

Regional triple helix cooperation's in climate change related innovations: great contributors or organizational nightmares?

A case study of the regional initiative of The University of the North in the North Netherlands region.

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Abstract

Climate change is increasingly getting attention as a large, if not the largest problem faced by society. Because decreasing living standards to reduce negative climate effects are hard and unpopular, attention is given to innovations that allow for retention and even increasing living standards of people around the world. Researchers, policy makers and private industries all work within their own realm and at their own pace to develop and implement such climate change innovations. Because of the differences between knowledge institutions where researchers work, governments where policy makers are active and industries, goals and approaches do not always align. Resulting in climate innovations not being implemented, developed, or getting the funding or support needed. To address these issues attention has been given to increasing cooperation among stakeholders in regions working towards climate innovations. However, is more intensive cooperation among important stakeholders such as knowledge institutions, governments, and industries within a region effective in developing and implementing climate change innovations? In this research the effectiveness of increasing cooperation among the stakeholders of knowledge institutions, governments and industries also known as the triple helix is explored, what challenges arise in forming triple helix cooperation and does it increase development and implementation of climate change innovations. The study has been conducted in the region North-Netherlands and has used the initiative University of the North as case study. Data was collected through interviews with representatives of the three triple helix pillars of whom some are involved, and some uninvolved in the University of the North initiative. Findings suggests regional triple helix cooperation's can be useful in developing and implementing climate change innovations, if internal issues within the three triple helix pillars hinder cooperation are overcome. However, findings do nuance the region as important layer and suggest climate innovations cannot be developed and implemented exclusively within regions.

Key words: Triple Helix, Climate change, Innovation, Regions, North-Netherlands

Introduction

The wicked problem¹ of climate change has been acknowledged for a number of years, however reaching consensus on measures to solve and mitigate the worldwide issue seems to remain daunting. A statement underlined by the recent World Climate Summit in Glasgow, where clear consensus on the path forward was not achieved, despite high anticipation (McDonald, 2021). Though measures aimed at reduction of harmful activities on the climate will most likely be necessary, the failure of formulating and implementing these measures means other approaches need to be considered as well. If reducing output outright is not option, turning to innovations reducing the negative effects of output seems to be the most logical next step. Though innovations reducing harmful effects of activities on the environment in principle should mean little to no concessions for living standards of individuals, they can still prove difficult to develop and implement.

In response questions should be asked on how climate change innovations could be most effectively developed and implemented. Such as on what governance level can implementation of innovations be done efficiently and decisively, and which stakeholders need to be involved and to what extent. Regarding governance level the region has gotten attention as being quite capable of using available resources and (local) knowledge to develop and implement climate change innovations. (Cooke, 2008; Granberg, Bosomworth, Moloney, Kristianssen, & Fünfgeld, 2019; Moloney & Fünfgeld, 2015). While also being a level on which the relevant stakeholders for innovation can be linked. Though regions have been put in the spotlight, dealing with climate change on the regional level also comes with it sets of challenges. First of it is not always clear what exactly constitutes a region and how a region can be best defined in the context of climate change (Pugalis & Townsend, 2014). Simply limiting regions to existent institutional borders might hinder the effectiveness and potential of regional cooperation. Secondly, even if a region is defined, cooperation can be limited by institutional challenges when responsibilities are unclear and communication lines between stakeholders and actors are weak or nonexistent (Head, 2011). In this research the benefits and challenges of the region will be investigated and discussed using the North-Netherlands region as example. In addition to the governance level, which and how stakeholders are involved is important in developing and implementing climate change innovations. Cooperation between the stakeholders of government, knowledge institutions and industry has been captured in the model of the triple helix, which in the years after has been built upon by scholars (Leydesdorff & Etzkowitz, 1995; 'Triple Helix', 2022). This research aims to take a closer look at how cooperation between the stakeholders, government, knowledge institutions and industry (referred to in this research as the three pillars of the triple helix) on regional level can contribute to developing and implementing climate change innovations and which challenges they face in doing so. Within the region North-Netherlands project University of the North (UvhN) will be used as case study as it aims to increase the cooperation among the pillars of the triple helix and sets out goals to develop and implement climate change innovations. The central research question is formulated as follows: *How do institutional challenges in the north of the Netherlands hinder triple Helix cooperation in the region to effectively contribute to climate change related innovations?* To answer the central research question four sub-questions have been formulated to explore and explain concepts as the region and the triple helix. Data to answers the questions will be gathered through interviews.

The first sub-question will discuss the North-Netherlands region: *What defines a region and how do these definitions influence how the region can be used as tool towards developing and implementing climate innovations?* This sub-question will explore what constitutes a region and how these constitutions are made, subsequently applying insights to the North-Netherlands region.

¹ Wicked problems are contingent problems that are differently judged by societal groups or actors, with many interdependent factors making them difficult to solve (Incropera, 2016).

Secondly the triple helix is explored. *What is the relevance of triple helix in contributing to regional climate change innovations?* This sub-question will explore if and why cooperation between government, knowledge institutions and industry is relevant. Does the model still hold up or do more actors need to be involved?

Lastly the University of the North is discussed. *To what extent does University of the North fill the role of triple helix regional cooperation? Which institutional challenges does the University of the North face in reaching its goals?* This sub-question combined data gathered about the region and triple helix is used to discuss the project University of the North and to what extent the project currently contributes to climate change innovations and what potential it has for the future.

It is expected that by conducting the research more insight in what is needed for the three pillars of the triple helix to effectively work together is gathered. Organizational incompatibilities are expected to be a challenge since governments, knowledge institutions and industries have very different structures, with different core values and goals. It is expected these different structures are a hurdle to overcome to establish a well-functioning cooperative that is decisive and effective. Furthermore, an expected challenge is ensuring societal relevance. If a strong triple helix cooperative is established in a region, can it ensure broad societal applicability and avoid relying solely on its own network.

Theoretical Framework

For this research climate change innovations have been selected as specific subject of study within triple helix cooperation, for the reason that the wicked problem of climate change inherently demands close cooperation with many stakeholders because of contingencies, unclear solutions and need for societal support (Incropera, 2016). Climate change innovations are therefore an ideal challenge for creating partnerships between different stakeholders such as knowledge institutions, governments, and industries. In this chapter the region, triple helix and the case study are introduced and discussed.

Regions and the North-Netherlands

Regions have been increasingly recognized as effective level to deal with climate change challenges and therefore received increased academic attention (Head, 2011; Moloney & Fünfgeld, 2015), regions in this research being understood as a defined geographical area containing actors that agree on the regional constitution and having meaningful relations. Such regions in contrast to national governments have been found to be more able to connect local institutions and communities in tackling climate change challenges (Cooke, 2008). Especially for climate change related issues this is relevant as it effects every part of society, measures often need wide support of actors and can vary depending on geographical location (Farber, 2011). Besides connecting actors on a more local scale, regions have also been found to be an effective scale to develop innovations (Cooke, 2008). Research has found that certain developments and innovations tend to cluster in the same geographical locations. These clusters have benefits as facilitating infrastructure can more easily be implemented and networks in the same field can be established, to nurture new innovations (Head, 2011). Though regions have been argued as being an effective layer in facing challenges, they still may not be effective in implementing policies or fostering innovations regarding climate change due to problems that arise such as unclear jurisdictions and weak or non-existent communication channels (Head, 2011). This is where triple helix initiatives introduced below have the potential to contribute positively, first in establishing communication between all relevant stakeholders and secondly in fostering and increasing innovations to reduce and mitigate climate change. Before taking a closer look at the triple helix, the North-Netherlands region used as example for this research is introduced.

The North-Netherlands region is officially defined by the European Union as a NUTS 1 major socio-economic region, consisting of the Dutch provinces of Friesland, Groningen and Drenthe (Eurostat, 2022). Besides this formal recognition the region as such does not have a formal governing body. However, the three provinces have introduced cooperation schemes in order to work to common goals

for the region as such, the most notable being the partnership in the form of Samenwerkingsverband Noord Nederland (SNN).² SNN is tasked to divide subsidies within the region, have an active lobby towards national and European politics and stimulate cooperation between industries, knowledge institutions and governments within the North-Netherlands region. Together aiming to improve the North-Netherlands region economically and socially. To reach its goals SNN has developed research and innovation strategies in which climate innovations are featured and mentioned as good opportunities for the region, the most recent one being the strategy for 2021 to 2027 called RIS3 (SNN, 2022). The region features multiple knowledge institutions with strong research departments focused on climate change innovations such as renewable energy and environmentally friendly farming. Moreover, the region hosts a multitude of industries fit for these innovations such as farmers, chemical plants, and ports. Though clear case for the North-Netherlands as region can be made, this research will take a closer look at the region and if the region could be more effective in developing and implementing climate change innovations in different constitutions.

Triple helix and the University of the North

The triple helix model referring to cooperation between industry, knowledge institutions and government was introduced by Loet Leydesdorff and Henry Etzkowitz in 1995. Since then the model has been widely used by scholars to investigate cooperation between industry, knowledge institutions and government and how this is more beneficial from less integrated approaches ('Triple Helix', 2022). As introduced this research will investigate the challenges that regional triple helix cooperatives face to become successful in developing and implementing climate change innovations. In previous research it has been shown that triple helix cooperatives can be effective once they have been established and operational. Moreover, academic literature suggests that regions can be an effective level when it comes to tackling climate change challenges, if proper and sustainable cooperation among triple helix stakeholders is established (Cooke, 2008). The triple helix model has also been used in the past to investigate initiatives focusing on energy transition related projects (Brink, 2017; Werker, Ubacht, & Ligtvoet, 2017). Triple helix initiatives are thus not new and research into projects have shown success, however there is also evidence that regional cooperatives do not always work out and reach their full potential (Head, 2011; Smith, Wilson, & Wise, 2020). Where triple helix initiatives once established seem to work and contribute to problems faced, it can be challenging to establish them (Smith et al., 2020). Furthermore, examples of triple helix cooperation have shown to fail or become ineffective if confronted with institutional challenges (Head, 2011; Smith et al., 2020). Critique on the triple helix model has also extended beyond the initial idea of three pillars and even one of the original authors on the triple helix has acknowledged there could be more helices (Leydesdorff, 2012). The extension of one pillar to the helix resulting in a quadruple helix is most often used and involves next to the three original pillars societal groups as additional helix (Benneworth, Cunha, & Cinar, 2020). Besides the central question of effectiveness of regional triple helix cooperation, the opinion of the existing three pillars to adding a fourth pillar introduced in the quadruple helix will be explored. Climate change being a large societal challenge with innovations and implementations having potential direct influences on the daily lives of individuals. The exploration of this fourth helix is therefore assumed to be relevant for this research.

Following the RIS3 introduced by SNN five knowledge institutions within the North-Netherlands region; Rijksuniversiteit Groningen, Hanzehogeschool Groningen, University Medical Centre Groningen, NHL Stenden and van Hall Larenstein formed the alliance of University of the North (UvhN). The alliance has the aim to work more intensively together towards education, research and innovation among the knowledge institutions, but also envisioning more involvement of industry to increase educative and innovative transitions within the North-Netherlands (UvhN, 2022b). Currently the project is not a standalone project but a joined venture of the knowledge institutions that together developed themes and goals. The UvhN cooperative has formulated eleven themes of focus of which

² For further information see <https://www.snn.nl/over-snn>.

six are climate change related: Energy, Green chemical, Circular economy, Sustainable agriculture, Water-technologies and circular plastics (UvhN, 2022a). By bringing together institutions and involving industry in developing and implementing climate innovations the cooperative of UvhN is chosen as subject for this research to investigate triple helix initiatives. Furthermore, the UvhN cooperative challenges the idea of the North-Netherlands as being the limit for regional cooperation and actively seeks to involve parts of Germany (UvhN, 2020). By combining the proven concepts of the triple helix and the region as effective level, this research aims to contribute to uncovering what the institutional challenges arise on the regional level and how they hinder regional triple helix cooperatives in effectively contributing to regional climate innovations.

Conceptual Model

To visualize the research a conceptual model has been drafted and can be found in figure 1 below. Climate change related challenges and their regional sources and effects are assumed to be a given and widely supported by literature. As the model shows the research will focus on how regional cooperatives can work towards innovative solutions, with strong focus on the institutional challenges (The orange square) faced in creating cooperation among knowledge institutions, industries, and government.

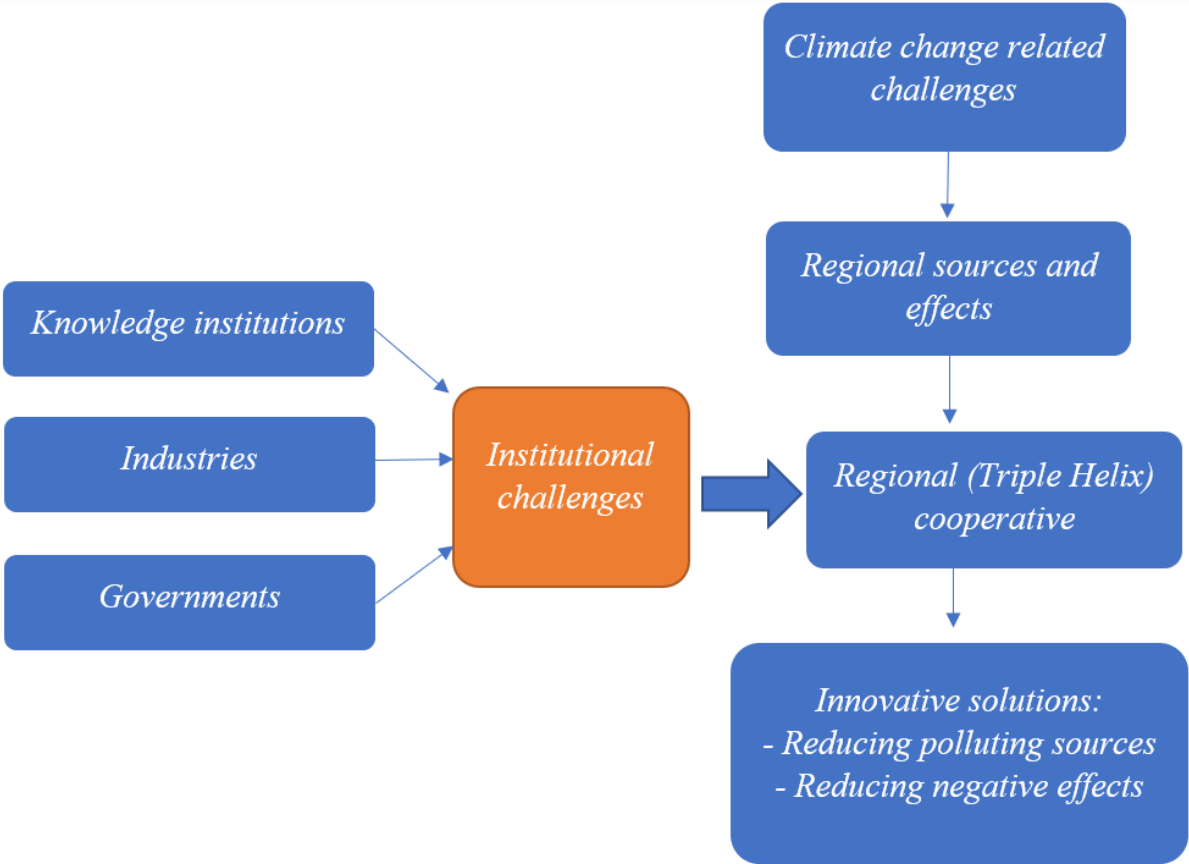


Figure 1 – Created by author

Methodology

To answer the central research question this research was conducted using semi-structured interviews. Semi-structured interviews defined as the interview process whereby the interviewer will make use of both close-ended as open-ended questions, allowing the interview to be focused on the research questions and ensuring comparability between interviews, while leaving room for flexibility (Clifford, Cope, Gillespie, & French, 2016; Klenke, 2015). Predetermined questions discussed below, make sure that the interview questions are carefully constructed and align with the goals of the research. Because in this research differences between vision and opinion among triple helix pillars have been investigated a degree of comparability between interviews was necessary which was ensured with predetermined questions. However, because interviews have been conducted with a wide vary of actors having different backgrounds a complete rigid structure could not be made as deviation per interview had to be incorporated, hence semi-structured was deemed the best fit for this research.

The interview questions and protocol have been developed based on the research question, sub-questions, theoretical framework and initial knowledge gathered on the project UvhN and the model of the triple helix, as to be well informed on the topic and gathering the relevant information during the interviews (Clifford et al., 2016). This led to a general outline of the interview protocol in the following format: Questions regarding effective geographical layers of climate innovation and if and where regions fit in those layers, Questions on the supposed region North-Netherlands, Questions on the different pillars of the triple helix, Questions on triple helix model and initiatives, Questions connecting university of the north to regions and the triple helix model in the context of climate innovations.³

For this research seven interviews have been held with individuals in different positions and affiliated with different institutions linked to UvhN or a pillar within the Triple Helix model. Interviews have been held with persons affiliated with the following institutions: Rijksuniversiteit Groningen, Hanze Hogeschool, Van Hall Larenstein, NHL Stenden, Groningen Seaports and Noorden Duurzaam. Furthermore, interviews have been conducted with a civil servant from the province of Friesland. The positions of the interviewees within their institutions range from board members, policy officers, researchers, and lobbyist, of whom some fulfill multiple roles. In the table below the interviewees have been numbered and categorized into triple helix pillar and function. In addition, it is indicated whether the interview was conducted physically or digitally. All interviews have been processed anonymously.

Interviewee	Triple helix pillar	Function(s)	Digital/physical
1	Knowledge institution (KI)	Policy officer	Digital
2	Knowledge institution (KI)	Board member	Digital
3	Knowledge institution (KI)	Professor and researcher	Physical
4	Knowledge institution/Industry (KI/IND)	Researcher and farmer	Physical
5	Industry (IND)	Board member	Physical
6	Government (GOV)	Policy officer	Digital
7	Government (GOV)	Lobbyist	Physical

For this research all knowledge institutions involved in UvhN have been interviewed except for UMCG. This has been a deliberate choice as this research will be focused on the climate initiatives of UvhN and the UMCG being primarily involved in the healthy aging part of the cooperation. While Healthy aging is linked with climate change for the scope of this research it has been left out, as it is mostly a symptom of the harmful effects. The UMCG and the University Groningen organizations are

³ The complete protocol has been added as second attachment to this thesis.

furthermore organizationally linked. Moreover, the choice has been made to only interview Provinces within the region of North-Netherlands and leave out the municipalities and waterboards. The reason for this is that most regional innovation funds are managed on province levels and are therefore more linked with regional cooperation's. For the industry pillar of the triple helix in the North-Netherlands the choice has been made to interview a representative of Seaports Groningen as this authority is involved with many of the larger industries in the North and is therefore believed to be able to provide information on how UvhN can or cannot aid in improving and initiating innovations regarding climate change. Furthermore, an interview with Noorden Duurzaam is deemed useful as an outsider to the project of UvhN, but knowledgeable on climate innovations and cooperation between different actors and administrative levels.

The interviews have been recorded and subsequently converted to transcript. In order to analyze the transcriptions the method of coding has been applied using ATLAS.ti. Three code groups were created shown in the table below.

Regions and definition	Triple helix	UvhN
Definition North-Netherlands	Hurdles industry	Hurdles UvhN
Personal Definition North-Netherlands	Hurdles knowledge institutions	Challenges UvhN
Best governance level for innovations	Hurdles governments	Definition UvhN
	Future focus on triple helix	Goals and effectiveness UvhN
	Helix models	

During preparation of the interviews and the interview protocol use of data and ethics have been carefully considered. First it should be noted that UvhN is a new project and most interviewees had to some extent a stake into the success of it. Leading to the possibility that some interviewees would be inclined to acknowledging good progress of the project then might be the case in reality. This consideration has been reflected in the questions of the interview being asked in a 'negative' way instead of 'positive' way, for example asking specifically for challenges or issues encountered rather than asking what could be improved. A second consideration that was taken into account has been the position of the interviewees towards their institution and other institutions. As many of these interviewees are in some way cooperating with each other on a professional basis discretion and anonymity has been applied to all interviews. Because linking position of an interviewee to an institution would in some cases create an easy opportunity to discover the identity of the interviewee, these two have not been linked.

Results

To answer the central research question first regions as such and the region of the North-Netherlands will be discussed. Secondly results regarding the Triple Helix and its individual pillars of knowledge institutions, Governments and Industry will be examined. Lastly the region and triple helix are discussed in the context of UvhN and climate change related innovations.

The North-Netherlands region defined and explored

The interviews were started off by questions on the region and the definition the North-Netherlands, and to what extent this aligns with ideal view of an effective governance layer in the context of climate change innovations according to the interviewees. Effective governance layer meaning a defined geographical area with actors that in the interviewees view would be useful in implementing and developing climate innovations.

The interviewees have been asked if they were familiar with the term North-Netherlands in the context of a region. All interviewees responded with the lowest common denominator defining the region as the provinces of Friesland, Groningen and Drenthe. However, some initial nuances among interviewees can be noted. Interviewee 2 (KI) for instance mentioned that some villages close to the borders of the three provinces which are officially not part of any could be considered as heavily involved in the region as in practice their economy is focused on villages, towns, and cities within one of the provinces of the North-Netherlands. Therefore, the interviewee argued it would be more effective to actively include these villages in programs and projects of the North-Netherlands region. This line of reasoning was also mentioned the other way around, where villages are more focused on the economy of a different province than the three provinces of the North-Netherlands. Furthermore, interviewee 5 (IND) emphasized on the cooperation between Groningen and Drenthe and noted that in their opinion Friesland is only limited involved in innovations in the area from Emmen to the Eemshaven. Interviewees 3 (KI) and 6 (GOV) did not explicitly mention more or involvement of specific provinces but mentioned the region as geographically logical but referring to other governance levels as being better suited for tackling climate change. With their reasoning being that climate change does not limit itself to geographical boundaries and for innovations or policies to have significant effect this should be done on national or even international scale.

When the interviewees were asked what their ideal North-Netherlands region would look like the answers varied. Interestingly depending on which triple helix pillar a particular interviewee belonged to the view of an ideal region was based on different assumptions. Interviewees in the governmental pillar of the triple helix reasoned mainly from an administrative view, making their ideal region one with similar administrative systems and 'culture'.⁴ With one interviewee remarking "I would suggest creating regions as pragmatic as possible", referring to existing organizational structures and cooperation among them. The knowledge institution interviewees perspective in general is more focused on geographical proximity and similarities in research and education, mentioning that even some places in Germany could be considered in creating an effective region to collaborate more on climate innovations. Though according to interviewees this is also incentivized by European subsidies that are granted to transboundary collaborations. Interviewees within the industry pillar of the Triple Helix are less interested in comprehensive and formal regional structures in general, mentioning project-based cooperation is more effective since conditions and needs vary for every project. Furthermore, an industry interviewee mentioned that the three provinces in the North-Netherlands region generally lack large international businesses with their headquarters in the region and often need to convince overseas boards that do not know the region or rather work with universities elsewhere as their R&D departments are based closer to these locations.

⁴ Two interviewees used the word 'culture' referring to informal codes of conduct.

Triple helix and its pillars

During the interviews all participants were asked which pillar of the triple helix was in their view best equipped to take the lead in cooperation towards climate innovation and what the individual hurdles of each pillar were in the North-Netherlands region. To the first question interviewees 4 (KI/IND), 5 (IND) and 7 (GOV) mentioned knowledge institutions should be in the lead in initiating triple helix cooperation when it comes to climate change innovation. Where interviewee 4 (KI/IND) also noted governments should take responsibility and interviewee 5 (IND) industry. Interviewee 2 (KI) mentioned government as needing to be in the lead to create concrete and clear rules and laws to allow for climate innovation. Lastly interviewee 3 (KI) and 6 (GOV) responded that all three pillars should equally be involved, and the lead should be taken on individual tasks to reach the common goal based on competences of each pillar. Interviewees remarked that the strength of triple helix initiatives is the fact that it can align values and goals of the individual pillars were in normal situations those might conflict. By bringing the three pillars together and involving them from the start in creation of goals and plans, resources, time, and knowledge could be used effectively, and opposition could potentially be mitigated. Though most interviewees in theory are in favor of triple helix cooperation and see potential, challenges of each pillar were mentioned hindering in creating such cooperation. Below each pillar of the triple helix will be discussed in terms of strengths and weaknesses in coming to triple helix cooperation.

Knowledge institutions

In order to come to regional innovation and implementation knowledge institutions are of vital importance, not only in developing innovation but also in educating future employees on working with and on these innovations (Fonseca & Nieth, 2021). Though knowledge institutions in the North-Netherlands region are numerous and have a strong focus on climate related innovations a number of interviewees noted challenges within the institutions that limited the potential of creating real world applicable solutions. The issue of fragmentation and lack of cohesion within and among knowledge institution was frequently (5 out of 7, including one of each pillar) identified by interviewees as a hurdle to come to triple helix initiatives. The interviewees mentioned that cooperation and communication between the knowledge institutions existed but mostly on specific projects and with differing degrees among institutions. Furthermore, most knowledge institutions are seen as being fragmented internally making it difficult for other triple helix pillars to know whom to contact and work with. A second observation made by both a knowledge institution and government interviewee has been the system within most knowledge institutions towards research that incentives to conduct research to receive subsidies and publish as much as possible. Interviewees felt that this system led to research being shelved quickly after completion and thus only limited being transferred to real world applications.

Governments

Within the context of this research and the North-Netherlands region governments are the provinces, municipalities, waterboards and formalized groups involved in policymaking. Though the national government and even the European Union cannot be totally disregarded as many means such as funds are directed by these levels and have a degree of influence on regulations that do effect climate change innovations. For this research however, the provinces of Friesland, Groningen and Drenthe have been singled out. The provinces during the interviews received little attention by almost all interviewees compared to the other pillars of the triple helix in the North-Netherlands. Interviewees viewed this body mainly as facilitator of climate innovation by changing regulations or providing funding for either research or applications of new technologies. When asked about the hurdle of the province's interviewees mentioned distance and indecisiveness as problems. Distance towards other pillars and societal actors leading to resistance and slow implementation, fueled by indecisiveness leading to long periods of time passing before decisions are made. This issue of government has been discussed in

literature and is often contributed to the risk-averse nature and the high pressure of other issues, making it difficult to devote enough attention (Head, 2011).

Industries

Industries in contrast to the knowledge institutions and governments are in principle less focused on societal issues and driven by the bottom line. Though companies are increasingly under pressure to invest in more sustainable business practices as consumer demand and external and societal actor forces increase (Cornelissen, 2022). The interviews reflect the notion that the industry pillar of the triple helix is willing to work together towards climate innovations, but only to the extent that it fits their core goals. Distinction between different sectors within the industry pillar of triple helix must be made as the type of business and scale greatly determines capability of actively working on climate innovations and being involved in regional triple helix cooperation. Interviewee 4 (KI/IND) mentioned that farmers are already involved in research done by knowledge institutions for example, but often struggle with financing and incorporating all new innovations that might reduce their effect on the climate. Larger industries in contrast were mentioned by interviewee 5 (IND) as often not having their headquarters or R&D departments located in the North-Netherlands region as they are international companies, which makes regional cooperation less attractive and useful for them. When it comes to regional innovation it thus seems more local industries such as farmers are willing, but do not have the financial means. While larger industries with financial means are either unwilling to cooperate on regional scale or have internal barriers to do so.

University of the North

UvhN as triple helix initiative

The University of the North initiative as introduced aims to increase intensive cooperation among the knowledge institutions within the North-Netherlands region and potentially institutions beyond. With the strong focus on knowledge institutions, all the interviewees have been asked to what extent UvhN in their perspective fits within the model of the triple helix. In response to this question all interviewees were of opinion that the UvhN initiative fits within the model of the triple helix as it clearly sets out to intensify cooperation among one pillar of the triple helix. Though the UvhN project itself explicitly mentions⁵ to aim at increasing triple helix cooperation among all pillars, interviewees when asked to describe the project in their own words focused on the cooperation among knowledge institutions and how the project would make it through that way easier for the government pillar and industry pillar to connect with the knowledge institution pillar. The UvhN project is thus not seen by interviewees as a comprehensive triple helix project itself combining all three pillars, but rather as an initiative strengthening the knowledge institution pillar in the North-Netherlands region to engage in triple helix based projects.

In the RIS3 forming the basis of UvhN, the quadruple helix involving next to triple helix societal actors is explicitly mentioned (SNN, 2022). In addition to climate innovations potentially having effect on everyday lives of individuals, interviewees were asked what their opinion was on involving the extra helix pillar. Interviewees 3 (KI), 4 (KI/IND), 5 (IND) and 6 (GOV) acknowledged the importance of societal involvement in climate change innovations but were skeptical about involving them in a helix structure. Reasons given for not involving societal actors were that it would be very difficult to find representatives to involve and while societal organizations exist, they are often created for specific local issues and noted as being unrepresentative. Instead, these interviewees mentioned involvement of societal actors and citizens could be done through organizing activities where new ideas are presented and discussed on a regular basis. Interviewees 1 (KI), 2 (KI) and 7 (GOV) were of opinion that societal actors should be a formal pillar and would suggest moving towards quadruple

⁵ “Our collaboration transcends the boundaries of the affiliated knowledge institutions. We promote collaboration between various knowledge areas and sectors, and between the government, the business community, and knowledge institutions.” <https://universiteitvanhetnoorden.nl/en/about-us/>

helix structures instead of triple helix structure. There is no clear consensus among pillars in this regard other than that both industry interviewees prefer the triple helix structure.

Challenges and effectiveness

Six out of seven interviewees were to some extent familiar with the UvhN initiative and subsequently asked what challenges the project in their opinion faces and if the current state of the project will result in effectively achieving goals in developing and implementing climate change innovations. The UvhN initiative has only been recently launched and four interviewees also remarked this in answering the questions about challenges and effectiveness. Regarding challenges interviewees were positive about the initiative and believed it to have potential in reaching its goals, including developing and introducing climate innovations. However, they also believed the initiative being in the critical phase of transitioning from an idea to a functioning platform. The challenges noted by interviewees in the transition phase are risk of creating a meeting-culture, internal resistance within the knowledge institutions and creating an organizational body that is dependent on specific individuals. The risk of the project falling subject to a meeting-culture, or in other words promoting and holding meetings with little follow up was mentioned five times during the interviews. Interviewees mentioning internal resistance pointed to the current way knowledge institutions operate, with faculties and departments with a high degree of autonomy. Some interviewees mentioned it will in cases be difficult to convince faculties and departments to give some of this autonomy up, which would make holistic cooperation difficult. Lastly three interviewees noted that currently the UvhN initiative although backed by all knowledge institutions relies mostly on the active lobbying of a few people. The risk of this being that if no structural organization is created the project could quickly fail or dissolve if the people it now relies on would no longer be involved.

When asked about effectiveness of the UvhN project in reaching its goals interviewees were more hesitant in giving concrete answers, saying the project is in an early phase but having potential. Interviewees referred to the challenges of the UvhN initiative itself discussed above as being vital to overcome. Though the connection with the remaining two pillars of the triple helix have also been mentioned by interviewees as potential issues. Interviewees remarked that if the knowledge institutions would be able to work more intensively together towards climate innovations it would be a good step towards creating more triple helix cooperation in the North-Netherlands region. Since the UvhN initiative already incorporates some projects⁶ that involved multiple knowledge institutions that showed success, interviewees were confident that if challenges are overcome the UvhN could be effective in contributing to developing and implanting climate change innovations in the North-Netherlands region.

As final question interviewees have been asked if in their opinion there should be more cooperation within triple helix initiatives, like the UvhN project in the North-Netherlands. Six out of the seven interviewees mentioned more attempts at stimulating triple helix cooperation with the North-Netherlands would in their opinion be beneficial in developing and implementing climate change innovations. Only interviewee 7 (GOV) believed triple helix cooperation would only be beneficial if first more fundamental changes within the three pillars itself were made.

⁶ <https://universiteitvanhetnoorden.nl/en/programmes/hybrid-research-group-sustainable-polymers/>

Conclusions

This research set out to investigate how institutional challenges hinder triple helix initiatives to contribute to climate change innovations in regions, with the North-Netherlands region and University of the North initiative as case study. First the research set out to explore the region as such, resulting in the findings that interviewees agreed with the geographical definition as defined by the European Union. Though when asked about their personal idea about an effective region for climate change innovations answers varied. Differences between the triple helix pillar could be noted in these answers as knowledge institutions answers related to close proximity of development and research opportunities regardless of territorial borders, while the government pillar emphasized cooperation within pragmatic institutional frameworks. Industry did see value in regional cooperation but emphasized much more on broader cooperation based on R&D and headquarter locations of companies. The findings align to an extent with the literature as the region is seen as a valuable layer for climate innovation, however interviewees noted that climate change policies and innovations cannot be solely on regional level and need close cooperation with other governance levels from local to global.

Within the context of the North-Netherlands region interviewees agreed triple helix cooperation has potential to contribute to reaching common regional goals and should therefore get more attention from all three pillars, though interviewee 7 (GOV) emphasized the need of systemic change within the pillars first. Even though the University of the North initiative being in early stages, many interviewees believed that the initiative could contribute to facilitating triple helix cooperation within the region North-Netherlands. Several challenges however remain not only for the University of the North project, but also for future triple helix cooperation within the North-Netherlands region. Challenges identified with the UvhN initiative are mainly found in the transition from strategy and intention to a functional organizational structure. To come to a functional organizational structure for UvhN meetings need to be converted to actions and individuals within the knowledge institutions need to be formally involved. Challenges identified for future triple helix cooperation in the North-Netherlands were mentioned as being more fundamental in the way the different triple helix pillars and their systems currently operate, examples being internal fragmentation and indecisiveness. Interviewees see the UvhN project as a good step towards tackling those fundamental challenges of triple helix cooperation in the North-Netherlands region, as it has the potential to make the knowledge institution pillar more accessible for the industry and government pillar. Thus, making future triple helix cooperation easier.

This research has been limited to the exploration of one region and one triple helix initiative. For further research comparison with other regions similar to the North-Netherlands region and triple helix initiatives that exist in those regions could give valuable insight in universal challenges faced and potential best practices to overcome these. In addition, investigation into the scalability of triple helix cooperation could produce constructive data on what governance layer most attention for climate innovations should be focused. For this research the region was assumed as capable governance layer cooperation among triple helix pillars, however during the interviews other governance layers suitable were mentioned. Governance layers not only within national border, but also extraterritorial as long it makes pragmatic sense for actors to work together. Moreover, future research into regional triple helix cooperation in the context of climate change innovation could include more stakeholders and real-life projects in regions to test its effectiveness.

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Attachments

University of the North website

Link website University of the North: <https://universiteitvanhetnoorden.nl/en/about-us/>

Interview protocol

Vooraf:

- Het interview zal maximaal 45 minuten duren.
- Zoals aangegeven in de uitnodiging wil ik dit interview gebruiken voor mijn bachelor scriptie, de informatie zal nergens anders gebruikt worden zonder expliciete toestemming van u.
- Alle informatie zal vertrouwelijk en anoniem verwerkt worden in het onderzoek, tenzij u expliciet toestemming geeft om uw naam te gebruiken. Mocht u hier toestemming voor geven zal ik u later nogmaals benaderen wanneer ik ook daadwerkelijk u naam en/of quote wil gebruiken in het onderzoek.
- Het interview kan op elk moment gestopt worden en u kan ook op een later moment uw medewerking zonder opgave van reden terugtrekken.
- Het interview is half-gestructureerd.
- Als laatste wil ik vragen of u akkoord gaat met het maken van een audio opname van het interview?
- Begrippen:
 - Kennisinstellingen: MBO, HBO en universiteiten
 - Overheden: Gemeentes, provincies en Rijk
 - Industrieën: Private sectoren of bedrijven
 - Klimaat innovaties: Ontwikkelingen aan zowel de oorzaak als gevolg kant, die op een positieve manier bijdragen aan het reduceren van ongewenste klimaateffecten.
 - Institutionele problemen: Uitdagingen die zich voordoen in samenwerkingen, zowel bij het vormen als bij het nastreven van doelen.

Vragen:

1. Wat is volgens u het meest effectieve niveau (Wereldwijd, landensamenwerkingen, Landelijk, regionaal of lokaal) om klimaat innovaties te ontwikkelen?
 - a. Kunt u dit toelichten, (hoe definieert u deze laag)?
 - b. Is dit niveau in uw ogen ook de meest effectieve laag om deze innovaties toe te passen?
 - c. Hoe zou u de regio 'Noord-Nederland' definiëren?
 - d. Is 'Noord-Nederland' zoals u definieert, naar uw mening een effectieve laag voor klimaat innovaties of zou u liever een ander kader zien?
2. Als u moet kiezen tussen kennisinstellingen, overheden of industrieën welke van deze drie zou volgens u in de lead moeten zijn in het initiëren van klimaat innovaties?
 - a. Kunt u dit toelichten?
 - b. Wat is naar u idee het grootste struikelblok als het aankomt op effectief toewerken naar klimaat innovaties voor:
 - i. Kennisinstellingen
 - ii. Overheden
 - iii. Industrieën
3. Bent u bekend met het model van de Triple Helix? (Zo niet korte uitleg)
 - a. Bent u bekend met het project Universiteit van het Noorden?
 - i. **Zo wel:** Hoe zou u het project in uw eigen worden omschrijven?

1. Past dit project in uw ogen in het model van de Triple Helix?
 2. Is het project naar u idee effectief in het behalen van haar doelstellingen?
 3. Tegen welke institutionele problemen loopt het project volgens u aan (Financiën, mensen, kennis, organisatorisch, legitimiteit)?
 - a. Doorvragen op gegeven antwoorden: Welke reden? Uit welke hoek? Oplossingen?
 4. Er wordt ook gesproken over quadrupel helixen, wat is uw visie daarover?
 5. Heeft u ideeën hoe het project effectiever zou kunnen functioneren in het behalen van haar doelstellingen?
- b. **Zo niet:** Bent u bekend met een project of initiatief die binnen dit model past?
- i. Is dit project naar u idee effectief in het behalen van haar doelstellingen?
 - ii. Tegen welke institutionele problemen loopt dit project volgens u aan (Financiën, mensen, kennis, organisatorisch, legitimiteit)?
 1. Doorvragen op gegeven antwoorden: Welke reden? Uit welke hoek? Oplossingen?
 - iii. Bij welke partner in het project valt volgens u het meeste winst te halen voor verbetering?
 - iv. Heeft u ideeën hoe het project effectiever zou kunnen functioneren in het behalen van haar doelstellingen?
4. Zou er naar uw mening meer ingezet moeten worden op samenwerkingen in het triple helix model in regio's?
- a. Wat is de voornaamste reden voor uw antwoord?

Afsluiting:

- Zijn er vanuit u kant nog vragen of opmerkingen?
- Mocht er later nog wat opkomen dan kunt u mij bereiken via de verstrekte informatie.