



How to develop collaboration between bioeconomy clusters through a digital platform

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Abstract		
<p>At the beginning of the 20th century, Europe decided to take resource-efficient and sustainable economy as its national development strategy. The Interreg Baltic Sea Region Programme 2014-2020 is a project which is funded by European Union that aims at integrated territorial development and cooperation for a more innovative, accessible and sustainable Baltic Sea Region. The RDI2CluB project is part of the Interreg Baltic Sea Region project family, which concentrates on strengthening the ability of the Baltic Sea Region and stimulating the potentiality and commercial innovation of the region.</p> <p>The objective of the thesis was to analyze and pre-screen the target digital platforms which include TCI, ECCP, GCCA, ScanBalt BioRegion by using a theoretical framework that was summarized from the literature review to identify the best partners for further collaboration.</p> <p>The theoretical assessment criteria were taken references from the academic study of "five types of actors in a cluster, benefits to the businesses in a cluster, the necessary of clusters need to collaborate with each other, IKT Grenland report".</p> <p>The qualitative research enables readers to grasp more details from each platform in order to benefit the decision making of the RDI2CluB project. The data was collected from the website of each platform, as well as from the interviews of platform managers.</p> <p>After analysis and comparison, the ECCP platform was found to be the most ideal cooperation partner due to its comprehensive platform with a high bioeconomy concentration and active performance. The ScanBalt BioRegion ranks the number 2 on the collaboration list. The GCCA platform ranks the number 3 on the collaboration list, and the TCI platform ranks the last.</p> <p>The limitation of this research is the lack of data. In future academic research, where data is available, a possible research angle is to consider "the efficiency of the activities organized by the platform and how the platform members innovate as extra assessments.</p>		
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1. Introduction

1.1. Background

As Lasley and Bain (2008,19) defined: bioeconomy is an economy to use biological knowledge for commercial and industrial purposes. The bioeconomy is defined as an economy that utilize the renewable biological resources (for example field crops, woods, fish, animals or micro-organisms) to produce food, materials and energy (what is the bioeconomy? 2018). In the other words, the bioeconomy is an economy that consists the production which made from the renewable biological resources, the converted products can be food, feed, bio-products and bioenergy (BERST (Building Regional BioEconomies): A representative set of case studies 2015, 3). The bioeconomy is a foundation for a future in which societies rely on renewable and sustainable resources to meet the need for energy chemicals replacing today's use of non-renewable resources. It will reduce the negative environmental impact of industries and create a basis for sustainable future societies. (Matís Iceland 2017.) At the beginning of the 20th century, Europe started to take a resource-efficient and sustainable economy policy as its national strategy. It aims at developing a more innovative and low-emission economy that will balance the development of industry and environment protection by using renewable biological resources sustainably. To achieve the goal, the European Commission proposes a Bioeconomy Strategy and action plan, which stresses on three aspects:

- The new technologies and processes should be developed for the bioeconomy;
- The markets and competitiveness should be created in bioeconomy sectors; and
- The policymakers should make an effort on pushing stakeholders to work more closely together (Bioeconomy Policy 2018.)

The cluster is the concept that was developed recently decades. Porter (1998) defines clusters as, clusters are geographic concentration of interconnected companies and institutions in a particular field. Clusters enable linked industries and other entities important to competition. Clusters play an important role in measuring the promotion of innovation. They act as “industry-ecosystem” and provide new business solutions to a favourable business environment for experimenting (Gamp, Köcker, & Nerger 2014, 2.)

As a bioeconomy cluster, the structure consists of: the active bioeconomy entrepreneurs, supply of biomass, the bioeconomy R&D institutes, policy makers willing to support the bioeconomy, competitive bioeconomy products. (*BERST (Building Regional BioEconomies): A representative set of case studies* 2015, 6.)

The maturity of clusters usually takes fifteen years. In the analysis of the development path in the BERST project, it was divided into three stages

- Initial stage and take off (IS): to introduce the bioeconomy concept into the regional developing strategy and create the relevant policy.
- Drive to maturity (DM): When the first competitive bio-product is available on the market. The growing of a cluster includes three steps: the appearance of new companies, the establishment of cluster infrastructure (incubator, the training center etc.), and the ability of a cluster to attract funding both private and public.
- Age of mature productions (MS): a cluster can produce a competitive bioproducts in a large scale. (ibid.7)

In recent years, the huge growth potential untapped in cross-sectoral cooperation has been realised by cluster organisations. Based on this trending, cluster managers start to look for the collaboration beyond boarder (ibid.4).

As the development of internationalization, it becomes very necessary for clusters to collaborate with each other

- To provide access to markets and to knowledge;

- To raise the profile of the cluster and the cluster organization; and
- To influence policy and funding. (Greenhalgh 2012, 17).

The Interreg Baltic Sea Region Programme 2014-2020 is a project which is funded by European Union, it aims at integrated territorial development and cooperation for a more innovative, better accessible and sustainable Baltic Sea Region (Interreg Baltic Sea Region Programme 2014-2020)

The RDI2CluB project, is part of the Interreg Baltic Sea Region project family of 2014-2020 under the Priority 1 “Capacity for innovation”. It concentrates on strengthening the ability of the Baltic Sea Region and stimulate region potentiality and commercialize innovation. JAMK University of Applied Sciences is the leader of the project.

(About the project, 2017)

Five regions of RDI2CluB partnership are

- Central Finland/Finland,
- Hedmark/Norway,
- Świętokrzyskie Voivodeship/Poland,
- Vidzeme/Latvia, and
- Estonia.

This transnational cooperation will stimulate the regional innovation system and create a more dynamic innovation ecosystem for supporting bioeconomy business development and innovation. The bioeconomy innovation ecosystem promotes regional economic transition to knowledge-based jobs and bioeconomy products and services with higher economic value. The users of the bioeconomy innovation ecosystem, including SMEs, are invited to join the development process and to pilot the innovation systems created in RDI2CluB. (ibid.)

1.2. Motivation for the research

It is well-known that Baltic Sea Region has abundant natural resources, thus, which has very high potential of bioeconomy. However, with the development of urbanization, the young generations start to move to bigger cities, which cause the series of problems, such as lacking suitable human capital and specialized clusters and networks which urban areas usually have, that limit the development of rural areas. Until now, the economy in rural areas keeping the traditional way, resource-based, which not yet benefited from the latest technology and service innovations include digitalization (About the project, 2017).

European Commission decides to provide assistance for the further development of clusters' research and the labeling scheme in order to adapt it to a changing economic and political framework under which cluster organisations have to operate today: increased internationalisation and smart specialisation are just two out of many other terms that capture the new developments. (European Secretariat for Cluster Analysis 2017.)

European Parliament and European Commission set up a strategy to promote the transnational collaboration in the Baltic Sea Region and to promote the cooperation model for the whole EU. Based on this strategy, Interreg Baltic Sea Region inevitably supports the implementation of the strategy. (EU Strategy for the Baltic Sea Region 2017.)

Central Finland set a regional strategy to develop bioeconomy in Vision 2040: Central Finland dedicates to be a prosperous, international, and knowledge-based region by developing bioeconomy and digital economy (Central Finland Strategy 2040 2018.) This region is famous for the forest-based pulp, paper and bioenergy. There are three bioeconomy sectors in Central Finland: primary biomass, pulp & paper and energy. They are considered a good example that provides valuable experiences on how to establish, develop and successfully operate similar cluster (BERST (Building Regional BioEconomies): A representative set of case studies 2015, 6.) Tarvaala Bioeconomy Institution of JAMK University of Applied Sciences located in central Finland and it is

the leading Finnish bioeconomy center. It concentrates on bioeconomy education as well as finding new business solutions (Bioeconomy Towards ecologically sustainable and wise use of resources 2018.)

Confronted with global fierce competition, there is an emergency requirement for new value chains which will yield new products, services and processes. Hence, the collaboration and integration of different industry actors are called for by the new trend. Clusters and networks always act as “springboards” that bring companies and new technologies from different sectors and countries jointly to develop innovations, which will provide the ideal environment for the development of new value chain. Joining clusters enable SMEs to find the easier access to global value chain and establish the long cooperation furtherly with partners from the other countries (Gamp, Köcker, & Nerger 2014, 25.)

In the autumn of 2017, I took the economics of competitiveness as my main research track, in this course, cluster and collaboration topic are ranking as an important factor to a nation’s competitiveness. I have observed few cluster models before, after study cluster definition and detailed model, it raised my interesting to research deeper.

Based on the realization of bioeconomy, I decided to take bioenergy development as my initial theme, until I was introduced with the RDI2CluB project, which was an under-going project that sharing a similar topic with my initial plan, however it considers the bioeconomy collaboration and innovation from the level of a region.

Generally speaking, out of the curious to academic, the importance and result-oriented of the project, as well as worldwide trending, well-supported, gaining working experience which will benefit my future work, all of these factors motivate me to start this research.

1.3. Research Problem and Approach

Research Problem

The RDI2CluB project would like to assess the potential transnational networks such as TCI, ECCP, EEN, GCCA by using criteria to find collaboration and create innovation. So, the **Main** research question will be asked like this:

- *How to assess transnational networks for potential cooperation to create innovation?*

There will be another two **sub-questions** to support the main question:

- *What are the criteria to assess transnational networks for potential cooperation? and*
- *How to measure the identified networks?*

Research Approach

Based on the understanding of above context, the research approach naturally turns to qualitative research. Qualitative research designs tend to work with a relatively small number of cases. Generally speaking, qualitative researchers are prepared to sacrifice scope for detail (Silverman, 2005, 9). In my research, I will develop a frame work after literature review.

2. Literature Review

In this chapter, I focus on defining the main concepts: cluster, cluster collaboration and internationalization, open innovation.

2.1. Cluster

Porter (1998, 78) defines clusters as: Clusters are the geographic concentration of interconnected companies and institutions in a particular field. Clusters encompass an array of linked industries and other entities important to competition. They include, for example, the suppliers of specialized inputs such as the components, machinery, and services, and the providers of specialized infrastructure. Clusters also often extend downstream to channels and customers and laterally to the manufacturers of complementary products and to companies in industries related by skills, technologies, or common inputs. Finally, many clusters include governmental and other institutions-such as universities, standards-setting agencies, think tanks, vocational training providers, and trade associations, that provide necessary services such as tailor-made training, education, information, researching, and technical support.

Sölvell (2015) defined clusters as: clusters represent a type of agglomeration consisting of firms in related industries (competitors, buyers, suppliers, firms in related technologies, etc.) and a range of other supporting organizations and actors. It can be divided into four main types of agglomerations:

- The first type agglomeration related to the general economics of regional and urban concentration that apply to all firms and industries in a single location (urbanization economies), representing those external economies passed on to firms within the agglomeration. These are the forces that lead to the emergence of industrial core regions, manufacturing belts and metropolitan regions. City agglomerations and regions attract a wide range of economic activity.
- A second agglomeration type involves economies that relate to firms engaged in similar or inter-linked business activities, leading to the emergence of an industrial district. Agglomeration economies have their roots in processes whereby linkages among firms, institutions and infrastructures within a geographic area give rise to the economies of scale and scope; the development of general labour markets

and pools of specialized skills; enhanced interaction between local suppliers and customers; shared infrastructure; knowledge spillovers and other localized externalities.

- The third type of agglomeration can be defined as the centers of innovation. Clusters can be seen as a dynamic arrangement based on knowledge creation, increasing returns and innovation in a broad sense. Thus, clusters are made up not only of the physical flows of inputs and outputs, but also intense the exchanges of business information, know-how, and technological expertise, both in traded and un-traded forms.
- The last type of agglomeration relates to knowledge creation and creativity in a region without any sectoral and reproduction of the clusters of technologically related firms, there are corresponding attempts to analyse the learning abilities and creativity of regional and urban agglomerations of the general type. (Sölvell, 2015, 68-69)

Five Actors in Cluster:

A Cluster comprises five crucial actors: companies, research organisations, education organisations, capital providers, and government. (See Figure 1.)

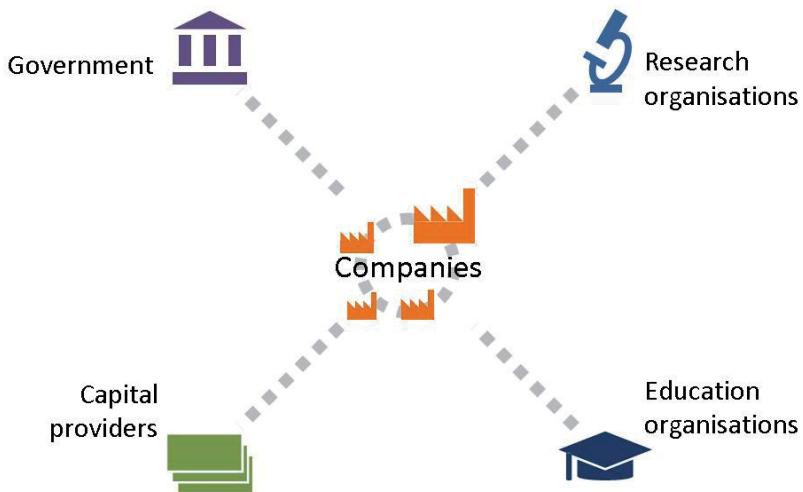


Figure 1. Five types of actors in a cluster

(Lindqvist & Sölvell 2018, 12).

Why are the clusters critical to a nation's competitiveness nowadays? Porter (1998, 80) gives an explanation: modern competition depends on productivity, not on access to inputs or the scale of individual enterprises. Productivity rests on how companies compete, not on the particular fields they compete in.

As for how the cluster will affect competition, Porter (1998) defines as three ways:

- By increasing the productivity of companies based in the area;
It will provide better access to employees and suppliers. A well-developed cluster also provides an efficient means of obtaining other important inputs. Cluster provides an access to specialized information.
It will also act as complementarities for the members. A host of linkages among cluster members results in a whole greater than the sum of its parts.

- By driving the direction and pace of innovation, which underpins future productivity growth; sophisticated buyers are often part of a cluster, companies inside clusters usually have a better window on the market than isolated competitors. Clusters also do more than make opportunities for innovation more visible. Companies within a cluster can experiment at lower cost and can delay large commitments until they are more assured that a given innovation will pan out.
- By stimulating the formation of new business, which expands and strengthens the cluster itself. Many new companies grow up within an existing cluster rather than at isolated locations.

A cluster allows each member to benefit as if it had greater scale or as if it had joined with others formally-without requiring it to sacrifice its flexibility. (ibid. 80-84)

Cluster maturity time:

The maturity of clusters usually takes fifteen years, and it was divided into three stages according to the analysis of BERST project.

- Initial stage and take off (IS): The bioeconomy concept is introduced in the regional planning and policymakers create the relevant policy, socio-economic and R&D landscape for its establishment operation.
- Drive to maturity (DM): When the first competitive bioeconomy products are sold in the market, it indicates that the cluster is heading to the maturity direction. The setup of new companies, the establishment of a cluster infrastructure (incubator, the training center etc.). All these phenomena are the indicators of cluster's growing, as well as the ability to attract both private and public funding.
- Age of mature productions (MS): When a cluster has an ability to produce the competitive bioeconomy products in a large scale. (See Figure 2)

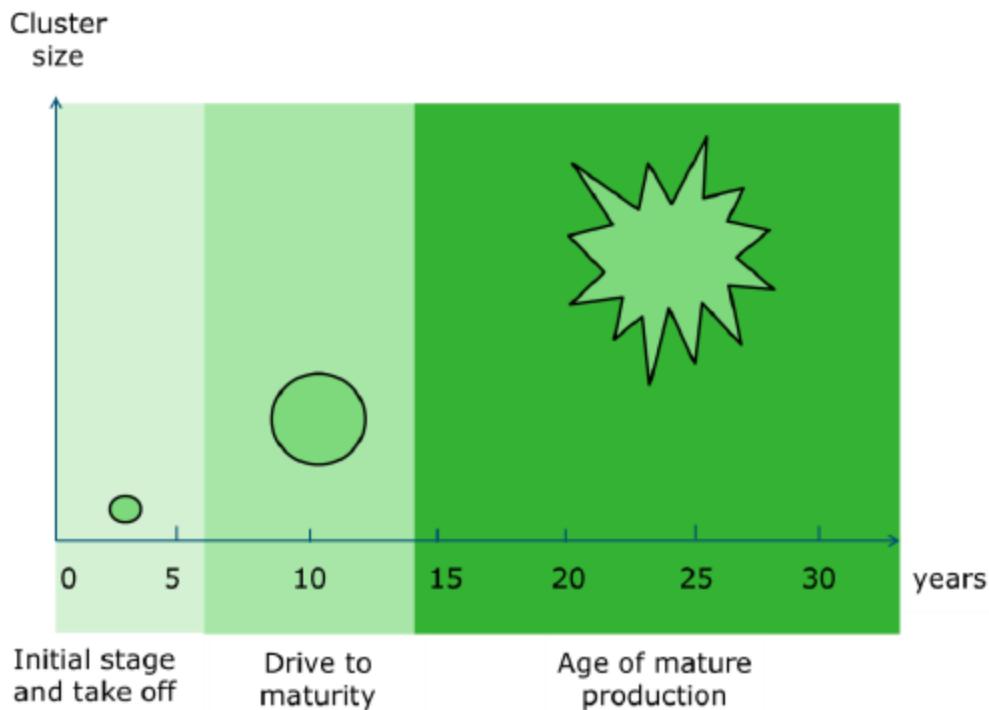


Figure 2. The development path of a biocluster

(BERST (Building Regional BioEconomies): A representative set of case studies 2015, 7)

Cluster Benchmark

Gerd (2009) indicates, benchmarking of a cluster describes the process of comparing the cluster structures, processes, developments and methods as well as service with those from other clusters, which provides a very good orientation on how the own cluster is placed and how it performs compared with similar clusters (6).

It is very important that a cluster always reviews the defined goals and tasks and to analyze the specific structures, as well as the developing history of the cluster since it was founded. The continuously economical changes and technological conditions critical factors for the development of a cluster. Except the cluster management,

there are some other factors which adopted by stakeholders to assess a cluster impartially as well, such as executive boards, policy makers and funding authorities, members. (ibid)

The comparative portfolio gives a significant affection to the benchmarking process.

There are several methods to benchmark a cluster:

- From technology perspective-specific benchmarking (the cluster compares itself with other clusters operating in the same innovation field)
- Trans-sectoral benchmarking (the cluster compares itself with the entire existing comparative portfolio, e.g. only young or small clusters, all clusters registered in the comparative portfolio) or
- Benchmarking with selected clusters (comparative portfolio is assorted individually).

Usually, the technological domain-specific comparative portfolio is chosen, because

- It can be applied to all clusters in a specific technological domain;
- It is quite similar about the operation conditions, structures, processes and patterns of services;
- It is possible to compare and classify the market and competitive position within the same technological domain;
- There are detailed and comparable data in the comparative portfolio; and
- There is similar structured information which gives the benchmarking high significance.

According to IKT Grenland report (Gerd 2009, 5), there are explicit indicator which used to assess a cluster:

- Financing: ages, the number of members when emerged, the number of current members, R&D intensity, dynamic of growth, how many foreign partners, legal form, how many staffs of cluster organisations, do they have the relevant cluster manage experiences, which area the SMEs concentrate on,

the utilisation of regional member potential, the completion of value chain, how much percentage of private financing of cluster organisation, how private financing developed of cluster organisation, how much budget per member in a cluster, the sustainability of financing of cluster organisation;

- Type and governance: the history of emergence, how a cluster govern, what kind of a role the cluster organisation plays, the assignment or tasks, the goal of a cluster, how a cluster to achieve goals;
- Cluster services: internal: how the internal information/experience exchange, how R&D/tech collaborate, how the clusters collaborate transnationally, financial services, entrepreneurial support, relevant education and tailor-made training/stuff recruiting; output: how they deal with public relations/external exchange, how R&D/tech collaborate, how the clusters collaborate transnationally, financial services, entrepreneurial support, relevant education and tailor-made training/stuff recruiting; overall output;
- Internationalisation: the status, the degree, and the responsibilities of internationalisation;
- Achievements and performance: what kind of achievements it reached, what kind of added value it has achieved that related to cluster activity, how it deals with internal and external assessments, the overall performance. (Gerd 2009, 4)

Bioeconomy Cluster

Bioeconomy cluster is the cluster that concentrate on the economy based on the production of renewable biomass resources such as plants, wood and waste, and their conversion into food, feed, bio-based products and bioenergy. (Glossary of BERST terms 2018).

As a bioeconomy cluster, its structure describes like below (See Figure 3):

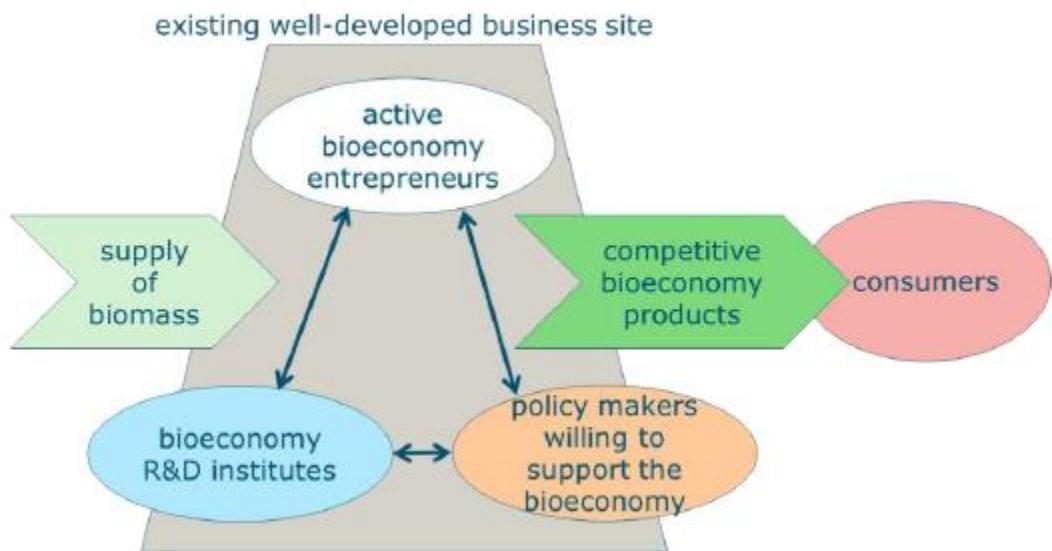


Figure 3. Organisational structure of a biocluster

(BERST (Building Regional BioEconomies): A representative set of case studies 2015, 6)

In the biocluster organisational structure, there are several key roles

- Entrepreneurs: it is a vital role in driving clusters towards successful development. Entrepreneurial spirit such as flexible, risk-taken and willing to try new ideas are very crucial to the success of cluster.
- Policymakers: government leaders who are willing to support and promote bioeconomy by providing governance and set institutional structures and providing financial support.
- Knowledge institutes: bioeconomy or relevant R&D and technologies providers which will do innovation for the development of bio-products.
- Biomass supply: biomass resources providers are critical.
- Competitive bioeconomy products: bioeconomy products which have a competitive unique selling point in the market, the bioproducts domain: fine chemicals, medicines, food, chemicals, bioplastics, transport fuels, electricity and heat.
- Funding: public and private funding, as well as the funding mechanisms that support the entrepreneurs and investors.

- Policies and measures: local legislation and supporting policies regarding to the bioproducts including measures relating to legislation, policies, standards, labels, certification and public procurement. (ibid. 5-6)

There are 8 sectors in the bioeconomy clusters: primary biomass, food and feed, construction, chemicals and polymers, pulp and paper, textiles and clothing, energy, R&D services. (ibid.)

Important of key assets in bioeconomy cluster:

- It is critically important to have a securing funding which comes from both public and private sources to establish and operate a cluster.
- Cluster organization is a useful means to develop a cluster and ensure its smooth operation.
- Entrepreneurs and entrepreneurial culture are the critical factors in the cluster development stages.
- Knowledge institutes are another important factor for a bioeconomy cluster, especially in the first two stages.
- Biomass supply ranks a quite high score, it plays an important role in the development of a cluster, besides biomass supply, good infrastructure and logistics are thought to be the other critical factors.
- The existence of competitive bioeconomy products is another important factor for the drive to maturity and mature stages (ibid.)

2.2. Cluster Collaboration and Internationalisation

Why collaborate?

The aim of creating an international platform between clusters is to enhance the collaboration among knowledge-based businesses, knowledge institutions and the local authorities, and to improve the cooperation between each other and to give them competitive edge in the future technologies, talent and markets area (Gamp, Köcker, & Nerger 2014, 25.)

The necessary of clusters need to collaborate with each other

- To provide access to markets and to knowledge;
- To raise the profile of the cluster and the cluster organization; and
- To influence policy and funding.

Internationalisation will provide different kinds of benefits to the businesses in a cluster, other organizations in a cluster, as well as the cluster organization:

Benefits to the businesses in the cluster

- Access to knowledge, to use in new products and services;
- Access to new markets;
- Access to key infrastructure, e.g. pilot plants, living labs;
- Access to new international partners for collaboration; and
- Raised profile. (Greenhalgh 2012, 18.)

Internationalisation Cluster Cooperation Journey

Below illustration describes main processes of cluster to go internationalisation. (See Figure 4)

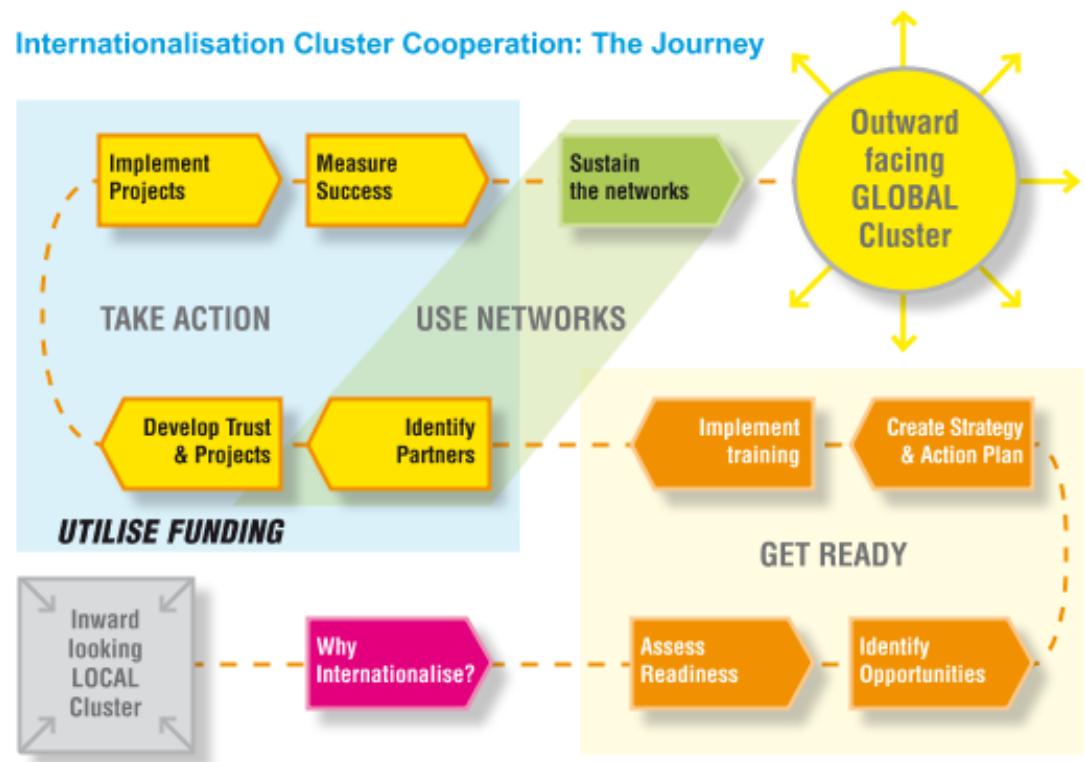


Figure 4. Internationalisation Cluster Cooperate Journey
(Greenhalgh 2012, 16)

In the book *Tactics-Cluster Internationalisation*, Greenhalgh (2012) defines the main objectives of internationalisation strategy are

- develop the sectors of the regional economy that are internationally competitive;
- maximize the region's international potential in terms of science and innovation, research & development, and education; and
- target those countries that are strategically important for the region, in terms trade, knowledge exchange and inward investment.

2.3. Open Innovation

Broadly speaking, innovation refers to the effort to commercialise new ideas (Andersson 2004). Innovation is different with the invention, it has two sides: one side is

about new things, new products, new production processes, services and novel business models, but the other side is about bringing the new product or service into practical use and create the new type of added value. The height of an innovation is not about how big the idea is, but how widely it is becoming into use. (See Figure 5).

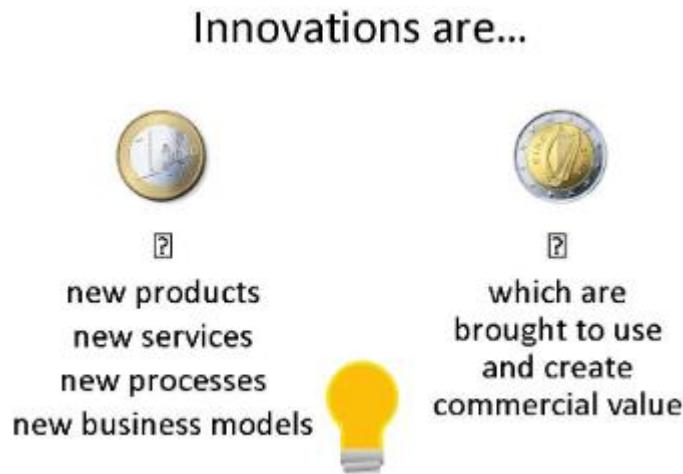


Figure 5. Two aspects of innovation

(Lindqvist & Sölvell 2018, 6)

The connections between academia and business are crucial for innovation. Usually universities and laboratories locate in city regions, innovation's seeds always sprout from that region. The acts of entrepreneurship are the other sides of the innovation. As long as the innovation be put into use, there are must be potential customers who are willing to pay for it and transform the old technology to the new type. Cluster provides mature skills, sophisticated users, relevant education opportunity and research service, and financial service which prepare to finance new ventures. In the other words, clusters provide the incubator where ideas are turned into successful commercial service and products, it is a soil for innovation. (See Figure 6).

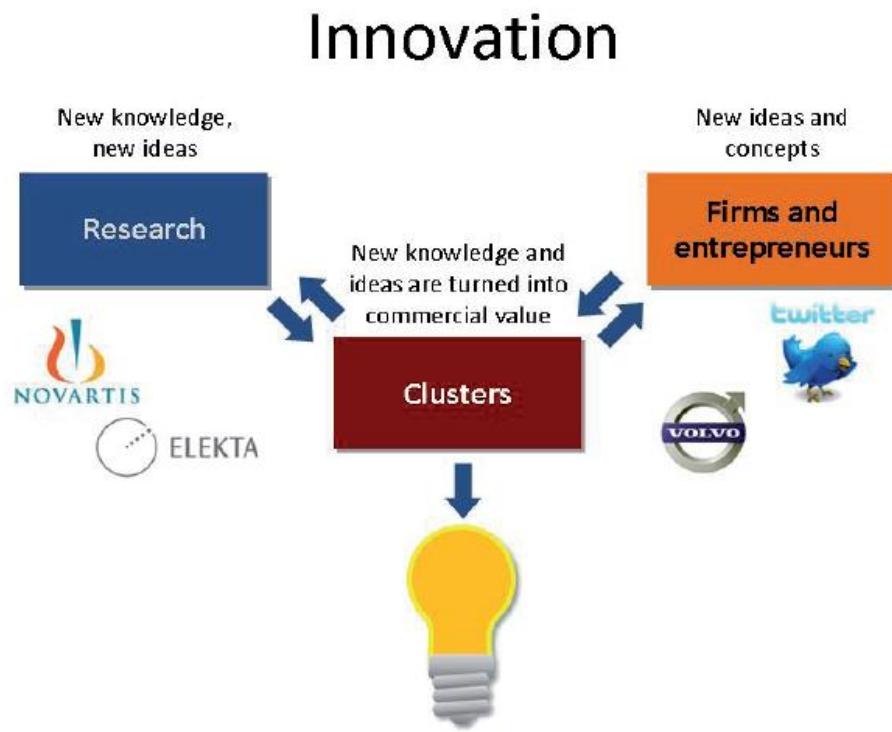


Figure 6. Innovation and Clusters

(Lindqvist & Sölvell 2018, 6).

Innovation level has a positive impact on region's cluster strength (See Figure 7)

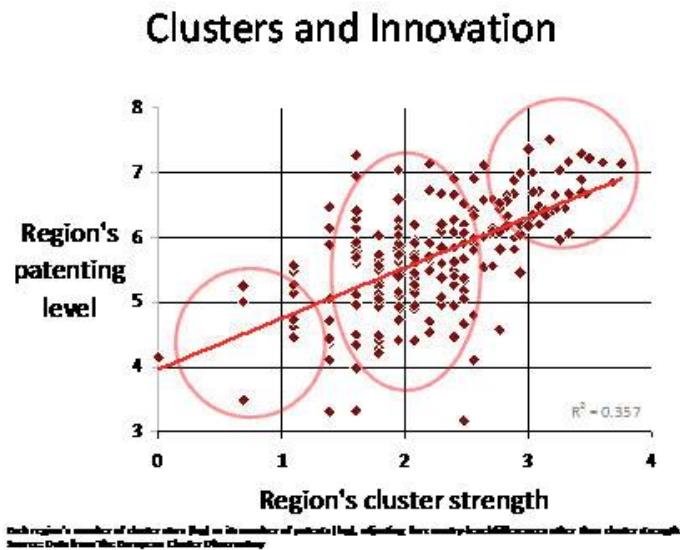


Figure 7. The affection of patenting level to clusters and innovation
(Lindqvist & Sölvell 2018, 11).

The connection between clustering and innovation is associated with sticky knowledge grounded in social interaction (Von Hippel 1994).

Indicators of innovation and economic performance

The most common indicator is research and development (R&D), which is often used as a synonym for innovation (Andersson 2004).

The importance of R&D for economic performance has been verified at both firm and industry level (Lall 1980, Mairesse & Sassenou 1991; Kravis & Lipsey 1988).

Other often-used indicators of innovation are those of scientific publications, patents, high growth firms, and the number of firms developing new or improved products. Innovation may also be observed in the form of subtle proxies for organizational change, improved quality, upgraded logistics chains, and so on.

2.4. Theoretical Framework

After studied the basic concepts, I summarized theoretical framework which consists below criteria:

Table 1.Theoretical framework for assessment of collaboration

Criteria		Measurement
Basic Information	History of the network	Year when the network started to operate
	Scale of the network	Number of members, Number of bioeconomy members, Level of internationalization.
	Aims of the network	Main objectives
	Existence of (bioeconomy) related R&D institutes	Number of R&D institutions; Number of bioeconomy R&D institutions;
	Existence of (bioeconomy) related education organisations	Number of education organisations Number of bioeconomy related education organisations
	The level of (bioeconomy) innovations in the network	Number of patents, How they are innovating Number of scientific publications
Organisation	Focus industry /clusters in the network	Key industries represented in the network
	Requirements for membership	Membership fee
Platform services	Existence of bioeconomy infrastructure owned by the network	Number and type of infrastructure
	Activities organised by networks to promote collaboration among members	Number of activities organized by networks to promote collaboration Number of Conferences in the year Number of webinars, Matchmaking activities, Other activities
	Existence of access to bioeconomy markets	Number of organised bioeconomy related trade fair
	Collaborative research	Number of research held by research institutions jointly
	Information/publication services	Number of library, mentoring services

In this framework, criteria were taken references from below resources:

Criteria: “the history of the network, scale of the network, aims of the network, the level of (bioeconomy) innovations in the network, focus industry /clusters in the network, focus industry /clusters in the network, information/publication services, collaborative research” were taken references from the suggestion by the project.

Criteria: “Existence of (bioeconomy) related R&D institutes, Existence of (bioeconomy) related education organisations?” were taken references from “five types of actors in a cluster” (Lindqvist & Sölvell 2018, 12).

Criteria: “Existence of bioeconomy infrastructure owned by the network” was taken reference from “benefits to the businesses in a cluster” (Greenhalgh 2012, 18)

Criteria: “Existence of access to bioeconomy markets was taken reference from “the necessary of clusters need to collaborate with each other” (Greenhalgh 2012, 18)

Criteria: “Activities organised by networks to promote collaboration among members.” was taken reference from IKT Grenland report (Gerd 2009)

3. Methodology

3.1. Research Approach

Qualitative research consists of a set of interpretive, material practices that make the world visible. These practices transform the world. They turn the world into a series of representations, including fieldnotes, interviews, conversations, photographs, recordings, and memos to the self. At this level, qualitative research involves an interpretive, naturalistic approach to the world. This means that qualitative researchers study things in their natural settings, attempting to make sense of, or interpret, phenomena that people bring to them. (Denzin & Lincoln 2005, 3.)

However, when we need to use qualitative research, Creswell (2005, 40) defined like this: when people need to research a group or population, he or she need to identify variables that can be measured, then we need to turn to the qualitative approach to research the issue.

In my research, I will analyze four networks by using the theoretical framework. (Table 1.)

3.2. Research Context

European Union Strategy

The context of the research is set under the general background of European Union's strategy. At the beginning of the 20th century, Europe started to take a resource-efficient and sustainable economy policy as its national strategy. It aims at developing a more innovative and low-emission economy that will balance the development of industry and environment protection by using renewable biological resources sustainably. To achieve the goal, the European Commission has set a Bioeconomy Strategy and action plan which focuses on three key aspects: developing new technologies and processes for the bioeconomy; developing markets and competitiveness in bioeconomy sectors; pushing policymakers and stakeholders to work more closely together. (Bioeconomy Policy 2018.)

European Commission has decided to provide assistance for the further development of clusters' research and the labelling scheme in order to adapt it to a changing economic and political framework under which cluster organisations have to operate today: increased internationalisation and smart specialisation are just two out of many other terms that capture the new developments. (European Secretariat for Cluster Analysis 2017.)

European Union Strategy for the Baltic Sea Region (EUSBSR)

The Baltic Sea Region (EUSBSR) is the first Macro-Region Strategy in Europe of the European Union Strategy family. The strategy was approved by the European Council in 2009 following a communication from the European Commission. The strategy is divided into three objectives, which represent the three key challenges of the Strategy: saving the sea, connecting the region and increasing prosperity. Each objective relates to a wide range of policies and has an impact on the other objectives. (EU strategy for the Baltic sea region 2018.)

Why European Union establish this strategy? This is due to the fact that the strategy is an agreement between the member states of the EU and the European Commission to strengthen cooperation between the countries bordering the Baltic Sea in order to meet the common challenges and to benefit from common opportunities facing the region. (ibid.)

The EU member states involved in the EUSBSR are Sweden, Denmark, Estonia, Finland, Germany, Latvia, Lithuania and Poland. The EUSBSR implementation is coordinated in close contact with the European Commission and the other relevant stakeholders, i.e. other member states, regional and local authorities, inter-governmental and non-governmental bodies. The Strategy is also welcoming cooperation with EU neighbouring countries (Russia, Iceland, Norway and Belarus). (ibid.)

The EUSBSR is implemented in concrete joint projects and processes. Projects and processes named Flagships of the EUSBSR demonstrate especially well the progress of the Strategy. However, no new funding or institutions have been founded to support the implementation of the Strategy. Instead, the EUSBSR, as all Macro-Regional Strategies, is based on effective and more coordinated use of existing funding sources, and the promotion of synergies and complementarities. (ibid.)

Interreg Baltic Sea Region Programme

The Interreg Baltic Sea Region Programme 2014-2020 is a project which was advocated and funded by the European Union, as well as coordinated by the European Commission. It aims at integrating territorial development and cooperation for a more innovative, better accessible and sustainable Baltic Sea Region and promote the shaped model to the other region in EU. Partners from countries around the Baltic Sea work together in transnational projects on common key challenges and opportunities. The programme is an agreement between EU member states Denmark, Estonia, Finland, Latvia, Lithuania, Poland, Sweden and the northern parts of Germany as well as partner countries Norway, Belarus and the northwest regions of Rus-

sia. This programme has four priorities: capacity for innovation, management of natural resources, sustainable transport, EU strategy support. (Interreg Baltic Sea Region Programme 2014-2020 2018.)

The programme funding consists of two parts: public funding and co-financing. The Programme public funds come from the European Regional Development Fund (ERDF), the European Neighbourhood Instrument (ENI) and Norwegian national funding. Project partners co-finance activities with their own resources. For priorities 1-3 (capacity for innovation, efficient management of natural resources and sustainable transport) the programme co-funds: up to 75% of the costs generated by partners from Denmark, Germany, Sweden and Finland; most of partners from Estonia, Latvia, Lithuania and Poland; up to 50% for partners from Norway (from Norwegian national funding); up to 75% for countries outside the Union part of the programme area. As the financing agreements between Russia and the EU, as well as Belarus and the EU, are not signed, partners from Russia and Belarus cannot receive funds at this stage. However, applicants are encouraged to include associated partners from Belarus and Russia with funding from other sources. (ibid.)

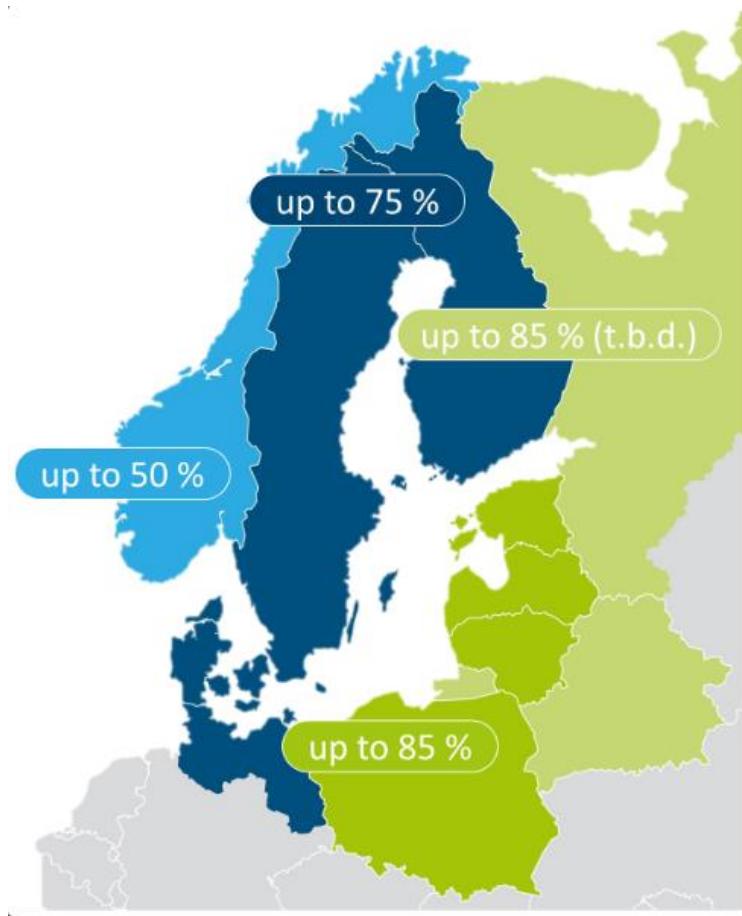


Figure 8. Map of co-financing rates in the different countries of the Interreg Baltic Sea Region Programme are.

(EU strategy for the Baltic sea region 2018.)

RDI2CluB Project

The RDI2CluB project, is part of the Interreg Baltic Sea region project family of 2014-2020 under the Priority 1 'Capacity for innovation' that is dedicated to actions strengthening the ability of the Baltic Sea Region to create and commercialize innovation. As we know, Baltic sea region have abundant natural resources; thus, it has very high potential of bioeconomy. However, with the development of urbanization, the young generation moved to bigger cities, which causes the series of problems, such as lacking suitable human capital and specialized clusters and networks which urban areas usually have, which limited the development of rural areas. Until now,

the economy in rural areas is keeping the traditional way still, resource-based, which not yet benefited from the latest technology and service innovations include digitalization (About the project, 2017.)

There are five regions were included in RDI2CluB project: Central Finland/Finland, Hedmark/Norway, Świętokrzyskie Voivodeship/Poland, Vidzeme/Latvia and Estonia.

The mission of RDI2CluB project is to help rural areas in the Baltic Sea Region to reach their full potential in bioeconomy, which founded on the use of clean technologies, renewable natural resources an recycled materials. Bioeconomy makes human beings less dependent on fossil fuels, and prevents the degradation of ecosystems, as well as promotes economic development and creates new jobs.

Central Finland Strategy

Central Finland has been setting bioeconomy development as its strategy in “CENTRAL FINLAND STRATEGY 2040”. The vision of 2040 is: “the strength of Central Finland is the knowledge and technologies in agriculture and forestry, sustainable and diverse use of renewable raw materials. It is possible to increase the local economy by developing the local and sustainable products. Clear water and water technologies create new business. The local and organic food have a big market, not only domestic, but also internationally. Central Finland can develop bioeconomy by the smart utilization of the nature resources. The sector has a leading role in export”. (Central Finland Strategy 2040.) In Central Finland Strategy 2040, there are 5 strategy choices about bioeconomy: to develop new biobased products and the machinery which will increase the production, to increase the renewable energy production, to shape the resource wise Central Finland, to strengthen strong entrepreneurs in bioeconomy, to enlarge the locally produced and processed food.

JAMK University of Applied Sciences

JAMK University of Applied Sciences locates in Jyväskylä, central Finland, it is a lead partner of RDI2CluB project. JAMK University of Applied Sciences is a developer of business and promotes of export activity within bioeconomy. It creates new material economy and circular economy saving natural resources. Several areas of expertise

are connected to bioeconomy(e.g.forestry, agriculture, industrial management, energy production, business economics and tourism.) JAMK is a producer of new resource smart solutions for the new city district of Kangas and a promoter of the business activities created by the biofactory investment in Äänekoski. JAMK strengthens the bioeconomy campus in Saarijärvi and the position of the Bioeconomy Institute as a regional centre of excellence together with businesses, the Vocational Education Institute of Northern Central Finland and the City of Saarijärvi. (JAMK Bioeconomy Institution 2018.)

TCI (The global practitioners network for competitiveness, clusters and innovation)

The TCI platform is founded in 1998, and it is a leading global network of the deep expertise in clusters and competitiveness. It collaborates in a unique open, flexible and practical context to advance in the practice of competitiveness, innovation and cluster development. Through many years' effort, TCI has reached out to 9000 practitioners from development agencies, government departments, cluster organizations, academic institutions, companies and multilateral organizations in over 110 countries. (What is TCI 2018.)

The mission of TCI network is: to support the effective use of cluster-based economic development approaches as tools for raising the competitiveness and innovative capacity of firms, cities, regions and countries. (ibid.)

The vision of the TCI network is: to be the leading global network of professionals and organizations in cluster-based economic development. (ibid.)

ECCP (European Cluster Collaboration Platform)

The European Cluster Collaboration Platform is a service facility aiming to provide cluster organisations with modern tools. By using these tools, platform members are able to make efficient use of networking instruments (search/find potential partners and opportunities), develop collaboration trans-nationally (with Europe) and internationally (beyond Europe), support the emergence of new value chains through cross-sectorial cooperation, access the latest quality information on cluster development,

improve their performance and increase their, as well as their members' competitiveness. (A vibrant platform at the service of cluster organisations. 2018.)

This platform provides below services: a dynamic mapping of more than 750 profiled cluster organisations worldwide, the largest information hub for clusters offering the latest new/events/open calls to a broad community, with more than 5000 subscribers to its weekly digest, matchmaking events supporting the development of cooperation between clusters in Europe and beyond, a unique database on regional, national, international and sectoral cluster networks, detailed information on the European Strategic Cluster Partnership, a partner search facility where cluster organisations can exchange their offers and demands, dedicated pages supporting international cooperation including the profiles of selected countries of strategic interest and related European international support services, a unique database of profiled cluster-related projects developed under various European programs. (ibid.)

The ECCP addresses primarily the needs of cluster managements, but its rich content is useful for both the SMEs cluster members and for the cluster policy makers at regional, national or international level. (ibid.)

Being at the service of cluster organisations, with a unique offer of facilities and tools to create a favorable environment for collaboration to emerge and develop, ECCP aims to become the leading European hub for international cluster cooperation, building cluster bridges between Europe and the world. (ibid.)

GCCA (Global Cleantech Cluster Association)

Global Cleantech Cluster Association is an open platform which is designed to support the development towards a shared economy and low carbon prosperity, it is a fully independent platform. Platform members are able to access capital, corporates, markets and insights by joining GCCA. (GCCA-MAKING LOCAL, GLOBAL 2018)

The GCCA is focusing on developing a new financial mechanism to enable the large-scale commercial deployment of proven technologies. The goal of GCCA is to provide

proper risk and return investment alternatives to institutional investors, e.g. pension funds (ibid.)

GCCA network provides the following services: GCCA deployment Hub network, annual GCCA later stage award, multi asset renewal fund/MARF programs, best practices and webinars, local and global office. (ibid.)

ScanBalt BioRegion

ScanBalt BioRegion is a macro-region organisation which focuses on health and life sciences economy. The registered members come from Denmark, Estonia, Finland, Iceland, Latvia, Lithuania, Norway, Poland, Sweden, northern part of Germany and north-western part of Russia. This region can also be referred to as the Nordic-Baltic or Baltic Sea Region. ScanBalt BioRegion organisation consists of university networks, corporates, hospitals, public organisations, as well as other relevant stakeholders within health and life sciences and social sciences. (Statutes of ScanBalt® fmiba, 2013.)

ScanBalt fmiba is a not-for-profit membership association with a legal entity registered in Denmark. The aim of ScanBalt fmiba is to shape the ScanBalt BioRegion as a globally competitive macro-region and innovation market. ScanBalt platform focuses on the areas of knowledge formation, education, research and technology transfer within health and life sciences to create a world-class macro-region in accordance with ScanBalt values. It acts as a bridge for communication and coordination among members. (ibid.)

The mission of ScanBalt is to accelerate the regional and inter-regional cooperation in northern European and shapes the region as an advanced health and bioeconomy concentrating region (About ScanBalt®fmiba 2018.)

3.3. Data Collection

As Creswell defined, data collection activity is a series of interrelated activities aimed at gathering good information to answer emerging research questions. Figure 9 describes the data collection activities. (2007, 118.)

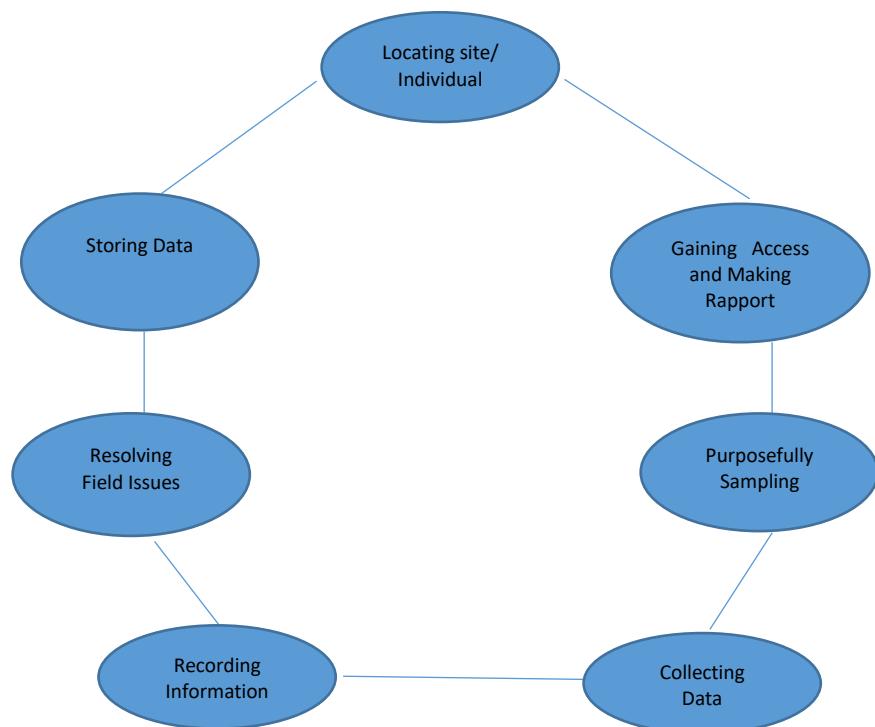


Figure 9. Data Collection Activities

(adapted from Creswell 2007, 118)

The need to choose potential platform to collaborate

As Gamp, Köcker, & Nerger defined, the purpose of creating international collaborative platform between clusters is to enhance knowledge-sharing between businesses, knowledge institutions and the local authorities, and to improve collaboration between the regions where the clusters are located in order to give them competitive edge in the battle for new technologies, talent and markets share (2014, 25.)

Identify target platforms

The RDI2CluB project is focusing on bioeconomy cluster's collaboration and innovation, so the most suitable partners will be the comprehensive cluster platforms which include the bioeconomy cluster or just the regular bioeconomy or relevant cluster digital platforms. Out from this consideration, the following digital platforms will be in my research checklist:

- TCI (The global practitioners network for competitiveness, clusters and innovation);
- ECCP (European cluster collaboration platform);
- GCCA (Global Cleantech Cluster Association); and
- ScanBalt BioRegion.

Data Collection methods-Purposeful Sampling Strategy

Purposeful sampling is used in qualitative research. It means that the inquirer selects individuals and sites for study because they can purposefully inform an understanding of the research problem and central phenomenon in the study. Decisions need to be made about whom or what should be sampled, what form the sampling will take, and how many people or sites need to be sampled. Further, the researchers need to decide if the sampling will be consistent with the information needed by one of the five approaches to inquiry. (Creswell 2007, 125.)

By following the above instructions, the data was collected from following webpages:

<http://www.tci-network.org/>

<https://www.clustercollaboration.eu/>,

<http://www.globalcleantech.org/en>,

<http://scanbalt.org/>.

Data Collection methods-Interviewing

Interviewing provides a way of generating empirical data about the social world by asking people to talk about their lives. In this respect, interviews are special forms of

conversation. While these conversations may vary from highly structured, standardized, quantitatively oriented survey interviews, to semi-formal guided conversations and free flowing informational exchanges, all interviews are interactional (Silverman, 2005, 113.)

Due to information lacking, I have arranged interviews for that unknown information. As Creswell (2007, 132) defines, there are a few steps in interviewing: identify interviewees based on one of the purposeful sampling procedures mentioned in the preceding discussion (Huberman & Miles 1994); determine what type of interview is practical and will net the most useful information to answer research questions; use adequate recording procedures when conducting one-on-one or focus group interviews; design and use an interview protocol, a form about four or five pages in length, with approximately five open-ended questions an ample space between the questions to write responses to the interviewee's comments; refine the interview questions and the procedures further through pilot testing; determine the place for conducting the interview, find, if possible, a quiet location free from distractions.

3.4. Data Analysis

Data analysis in qualitative research consists of preparing and organizing the data (i.e., text data as in transcripts, or image data as in photographs) for analysis, then reducing the data into themes through a process of coding and condensing the codes, and finally representing the data on figures, tables, or a discussion. Usually, the analytic strategy includes the following steps: sketching ideas, taking notes, summarizing fieldnotes, working with words, identifying codes, reducing codes to themes, counting the frequency of codes, relating categories, relating categories to analytic framework in literature, creating a point of view, displaying the data. (Creswell 2007, 148.)

According to Creswell (2007, 149), Wolcott (1994) defines a research approach as: firstly, highlight certain information in description, secondly, identify patterned regularities, then, contextualize in the framework from literature, finally, display findings on tables, charts, diagrams, and figures; compare cases, compare with standard. Hu-

berman & Miles (1994) also define: data analysis is custom-built, revised, and “choreographed”, the processes of data collection, data analysis, and report writing are not distinct steps in the process-they are interrelated and often go on simultaneously in a research project. (428-444).

In my research, I adopt Wolcott’s approach to analyze question: firstly, I have a meeting with RDI2CluB project manager and capture the certain keywords “bioeconomy, cluster, collaboration and internationalisation, innovation”, afterwards, I identify the relationship between each other, after I get more instructions from Professor Murat and the comments from project manager, I organized a theoretical framework from previous literature review (show as Table 1.), which will be used to analyze target networks.

3.5. Validation of the Results

As Creswell (2007, 211-212) defines, there are five validation standards to be applied to all research: First, they assess a study in terms of whether the research questions drive the data collection and analysis rather than the reverse being the case. Second, they examine the extent to which the data collection and analysis techniques are competently applied in a technical sense. Third, they ask whether the researcher’s assumptions are made explicit, such as the researcher’s own subjectivity. Fourth, they wonder whether the study has overall warranted, such as whether it is robust, uses respected theoretical explanations, and discuss disconfirmed theoretical explanations. Fifth, the study must have “value” both informing and improving practice (the “so what” question) and protecting the confidentiality, privacy, and truth telling of participants (the ethical question.)

Regarding to the first standard, I design research questions beforehand and then start to review relative literature to generate the theoretical framework which will help me to collect data and analysis.

I choose four different networks as my target analysis group, among them, they either represent comprehensive networks which supported by national or regional

commission, it includes different industry segments; either single network which focuses on certain industry. In this sense, it assures the validity and accuracy of research.

All the literature was collected from respected textbook or academic report, analysis data were collected from official websites or interviewing of organization manager or secretary.

The generated theoretical framework is also able to be applied to other cluster collaboration analysis. Besides this, all the interviews are kept confidentiality.

4. Results

4.1. TCI network

Basic Information:

- History of the network: TCI network was founded in the year 1998;
- Scale of the network:

TCI has 316 members, among them, there are 70 organisations, 246 individuals; there are 8 bioeconomy or relevant clusters exist in the organization. The network members come from America, Europe, Asia, Oceania, Africa.

- The main objective of TCI network:

TCI will support the effective use of cluster-based economic development approaches as tools for raising the competitiveness and innovative capacity of firms, cities, regions and countries;

- Existence of (bioeconomy) related R&D institutes:

TCI does not own any R&D institutes, but there are nine R&D research institutes are the members of TCI network: Institute for Competitiveness (India), Brainport Development NV (Netherlands), National Institute of Development Administration (NIDA) (Thailand), Kyiv-Mohyla Business School (Ukraine), Orkestra-Basque Insti-

tute of Competitiveness (Spain), Institute for Competitiveness & Prosperity (Canada), Industrial Technology Research Institute (Taiwan), Monash University (Australia), Higher School of Economics (Russian Federation).

- Existence of (bioeconomy) related education organisations:
there are 8 universities members exist in TCI network, the same as R&D institutes.
There are no bioeconomy related education organizations.
- The level of (bioeconomy) innovations in the network:
there is no data of patents and scientific publications.
TCI innovated by organising activities of a different kind, such as: global and regional conferences, webinars, study tours, matchmaking events, peer reviews, staff exchange, mentoring programmes. By attending activities, new ideas were generated, new technologies were promoted, new people and clusters were introduced, and new markets were accessed, all these activities facilitate collaboration and innovation.

Organisation:

- Focus industry /clusters in the network:
TCI is a comprehensive network, hence, there are no representative industries in it. TCI members include clusters of different kind, organisations and individuals: national development agency, regional or local development agency, national ministry/government department, regional or local ministry/government department, council of competitiveness, program on clusters & competitiveness/cluster region & community/ network & alliance of clusters, cluster organization/business network, university/institute of competitiveness, consulting company.
- Requirements for membership:
There is membership fee required for members: TCI membership fee: €2000, special fee for cluster organisations with up to 5 employees: €500, special fee for developing countries: €500.

Platform services:

- Existence of bioeconomy infrastructure owned by the network:

there are no infrastructures or bioeconomy related infrastructures exist in TCI network.

- Activities organised by networks to promote collaboration among members:
 - 21 times of TCI Global Annual Conferences has been organizing between the year 1998-2018.
 - 22 times webinars have been held between 2011-2018.
 - 18 times matchmaking events have been held between 2009-2016, and among them, there are 4 times events are bioeconomy or related.
 - Other activities:
 - Study tours: TCI platform provides opportunities for members to access key people from leading clusters and best performing regions.
 - Peer reviews: TCI Network offers members the possibility to organize or participate in a peer review, a non-paid evaluation performed by a selected group of experienced TCI members.
 - Staff exchange: TCI Network offers members the possibility to share your day-to-day activity in advanced teams in similar organisations as yours in another part of the world.
 - Mentoring program: The TCI Mentoring Program is aimed at improving the skills and competence in cluster management of network members. It will be held online monthly.
 - Host TCI conference: TCI provides a possibility to co-organize a TCI conference in a city or region running a program on competitiveness and clusters.
- Existence of access to bioeconomy markets:
in TCI platform, trade fairs were held in form of matchmaking events. It will offer to Cluster professionals the opportunity to explore possible common areas and market focus on SMEs.
- Collaborative research:

There is no data online about collaborative research, but from the introduction of the global conference, collaborative research is usually part of TCI global conference.

- Information/publication services:

Mentoring services will be held monthly.

There is no library service, but “links& resources” function will enable members to be able to access relevant information and resources.

4.2. European Cluster Collaboration Platform (ECCP)

Basic Information

- History of the network: ECCP network was founded in the year 2016.
- Scale of the network: it consists of 805 registered clusters or organisations that come from Europe, America, Asia, Oceania, Africa, and most of them locate in Europe. Among them, there are 135 bioeconomy or relevant members (agriculture inputs and services: 60, biopharmaceuticals: 75)
- Aims of the network: to improve member clusters' performance and increase their competitiveness through transnational and international cooperation.
- Existence of (bioeconomy) related R&D institutes: there are totally 4 R&D organisations, and 3 of them are bioeconomy or related.
 - Georgia Medical (Tuberculosis) R&D Cluster: it was founded in the year 2001 at Georgian, which focuses on biostatistics, epidemiology, clinical research, trials diagnostics, diagnosis. (Bioeconomy)
 - InfectoGnostics Research Campus Jena: it was founded in the year 2013 at Thüringen, German, which focuses on biopharmaceuticals and education and knowledge creation. For more information:
<http://www.infectognostics.de/en/partners/partner-overview.html>
 (Bioeconomy)
 - Nationwide Centre for Research, Education and Monitoring Fertility Problems: it was founded in the year 2010 at Poland, which focuses on

Cellular and Molecular Biology, Health information management, Biostatistics, Epidemiology. For more information: <http://centrumplod-nosci.pl/> (Bioeconomy)

- Klaster B+R&I - Badań i Rozwoju oraz Innowacji (Research and Development and Innovation Cluster).
- Existence of (bioeconomy) related education organisations: there are 4 education organisations and 3 of them are bioeconomy focused or related education organisations, which are the same as above R&D organisations.
- The level of (bioeconomy) innovations in the network: there are no scientific publications and patents. However, by using partner searching function, network members are able to access target partners.

Organisation

- Focus industry /clusters in the network: ECCP Network is a comprehensive network which include 50 different industry sectors, among them, there are 7 bioeconomy related industry sectors: agricultural inputs & services, biopharmaceuticals, fishing and fishing products, food processing & manufacturing, forestry, paper & packaging, wood products.
- Requirements for membership: it is an open platform where you can register your cluster free of charge.

Platform services

- Existence of bioeconomy infrastructure owned by network: there is no infrastructure in ECCP network.
- Activities organised by networks to promote collaboration among members: ECCP network provides below services: 82 times of matchmaking events, 164 times of global conferences (2016: 85 times, 2017: 67 times, 2018: 12 times), there are also partner researching service, calls publication, as well as FAQ interface for cluster organisation to ask question.

- Existence of access to bioeconomy markets: trade fairs were organised by ECCP in the form of international matchmaking events (82 times), where cluster organisations are able to access potential markets.
- Collaborative research: There are 131 times research events were held by ECCP research institution jointly.
- Information/publication services: ECCP platform provides the member with registration service which allows organisations to upload their profiles by using member registration service where they can publish the latest news and products from their cluster. Developing innovation can be created by searching suitable partners or matchmaking events. (Seel 2018.)

4.3. Global Cleantech Cluster Association (GCCA)

Basic Information

- History of the network: It was found in the year 2010 at Lahti, Finland.
- Scale of the network: it includes 54 clusters that come from Europe, America, Asia, Oceania
- Aims of the network: the main objective of GCCA is to provide suitable risk and return investment alternatives to institutional investors, such as pension funds.
- Existence of (bioeconomy) related R&D institutes: no.
- Existence of (bioeconomy) related education organisations: no.
- The level of (bioeconomy) innovations in the network: as a cooperating network, GLOBENIA network provides “innovation call” function which connects innovative startup or SMEs with investors.

Organisation

- Focus industry /clusters in the network: clean technology industry;
- Requirements for membership: there is no registering fee required.

Platform services

- Existence of bioeconomy infrastructure owned by the network: no;

- Activities organised by networks to promote collaboration among members: GCCA network provides services to access to capital, corporates and markets, the network members could benefit from the open innovation call catalyst and match maker, they are also able to benefit from financial technologies for industrial renewal, the meeting spaces at regional cluster partners, global exposure and keystone compact assessment, peer-to-peer know how and timely trend identification.
- Existence of access to bioeconomy markets: usually the trade fair will be organised by GCCA in the form of world widely events where SMSs will meet the capital providers and potential markets.
- Collaborative research: no.
- Information/publication services: there is social media was involved in GCCA, where news and events will be published, such as YouTube, LinkedIn, twitter.

4.4. ScanBalt BioRegion

Basic Information

- History of the network: it was founded in 2004;
- Scale of the network: it includes more than 3000 companies, 50 health care clusters and networks, 75 health care sector science parks and 60 universities that come from eight countries: Denmark, Estonia, Finland, Iceland, Latvia, Lithuania, Norway, Poland, Sweden, Northern Germany, northern western Russia. The bioeconomy or related industries exist in platform: pharmaceutical and biotechnological industries, biotechnology for health economy, veterinary medicine economy, as well as clean technology, food and fermentation technologies, biocompetence center of healthy dairy products, agrobiotechnology, biowater,
- Aims of the network: the aim of ScanBalt Bioregion is to accelerate the regional and inter-regional cooperation in northern European and shapes the region as an advanced health and bioeconomy concentrating region.

- Existence of (bioeconomy) related R&D institutes: there are 75 health care sector science parks, 60 universities within health/life science incl. 25 with a focus on Medtech. ScanBalt BioRegion is possible to sign a subcontract with the research institutes to do researches. (Frank 2018).
- Existence of (bioeconomy) related education organisations: there are 60 universities within health/life science including 25 of them focus on medical technology.
- The level of (bioeconomy) innovations in the network: ScanBalt Bioregion does not own any patents, but it collaborates with different medication universities and science parks which will provide research and innovation services.

Organisation

- Focus industry /clusters in the network: health economy
- Requirements for membership: There is a membership fee required:
 - Institutional membership (INS) 1100 Euro/year;
 - Founding Membership (FOU) 5500 EUR/year. Cover all organisations and companies in the member region and give a seat on the board of ScanBalt (ExCo);
 - Affiliated membership (AFF) for applicants located outside ScanBalt Bio-Region 1100 Euro/year. AFF have rights and services equal to INS; and
 - Members from the Baltic countries, Poland and NW Russia are entitled to 90% reduction in the annual fee.

Platform services

- Existence of bioeconomy infrastructure owned by the network: no;
- Activities organised by networks to promote collaboration among members: There are approximately 8-10 times of match-making events were held per year. ScanBalt Bioregion provides the below services: company news publication, partners searching and job advertising, promoting contacts with business support and investors and offering discounts on events. There are also other activities provided:

- think tank generates ideas between companies, regions, clusters and founding sources.
- accelerating services which will promote projects, the coordination of funding sources, smart specialization.
- communication services will facilitate contacts between health care providers, companies, investors and decision makers.
- Existence of access to bioeconomy markets: network members can access potential markets by attending matchmaking events (around 8-10 times per year), but the successful rates will depend on the region activities.
- Collaborative research: ScanBalt BioRegion will not do research by itself, but it was involved in some projects which aim at research.
- Information/publication services: there is a newsletter subscription interface available at where to publish news and events.

4.5. Overall Comparison and Conclusions

After collecting all the information, now I utilize the following table to compare the results with all platforms. See Table 2. Some conclusions are summarized out of the comparison.

- TCI platform was founded in 1998 which includes 316 members from 5 continents. However, the ECCP platform, which was founded in 2016, has 805 members, and is thus more active than TCI. Because the RDI2CluB project focuses on the bioeconomy cluster, ECCP platform has more advantage to collaborate due to 135 registered bioeconomy or relevant clusters covered by ECCP. Except ECCP, ScanBalt BioRegion platforms and GCCA are bioeconomy concentrating platforms as well, especially the ScanBalt BioRegion platform, which covers pharmaceutical and biotechnological industries, biotechnology for health economy, veterinary medicine economy, as well as clean technology, food and fermentation technologies, biocompetence center of healthy dairy products, agrobiotechnology, biowater industry sectors.

- All platforms do not own any R&D institutes, but TCI, ECCP, and ScanBalt Bio-Region platforms cooperate with relevant R&D institutes, which will provide research services to other members, that will facilitate innovation.
- As for the bioeconomy or related education organizations, ECCP and ScanBalt Bioregion platforms are the outstanding representatives.
- Based on the collected data, none of the platforms own any patents or scientific publications. Thus, this criterion has less affection in the decision making of collaboration.
- ECCP is the most active platform with 164 times of global conferences and 82 times matchmaking events had been held during the year 2016-2018, in where 27 times matchmaking events focus on bioeconomy industry. The TCI platform is less active in comparison with ECCP platform, and with less bioeconomy concentration as well. However, TCI platform is a good example for activity diversification. It is a dynamic platform with diversity activities that includes global conferences (21 times), webinars (22 times), matchmaking events (18 times), and there are also other activities, such as the study tour, peer reviews, staff exchange and mentoring services.
- Bioeconomy or related trade fair was organized in the form of matchmaking events. ECCP performed quite actively at this point, there are 27 times of bioeconomy focused matchmaking events out of 82 times matchmaking events, bioeconomy focusing rate high to 33%. ScanBalt BioRegion platform is another active representative, there are 8-10 times matchmaking events were held per year on average. The market accessibility of TCI platform and bioeconomy focus rate is not as good as ECCP and ScanBalt BioRegion platforms, there are only 4 times bioeconomy focused matchmaking events since the year 1998.
- GCCA platform is a good alternative to provide capital for clean technology SMEs.

- ECCP platform is the only one who have held collaboration researches among four platforms. 131 times of collaborative researches were held during the year 2016-2018.
- The membership fee was required by the TCI and ScanBalt BioRegion platform. The prices vary from different organizations.

Table 2.Comparison of four platforms.

Criteria		Measurement	TCI	ECCP	GCCA	ScanBalt BioRegion
Basic information	History of the network	Year when the network started to operate	1998	2016	2010	2004
	Scale of the network	Number of members, Number of bioeconomy members, Level of internationalization.	Totally 316 members (70 organisations, 26 individuals) that come from America, Europe, Asia, Oceania, Africa. 8 bioeconomy or related clusters.	805 clusters and organisations come from Europe, America, Asia, Oceania, Africa. 135 bioeconomy or relevant members (agriculture inputs and services: 60, biopharmaceuticals: 75	54 clusters that come from Europe, America, Asia, Oceania	More than 3000 companies, 50 health care clusters and networks, 75 health care sector science parks and 60 universities which are come from Europe and northern western Russia. Bioeconomy or related industries covered in the platform: pharmaceutical and biotechnological industries, biotechnology for health economy, veterinary medicine economy, as well as clean technology, food and fermentation technologies, biocompetence center of healthy dairy products, agrobiotechnology, biowater.
	Aims of the network	Main objectives	TCI will support the effective use of cluster-based economic development approaches as tools for raising the competitiveness and innovative capacity of firms, cities, regions and countries.	To improve the performance of member clusters and increase their competitiveness through transnational and international cooperation.	To provide proper risk and return investment alternatives to institutional investors, such as pension funds.	To promote inter-regional cooperation and envision the region as a Global Hotspot for Health and Bio Economy.
	Existence of (bioeconomy) related R&D institutes	Number of R&D institutes; Number of bioeconomy R&D institutes;	TCI does not own any R&D institutes, but there are 8 R&D institutes as cooperated members.	ECCP does not own any R&D institutes, but there are 4 R&D institutes registered in ECCP, and 3	No R&D institutes;	ScanBalt BioRegion does not own any R&D institutes, but it possible to sign a subcontract with member R&D organisations.

			There is no bioeconomy related R&D institutes.	of them are bioeconomy or related organisations.		
	Existence of (bioeconomy) related education organisations	Number of education organisations Number of bioeconomy related education organisations	TCI does not own any education organisations, but it has 8 education organisations as cooperated members, there are no bioeconomy or related education organisations.	There are 4 education organisations and 3 of them are bioeconomy focused or related education organisations.	No education organisations.	There are 60 universities within health/life science including 25 of them focus on medical technology.
	The level of (bio-economy) innovations in the network	Number of patents, How they are innovating Number of scientific publications	TCI does not own any patents or scientific publications. TCI innovate by organising activities of different kind.	ECCP does not own any patents or scientific publications.	No patents and scientific publications;	No patents and scientific publications; Member universities and research and development institutes
Organisation	Focus industry /clusters in the network	Key industries represented in the network	No.	No.	Clean technology industry;	Healthy economy
	Requirements for membership	Membership fee	TCI membership: €2000, special fee for cluster organisations with up to 5 employees: €500, special fee for developing countries: €500.	Free of charge.	Free of charge.	Institutional membership (INS) 1100 Euro/year; Founding Membership (FOU) 5500 EUR/year. Cover all organisations and companies in the member region and give a seat on the board of ScanBalt (ExCo); Affiliated membership (AFF) for applicants located outside ScanBalt BioRegion 1100 Euro/year. AFF have rights and services equal to INS; and Members from the Baltic countries, Poland and NW Russia are entitled to 90% reduction in the annual fee.

Platform services	Existence of bio-economy infrastructure owned by the network	Number and type of infrastructure	No.	No.	No.	No.
	Activities organised by networks to promote collaboration among members	Number of activities organized by networks to promote collaboration Number of Conferences in the year Number of webinars, Matchmaking activities, Other activities	21 times of TCI global annual conferences between 1998-2008; 22 webinars between 2011-2018; 18 times matchmaking events between 2009-2016(4 times aiming at bioeconomy). Other activities: The study tour, peer reviews, staff exchange, the mentoring program, host TCI conference.	164 times of global annual conferences between 2016-2018 (2016: 85 times, 2017: 67 times, 2018: 12 times.) 82 times matchmaking events. 27 times bioeconomy or related matchmaking events.	10 times of global conferences between 2015-2017, all of them are bioeconomy related.	8-10 times of matchmaking events were held per year. Other activities: think tank, accelerating services, communication services
	Existence of access to bioeconomy markets	Number of organised bio-economy related trade fair	Markets accessed by matchmaking events (18 times). 4 times aim at bioeconomy.	Markets accessed by matchmaking events (82 times). 27 times aim at bioeconomy.	No precise data. Usually, the trade fair will be organised by GCCA in the form of world widely events where SMSs will meet the capital providers and potential markets.	By attending matchmaking events (8-10 times per year)
	Collaborative research	Number of research held by research institutes jointly	No.	131 times.	No.	No.
	Information/publication services	Number of library, mentoring services	Mentoring services will be held monthly. No library services, but "links and resources" enable members to access relevant information and resources.	Member registration service where they can publish the latest news and products from their cluster. Developing innovation can be created by searching suitable partners or matchmaking events.	"News and events" channel will publish the latest news. Social media such as Twitter, LinkedIn, YouTube are also involved in GCCA platform.	"Newsletter subscription" publishes news and events regularly.

5. Discussion

5.1. The Answer of Research Questions

As talked in the sector 1.3, the main research question is “how to assess transnational networks for potential cooperation to create innovation”, and there are two sub-questions to support the main question: “what are the criteria to assess transnational networks for potential cooperation? “How to measure the identified networks?”

The results of the study are based on the comparison of the target platforms. In this research case, the following criteria play an important role at accessing target platforms: the scale of the networks, the activeness of platforms, bioeconomy focusing degree, the existence of bioeconomy or related R&D institutes and bioeconomy related education organisations. It is possible to facilitate innovation by collaboration between companies and R&D institutes. The ECCP and ScanBalt BioRegion not only performed actively in the organization of global conference or matchmaking activities, but also at the focusing degree of bioeconomy. They also performed well in the construction of collaborative relationships. GCCA platform is focusing on the clean technology investment. The TCI platform is a good example for platform activities diversification, but with less focusing degree on the bioeconomy industry.

After analysing and comparison, the ECCP platform is found to be the most ideal platform to collaborate with, which is a comprehensive platform with a high bioeconomy concentration and active performance. The ScanBalt BioRegion is a healthy economy focusing platform with a high bioeconomy concentration that ranks the No.2 of collaboration list. The GCCA platform ranks the No.3 of collaboration list which focuses on the capital providing for clean technology. The last one is the TCI platform, it is a comprehensive platform with highly activities diversification.

5.2. Managerial Implications

These four platforms are all well-developed organizations, but they focus on different aspects.

As a bioeconomy cluster, RDI2CluB project should cooperate with the most bioeconomy focusing platforms, to this aspect, ECCP, ScanBalt BioRegion and GCCA are the best partners, among them, the ECCP and the ScanBalt BioRegion platforms are the most ideal to collaborate. By collaborating with these platforms, RDI2CluB would be able to benefit the connections with bioeconomy industry companies, dynamic news, advanced R&D technologies, which will be the foundation to facilitate future innovation.

If the RDI2CluB project would like to participate different activities or trainings organized by platforms, the TCI platform will be a good partner which is good at activity diversification. By joining the activities, the RDI2CluB is able to enrich the activities of the organization or enhance the expertise of the organization's members.

For capital providing aspect, the GCCA platform is a professional platform for providing capitals for clean technology industry, which will be a good partner to collaborate with. Clean technology is now a trending industry globally and Finland is very famous for it. The biofuel industry is a branch sector of the clean technology, which is also a pillar industry in the central Finland. The RDI2CluB project may take this opportunity to introduce more capital to biofuel industry and facilitate its further development.

5.3. Limitation of the Study

Usually, research work always has certain limitations, there are limitations in my research as well. The data was collected from the given target platforms that RDI2CluB project is interested in. However, some of the issues are not the concerning of the platform or due to confidential reason or condition limitation, some data still are not available. For the missed or unclear information, such as the existence of R&D institutes in the platform, the existence of education organisations, the existence of patents and scientific publications, the number of infrastructures owned by platforms,

how they are innovating, the number of collaborative researches held by platforms, I have organized interviews with platform managers: Patricia Valdenebro, the CEO of the TCI; Lucia Seel, the ECCP communication and content manager; Peter Frank, the general secretary of ScanBalt BioRegion; Nina Harjula, the founding partner of the GCCA. However, 50% of interviewing acceptance rate unable me to access all the unclear information, which is the biggest limitation of this research.

5.4. Future Research Avenues

As this research is an initial study of the collaboration between bioeconomy clusters, there is still a lot of room for further researches. For example, the efficiency of the activities organized by the platforms, the successful rate of the matchmaking events organized. If the data available, it would be better to consider these facts as the further assessment of collaboration.

Furthermore, “how the platforms innovate” will be another interesting research topic, which will help RDI2CluB project learn experiences.

References

- Andersson, T. 2004. *The cluster policies whitebook*. Malmö: International Organisation for Knowledge Economy and Enterprise Development (IKED). Accessed on 20 February 2018. Retrieved from <http://libris.kb.se/resource/bib/9632865>
- ARCTIC Region (RCES) Regional Cluster Excellence Scorecard: 2017 Report European Secretariat for Cluster Analysis*. PDF document on cluster analysis website. Accessed on February 22 2018. Retrieved from https://www.cluster-analysis.org/ESCA_ArcticRegion.pdf
- About ScanBalt®fmba*. Page on ScanBalt BioRegion website. Accessed on 5 April 2018. Retrieved from <http://scanbalt.org/about-scanbalt/>.
- About the Project*, N.D. Page on the Interreg Baltic Sea Region RDI2CluB website. Accessed on 22 February 2018. Retrieved from <http://www.rdi2club.eu>
- A vibrant platform at the service of cluster organisations*. Page on European Cluster Collaboration Platform website. Accessed on 18 March 2018. Retrieved from <https://www.clustercollaboration.eu>.
- Brynjolfsson, E., Hitt, L. 2000. *Beyond Computation: Information Technology, Organizational Transformation and Business Performance*, Journal of Economic Perspectives 14(4), 23-48
- BERST (Building Regional BioEconomies): A representative set of case studies*. 2015. PDF document on BERST databank website. Accessed on 28 March 2018. Retrieved from [https://berst.databank.nl/report/d3.2-analyses%20of%20berst%20\(case%20study\)%20regions.pdf](https://berst.databank.nl/report/d3.2-analyses%20of%20berst%20(case%20study)%20regions.pdf)
- Bioeconomy Policy*. Page on European Commission website. Accessed on 20 February 2018. Retrieved from <https://ec.europa.eu/research/bioeconomy/index.cfm?pg=policy>
- Bioeconomy Towards ecologically sustainable and wise use of resources*. N.D. Page on JAMK University of Applied Sciences website. Accessed on 28 February 2018. Retrieved from <https://www.jamk.fi/en/Research-and-Development/Focus-areas/bioeconomy/tarvala-bioeconomy-campus/>
- Central Finland Strategy 2040*. Page on KESKI-SUOMEN LIITTO website. Accessed on 28 February 2018. Retrieved from https://www.keskisuomi.fi/in_english/central_finland_strategy_2040
- Creswell, J. W. 2007. *Qualitative Inquiry & Research Design: Choosing Among Five Approaches*. 2nd ed., Thousand Oaks: Sage Publications, Inc.

- Denzin, N.K., Lincoln, Y.S., 2005. *The Sage handbook of qualitative research*. 3rd ed. Thousand Oaks, CA: Sage
- EU Strategy for the Baltic Sea Region*. Page on Interreg Baltic Sea Region website. Accessed on February 22 2018. Retrieved from <https://www.interreg-baltic.eu/about-the-programme/eusbsr/interreg-and-eusbsr.html>
- Gamp,t. L., Köcker.G.M.Z., Nerger, M. 2014. *Cluster Collaboration and Business Support Tools to Facilitate Entrepreneurship, Cross-sectoral Collaboration and Growth*. PDF document on European Commission website. Accessed on 26 February 2018. Retrieved from https://ec.europa.eu/commission/index_en
- Gerd, m., z., k. 2009. Cluster benchmarking report. PDF document on ictcluster website. Accessed on 28 Feb 2018. Retrieved from http://www.ictcluster.bg/_Code/UserFiles/Files/8.%20Cluster%20Benchmarking%20Report.pdf
- GCCA-MAKING LOCAL, GLOBAL*. Page on Global Cleantech Clusters Association website. Accessed on 25 February 2018. Retrieved from <http://www.globalcleantech.org/en/page/about-partners-en>
- Glossary of BERST terms*. Page on BERST website. Accessed on 15 February 28 2018. Retrieved from www.berst.eu/Glossary.aspx
- Greenhalgh, B., 2012. *Tactics-Cluster internationalisation*. Transnational Alliance of Clusters Towards Improved Co-operation Support. Accessed on 15 February 2018. Retrieved from <http://search.credoreference.com/content/entry/columency/tactics/0>
- Gómez, J. 2017. *EFQM excellence model and TQM. Total Quality Management & Business Excellence*, 28(1/2), 88-103. Accessed on 30 March 2018. Retrieved from <http://www.efqm.org/the-efqm-excellence-model>
- Gamp, T. L., Köcker, G.,M., &Nerger, M. 2014. *European Cluster Observatory Report - Cluster Collaboration and Business Support Tools to Facilitate Entrepreneurship, Cross-sectoral Collaboration and Growth*. Accessed on 20 March 2018. Retrieved from https://www.clustercollaboration.eu/sites/default/files/eu_initiatives/cluster-collaboration-and-business-support-tools-to-facilitate-entrepreneurship-cross-sectoral-collaboration-and-growth_en_0.pdf
- Huberman, A.M., & Miles, M.B. 1994. *Data management and analysis methods*. In N.K. Denzin & Y.S. Lincoln (Eds.), *Handbook of qualitative research*. Thousand Oaks, CA: Sage.
- JAMK Bioeconomy Institution*. N.D. Page on JAMK University of Applied Sciences website. Accessed on 28 February 2018. Retrieved from

<https://www.jamk.fi/en/Research-and-Development/Focus-areas/bioeconomy/tarvaala-bioeconomy-campus/>

Kravis, I. Lipsey, R. 1988, *The Effects of Multinational Firms' Foreign Operations on their Domestic Employment*. Accessed on 27 March 2018. doi: 10.3386/w2760

Lasley, P., & Bain, C. 2008. *Bioeconomy-shaping the transition to a sustainable, biobased economy*. University of Hohenheim open Springer. Accessed on 15 February 2018. Retrieved from <https://link.springer.com/book/10.1007%2F978-3-319-68152-8>

Lindqvist, G. & Sölvell, Ö. Accessed on 22 February 2018. *Organising clusters for innovation: Lessons from city regions in Europe*. Retrieved from https://www.hhs.se/contentassets/f51b706e1d644e9fa6c4d232abd09e63/clusnet_final_report_v1.pdf

Lall, S. 1980, *Developing Countries as Exporters of Technology and Capital Goods; the Indian Experience*, mimeo, Oxford University Institute of Economics and Statistics, Oxford.

Mairesse, J., Sassenou, M. 1991, *R&D and Productivity: A Survey of Econometric Studies at the Firm Level*, Science-Technology-Industry Review 8 Pans, OECD

Matís Iceland. 2017. *The bioeconomy-a rural area approach*. Retrieved from <https://www.youtube.com/channel/UCY-frt3uTqgVZW-DLjoo5bA>

Porter, M., E. 1998. *Clusters and the new economics of competition*. Harvard Business Review, 76(6), 77-90. Retrieved from <http://search.ebscohost.com.ezproxy.jamk.fi:2048/login.aspx?direct=true&db=bsh&AN=1246493&site=ehost-live>

Silverman, D. 2005. *Doing Qualitative Research*. 2nd ed. SAGE Publications Ltd, London.

Sölvell, Ö., 2015. *On strategy & competitiveness: 10 recipes for analytical success*. Competitiveness Review. An International Business Journal

Symon,G., Cassell, C. 1998. *Qualitative Methods and Analysis in Organizational Research*. SAGE Publications Ltd, London.

Statutes of ScanBalt® fmba., 2013. PDF document on ScanBalt BioRegion website. Accessed on April 16 2018. Retrieved from <http://scanbalt.org/wp-content/uploads/2016/05/Statutes-ScanBalt-Revised-16-Oct-2013.pdf>

Von Hippel, E. 1994, "Sticky information" and the locus of problem solving: Implications for innovation", Management Science 40

Weber, P.R. 1985, *Basic content analysis*. Beverley Hills, CA: Sage.

What is the bioeconomy? N.D. Page on European Commission website. Accessed on 20 February 2018. Retrieved from <https://ec.europa.eu/research/bioeconomy/index.cfm>

What is TCI. N.D. Page on The global practitioners network for competitiveness, clusters and innovation. Accessed on 28 March 2018. Retrieved from <http://www.tci-network.org>

Wolcott, H. F. 1994. *Transforming qualitative data: Description, analysis, and interpretation*. Thousand Oaks, CA: Sage.

Appendices

- Appendix 1. Interview of TCI network
- What are the key industries represented in TCI network?
 - Does any bioeconomy focused or related R&D institutes exist in TCI? How many?
 - Does any bioeconomy focused or related education organisation exist in TCI? How many?
 - Does TCI offer any tools, services or platforms for developing innovations (new commercialised products or services) for its members? Please describe the tools, services or platforms for innovation, if any. Can you mention some examples of innovations created as a result?
 - Does TCI own any kind of infrastructure services, for example, piloting facilities or laboratories? If yes, are any of them bioeconomy focused or related?
 - Does TCI organise any events targeted for companies, such as trade fairs? If yes, are any of the events targeted to bioeconomy companies?
 - In what ways, does TCI promote or facilitate collaborative research between international partners? Can you mention some examples of collaborative research initiatives created as a result?

- Appendix 2. Interview of ECCP network

- What are the key industries represented in the network?
- Does any bioeconomy focused or related clusters exist in ECCP? How many?
- Does ECCP have any information or publication service, such as libraries or material banks on case studies, best practices etc.? If yes, are any of them bioeconomy focused or related?
- Does ECCP offer any tools, services or platforms for developing innovations (new commercialised products or services) for its members?

- Does ECCP own any kind of infrastructure services, for example, piloting facilities or laboratories? If yes, are any of them bioeconomy focused or related?
- Does TCI organise any events targeted for companies, such as trade fairs? If yes, are any of the events targeted to bioeconomy companies?