since they propose business students to conduct market study for one semester meanwhile attending university courses.

Several issues have raised up from those interviews. Indeed, the cost of such partnership between universities and companies can be extremely high affecting companies' willingness to work with students. For instance, Festo company must pay 8000 euros to university in order to work with students for a semester. In other words, small companies having low flexibility in their treasury might not be able to afford costs related to students' projects. In addition, companies have mainly highlight that students' projects are facing time constraints. Those projects involved a close follow up that companies are not always able to provide. Moreover, companies cannot share all information with students as some data are confidential affecting projects' outcomes. Lastly, some companies have also mentioned that they do not have any guarantee on their investment as the result of the project belong to students work.

To conclude, NIP. Fi team has faced time issues and have not meet initial expectations by meeting potential interested companies in Ostrobothnia. However, the work that has been done over the last four months will be beneficial for Novia University to develop an attractive offer to local companies. Novia 2Ways development would support further work on industrial activities integration into Novia courses as it addresses the numerous aspects and issues of current partnership between universities and companies.

Service Concept

After having brainstormed with John Dalhbacka and Nina Berg, we have been able to draw the following chart summarizing the outcomes of the concept project. The main problem that must be solved along this project is the allocation of the human resources. Indeed, even if the Technobotnia research laboratory is able to sell competences, the teachers are not available. As a result, we try to figure out where and when to invest to enhance flexibility in Technobotnia human resources.

In the same way as the Novia 2Ways of Development project, we have started analysing the resources available in the Technobothnia. The first section of Service Concept project present the main field of expertise of the laboratory. Those data have been collected through an interview with Anna Kietz.

Technobothnia Education laboratory positions Vaasa as a leading engineering research center in the field of technology. Technobothnia is co-owned and used by the University of Vaasa, Vaasa University of Applied Sciences and Novia University of Applied Sciences. It lays the foundation for innovative forms of cooperation which promise substantial benefits for trade and industry. The main objective of technobothnia is to implement information in an efficient and effective way, matching practical activities.

Technobotnia Service Concept project is looking for successful cases where education laboratory or research centre have started selling services beyond education as a business model and detect the most sales-worthy suitable cases. The project also seeks for potential customer that are in need of skills and to structure the research into few potential sales scenarios.

Initially we believed Project Technobotnia Service Concept was researching new ways of producing goods from the laboratory and selling to an external company or individual to generate additional revenue. The team has done a lot of research about successful cases where universities sell products or services to companies. However, the topic has been misunderstood has the laboratory is willing to sell competences and not items.

The purpose of second project is to increase the flexibility of Technobothnia human resources. In other words, the project aims to sell knowledge and not physical products.

As a result, most of second project research has not been relevant for this project and for the report. Nevertheless, few examples of the previous research are suitable and the team has considered appropriate to still include them in the report.

Technobotnia Laboratory has the possibility to sell knowledge to the companies by teaching them how to use machines or devices. Some entity such as the University of Tampere already does this kind of practices offering educational services, for instance training on electric cars, or in conducting mandatory Motor Vehicle Inspections. (TAMK, 2017)

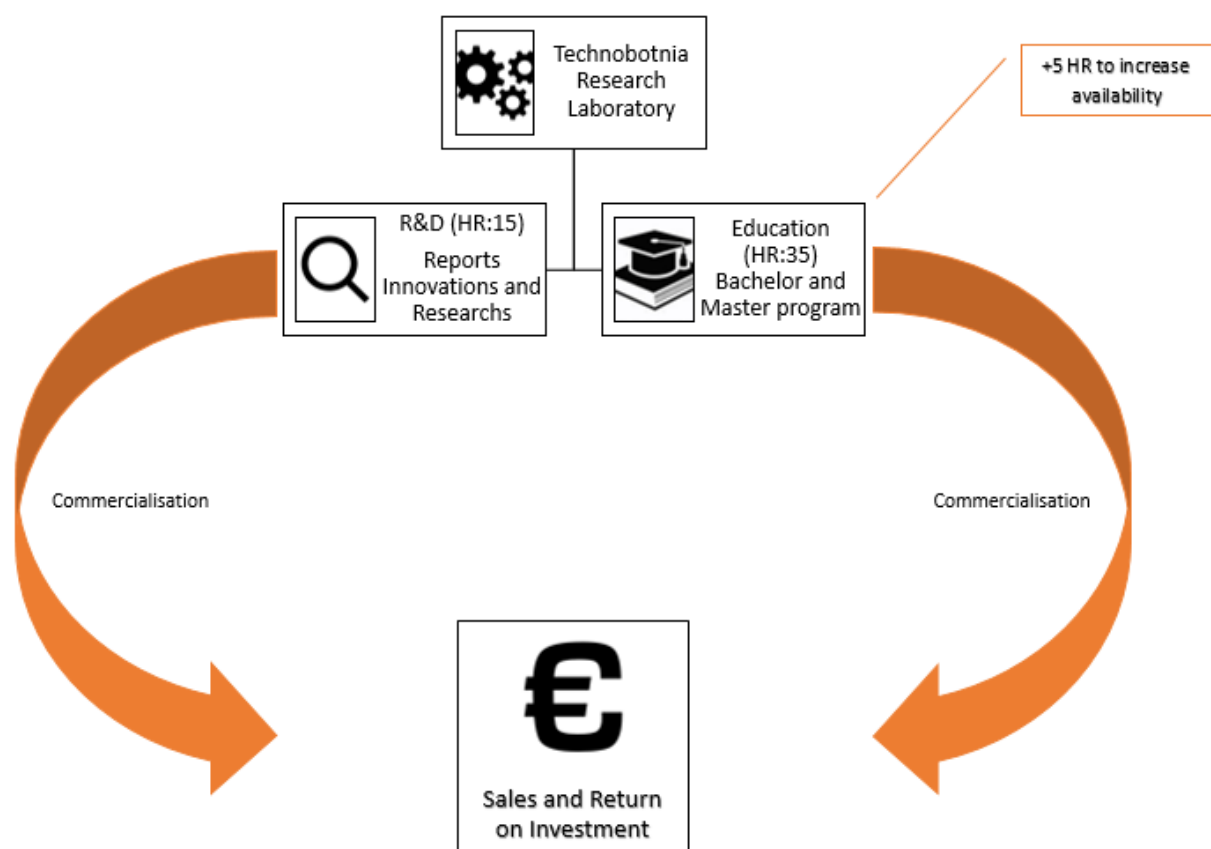


Figure 11: *Service Concept explication*

Technobothnia activities

Novia as a university of applied sciences, is more focused in education and students' training. There's also a lot of engineering research. Indeed, the principal researching areas are mainly focused in energy, mechanic, environmental engineering and physics and computer programming. The Technobothnia laboratory is willing to work with companies in several areas. It is mainly focus in education but it also let companies testing their products or materials with their machines, check their calculations and investigate solutions to solve complex problems or 3Dprint services. The areas where Technobothnia laboratory works are the one listed below. The areas are divided in two main sections. First, some areas are mainly focusing on education whereas some others also have research purposes. Lastly, it is important to mention that some zones of Technobothnia have already a significant collaboration with companies. It is also important to notify that Technobothnia offers additional service such as the research area section and a company meeting room.

As a part of Technobothnia activities, Novia Industry Partnership has investigated machines and knowledges available in Technobothnia laboratory in order to determined potential current assets. (*see appendix n°25 p108*)

Education areas

Engineering laboratory technology

This zone includes climate cabins and a construction part. They not only measure and test structures but also use machines pulling and pushing structures simulating potential circumstances that constructions might have to face.

Virtual factory

Virtual factory is a place dedicated developing virtual technologies. Indeed, this area mainly focused on education is focusing on using virtual environments including eye tracking, developing virtual reality and applying it in an efficient way.

Motor laboratory

They develop the Baltic yard project. They are carrying out research, develop and study the vibration and fuel managing. Motor laboratory section also include automatic technology where they test cars.

Education and research purpose

Electricity ICT (for students)

The electricity area mainly proposed for students includes different aspects such as software education I2A, education DEMVE, vibration testing, electricity area with simulators and test, high Voltage where companies can go and test their devices and varattu referring to climate tests in controlled conditions.

Environmental engineering

It is situated next to the electricity area and it is mainly research destined.

Physic Laboratory

This section is used to test materials with extreme temperature and report changes after heat exposure. It is used primarily to analyse metals behaviour and its resistance changes.

Mechanical area

The mechanical area is dedicated on training companies working with robots but they are also focused in education. This section mainly use PVC material but also use other materials such as thermic fusible wood, a mix of polymer and wood fivers.

Surfaces of the earth

Surface of the earth area of working produce test in a cabin environmental situations to check if the product or device can support a specific situation.

Acoustic testing room

It is used to monitor sound waves with accuracy which is useful to check how sound waves can affect a structure. It is common in high structures because forgetting to measure could cause problems such as the resonance effects.

Testing of materials

Material testing area is used to test materials such as rocks, looking to clarify their properties. Most of the materials are local and they use this part of the lab to check if the specific material will be effective enough for their potential use.

In addition, some areas listed above also work in collaboration with companies. Indeed, some areas have been already used for professional or external purpose. For instance, the mechanical area has developed robot 3D printing and sold it to company as scanning service.

Technobothnia current research

Technobothnia has conducted other researches in different fields. The examples below are the current research of the laboratory.

Air monitoring

The air breath is composed by oxygen, nitrogen and carbon dioxide and a wide variety of different gases and other particles. This specific area of researching oversees defining other components of air. This department focuses on the analysis of the composition of the air inside houses looking for ways to improve its quality, consequently affecting people's health.

The largest groups examined from indoor are air gases, particles and mould spores. A VOC sample can only give indications of damage in the building. However, nothing has been mentioned concerning the health of users.

The people listed below are the one performing research in the various area:

Eija Iivari - Laboratory analyst (VOC measurements)

Minna Lundberg - Laboratory technician (VOC measurements)

Mika Korpi | Laboratory engineer (Mold test)

Geotechnical investigations

Another part of the laboratory is also dedicated to test soil and rock destined to be used as building material. Sem Timmerbacka oversees quality determination of aggregate among other things.

In addition, Technobothnia also conducts research in General Acoustic Measurements concerning the determination of sound insulation. Furthermore, Density Measurement of Structures in another current active area aiming to determine low energy consumption in our buildings in relation to low U-values buildings' envelope and a good air tightness.

Technobothnia current testing activities

In addition, Technobothnia has conducted testing in various areas. The examples below are the current testing activities of the laboratory.

Power System Simulation

Technobothnia offers business services for simulation being specialized in the simulation of transients in electrical systems. The goal of this service is to calculate the mains voltages and currents fault and switching situations. Through this simulation, it is possible to determinate if the system works as expected, or trace the cause of any failure or false operation.

People in charge:

Kimmo Kauhaniemi professor Faculty of Technology - Kimmo.Kauhaniemi@uva.fi

Olavi Mäkinen - Principal Lecturer - olavi.makinen @vamk.fi

Test electromagnetic compatibility

Technobothnia encourages companies to EMC testing as soon as possible along the product development due to possible EMC problems discovered late often can cause a radical redesign with consequent timing problems

People in charge:

Esko Niemi-Hukkala - laboratory engineer

Jani Ahvonen - lecturer

Mid-term analysis

After the mid-term report, it is also important to mention that Novia Industry Partnership has streamlined its research perspectives using a list of questions that has been developed in collaboration with Mikael Ehlers. (*see appendix n°25 p104*)

Training benchmarked companies

As the team has been struggling to identify real similar structure of Novia-Technobothnia partnership, Novia Industry Partnership has investigated companies operating in sector related to Technobothnia activities. As a result, the examples of companies below have been beneficial to develop Technobothnia training offer.

FESTO Company

Festo company is operating on the electrical business environment providing training for companies. The company having its own laboratory propose package training services for companies through CD ROM or online report. In other words, the training provided by the company is only a digital one supporting engineers. The training package is divided in several parts meaning that the offer of the company is tailor to customer's demand. The advantage of providing online training is that the company do not need any human resources which can be an advantage for Technobothnia as they do not have available humans. The offer of the company includes mainly a workbook available online and equipment set or components in several departments:

1. Electrical Engineering/Electronics
2. Automation technology
3. Process automation
4. Robotics
5. Hydraulics
6. Pneumatics

All prices are available on request.

The company also propose seminar and events to all customers. They provide understanding process for workbook program learners.

(Festo , 2017)

J.J Keller and Associates

Electrical company proposing topic related to safety in electrical environment. The training is on demand meaning that the company propose a standardized offer to all companies. The training available online also cover several topics related to electrical safety such as:

- The electricity process
- Electrical hazards
- Fuses, circuit breakers and grounding
- Using and maintaining electrical equipment
- Accidents and emergency procedures

It discusses main electricity procedures and prevention to apply in case of electrical incidents. The company only suggest that learners have computer system able to support the online training, including Google Chrome or Internet Explorer 8, updated version of Flash Player and Adobe Acrobat Reader 7.0.

Price: 25\$

(J.J. Keller & Associations, Inc., 2017)

HERA Labor System

Company providing training on electrical department for companies such as:

- Electric Classroom Benches with Retractable bench racks
- Electric Classroom laboratory and workshop
- Electric Classroom mobile solutions
- DIN A4 Training system and Plug-In components for electric/electronic basics
- DIN A4 Training systems and Training Boxes for Installation Technology
- DIN A4 Training Systems and Training Boxes for Control – and Automation Technology
- Mechatronic Training Systems
- Training Systems for Renewable Energies

The training laboratory mainly offer training in classroom including practicing on electrical devices and machines. However, Technobothnia could probably offer standardized training on specific machines that companies would be interested in. The company also provides an online and practical guide explaining the instructions related to electrical machines.

Price: available on request.

(hera Laborsysteme GmbH , 2017)

Technical Training solutions

Technical training solutions is a company based in England providing engineering training for companies. As most of engineering training companies, Technical Training Solutions provide both training through online package and practical courses. Courses are divided in three distinct areas including electrical, instrumentation and mechanical. The company has developed a wide range of fixed period training lasting from one to ten days and occurring on average three times per year.

Some of the training offer the opportunity to validate an official certification at the end of the course generating extra fees.

Furthermore, the VAT is not included in the price below.

However, training can only be provided to small group per sessions with a maximum amount of people of eight people.

Electric area training

Training	Price (€)	Duration (days)	Periods
Industrial Elec Maintenance	2750	10	8 to 19 May 2017 3 to 14 July 2017 4 to 15 September 2017 9 to 20 October 2017 20 November to 1 December 2017

Electrical Maintenance Skills for Instrumentation Personnel	1930	7	11 to 19 May 2017 6 to 14 July 2017 7 to 15 September 2017 12 to 20 October 2017 23 November to 1 December 2017
Electrical Building Services	2750	10	18 to 27 October 2017
PAT Testing	240	1	21 April 2017 12 June 2017 14 August 2017 2 October 2017 18 December 2017
17th Edition Refresher	275	1	21 July 2017 8 September 2017 3 November 2017 8 December 2017
17th Edition Wiring Regs	650 + 60 exam fees	3-5	2 to 5 May 2017 14 to 17 August 2017 16 to 19 October 2017 4 to 7 December 2017
Elec Inspection & Testing - Practical Part	410 + 60 exam fees	2 + exams	8 to 9 May 2017 17 to 18 July 2017 18 to 19 September 2017 13 to 14 November 2017
Elec Inspection & Testing - Theory Part	500 + 145 exam fees	3 + exams	22 to 24 May 2017 31 July to 2 August 2017 2 to 4 October 2017 27 to 29 November 2017
Design of Elec Installations	1100 + 120 exam fees	4 + exams	20 to 23 November 2017
Electrical Safety Management	275	1	27 April 2017 29 June 2017

			22 September 2017 15 December 2017
Temporary Installations	275	1	5 April 2017 23 August 2017 8 November 2017
Electrical Safety on Construction Sites	275	1	30 June 2017 21 September 2017 14 December 2017
EAW Regs	275	1	13 June 2017 15 August 2017 3 October 2017 19 December 2017
ATEX	275	1	16 June 2017 18 August 2017 6 October 2017 1 December 2017
Duty Holder	550	2	13 to 14 June 2017 15 to 16 August 2017 3 to 4 October 2017 19 to 20 December 2017
Safe Electrical Isolation	275	1	14 June 2017 16 August 2017 4 October 2017 20 December 2017
Live Working	275	1	15 June 2017 17 August 2017 5 October 2017 21 December 2017
Design of Fire Alarms	550	2	18 to 19 April 2017 9 to 10 October 2017 11 to 12 December 2017
Installation of Fire Alarms	550	2	20 to 21 April 2017 11 to 12 October 2017

			13 to 14 December 2017
Emergency Lighting	275	1	28 April 2017 13 October 2017 15 December 2017

Table 8: *Price of electric area training***Control and Instrumentation area training**

Training	Price (€)	Duration (days)	Periods
Control & Instrumentation	1370	5	15 to 19 May 2017 10 to 14 July 2017 11 to 15 September 2017 13 to 17 November 2017
Instrumentation	820	3	15 to 17 May 2017 10 to 12 July 2017 11 to 13 September 2017 13 to 15 November 2017
PID Controller Tuning	550	2	18 to 19 May 2017 13 to 14 July 2017 14 to 15 September 2017 16 to 17 November 2017
PLC Fault Finding	820	3	21 to 23 June 2017 11 to 13 October 2017 11 to 13 December 2017
PLC Programming	1100	4	7 to 10 August 2017 23 to 26 October 2017
Electrical Problem Solving	820	3	14 to 16 August 2017 30 October to 1 November 2017
Soldering	820	3	10 to 12 July 2017 6 to 8 November 2017
Electronic Fault Finding	1370	5	14 to 18 August 2017 16 to 20 October 2017

Motion Control	820	3	25 to 27 April 2017 24 to 26 July 2017 9 to 11 October 2017 27 to 29 November 2017
Inverter Drives	550	2	25 to 26 April 2017 24 to 25 July 2017 9 to 10 October 2017 27 to 28 November 2017
Steppers and Servos	275	1	27 April 2017 26 July 2017 11 October 2017 29 November 2017

Table 9: *Price of Control and Instrumentation area training*

Mechanical area training

Training	Price (€)	Duration (days)	Periods
Mechanical Isolation	275	1	8 June 2017 10 August 2017 5 October 2017 23 November 2017 21 December 2017
Hydraulics	1430	4	18 to 21 April 2017 26 to 29 June 2017 25 to 28 September 2017 11 to 14 December 2017
Pneumatics	1100	4	24 to 27 April 2017 12 to 15 June 2017 17 to 20 July 2017 25 to 28 September 2017 27 to 30 November 2017
Compressed Air Safety	550	2	21 to 22 August 2017 6 to 7 November 2017
Mechanical Skills	1490	5	17 to 21 July 2017 11 to 15 September 2017 23 to 27 October 2017 4 to 8 December 2017
Abrasive Wheels	300	1	21 April 2017 11 August 2017 6 October 2017 22 December 2017
Machine Maintenance for Operators	895	3	10 to 12 July 2017 7 to 9 August 2017 2 to 4 October 2017 18 to 20 December 2017
Plumbing	895	3	24 to 26 May 2017

			21 to 23 August 2017 30 October to 1 November 2017
Line Breaking HSG253	275	1	28 July 2017 29 September 2017 15 December 2017
Bench Fitting	895	3	4 to 6 September 2017 20 to 22 November 2017

Table 10: *Price of mechanical area training*

In addition to those practical training, the company also offers two online guide books.

- Electricians Guide to Good Practice Book (8,50€ + post and packing) 2016
 - Section 1: Relevant Acts and Regulations
 - Section 2: Definitions
 - Section 3: Design Procedure
 - Section 4: Protection against Electric Shock
 - Section 5: Installation of Cables, Conduit and Trunking
 - Section 6: Earthing
 - Section 7: Inspection & Testing
 - Section 8: External Influences
 - Section 9: Standard Circuits
 - Section 10: Cable Reference Tables
 - Section 11: Special Locations
 - Section 12: Cable Colour Codes
- Electricians Guide to Inspecting and Testing (8,50€ + post and packing) 2016
 - Section 1: Introduction
 - Section 2A: Initial inspection
 - Section 2B: Initial Testing
 - Section 2C: Certificates & Schedules
 - Section 3A: Periodic inspection
 - Section 3B: Periodic Testing
 - Section 3C: Reports & Schedules
 - Section 3D: Frequency of inspect and test
 - Section 4: Minor Works
 - Section 5: Additional Information: Requirements for Test Instruments; Safe Isolation; Maximum Zs for withdrawn devices; Medical Locations; RCD operation

(Anon., 2014)

As detailed above, the companies investigated has enabled Novia Industry Partnership to highlight critical aspects of companies' current offer related to Technobothnia activities. Therefore, the investigation of those companies stands out that electrical offer has been strongly developed over the last years. Price range varies according to period, people concerned and the content of the offer.

Testing benchmarked companies

As the training offer, the team facing a lack of information online has defined new ways of investigation to improve results and enhance efficiency. Therefore, Novia Industry Partnership has investigated companies operating in sector related to Technobothnia activities. As a result, the examples of companies below have been beneficial to develop Technobothnia testing offer.

S&C Company

Company operating also in electrical business sector provides testing in their laboratory. Knowing that Technobothnia has also a testing area, it can offer the same services to company. Even though S&C Company is mainly operating on electrical sector, the organization offer numerous testing related to other engineering environment including:

- Electrical testing (Short circuit and interrupting, high voltage and dielectric)
- Mechanical testing (force, torque, stress, strain, endurance, compression, tensile, flexural, torsion, elongation and impact tests)
- Forensic testing (investigation of dysfunctional electric systems)

The testing area available at Technobothnia should definitely be used to generate additional revenue for Novia.

(S&C Electronic Company , 2017)

Intertek

Intertek is a world largest company providing testing, inspection and certification for companies. Offering electrical testing and delivering required standards for companies desiring to penetrate a new market could be a niche to target for Technobothnia. Electrical companies are willing to expand their business area and might need to adapt their products and meet new regulations. Therefore, Intertek company offer a full detailed analysis of electrical components and deliver ETL Mark compulsory to target North American market.

Therefore, the company offers the following standards listed below for the North American:

-ASME

-ASTM

-ANSI

-CSA

-NFPA

-NOM

-NSF

-ULC

Companies detailed above present the main aspects of testing offer available on the market. Companies listed are not only located in Finland but also in different places across Europe. As the training companies' investigation, this research has allowed Novia Industry Partnership to develop a testing offer in Technobothnia laboratory. Indeed, the investigation above has shown that most of testing companies deliver legal certification to enable companies launching new products on market. In addition, the research proved that the electrical sector is one of the main field of activity where companies need product testing.

Research benchmarked companies

Lastly, Novia Industry Partnership did not identify a significant amount of technology laboratory linked to universities. After the mid-term report, the team has realised that the previous data investigation process was not efficient enough as the information collected were not relevant to develop a proper research offer that Technobothnia could develop for companies. The list of examples below present detailed research cases that have been conducted by students.

Researching of new materials

The University of Linköping has been looking for new and more effective materials. Most of the materials we use every day have many hours of research behind. Materials science investigate how various materials are built up including their utility and applications. These materials are created with aim of helping the society using them in such applications as surgical implants or solar cells. (Leifler, 2017)

Ice and climate

The main activities of this centre at university of Copenhagen are drilling and analysis of ice cores with the objective of understanding climate change in the past. The university has created a section for students in order to improve our understanding of present and future climate change. Therefore, students can apply their theoretical knowledge into real research scenario developing their creativity and broaden their mindset. (Maries, 2017)

Efficient Solar Cells

This research has been promoted by the University of Oslo. This research has led to major change in solar energy as the university highlights the components of today's solar cells, mainly made with silicon. Current solar cell capture mainly the red spectrum of sunlight using only 20 per cent of the sunlight. Therefore, the purpose of this research was to use more spectrum of sunlight in order to increase solar energy plant productivity. Researchers from Romania and Norway are currently developing new solar cells that will capture up to 40 per cent of the sunlight. The process consists in adding a new layer on top of the silicon cells using efficiently the blue spectrum. However, solar cells deposit will create a chemical reaction damaging the

output of solar cells. In other words, the objective is to create a nano-thin protective layer between the two main layers. This research development project is a European collaboration between the University of Oslo and the Institute of Energy Technology in Norway and three Romanian institutions. (Vogt, 2017)

Centre for Nanotechnology and Nanomaterials

This centre was founded at Munich by Siemens and TUM in 1988 to create synergy among basic research in physics with the manufacture of semiconductors. Also known as Walter Schottky Institute, this department develops new nanostructures, semiconductor materials and several prototypes as ultra-sensitive measurement methods in physics and chemistry.

(Walter Schottky Institute, 2016)

Planning and execution studies

The University of Iceland is a leading research institution in Iceland. As one of the main fields, the university has been recently focused on planning and execution studies. Indeed, construction projects are not easy to conduct due to highlands. Therefore, the university support companies by providing research project to students. In addition, the student research section also target urban area such as the airport.

(University of Iceland , 2017)

Rehabilitation Engineering

This type of engineering involves developing mechanics and robotics to restores biological functions. Applications in this area are multiple. It can be used to restore a lack of physical functions such as a leg or even internal and internal organs. This type of technology can extend the life of the subjects concerned and this technology is constantly increasing due to the appearance of the new technologies. For instance, as one of the main new technologies arriving on the market, 3D printers can produce internal organs and body parts with high precision.

(National Academy of Sciences, 1997)

Governor General's Innovation Award

Nowadays health care represents the world's fastest and biggest growing market. Professor Paul Santerre has been honoured with the 2017 Governor General's Innovation Award for using one of the world's leading biomaterials at the University of Toronto. One of the most successful creations is Endexo, a surface modifying material that can prevent blood sticking and clotting to surfaces when manufactured into medical tubing. Professor Paul Santerre commercialized this material and other surface-modifying molecules through its small company Interface Biologics, Inc.

The company has been established sixteen years ago and has currently three distinct molecule-based technology platforms that can be applied to hundreds of different products. In addition, Professor Santerre guides his trainees commercializing their discoveries through start-up incubators, including a new company known as Polumiros Inc. The aim of this company is to develop a non-inflammatory, biodegradable "tissue filler" replacing breast tissue after breast cancer surgeries. (Brown, 2017)

Transportation Infrastructure

As population increased, infrastructure needed to upgrade. Therefore, the college Engineering researchers are developing guidelines for city planners across the USA to reduce significantly the traffic and thus improve human health affected by noise and pollution. Engineers are creating and testing their new materials such as roads and bridges to extend their life-span and therefore, reduce their investment. This research in transportation and infrastructure maintenance can be attractive for Finland due to the importance of keeping roads in good shape often damaged by weather conditions. (Rydin, 2012)

The few research cases detailed above show the main actors involved in research activities. The companies' investigation has been necessary for Novia Industry Partnership to identify the main research area that has been developed between universities and companies. Therefore, the companies involved in research and innovation are the one mostly concerned by renewable energies and infrastructure. The energy sector has increased significantly over the last decades and Novia Industry Partnership strongly recommends TechnoBothnia to consider this sector while developing a customized offer to companies.

Conclusion Service Concept

NIP.Fi decided to divide service concept project in three sub-missions depending on their objectives and functions. Therefore, the conclusion of Service Concept is divided in three parts including training, testing and research activities.

NIP. Fi has been struggling meeting initial expectations. Indeed, time constraint has led the project to provide only an overview of what can be implemented in Technobothnia laboratory to create more revenue. Nevertheless,

The main purpose of Service Concept project was to identify opportunities areas to strengthen Technobothnia activities and make it more suitable and attractive to companies. Indeed, Technobothnia has been looking for additional revenue using current internal competences.

Technobothnia is a multidisciplinary laboratory oriented in business. It offers education possibilities for bachelor's programmes, master's programmes, doctoral programmes, open university, keeping education and studies oriented on exchange students. Research is mainly focused on management and change, energy, sustainable development, financing and economic decision making.

As an engineering university laboratory, Technobothnia has several skills in diverse engineering areas that are currently used for many services, such as researching, testing and machines training with the purpose of providing additional benefits.

Technobothnia is mainly focused on training of students, but is also willing to cooperate with engineering companies offering them services related to research, testing products and knowledge such as training session on machinery use.

Technobothnia Laboratory is willing to offer training to companies in different areas according to specialities. Indeed, Technobothnia is offering two types of training, skills training and machine training. Thus, NIP.Fi team has started looking internal Technobothnia capabilities including the skills of human resources and available machines. On the other hand, Novia Industry Partnership has identified some successful training offers by benchmarking other similar laboratories such as Hera Labor system providing training on electrical department for companies. This company mainly offers training in classroom including practicing on electrical devices and machines. Technobothnia could offer standardized training on specific machines that companies would be interested in. The company also provides an online and practical guide

explaining the instructions related to electrical machines. However, no information related to training cost has been found.

Another example of entity providing training to companies is Festo Company operating on electrical business environment. The training package is divided in several parts meaning that the offer of the company is tailor to customer's demand. It presents a clear advantage as they do not need any human resources. This offer could be beneficial for Technobothnia as they lack on personal availability. The offer of the company includes a workbook available online and equipment set or components in several departments such as electrical and electronic engineering or robotic devices.

Many companies are not able to acquire high cost machines needed to test their own products. However, companies often need to meet official certifications and standards. Therefore, they need to test and certify their products. As one of the areas of Technobothnia, the testing room has been identified by NIP. Fi project as a potential asset to provide revenue. Therefore, NIP. Fi has investigated various testing companies to develop a potential successful offer to companies. For instance, Intertek is a company in charge of providing testing, certification and inspection for companies' products. Offering electrical testing and delivering required standards for companies desiring to penetrate a new market could be a niche to target for Technobothnia. Implementing those standards in Technobothnia would expand possibilities making it capable to work with American companies and also finding more companies willing to work with them. S&C Company is another example that might be helpful to develop Technobothnia offer. Indeed, the organization offers numerous testing related to other engineering environments such as Electrical testing, Investigation about dysfunctional electric systems and Mechanical testing. The testing area available at Technobothnia should be used to generate additional revenue for Novia.

As mentioned above, the laboratory is divided into different areas including their research activities according to its speciality. Each area has machines and therefore, potential knowledge to sell to companies.

Technobothnia could be able to offer machines training and using to companies. Most of companies willing to develop their activities are facing financial constraint. Therefore, the university of Technobothnia would be a gateway for small companies willing to grow in the labor market. Thus, NIP.Fi team has identified potential sectors where University of Technobothnia could use their skills to offer services and become more attractive. That is why,

Service Concept project includes a real experience of other universities and laboratories, both in the field of engineering and health. The aim of this investigation is to give an overview to Technobothnia to specialize in specific areas in terms of research. Indeed, a strong research department might attract more companies and develop Technobothnia source of income. In addition, students will also have the opportunity to develop their creative and innovation skills.

Besides implementing these new fields of research and generate additional revenue, the focus on Technobothnia research areas will extend Technobothnia fame and reputation to both local and worldwide companies. The university would be more competitive regarding to other universities and that position would be beneficial as it will attract more companies, reinforcing their participation and willingness to cooperate.

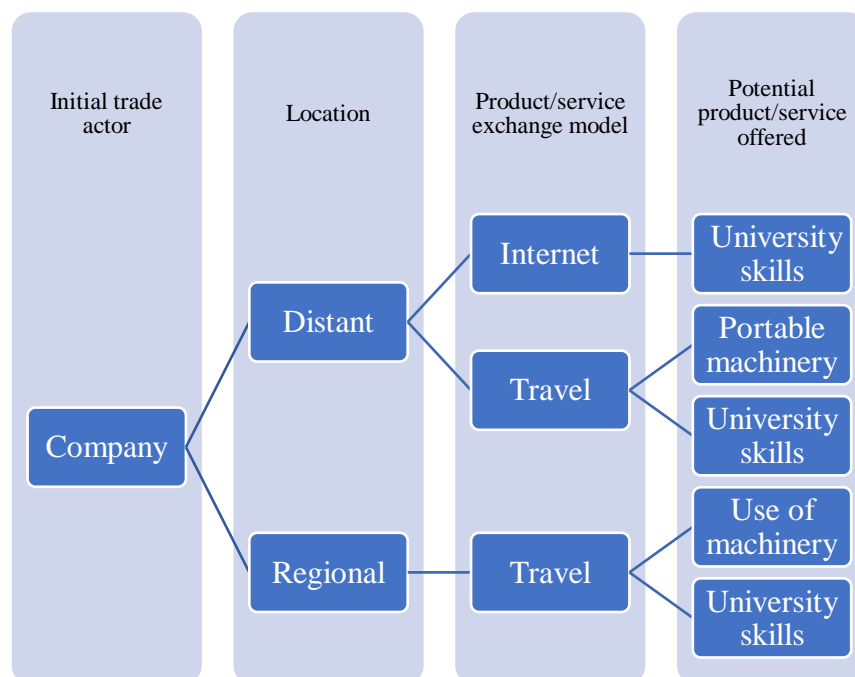
As part of the Service project, NIP. Fi has met several companies to obtain relevant information about companies' needs. For instance, ORA Company, manufacturer of packaging machines has a subcontracted its research activity. Indeed, the company do not have any R&D department contact offices specialised in engineering studies with the aim of developing their current machines enhancing production and investigating future required adaptation.

To conclude, Novia Industry Partnership has identified three main possibilities to create revenue. The team strongly recommend proposing a training offer on machines as well as knowledge transfer. In addition, Technobothnia could use its testing area as a strong asset to deliver official testing certification to companies. However, further investigation on certification delivering has to be conducted in order to develop a relevant offer. Lastly, the research area could also provide income to Technobothnia by offering a customized service for companies subcontracting their research activities. Novia Industry Partnership has been willing to identified potential companies prepared to work in cooperation with Novia and Technobothnia but have allocate a significant amount of time contacting university. Therefore, Service Concept project mainly offer a wide and detailed analysis of successful cases that will be beneficial to build Technobothnia future's offer.

Export Education

The third part included in the Novia Industry project has been investigated to determine the possible outcomes and to present a general idea during our further internal meetings. As a result, several perspectives have been identified in the chart below based on the location as a main variable.

Those two chart have been developed considering that the exchange of competencies can work in two ways: the university can propose service/product to external companies but, companies can also come and use university competencies. Furthermore, those two approaches will define the scope of the project and two distinct ways of exchanging competencies.



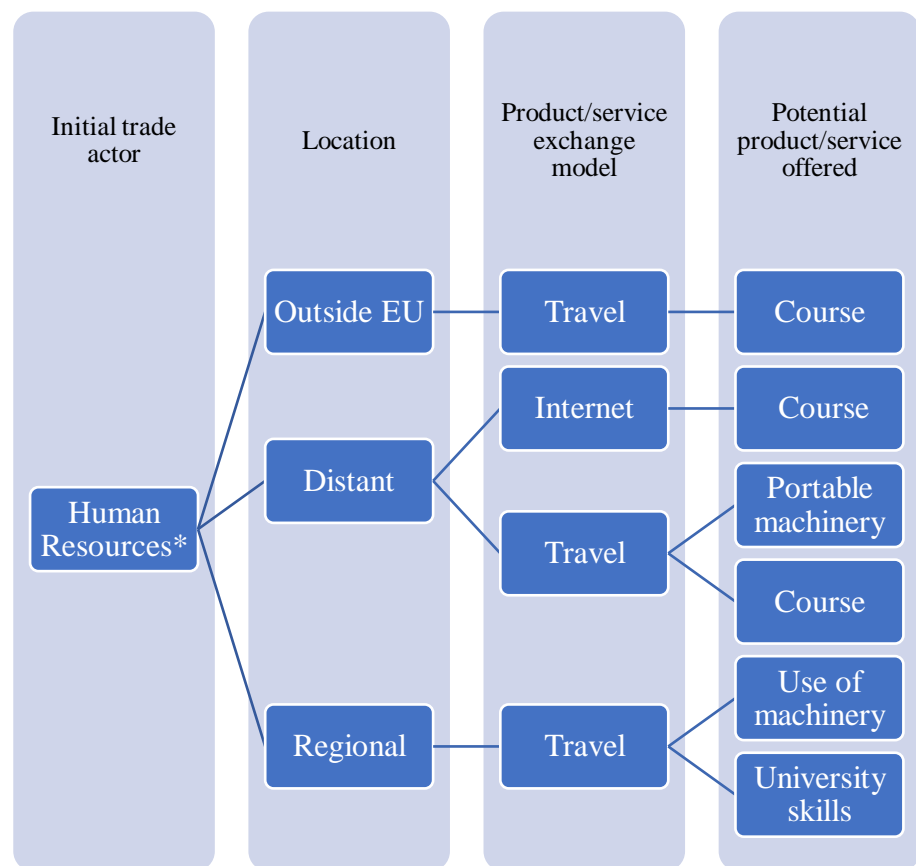


Figure 12: *Export project explication*

*Human resources: staff and student

Brainstorming meeting supervisor (15/02/2017)

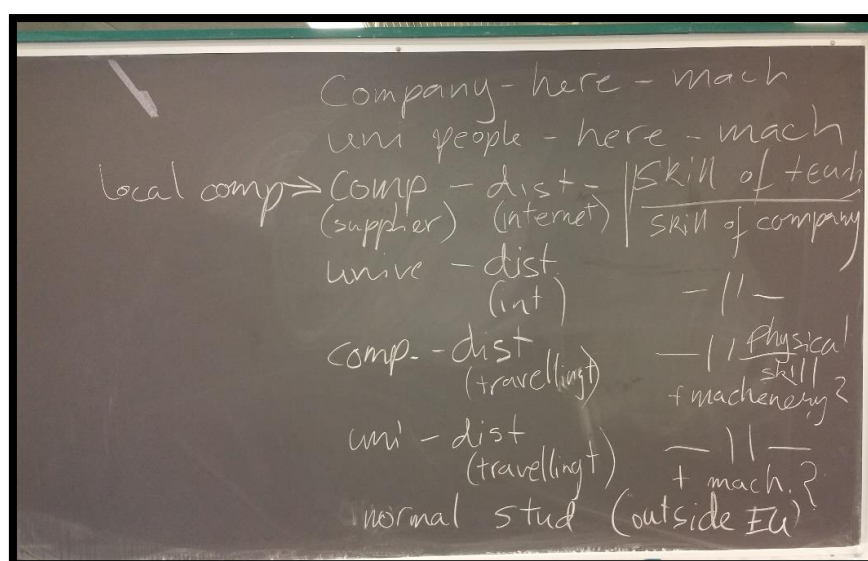


Figure 13: *First brainstorming*

Successful cases of education export

This part of the report presents several cases of education model export that have been conducted over the world in order to select the ones that can be put in place at Novia University. One also would like to point out that some of the examples below involved other institutions in the export process such as the Finnish Educluster institution. In charge of selecting export education projects, Educluster has built a successful position in Finland over the last years proposing projects to Finnish universities. The role of Educluster is mainly to manage potential future partnerships between different entities such as abroad or local universities and companies.

Finland to Indonesia

Finnish education model considered as one of the best educational systems in the world, has been exported to Indonesia. In November 2016, University of Tampere has sent their master students of Teacher Education to Indonesia in three different schools: Bidien, Lhokseumawe and Bireun. The program is commissioned and financed by Indonesia Sukma Foundation. The purpose of this educational project is to offer Indonesian teachers an opportunity to strengthen their competences using students having pursued their education in the best educational system in the world. On the other hand, it also enables Finnish students to improve their pedagogical skills and to face their future working environment. However, Finnish students are not left alone in Indonesia. Indeed, teachers from the University of Tampere flight to Indonesia one week per semester conducting face to face interviews with local teachers and giving additional lectures. At the end of the semester, Finnish students must come back to their home institution to validate their master program. (Tampere, 2016)

Finland to Saudi Arabia

In 2013, King Abdulaziz University has signed a contract with the University of Jyväskylä aiming to send fifty Finnish teachers to implement a world-class education and pedagogy centre in Jeddah, Saudi Arabia. The contract will be run for the next five years and will lead to an improvement of Saudi teachers' pedagogical skills and an openness of way of teaching. Indeed, the program will be mainly focus on girls and women's education including program for female teachers. Saudi Arabia is willing to import Finnish education model and has already signed several agreements with the Finnish ministry of education. The important aspect of this project

is the long-term agreement that have been signed between the both institutions. By contrast to most of other projects, the export of the education Finnish model to Saudi Arabia will last for several years and will generate revenues for the Finnish university. (Yle Uutiset, 2013)

China to Finland

This education model case involved the University of Helsinki, Jyväskylä and teacher trainers from Shanghai. By contrast to the first two examples, this education case is importing external demand to Finland. In 2012, the Educluster Finnish institution has determined opportunities in the Chinese market and has investigated the Chinese education model. The institution has identified a strong willingness from Chinese teacher trainers to learn from the world's best school system. As a result, teacher trainers have come to Finland for almost three weeks with the aim of understanding the Finnish school system including new methods of teaching and learning. They also had the opportunities to discuss about the main triggers leading to an efficient education through practical visits such as at the University of Helsinki and Jyväskylä. The feedback from the participants has been really positive stating mainly that Finnish education system is a model all countries should learn about and that discussions with Finnish teachers have shown other ways of teaching. (Korpi, 2012)

Argentina to Finland

In 2013, Educluster has investigated South American market to determine whether or not South American countries could be interested in Finnish education model. Thus, the Ministry of Education in Buenos Aires has contacted Educluster in order to improve local teacher competences and ways of teaching. The Finnish institution has sent a tender process in Finland and the University of Jyväskylä has answered it. The university has hosted a group of school principals and education administration from Buenos Aires during one week in Finland with the aim of learning from Finnish education model. They also had group work session to develop individual needs of student in Argentina. As a result, the project has been mainly focusing on getting some inspiration from the Finnish education model to apply in Argentina in order to develop and strengthen the local education system. (Educluster , 2014)

Finland to Oman

In 2015, an agreement between the University of Turku and the Ministry of Education of the Sultanate of Oman has been signed for eighteen months. The purpose of this contract is to evaluate the effectiveness of teachers in Oman using the Finnish education model as a reference. The project can be divided in two parts: First, the University of Turku is in charge of evaluating the level of effectiveness of Oman teachers and then their ability to initiate them in research activities. The Finnish university is aware of the importance of keeping teachers updated through scholar innovation and that is why they also train Oman teacher to apply what they learn in their classroom. Both entities have been traveling but a focus has been put on Turku university teachers going to Oman. (Hyytiainen, 2016)

India to Finland

In May 2016, thirty principals and heads of schools from India have been travelled one week to Finland to learn from the Finnish educational model including school procedures and working administration process. The Educluster institution have gathered several Finnish universities and settled conferences and meetings in at the University of Jyväskylä that both countries can exchange their educational opinions. Face to face interviews have been conducted to understand how Indian education system works. The purpose of this international meeting included a focus on several Finnish educational aspects such as the tuition fee system in Finland, the amount of homework given, the teacher-student relations and the overall school atmosphere. Even though Indians' principals and head of schools have pointed out that the trip was short, they mostly agree that the time spent in Finland was "an awakening experience". (Narain, 2016)

Bosnia and Herzegovina to Finland

Knowing that the Finnish educational system is one of the most advanced in the world, the Ministry of Foreign Affairs of Bosnia and Herzegovina has contacted Educluster to meet Finnish and Swedish universities. The purpose of the project has been focused on improving the overall Bosnia and Herzegovina educational system by inviting the most important actors of the Education Ministry to the University of Oslo and the University of Joensuu. Nowadays, Bosnia and Herzegovina is streamlining its educational system by implementing education reform and exchange program facilities for students. (Mustonen, 2015)

Kazakhstan to Finland

In May 2012, a Kazakh group of teachers willing to improve its education system, has travelled to Finland to encourage a collaboration between both countries. Indeed, the reforms and policies established in the Finnish education system has proved the importance of long-term changes in education and enhance the teaching quality. In collaboration with the Ministry of Education and Culture of Finland, the Educluster Finnish institution has organized the visit including three different levels of education: the Puistokoulu primary school, the College of the Finnish Institute of Educational Research and the University of Helsinki. The Kazakh delegation has been really interested in the independence of teachers and the autonomy of the organization of education. A focus has also been put on the free education and the willingness to improve the status of the teacher by diversifying and updating its competences. (Irsaliyev, 2012)

Finland to Nigeria

In 2012, two journeys have been organized by Incubator Africa Limited. Those two visits of Finland in Nigeria have led to a long-term relation aiming to support Nigerian education. The purpose of the journey was to identify critical triggers enabling to improve the Nigerian's educational system leading to a literacy level reduction. The project has mainly involved Nigerian decision makers and practitioners in the education sector willing to work with the world leading country in terms of education. Finnish Educluster institution has also played a role gathering Finnish universities willing to travel and export their teaching competences. Nevertheless, the main problem occurring in the education system in Nigeria is the attendance at school which is an issue that Finland was not able to solve for them. (Raatikainen, 2012)

Finland to Saudi Arabia

As Saudi Arabia has been really interested in nuclear power over the last few years, Finland has proposed to sell their competences in this domain. The idea is to physically export Finnish competences by travelling for a short time-period to Saudi Arabia and train nuclear power experts. The Finnish University of Technology (LUT) has work closely with the government and the Ministry of Energy. Indeed, Saudi Arabia is willing to conduct a sustainable energy project on a long-term base and the collaboration should last for few decades as stated in the article. Compare to other examples, this case refers to an export of a field of study whereas most of the other examples involve the export of the whole Finnish education model. (Eduexport , 2011)

Finland to China

In this project targeting China, three Finnish university have been involved: Tampere Adult Education Centre (TAKK), Jyväskylä University of Applied Sciences (JAMK) and the Guangdong Polytechnic Normal University (GPNU). The main purpose of the project was to create and open a Sino-Finnish Centre of Developing Learning Innovations in the province of Guangzhou in China. The collaboration between those three universities and China aim to provide a better higher and secondary education. It also intends to promote the development of innovations in education and teaching mentioned in their previous “Learning Garden Framework” agreement. (Educluster , 2016)

Finland to Botswana

In 2016, Finland has flown to Botswana to train local teachers about educational ways of teaching. The project took place in Francistown for two weeks and has involved a single Finnish university, the Haaga-Helia University of Applied Sciences. The project did not target schools directly but has been more focus on overall local teachers. Indeed, the delegation of the Haaga-Helia University of Applied Sciences has trained sixty vocational teachers coming from numerous areas and different level of study. Aiming to improve the quality of teaching in least developed countries, the Finnish delegation have also offer a wide range of drastic measures to boost the educational system and improve the qualifications of students. (Educluster , 2016)

Finland to Singapore

The Finnish University of AALTO has identified another mean of generating revenue overseas. Indeed, instead of looking for short-term project, AALTO University has looked for partnership with other universities abroad. The goal of those partnerships is to offer a Finnish degree, adding more value on a resume than a local one. The local student pay the fees of the program they are pursuing to the University of AALTO but are studying in their home countries. As a result, AALTO University has been able to build a strong worldwide presence in almost every continent including locations such as Singapore, Poland, South Korea, Taiwan or Indonesia. However, the local universities operating as a subsidiary of AALTO University also take a small percentage of student fees. (Iranian Business School, 2017)

Russia and Lithuania to Finland

The long-lasting collaboration between a Russian and a Finnish university has led to other profitable projects. Indeed, the newsletter of the Finnish University of AALTO has received in February 2017 thirty-five top leaders from Russia. The influent leaders coming from several companies and industries have spent three days at AALTO university to attend a module and develop their leadership skills and abilities. The module has already generated external revenue. Indeed, this is the sixth-time visitors are coming from Russia and the second-time participants attend modules from Lithuania. The purpose of the journey is to illustrate typical leadership cases by sharing live cases with other participants and support reactions with theoretical experts from the Finnish AALTO University. As a result, besides exporting its program to abroad universities such as in Russia, AALTO University host events and support them using its internal competences. (Iranian Business School, 2017)

France to Emirates Arab United

In October 2016, the French University INSEAD has joined the sixth edition of the Global Business Leaders Conference in Abu Dhabi. The main purpose of this event was to discuss the change in leadership and highlight the importance of corporate governance. Head of significant worldwide companies have attend the event and INSEAD have given talk about governance initiatives introducing its program in the related field. The famous French University INSEAD has also recently participated in a forum discussing the future of oil and gas industry. In collaboration with the worldwide company Siemens, the French university has open in November 2016 an international event in Abu Dhabi to debate the price strategy of oil and the restructuration of the gas sector. The purpose of this event is also to emphasise the importance of new energies encouraging new business partnership and other types of business model. On the other hand, the French University of INSEAD had the opportunity to propose programs related to the event and sell the institution beyond French borders. (Sleiman, 2016)

France to Vietnam

Knowing that a French degree worth more than a Vietnamese one, the French University of Toulon has exported several scientific programs. In 2010, the French university start offering chemical engineering program in the National University of Vietnam. Seven years later, the partnership between the two universities have trained more than three hundred Vietnamese following bachelor and master programs of the French university. The successful partnership has been developed in two main stages: First, an overseas host institution has been identified by the University of Toulon and then local Vietnamese teacher have been trained by French teacher. In other words, the French university has exported a full degree program keeping its own human resources. However, the standard of teaching are the same in both institutions and the degree is recognized in Vietnam and France. The Vietnamese university is now hosting six French programs and the two universities meet every two years to discuss of potential future issues and to strengthen their relation. (Université de Toulon, 2016)

Additional opportunities

In addition, investigating successful cases of export model has also brought up some supplementary opportunities. The examples below are mainly involving policies, reforms or tools that have been put in place to encourage education export. However, some other cases can also be articles presenting opportunities in countries offering a significant demand for Finnish education.

The article dated 23 January 2017, present a strong demand in Kazakhstan for Finnish education. Indeed, the “Team Finland Market Opportunities” institution in charge of identifying potential successful market, emphasise the willingness of Kazakhstan to modernize its education system. The education reforms taken by the government include a budget of EUR 4,065 million until 2019 and contain several goals. The main goal is to focus on childhood education to increase the attendance percentage in rural areas. Then, the government is willing to create new schools and streamline the education model of the existing ones. Lastly, national standards and policies should be put in place aiming to promote professional teacher development. As a matter of fact, Finnish educational institution can operate and export their skills and competences in teaching to Kazakhstan to generate another source of revenue. (Adilbek, 2017)

Some countries have also found other ways to increase their amount of student following degrees. As another reference in terms of education, Australian universities have work closely with the government to settle attractive policy for foreign students. Nowadays and since 1999, foreign students completing a full degree in Australia obtain a residence permit. From demographical point of view, Australia present the same aspects as Finland: a small population compare to the size of the country and an open country to immigration. A collaboration with the Finnish Ministry of Immigration could be beneficial and might increase profits of Finnish universities as foreign students have now to pay the fees. In other words, I strongly recommend a private-public partnership aiming to use international students as a significant external source of revenue. (Lowe, 2009)

Some other universities as used another tool to export their competences. The Massive Online Open Course (MOOC) enables numerous universities across the globe exporting their program without involving extreme investment or any partnership. Indeed, the online platform allow student to pursue a program of a given university online anywhere in the world. The final exam has to be completed in a specific infrastructure but students can adapt their time of study and

their schedules are completely flexible. MOOC is generally hosted by different platform such as Coursera, mainly used in France for instance.

Analysis Export Education Project

Looking at all the examples and opportunities described above some aspects stand out and help to streamline researches. Indeed, one of the main elements showing up is the implication of another actor in most of cases. The Educluster Finnish institution in charge of identifying education opportunities for Finnish universities often plays a role in the exchange of competences. Cost of project investigation might be costly and it could be more profitable to accept a private institution in charge of investigating project even if they sometimes charge significant fees. However, as it has been impossible to determine the amount of money charged by private institutions, we assume that it might be more time consuming for Novia to investigate its own project but more profitable. In addition, Foreign or Education Ministers willing to improve its level of education also sometimes launch calls for oversea projects.

Concerning the type of projects, most of them are directly related to the educational model including teachers' skills and how Finnish universities are so successful and well known across the globe. In other words, there is a huge worldwide demand to inspire local education across the world using Finnish education model. As mentioned in the examples above, there are two distinct ways of education model exchange. Whether an abroad delegation travel to Finland with the purpose of the learning how Finnish education is successful or Finnish individuals flight to another country to provide an overview of the Finnish education system. Both systems have their advantages and drawbacks. Traveling to another country might sometimes upgrade the competences of teachers but it will be more expensive whereas invite a foreign delegation will enable them to identify all the aspects allowing such a successful education system. The graph below show the amount of project that have been conducted abroad and locally.

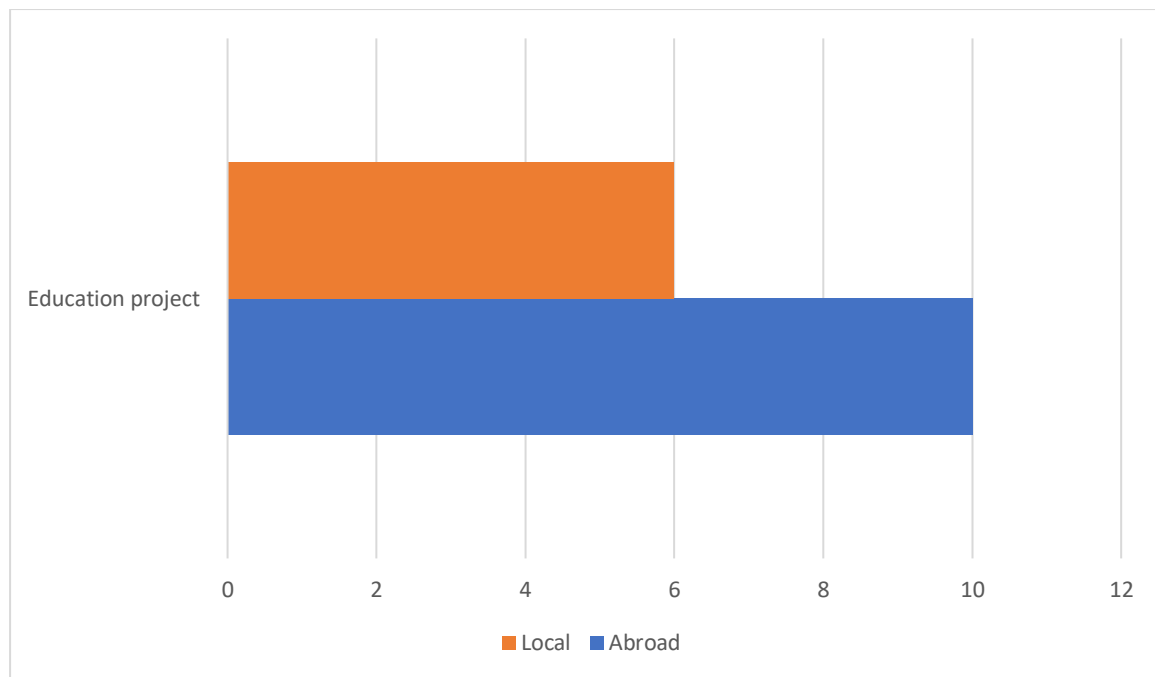


Figure 14: *Graphic analysis*

In addition, another element standing out of the cases analysis above is the recurring implication of Saudi Arabia. Indeed, some countries appear more than others and one might be able to conclude with a deeper analysis the education export opportunities in specific countries. That is the reason why, the pie chart below present the geographical repartition of the cases by continents.

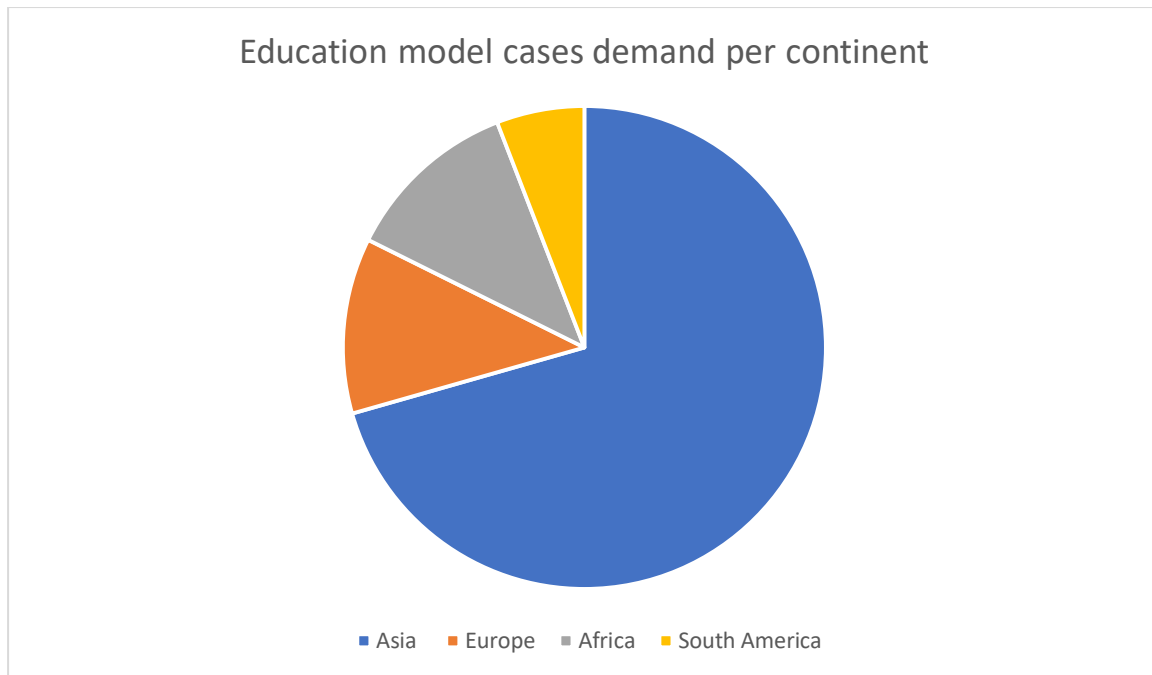


Figure 15: *Education model per continent*

One aspect important to specify is that the project that has been conducted in Europe were located in eastern Europe. As a result, one can affirm that the demand for Finnish location is mainly located in developing regions.

Another interesting education export model standing out is the one that happened in Indonesia conducted by the University of Tampere. By contrast to the other projects, the students of the university have send the competences in terms of education abroad. The main difference here is that the project did not required specific resources that are not always available as the university has used its own student. This project has led to multiple outcomes including a source of revenue for the Finnish university, a significant working experience for students and an improvement in Indonesian educational system.

On the other hand, participating in foreign event related to the university fields of study enable meeting potential partner to collaborate with. Long term projects such as the Saudi Arabian has started with an international event which has been a gateway to long-term partnership. Now the INSEAD French University propose programs in business and engineering in partner universities in United Arab Emirates. Revenue generated by the program are shared and student obtain a reliable degree recognised in both countries.

Mid-term analysis

As Novia 2Ways Development, mid-term report has led Novia Industry Partnership to streamline the research and develop a list of questions targeting companies operating in similar sector. The list of questions is included in the appendix. (*see appendix n°26 p109*)

Engineering training

The Export Education project is divided in two main axes of development. Previous researches on the Export Project have shown that universities export mainly cultural training and education. Therefore, NIP. Fi has identified opportunities related to its activity including the type of courses the university offered and its field of research and cultural training to Finnish company to align working practice and corporate policies among different units in Finnish worldwide companies.

NIP. Fi team has identified two main reasons to target countries. Indeed, countries might be interested in Novia offer for education improvement reasons whereas other countries should be targeted as they represent a high profitability and strong willingness to invest massively in education such as middle east countries.

Education improvement

From a wide perspective, education training refers to a presentation and an export of a level of education including how Finnish education system is efficient. However, as regard human resources of Novia university, teachers and researcher are operating in other fields of study and research. Therefore, NIP. Fi has identified opportunities based on Novia's courses and activities in other countries. Those opportunities are interrelated with engineering and nursing sectors confirming that Novia's human resources do possess the skills required to provide an efficient training. After having conducting research on the lack of engineering competences across the globe, NIP. Fi has selected United Kingdom and India. Looking in depth at the two articles described below, those two countries present strong significant opportunities that have to be investigated.

Peter Doyle, the Director at Nuclear and Manufacturing Excellence Ltd has published an article highlighting the lack of engineering skills in the United Kingdom in 2015. (Doyle, 2017) The article discusses numerous current and future problems significantly affecting the United Kingdom's engineering resources. One of the main aspects that the article points out is the strategy to settle in the engineering environment aiming to push students and learners to become engineers rather than attract them through incentives and other motivational drivers. Therefore, people willing to become engineers are quickly associated to non-social people. In other words, students pursuing studies in engineering are afraid of the respect of their career and how it will be perceived with the society. By contrast, German laws secure the title of Engineer that can only be given after having followed a recognized engineering degree.

In addition, Peter Doyle also points out that engineering includes various branches and teenagers must select their speciality before eighteen years old. They do not have an overview of the whole possibilities available of the engineer profession and it creates specific engineers that cannot be transferred or operate in other branches of engineering. However, the United Kingdom needs polyvalent engineering workers.

Those problems presented above present mainly two possibilities for Novia Engineering department. As engineering profession in Finland is well known, Novia can provide positive training based on career growing perspective and the importance of the engineering profession in tomorrow's issues. Novia can also through event or seminar give an additional training to students to increase their recruitment transferability from a specific domain to another. For instance, students pursuing studies in oil engineering can be trained also on electricity through short and intensive week. (Doyle, 2017)

Concerning India, the article published in July 2016 (Chakrabarty, 2016) put forward that only 7 per cent of engineering graduates are employable in India. Indeed, the reporter Roshni Chakrabaty has conducted a study of engineering employment opportunities and engineering students. Its study has been based on more 150,000 engineering students and has highlighted reasons of engineering sector unemployment.

A second article concerning nursing and healthcare sector has also been published on issues facing India. This article strengthens the willingness of Export Education project to focus on India has NIP. Fi would be able to provide educational training in two main field of studies: engineering and nursing. (Chakrabarty, 2016).

Thus, the article highlight critical issues in engineering sector that could be potential opportunities for Novia. First, the lack of quality teacher is significantly affecting the skills' level of engineering students. Engineering teachers' competences must be enhanced to enable an effective and complete transfer of knowledge. Then Roshni Chakrabatry noticed that students' mindset is focus on applying what they are learning rather than thinking on their own. In other words, their research level remains low and engineering students are operative but not innovative. Engineering universities are willing to develop an innovative way of thinking but do need support. As Technobothnia has a research area aiming to innovate, a training supporting the importance of creating research unit in engineering schools can be offer to university. The offer should include students but also teachers in order to create a common space that both parties can research and apply their ideas. Lastly, even though English is considered as an official language in India, there is a lack of proper English skills related to working area. In other words, as one of the main industry sector in India, IT cannot recruit students as they do not communicate effectively in English including specific vocabulary.

Overall, NIP. Fi has mainly identified three main opportunities for Technobothnia through this article. Indeed, the lack of engineering competences lead students to be unemployed. Technobothnia, with a high qualified engineering force could offer intensive training on a short period to update engineering teachers in Indian universities. Then, the Finnish research mindset in laboratory could also be exported highlighting the importance of innovation in engineering university. Indeed, Technobothnia has a research area and could provide through massive event or small seminar, informative session to present successful and interesting outcome of Technobothnia research laboratory. Furthermore, a specific English training related to area of study is required and affect the employability of engineering students. Technobothnia should also be able to give intensive short period English engineering survival to increase student's employment rate.

Lastly, as the article states that the lack of update on current market situation has also impacted the level of education and decrease the amount of people ready to employ after having pursued a degree in engineering. Therefore, NIP. Fi strongly recommend to send student abroad rather than providing additional engineering training. Indeed, sending human resources abroad will also be beneficial for Novia as it will give an opportunity to teachers to obtain an overall idea of worldwide current market expectations.

High profitability countries

As an example of countries having a huge buying power representing opportunities for NIP. Fi, Saudi Arabia has been increasing investment in education over the last few years. Indeed, having spent more than five percent of the whole Gross Domestic Product in 2006, Saudi Arabia shows a strong willingness to improve its educational system. As a matter of fact, the country has invested massively in education to almost twenty of its Gross Domestic Product in 2008. Moreover, education is free for students even though it is not compulsory. (Ecoles du Monde, 2016)

In addition, the school life expectancy rate has reached sixteen percent in 2014 and the country has launched the same year a twenty-one-billion-dollar investment program to improve and develop the educational system. The article written by Rania El Gamal (Reuters, 2014) mention that Saudi Arabia lack several professions and have been struggling producing fully-qualified scientists, engineers, economists and lawyers. This investment plan also strives to give an external professional experience to students by creating international partnership in the private sector. (Rasooldeen, 2017)

Vision 2030 aiming to transform educational system in Saudi Arabia, has been focused on attracting foreign minds to avoid future over-reliance on oil sectors. In addition, vision 2030 put forwards a specific set of goals including the improvement, recruitment and development of teachers. The improvement of curricula, teaching methods and learning environment to inspire creativity and innovation. (Patalong, 2016)

However, doing business in Saudi Arabia could be difficult for foreign entities. Indeed, Novia will need to obtain a legal approval and meet the licences and regulations of the Saudi Arabian General Investment Authority. (Hawayek, 2016)

Depending on the type of education, policies can significantly affect foreign presence in the country. For instance, the Bachelor of Nursing will be hardly exported as Nurse program must be owned only by nationals of Saudi Arabia.

Therefore, the article written by Naji Hawayek, (Hawayek, 2016) highlights that foreign educational institution should create partnership with local institution in order to penetrate Arabi Saudi market. In this case, Novia will only provide know how of a specific program including course syllabus and teaching materials. In exchange, the local university will have to payback Novia a fixed amount of income defined in an official term of agreements.

Cultural training

The second opportunity enable to support Novia Education Export development is to focus on company providing cultural training. Meeting the Chief Executive of Citec company in Vaasa has confirmed that Finnish worldwide companies, need a cultural adjustment between headquarters and abroad subsidiaries. Indeed, Finnish multinational companies are struggling to create a synergy between different working units. NIP. Fi can therefore, contact local companies to access to subsidiaries abroad and offer a cultural training.

Based on the interview with Citec company and the research of cultural training previously conducted, cultural training for foreign subsidiary should be operated in Finland. Indeed, as stated in most of the cases above, a local journey emphasis cultural aspects and therefore, offer the best condition to understand Finnish working process. The company list established in Ostrobothnia attached as an annex presents a wide range of important companies operating on world-wide markets. They mainly face issues adjusting their working process and adapting their working behaviour to the headquarters company based in Finland.

Following the article “Cultural Adjustment”, (Cultural Adjustment, 2016) there are four stages to understand a culture. Those four stages are the following ones:

- The “Honeymoon” stage, referring to the excitement occurring when discovering the new culture

- The “Crisis” period, related to an irritation or anger about the new culture
- The “Recovery” phase, defined as the period where foreigners start understanding basic aspects of the culture
- The “Adjustment” time, characterised as a feeling home mindset

Many articles are highlighting cultural adjustment using a similar theory. However, as cultural integration differs from an individual to another, no specific time can be defined as needed to understand a culture. In other words, it is highly related to various factors such as the frequency of traveling or the culture of the employee.

NIP. FI is composed by Spanish and French members that have already faced the Finnish culture. As a result, they evaluated the time necessary to understand the Finnish culture and have agreed upon two weeks. Indeed, this period is the longest training that companies can propose to workers without affecting their activity. Most of training program offered by engineering companies vary from one to ten days but never exceed two weeks.

Lastly, the time allocated for cultural training is based on assumption and can therefore, be adjusted on request if companies are willing to shorten or extend the training.

In partnership with the Finnish company, Novia University should be able to offer a training in Finland divided in several parts. First, Novia must meet the local company to agree upon the expectation and limitations of the cultural training before employees arrived in Finland. Then, Novia would provide theoretical cultural training for one week. (*see appendix n°26 p115*)

The second period of the cultural training should take place in the infrastructure of the company giving an opportunity to foreign employees to be fully integrated in a Finnish working environment. Indeed, spending time in the Finnish headquarters would strengthen the subsidiaries' relation with the control centre. A support should also put in place by Novia to illustrate the theoretical part in daily companies' activities. Lastly, as feedback is crucial in offer development, this second cultural training period would enable Novia to receive a proper feedback from companies to customized its offer if needed.

To conclude, developing cultural training could be a real opportunity for Novia to create an additional source of revenue. Indeed, as mentioned above, local companies in Ostrobothnia are facing cultural issues with their different working units across the globe. Therefore, develop such competences at Novia could strengthen Novia university activities in Ostrobothnia and

increase its fame. Following the multicultural training specialist David Solomons, (Solomons, 2011) a cultural training cost between 1500 to 2000 euros per day. David Solomons highlights that the cost of training is high as cross cultural blunders can significantly affect companies' activities. As stated, the cultural offer that Novia will propose should last for two weeks divided in two periods. Therefore, the cultural training offer proposed by Novia should be able to generate an income between 22 500 to 30 000 euros. Previous research has also shown that a group of ten employees will be the most suitable number of members to provide an effective training. On the other hand, human resources providing the cultural training might need to be replaced by other teachers. Knowing that teachers in Finland earn on average 3 500€ per month, (*see appendix n°26 p117*) 1 750€ will be needed to recruit another lecturer for two weeks. The offer should also consider other cost such as the transportation and the accommodation. NIP. FI team strongly recommend proposing a full package including all costs involved that it would not affect activities of companies concerned. Indeed, full included package are often more attractive as they do not require any organization from consumers.

All the offer could be customized upon companies request and the table below has been developed using benchmarking and assumption.

Cash inflow	Amount	Cash outflow	Amount	Details
Cultural income per day	1750 x 15	Human resources replacement	3 500/2	Based on salary average in Finland but can slightly differs according to the occupation
		Fly ticket (per person)	750 x 10	Price of flight tickets could fluctuate according to the location of the subsidiary
		Local transport (Minibus per day)	100 x 15	Calculation using rental car website
		Food (per day for a ten-people group)	50 x 10	Assuming people will have breakfast and lunch at Novia and a dinner in a restaurant

		Accommodation (including water + electricity)	100 x 10	In partnership with VOAS rent estimated around 200/month
26 250€		12 250€		
Net income for a two-weeks cultural training (10 people): 14 000€				

Table 11: *Cultural training income*

As a result, the financial statement above present the cost involved in the cultural training opportunity. Even though the offer will slightly be modified and cost will fluctuate according to other factors such as the location of subsidiaries or the teaching field of the lecturer, the table shows evidence of revenue that can be generated through the cultural training offer. The net income for a ten-people group would be 14 000€ for a two weeks training period.

Need creation through investment

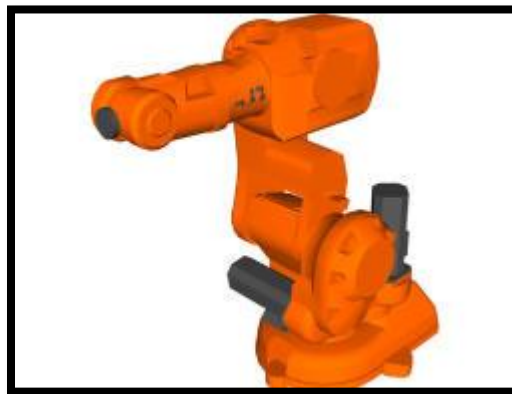
The last opportunities for Novia to export its activities is to create the need. However, the low amount of information online and the time constraint has not enable NIP. Fi to develop a relevant case scenario where Novia could generate revenue through investment. Nevertheless, the idea of the investment scenario is to invest in machines for companies and therefore, providing a long-lasting support and training on machine.

Having benchmarked the company ABB, (ABB, 2015) NIP. FI has been able to propose and estimate the return on investment. Taking as an example, the machine IRB140/IRB120 used in robotics, NIP. FI has been able to propose and estimate the return on investment. Mainly used for modelling and animation software, Novia can purchase machines for small companies and provide a long-lasting training and maintenance. Indeed, as regards the company ABB, a training on those types of machines cost on average 1 000 euros for one day to 2 000 euros for five days training session. The table below present briefly the main financial elements involved.

Cash inflow	Amount	Cash outflow	Amount	Details
Machine training income per session (5 days)	2 000	ABB Robot system	1 500	E bay website source
		Human resources replacement	3 500/4	Based on salary average in Finland but can slightly differs according to the occupation
		Local transport (petrol)	100	Calculation fluctuating according to the location
Maintenance (every month)	150 x 12			
3 800€		2 475€		
Net income for a five-days machine training (1 person): 1 325€				

Table 12: Machine training income

The financial table above shows that a one year partnership with a company will provide 1 325€ including the machine investment, the training and the maintenance. However, one would like to highlight that this example could slightly vary according to the initial investment amount.



Source (STL Finder , 2017)

Those types of partnership would be more efficient with small size companies having poor financial resources and willing to grow their business.

Conclusion Export Project

To conclude, the initial purpose of the export project was to identify opportunities to strengthen Novia position abroad while selling an educational model. NIP. Fi has identified three different ways to generate revenue using abroad opportunities.

Novia is an engineering university possessing a diversify and wide range of engineering skills that can be sold thinking outside the box. Humans' Novia knowledge can be also used to create income by providing services to companies. NIP. Fi team has identified two main reasons of selecting a country. Indeed, some countries have already a strong educational system but face issues related to engineering sector. For instance, the articles presented below shows that even though United Kingdom has a strong engineering educational model, companies required multi-sectors qualified students. Therefore, Novia could provide short term training diversifying skills of future workers. On the other hand, some other countries do not have an efficient engineering education system and are willing to improve it. Those countries have also often a strong investment capability such as Saudi Arabia. Novia has several possibilities to answer their demand. Indeed, after having investigated abroad education NIP. Fi team can suggest several ways to support engineering education development. For instance, a university partnership with a university abroad will enable Novia to implement a full technical engineering degree abroad giving opportunities to student to complete a Finnish valuable degree in their own countries.

The cultural training is a need that has been identified in several multinational companies. Indeed, as stated above, international companies operating on several diversified markets and continents are facing cultural issues among sub working units. The need for cultural training have significantly increased over the last decades as the world has become more globalised. Therefore, Novia could propose cultural training service to generate additional income. The idea is to contact world-wide local companies in Ostrobothnia (*see appendix n°8 & n°9*) and offer a full cultural training service including the accommodation. The financial plan above shows how profitable it could be for Novia and detail the multiple aspects of the offer.

Lastly, the need creation through investment refer to Novia ability to strengthen its participation into companies' capital. The aim of this sub-project is to create a need in a company by investigating in companies' machines. Indeed, small sized companies do not

always have a strong financial position enabling machine purchase. Therefore, Novia buying machines will have two possibilities. The integration in companies' capital through an official agreement giving a certain amount of companies' revenue to Novia covering the initial investment or a long-term training with maintenance on the machine purchased. Those two investments program will provide Novia an opportunity to cover its investment and generate additional revenue depending on the terms of each agreement.

Novia Industry Partnership conclusion

As mentioned above, the purpose of Novia Industry Partnership was to integrate industrial activities into educational program in Novia University and Technobothnia laboratory. The project has been conducted during the last couple months and has led to significant valuable result. The conclusion of the project discussed several aspects such as the overall team management and the content of the three projects. Indeed, as Novia Industry Partnership cover three distinct mission, the conclusion is divided.

As one of the main aspects of team working, management has significantly impact the efficiency and the productivity of team. It is important to mention that the leadership of Novia Industry Partnership has been taken in charge by Martin Hochart before the mid-term report whereas the second part by Carlos Iglesias. The team has faced strong leadership issues slowing down working achievements. Therefore, some of the initial expectations and purposes have not been accomplished. Martin Hochart leadership system has been mainly focusing on team productivity neglecting team working satisfaction. A poor working atmosphere has been settled leading to a real lack of motivation. Nevertheless, NIP. Fi team has streamlined the roles of each member and have been able to work in synergy during the second period when Carlos Iglesias has become leader. In retrospect, the team has understood that focusing on productivity and efficiency do not lead to better achievements. By contrast, cohesion and synergy among team member has more importance and create an operative working environment.

As the first mission included in Novia Industry Partnership, Novia 2Ways Development has most of initial objectives. Indeed, the investigation of industrial activities into education program in different countries has led to concrete result. After having explored courses available at Novia University, the team has divided the research to increase efficiency by targeting different countries such as Ireland, France and Spain. Researching universities integrating external activities in their courses have not led to relevant result as the rate of respond has been almost non-existent. Even though this approach has been really time consuming, the team has rapidly defined new ways to collect information on university-company partnership. As a result, NIP. Fi has contacted companies and addressed a

questionnaire aiming to determine the pros and cons that are facing entities. Companies mostly mention that project are not lasting enough (35h/semester on average) to provide significant result. On the other hand, companies are facing cost issues as long-term student projects can cost up to eight thousand euros. Facing time constraints, Novia Industry Partnership has not been able to start prospecting local companies willing to work with universities but Novia 2Ways Development has addressed most of aspects of the offer Novia could present to companies.

Service Concept project consisted in developing potential real scenarios where Technobothnia can sell competences and knowledge to external entities. In other words, Novia Industry Partnership team has determined valuable assets of Technobothnia laboratory and identified opportunities on the current market. Therefore, an investigation of Technobothnia has been necessary to orient researches. Similar to Novia 2Ways Development, the team has spent a huge amount of time researching university laboratory providing external services to companies. However, facing a lack of information and low rate of responses, the team has review its investigation strategy and has started targeting companies providing services related to Technobothnia activities. The offer that Technobothnia could offer is divided in three main categories. Indeed, Novia Industry Partnership has identified three potential assets to generate additional revenue. First, Technobothnia can provide professional training to companies. For instance, electrical training is a growing sector as the amount of engineering companies is also increasing. Technobothnia can therefore, provide electrical machine training using internal engines available in the laboratory or knowledge transfer service. The second main way of generating additional income that has been identified by Novia Industry Partnership is the testing area. The testing area available in the laboratory has a huge potential and can be used to provide services to companies. Several companies have been contacted regarding testing activities and mostly mention that they subcontract testing as it represents several issues related to legislation and governmental standards. Therefore, Technobothnia could develop an attractive offer to test companies' product and deliver international standards. Lastly, the research area of Technobothnia can also be used to provide a service to companies. A customized offer must be settle where Technobothnia can perform on research cases subcontracted by companies. Besides creating another source of income, develop a research activities in Technobothnia will be beneficial for students and keep update internal lecturer with market current situation. Some research examples have been found between universities

and companies where students have conducted research on given project such the University of Oslo where students have investigating solar system for a company.

Lastly, Export Education project aim to identify potential opportunities in foreign countries where Novia could export its activities. This sub-project could also be divided in several parts as Novia Industry Partnership as defined different triggers and reasons to look for opportunities beyond Finnish borders. Therefore, Novia university can export three main elements of its educational activity. As NIP. Fi team has met several companies such as CITEC, some ideas have raised up from interviews. For instance, the local company established in Vaasa have highlighted cultural issues with subsidiaries. The full included cultural training offer on Finnish culture is detailed in the Export Education part and address all financial aspects. One of the other parts that Novia should be able to export is its engineering competences. Indeed, the highly qualified human resources in Technobothnia could provide engineering training similar to the Service Concept offer. Novia Industry Partnership has defined several methods to target countries and identified opportunities in foreign countries. Novia could whether look at countries facing a lack of engineering competences to strengthen educational program or target countries with high solvability willing to develop their educational system such as Saudi Arabia. Lastly, a need creation through investment could also be a real opportunity for Novia to create income. Several small size companies have mentioned that they lack financial flexibility and therefore, struggle investing in machine development. The idea behind this companies' issues is to offer an investment in high potential start-up companies and provide a long-term training and maintenance on investment. Besides enabling a return on their initial investment, Novia might also be able obtain company shares increasing its fame and vehicle a dynamic and pleasing image. However, as this example is slightly specific, NIP. Fi did not find any similar successful cases and have based this scenario mainly on assumptions.

To conclude, Novia Industry Partnership has not meet all initial expectations but have provide a valuable market study related to the integration of external activities into educational program. The team has been willing to start creating partnership and identify potentially interested local companies but have been too ambitious and have faced time constraint. Further work would be beneficial for both Novia and Technobothnia and should be now focused on addressing all aspects of offers Novia would propose to companies.

Bibliography

ABB, 2015. *Training pricing.* [Online]
Available at: <http://new.abb.com/service/abb-university/united-states/robotics/training-pricing>
[Accessed 09 05 2017].

Adilbek, Z., 2017. *Finland Market Opportunities.* [Online]
Available at: <https://www.marketopportunities.fi/kazakhstan-reforms-its-education-system-strong-demand-for-finnish-offering>
[Accessed 08 05 2017].

Anon., 2014. *Technical Training Solution.* [Online]
Available at: <http://www.technicaltrainingsolutions.co.uk/>
[Accessed 05 04 2017].

Baggström, M., 2016. *Admissions.* [Online]
Available at: <http://www.tut.fi/en/admissions/masters-studies-in-english/industrial-engineering-and-management/focus-areas/index.htm>

Brown, D., 2017. *A cision company.* [Online]
Available at: <http://www.newswire.ca/news-releases/winners-of-the-governor-generals-innovation-awards-621445373.html>
[Accessed 09 05 2017].

Chakrabarty, R., 2016. *Indiatoday In Education.* [Online]
Available at: <http://indiatoday.intoday.in/education/story/engineering-employment-problems/1/713827.html>
[Accessed 09 05 2017].

Cheers Creative, 2017. *What Logo Shapes Mean.* [Online]
Available at: <http://www.cheerscreative.com/logo-shapes-series/circle-shaped-logos/>

Comunicación, D. d., 2016. *Noticia.* [Online]
Available at: <http://www.ingenieros.es/noticias/ver/ct-ingenieros-presenta-un-proyecto-bim-hecho-mediante-ingenieria-inversa-en-la-upc/6427>

Cultural Adjustment, 2016. *Cultural Adaptation.* [Online]
Available at: http://internationaloffice.berkeley.edu/cultural_adjustment
[Accessed 09 05 2017].

Doyle, P., 2017. *A Personal View on the Current Lack of Engineering Skills*. [Online] Available at: <https://www.linkedin.com/pulse/personal-view-current-lack-engineering-skills-uk-peter-doyle>

[Accessed 09 05 2017].

Ecoles du Monde, 2016. *Arabie Saoudite*. [Online] Available at: http://www.ecolespubliques.fr/pays_arabiesaoudite.php

[Accessed 09 05 2017].

Educluster , 2014. *School capacity-building programme 2013-2014*. [Online] Available at: <http://www.educclusterfinland.fi/en/about-us/references/argentina-2>

Educluster , 2016. *Higher education*. [Online] Available at: <http://www.eduexport.fi/higher-education>

[Accessed 08 05 2017].

Eduexport , 2011. *Saudi Arabian Nuclear Safety Experts*. [Online] Available at: <http://www.eduexport.fi/higher-education>

Empowered , 2009 - 2017 . *The color blue*. [Online] Available at: <http://www.empower-yourself-with-color-psychology.com/color-blue.html>

Festo , 2017. *Equipment sets*. [Online] Available at: <http://www.festo-didactic.com/int-en/learning-systems/equipment-sets/?fbid=aW50LmVuLjU1Ny4xNy4yMC41MDE>

[Accessed 05 04 2017].

Fue , 2010. *Prensa*. [Online] Available at: https://www.fue.es/html/032_fueenlosmediosNoticia.asp?id_noticia=141&pgAct=7&TM=30

Händler, A., n.d. *Books*. [Online] Available at: https://books.google.fi/books?id=-SoACgAAQBAJ&pg=PA10&lpg=PA10&dq=empresa+presenta+su+proyecto+a+la+universidad+politecnica&source=bl&ots=md02TImCZ_&sig=DeQndgYTVIpAytwGII3XHpmuU8I&hl=de&sa=X&ved=0ahUKEwj75r_H08rSAhVRKywKHSw7D7AQ6AEIYTAJ#v=onepage&q=empre

Hawayek, N., 2016. *Insight & Knowledge*. [Online]
Available at: <http://www.clydeco.com/insight/article/investment-in-education-in-the-kingdom-of-saudi-arabia>
[Accessed 09 05 2017].

hera Laborsystme GmbH , 2017. *Electric Classroom Laboratory and Workshop*. [Online]
Available at: <http://www.hera.de/en/electriceducation/electric-classroom-laboratory-and-workshop.html>
[Accessed 05 04 2017].

Hyytiainen, E., 2016. *Finland University develops educational research*. [Online]
Available at: <https://www.utu.fi/en/units/edu/news/news/Pages/Oman-education-export-project-.aspx>

Iranian Business School, 2017. *IBS AALTO University Education*. [Online]
Available at: <http://www.ibs.ir/en/emba.php>
[Accessed 08 05 2017].

Irsaliyev, M. S., 2012. *Finnish education and evaluation system*. [Online]
Available at: <http://www.educlusterfinland.fi/en/blog/15-08-2012/finnish-education-and-evaluation-system>

J. White , 2017. *Crisis Management*. [Online]
Available at: https://en.wikipedia.org/wiki/Crisis_management#Types_of_crises

J.J. Keller & Associations, Inc., 2017. *Electrical Safety in the Laboratory - Online Training*. [Online]
Available at: <https://www.jjkeller.com/shop/Product/Electrical-Safety-in-the-Laboratory-Online-Training#overview>
[Accessed 05 04 2017].

James, G., 2011. *The 9 external rules of teamwork*. [Online]
Available at: <http://www.cbsnews.com/news/the-9-eternal-rules-of-teamwork/>

Korpi, A., 2012. *Enabling professional development through coaching and training programmes*. [Online]
Available at: <http://www.educlusterfinland.fi/en/work/enabling-professional-development-through-coaching-and-training-programmes>

Leifler, K. S., 2017. *LiU awarded large research grants for competence centres*. [Online] Available at: <https://liu.se/en/article/storpott-for-liu-i-satsning-pa-kompetenscentrum> [Accessed 09 05 2017].

Logo design love , 2012. *On circular Logos*. [Online] Available at: <http://www.logodesignlove.com/circular-logos>

Lowe, S. J., 2009. *World Education News and Reviews*. [Online] Available at: <http://www.wes.org/ewenr/pf/09aug/pfpractical.htm> [Accessed 08 05 2017].

Maries, J., 2017. *University of Copenhagen*. [Online] Available at: <http://www.iceandclimate.nbi.ku.dk/> [Accessed 09 05 2017].

Mustonen, M.-L., 2015. *Finnish cooperation in the Education sector of Bosnia and Herzegovina*. [Online] Available at: <http://www.educlusterfinland.fi/en/about-us/references/bosnia-and-hertzegovina>

Narain, A., 2016. *Learning Journey*. [Online] Available at: <http://www.educlusterfinland.fi/en/blog/01-07-2016/learning-journey-finland>

National Academy of Sciences, 1997. *NCBI*. [Online] Available at: <https://www.ncbi.nlm.nih.gov/books/NBK233566/> [Accessed 09 05 2017].

Noticias Universia, 2007. *Los Proyectos Fin de Carrera en Empresas, una alternativa para conseguir tu título*. [Online] Available at: <http://noticias.universia.es/vida-universitaria/noticia/2007/11/05/675611/proyectos-fin-carrera-empresas-alternativa-conseguir-titulo.html>

Novia , 2015. *Degree Programmes*. [Online] Available at: <https://www.novia.fi/degree-students/degree-programmes/>

Novia , 2015. *Utbildningsutbud*. [Online] Available at: <https://www.novia.fi/utbildning/utbildningsutbud/>

Oficina de Informacion Universitaria, 2015. *Universidade de Santiago de Compostela*. [Online]

Available at: <http://www.usc.es/es/servizos/oiu/practicas.html>
[Accessed 08 05 2017].

Patalong, F., 2016. *Vision 2030 and the transformation of education in Saudi Arabia*. [Online]
Available at: <http://www.lexology.com/library/detail.aspx?g=ddc8ee5b-6fae-4e7a-abf7-a16c1c7ddd4b>
[Accessed 09 05 2017].

Press, E., 2016. *Estudiantes de la UPNA diseñan cuatro proyectos de empresa con ayuda de CEIN*. [Online]
Available at: <http://www.20minutos.es/noticia/2822460/0/estudiantes-upna-disenan-cuatro-proyectos-empresa-con-ayuda-cein/>

Professinal, A., 2015. *5 rules of effective teamwork*. [Online]
Available at: <http://www.businessmanagementdaily.com/43270/5-rules-for-effective-teamwork>

Raatikainen, T., 2012. *Educluster*. [Online]
Available at: <http://www.educclusterfinland.fi/en/blog/04-12-2012/shaping-future-experiencing-nigerian-educational-reform>
[Accessed 08 05 2017].

Rasooldeen, M., 2017. *Investors see new opportunities in Saudi education projects*. [Online]
Available at: <http://www.arabnews.com/node/1037256/saudi-arabia>
[Accessed 09 05 2017].

Rasooldeen, M., 2017. *Investors see new opportunities in Saudi education projects*. [Online]
Available at: <http://www.arabnews.com/node/1037256/saudi-arabia>
[Accessed 09 05 2017].

Reuters, 2014. *Saudi Arabia approves 21\$ bln five-year education plan - SPA*. [Online]
Available at: <http://www.reuters.com/article/saudi-education-idUSL6N0O53HU20140519>
[Accessed 09 05 2017].

Roach, D., 2014. *10 Commandments of teamwork*. [Online]
Available at: <http://likeateam.com/laws-teamwork-the-10-commandments/>

Rydin, Y., 2012. *Europe PMC Funders Group*. [Online]
Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3428861/>
[Accessed 09 05 2017].

S&C Electronic Company, 2017. *Laboratory Services*. [Online]
Available at: <https://www.sandc.com/en/products--services/services/laboratory-services/>
[Accessed 05 04 2017].

Sleiman, Z., 2016. *Insead and Siemens Forum*. [Online]
Available at: <https://www.insead.edu/news/2016-oil-and-gas>
[Accessed 08 05 2017].

Solomons, D., 2011. *Cross Cultural Communication*. [Online]
Available at: <https://www.youtube.com/watch?v=q2Th76xHa-w>
[Accessed 09 05 2017].

STL Finder, 2017. *ABB IRB 140 3D Model*. [Online]
Available at: <https://www.stlfinder.com/model/abb-irb-140-3d-model-cu5rVcwX/7429821>
[Accessed 09 05 2017].

TAMK, 2017. *Tampere University of Applied Science*. [Online]
Available at: <http://www.tamk.fi/web/tamken/home>
[Accessed 08 05 2017].

Tampere, H. J. P. S. a. U. o., 2016. *Greetings from Sukma Bangsa Indonesia*. [Online]
Available at: <http://samok.fi/en/2016/11/29/english-greetings-sukma-bangsa-indonesia-case-education-export-project/>

Uniovi, n.d. *Prácticas externas*. [Online]
Available at: <http://www.uniovi.es/recursos/laboral/practicas>

Université de Toulon, 2016. *Université de Toulon*. [Online]
Available at: <http://www.univ-tln.fr/L-Universite-de-Toulon-exporte-son-savoir-faire-au-Vietnam.html>
[Accessed 08 05 2017].

University of Iceland, 2017. *Civil and environmental Engineering*. [Online]
Available at: http://english.hi.is/sens/faculty_of_civil_and_environmental_engineering/academic_program

mes

[Accessed 09 05 2017].

Vogt, Y., 2017. *The world's most efficient and environment-friendly solar cells*. [Online] Available at: https://www.apollon.uio.no/english/articles/2017/1_solarcells.html [Accessed 09 05 2017].

Walter Schottky Institute, 2016. *The history of the WSI*. [Online] Available at: <https://www.wsi.tum.de/Institute/HistoryofWSI/tabid/54/Default.aspx> [Accessed 09 05 2017].

Yle Uutiset, 2013. *Uutiset*. [Online] Available at: http://yle.fi/uutiset/osasto/news/saudi_arabia_to_import_finnish_education_expertise/6499687

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