



Good Practice: Greater Manchester (COE Bio3)

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1. Introduction

The BERST project explains the bioeconomy development path of a) BERST regions and b) selected Good Practices. Aim is to provide a practical guide and source of inspiration for other regions that wish to develop their bioeconomy potential. Under this analysis:

- **BERST regions** are structured narratives for development pathways of clusters in different bioeconomy sectors in the regions of partners in the BERST project;
- **Good Practices** are examples of regions that contain one or more successful bioeconomy clusters at the mature production stage.

Especially, Good Practices have been analysed in order to:

- understand how the various key assets interacted and performed during the development stages;
- draw a number of lessons for the development of bioeconomy clusters within their respective regions; and
- provide recommendations to other regions and clusters for each key asset and each bioeconomy sector on which issues they have to take into account in order to establish, develop and successfully operate similar clusters.

1.1 Bioeconomy clusters

The bioeconomy can be described in terms of an economy that ‘encompasses the production of renewable biological resources and their conversion into food, feed, bio-based products and bioenergy. In BERST, a **bioeconomy cluster** is perceived as a geographical concentration of actors in vertical and horizontal relationships aiming to develop the bioeconomy. Bioeconomy clusters have been categorised to allow comparison and better understand synergies and interactions of the various elements involved in the formation of bioregions. BERST recognises eight bioeconomy sectors, namely:

- primary biomass;
- food and feed;
- construction;
- chemicals and polymers;
- pulp and paper;
- textile and clothing;
- energy;
- R&D biotechnology.

Given the broad coverage of sectors within the bioeconomy, bioeconomy clusters might be rather heterogeneous in their specific focus. The development and marketing of bioeconomy products does not differ from other products: the challenge is to introduce competitive bioeconomy products that can be sold in profitable quantities on the basis of its price, quality, and service combination preferred by buyers over that offered by competing products. This implies that in the analysis of the development of the bioeconomy clusters the same three factors play a role as in the case of clusters aiming at the introduction and marketing of televisions or cars: input-output linkages among firms, social capital and institutional thickness.

1.2 Key assets and development paths of bioeconomy clusters

The input-output linkages among firms, social capital and institutional thickness in the cluster are all embodied by actors with varying properties. In the analysis of the development path of a bioeconomy cluster, we assume that the actors of the region, in which the cluster is located, apply a strategy to develop the bioeconomy by transforming biomass into competitive bioeconomy products. Such a transformation process takes time. Hence, our analysis is guided by two starting points:

1. a focus on five key assets of a bioeconomy cluster, as outlined in our conceptual model for the analysis of the strategy of a bioeconomy cluster (Fig. 1). These are:
 - a. **entrepreneurs**: the presence of an entrepreneurial culture with active, innovative, flexible and risk taking entrepreneurs plays a pivotal role in driving clusters towards successful development;

- b. **policymakers:** political leaders who are willing to support the development of the bioeconomy by providing governance, institutional structures and financial support;
 - c. **knowledge institutes:** organizations that provide the technical knowhow and innovation for the development of bioeconomy products;
 - d. **availability of biomass resources:** a continuous supply of biomass resources of constant quality is critical for the development of bioeconomy products;
 - e. **competitive bioeconomy products:** commercially viable products, such as chemicals, medicines, food, bioplastics, transport fuels, electricity and heat.
2. a long run time horizon of a bioeconomy cluster, with 3 phases (Fig. 2):
- a. **initial stage and take off:** the bioeconomy is introduced in the regional planning agenda and the policy, socio-economic and R&D landscape for its establishment and operation is created;
 - b. **drive to maturity:** the first competitive bioeconomy products are sold at the market. The cluster grows with the setup of new companies, cluster infrastructure (with incubator, training centre etc.) has been established, and the cluster is able to attract both private and public funding
 - c. **age of mature production:** the cluster is able to produce competitive bioeconomy products at an extensive scale.

The exact duration of each of these phases differs from cluster to cluster; according to estimates of PwC (2011) the duration of the initial stage and take off is about 5 years, that of the drive to maturity 5-10 years, and that of the age of mature production 10-20 years.

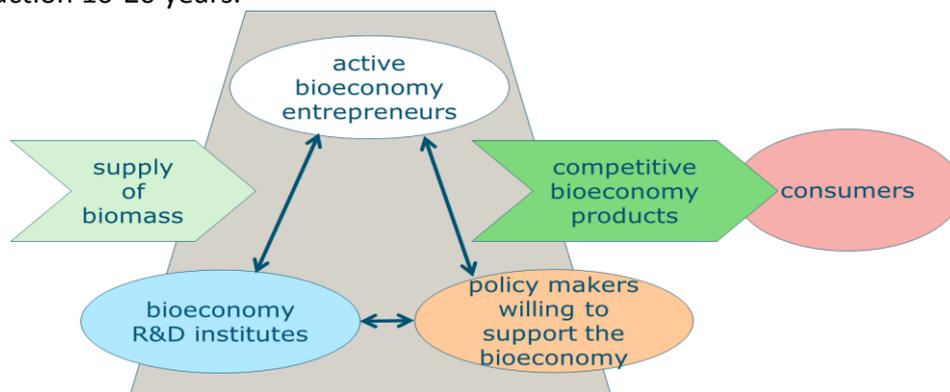


Figure 1 Conceptual model for the analysis of the strategy of a bioeconomy cluster

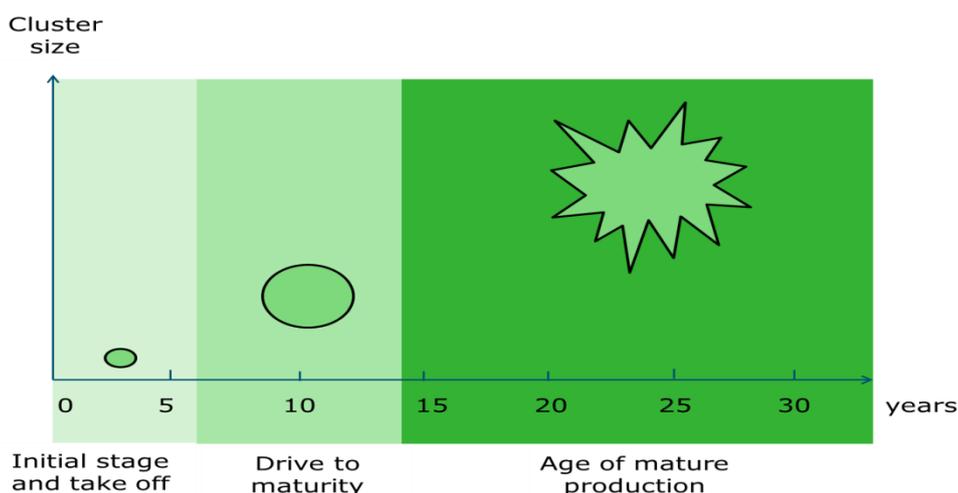


Figure 2 The development path of a bioeconomy cluster

1.3 Bioeconomy clusters in BERST project

The bioeconomy clusters that are analysed in BERST are distinguished in ‘Good Practices’, i.e. bioeconomy clusters within the age of mature production, and ‘BERST regions’, i.e. bioeconomy clusters in the regions of partners in the BERST project (Table 1).

Table 1 Studied bioeconomy clusters in BERST

<i>Good Practices</i>	<i>BERST regions</i>
Ghent (Belgium)	Central Finland (Finland)
North Rhine Westfalia (Germany)	Straubing (Germany)
Toulouse (France)	Biobase Westland (Netherlands)
Manchester (UK)	Biobased Delta (Netherlands)
	Madrid region (Spain)
	Western Macedonia (Greece)
	Slovenia

The bioeconomy clusters in the BERST regions are in varying stages of development, and some of them can also be regarded as Good Practices (Central Finland, lower Bavaria, Biobase Westland and Biobased Delta). Statistical data, literature and interviews with key actors have been used to collect information on the functioning of each bioeconomy cluster. The analyses of the bioeconomy clusters of the Good Practices have provided a number of key findings on the interaction of actors in the cluster. Subsequently, in the analysis of the BERST regions it has been explored to which extent the key findings of the Good Practices also apply for these bioeconomy clusters and which barriers they face in developing the bioeconomy cluster. The analysis in BERST focuses primarily on the Good Practice mature bioeconomy sectors within the study countries, but as the clusters encompass more than one sector, the performance and interactions of key assets is expected to influence them as well.

2. Greater Manchester (CoE Bio3)

With kind contribution from Dr Mark Corbett

2.1 The region and the cluster

The region

Manchester is a city in England, with population (2013) of 514,417 as of 2013¹. Manchester is in the south-central part of North West England, which is the UK's second most populous region, with population 2.5m². It is fringed by the Cheshire Plain to the south, the Pennines to the north and east and an arc of towns with which it forms a continuous conurbation.



Figure 1 Region of Greater Manchester

Today Manchester is ranked as a beta world city by the Globalization and World Cities Research Network and is consequently the highest ranked British city except for London³. Its metropolitan economy is the third largest in the United Kingdom with an estimated PPP GDP of US\$92 billion as of 2014⁴.

The cluster

CoE Bio3 is a research based organisation funded by industrial actors with focus on the industrial development of northwest England. So far they have funded mostly doctoral level research on pharmaceuticals but there is a recent re-focus to advanced chemical applications including bioenergy and biomass. Albeit these activities are relatively new and advanced, they already form an important part of the activities among certain partners of CoBio3.

2.2 Performance of key assets during the development pathway of the cluster

CoE Bio3 is a Good Practice in the R&D services sector in BERST.

¹UK population estimates". Office for National Statistics. 26 June 2014.

²2011 Census – Built-up areas". ONS.

³The World According to GaWC 2012". Globalization and World Cities Research Network.

⁴Istrate, Emilia; Nadeau, Carey Anne (November 2012). "Global MetroMonitor". Washington, DC: The Brookings Institution.

An analysis of the performance of key assets across cluster development stages is provided in the following sections alongside with barriers and enabling factors which have framed their progress. Traffic light colour coding is used to illustrate the strength and performance of each key asset during the development stages and how this has impacted in the progress of the cluster’s activities. Traffic light colour coding reflects the discussions with stakeholders from the clusters and the region as well as the regional partners from the BERST project.

Table 1 presents the performance of the various bioeconomy sectors which are present in the cluster across the key assets, during the initial (IS), the drive to maturity stage (DMS) and the mature stage (MS), based on the results from the questionnaire survey.

Table 1 Cluster performance in the under study key assets

Key asset	R&D services		
	IS	DMS	MS
Cluster Organisation	Moderate	High	High
Actor			
Entrepreneurs	Moderate	High	High
Policy makers	Moderate	Moderate	High
Knowledge institutes	High	High	High
Biomass supply	Moderate	Moderate	Moderate
Competitive bioeconomy product	Moderate	High	High
Funding	Moderate	High	High
Policies and measures	Moderate	High	High

Low

Moderate

High

Biocluster organization

Table 2 shows how CoE Bio3 has strong centralised cluster organisation with dedicated jobs and roles. This structure facilitates transfer of knowledge, communication and facilitates strong networking activities. The cluster was focused from the outset on industrial research and was successful in simplifying intellectual property rights and administrative procedures with the result that industry was able to access and to fund the cluster’s activities.

Table 2 Cluster performance in biocluster organisation

Issue	R&D services		
	IS	DMS	MS
<i>Central organisation that coordinates, manages, and facilitates the biocluster</i>			
<i>Role of key actors</i>			
• <i>Entrepreneurs</i>			
• <i>Policy</i>			
• <i>RTD</i>			
<i>Funding</i>			

Since 2013, cluster management is paid by member fees.

Barriers

- As the cluster is initiated by R&D providers strong efforts were required to communicate the results that are mature and close to commercialisation and persuade for the added value of the innovative components.

Enabling factors

- Central organisation was developed shortly after the establishment of the cluster.

Actors

The strong support from the North West Development Agency (a regional government entity) was critical at the initial stage of development. More recently, the cluster engages with stakeholders via research projects, Climate KIC, etc.

The dialogue with the policy makers in the region has been in the forefront of the cluster's activities as it is very important to help maintain both the profile and secure support.

Table 3 Cluster performance in actors involved

Issue	R&D services		
	IS	DMS	MS
<i>Entrepreneurs activity</i>			
<i>Interaction of entrepreneurs with RTD</i>			
<i>Geopolitical position of the region</i>			

Barriers

- Initial interaction with entrepreneurs was time consuming and required effort to communicate benefits of biobased innovations.

Enabling factors

- Strong knowledge providers provided a successful start to the cluster through research projects;
- Increased awareness and consistent interactions among policy, industry and research actors.

Supply of biomass

The cluster is not directly linked with large biomass supply, since its focus is R&D. However, and as their members plan to move towards biorefinery research the issue of biomass supply is expected to gain more interest.

Table 4 Cluster performance in biomass supply

Issue	R&D services		
	IS	DMS	MS
<i>Biomass availability</i>			
<i>Indigenous supply</i>			
<i>Biomass trade</i>			

Barriers

- Sourcing lignocellulosic biomass for future research in biorefineries is expected to be a big challenge

Enabling factors

- Well-developed road infrastructure
- Using residual or by-products from agricultural industries increases the potential for adding value both to the farmers and the traditional markets.

Competitive bioeconomy products

The following competitive bioeconomy products have been developed within the cluster so far:

- Components for the pharmaceutical industry,
- biocatalytic toolkits for diagnostics,
- fine chemical manufacturing, etc.

All of them have been results of successful cross over and transfers between the respective sectors.

Table 5 Cluster performance in competitive bioeconomy products

Issue	R&D services		
	IS	DMS	MS
<i>Innovation of bioeconomy products</i>			
<i>Cross over/ Transfer between sectors</i>			
<i>Degree of innovation</i>			

Barriers

- Volatility of raw material prices
- Complexity over meeting product specifications due to variable and volatile physical properties of the bio- based products

Enabling factors

- Efficient cross over and transfer among the entrepreneurs and the regional chemical industries.

Financing

CoE Bio3 is a virtual centre which obtains funding from industrial contract research assignments and large European research and demonstration projects.

Table 2.6 Cluster performance in financing

Issue	R&D services		
	IS	DMS	MS
<i>Public funds</i>			
<i>Accessibility of funds / Procedures</i>			
<i>Private funds</i>			

Barriers

- The availability of private funds is rather difficult to secure during the initial stage as the cross sector transfers, respective methods and products are not yet developed.

Enabling factors

- Increased access to public funding for research, development and demonstration activities provided opportunities for entrepreneurs and for increased innovation in end products.
- Very successful R&D programmes strengthened the position of the cluster in terms of technological excellence and brought funding from private sources/ industrial actors as well.

Policies and measures

The cluster, being driven mostly by the research and innovation policies, has benefited through the years by targets set for bioeconomy and biobased products at different governance levels, including EU, national but also regional ones that focus at fostering industrial innovation.

Table 7 Cluster performance in policy

Issue	R&D sevices		
	IS	DMS	MS
<i>Presence of policy instruments</i>			

<i>Effectiveness of policy instruments</i>			
<i>Consistency of policy</i>			
<i>Monitoring procedures</i>			

Barriers

- Variability of demand sectors increases the complexity of setting targets for research across sector budgets.

Enabling actors

- Interest in initiative from industrial actors.
- Possibility for funding of research and infrastructure through national and regional funding.

2.3 Difficulties, opportunities and lessons learned

Difficulties and opportunities during the initial and drive to maturity stages

An initial difficulty was access to UK funds to enable large industrial collaboration. Such opportunities were more readily available through European programmes with industrial research focus. UK funding for developing technology from the laboratory to industrial scale has only recently become available.

The major opportunity was the diversity of funding sources (public, private, EU, national, regional, etc.) which allows flexibility, facilitates efficient intellectual property rights, efficient IT and operational access to all partners involved.

Another critical opportunity for the development of the cluster was the presence of the Centre of Excellence with academic participants who were focused, visionary and able to work with industry.

Lessons learned

Specific learning points from the development of the bio-cluster in Manchester

In this section a set of specific learning points are described, based on the interviews with stakeholders in the Good Practice clusters/ regions. The learning points are linked to the key assets, the development stages and the respective bioeconomy sectors.

Table 8 analyses a set of specific lessons learnt from the development of the biocluster in Manchester by key asset, development stage and bioeconomy sector.

Table 8 Specific lessons learnt in Manchester

Specific lessons per key asset	Stage related to	Specific lessons	Bioeconomy sector
	Initial	Develop a «Cluster culture».	R&D services

Actors	Initial Drive to maturity; Mature production	Develop an "open & participatory" approach within the innovation communication channels. Communicate and discuss findings, success and failures frequently.	R&D services
Biomass Supply	Drive to maturity	In order to use primary and secondary biomass as feedstock for bioeconomy applications, consistent stakeholder dialogues and coordination needs to be facilitated.	R&D services
Products	Initial	Cluster management should be more engaged in and informed about product development of its cluster partners in order to monitor project processes, recognize potential cross-overs and facilitate cooperation.	R&D services
Funding	Initial	Ask for cluster participation/membership fee, as it will heighten the value of the membership to companies.	R&D services

2.4 References

<http://www.coebio3.manchester.ac.uk/>

<http://www.rsc.org/chemistryworld/2014/06/10-years-ago-co3bio3-opens-manchester>

<http://www.uk-cpi.com/case-studies/coebio3/>