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Smart specialization through working life oriented higher education

Abstract

The purpose of this paper is to describe how re-direction of higher education towards working life orientation gives a fruitful ground for smart specialization to grow.

Higher educational institutes (HEIs) and especially universities of applied sciences (UASes) aim to educate students having the key skills for working life when graduated. Anyway, the working life is changing so rapidly that more reactive and flexible ways to upskill competences are urgently needed, and the emphasis should be put on skills required not presently but far in the future.

Finnish universities of applied sciences were set up in mid 1990s to strengthen the role of professional higher education and to fill the gap between academic universities and working life. In two decades, the UASes have found their role and become active generators of regional welfare across Finland. Universities of applied sciences educate professionals for society and business needs, and have a high input both in regional development and research, development and innovation (RD&I) approaches.

In general, the Ministry of Education and Culture is responsible of sharing the educational responsibilities and resources among the 24 Universities of Applied Sciences in Finland. Ministry gives the framework for how to play, but the UASes have all the cards to implement the education and RD&I activities to fulfil and predict the working life needs and maximize the regional benefit. The UASes role is the most to serve the regional stakeholders and especially the small and medium sized enterprises. Professionals graduating from universities of applied sciences should have learnt the skills, with which they can survive in the working life for the next 30-40 years. Predicting the future is not easy, but should be done somehow. The curriculum development process takes place usually even 6 years before the first students graduate based on the new

curricula, and the world has changed a lot in between! Thus, more flexible and reactive ways to increase knowledge and competences should take place.

Karelia University of Applied Sciences is part of two network projects, in which the aim is to fulfil the requirement of reactivity in higher education. Firstly, the aim of Finnish ESF (European Social Fund) project AVOT is to develop open higher education towards working life needs. Special emphasis is put on finding out the actual and future needs in companies and other working life organisations, and re-packing the study modules to fill the knowledge gaps of workers. Tutorial aspect as well as flexibility in ways of studying are taken seriously into account. Working life oriented open education is piloted in eight HEIs in the fields of bioeconomy and environmental studies; social and health care; and ICT.

Secondly, Erasmus+ Knowledge Alliances funded transnational project ERDI – Empowering Regional Development and Innovation – is supporting the regional smart specialization by co-creation of working life oriented higher education. The project is coordinated by Karelia and supported by 16 partners from Slovakia, Hungary, Czech Republic, the Netherlands and Canada. The common umbrella for the development is bioeconomy, and the co-creation covers curriculum and pedagogical development, digital learning tools, innovative business models and regional knowledge alliances.

The innovativeness in this approach is based on the strong regional working groups, where HEIs and working life organisations work jointly to find the key competences to be improved through higher education. Cross-sectorality, multidisciplinary and internationality help the thinking to find new ways. For predicting future competences, the Future Wheel tool is applied. Both projects mentioned will exist until year 2018.

Keywords: working life, future competences, Universities of Applied Sciences, curriculum development, bioeconomy

1. Introduction

The role of universities of applied sciences (UASes) in the Finnish society is based on law (Finlex 2014) and the detailed framework for education is given by the Ministry of Education and Culture. The UASes should concentrate on providing higher professional education,

apply working-life oriented research, development and innovation (RD&I), and boost the regional businesses – thus, play a central role in fulfilling the regional smart specialization strategies. The specific aim is that graduated students should have adopted all the key working life skills in their sector and in addition an ability for lifelong learning and developing working life. Anyway, as the working life is changing more and more rapidly, more reactive and flexible ways to upskill competences both for under- and post-graduates will be urgently needed. An emphasis should be put on skills required not presently but far in the future.

In general, the curriculum development process for UAS degrees takes place six - seven years before the first students applying the curriculum graduate. Meanwhile, the world and working life have been changed a lot. Thus, more flexible and reactive ways to increase knowledge and competences should take place. One way for this is to develop alternative ways of studying and especially to seek the ways for predicting the future professional framework and key competences required. The actual development work for such studies at Karelia University of Applied Sciences is based on European Union funded projects AVOT (Turun yliopisto 2016) and ERDI (Karelia-ammattikorkeakoulu 2016a), and the pilot platform are the studies related to bioeconomy sector (Forestry, Energy and Environmental Engineering).

2. Smart Specialization in North Karelia

North Karelia region is situated in the easternmost part of Finland and European Union (Pohjois-Karjalan maakuntaliitto 2014, 6-7). It is a sparsely populated region of 165 000 inhabitants, and the regional economy is strongly dependent on natural resources and business across the Russian border. Thus, forest bioeconomy is nominated as one of the three main development sectors of the regional Smart Specialization strategy. The region is already European forerunner in the use of renewable energy and aims for completely fossil fuel free by year 2030. The other specialization areas *Technology and materials* and *Russian know-how* support also the development of forest bioeconomy.

The smart specialization goal *New era of natural resources*, related to forest bioeconomy, is in more detailed divided in following sub-topics. The interest of development is especially focused on decentralized biorefinery, wood based materials, forest technology and harvesting, bioinformatics, and sustainable multiuse of natural resources (Figure 1). As a whole, North Karelia is the world's leading expertise hub in forest bioeconomy and aims for developing that status even further.

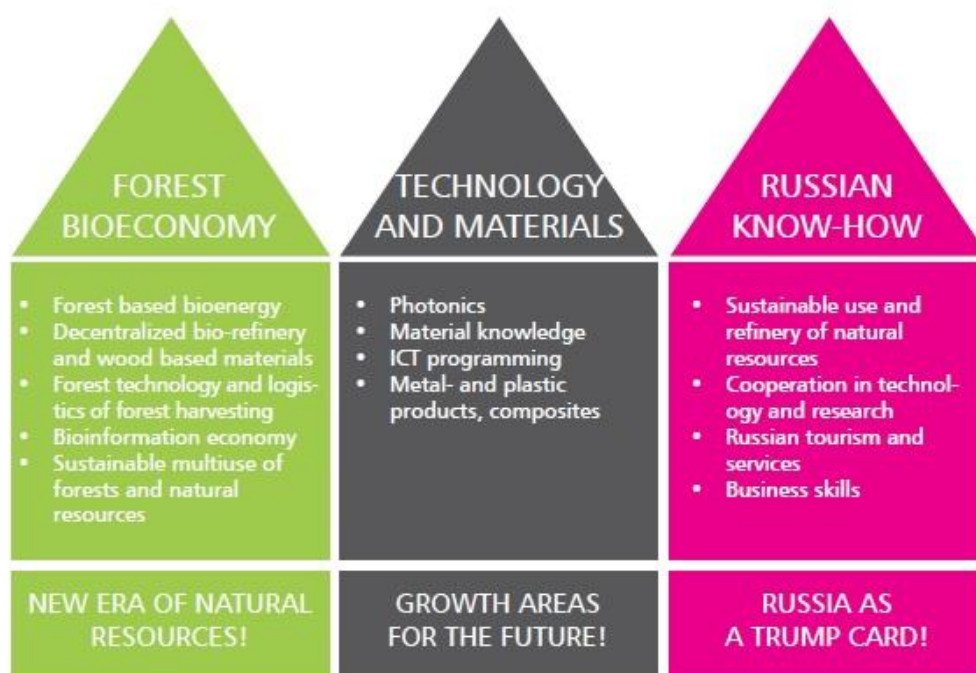


Figure 1. The Smart Specialization strategy foci of North Karelia region, Finland (Pohjois-Karjalan maakuntaliitto 2014, 8).

At Karelia UAS's approach, the concept of bioeconomy is understood wider to include all the aspects of bioeconomy defined by the Finnish Bioeconomy Strategy (Ministry of Economic Affairs and and Employment 2014, 3). The definition includes *all the economies, which use renewable natural resources to produce food, energy, products and services*, for example forestry and forest industry, agriculture and food processing, environmental technology and

protection, waste treatment, energy production, wood construction, and ecosystem services (Figure 2).

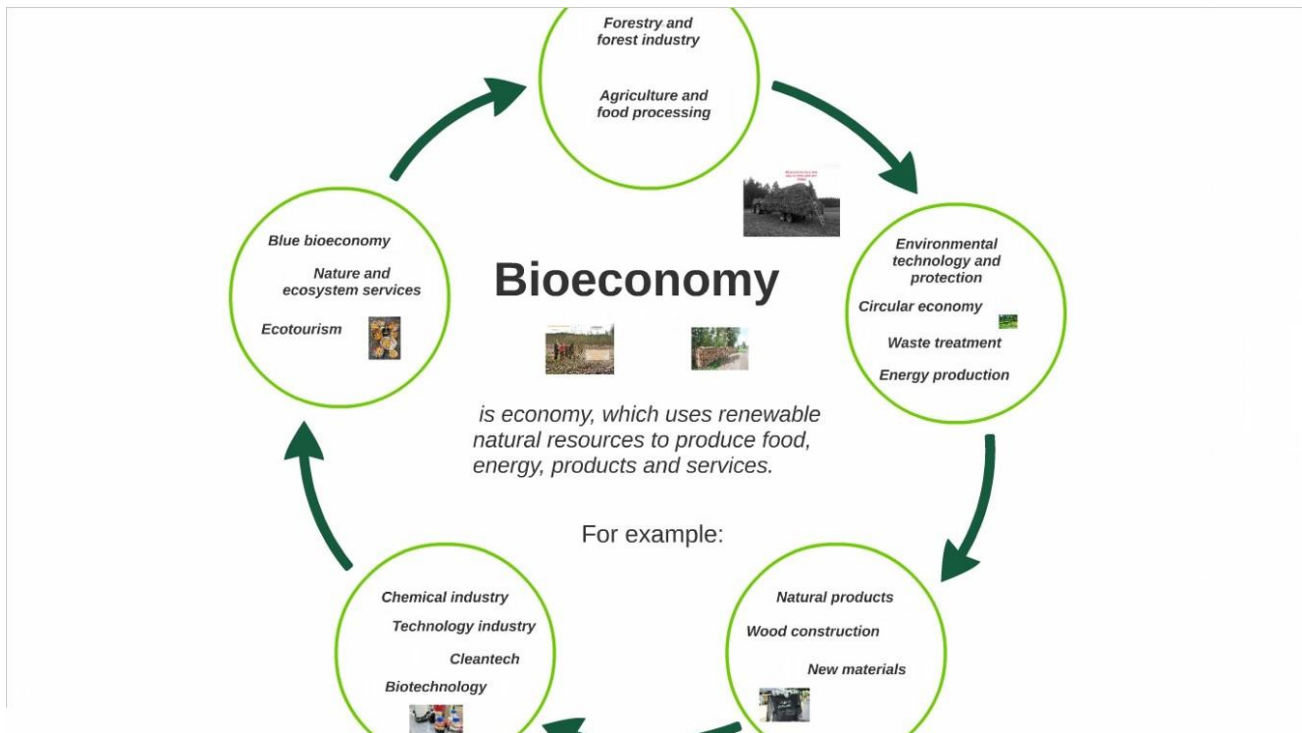


Figure 2. Bioeconomy definition and sectors applied by Karelia University of Applied Sciences.

3. Working life oriented curriculum development work at Karelia UAS

The key issue for predicting the crucial competences for future working life is the close cooperation with the businesses and other working life organisations. Also, relevant methods and tools for co-creation are needed. As universities of applied sciences have the strong regional focus, the future competences are also discussed at regional level in multiorganisational working groups. Cross-sectorality, multidisciplinary and internationality support the finding of new ways to improve higher education and serve better the development of regional labour market.

Working life oriented curriculum development work related to bioeconomy studies at Karelia UAS was piloted in 2014 for the development of Forestry, and Energy and Environmental Engineering Bachelor's degrees. The approach was quite successful, which motivated for future development work. Since that, Karelia UAS has been part of two network projects, in which the aim is to fulfil the requirement of reactivity in higher education. Firstly, the aim of Finnish ESF (European Social Fund) project AVOT is to develop open higher education towards working life needs (Turun yliopisto 2016). Secondly, Erasmus+ Knowledge Alliances funded transnational project ERDI – Empowering Regional Development and Innovation – is supporting the regional smart specialization by co-creation of working life oriented international higher education (Karelia-ammattikorkeakoulu 2016a). At AVOT project, the special emphasis is put on re-packing the existing study modules to fill the knowledge gaps of workers and provide the education openly for all persons independent of the educational background. At ERDI project the value added is the international cooperation and cross-fertilization of ideas among regions and business with similar working life challenges.

A common methodological approach used in both projects is called the Future Wheel. JAMK University of Applied Sciences from Jyväskylä has been a pioneer of applying this method in Finland (Hakala & Hopia 2015). The improved method is a great pedagogical tool for higher educational institutes to vision future working life and learn future thinking. Tool helps HEIs to concretize cooperation with the working life organisations and systematically collect information and needs for future competences.

The core idea of the method is to collectively draw a future vision of a joint theme in smaller groups. The output of each group is discussed between all the participants after every step of the wheel. As a joint output, a future wheel is documented to the whiteboard or similar by using colourful notes (Figure 3). The aim of the Karelia's Future Wheel workshops was to vision the bioeconomy working life in year 2030. Two workshops took place during the spring 2016. First workshop took place among the AVOT stakeholders in January in Joensuu,

common. Wood construction and new materials will exist more and more, as well as new innovations related to clean drinking water and decreasing climate change. General public would be much more conscious about bioeconomy, environment and green solutions. Circular economy would be a basic concept and a term of “waste” would have been disappeared from everyday use, as all the materials would be recycled and reused.

After summarizing the first question’s output, the working groups started to think about the competences, which would be needed to work in such a world visioned in the first step of the future wheel. Two different aspects raised up from the results; on the other hand basic multidisciplinary knowledge will be required, but on the other hand there would be also a need for very deep and highly specialized knowledge. This causes a dilemma, whether the HEIs should concentrate on improving the learning and knowledge search skills of graduates, or should they specialize on providing top level know-how from pre-defined, narrow focus areas.

The bioeconomy related competences visioned in step 2 varied from basic knowledge on natural sciences to field-specific skills, but also general working life skills such as networking and multicultural skills were emphasized (Figure 4). It was noted that the need for competences depends also on the sector and the level of duty. For an electric engineer it is enough to learn the basics for green economy to be able make green energy installations. On the other hand, for a doctor of forestry in global company it would be useful to learn the differences between regional economies and culture instead.

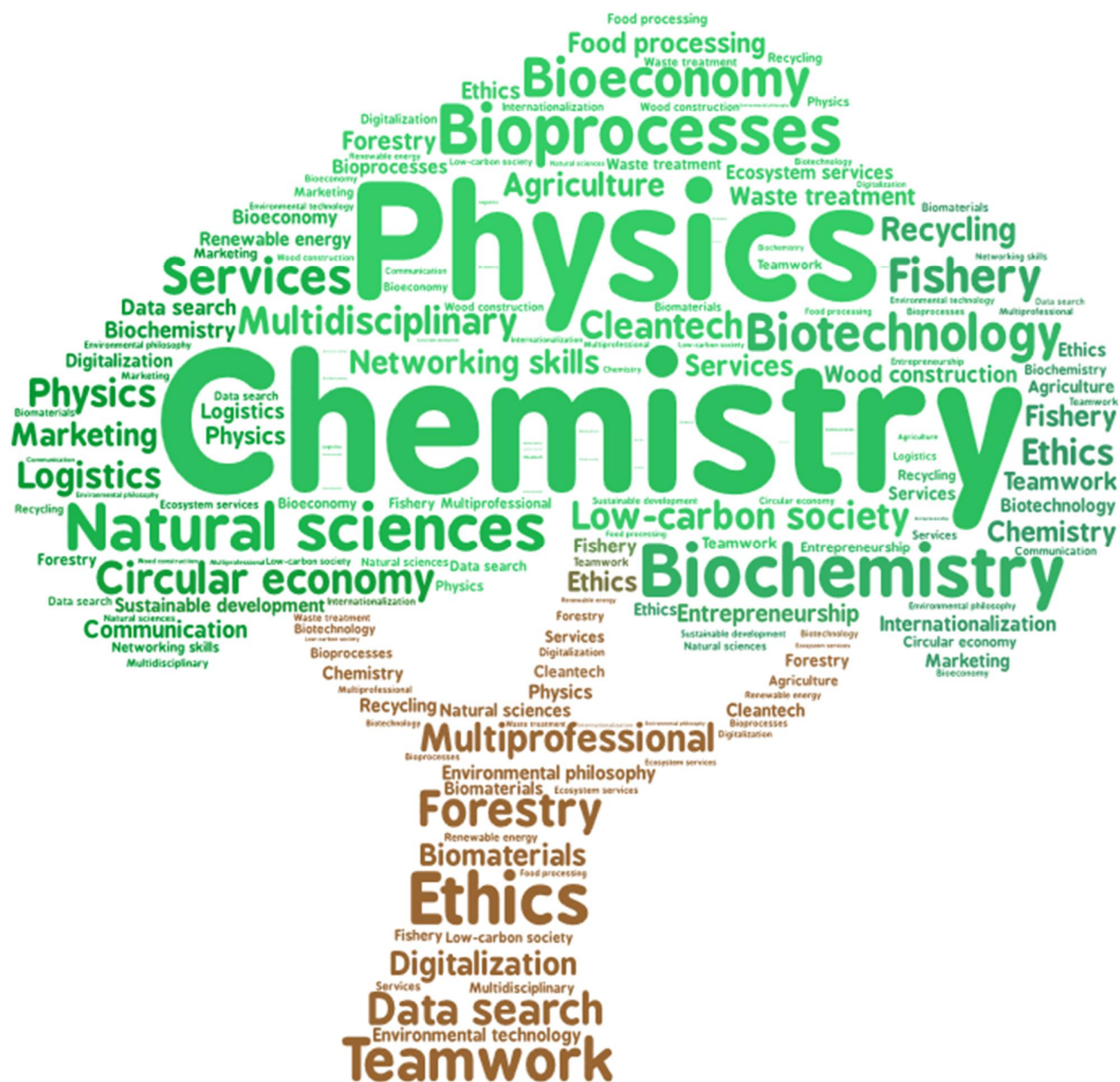


Figure 4: Summary of the key competences for future labour force at bioeconomy sector. Summary is based on the output of Karelia UASes Future Wheel workshops.

Thus, the next and last question is, how Higher Educational Institutes could respond to these very wide and variable competence requirements? How we would be able to teach those competences to our learners? A joint conclusion was that in the future individual study paths

and personal study plans will become even more common than today. Degrees will be tailored based on student's background level. New competences will be complementary to existing knowledge and a concept of continuous development and lifelong learning will be emphasized. Mentoring and coaching will be preferable teaching methods instead of lecturing. Curriculum development is based on co-development of multidisciplinary stakeholder and expert groups, and study assignments should be more and more related to real life cases.

4. Conclusions and recommendations

Higher educational institutes meet great challenges when trying to provide proactive and high quality education in acceleratingly changing world and to meet the requirements of regional smart specialization goals. The conventional curriculum development work is a slow process and new tools for defining the future key competences will be needed. In Karelia University of Applied Sciences network projects AVOT and ERDI the approach has been to apply the Future Wheel tool (Hakala & Hopia 2015) to vision the key competences of the growing bioeconomy sector in year 2030.

As a result of the Future Wheel workshops with working life organizations, a wide variety of important competences were listed (Figure 4). On the other hand, general competences as networking and multicultural skills were emphasized, but also very deep knowledge of specific areas were required. It is a huge challenge for HEIs and especially UASes to fulfil these requirements and provide proactive education for highly skilled future labour force. New, more rapid ways of providing education needs to be developed in addition to conventional degree programmes. Short courses, open university and specialization studies already exist in Finland, but may be developed further. E.g. in AVOT project, the goal is to re-pack the existing bioeconomy related open online courses from all the Finnish HEIs to a single portal easily accessible to all potential students (Karelia-ammattikorkeakoulu 2016b).

In addition, new pedagogical approaches will be needed, including e-learning, project learning and study assignments based on real-life cases. The key issue is to integrate all the studies to the working life and widen the cooperation with businesses and other organizations to

cover all the steps from joint curriculum development to co-creation of studies, mentoring, case studies and RD&I work. An example of this integration is Karelia UASes open innovation platform Sirkkala Energy Park (Figure 5), a mobile energy production system, which serves both learning, RD&I work, business experiments as well as raising awareness among general public.



Figure 5. Sirkkala Energy Park mobile energy production system as an example of open innovation platform at Karelia University of Applied Sciences.

During these first Future Wheel workshops we have just scratched the surface of the future key competences in bioeconomy, and the work will continue during the coming years. New platform for testing the method is the national network project for developing specialization studies in bioeconomy, due to be piloted in autumn semester 2017. Karelia UAS leads the

curriculum development process related to forest bioeconomy, following the focus of the regional smart specialization strategy.

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