



## SMART & CIRCULAR HUB



**Development plan**  
University of Groningen



# Disclaimer

In May 2020, the Rijksuniversiteit Groningen (hereafter: the 'Client') has requested PwC Advisory N.V. (hereafter: 'PwC' or 'we' or 'us') to support them in setting up a development plan for the Smart & Circular Hub.

PwC has drawn up this report (hereafter: the 'Report') in collaboration with the University of Groningen. PwC has supported the writing of this report and has guided the RUG in drawing up this development plan. The Report should be read as a whole, and only as a whole, in order to let the reader understand the outcome of the report with respect to the assignment.

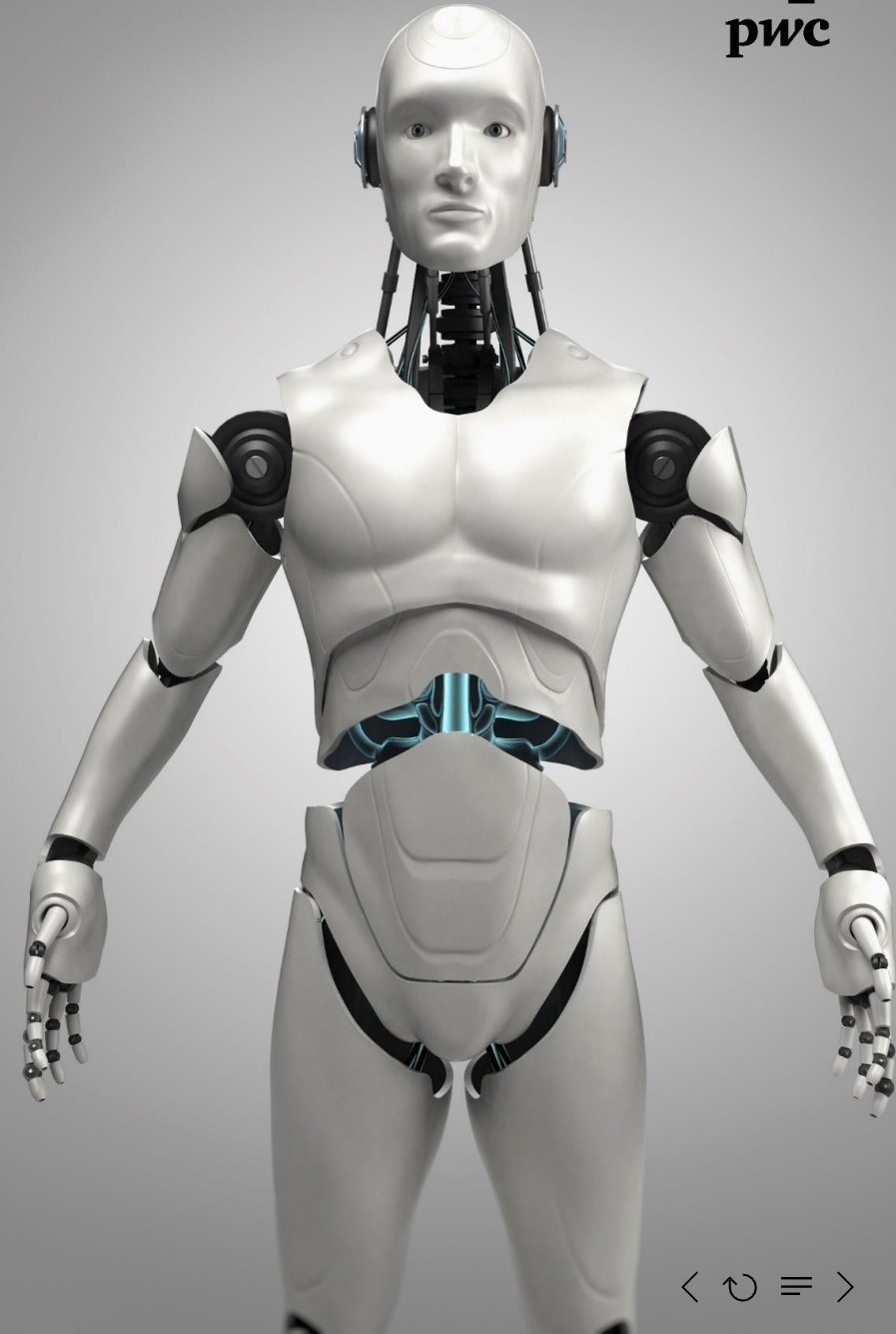
In preparing the Report, PwC has based itself (in part) on documents and information PwC received from various parties (including the Client) (hereafter: 'Third Party Information'). PwC has used the Third Party Information on the assumption that this information is correct, complete and not misleading. The reliability of the Third Party Information has not been verified or established by PwC. PwC has not performed an audit of the Third Party Information, nor an assessment aimed at determining its completeness and accuracy in accordance with international audit or review standards. PwC makes no representation or warranty, express or implied, as to the accuracy or completeness of the Third Party Information or related representations in the Report.

The scope, context and limitations of the work done by PwC are set out in our proposal dated June, 4th, 2020 with reference number 2020-0164/FK/IB/mvg. The Report was prepared for the exclusive use of the Client and solely for the purpose stated in the Report. No other parties than the Client are authorized to use or rely on the Report. PwC accepts no responsibility, duty of care or liability in relation to (information contained in) the Report – whether in contract, tort (including negligence) or otherwise, to any other party than the Client.

This Report and any dispute which may arise out of or in connection with it, shall be governed by and construed in accordance with the laws of the Netherlands.

[www.pwc.nl](http://www.pwc.nl)

© 2020 PwC. All rights reserved. PwC refers to the PwC network and/or one or more of its member firms, each of which is a separate legal entity. Please see [www.pwc.com/structure](http://www.pwc.com/structure) for further details.





# Content

- I. Introduction
- II. Mission statement
- III. Internal analysis
- IV. Market analysis
- V. Best-practices
- VI. Stakeholder analysis
- VII. Vision
- VIII. Growth model
- IX. Strategy
- X. Development path
- XI. Appendices



## Background

The Northern region of the Netherlands consists of three provinces: Groningen, Friesland and Drenthe. Since this decade, the region is facing some challenges, such as an increase in earthquakes due to the gas exploration in the province of Groningen. Due to public pressure, the Dutch government decided to gradually reduce and eventually stop these activities. According to research performed by the Dutch news station NOS, the discontinuation of these gas drilling activities will result in a national economic decrease of up to 2 billion euros every year. Furthermore, the population growth and the gross regional product of the northern provinces have been lagging behind in comparison to the rest of the Netherlands for the last 10 years (CBS, 2018). The same trend applies to the employment rate in the industry sector. In contrast to an average national growth, the Northern region shows a decrease in the provinces of Groningen and Drenthe (ING, 2018).

Despite the aforementioned challenges, the Northern region also offers unique selling points such as a strong innovation climate. The province of Groningen has a strong position in the ING innovation index (rated as no. 5 of provinces in the Netherlands), with for example an increase of the level of education in East Groningen and Delfzijl. By specializing their education to ICT, energy transitions and hydrogen, Groningen is holding off the so-called “brain drain” by keeping higher educated people in Groningen. The innovative capacity of the province of Friesland stems mainly from their manufacturing industry and clusters such as the innovation cluster Drachten. Lastly, the province of Drenthe has a very flexible business environment due to a high percentage of SMEs, reflected by an increase in patent applications since 2017. Especially the chemical cluster at Emmen is active in the development of sustainable plastics (ING, 2018).

## University of Groningen

The University of Groningen (hereafter: RUG) is the second-oldest university in the Netherlands and is a comprehensive university with eleven faculties, ranging from Science and Engineering to a medical hospital (UMCG).

The university lately made the strategic decision to strengthen their research and education in engineering. Next to that, the RUG is an important partner in the University of the North and aims to respond to the regional challenges (RIS-3). As a consequence, research and education in the field of Smart Industry, where concepts such as Artificial intelligence, Sensoring, Big Data and Robotization are applied in order to produce more efficiently, will be intensified. A second line of activities is associated with the Circular Economy, an (ecological) shift of the way of producing and consuming materials. The latter entails waste prevention by preserving the value of products and materials, using renewable carbon (e.g. CO<sub>2</sub>, plastic recycle and biomass) and changing business models to safeguard a smaller ecological footprint. In the ENgineering and TEchnology institute Groningen (ENTEG), part of the Faculty of Science and Engineering, active research lines have been developed and there is already extensive knowledge and expertise on both subjects.

For some years, the RUG has already been playing an important role as innovation engine for the region on Smart industries and circular concepts. Currently there are many initiatives on these topics, however often prepared and executed in isolation without any synergy. Therefore, the RUG would like to take a leading role in connecting these initiatives and stimulate the integral transition to a Circular and Smart future for the industry, in collaboration with relevant stakeholders (within industry as well as government).

## The Smart & Circular Hub

Technological developments in the field of Smart Industry and Circular Economy can, if being combined, pose additional value propositions and offer ample opportunities for the Northern region of the Netherlands. The region has a strong chemical, process, manufacturing and agri-food industry. In these sectors in particular, there are multiple opportunities for Smart Industry and Circular Economy initiatives. By creating a center of expertise, the RUG aims to stimulate R&D activities in the field of smart industry and circularity to strengthen the regional industry. With this center of expertise – also called the Smart & Circular Hub – the RUG intends to achieve the following goals:

- It will give the RUG and its partners within the Hub the opportunity to stand out as a frontrunner of industrial innovation and research and education in the field of Smart Industry and Circular Economy.
- Future-proofing the industry in the Northern region by innovation through the entire value chain (‘more with less’) and the exchange of knowledge.
- Retaining talent in the northern Netherlands by offering high quality education and job opportunities.

## Involvement of PwC

PwC supports and advises the RUG in the development of a roadmap for the Smart & Circular Hub. This support is split in two different phases. In the first phase, we draw up a roadmap for the first year, which will be presented to the Executive Board of the University of Groningen. First, we conducted an internal analysis by interviewing several experts of the RUG to get a better understanding of the purpose and goal of the Smart & Circular Hub. Second, we carried out a market analysis (external analysis) using the broad network and vast experience of PwC to identify the market potential of the Hub and gain important insights by looking at best practices. Third, a stakeholder analysis pinpointed the needs of the Smart & Circular Hub in relation to the needs of other relevant stakeholders. Both the internal and external analysis formed the base of the initial sketch of this roadmap. If the Executive Board agrees to this business plan in outline, we will continue with phase 2 and develop the business plan in further detail.

## Reading guide

As previously mentioned, the roadmap, as presented in this report, is the result of phase one. In chapter 2 we will present the mission statement (the reason for the Smart & Circular Hub to exist). Chapter 3 to 6 represent the external analysis, for which we interviewed the relevant stakeholders, conducted a broad market analysis and reviewed best-practices (benchmarking). In chapter 7 to 9 this is being translated to the vision statement and the strategy of the hub. Concluding, in chapter 10 the development path of the hub is presented for the first year.



# Mission statement

## *The reason why we exist*

*The purpose of the Smart & Circular Hub is to innovate in the areas of smart industry and circular economy to improve existing value chains and build new ones with the ultimate aim to boost regional development in Northern Netherlands*



# Internal analysis

## Introduction

At the start of the development of the high-level business plan, the Smart & Circular Hub was mainly a rough idea from an enthusiastic group of RUG experts (the expert team). The mission statement, as presented on the previous page, demonstrates what the Smart & Circular Hub could bring to the region based on its strengths and weaknesses. To move from a rough idea to a clear vision for the hub (i.e. what we want it to be in the future) by following a certain strategy, both an internal as well as an external analysis have been performed.

The internal analysis was performed to better understand the strengths and weaknesses of the hub. Next to that it helps to bring focus to the themes and activities of the hub. The outcome of the internal analysis is highlighted in this chapter. In the following chapters the external analysis will be made, namely the market analysis, the best-practices and the stakeholder analysis will be presented, after which the vision and strategy of the Smart & Circular Hub will be defined.

## Approach

During the first strategy day, in which all members of the expert team were present, the hub was further defined through a number of interactive sessions. In these sessions the expert team members were asked to define the role smart industry and circular economy in to the hub, which stakeholders would have to be involved in the hub and what activities the hub should perform in order to make it a success. The sessions were designed by the PwC team and were held in an online environment due to the Covid-19 outbreak.

As a result of this internal analysis, a better definition of the Smart & Circular Hub has been created. This gave basis for understanding what the strengths of the RUG are as initiator of the hub, as well as the expertise of the involved individuals. Next to that, the definition of the hub was useful in the external analysis as it could be clearly explained to the interviewees what the Smart & Circular Hub is and what the ambitions are towards the future.

## Findings

The internal analysis has led to a preliminary description on the Smart & Circular Hub, which was presented based on five bold statements. This description was the starting point for further developing the design of the hub and should be considered as an intermediate result based on the first strategy day.

### *The Smart & Circular Hub will*

- Setup projects, studies and demonstrators in collaboration with industry partners
- Provide courses, education and execute research projects
- Connect the lower technology readiness levels (TRL's) from the knowledge institutes to the higher TRL's required for the industry
- Position the Northern Netherlands as connect funding requests from our partners to national funds
- Work together with the three Northern provinces to create a regional strategy that includes the themes *smart industry* and *circular economy*
- Make the connection with existing initiatives such as Chemport
- Communicate the ambitions of the Northern Netherlands on a(n) (inter)national scale

### *With a focus on*

- Smart Technologies to improve the efficiency of processes and the quality of products
- Circular economy to improve the sustainability of processes and lower their carbon footprint

### *By using*

- The network of strong organizations such as Philips, AVEBE, COSUN, DSM, Teijin, Nobian, RUG, Hanze Hogeschool, but also mid-sized companies
- Highly skilled employees, academics and students for the knowledge institutes

- The connection and access to ecosystem in the North and other networks
- A clear industry-led innovation and R&D roadmap, underlying projects and related business cases
- Insight in industrial needs and challenges

### *Supported by*

- Funding from both private as well as public sources
- A physical location in which the main activities of the hub will take place, where stakeholders can meet, perform research and demonstrations are conducted
- A sustainable commercial proposition from which all stakeholders benefit

### *To create/generate*

- Processes, technologies and products that can directly be implemented to support the industry in making the transition towards the factory-of-the-future. The hub defines the factory-of-the-future as a facility that implements smart technologies to create more autonomous processes, while reducing its emissions and waste to become circular (zero emissions and waste).
- A test facility where multiple stakeholders can test these processes, technologies and products. In this way we facilitate a *Test before you buy* environment.
- Improved alignment between job opportunities and the experience/knowledge of graduates
- Regional growth in terms of a thriving regional economy and employment opportunities, which results in an overall improvement of the welfare in the region.

## Introduction

Next to the internal analysis, a market and stakeholder analysis was performed and best-practices were examined. Initiatives in which knowledge institutes, the government and the industry work closely together – the so-called triple-helix collaboration – is a widespread model to foster social and economical development and innovation. In this market analysis we identify the existing initiatives in the field of smart industry and circular economy, determine their specific value proposition, analyze how these triple-helix collaborations are being setup and identify how the Smart & Circular Hub would fit into this landscape. The market analysis helps to reveal the market potential of the Smart & Circular Hub. It not only shows whether the value proposition of the Smart & Circular Hub is distinctive from the already existing clusters, but also whether it aligns with the regional trends.

## Approach

First of all, we identified 80 triple-helix initiatives in Europe (see Appendix B) and the Netherlands based on their similarities in comparison with the mission statement of the Smart and Circular Hub. This selection of initiatives was analyzed and compared to the Smart & Circular Hub using several indicators such as education, funding, regional development, research and test facilities, presence of physical location, involvement of SME's and incubator role (see Appendix A). These indicators have been determined together with the RUG Expertteam in the first strategy session. During this desk study we also looked at the focus areas (topics) and the involved stakeholders of the selected clusters. This comparison allowed us to pinpoint key aspects and gain insights of triple-helix collaborations to take into consideration for the Smart and Circular Hub. Lastly, we also looked at the economical climate of the northern region of the Netherlands to look for opportunities for the Smart and Circular Hub.

## Findings

### Europe

In Europe there are plenty of triple-helix initiatives, each with their own characteristics and focus areas. However, almost no initiatives

combine the topics Smart Industry and Circular Economy. A few examples of clusters that do combine both topics are the Sustainable Business Hub Malmö (Sweden) and the Arctic Smart Industry and Circular Economy Cluster (Finland). Both clusters have the aim of stimulating green development and green business. Circular Economy is their main focus and they use smart technologies to pursue green business. Their key activities are limited to regional development (and funding) and the initiatives focus less or not at all on education or serving as a research or test facility.

Other European initiatives have activities and characteristics similar to the Smart and Circular Hub but focus on one specific sector or topic. For example, Kista Science City (Sweden) is the leading ICT cluster in Europe. Another example is SmartAgriHubs (multiple locations in Europe) which brings together a consortium of well over 164 partners in the European agri-food sector and aims to realize the digitization of European agriculture.

### Netherlands

In the Netherlands, well-established initiatives such as Brainport Eindhoven and Brightlands Chemelot offer similar activities and embody the same goals as the Smart and Circular Hub. Brainport Eindhoven played a crucial role in the regional development of North Brabant. The region evolved from a region in an economical crisis to the number one knowledge hub of the Netherlands. Brainport now flourishes as one of the economic cores of the Netherlands due to their focus on key technologies such as AI, micro- and nanoelectronics, advanced manufacturing and markets such as energy, health, food and mobility.

Brightlands Chemelot is an ecosystem of over 370 companies and 10.000 students located on four campuses in Limburg, each with their own specialization. Brightlands serves as an innovation hotspot and is internationally oriented. Their main focus is on chemistry & materials, health, food and data.

These initiatives embody the long-term goal of the Smart and Circular Hub. However, both initiatives are in a very different stage of maturity compared to the Smart and Circular Hub which is still in her infancy.

### Northern Netherlands

In the northern region of the Netherlands, mainly smaller scale initiatives can be found. Examples of triple-helix initiatives in the northern region are WaterCampus Leeuwarden (Wetsus), the Smart Industry Hub Noord and Innovatiecluster Drachten. Generally these initiatives are smaller than the more internationally recognized initiatives and focus on a specific topic or sector. It is notable, however, that the northern region of the Netherlands already houses a lot of these collaborations with the same recurring stakeholders. The initiatives are mostly smaller in scale and less mature compared to other initiatives in the Netherlands or Europe.

### Relevant initiatives with RUG involvement

The RUG is involved in several initiatives such as the Campus Groningen, ZAP (Zernike Advanced Processing unit), Entrance, and Innolab Agrifood and Chemistry. These initiatives serve among others as an incubator for start-ups. However, these initiatives have a certain specific focus, which is different from the integrated approach foreseen for the Smart and Circular hub.

## Deskstudy results

Overall, we gained the following insights which are relevant for the Smart & Circular Hub:

- Almost no triple-helix initiatives combine Smart Industry and Circular Economy. This provides an opportunity for the Smart and Circular Hub to combine these two focus areas to create new value propositions. The challenge is to organize the Smart and Circular Hub in such a way that both topics strengthen each other and lead to synergy instead of competition.
- Hubs often focus on a specific niche in terms of sector and/or thematic focus, such as Smart Mobility or Circular Agriculture. The lack of focus could make it hard for the Smart and Circular Hub to find a specific starting point. Having a very specific focus area can be helpful to distinguish yourself from the rest. Expansion into other markets could then be a logical (long term) next step.



*The northern Netherlands is characterized by:*

*“A great number of initiatives are present (see image) with a focus on either the Smart Industry or Circular Economy*

*“These initiatives all have their own agenda and an umbrella organization, connecting these initiatives, does not seem to exist*

*“The Smart & Circular Hub should do its best to not become ‘one of many’.*



Figure 1: Projection of all the initiatives in the northern Netherlands. Source: PwC analysis (see Appendix A for hi-res image)



# Market analysis

- Typically only the big initiatives (e.g. Brainport) offer physical research & test facilities, most initiatives facilitate access to/via their network. Therefore, the focus of the Smart and Circular Hub on short term should be to develop a broad network within the region at large, not on building a physical research & test facility.
- Regional governments are often the driving force behind successful initiatives. These initiatives are built on the synergy between the regional industry and the expertise of the regional knowledge institutes to drive regional economic development.
- Leading initiatives also engage a broader stakeholder group beyond the traditional triple-helix, such as citizens, end-users and for-profit funding providers.
- Cluster compositions with only two stakeholder groups are also common and have a more specific focus, e.g. government in cooperation with knowledge institutes focusing on research and education in a specific field.

## Growth model

Based on the analysis of 80 initiatives, we generally identified three levels or types of triple-helix models, each with their own characteristics. These are collaboration, hub and regional hub, see figure 2, which also includes several established initiatives. The Smart and Circular Hub is still in her infancy and at the very beginning of her development (at the start of a collaboration as displayed on the far left in Figure 2).

The first type – *Collaboration* – is characterized by typically one specific thematic or sectoral focus and a limited number of programs (1 to 3). It is often non physical (with an office in an existing location, though typically small) and entails one collaboration with a single partner and one specified goal. The driver is generally a local or regional government based on a sectoral development agenda within the region. An example of a collaboration is Greenport in Westland – South-Holland.

The second type of triple-helix collaboration is the *Hub*. The hub generally has typically one physical location (new or refurbished), one

or two thematic or sectoral focuses and several programs (2 to 5). It can contain several collaborations, each with their own complementary goals. Mostly, knowledge institutes are the driver of a hub and play a crucial role. For example, they provide research facilities for industrial challenges. An example of such a hub is Wetsus which is located at the WaterCampus in Leeuwarden.

The last and most “mature” type of triple-helix collaboration is the *Regional Hub*. The regional hub typically has several physical locations and focuses on multiple topics and sectors. It often has multiple programs and has a more regional approach of organizing innovation. This type of triple-helix cluster contains several hubs and collaborations that contribute to the overall goal of the region as well as the respective stakeholders.

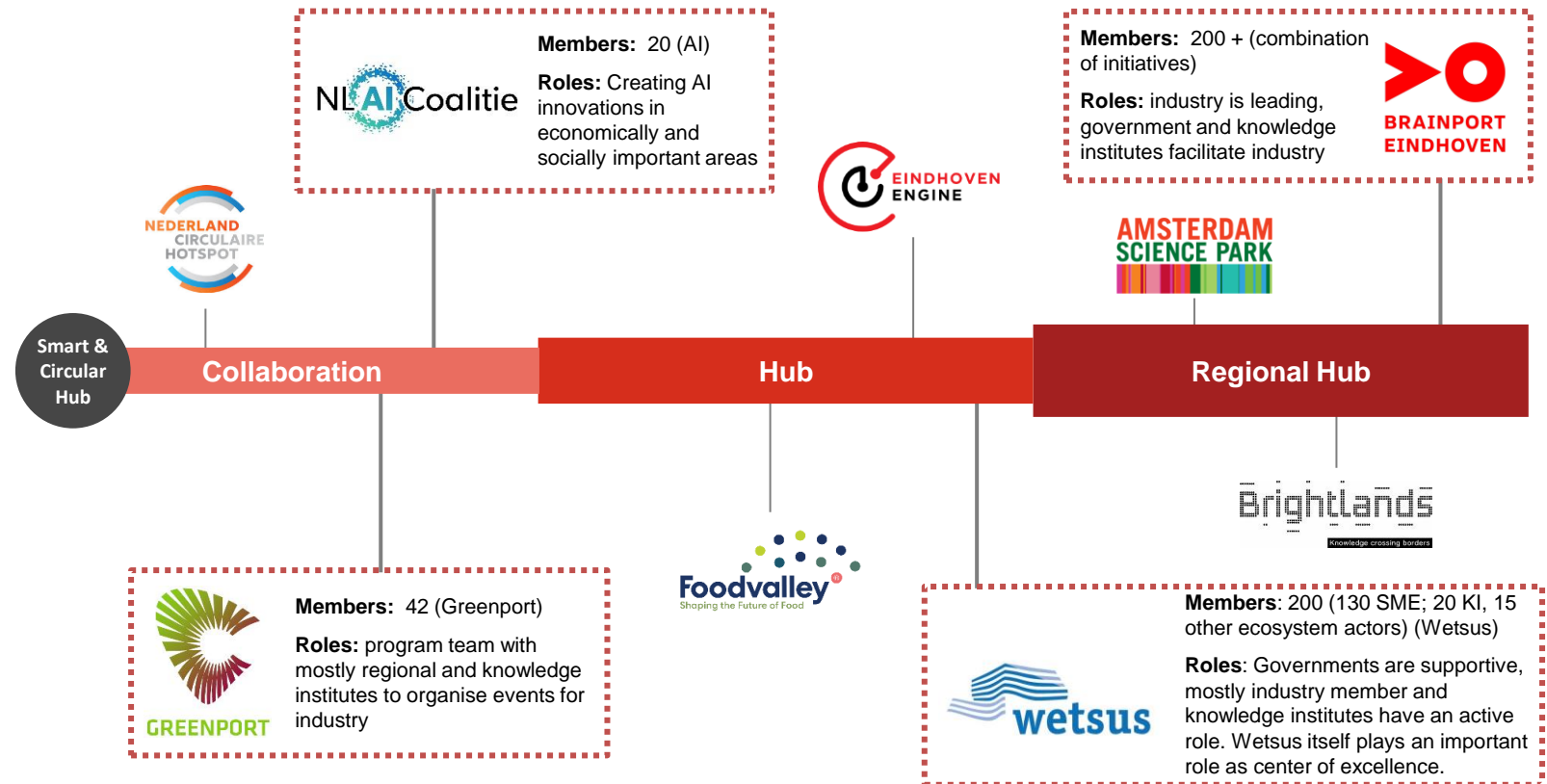


Figure 2: The initiatives growth model with several Dutch examples plotted along the timeline. Source: PwC analysis



# Market analysis

Successful triple helix collaborations are generally driven by a local or regional government based on their regional development agenda. An example of such a regional hub is Brainport Eindhoven which has played a key role in the development of the region. The foundation of Brainport dates back to 2005 but the collaborative spirit in the region dates back even further. This indicates that building a well-established hub and making impact on a regional scale takes time.

Based on the extensive market analysis, it shows that it is effective to focus on one specific sector/topic and identify a launching customer (first customer and first-time user) as one of their first steps. In this way the collaborative initiative can start building credibility and position itself in the market. After being established as a functioning collaboration, it can gradually evolve and expand to a so-called (regional) hub. If the long-term goal is to use the Smart & Circular Hub as a catalyst or initiator for regional development, the cluster has to steadily expand.

In the early stage, many initiatives do not invest in a physical location. Instead, they focus on building a broad network and foster collaboration at first. According to the best practices (e.g. Brainport), a critical success factor is to have an open structure so people can communicate freely and exchange ideas. Knowledge sharing and inspiring each is a key for innovation and success. The RUG can play a main role in this by connecting the different stakeholders and project to spark new opportunities.

## Regional Analysis

The last part of the market analysis consists of a regional analysis. This regional analysis aims to create a better understanding of the market in which the Smart & Circular Hub will be operating. It gives insights in the local economy and innovation index of each province. This aids the Smart & Circular Hub to tailor its value proposition to the regional opportunities and needs.

## Economy

The three provinces of the Northern region have a lower income per capita in comparison to the total average of the Netherlands (NL: 44.920 EUR, Groningen 42.784 EUR, Friesland 30.638 EUR and Drenthe 30.662 EUR). This implies that the prosperity of the region is lower than average which poses some challenges for the region.

Because the Smart & Circular Hub has its focus on Smart Industry, an in-depth industry analysis was conducted. This analysis shows that the Northern region (Groningen, Friesland en Drenthe) has approximately 154.000 technical jobs of which 88.000 in the technical industry sectors. figure 3 shows the distribution of technical industry jobs. Moreover, in total almost 18% of all jobs are industry jobs in this region which provides an opportunity for the industry focus of the Smart & Circular Hub.

## Innovation index

The purpose of the Smart & Circular Hub is to accelerate innovation which leads to regional development. Therefore, an important indicator to rate the region is the Innovation Index. The Innovation Index (see figure 4) is developed by ING and looks at five parameters to indicate the innovativeness of a province in the Netherlands. Based on these parameter, each province is ranked in relation to other provinces. The lower the score of a province the better. The 5 parameters for the Innovation Index are:

- **Youth potential:** Younger employees bringing in new knowledge and a new working method.
- **Education:** Higher education has a better innovation potential.
- **Dynamics:** The number of start-ups and closures is compared with the number of branches. This is an indication of the extend to which the business community is renewing itself.
- **Flexibility:** More self-employed people can result in more flexibility in the business environment and more knowledge transfer between companies.
- **Innovative investments (patents):** patent applications are used as an indicator for this parameter.

**Distribution of industry jobs in the north of the Netherlands.**

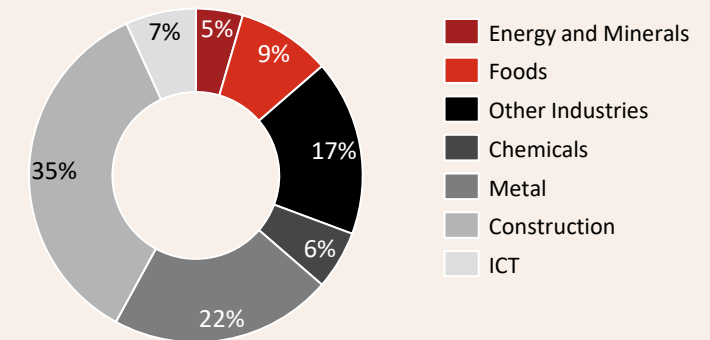


figure 3: Amount of jobs per industry in the northern region of the Netherlands in 2019 (Techniekpactmonitor, 2020)

**Position on the Innovation Index per category for Groningen, Drenthe and Friesland**

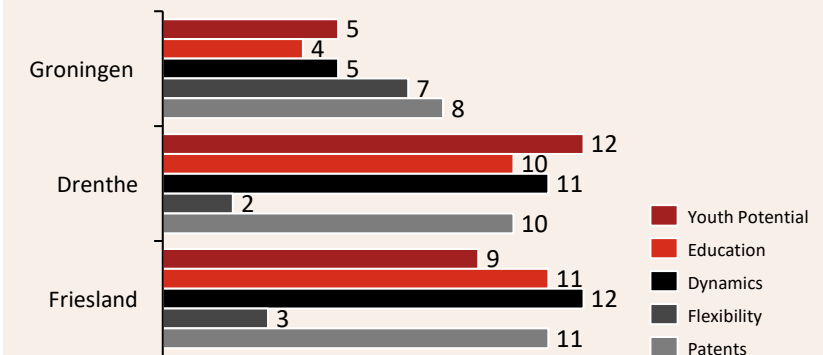


figure 4: Innovation index build up. 1 = best; 12 = worst in comparison with the other provinces in the Netherlands (ING, 2018)



# Market analysis

The northern provinces are ranked as follows on the innovation index:

**Groningen (5th).** The top 5 position of the province of Groningen on the Innovation Index is mainly due to its capital Groningen. The city scores well on education, due to the presence of the RUG and the Hanze Hogeschool. With the development of ICT knowledge centers, Groningen aims to slow down this so-called 'brain drain'. The province of Groningen also has a strong focus on energy technologies. The climate agreement creates opportunities for the province for activities in the field of renewable energy (Hydrogen).

**Drenthe (10th).** The province of Drenthe has been ranked at the bottom of the Innovation Index since 2015. However, due to an increase in self-employment and patent applications, the province tries to boost their innovation and knowledge sharing capabilities. The South-East of Drenthe offers ample innovation opportunities with the Chemical Cluster Emmen. On the other hand, Drenthe is facing the highest amount of aging.

**Friesland (11th).** The high amount of self-employment in Friesland is not contributing directly to its innovative capacity. It is mostly focusing in traditional sectors like farming and construction. Innovative impulses are coming mainly from manufacturing parties and in particular from the Innovation Cluster Drachten. Despite the challenging conditions, opportunities lie in collaborations inside and outside the region and focus on high-tech industry.

## Conclusion

Although the Northern region is a region with a GDP less than average and a position at the bottom of the innovation index, it is characterized by great flexibility due to self-employment. The university of Groningen is a stronghold for knowledge and innovation in the Northern region and combined with the Chemical Cluster Emmen and the Innovation Cluster Drachten the region has high innovative potential.



	Groningen	Drenthe	Friesland
Priority sectors*	<ul style="list-style-type: none"><li>Chemicals</li><li>Agriculture and agribusiness</li><li>Digital and tech</li><li>Health and biotechnology</li><li>Energy</li></ul>	<ul style="list-style-type: none"><li>Chemicals</li><li>Agriculture and agribusiness</li><li>Digital and tech</li><li>Health and biotechnology</li><li>Manufacturing and materials</li></ul>	<ul style="list-style-type: none"><li>Agriculture and agribusiness</li><li>Manufacturing and materials</li><li>Watertechnology</li></ul>
Percentage SME	65%	95%	84%
# of registered companies	58.481	49.780	69.886
Companies (>200) Employees	130	93	141
Interviewed stakeholder (HQ in region)	Avebe (Yes), FrieslandCampina (No)	Fokker (No)	Philips (No)

Table 1: Overview of the three northern provinces of the Netherlands and their characteristics. Source: PwC analysis



# Best-practices

## Introduction

When starting a triple helix collaboration, such as the Smart & Circular Hub, it is very useful to understand what good and bad-practices are and learn from them. All initiatives were once in their start-up phase and the decisions that were made in this initial phase have had a significant impact on the success of these organizations.

To determine what strategic decisions others have made and which ones could be useful for the Smart & Circular Hub as well, a study on the best-practices have been included in the business case. In this chapter, the approach of this study and the results are being presented.

## Approach

Based on the *growth model*, as presented in the Market Analysis, two organizations were selected from the longlist that have been analyzed: one in the *collaboration* phase and one in the *hub* phase. Selecting two organizations in different phases allows us to understand how the growth path develops over time.

The two organizations that were selected are the Carbohydrate Competence Centre (hereafter CCC) (collaboration), a leading carbohydrate knowledge center in the Netherlands, and Wetsus (hub), the European centre of excellence for sustainable water technology. To better understand their growth path, challenges and best-practices we have conducted two interviews. One interview was with Gert-Jan Euverink, the director of CCC, and another with Johannes Boonstra, executive board member of Wetsus.

In two individual interviews we have tried to understand how their organization has developed over time in terms of their growth path, organizational and financial model.

## Findings

The findings that we derived from the two interviews are listed in this part. We have found many similarities in the development between the two organizations and therefore the findings are grouped together. In case that there was a completely different opinion on a certain topic between the two organizations, this will be explicitly indicated.

A couple of key advices were provided during the interviews:

- *“It is important that your organization has a strong and distinguishing focus/specialization. What you would like to achieve as an organization is that others cannot go around you anymore”*
- *“Especially in the start-up (collaboration) phase, it is essential to have a dedicated team. The success of the initiative should directly affect them in a personal way.”*

## Growth path

The startup phase of the CCC was different in comparison to Wetsus. The CCC is a relaunch of the Dutch Carbohydrate Institute after discontinuation. The CCC used the foundation of the Dutch Institute of Carbohydrate to continue working together with enterprises, such as AVEBE, to create additional value for agricultural crops (from bulk to pharmaceutical applications).

Wetsus on the other hand, started from scratch when two individuals identified an opportunity to collaborate and do research in the field of sustainable water technologies. It initially started as an information desk (portacabin) that connected research projects to enterprises in the area. One key element for its success was the presence of several international organizations in the region focusing on water management. Promoting collaborations between them via an independent institute was therefore a logical choice.





# Best-practices

Organically the Wetsus organization has grown to a European center of excellence it is today. The origin of this growth started by doing research projects within the already existing network of Wetsus. Additionally, the possibility to involve local government was *continuously explored*.

## Organizational model

The CCC started as a collaborative project between the RUG and Wageningen, whereas Wetsus started as a small foundation (NL: Stichting). In both cases, the initiatives started with two or multiple team members of which one was responsible for the business operations, such as financials, marketing, sales, etc. and the other member was focusing on the projects.

The individuals that started Wetsus were extremely dedicated, mainly because they were the founding partners. Johannes Boonstra explains that this dedication, and the ability to accept that there is no structure, is of utmost importance for the success of the initiative. Additionally he argues that having the freedom of setting out your own course, without any constraints from other stakeholders, will help the initiative to create an area of neutral ground. This provides security for the participants in the hub.

Wetsus, now being grown to a full-scale research institute, has a supervisory board of eight people which are representatives of the top 8 key stakeholders. It is good to notice that these persons are only taking decisions in favor of the Wetsus organization, not their own companies.

The current organizational model of Wetsus is based on a Technological Top Institute (TTI) model. During the interview it was highlighted however that the decision of an organizational model strongly depends on the needs of your stakeholders.

## Financial model

The CCC and Wetsus both started with funding from (local) government in the form of subsidies and private investments.

This allows the organization to get a kickstart and to develop itself in such a way that a sustainable revenue flow can be created from the activities that the organizations performs. Half of the income that the initiatives obtain nowadays is still coming from governmental funding. In case of Wetsus the other 50% is split evenly over knowledge institutes and the industrial partners, whereas for the CCC the contribution of the industry depends on the amount of the subsidy.

The subsidies and governmental support is obtained from a wide variety of sources such as local governments, such as municipalities and provinces, but also from national and European funds. To be more successful in applying for these subsidies and funds, and eventually getting them rewarded, requires experienced proposal writers.

Financial support from the industry partners can be in different forms. One way to do this is by connecting companies to specific research projects that can be useful to their business. Per project, a management fee is defined which is accredited to the involved company(ies) in addition to the subsidy. This model is used by the CCC with the note that the CCC follows the same rules for IP as the RUG does. Another financial model involves a periodical fee which allows the company to participate in projects and use intellectual property. In comparison with the research fee, the disadvantage of this model is that it could initially be unclear for the companies what it is that they're paying for.

Another form of income is from the revenues of patents. During the interviews it was mentioned that one should not take patents as a sustainable source of income when setting up the financial model.

## Conclusion

Both initiatives show that a steady and organic growth of the organization is preferable. The organizational and financial model correspondingly growth with the organization.





*We have analyzed the following parties in our stakeholder analysis:*

## Industry

- Philips - consumer electronics
- Fokker GKN Aerospace
- STORK
- Friesland Campina
- Nederlandse Aardolie Maatschappij
- Nedmag
- Gasunie
- AVEBE
- Holland Malt
- Consunbeet Company
- Nouryon/Nobian
- Teijin Aramid
- UMCg
- Cumapol
- JDE
- DSM
- Low&Bonar
- Avantium
- BASF
- Omrin
- Shell
- Attero
- Smurfit Kappa twinncorr b.v.
- AkzoNobel Speciality Chemicals
- Huhtamaki
- PPG

- DOW
- Evonik
- OCI/BIOMCN
- DVJ-insights
- NDC
- ENGIE
- Syncasso
- Vattenval
- Sanoma
- Eneco
- Ahold Delhaize

## Government

- OCW
- EKZ
- Europese Commissie
- Provincie Drenthe
- Provincie Groningen
- Provincie Friesland
- Gemeente Groningen
- SNN
- NOM

- NTCP
- Region of Smart Factory
- Smart Industry Hub
- Wetsus
- CCC
- SBE
- EDR Interreg
- NPAL
- 5Groningen
- Technologies Added
- NPG
- Akkoord van Groningen
- Kenniscentrum kunststof recycling
- NLAIC
- Health Hub Roden
- Northern Knowledge
- Waddenfonds
- SPRINT
- HTRIC
- Fascinating
- ZAP

## Institutes

- Drenthe College
- Noorderpoort
- Van Hall Larenstein
- Universiteit van het Noorden
- Hanze Hogeschool
- Stenden
- Drenthe College
- Innolab RUG
- Rijksuniversiteit Groningen
- Campus Groningen

## Initiatives

- BERNN
- Bio Cooperative
- Chemical Cluster Emmen
- Chemport Europe
- EMMTEC
- Groningen Seaports Delfzijl & Eemshaven
- IHOG
- Innovatie Cluster Drachten (ICD)
- New Energy Coalition

*Table 2: Overview of the stakeholder's that have been part of our analysis*

## Introduction

The stakeholder analysis is the third step of the external analysis. Based on the broad network and regional knowledge of both the RUG experts and PwC, nine potential stakeholders were selected for an interview based on their relevance with the Smart Industry and Circular Economy.

A desk study was conducted for each stakeholder (see previous page), to map their strategic agendas, plans and objectives and in particular their vision towards Smart Industry and Circular Economy. This provided an initial overview of the strategic interests of the stakeholders and their relation towards the Smart & Circular Hub.

The desk study was followed by an interview with each of the 9 selected stakeholders. The purpose of these interviews was to explain the intention and goal of the Smart & Circular Hub and reflect on the proposed mission, vision and strategy. The second goal of the interviews was to get a better understanding of the specific interest of each stakeholder (Smart, Circular or both) and whether, and in what form, this party may wish to participate in the Smart & Circular Hub in the future. Lastly new insights from the interviews could be of use to strengthen the mission vision and strategy of the Smart & Circular Hub.

## Approach

Nine stakeholders with a mutual interest in the domains Smart Industry and Circular Economy, strong regional presence, a track record in participation in similar initiatives, and previous collaborations with the RUG, were jointly identified.

This resulted in the selection of the following four industrial stakeholders: AVEBE, FrieslandCampina, Fokker Aerostructures and Philips. All industry participants are established in multiple provinces.

As stakeholders of the second triple helix group – the knowledge institutes (Hanze Hogeschool and the RUG) were selected based on their interest and track record in the smart and circular topics, both in research and education.

The stakeholders of the third group are the regional governments. Based on the geographical scope of the Smart & Circular Hub interviews were conducted with all three provinces in the northern region: Groningen, Friesland and Drenthe.

Each interview (approximately one hour) was conducted in the first 3 weeks of September 2020 with a representative of the stakeholder, one expert of the RUG and two consultants of PwC. The interviews were semi-structured. They started with a description of the international trends in the area of Smart Industry (Industry 4.0) and Circular (Green) Economy followed by a description how the Smart & Circular Hub could respond to these developments. Questions were related to the stakeholders' ambition on these subjects, their relation with other initiatives/clusters and their experience with those collaborations and how the Smart & Circular Hub could contribute to their strategic goals and ambitions. The end of the interview was used to identify the added value of the Smart & Circular Hub and to identify new opportunities for the Smart & Circular Hub. In the interviews a one-pager was displayed with the representation of the initial value proposition (see table 3). All interviews were conducted digitally because of the COVID-19 pandemic.

## Findings

During the interview sessions we elaborated on the value proposition of the Smart & Circular Hub and reflected on the needs and desires of each stakeholder. In summary, this resulted mainly in two focus areas (Smart Industry and Circular Economy) and three initial value propositions of the Smart & Circular Hub.

### Initial value proposition

As presented in table 3, not only the focus areas itself but also the power of combining Smart and Circular was widely acknowledged. The feedback for the three initial value propositions is elaborated on in this paragraph.

- **Education:** Education was widely acknowledged by the stakeholders as one of the key focus areas of the region (Groningen, Friesland and Drenthe). The knowledge institutes supported the need for engineering education and integration of MBO, HBO and WO (continuous learning lines), for which the newly established University of the North to be instrumental. Industry stakeholders pointed out that they were looking for *life long learning* opportunities and indicated their worries for substantial shortage of technical skilled employees. The governments mentioned that good engineering education at all levels is essential for regional development
- **Research and Test Facilities:** All stakeholders mention that research and test facilities are key for innovation and to bring technical inventions in the smart and circular domain to the companies/markets. It is also acknowledged that particularly the innovation gap between TRL 3 and TRL 7 is a main issue and that the hub may play an important role to close this gap. Some of the stakeholders mention that integration with existing facilities on the Zernike Campus (e.g. ZAP, Entrance, Innolab) is essential to avoid duplication. This was also mentioned by the industrial stakeholders and governments, who have no desire to duplicate existing infrastructure and challenged the hub to come up with complementary initiatives regarding R&D infrastructure.
- **Funding:** Each stakeholder was asked whether they were open to the idea of funding (resources or cash) the Smart & Circular and therefore open to possible investment at the development phase or in the future.

The provinces were open to support the Hub financially, though under the condition that the Smart & Circular Hub should make explicit how it will create added value for their working class citizens. The industrial stakeholders and particularly AVEBE showed interest to invest in the hub, though mentioned that further discussions would be required after further detailing the hub.



# Stakeholder analysis










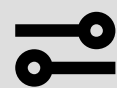
	Focus Areas		Initial value proposition			Willingness to invest	Additional propositions			
	 Smart	 Circular	 Education	 Regional development	 Research and test facilities	 Funding	 Incubator	 Physical Location	 SME involvement	 Knowledge exchange
Rijksuniversiteit Groningen	●	●	●	●	●	●	●	●		●
Hanzehogeschool Groningen	●	●	●	●			●		●	●
Provincie Friesland	●	●	●	●				●		
Provincie Groningen	●	●	●	●		○	●	○	●	
Provincie Drenthe	●	●	●	●	○	○			●	
Philips	●	●	●	●						
AVEBE	●	●	●	●	●	●	●	●		
Friesland Campina	●	●	●	●			●	○	●	●
Fokker	●	●	●	●						

Table 3: Outcome of the stakeholder analysis which shows the interest of the different stakeholders in relation to the value propositions of the Smart & Circular Hub. Source: PwC analysis

# Stakeholder analysis

## Additional propositions

As presented in table 3, multiple suggestions and needs came up during the interviews with the relevant stakeholders. Despite divergent interests, four additional propositions were identified and supported by at least one of the stakeholders. These additional propositions create a different view on the initial value proposition and eventually reinforces the value proposition of the Smart & Circular Hub.

- **Incubator:** According to the province of Groningen and industry stakeholders AVEBE and Friesland Campina, the Smart & Circular Hub should act as an incubator. By supporting start-ups with starting and growing their businesses and offer them office space, test facilities and knowledge, the Smart & Circular Hub could fulfil the need of these stakeholders. The role for the Smart & Circular Hub as incubator fits to its purpose to stimulate innovation.
- **Physical location:** As described earlier, all stakeholders expressed that research and test facilities are key for innovation. A physical location can thus be beneficial for the Hub, and also serve for educational purposes (lecture halls, dedicated research equipment for illustration of engineering concepts, and office space for start-ups. Nevertheless, stakeholders do not directly see the added value of a large investment in a new building. Most industry stakeholders described that a new physical location is not their first priority, because they already have their own facility. Governments, on the other hand, endorse the need for a physical location from an educational point of view.
- **Involvement of Small and Medium-sized Enterprises (SMEs):** As mentioned in the introduction, the northern region has a relatively high percentage of Small and Medium-sized enterprises. Our industry stakeholders pointed out that they are dependent on those SMEs in their value chain and were wondering how the Smart & Circular Hub can be of value for SMEs.

Especially FrieslandCampina, describes the need to connect their value chain partners with first hand technology and knowledge from knowledge institutes. The provinces Groningen and Drenthe pointed out the same gap. SMEs have the ambition to be on top of the latest Smart and Circular developments and technologies. The Smart & Circular Hub could close this gap and create better accessibility for SMEs in the northern region.

- **Knowledge exchange:** In direct relation with our previous three external findings (incubator, physical location and SME involvement), stakeholders mentioned that the Smart & Circular Hub should serve as a platform to exchange knowledge. Not only should the Smart & Circular Hub involve SMEs in research and technologies and serve as an incubator for start-ups, but it should also be a place (physical or digital) where these partners and members can meet up to exchange knowledge, for example during activities, workshops, events, congresses or expositions. According to our interview with FrieslandCampina, the Smart & Circular Hub should act as a knowledge broker where questions and answers are directly connected.

## Other findings

At the end of each interview, stakeholders were asked what they think about the general idea of the Smart & Circular Hub and how it distinguishes from existing initiatives in their region.

Industry stakeholders were positive towards the idea of the Smart & Circular Hub. They recognized the added value to bring together smaller initiatives and create a cluster with an umbrella function to have a stronger regional, national and international presence. They also promoted the idea of combining smart industry and circular economy. The provinces expressed that it is essential to look for synergy between initiatives and not to cannibalize existing clusters in the region.





The RUG considers the Smart & Circular Hub as a flagship project for the University of the North. The ambition of the Smart & Circular Hub is aligned with the ambition of the University of the North to create an umbrella initiative where in a triple helix collaboration innovation is accelerated and future-proof education is provided.

Overall, there was a positive sentiment regarding the ideas of the Smart & Circular Hub and the unique combination of the topics Smart Industry (Industry 4.0) and Circular (Green) Economy.

The findings also show a positive attitude towards hosting the Smart & Circular Hub by the provinces. This obviously poses a challenge for the decisionmakers to come to an agreement on the physical location of the Hub.

## *Related initiatives in the region*

Next to the stakeholders in the industry, institutes and government, we have analyzed initiatives in the region that have the possibility for collaboration with the Smart & Circular Hub. These initiatives are listed below.

- The **Smart Industry Hub Noord Nederland** is responsible for the implementation of the national Smart Industry agenda and functions as a catalyst for digitalization of industry in the north. The RUG, Hanze Hogeschool, NHL Stenden and the regional Fieldlabs (5Groningen, ICD, Technology Added) work together in the SIH NNL, together with branch organizations and industrial clusters. The SIH NNL aims to develop into a European Digital Innovation Hub (EDIH) to widen its scope, from solely industry to health, agri-food and utilities, and to connect with other European regions. In the next 2 years SIH NNL will start-up 3 regional Skillslabs, which will be equipped with testing -, teaching – and research facilities, all focused on digitalization. The initiation of Skillslab Groningen will be realized in close collaboration with the founding fathers of the Smart & Circular Hub. The general vision is to integrate and operate the Skillslab Groningen and the Smart&Circular Hub facilities from within the same location at the Zernike Campus.

- **The AI-coalitie Noord Nederland** connects companies and (educational) institutes and focusses on development of AI-applications in agriculture, industry, energy, maritime sector, safety, health and mobility. It thereby complements the existing ecosystems in the Netherlands and strives for sector transcending AI projects based on specific needs of companies working in these sectors. The AI-coalitie will focus on crucial AI-themes, such as; sharing data, investment in development of new AI knowledge and application of this knowledge through demonstrators in affiliated companies. Within the coalition and her respective AI-projects there always is a balance between public - and private sector, resulting in an ideal mix between development and application. All degrees of higher education (ranging from MBO-institutes to universities) will be represented within these projects.
- **3D-printing and 3D-electronics** are 2 closely aligned technologies, which are capable of disrupting traditional design – and production processes in the long term. Both technologies can make a difference in the northern strategic goals regarding health, energy and water technology by acting as an enabler for further development. By using the NNL facilities and infrastructure, a Virtual Shared Facility can be realized which includes various technologies for 3D-metalprinting, 3D-compositeprinting, 3D-glasprinting and 3D-electronics.. Companies (all sizes), company clusters (Blinder, ICD and educational institutes (RUG, NHL/Stenden, ASTRON, NLR) will be participating.
- The **Centre of Research Excellence SPRINT** focuses on improving and restoring elderly mobility through mainly Smart Mobility Devices: smart technology that supports elderly in remaining active. Furthermore, SPRINT develops prostheses and orthoses. The new technologies are developed in close collaboration with UMCG, RUG, UT and a network of 80 affiliated companies and institutes.

- The potential of the **ZAP processing Scale-up Facility** is twofold:
  - Generate innovation: enable the current ecosystem (companies, institutes) to further develop innovation to commercialization and actual impact, optimizing the chain from start-up to industry
  - Generate business: acquisition of companies in Chemicals, Food and Pharma that are eager to innovate together with the current ecosystem. At the moment these companies prefer a location in Delft or Gent, where a similar scale-up facility is located
- **Chemport Europe** is at the forefront of 'greenification' of the chemical industry in the north to enhance local sustainability and employment. It is an ecosystem in which companies, educational institutes and the government collaborate. Chemport unites, supports and advertises parties that share the common goal of a 'green' chemical industry in the north in order to achieve a sustainable, CO2 neutral chemical industry and to boost sustainable activity and employment. Typical themes that concern companies in the Chemport region are recycling of plastics, adoption of recycled polymers and sustainable raw materials, electrification and circular development in waste and energy.

# Stakeholder analysis

- The goal of the **Fascinating program** is the realization of a circular agricultural system. Such a system supports a healthy diet, is in balance with nature and delivers prosperity for food producers. In balance with nature means it has a closed nitrogen loop and additionally does not emit any CO2. In order to realize this system it takes a significant protein transition and a different approach to the concept of value. Fascinating is an open test – and innovation program which connects companies, agriculture, educational institutes and local communities and adopts 4 pillars:
  1. A healthy and balanced diet: we take a step from quantity to quality
  2. Sustainable production of nutritious crops: we express quality in nutritional – and economic value
  3. Energy efficiency and sustainable production: through upgrading of existing technologies and development of new technologies we aim to use all nutrients
  4. Non-food from waste streams: we enhance circularity by adopting waste streams as raw materials for the chemical industry or energy production

Fascinating is an initiative from 4 larger agricultural cooperations (Agrifirm, AVEBE, Cosun, Friesland Campina), the Provincie Groningen, UMCG and a growing number of organizations in agriculture, food industry, chemical industry and the energy sector. The program is overseen and coordinated by the Institute for Sustainable Process Technology (ISPT)

- The **InRep project** has an integrated approach for recycling of plastics. This results in systematic and technology-driven solutions for sorting and grading of plastic waste, mechanical and chemical recycling and upcycling of polyolefins (PE & PP) and polyester (PET). The project '**het schone Noorden**' shares the same goal. Next to NNL educational institutes RUG, NHL/Stenden and Hanze Hogeschool another great number of companies and institutes (affiliated with NNL) participate/support both projects.

- The goal of **Industry 2030** is the development and exchange of knowledge which enables participating organizations to adopt supercritical CO2 (scCO2) as a green process technology for industrial production of sustainable chemical products. It is led by RUG (ENTEG) in a consortium with Hanze Hogeschool and a great number of regional chemical companies.
- The **Health Technology Research & Innovation Cluster (HTRIC)** on Campus Groningen bundles existing knowledge within the faculties Science & Engineering (FSE), Gedrags- en Maatschappijwetenschappen (GMW), Economie en Bedrijfskunde (FEB) en het Universitair Medisch Centrum Groningen (UMCG). This unique combination of university faculties results in great possibilities for regional, translational, medical-technical research and can be regarded as critical for the University of the North. In addition, the ecosystem can rely on strong connections with HBO institutions, regional and (inter)national companies and the government.

This ecosystem stimulates multidisciplinary research and facilitates an unique environment focused on innovation of multidisciplinary collaboration. The unique proposition is that this initiative bundles topics as healthcare, research, education and entrepreneurship and aims to create innovation throughout the entire value chain. For every aspect of innovation, the focus is on knowledge development, health technology development and business development.

- The **Netherlands Enabling Watertechnolgy (NEW) consortium** stimulates and supports start-ups an initiatives in water technology. Its major themes concern water treatment, water- and waste recycling, energy production and storage form water and smart water system operation.

The consortium consists of Wetsus, Rijksuniversiteit Groningen, Deltares and the NOM and it has receive €8 mln. to bridge the gap from water technology research to eventual commercialization and subsequent embedding in society. In this way they aim to speed up the transition towards a circular, sustainable and climate neutral economy.

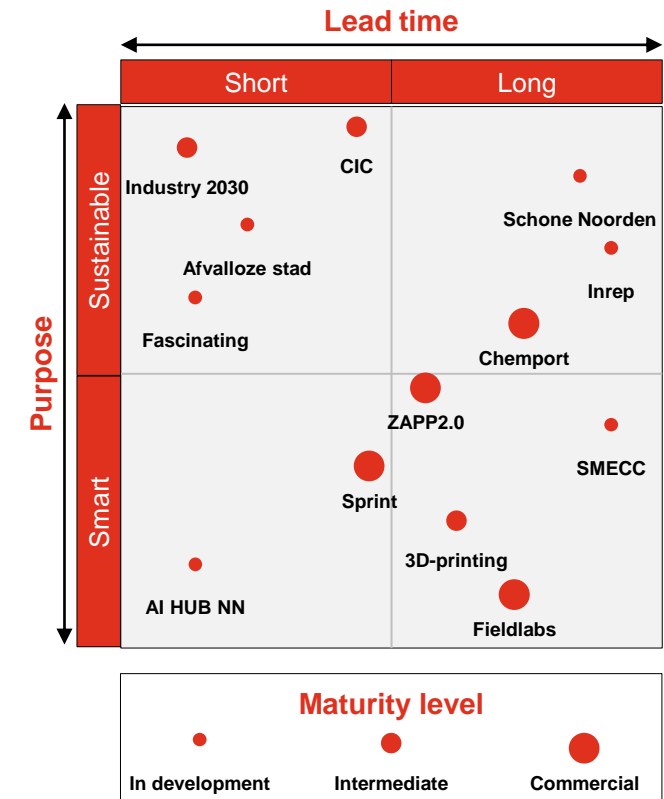


figure 5: Initiatives showing the maturity, purpose and level of maturity



# Stakeholder analysis

## Conclusions

- There is consensus among the interviewed stakeholders that the combination of Smart and Circular is unique and offers ample opportunities for collaboration, innovation and regional development.
- There is a need for education (MBO, HBO, WO), highly skilled employees, continuous learning and lifelong learning in the field of Smart and circular.
- There are multiple initiatives/clusters in the Northern Region with smart and circular elements. However, most of them are focused on either smart OR circular. It is essential to aim for synergy between the smart and circular hub and other initiatives and not for cannibalization.
- There is general consensus that a physical location will be beneficial for the future development of the hub (incubator role, test facilities, meet and greet, education). The willingness to invest in the hub in its current stage of development needs further discussions with individual stakeholders.
- According to several industrial and governmental stakeholders the Hub should be a meeting place for SMEs to connect them to the knowledge institutes and serve as a knowledge broker. Additionally, the Hub could serve as a platform to exchange knowledge throughout the entire value chain.

With the conclusion of the stakeholder analysis, all the external information has been gathered. In the next chapters, both the internal plans (missions statement) as well as the external opinion will form the basis for defining the vision and strategy of the Smart & Circular Hub. Ultimately, this is further specified to come to a clear development path with specific activities for the first year.



***In our vision, the Smart & Circular Hub will be a physical center where:***

- Smart and circular initiatives are brought together and innovations are accelerated to higher TRL levels
- Knowledge institutes meet industry in joint research projects
- The ambitions of the University of Groningen to strengthen its engineering profile are realized, among others by creation of relevant new engineering programs, among others jointly with the Hanze Hogeschool
- Regional development is stimulated by providing key technological solutions to challenges in the smart/circular domain. This means that the northern Netherlands has an industry that becomes an example of how smart and circular can be applied. Moreover, it creates an environment where talented people like to settle.
- The hub has a dedicated project team



# Growth model

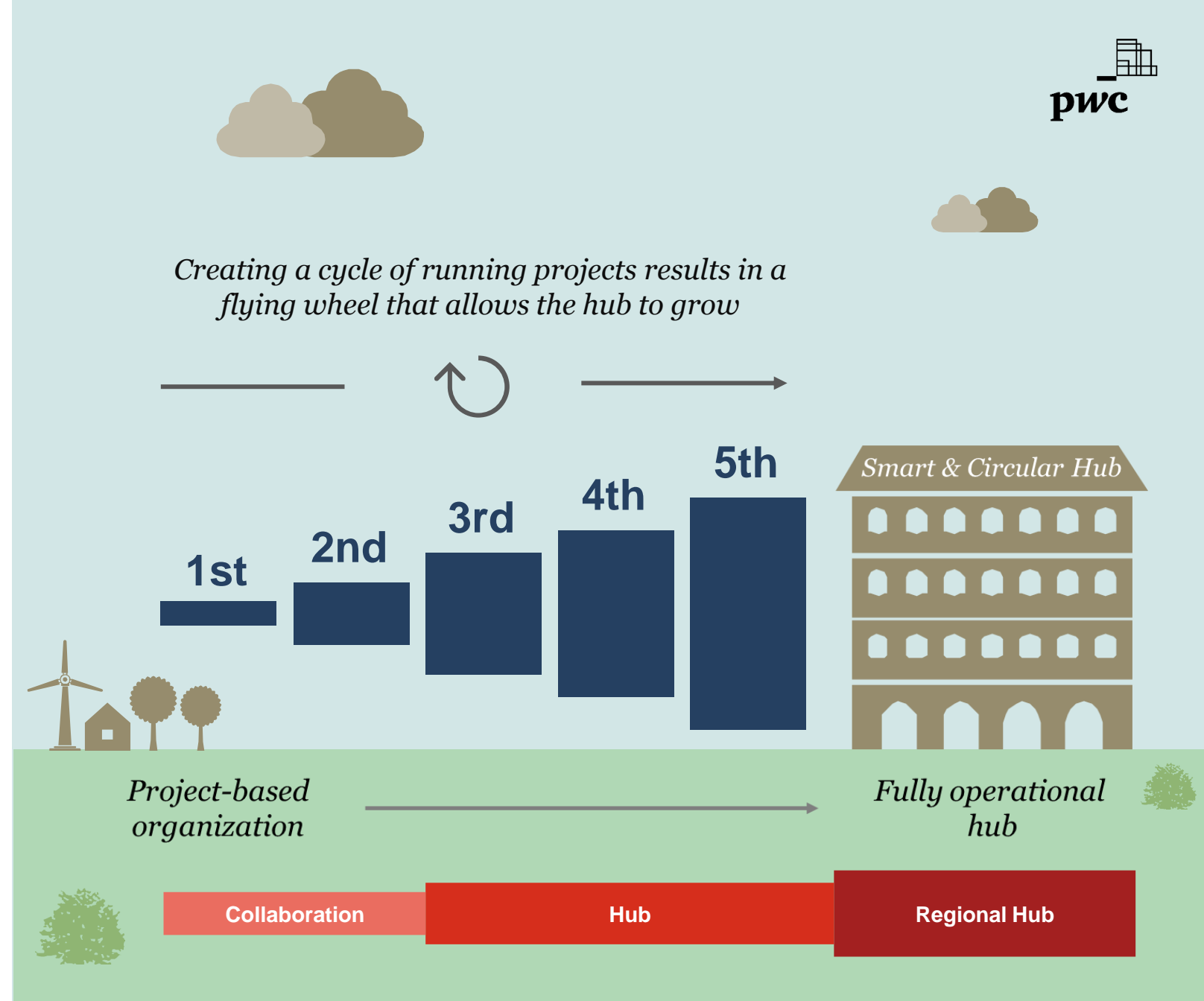
***The growth path develops the hub from a collaborative initiative to a fully operational hub in 5 years***

In the chapter *Market Analysis*, the idea of a maturity path for triple helix initiatives was introduced, starting from a collaboration and developing towards a hub or regional hub. The Smart & Circular Hub will start its journey as a collaboration at the far left of this maturity scale (see Figure 2). In this phase it is important to have a set of clearly defined activities that helps to bring focus and let the hub growth organically. The growth path develops the hub from a collaborative initiative to a fully operational hub in 5 years according to the following assumptions:

- Based on SMART-defined activities, we create a cycle that allows this growth (the steps in this cycle are further explained on the next page). Active involvement of RUG and other stakeholders is key.
- In 2021 we will kick-start the hub with one or two carefully selected projects in which we start combining smart and circular elements (sweat spot stakeholder analysis).
- We assign a dedicated team, find a starting location and apply for sufficient budget that allows growth (see next page)
- By learning on the job, we finetune our 5 year's vision and continuously improve ourselves

Based on this growth path, the intention is to accelerate the Smart & Circular Hub from a collaboration toward a fully operational hub. Every next year the number of activities grow and more projects are being incorporated within the hub.

It is the intention to create a cycle of running projects which act as the fly wheel that allows the hub to grow. Using a standardized and continuous project cycle, the hub starts to extend its network, creates new innovations and this ultimately results in new opportunities. This project cycle consists of five activities that the hub performs. In the next chapter, the strategy of the Smart & Circular Hub will be outlined and these five activities will be further clarified.



In the northern part of the Netherlands, a large number of initiatives in with smart industry or circular economy elements have been initiated recently (see chapter *Market Analysis*). Considering this environment, the Smart & Circular Hub should utilize the strength of the region, while having a clear value proposition that distinguishes itself from the other initiatives. The Smart & Circular Hub intends to do so by using three unique selling points (USP's):



## Linking Smart Industry with Circular Economy

- Focusing on the complete value chain in the manufacturing and process industry
- Combination of smart and circular elements that can improve the competitiveness of the involved parties
- Strong fit with the Regional Innovation Strategy



## Connecting stakeholders in a physical location

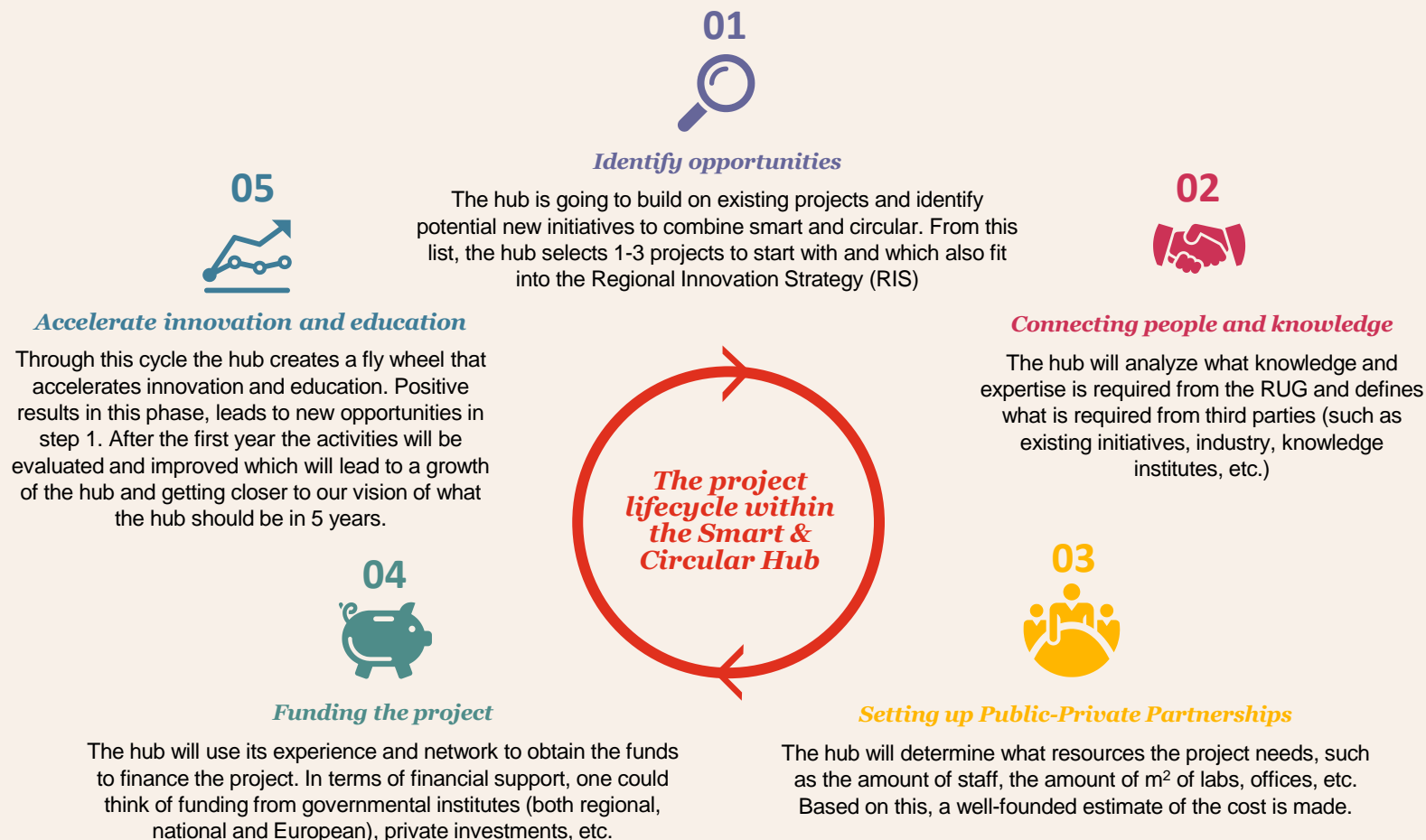
- Collaboration between knowledge institutes and the industry in dedicated research and development projects will boost innovations and bridge the valley of death (TRL)
- These projects are financed based on PPP constructions or private investments (by industry per project)
- It provides a location where innovations can be tested and demonstrated (try before you buy)
- Existing experience and knowledge generated in other initiatives will be highly beneficial



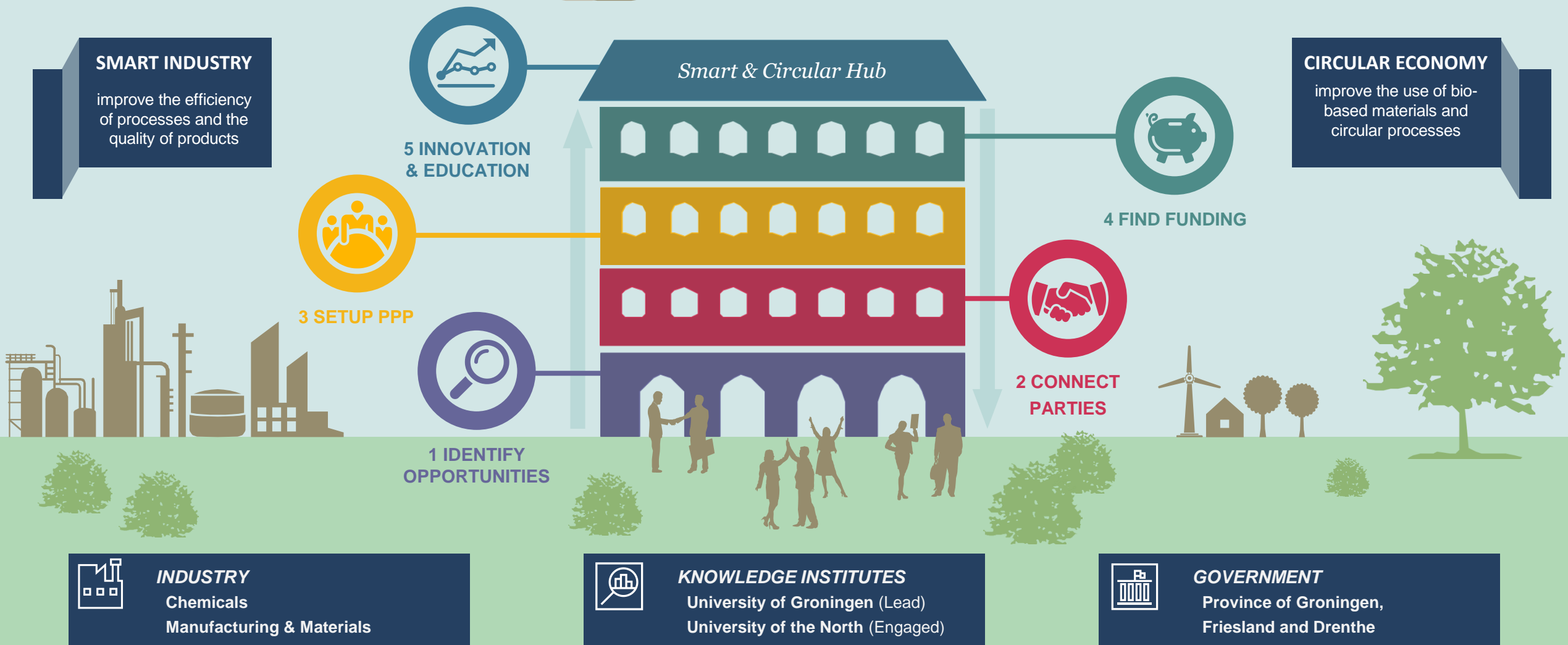
## Bringing expertise and knowledge to the table

- The RUG and other stakeholders involved will strengthen the regional industry and its entire value chain by creating a network of SME's
- The knowledge institutes involved will collaborate in research projects as well as in education. This may involve setting up new educational programs within the theme of the hub with all partners involved.

**Based on three USP's we have defined five main activities that the hub should carry out in the Smart & Circular Hub. These activities define the project lifecycle of project that are being ran in the hub. The infographic on the next page visualizes this.**







# Development path – First year ambitions

The development of the Smart & Circular Hub will follow the growth model. Based on this model and the mission, vision and strategy, concrete activities for the first year of the hub have been identified. These activities have been divided into six categories, namely education; research; knowledge exchange; demonstrators; funding and ecosystem generation. The activities for the 1<sup>st</sup> year of the Smart & Circular Hub are listed below per category:



## Education

- Organizing one training together with an industry partner
- Find cohesion with the training program already provided by the Smart Industry Hub
- Complete a feasibility study for a Pdeng Chemical Engineering
- Start exploring setting up an educational program with combined smart and circular elements e.g. (potentially together with the Hanze Hogeschool)



## Research

- Total of three public-private partnerships have been initiated that preferably combine both smart and circular aspects and are jointly set up with foreseen partners in the hub
- At least one project is submitted to a funding body



## Knowledge exchange

### External

- Creating a communication plan for the hub
- Total of five networking events will be organized
- Performing an analysis on the existing initiatives and setting out a strategy to combine these different initiatives (result will be a report)
- Working out a (potential) collaboration plan between the Smart Industry Hub, the AI Hub and the field labs

- Initiate/explore one multi-disciplinary project that integrates technical, economic and social elements and covers the entire value chain
- Starting one project together with an external stakeholder that co-funds the project (see also in Research)

### Internal

- Explore the possibility to involve at least two other faculties in the hub
- Setup a Smart & Circular community within the RUG



## Demonstrators

- A demonstration project will be developed. A possible option is a next level ZAP facility in collaboration with the Hanze University of Applied Sciences



## Funding of the smart and circular hub

- Discussions will be initiated with at least 3 of the potential stakeholders to participate in the hub and to actively invest in the development of the hub.
- In collaboration with the Smart Industry Hub and the AI Hub we will apply for regional subsidies to set-up the hub



## Ecosystem development

- The Smart & Circular Hub will position itself as a connecting initiative that brings together the multiple smart and circular initiatives in the Northern Netherlands
- The first year's activities are focused on strengthening our position in the ecosystem
- In the first year, the Smart & Circular Hub should become a full-fledged project of the University of the North
- In the first year, the Smart & Circular Hub will actively look for collaboration with the following parties:
  - AI Coalition – Jointly develop research projects in the area of artificial intelligence and valorize them as part of the Groningen Skillslab

- SIH – Jointly develop research projects in the area of digitalization of industry and valorize them as part of the Groningen Skillslab
- European Digital Innovation Hub – This will connect the Northern ecosystem to the European network to spark collaborations, to strengthen each others business and to get exposure to higher TRL's
- Chemport – Jointly develop research projects in the area of smart and circular to the achieve regional sustainability and development goals

Next to these goals, the Smart & Circular Hub has the ambition to create a dedicated office and demonstrator space at the Zernike Campus, and to appoint a “kwartiermaker”.

The main focus point of the first year will be to further shape the hub. After the first year, the goals as described above will be evaluated and the strategy, with concrete activities, will be formed according to the outcome of this evaluation.



# Development path – Requirements for the first year

## What does the Smart & Circular Hub need for the 1<sup>st</sup> year?

Adequate resources will be required to perform the aforementioned activities for the first year in the Smart & Circular Hub. Different funding schemes are foreseen (RUG, other stakeholders, subsidy bodies)

### Required personnel commitment

Based on our discussion with other initiatives (see chapter *Best-Practices*) and our own estimations, we require the following personnel commitment:

Staff member	Working hours (FTE)
Kwartiermaker	0,5
Business/project/proposal developer	0,8 – 2,0
Scientific director	0,2
Event organiser/PR/Communication	0,2
Financial support	0,2
Secretarial support	0,1 – 0,2
<b>Total</b>	<b>2,0 – 3,3</b>

### Governance

The Smart & Circular Hub will initially be a project of the research institute ENTEG of the Faculty of Science and Engineering of the RUG. However, this should be reconsidered in upcoming years of the hub, particularly when other stakeholders are more heavily involved and a private judicial body may be a better option.

## Revenue model

The revenue model in the first year of the Smart & Circular Hub will be based mainly on (already obtained) subsidies (including resources and personnel) and stakeholder contributions. Below there is a list of potential sources of income to support the hub in the first year:

- Financial contributions from RUG bodies (CvB, FSE, ENTEG)
- Already approved and running projects (such as Industry 2030, training budget, AI hub, HTEq, EDIH) of which certain project activities could be executed within the framework of the hub.
- Project specific subsidies (e.g. SNN, NPG)
- Contributions by key stakeholder (potentially linked to specific projects)

In the first year, the revenue model for the upcoming years will be further specified. In the following slides an initial overview of the already identified opportunities for future resources are given.

### Cost overview first year

To house this organization and to accommodate the activities as described in this chapter, we require adequate housing at the Campus Groningen. This involves office space, and a meeting room. Next to that, some research facilities are required for setting up demonstrators and experimental/test equipment. For events we would like to make use of facilities available at the Zernike Campus.

Next to the housing and equipment, we have reserved a small budget for promotional activities and material. In the cost overview on the right, we have made an estimate for the cost items as described above.

Cost item	Estimate (EUR)
Office, meeting and demonstrator space	50.000
Equipment and consumables	70.000
Staff	250.000
Support staff	50.000
Promotional activities and material	30.000
Contingency (10%)	50.000
<b>Total</b>	<b>500.000</b>

### Request to the RUG executive board

Our primary request towards the executive board of the RUG is to get commitment to further work out and specify the plans and strategy for the Smart & Circular Hub in 2021. This commitment specifically means the following:

- Financial support for the “kwartiermaker” and business/project/proposal developers.
- Representation of the Smart & Circular Hub by the RUG executive board at relevant occasions for example with meetings in the context of NPG, Regiodeal, University of the North, etc.

# Development path – Five year goals to become a world leading institute

As explained before, the 1<sup>st</sup> year of the Smart & Circular Hub will mainly focus on further shaping the hub and defining its DNA. The idea of the growth model is to gradually develop the hub and continuously use feedback to further sharpening its value proposition. Our ambitions are quantified in multiple goals categorized using in the domains of education, research, knowledge exchange, funding and ecosystem also used in the development of the year 1 plan have been defined.



## Education

- Pdeng Chemical Engineering (NPG) is realized
- At least three training sessions are being organized by the hub per year. The focus of these trainings could be on: Lifelong learning and smart & circular skills training in combination with the Smart Industry Hub, CIC or IEM design team.
- A fully operational educational program on Smart Industry and Circular Economy (min. 20 students)



## Research

- Research portfolio with at least 10 PPS projects and a total project value between 10 and 20 million Euros



## Knowledge exchange

### External

- At least five networking events per year
- The Smart & Circular Hub is considered as *the* centre of expertise for smart industry and circular economy in the Northern Netherlands
- At least hundred stakeholders have joined the hub, ranging from small enterprises to large multinationals

### Internal

- Strong connections of other faculties to the smart and circular initiative to a wider scope including alpha and gamma elements (e.g. law, spatial planning, business

models, logistics). In this way, the Smart & Circular Hub stimulates inter and multi-disciplinary research within the region.



## Demonstrators

- Three demonstrators have been implemented
- Demonstrators will be positioned in a dedicated Smart & Circular Hub building
- The ZAP is booming and hosts multiple projects/start-ups within the framework of the smart and circular hub.



## Funding

- Revenue model has been fully developed and a sustainable income is generated. For the revenue model over the course of five years, the expert team has made an initial overview of the potential streams of income (figure 6).



## Ecosystem development

- The Smart & Circular Hub is widely recognized as the overarching body that brings together the multiple smart and circular initiatives in the Northern Netherlands
- It should be the hub of choice to perform research and education in the framework of smart and circular, not only for the region but also nationally and internationally

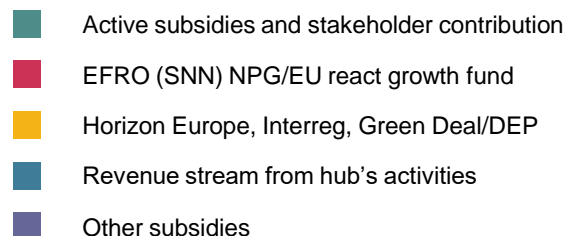


Figure 6: Revenue model showing the potential streams of income over the course of five years



# *Thank you*

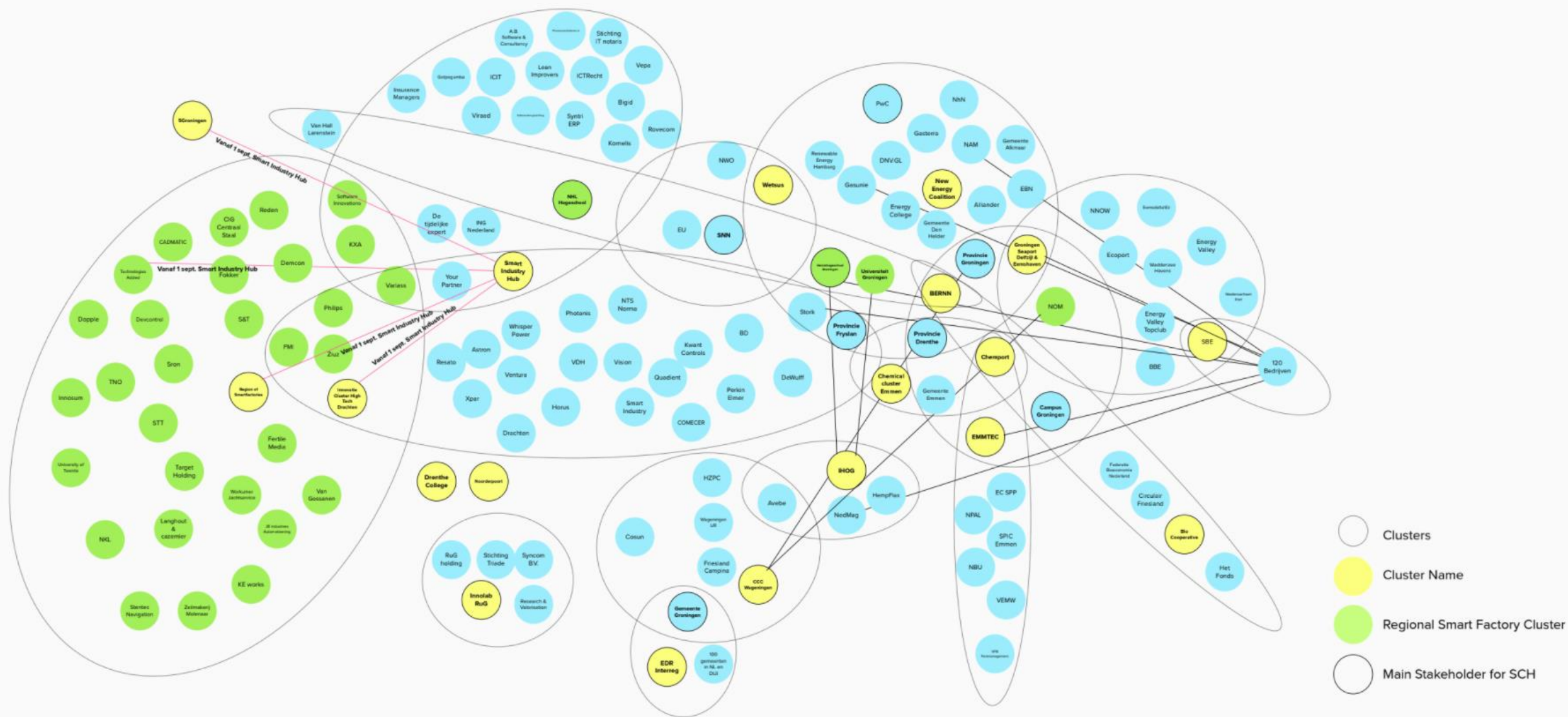
*PricewaterhouseCoopers B. V., Thomas R. Malthusstraat 5, 1066 JR Amsterdam, P.O. Box 90351, 1006 BJ Amsterdam, the Netherlands*

*T: +31 (0) 88 792 00 20, F: +31 (0) 88 792 96 40, [www.pwc.nl](http://www.pwc.nl)*

---

"PwC" is the brand under which PricewaterhouseCoopers Accountants N. V. (Chamber of Commerce 34180285), PricewaterhouseCoopers Belastingadviseurs N. V. (Chamber of Commerce 34180284), PricewaterhouseCoopers Advisory N. V. (Chamber of Commerce 34180287), PricewaterhouseCoopers Compliance Services B.V. (Chamber of Commerce 51414406), PricewaterhouseCoopers Pensions, Actuaal & Insurance Services B.V. (Chamber of Commerce 54226368), PricewaterhouseCoopers B.V. (Chamber of Commerce 34180289) and other companies operate and provide services. These services are governed by General Terms and Conditions ('algemene voorwaarden'), which include provisions regarding our liability. Purchases by these companies are governed by General Terms and Conditions

# Appendix A - Projection of all the initiatives in the northern Netherlands



## *Appendix B – Triple helix initiatives*

See attachment