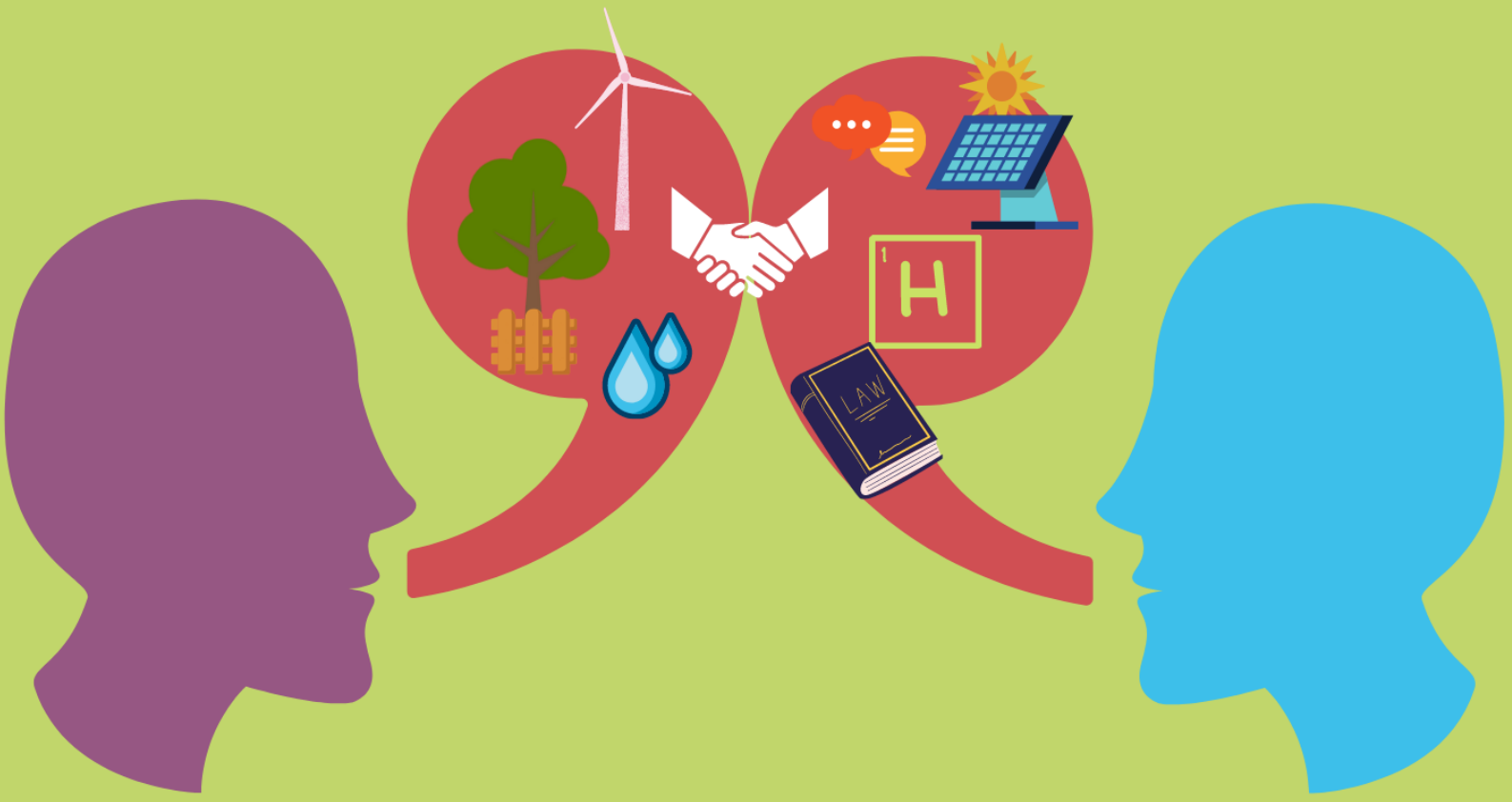
UNIVERSITY OF TWENTE.

Energy transition; a challenge for communication professionals

Bachelor thesis



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Abstract

Objectives: In the light of the increased interest in climate change, as well as the Dutch ambition to become natural gas-free by 2050, this research investigates the challenges encountered by communication specialists when it comes to energy transition in the Twente area in 2022, targeting various stakeholder categories such as governmental institutions, NGOs, energy suppliers, housing corporations and research institutes. This study focuses on identifying what are the main barriers in moving the energy transition further in the Twente area, as well as exploring and selecting which communication strategies are evaluated by the target group as efficient, based on their estimation.

Method: In this research, the data collection was gathered in two phases, using semi-structured interviews as a qualitative collection tool. In the first phase, the sample was based on the communication specialists who are confronted with challenges in their daily practices in the energy transition activity; and the second phase was dedicated to collecting the academic point of view concerning the challenges encountered by practitioners, as well as reflecting on how to address the barriers from the research perspective. The total number of participants was 17 (N=17), thereof 11 (N=11) were practitioners and 6 (N=6) were researchers. All the interviews were coded with the use of a deductive codebook, which resulted in 12 categories and 53 sub-categories addressed.

Results: All participants stated that for energy transition, there is no unique challenge, but several interconnected. The main challenges encountered by all communication professionals in the study are awareness, intrinsic motivation, legislation, and costs. The researchers framed the challenges as 'energy trilemma' specifically citizen engagement, enviornemntal sustainability awareness and energy justice (energy accesability). Additionally, the specialized workforce and fake news were also frequently mentioned by communication specialists. The NIMBY effect was a concept mentioned by all the participants as the explanation for the resistance and the war between Ukraine and Russia was categorized as a facilitator of both awareness and acceptance of the population for renewables.

Conclusion: The findings show that the communication practitioners classified the challenges from the practical point of view, while the academia presented the challenges from a theoretical perspective, based on human behaviour theories. The communication strategies that work for governmental institutions, energy suppliers, and housing corporations were evaluated as inefficient by NGOs, due to the lack of institutional trust from the population.

Overall, traditional, and modern communication methods are used by all the communication specialists involved in the study, however, the focus is on social media as well as personal contact with the community. When reflecting on the next 10 years of energy transition's future of Twente, communication experts unconsciously distinguish between the expected and desired future, using the verbs "think" and "hope", while researchers shared only the expected future.

Recommendations

This study investigated the opinion of the communication specialists from the governmental, housing, energy supply industries and academia about the challenges of the energy transition of Twente region. Therefore, as recommendation for future research, the opinion of the population should be investigated and identified the gap between awareness and acceptance of renewables, based on what are the needs of the people to make the transition to alternative energy sources. To this end, a combination of quantitative and qualitative research can be conducted to reach a larger sample. The communication specialists should focus on sharing the initiatives and supporting the silence majority who are currently the adopters of energy transition, more than building their strategies on influencing the noisy minority.

In the light of having 70% renewables by 2030 and disconnecting 8 million buildings from natural gas by 2050, retrieved from the Climate Agreement, the only way of achieving the milestones is by efficiently and proactively engaging people and industry, now.

1. Introduction

Climate change is constantly on the lips of most people who are concerned about the noticeable consequences of human actions reflected on the environment. In broad terms, climate change can be described as the radical but slow shift depicted by variations in the wheatear characteristics, as well as temperatures. Since the industrial revolution in the 1800s, massive production started to grab the attention of the technology supporters which resulted in a lack of focus on what was the most important, our home, and the environment (Mowery, Nelson, & Martin, 2010). The human activity started to be more diverse and more demanding in terms of resources. Therefore, one of the main reasoning that led to the climate emergency in which society is currently in is due to burning fossil fuels such as coal, oil, and gas, which are part of our routine (Otto, Kaiser & Arnold, 2014). Greenhouse gas emissions are generated by the intense burning of fossil fuels, which act as a trap for the sun's heating, causing a boost in the temperatures registered, all around the globe. The Earth is feeling suffocated, as consequence, it reflects the heaviness of human actions' consequences to nature, through intense droughts, severe storms, flooding, melting the polar ice, loss the biodiversity, as well as ad-hoc fires due to the increase of temperature registered.

Energy is a substantial part of people's life because most of the activities need the energy to be fully accomplished. In the last decades, the transition to renewable energy started to be a point of discussion not only for the experts but also for society (Sen & Ganguly, 2017). The abuse of energy consumption has severe consequences for various fields, but mainly the eco-system suffers from the irresponsive behavior and carefree routine of people (Guath, Millroth & Elwin , 2015). One critical but necessary step to make in this context is the transition to the renewable energy source which will keep in the first instance the harmful climate impact under control, and consequently, facilitate achieving the global milestone of being climate neutral by the next decades. The Paris Agreement known as 'Klimaat Akkord' in Dutch, is the internal treaty signed by various countries that states the responsibility of the parties involved to limit the global warming and keep it between 1.5 and maximum 2 degrees Celsius (Mesík, 2015).

The solar energy from the sun, the wind, and biomass are all renewable energy resources that once upon a time our ancestors were happily living with. Moreover, society has changed, the current technological progress shows that renewable energy sources increased their variety, and with the help of innovation, people can make use of hydrogen, hydropower, ocean thermal, and geothermal energy and adapt it to their lifestyle, say Rosenbloom, Berton&

Meadowcroft (2016). However, even if the options exist, there are some challenges that experts are concerned about. Along with the dependency on natural resources, there are more concerns stated, such as power quality, resource location, awareness obstacle, and nevertheless, high financial investment (Stirling, 2014). While experts and higher power institutions are investing their knowledge, money, and time to make the transition available for society as fast as possible and react to the climate emergency, there is a lack of awareness noticed on behalf of the consumers, meaning that people are not aware of the benefits of renewable energy or understand the process of this transition (Henderson & Sen, 2021).

Matching the problem with the possible solution, leads to the next concerning point, specifically, influencing the call of action. In other words, how individuals can be persuaded to positively change their behavior and attitude towards energy transition. Therefore, there is an urgency to facilitate sharing the information, and educate and coach consumers on how to incorporate renewable energy as part of not only their mindset but also routine. As Wüstenhagen et. (2007) state, the social acceptance of energy transition is the crucial factor that must be supported to make the shift happen, because many key stakeholders such as policymakers, government, municipalities, and businesses overestimated the community acceptance and interest in renewable energy usage (DeWall & Bushman, 2011). Therefore, overcoming the communication challenges between stakeholders and consumers, with respect to energy transition is forwarded to the communication specialist who is both sender and receiver of the demands of industry and clients, mediating the communication. In this sense, identifying the gaps in communication, as well as create a targeted communication strategy are part of the daily activities in the communication field.

As a communication specialist, one of the main roles is to build bridges between the groups who share different opinions, mediate the communication, inform, educate, and guide society to acknowledge various perspectives. The most challenging task for a communication expert is to address echo chambers and find the perfect method(s) to break the filter bubbles in which some people live, avoiding hearing any opinion that is different than their belief (Rudolph, Rauvola, Costanza, & Zacher, 2020). Furthermore, is the role of a communication expert to make visible and analyze different stakeholders and public opinions about energy transition, along with perspectives, ideologies, behavior patterns, and shared values. One step is to bring attention to renewable energy sources, using stakeholder management and set the goal for aligning the urgency of this transition with the public opinion and stakeholders' engagement. When it comes to the energy transition, the challenge is even higher to find the common language and provide a fast and positive reaction because nowadays, due to the

unlimited access to media sources, misinformation and miscommunication are the main consequences that make humanity step back in acknowledging that technology can be an ally if the involvement is mediated by the responsible behavior. The success of energy transition requires a deep understanding of how social acceptance, as well as social rejection, can change completely the fate of renewable energy adoption.

This paper aims to provide a broader overview of how different stakeholders (researchers, companies, municipalities, universities, and customers) are engaged in the energy transition process, along with their understanding of this phenomenon. Therefore, the research question for this study is "*What are the most common challenges of communication specialists and researchers encountered concerning energy transition in 2022?"* . This research is done with focus on Twente area because according to the Dutch statistics, this is the only area from the Netherlands where there is no windmill placed and therefore, no wind energy produced (Energy in Twente, n.d.). Twente area represents 4.4% of the total landscape of the Netherlands, which can support 88 turbines and contribute achieving the milestone of the Paris Agreement. Presenting both sides of the coin, Twente area is situated on the Eastern part of the Netherlands, which is far away from the Dutch coast where the wind has the highest power (About the Netherlands, 2020). In other words, even if the Netherlands is a flat country and the wind does not encounter various obstacles, due to its geographical position, Twente area does not have the most intense wind activity. Currently, there are no scientific papers focused on the energy transition in the Twente area, as well as investigations about the challenges encountered by both communication experts and researchers from the region with respect to renewable energy sources.

In other words, various perspectives will be analyzed concerning human behaviour, such as social acceptance, group pressure, and social rejection, along with identifying the role(s) played by communication specialists and researchers in the energy transition context. Furthermore, this study is focused on identifying what are the challenges, as well as barriers, that communication specialists and academics encounter when it comes to pitching the importance of energy transition to the public. The subsequent goal of this research is to identify in which ways communication experts can better portray energy transition and how to address to society the urgency for adapting to this environmental change. Therefore, the sub-question of this study is:" *How do researchers think about the challenge(s) encountered by communication professionals?*

2. Theoretical framework

The energy transition is one of the most debated topics in the global sustainable development goals. It can be described in broad terms as a progressive but essential relocation focused on the energy system, which starts from a current model to a distinct and advanced pattern that satisfies the sustainable needs of humanity (Blazquez, Fuentes-Bracamontes & Manzano, 2019). The convoluted and multifarious composition of energy transition overshadows and rises above the replacement of one source of fuel with a renewable one. For all intents and purposes, according to Sovacool & Geels (2016) scholars, energy transition is designed to sparkle and support changes in three main interconnected sections: a) the totality of palpable components of the energy system, specifically, technology, infrastructure (including the distribution), market, as well as the necessary production equipment, and nevertheless the consumption archetype; (b) stakeholders and social actors, along with their behaviour, belief, and ideologies, which entails innovative and investment strategies, as well as dynamic affiliation and aptitudes and potential of the social actors; finally c) the encompass of the rules and regulations emitted by the socio-economic and technical regimes that contain not only various institutions and policies, but also the mindset and belief systems, discussion and perspectives about socially accepted practices. In other words, it can be concluded that the energy transition is a complex, multilayered, non-linear, urgent, and versatile process, due to the speed of changes involved, as well as the proactive engagement of different stakeholders.

2.1.Socio-technological aspect

Facilitating the use of renewable energy sources stands out as an urgent call to action especially due to its various benefits such as energy supply security, reducing foreign energy dependency, influencing the economic development of societies, and notwithstanding, keeping the balance in equilibrium when it comes to environmental impact, along with relevant profits from all above-mentioned factors. Additionally, it goes without saying that meeting basic human needs, such as mobility, communication, house maintenance, etc., requires energy consumption. Therefore, considering the sustainable context, for energy to be environmentally friendly, the supply and delivery of energy must have a low environmental impact and low greenhouse gas (known as GHG) emissions (Jacobsson & Bergek, 2011). In essence, adopting renewable energy leads to money-saving, it decreases the economic and political dependence of the foreign energy supply and all the same, registers a decree in carbon emissions of the industries

and other activities emerged by society (Ozturk, 2013). In other words, renewable energy is in most cases the result of a domestic source of energy use (for example solar, biomass, and wind) and has huge potential to facilitate a low environmental impact. Indirectly, by using renewable forms of energy, it influences and controls the oil and gas prices. In the electricity sector specifically, renewable sources lead to limited use and import necessity of gas or coal (Ozturk, 2013). The consequence of the current fossil fuels usage is the increase to the carbon dioxide (CO2) concentration released in the atmosphere, which contributes to the deterioration of the Earth's climate. The climate changes are one of the most challenging phenomena that humanity has faced, due to its complexity and large-scale effects because of human activity, increasing, ultimately, climate warming (Physical Geography, 2009). Therefore, the importance of socio-technical systems can be argued by the balance established through the interaction of technology (the innovation provider) and the humanity (the innovation adopter).

The nature of socio-technical system requires the involvement of various social actors such as politics, industries, academic and still and all, the public that provide different perspectives of energy transition based on their resources, interest, and methods (Jansma, 2020). Considering these social and technological aspects, the suitable approach for improving the innovations in the renewable field is to address them as a dynamic process because it requires interactions between the stakeholders involved in the energy transition (Greenacre et al., 2012). Thus, renewable energy sources must be considered, implemented, and supported by various stakeholders.

2.2.Stakeholders' interaction

Shaping modern Europe does not entail only structuring the society in terms of ideology, values, and opportunities, but also sustainable behaviour. To this end, the Netherlands is one of the European countries which acknowledges the urgency of the transition to renewable energy. Fostering both financially and educationally, the Dutch population to advance the climate change fight and contribute to the development of an environmentally responsible future, by offering various grants to businesses to invest in renewables (Government of the Netherlands, 2017). It is interesting to mention that the Netherlands possesses as main types of renewable resources, both onshore, such as solar energy and wind (eoliennes) and offshore, biomass and wind supply (Government of the Netherlands, 2017). The Dutch government which was in charge until 2010 had on the agenda to shape the Netherlands into one of the most productive and cleanest energy structures in Europe by the end of 2020 (de Bruijne & de Rijke, 2011); however, the new government which started its activity in autumn 2010 pointed

that these were too ambitious plans, which were not in line with the European targets, therefore, they slightly changed the plan. The scholars highlight in their paper that the government is still keen and engaged in making a 'Green Deal' with the Dutch society by informing, educating, coaching, and supporting them in adapting to the renewable energy transition and encouraging innovation in this regard. The current strategy of the Dutch government is to uncouple the 8 million houses from natural gas in layers, specifically regional, municipal and borough level (RES, n.d.). This means that it is decided on the regional level what is the infrastructure strategy to make the transition to renewables, by dividing the Netherlands in 30 regions which closely collaborate on this topic; therefore, the transition is scheduled per city and finally, it is executed by districts (RES, n.d.). It is relevant to mention that the Dutch Planning Agency shared the intention of uncoupling from natural-gas 50.000 houses by 2021, 1.5 million by 2030, and 8 million by 2050 (PBL, 2021) and the ambition of the year 2021 was not achieved (de Volkskrant, 2021). However, the government stimulates the population by introducing ‘Green Loans' budgets for investments as a helping hand for those that are willing to research and engaged in new sustainable projects, by providing the finance needed with an interest of 1% below the market interest registered. Importantly to remark is the fact that this financial scheme had such high demand that the Dutch government could not support all the applications, therefore, the first-come, the first serve method rules (Butenko, 2016).

The innovation process of energy transition depends on the constant implication of the stakeholders in social acceptance. The renewable energy source is a topic that has the attention and support of the government and business. Corporate Social Responsibility (CSR) is a marketing tool used by businesses, which supports the idea that any practice and attributes shared by the business must be strongly connected with the societal and environmental frame and nevertheless be accountable to its stakeholders and community, which leads to a stronger relationship between the corporations and clients, influencing the social acceptance of their services, (Basu & Palazzo, 2008). However, along with government, local municipalities, and businesses, other stakeholders must be committed in order to make the transition efficient and long-term. Precisely, the consumers are those who have in their hands the fate of the success of any innovation.

2.3.Role of the communication specialist in energy transition

Currently, due to the acceleration of digitalization, consumers have access to a large range of information, which offers them the knowledge and answer they are looking for. However, this is not always a positive thing because anyone can share anything on the internet and the information found is not always coming from and supported by experts in the field. This is also the case for renewable energy sources where misinformation can harm and diminish the positive impact of the innovation. Consequently, the mediator between the industries (businesses that offer renewable sources) and costumers (those who are the majority stakeholders and have the power to influence the perpetuation of energy transition) is the communication specialist.

The challenge for communication specialists starts with the explanation of the renewable energy sources. Specifically, energy transition is a complex process, which requires a deep understanding to be able to see the long-term benefits. The multiplicity of the renewables adoption process is even harder to pitch to the population when lack of trust from the governmental institutions, as well as policy makers, concerning the disponibility of fair and accessible green energy solution are shared by the people (Longo & York, 2015). To this end, one of the vital steps for communication specialists to take is to get to know the target group, listen to their needs, concerns and adapt their communication strategy to the demands of both industry and consumers. There are various exemples of countries, such as the Netherlands' neighbor, Germany, where the strategy of getting to know the target group improved the acceptance level of renewables adoptions and nevertheless, the support for the radical changes in sustainability (People's Budget, n.d.). Other studies showed that the negative news presented in the media about energy transition overshadow the success of the people who adopted the sustainable lifestyle, by replacing the natural gass with renewable energy sources (Lowitzsch, & Hanke, 2019). Therefore, the task of the communication specialist is to collect the great initiatives of early adopters of energy transition and shared them via social media or other communication channels to persuade the rest of the population to join the community of renewables. In this way, the awareness of alternative energy sources increases, and the population can link in their mind a theoretical concept with a practical successful example.
Finally, in energy transition field, there is a lack of stating the problem clearly and sharing the consequences on long-term (Macarthur, 2019). Specifically, due to the complexity of the topic, the experts and governmental institutions, along with the industry are aware of the implications of energy transition, as well as what the adoption of renewables mean to the daily lives of

population, however, the people are not informed about how their lifestyle will be changed when adopting green energy. Therefore, the lack of communication leads to lack of interest and acceptance from the population. In other words, it is crucial for communication experts to create interaction and most importantly collaboration between population and energy industry, housing corporations, educational institutions, NGOs, governmental institutions and media by sharing explanatoring information about energy transition, as well as promoting positive and successful initiatives in the renewable energy field (Clausen, Zhukova & Ramasar, 2022).

It can be concluded that the role of the communication professional is to openly discuss dilemmas and build trust, and values with the stakeholders; see how digital platforms and media play a role in perpetuating already existing clusters in society and reinforce collective ideas. Nevertheless, it is the role of a communication specialist to build bridges between divided groups and help them reflect on what it means to have a 'shared future, with the help of energy transition.

2.4.Social acceptance

Renewable energy consumption unlocks not only industrial but also social changes. However, there is an academic debate which relates to the understanding of energy transitions by the population, as well as the acceptance of renewables. Specifically, some believe that even if the benefits of the energy transition are clear and the technology acceleration supports it, there is still a lack of involvement from society to adapt the use of renewable energy to their daily activities (Krug, Di Nucci, 2020). Making a step back and reflecting on the technological structure of the renewable energy systems, it can be concluded that indeed, this innovation is quite complex to understand and demanding to adapt (Welton, 2018). Despite proven benefits, including both environmental and financial aspects supported by the government, there is still no constant increase responsiveness from both industry and population (Zinecker et al., 2018). Going further with the analysis and identifying the cause of the limited engagement of the social actors, a valuable sociological concept, called social acceptance, succussed in shaping the context of the problem, as well as a consequence, around not only the technology but also stakeholders (Devine-Wright et al., 2017).

When it comes to innovation, social acceptance is a vital point that must be stepped upon for the technology created to reach the potential and address the target group. The importance of this topic has increased considerably in the past years, becoming challenging for innovators to consider when launching new systems of products on the market. In broad terms,

according to the Open Education Sociology Dictionary (2014), social acceptance can be described as the process in which individuals inform and educate themselves, accept and finally adopt an innovation. It is important to mention that the social acceptance of an individual concerning a technical system is strongly connected with the collective attitude concerning this specific innovation. Precisely, social acceptance can be analyzed looking from both individual and collective perspectives. As an individual, you might, or might not acknowledge and be willing to adapt and integrate innovation into your daily activities. However, when you are in contact with various social actors (which you certainly are due to social activities that every individual performs daily), your opinion and attitude with respect to technical innovation might change and be influenced by the collective opinion concerning the innovation in cause. In this case, there are two scenarios possible: 1) you were considering adopting a renewable energy source to your activity, but the collective had an opposite opinion, therefore you changed your mind; 2) you were not considering adopting a renewable energy source as part of your daily activities, but after listening to the general collective opinion which is pro-renewable energy, you changed your mind and are ready to join their initiative. In other words, the pressure of the group known in academic terminology as the phycology of the group influences the individual human behavior, highlighting the fact that individuals behave differently when they are in the group than they would normally do if they were alone (Stets & Burke, 2000). Furthermore, the social norms (known also as the group norms) are the standards according to which a behaviour, attitude, or belief is judged in different groups, (Psychology Dictionary.org, 2018). The social norms can either support the future and success of renewable energy for example or, dramatically slow it down, which leads to serious and dangerously negative consequences for both the environment and society.

Society has a dynamic construction, heterogeneous and complex by its nature, hyper-connected and nevertheless challenging to guide. DeWall & Bushman (2011) scholars agree with the social acceptance importance of innovation, and additionally, they point out that the social rejection of innovation plays a crucial part in the phycological reasoning of individuals, as well as influencing the future of the innovation itself. Social acceptance can be described reported to three dimensions: acceptance of object which emphasis the recognition of the innovation; acceptance of the conditions which relates to the terms, consequences and changes brought by innovation and finally the acceptance of creative destruction which is focused on the exchange of power between stakeholders (Wolsink, 2018).

This leads to another interesting aspect that must be discussed to understand what lays behind people's choice to adopt and not an innovation, precisely, the motivation. The call to action of

individuals must be shaped with the help of the self-determination theory, meaning that unconsciously, both intrinsic and extrinsic motivation affect the individual's behaviour, attitude, and beliefs (Levesque, Copeland & Sutcliffe, 2008). Additionally, Ryan & Deci (2000) argue that the environmental factors produce phycological changes in individuals' systems, transforming a set of actions into automatic behaviour or response if the brain intercepts similar contexts which match with the past experiences. This means that the human brain can be trained to categorize activities as automatisms, which does not need to rationalize the action(s) because it is tracked back to an already learnt behvaiour. One example of how to support population to embrace the change is by rewarding their actions that facilitates, in this case, the adoption of renewables, which will later be translated into intrinsic motivation that is long-term effect (Deci, Nezlek & Sheinman,1981).Therefore, to create a reaction and effect on the individual behaviour with respect to renewable energy sources, the information must be known and clear by the phycological system of people and be already trained on how to react and incorporate energy transition as part of their life. This is the reason why communication implication is relevant for social acceptance because the message must be clear and attractive to influence the human behaviour and make the individuals recognize the need and benefits of adopting renewable energy sources (Knoll, 2016).

All in all, the energy transition is still a new topic that indeed needs immediate attention from society. Due to its complexity and effort required from various stakeholders, it might face opposition from society to acknowledge not only the necessity but also the benefits in the long term. Even if technology is constantly pushing the boundaries and is keen on innovating and persuading people to make the transition to renewable energy sources faster, the limitless access to information, as well as contradictions between-group emerged from different opinions, leads to a disconnection between the goal (reaching environmental neutrality) and result (stopping the climate change, becoming energy independent, etc.). Therefore, the ones who have the power and knowledge to break the filter bubbles and interfere with the echo chambers are the communication specialists, using marketing and communication practices to analyze where the discrepancy starts and what solutions are available to satisfy the needs of all the stakeholders involved.

3. Methodology

3.1 Research design

The topic of this study requires a deep understanding and analysis of the attitudes and beliefs of the communication specialists concerning the energy transition in the Twente area in 2022, meaning that qualitative analysis is required in this case. A qualitative data analysis was conducted, in two-phases, with a focus on two target groups. Specifically, in the first phase, there were interviewed communication specialists from governmental institutions, housing corporations, and energy suppliers from the Twente area, to get insight into the challenges they encountered in their daily practice. On the other hand, for the second phase of the data collection, researchers as communication experts were interviewed to compare the practicalities, with the theoretical ones and reflect on how to tackle the challenges encountered in the field from the academic perspective. Accordingly, semi-structured interviews as data collection tools were conducted, which provided the explicit information for making connections between the experiences of the participants, as well as concluding the main challenges encountered and answer the research questions and the sub-questions of the study. Coincidently, the communication specialists who participated in the study had the opportunity to share their work experience in energy transition, goals, and milestones of their organization, as well as reflect on the obstacles and strategies they use on overcoming them. Additionally, the academia, specifically, researchers who have expertise in communication as well as interest in the energy transition reflected on the challenges of energy transition from theoretical perspective and shared advice on how to use communication to foster the transition to renewables.

In essence, this data collection tool was chosen for the valuable information that can be identified based on the testimony of the participants and evaluate the current stage of energy transition goals of the institutions represented by the participant. As mentioned, the interviews were semi-structured, meaning that it was beforehand prepared a structure with a set of questions put in a logical order for participants to answer, however, there was also the possibility to deviate the conversation if the participant shared interesting information about the topic which was not included in the set of questions. The questions were divided into categories such as introduction, organization, communication specialist role, challenges, and

future of energy transition. The benefit of using semi-structured interviews is that the researcher can lead the interview and determine the flow of the conversation and nevertheless, has the potential to encourage a two-way interaction with the participant and identify the arguments which lay behind their attitude or beliefs about the topic analyzed (Heaton, 2008). To this end, the added value lays on insights and commonalities amongst participants that can be highlighted. This also helped to narrow down the areas of interest and disinterest, and overall collect more data to answer the research question. Finally, approval from the University of Twente ethics review board was obtained before the data collection phase started and all the participants signed the informed consent form before attending the interview session, which assures that they acknowledged their rights and gave permission to use the data provided.

3.2 Sample selection and participants

The focus of this research was on energy transition, seen as a challenge for communication specialists. The stakeholder's selection for the interview phase was made using probability sampling, specifically cluster sampling. Precisely, this method was chosen because it helps divide the entire population into groups that are representative of the population. The clusters are selected in a sample based on various parameters such as location (Twente area), job title (communication specialists), company field (energy supply, governmental affairs, housing providers, education), etc. One of the big advantages of this method is that it allows effective and organized results retrieved from the data collected. Moreover, the usage of probability sampling reduces sample bias in the sample, being negligible to even non-existent, because it leads to higher quality data collection due to correspondingly representation sample of the population. Secondly, the population is diverse, therefore, the study must have proper representation to avoid limiting to one demographic. Finally, one last advantage is the possibility to create an accurate sample that will facilitate the gathering of well-defined data.

To this end, the selection criteria of this study was focused on gathering participants that are communication specialists who represent different stakeholders' categories, such as governmental institutions, energy suppliers, NGOs, housing corporations and research institutes. In other words, the population of this study is based on the total number of companies and researchers with these specific requirements in the Twente area (see table 1) that could be identified using media platforms such as LinkedIn or reached via email or phone.

Table 1

Demographics representation of the participants

Institutional name	Stakeholder category	Market addressed
BTG	Energy supplier	National and international
RES Twente	Governmental institutions	National, regional and local
Nieuwe Energie Overijssel	NGO	National and local
Ons Huis	Housing corporation	Regional and local
Enschede municipality	Governmental institutions.	Regional and local
Hengelo municipality	Governmental institutions.	Regional and local
Twente Board	Governmental institutions.	Regional and local
Green Businesses Twente	NGO	Regional and local
Energie Enschede	Energy supplier	Local
Energiefonds Overijssel	NGO	Regional and local
Pure energy	Energy supplier	National, regional and local
University of Twente	Research institute	Local

The total amount of participants was 17 (N=17), with the following repartition: 11 representants (N=11) from various stakeholder's categories Municipality of Enschede, Municipality of Hengelo, Twente Board, RES Twente, Nieuwe Energie Overijssel, Energiefonds Overijssel, Pure Energy, BTG, Green Businesses Twente, Ons Huis and Energie Enschede, and for the second phase, there were gathered 6 participants (N=6), communication researchers from University of Twente.

Regarding the stakeholder category, there were registered five different categories, that were represented by the participants in the following structure: governmental institutions (N=4), energy supply (N=3), NGO (N=3), housing corporations (N=1) and research institutions (N=1). The anonymized representation of the participants, specifically each participant received a random number from 1 to 17, where 17 (N=17) represents the total amount of participants in the study, to make a clear distinction between the quotes presented in the results section can be found in the APPENDIX 1. Along with the number assigned, the institution the participants represented, and the stakeholder category are displayed as qualifying information (see APPENDIX 1).

Around 30 participants (N=30) were contacted, however, considering the limited time frame for data collection, 17 participants (N=17) were available to join the study. The companies chosen to be contacted resulted from the stakeholder mapping executed by the researcher, identifying the pioneer, as well as innovative companies that are currently located in the Twente area and activate in the renewable energy domain, also because of the fact that Twente is an interesting case to analyze due to its resistance for wind turbines.

3.3. Instrument

The interview sessions took place in an online environment, specifically on Microsoft Teams, having the benefit of recording the meeting and having as much face-to-face interaction. The time scheduled for the interview was 45 minutes, however, the participants were informed that the interview might take longer, depending on their verbal rhythm, the details they want to share, the flow of the conversation, and nevertheless, technical issues if there are any. Before planning the interviews, the 17 participants (N=17) were reminded about their rights as well as asked for permission to record the meeting and they signed an informed consent form before starting the interview. The questions prepared for the interview sessions (see APPENDIX 2) were developed based on concepts from scientific papers, which are presented in the theoretical framework, and anyhow, the curiosity of the researcher to map out the challenges, as well as the solutions of facilitating the transition to renewables in the Twente area. It is important to mention that both phases of data collection had different sets of questions in order to appeal to the participants' typology (See APPENDIX 2). At the starting point of the interview session, the researchers summarized once more the context and the goal of the study, asking for final permission to record the interview. The participants were informed about their rights, both written and verbally. The first questions were about demographics, to break the ice and facilitate the conversation between the participant and the researchers, nonetheless ensuring that the participant meets the study selection criteria (position in the company, activity fields, and location). The questions asked were open-ended, created especially to investigate both positive and negative aspects of energy transition from the perspective of a communication specialist, and structured to engage the participants to reflect on their professional and personal experiences about this topic. The interview questions scheme was divided in four main categories: organization, communication specialist role, communication challenges & energy transition and future of Twente area (see APPENDIX 2). Therefore, the rationale behind this choice lays in the smooth transition provided from general to specific

information, ending with reflection of the future as a take-home message. The questions were designed to fit the four categories and flow along a logical and chronological narrative, starting with the past, specifically when they started their career in communication, followed by the present sharing what is the organization they represent doing in relation to energy transition, what are their tasks as communication specialists/researchers, what are challenges and the strategies they use to overcome the obstacle etc), ending with the future dimension, when the participants were asked to reflect on what the Twente area will look like in 10 years with respect to the energy transition. The most questions were addressed in the communication challenges and energy transition category because this was the main objective of the paper, to identify the barriers and collect the opinion of the participants about how to facilitate the transition to renewable energy sources.

The interview time range was from 29 minutes to 40 minutes, with an average of 35 minutes, excluding the introduction and reminders of the participants' rights.

3.4. Coding scheme and corpus

The first step for analyzing the data collected by the semi-structured interviews was to create the corpus which contains the transcripts of all 17 interviews (N=17) conducted. After the interviews were recorded, the second step was to transcribe the conversation, which was made manually by the researcher. In total, there were collected over 150 pages of information. Subsequently, all the transcripts were uploaded in the Atlas.ti software, which was the platform chosen for coding.

Creating the corpus is not the only step that has to be considered when it comes to analyzing the qualitative data. As consequence, for analyzing the information from the corpus, a codebook was elaborated by the researcher. The codebook can be explained as the guidelines used by researchers, for the data analysis process, which identifies relevant themes from all the data collected and helps scholars to draw conclusions and connect the information gathered, (Boujie, 2009). The codebook of this study was based on 12 codes, from which 1 (N=1) was form code (more quantitative) and the rest 11 (N=11) were content codes (more qualitative). Particularly, the form code was 'work experience' and the content codes were 'stakeholder type', 'company activity level', 'challenges', 'communication strategies', 'communication tools', 'sentiment', 'evaluation', 'desired future', 'expected future', 'point of arguing' and 'factors influencing awareness'. All codes were designed to measure different aspects concerning the

challenges encountered by the participants, as well as practical solutions and reflection on the future of the Twente area with respect to renewables, but all the perspectives were interconnected. The codebook of this study was a deductive one, meaning that the codes were created after going through all the interviews and identifying the main aspects which were interesting and valuable to cluster. As mentioned, a total of 12 code categories were created, and 53 sub-codes were designed to make the analysis efficient, specific, and structured. The coding scheme resulted was drafted in order to be applicable for all the transcripts, meaning all interviews from both phase 1 and phase 2 (See APPENDIX 3). The coding process took place in Atlas,ti based on the deductive codebook. This software was chosen because it offers the possibility to easily introduce the codebook in the program and has the feature of highlighting the parts coded with different colors, keeping a clean and structured overview of the number of times a code was chosen. Finally, it provides the analysis of many codes used for every interview transcript.

3.5. Reliability analysis

In order to identify and analyze the reliability of the data, the Cohen's kappa was calculated for each code category. According to McHugh (2012), the Cohen's Kappa is the coefficient calculated that is used when reporting the interrater reliability; the ranges are from +1 to -1, and 0 describes the agreement represented by random chance. The Cohen's Kappa is calculated after two coders code 10% of the corpus using the same codebook. The perfect agreement between the coders is described by the value +1. According to Boujie (2009), the interpretation of the Cohen's Kappa is based on the following values: ≤ 0 indicates no agreement; 0.01-0.02- none to slight agreement, 0.21-0.40 is described as fair agreement, 0.41-0.60- moderate agreement, 0.61-0.80 is interpreted as substantial agreement and nevertheless, 0.81-1.0 is registered as perfect intercoder reliability.

Considering that the corpus of this study was 17 (N=17), the Cohen's Kappa must be computed based on coding 10% of the corpus, which means 1,7. Therefore, it was decided by the researcher to code two transcripts, a randomly chosen one from each data collection phase, in order to make sure that the codebook created suits all transcripts. The second coder was a student in the Communication Science program, from the University of Twente. Before individually coding the transcripts, the second coder was debriefed about the topic of the study, as well as methodology and the codebook was delivered during the explanatory session.

According to Table 2 which represents the Cohen's Kappa for every category, 10 out of 12 coding categories registered 1.0, which means perfect agreement between coders, stressing that the codebook was explicit enough and reliable for both transcripts from each of the two phases of data collection. However, there are two categories, 'challenges' and 'expected future', which registered a value of 0.786 and specifically, 0.750, which is translated as a substantial agreement between coders. Due to the fact that all values were high, and the majority indicated perfect agreement, all 12 code categories (N=12) were included in the final codebook and used for analyzing the rest of the corpus.

Table 2

Cohen's Kappa: Code categories

Subject	Cohen's Kappa
Work experience	1
Stakeholder type	1
Company activity level	1
Challenges	0.786
Communication strategies	1
Communication tools	1
Sentiment	1
Evaluation	1
Desired future	1
Expected future	0.750
Point of arguing	1
Factors influencing awareness	1

3.6. Data analysis

After the Cohen's Kappa was calculated for the 10% of the corpus, the coding process continued in the Atlas.ti software. All the transcripts were uploaded in the chronological order

in which were conducted, starting with the first phase interviews which collected the challenges of communication professionals with respect to energy transition in the Twente area, followed by the second phase where the information from the first phase was used in order to ask the participant to reflect, from their academic point of view, on the challenges encountered by communication practitioners. The coding was made not only on the transcript level but also on paragraph level and even sentence level, depending on the codes, as well as the information shared by the participants. During the analysis quotes from the participants were highlighted, which proved to be efficient and helpful when analyzing the data because it offers support to the explanation provided to the reader.

4. Results

The goal of this study was to identify the challenges encountered by communication specialists when it comes to addressing energy transition in the population of Twente. The results are presented per themes and the connections are analyzed in the discussion section.

4.1.Participants' characteristics

The first questions were addressed to identify the characteristics of the participants and make a clear distinction from which perspective they argue, as well as how much experience they have in the field of communication. In this case, the situation is balanced because according to the data collected, the stakeholders are active in local, regional, national, and international markets, and there are cases when they do not activate only in one market, but penetrate simultaneously two, or even more, depending on the goals and size of the organizations (See Table 2). For instance, when it comes to governmental institutions, they do not activate only on the local level, but also regional and national level, by collaborating with other municipalities and national government:" *Now in the Netherlands, we work with all the municipalities, so we have to do our share (..), we have no other choice"*, points one participant. For the organizations that sell their services, the market depends on the type of service they provide. One participant claimed that for their company, the market that provides them the success is the international market mostly, even if they are based locally, in the Twente area:" *We focus more on the North America and Europe".*

4.2.Communication specialists' responsibilities

The communication specialists are the focus of the study, therefore, a detailed analysis of their tasks, challenges, as well as strategies, along with the organizational goals of the company they are working for, were shared, and described by the participants during the interview session. Starting with the tasks the participants usually perform in their company, it was noticed in the data analysis that the pallet of responsibilities is broad, including both internal and external communication and even consultancy in the case of governmental institutions and NGOs:" *I do internal and external communication as well because on the other hand I facilitate our investment managers with communications means so they can do their job and find the right projects to finance*.", claims participant 1. Additionally, participant 4 claimed that their main task as communication specialists in the company is to be the mediator between the industry and the consumers:" *So people tell me stuff and I cannot say yes to everything, but I try to combine the information and then try to bring back to the organization the demands".*

4.3.Awareness

The research question of this study is not only focused on the communication specialist by title, but most importantly on the challenges they encounter when working with energy transition. When analyzing the data, there were various challenges mentioned by the participants, which were more or less frequently mentioned. The main challenge shared was awareness of the population and in 6 cases of 11, this was the most mentioned, followed by intrinsic motivation, legislation, and costs. It must be mentioned that the participants did not choose only one challenge, but more, depending on their market, as well as reflecting on their tasks. Participant 1 provided an interesting perspective of how to reflect on the awareness, stating that this is a lack that involves both the industries and the population:" *I think the most important is to create awareness to all people involved in the intervention because it is not only the consumers but also companies, they don't know much about it".*

4.4.Intrinsic motivation

In the top challenges encountered by the communication professionals, intrinsic motivation ranked second with respect to the number of times mentioned by the participants, specifically 20 times. The explanation of the participants behind their choice was the fact that to change human behavior, people need intrinsic motivation that will produce a change in their lifestyle*:" Their own behaviour has to change*", points out participant 8. The same opinion is

shared by communication specialists of governmental institutions:" *People know about the climate change, but they don't want to know. They want to live like they do, they want to get the plane and they want to eat meat. They don't want a big windmill or a solar field. You cannot shut your eyes off for it and that's a big problem."*

4.5.Legislation

On the other hand, legislation proved to be consistent in the frequently mentioned challenges, mentioned 17 times, mostly by companies that are energy providers, but also governmental institutions:" *Everything has to do with legislation, so what has been decided or will be decided in the EU level (..) will have a great impact on the investments to come. Without the right legislation in place nothing will happen*", states participant 1. Costs as a challenge of implementing energy transition were mentioned 10 times, predominantly by governmental institutions:" *I think that one of the main challenges is money because it costs just a lot of money to isolate all those houses in our municipality. And we have also a quite relatively poor municipality; Sometimes people just do not have the money to do something on their house"*, says participant 5.

4.6.Other challenges

Energy transition was described by the communication specialists as a complex and multi-faceted topic, which enables various stakeholders to connect and communicate, to achieve the goals of the Climate Agreement signed by the Netherlands: "*The first thing is that it is very complex. For instance, I was at a birthday party and people asked me what I do for a living, and I tell communication specialists in energy transition, they are like oh, but you know if we put down a few more solar panels, that will be it. And I tell them that no, it does not work like that*", points participant 3. Another specialist supports the complexity of the energy transition as one of the main challenges:" *We are trying to explain to people like it is very complex, you can't just say yes or no to this, or instead of one windmill, we will put two solar panels. It is very complicated, and we need everything to be able to save our planet",* argues participant 10.

What is interesting to highlight is the fact that participants mentioned fake news and the lack of a specialized workforce as challenges they encountered in their practice. Participants

who activate in NGOs mentioned that for them it is difficult to find people who are not only interested in working in this field, but also have the knowledge to advise people with respect to the possibilities of renewables that apply to their individual case:" *You have to make difficult choices in energy transition, we work with volunteers who do that in their free time, so we have to choose where we put our energy in and our money we invest.",* claims participant 9. The lack of workforce is registered by governmental institutions as well, claims one of the representatives:" *The labor market is quite tight at the moment. We cannot find enough people working in the field of energy transition in the municipality. But it is also a problem with the people who actually do the work at the houses, who install for example the solar panels.",* shared participant 6.

Finally, the fake news was mentioned as a challenge by the governmental institutions, arguing that it is hard to increase awareness when you must fight the fake news simultaneously: "*We have to deal with fake news too, like the people who do not like it. They say you will get ill if you live close to wind turbines. There is a lot of noise, and the birds are killed*.", argues participants 11.

4.7.Communication strategies and tools used

Significant challenges require diverse communication strategies implemented to overcome the barriers encountered. Therefore, one of the points of interest in the interview session was to collect the communication strategies used by the communication professionals and ask them to evaluate which were efficient and which were not, by looking back at the results. The point of collecting this data is to reflect on what are the communication strategies that were efficient, as well as which communication tools fostered the achievement of the objectives.

The most mentioned communication strategies used by the participants are increasing awareness about both energy transition, as well as the activity of their company, and nevertheless persuading the audience. There was no differentiation between the stakeholder categories with respect to the choice of communication strategies because all of the institutions focus on both. What is indeed different, is the method they use in order to put into practice these strategies. Specifically, when it comes to increasing awareness, participants mentioned various methods of achieving the goal: attending and organizing symposiums, think tanks, panel sessions, as well as having a personal conversation with the communities. Making use of social media channels such as LinkedIn, as well as sharing the newsletter with the community

are methods of spreading the awareness, claim participants*:" We have social media channels, which especially LinkedIn has over 1500 followers, which is quite a lot, and the posts are also well-read and liked, so that's good.*", points participant 3.

There are cases when participants focus on one communication tool, but there are also organizations that are tackling the topic using various methods such as traditional media (newspaper) and modern media (social media):" *A lot of communication. We have to do it by newspaper, we have to do it in letters. We have to do it by social media, we have to do it with a short movie, we use a lot of different communication channels to inform people and the message must be very easy.",* stresses participant 10.

What is interesting to point out is the fact that besides coming up with creative ideas on how to tell the story, participants argued that it is of utmost importance to listen to the community and pay attention to the 'silent majority': "*Another strategy is that we have to listen very good what other people tell us. We have to listen to social media, to meetings. Does our communication suit that? What is the language they are using tell us? It is not about sending messages only, but also very much like listening.*", shares participant 7. Inspiring the community is another important element in the communication strategy used by specialists: "*We decided in our communication strategy not to focus on the people who do not want it (energy transition), but on those who do and tell their story so that other people can get inspired*", claims participant 3.

Finally, the strategies that work for certain stakeholders' group did not work for the rest, such as communicating directly with the community or advertising the organization: "*acting like a big company is not working for us"*, stresses participant 9.

4.8.Awareness and social acceptance estimations

Firstly, the participants were asked to rate the awareness of the population from the Twente area with respect to renewables, using the scale where 1 means no awareness at all to 10 which means complete awareness. The range was from 3.5 to 7.5, and the average registered was 6.5. The explanation behind the choices is diverse: "*It is my feeling by talking to people. There has to be some big change that has to come. I don't think people want to change all by themselves. But most of the people do not have the knowledge",* motivates participant 1 who gave the lowest rate. On the other hand, the explanation for the highest score lies in the fact that people are aware nowadays, however, it is not translated into their behaviour:" *I think that if you would have asked me six months ago, I would have said 5-6, but now I would say 7-8,*

and I will explain why. It is the wrong trigger, but it works that way. It is because of energy prices. What happens with the energy market at the moment it is shocking to see how people react. The threat of the Russian gas brings this sudden awareness.", argues participant 4

Using the same scale, the participants were asked to rate the acceptance of the population from the Twente area of renewables. The range was 4 to 8, and the average score was 5.5. The argumentation for the lowest rate is the resistance of the windmills: *"I would say 4, maybe 5 on a good day, but especially a few weeks ago I was in the train and saw all the banners that we don't want the wind turbines, and I was thinking that this is where we need to be. We need to talk to these people because those that are really against it, you hear them the most"*, claims participant 3. Participant 10 who gave the highest rate, explained that based on the experience, the solar energy is demanded:" *I know most people are not so against solar energy, for example, so solar is more accepted, so I would rate it 8".*

4.9.Expected and desired future of the Twente area

When the participants were asked how they would see the Twente area in 10 years with respect to the energy transition, all the participants made involuntary the distinction between the expected and desired future, which was reflected using the verbs:" think" and "hope". Most answers were related to the technical and societal aspects, referring to the goals of the Climate Agreement:" *I am not really optimistic because I think is so much talk going on and so much discussion and there's no action mode. Maybe I if I can dream a little bit, I'd say I feel now people are much more in the action modes than policymakers and maybe they will surpass the policies because they're going much quicker. I would love to say that in 20 years they changed electricity legislation, so you can just put solar panels on all the rules, and you don't need all the areas where you can also build houses, have green areas, et cetera, et cetera, to put the solar panels but just use the space on the roofs and divide the electricity from there. I would prefer that.*" says participant 1. Participant 2 argued in relation to the profile of the Twente population*:" Well, I hope of course that it's 100%, not 50, but 100% is renewable or clean energy. I hope that people can be proud also of how fast they acted and how to feel like they're an example for the rest of the world because people from Twente, they are like little bit stubborn people and but also really proud. So, I hope they can use their pride for being courageous enough to make big steps and be really nice to have many people discussing how not, not if we would like".*

All in all, the communication specialists participants answered all the questions and offered detailed explanations for their choices, arguing from both their role's and company's perspective.

Interviewing the researchers who are communication specialists and interested in the energy transition provided academic perspectives in the study. The research institute the participants represented is the University of Twente, and the department where all the participants work is Behavioral Management and Society (BMS). The sample had in total 6 participants (N=6).

Participants were asked to share what are the goals of their organization with respect to energy transition and the most frequent answer was research within the department in order to help external stakeholders on how to portray energy transition as appealing to the population, as well as targeting the young talent by teaching courses which are focused on sustainable energy, for instance:" *Of course, our research should be converted into teaching activities also, because otherwise, we don't create impact. So in that sense, I teach the components of sustainable energy in different courses",* mentioned participant 13.

Researchers were asked to name what is the main challenge in moving the energy transition forward, reporting to the population of the Twente area. Most answers were similar to the challenges encountered by the practitioners, however, there was an answer that provided a different perspective:" *The acceptance of citizens, citizen engagement and energy justice. What I think is to balance this energy trilemma that you can call it*.", argues participant 17. Another different point of view comes from participant 14 who is looking at the challenges from the human behaviour perspective:" *Behavior does change, so people who live in sustainable houses may actually start consuming more energy than they did before. And there are all kinds of reasons for that."*

4.10. Advice and reflection of the academia

The participants were then informed which were the answers of the practitioners from the first phase of data collection and were asked to reflect, from the academic point of view, on the barriers. Researchers analyzed the concepts and came up with suggestions for practitioners:" *The last one intrinsic motivation that that's very important actually what you wanna do if you wanna stimulate people to save energy, you wanna stimulate their intrinsic motivation, not their extrinsic motivation. Intrinsic motivation is much more durable. It spills over to others' behaviors. So if you get people to save on their electricity bill and they do so because they feel it's the right thing to do, then you can expect that this behavior will also*

translate to for instance use of shorter showers as well or they will use the car less and the and the bicycle more for instance. So that happens when you focus on intrinsic motivation. When you focus on extrinsic motivation, you may actually see the opposite. So if you save money because your energy bill goes down, you spend it on other things and you might actually use more energy.", explains participant 16. Concerning the top mentioned challenge, awareness, the scholars provided a scientific perspective:" *Uh awareness matters for some behaviors, but not for others. Those behaviors that we do quite a lot and they are relatively small. They tend to become habits and we and we just sort of mindlessly do what we normally do. But when behavior is automatic or is a habit that information actually doesn't reach you at the moment you make a choice, you're going to do what you did before, regardless of the fact that somewhere in your head there is the knowledge that this isn't optimal behavior, but at the moment you make the decision, it doesn't come into play. So yes, awareness is important, but it's not everything. But I think one way for breaking habits is to disrupt the normal course of events.*", mentioned participant 12 as a piece of advice for communication specialists from the renewable energy industry.

It is necessary to mention that the scholars were asked to rate both the awareness and acceptance level of the population from the Twente area with respect to the energy transition, however, all of them mentioned that due to the fact their inner circle is based on highly educated people and no direct contact with the community, they specified that their assumptions are only wild guesses. The range was 5 to 7, with an average of 6 for awareness, and for acceptance, the participants found it difficult to rate, mentioning that the voice of those that resist is always the loudest. Therefore, two participants (N=2) did not answer this question and the range of acceptance is 6 to 7, with an average of 6.25. The explanation for the highest rate is based on the willingness of people to benefit from the help of the government, along with the external context of the Russia and Ukraine war:" *That tremendous increase in energy prices that plays an important role, even the war between Russia and Ukraine, important role*.", states participant 15.

Finally, all researchers who participated in the study reflected on the future of Twente with respect to renewables, and there was no distinction between the expected and desired future in the answers of the scholars. All the participants used the phrasing:" I think" in their answers while considered not only the technical and societal aspects but also political:" *I think that there is an inclination of governments and researchers to collaborate more on societal challenges*.", shares participant 13.

5. Discussion

In the first part of the discussion the main barriers experienced by the communication specialists, as well as researchers concerning energy transition will be presented. Therefore, the focus is to answer the central research question: RQ1*:What are the most common challenges of communication specialists and researchers encountered concerning energy transition in 2022?".* Consequently, the discussion is based on the relevant findings from this research conducted , presenting an overview of the communication strategies and tools used by the participants, which will be analyzed in relation to literature.

In the second part of the discussion, the focus is on the reflection of researchers concerning the challenges mentioned by the communication specialists. The aim is to answer the sub-question of this study: RQ2: *How do researchers think about the challenge(s) encountered by communication professionals?"*. Therefore, the theoretical aspect of energy transition communication will be analyzed, provided by researchers, in comparison to the practical experiences shared by the communication specialists.

Challenges encountered

The findings suggest that the top three challenges of communication specialists, according to the frequency of mentions, are: awareness, intrinsic motivation, and legislation. To this end, the first two challenges are focused on the societal aspect, while the last one is on the political one.

5.1. Awareness

As argued by several participants, the awareness is one of the main priorities for the communication specialists from the Twente area, having in mind the milestones that the Netherlands must achieve according to the Climate Agreement known in Dutch as Klimaat-akkord, specifically to provide an infrastructure of 70% renewables by 2030, disconnect 8 million buildings from natural gas, no emission of fossil fuels by 2050 and become carbon neutral by 2050 (Braun & Van Geuns, 2018). The participants, who represent energy supplier organizations, housing corporations, energy-related NGOs, as well as governmental institutions, argued that increasing awareness is a challenge due to the complexity of the topic. This resonates with the study of Svenningsen, Boxenbaum & Ravasi, 2016) who mentioned

that the tolerance of ambiguity of individuals plays a vital role in energy transition process because without a deep understanding of the renewable adoption concepts, people are not open to change their lifestyle if they do not understand the urgency, reason, procedure, and benefits.

Additionally, the communication specialists and researchers mention that based on their experience, the information must be easy to access and understandable by the people who are not highly educated. This finding is in line with previous research, for instance, Clausen, Zhukova & Ramasar (2022) concluded that researchers, governmental institutions, media, energy suppliers, housing corporations and NGOs are aware of the urgency and long-term benefits of energy transition, however, population is not fully aware of the reasons of adopting renewable energy sources. This means that the communication specialist must facilitate the information sharing and increase the interaction between the population and the energy representants, while adapting the language to the characteristics of the target group.

Other than that, the participants in the study, both communication specialists and researchers, mentioned that the awareness is considered consciousness be either positive or negative. This conclusion is supported by Massey, Kliestikova, Kovacova & Dengov (2018) scholars, who provide a further explanation to the finding, concluding that the fake news and negativity are faster spread among the population compared to the positive information. An interesting connection is resulted by looking at the awareness as a challenge and the examples provided by the energy practitioners, specifically mentioning that the people who are against renewables are the loudest, overshadowing the silent majority:" *We need to talk to these people because those that are really against it, you hear them the most"*. The study of Lowitzsch, & Hanke (2019) is supporting the conclusion retrieved from the experience of the participants, highlighting that in media, the bad news is overshadowing the impressive energy transition projects which are successful.

5.2. Intrinsic motivation

The intrinsic motivation scored second on the top challenges mentioned by the communication energy practitioners and researchers, arguing that changing the human behaviour is difficult and there are cases when people are aware of the urgency and context of the energy transition, however, they are not willing to change their behaviour and give up on their comfort in order to minimize the usage of energy or even adopting renewables as alternative sources of energy. The findings are explained by the research of Munywoki (1997), arguing that human beings are socialized in the early stages of life and used to a specific

lifestyle; therefore, their entire activity, as well as beliefs and demands are gravitating around their education. Additionally, Sovacool & Geels (2016) supports the conclusion of Munywoki (1997) and elaborate that the energy transition is a new topic that recently started to get attention because of the climate emergency and increasing international initiatives. This shades light into the observation of some communication specialists who mentioned that at the gatherings they initiate to discuss with the community about the decision-making of renewables adoption, people with the age segment of 70-80 years are the ones who are the loudest when it comes to sharing the resistance. This can be argued by the fact that for decades people were used with fossil fuel consumption, therefore when it comes to changing their behaviour, the resistance appears as the effect. Moreover, in relation to the first challenge dimension, specifically the complexity of the topic, supports for certain population groups the resilience effect due to the lack of understating the necessity, as well as methods of implementing renewables, concluded the study of Haapala & White (2015).

5.3. Legislation

Finally, besides the societal aspects, the political one proved to be challenging too. Communication specialists claimed that legislation is not fostering the energy transition and energy suppliers, as well as a surprisingly governmental institution, are interested in more strict involvement of the national government, through legislation focused on renewables. Participants mentioned that because of the Dutch legislation, they had to move their company's activity to North America or other countries from Europe. The study of Genard and Giannelli (2017) supports the findings in the analysis of the energy transition legislative framework, bring Paris (the Climate Agreement signed in Paris in 2019) home (to the Netherlands), by translating the ambitions of the agreement into rules of regulation to support the early adopters of renewables, as well as provide guidance for the rest of the population.

What is interesting to point out, as external factors that influence the evolution of energy transition, is the war between Russia and Ukraine. The majority of participants, both communication specialists and researchers, mentioned that even if, morally speaking, this is completely the wrong trigger, it works on increasing awareness and stimulates the energy transition due to the high prices of Russian gas. Considering that the conflict between Russia and Ukraine is a recent event, there are currently no studies available that supports or disagree with this result. Nevertheless, the NIMBY effect was mentioned by all the participants as the explanation for the lack of progress in the Twente area for renewables adoption, specifying the

people who want to change, but not in their backyard. Wexler (1996) agrees with the idea and further explains that the NIMBY syndrome portrays the reaction of the population to "locally unwanted land uses," recognized as LULUs.

The sub-question of this research, specifically RQ2: *How do researchers think about the challenge(s) encountered by communication professionals?* is introduced in the following paragraph. The opinion of researchers concerning the experiences mentioned by communication specialists is presented detail in the results section 4.10. Therefore, in the second part of the discussion, a selection of foundings are discussed based on their relevance for answering the research question.

5.4. Researchers' reflection on communication barriers of practitioners

It is important to mention that both communication specialists and researchers selected the same challenges as main barriers, specifically awareness, intrinsic motivation, and legislation, however researchers framed them differently, as 'energy trilemma'. To this end, the equivalents of awareness, intrinsic motivation and legislation are framed in theoretical terms as enviornemntal sustainability awareness, citizen engagement, and energy justice (energy accesability).

5.4.1. Awareness reflection

Researchers provided another perspective for the most mentioned challenge, explaining that there are cases when awareness is not the most important aspect to mainly focus on because people, in general, are driven by habits, they do not rationalize every activity; therefore, the focus of communication specialists should be on breaking the habits and interrupt the course of events. This is in line with previous research of Andrews (1903), stressing that the habit can be described as the mentality and beliefs translated into actions, without rationalizing every step, which indeed explains the lack of engagement for the population who is against renewables or are neutral to the energy transition.

5.4.2. Intrinsic motivation reflection

Elaborating on the explanation of researchers, changing the human behaviour is recommended to be done, in the context of the energy transition, by means of intrinsic motivation because according to Psychology, the results are long-term. Bénabou & Tirole (2003) made the same observation, arguing that stimulating the intrinsic motivation of individuals leads to long term results because both intrinsic and extrinsic motivation are effective, however, when the extrinsic motivation disappears, the intrinsic motivation is linked to the sense of individuality. Carol Dweck supports the explanation and further

brings into discussion how extrinsic and intrinsic motivation can be differentiated, by describing them as ‘Fixed Mindset’ and “Growth Minset”, specifying that both types of motivation are necessary, however, the ratio must be closely distributed in relation to the context and what expectations.

5.4.3. Legislation reflection

Researchers explained that from their perspective, the legislation, described as ‘energy justice’ is indeed one of the concerns they share with communication specialists. While communication experts were stressing that more support from government would be beneficial, researchers provided a different angle, by reporting to the Sustainable Development Goals (SDGs). Specifically, the SDG 7 is focused on providing affordable, sustainable, and modern energy source to the population, meaning that the focus of the legislation should not be only reserved to the energy industry, but also to the population. This conclusion is supported by the work of Kempe et al. (2021) who argue that the right legislation in place must involve all stakeholder’s types, because providing energy is a basic fundament right which must be distributed to all population. Van de Biezenbos (2018) further elaborates on this topic and specifies in his work that the implication of both population and industry must be considered when designing legislation, which can be used to restore the trust in the governmental institutions.

6. Limitations and suggestions for future research

Thinking in retrospect, there are some limitations of this study that must be addressed. One limitation is based on the number of participants that took part in the research. The findings are based on the experiences of 17 participants, which represented different stakeholder groups. The governmental institutions, as well as research, NGOs, and energy providers, were represented by a well-balanced number of participants; however, the housing corporations were underrepresented, and only one corporation joined the study. This qualitative study offered the opportunity for participants to share their experiences and contribute to the identification of the challenges inspired by the communication colleagues, encountered in the Twente area. However, it must be considered the low number of participants when it comes to the interpretation of the findings. The lack of engagement in the study was due to the limited time for data collection (two weeks), as well as the timing which corresponded with both Easter as well as spring break. Therefore, as suggestion for future research, an extended period for data collection might increase the participation in the study, for example, by assigning three months only for data collection.

On the other hand, the process of getting in touch with the communication specialists was difficult. Specifically, since the email addresses of the employees were private, the only way of getting in touch was to find the names of the communication experts on LinkedIn's profile of the companies and send them a request to connect to be able to send an invitation for the study. However, this did not work as expected because many people did not accept the request, therefore, it was impossible to get in touch. Some of the people who accepted the invitation and shared their work email addresses, along with their willingness to join the research, did not reply to the following up an email to schedule the interview. In this case, the only options left to remind them about the study were to call the companies or even visit them, which was time-consuming. As recommendation, the researchers should collaborate with a governmental institution that has influence on the region to engage the participant in making time to join the study. Additionally, pitching the relevance of the study, along with the long-term benefits that such research can provide to the stakeholders involved might also increase the participation and variety of insights.

The study was focused on governmental institutions, NGOs, energy suppliers, housing corporations, and research institutions. There were stakeholder categories that were not

represented, such as policymaker institutions and even citizens. For this research, a two-phase data collection design was considered, which focused on the second part on asking the researchers to reflect on the challenges encountered by the communication specialists in their daily practices. All participants, both communication specialists and researchers involved the community in their answers, however, this study did not consider the citizens in the data collection. A suggestion for future research would be to collect the challenges and opinions of the communication specialists and ask the community what their main challenges about energy transition are, as well as how involved they are in the renewables' adoption, and the reasons behind their choice. In this way, it can be identified what are the expectations and demands of the population from the stakeholders and how communication professionals can address both top-down as well as bottom-up strategies and make further steps towards achieving the energy milestones. Mapping the challenges encountered by all stakeholders in energy transition might provide a new perspective and consequently an efficient strategy on how to collaborate and engage all parties.

Finally, this study only scratches the surface of the challenges, as well as activities of communication specialists concerning energy transition in the Twente area. By making use of one research method, specifically qualitative, it was possible to ask a quite limited number of questions since there were open and the participants were requested to share their experiences as much as possible. To this end, it is important to mention that all participants are part of relevant and highly engaged companies, and their schedules are tight, meaning that it is extremely challenging to schedule interview sessions longer than 45 minutes. As recommendation for further research, combining quantitative and qualitative research designs could increase the insights collected. Specifically, using quantitative research by means of survey, the researcher(s) can reach the population and collect their general opinion or challenges. Additionally, mixing elements of qualitative research with critical thinking and brainstorming, a full day workshop can be organized where various stakeholders' representatives can join and openly discuss their needs, concerns and expectations about energy transition, ending with a set of further action distributed for every stakeholder category represented.

7. Practical recommendations for communication specialists

While for researchers this study is beneficial because it provides new insights concerning the challenges of communication specialists and researchers which were not discussed simultaneously before in literature, and most importantly, not focusing on the Twente region, communication specialists can also use the findings in their activity. Precisely, considering the challenges shared by their communication colleagues and emphasized by researchers, the practitioners can improve their communication strategies by making use of the explanations of the scholars and experiences of the other participants. For example, concerning the awareness of the population about energy transition, a recommendation for communication specialists would be to work on framing the information using day-to-day language, highlighting the relevance with key words, and supporting it with visuals. Nevertheless, based on the testimonials of some participants, creating explanatory short videos increases the engagement and understanding of people about the renewable energy sources. As pointed out several times by the participants, an important aspect to consider when designing awareness campaigns is the target group. Getting to know your target group is one of the most important steps because the message must be adapted to the receiver. A suggestion is to create buyer/ costumer persona(s) and go as much in detail as possible in creating the profile of your audience.

Connecting with the next challenge, as explained by researchers who participated in the study, in order to see long-term engagement from the population, the intrinsic motivation must be stimulated. A suggestion of how to achieve this goal as a communication specialist is to share and promote constantly the renewable energy initiatives started by the community. In this way, people will see the benefits of the renewable adoption from the testimonials of their neighbors, which can increase their intention to uncouple their house from natural gas. Breaking the unsustainable habits of people, as stated by researchers, is one important strategy to consider. As suggestion, mapping the every-day activities of the target group can help identifying which actions can be changed and further design the action plan. The individual experience is a factor that should be taken into account when it comes to increasing the intrinsic motivation and an idea of how to achieve this goal is by letting people experience what it means to use green energy. For instance, a collaboration between governmental institutions, housing corporations and energy suppliers which offers the chance to experience living for a month in an apartment or a house fully equipped with alternative energy sources can be created. This idea can be implemented via an online contest so it can easily go viral and reach a large segment

of people. When checking the utility bill, people will understand that renewables are not only sustainable, but also friendly with your budget.

Finally, in relation to the last challenge mentioned by the participants, specifically legislation, a full day workshop can be designed, for example, gathering not only the energy and housing industry, governmental institutions, and policy makers, but also population. Therefore, people can make use of this opportunity to discuss their needs and come up with a method of how various stakeholders can further interact and collaborate for this topic. A piece of advice is to separate the people in groups and a moderator must take care of the discussion's flow.

8. Conclusion

To sum up, this study was a valuable opportunity to investigate the current state of the barriers encountered by the communication specialists of the Twente area concerning the renewable energy sources, as well as compering and reflecting on the challenges with the help of the academia. Having relevant and representative samples such as well-known energy supply companies, housing corporations, energy NGOs, governmental institutions, and nevertheless research centers, facilitated the data collection and provided diversified perspectives on the table. To this end, the answer to the research question:" "*What are the most common challenges of communication specialists and researchers encountered concerning energy transition in 2022?"* is given by the top three challenges, specifically awareness, intrinsic motivation, and legislation. However, there were more challenges encountered such as costs, specialized workforce as well as energy misconceptions.

Thereby, the communication specialists provided a broad spectrum of barriers to renewables in the Twente area, arguing from the company's perspective they represent. The participation and the opinion of researchers shaped the answer to the sub-question" *How do researchers think about the challenge(s) encountered by communication professionals?* which highlights that they share the same challenges, however, framed differently due to the field of expertise which is academic. It is important to note that researchers explained the challenges, which can be beneficial for communication specialist to better understand the theories behind the human behavior.

Different challenges require creative communication strategies and tools to tackle the resistance of the population. To this end, starting with traditional communication channels such as newspapers, to modern communication channels such as social media, are consistently used by the communication experts, based on the stakeholder category, as well as the activity field of the company. It is relevant to mention that the communication strategies evaluated as efficient by some stakeholders, proved to be inefficient for other stakeholders, which highlights the importance of targeted strategies.

External factors such as the war between Russia and Ukraine were mentioned by the participants, as efficient stimuli that increased not only the awareness about alternative energy sources but also the acceptance level and willingness of the population to adopt the renewables and decrease the energy costs of the Russian gas. However, this external factor is not sufficient, fact that was stressed by all the participants that mentioned the NIMBY syndrome as being

present mostly for wind turbines, meaning that the population wants the change, but not in their backyard.

Finally, the next 10 years of the Twente area look different in the eyes of the participants, where the distinction between dream and reality was clearly made by the communication practitioners, in contrast to only rational scenarios provided by the academia participants. In other words, the common language of shaping a responsible future lay in the cooperation of technology and society.

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Appendix 1

Anonymized representation of the participants

Institutional name	Stakeholder category	Participant coefficient
BTG	Energy supplier	1
RES Twente	Governmental institutions	2
Nieuwe Energie Overijssel	NGO	3
Ons Huis	Housing corporation	4
Enschede municipality	Governmental institutions.	5
Hengelo municipality	Governmental institutions.	6
Twente Board	Governmental institutions.	7
Green Businesses Twente	NGO	8
Energie Enschede	Energy supplier	9
Energiefonds Overijssel	NGO	10
Pure energy	Energy supplier	11
University of Twente	Research institute	12
University of Twente	Research institute	13
University of Twente	Research institute	14
University of Twente	Research institute	15
University of Twente	Research institute	16
University of Twente	Research institute	17

Appendix 2

2.1. Interview Questions Scheme- phase 1:

Interview questions

Introduction:

Good afternoon! Thank you for accepting my invitation to participate in my bachelor thesis study "Energy transition: a challenge for communication specialists". Let me introduce myself: I am Amalia Balan I am a Communication Science student and I am doing my Bachelor assignment on the energy transition. Today I will address you with a set of questions in order to find out your opinion the energy transition, as well as your viewpoint on how the role of communication in this regard.
I would like to remind you about your rights as a participant in the study, specifically, you are allowed to stop the interview anytime and you are also entitled to refuse to answer any questions.
May you allow me to record this interview for data analysis purposes? As stated in the informed consent form, your data is anonymized, stored on a separate drive for privacy and data protection, and will be deleted as soon as the results will be analyzed.

Intro questions:

I know that you are the communication specialists within your company. How long have you worked in the communication and research field?

Organization

1. What is your company doing in relation to the energy transition?

Comm. specialist

2. What is your task as a communication specialist in this regard?
3. Based on the goals related to the energy transition of the company, how are you trying to achieve this?

Challenges comm. & energy transition:

4. ‘What do you think are the most important challenges in moving the energy transition forward for your organization? (or in general).

5. Using the following scale, from 1 (no awareness at all) to 10 (complete awareness), how would you rate the awareness level of the population form the Twente area about the renewable energy sources?

6. Why did you five this number to it?

7. From 1(no acceptance at all) to 10 (which means complete acceptance), how would you rate the acceptance level of the population about the renewable energy sources?

8. Why did you give this number to it?

9. How do you try as a communication specialist to overcome the barriers? What strategies do you use for that?

10. Are there any strategies that you used and did not work? May you elaborate on that?

Future of Twente area

11. How do you see the Twente area in 10 years with respect to the energy transition?

2.2. Interview questions scheme- phase 2

Interview questions

Introduction:

Good afternoon! Thank you for accepting my invitation to participate in my bachelor thesis study “Energy transition: a challenge for communication specialists”. Let me introduce myself: I am Amalia Balan I am a Communication Science student and I am doing my Bachelor assignment on the energy transition. Today I will address you with a set of questions in order to find out your opinion the energy transition, as well as your viewpoint on how the role of communication in this regard.
I would like to remind you about your rights as a participant in the study, specifically, you are allowed to stop the interview anytime and you are also entitled to refuse to answer any questions.
May you allow me to record this interview for data analysis purposes? As stated in the informed consent form, your data is anonymized, stored on a separate drive for privacy and data protection, and will be deleted as soon as the results will be analyzed.

Intro questions:

I know that you are a research, specifically a communication specialists within your BMS department from University of Twente. How long have you worked in the communication and research field?

Organization

What is your department doing in relation to the energy transition?

Comm. specialist

2. What is your task as a communication specialist, as well as researcher in this regard?
3. Based on the goals related to the energy transition of the department, how are you trying to achieve this?

Challenges comm. & energy transition:

4. 'What do you think are the most important challenges in moving the energy transition forward for population in general?

5. Using the following scale, from 1 (no awareness at all) to 10 (complete awareness), how would you rate the awareness level of the population form the Twente area about the renewable energy sources?

6. Why did you five this number to it?

7. From 1(no acceptance at all) to 10 (which means complete acceptance), how would you rate the acceptance level of the population about the renewable energy sources?

8. Why did you give this number to it?

9. According to the data collected, the top challenges encountered by the communication specialists with respect to energy transition are awareness, intrinsic motivation, legislation. Can you reflect from your academic point of view on this top?

10. What are your suggestions for the communication specialists that face these challenges?

Future of Twente area

11. How do you see the Twente area in 10 years with respect to the energy transition?

Appendix 3

Full Codebook

Code	Sub-code	Definition	Example	Level
Work experience	1.1 Less than 1 year 1.2: 2-5 years 1.3. 6-10 years 1.4 Over 10 years	For how long the participant has been working in communication	*"For this company's department I work now for 3 years"*	Transcript level
Stakeholder type	2.1. Governmental institution 2.2. Energy NGO 2.3. Energy supplier 2.4. Housing corporation 2.5. Research institute	The activity field of the organization that the participant represents	*"We offer an alternative fossil fuels"*	Transcript level
Company activity field	3.1 Local 3.2. Regional 3.3. National 3.4 International	On which market they are active on On which level the stakeholders discuss the problems,	*"We focus on North America and Europe"*	Transcript level

		solutions and desired future		
Challenges	4.1. Awareness 4.2. Costs 4.3 Legislation 4.4. Expertise workforce 4.5. Intrinsic motivation 4.6 Fake news 4.7 Other	Type of resistance that the communication specialists encountered	*"Everything has to do with legislation"*	Paragraph level
Communication strategies	5.1 Increase awareness 5.2 Persuading 5.3.Other	An example of communication strategy the participants are currently using in order to overcome the barriers Example of strategies they tried and did not work	*"Explaining the complexity of the energy transition"*	Paragraph level
Communication tool	6.1 Word-of-mouth 6.2 Traditional media (newspapers, TV, radio etc) 6.3. Internet 6.4 Newsletter 6.5 Social media channels	What are the channels or methods used by participants in order to apply their communication strategies.	*"We have our social media channels, which especially LinkedIn has over 1500 followers. That's quite a lot. And the posts are also well read and well liked, so that's good."*	Paragraph level
Sentiment	7.1 Positive 7.2. Negative	The tone of voice of the participants is positive	*"But in 10 years, we see why we do it and we see that it works. So I'm*	Transcript level

	7.3. Neutral 7.4. Ambiguos	Tone of voice of the participant is negative Tone of voice of the participant is neutral Tone of voice of the participant is ambiguous	*optimistic about that."*	
Evaluation	8.1. Effective 8.2. Not effective 8.3. Neutral	How the participants rate the success of the communication strategies applied.	*"We have tried communication like communicating with the people living in the property of others also directly to towards people, but it didn't really work for us"*	Paragraph level
Desired future	9.1 Technological aspect 9.2. Societal aspect 9.3 Economic aspect 9.4. Political aspect	What is the aspect that the participant is referring to when answers how the desirable future looks like from his/her perspective;	*"I hope that people are aware enough that we need these changes."*	Paragraph level
Expected future	10.1 Technological aspect 10.2. Societal aspect 10.3 Economic aspect 10.4. Political aspect	What is the aspect that the participant is referring to when answers how the expected/realistic future looks like from his/her perspective;	"*I think there will be more renewable sources of energy."*	Paragraph level
Point of arguing	11.1. Company perspective 11.2. Communication perspective	What is the role/ status the participants are referring to when they answer the	"*So I think that applies for our customers and for us"*	Paragraph level

	11.3. Researcher perspective 11.4. Societal (citizen) perspective	question. From which perspective they reflect on the questions		
Factors influencing awareness	12.1 Inner circle 12.2. Age 12.3. Fake news 12.4. Complexity of topic 12.5. Educational level 12.6. Other	The factors that are influencing the knowledge of the population from the Twente area according to the opinion of the participants	*"(..)but they just feel a social pressure because everyone is apparently doing it now. And if you're a whole street has solar panels on the roof and you're the only one who hasn't, you're like, ohh what, why don't I?"*	Paragraph level

Appendix 4

Literature log display

Research questions used for literature log display:

RQ1: What are the characteristics of climate change?
RQ2: What are the alternative sources of energy available in the Netherlands?
RQ3: Is energy transition a challenge for communication professionals?
RQ4: What are the stakeholders involved in energy transition in the Netherlands?
RQ5: What role play awareness and societal acceptance in energy transition?
RQ6: What are the main communication strategies used by specialists in energy transition?
RQ7: What factors influence the intrinsic motivation of individuals about energy transition?
RQ8: What are the Dutch milestones with respect to energy transition?

Literature criteria

The type of literature that was preferred for this research was scientific journal because the topic of the study requires a deep understanding of theoretical concepts from Communication science and Psychology. The desired language in which the literature was written is English, however, any report, journal or scientific article written in Romanian and German were considered as well. However, news articles were also considered as information source that was used to further identify theoretical aspects relevant for the study, since energy transition is quite a debated topic nowadays.

Relevant terms

Concepts	Related Terms	Smaller terms	Broader terms
Energy transition	Renewable energy Alternative sources of energy; Greenhouse emissions; Energy	CO2 reduction, climate change, renewables;	Energy demand Energy supply

	systems; Climate Agreement		
Energy communication	Awareness Societal acceptance of energy Intrinsic motivation Extrinsic motivation Communication strategy; Energy justice; citizen acceptance	Behavioural change Long-term engagement	Corporate Transparency. Corporate sustainable development
Socio-technological levels	Conflicts; Innovation acceptance; Societal acceptance of innovation; adoption of innovation; changing behaviour;	Innovation adoption cycle; Innovation adoption; Niche	Modern society
Energy legislation	Climate Agreement Climate milestones Uncouple natural gas houses Green Deals; Transparency Governmetal institutions Energy justice	CSR European financial deals National climate deal Stakeholder community Stakeholder innitiatives SDGs	Polictics; Governmental administration

Search Actions

	Date	**Database**	**Search technique & key words**	**Total hits**
1	**25.02.2022**	**Jstor**	Climate change Dutch agreement	**747**

			and-searching *TITLE-ABS-KEY (climate AND change AND Dutch AND agreement)*	
2	**04.03.2022**	**Scopus**	Stakeholder Energy Communication and-searching *stakeholder AND energy AND communication)*	**83**
3	**05.03.2022**	**Jstor**	Societal acceptance renewables and-searching + year *(societal AND acceptance AND renewablest) AND PUBYEAR > 2018*	**90**
4	**08.03.2022**	**Google scholar**	Energy justice And-searching; Or-searching *TOPIC: (Legislation) OR TOPIC: (Sustainability in Netherlands) AND TOPIC: (Politics)*	**10**
5	**24.03.2022**	**Jstor**	Communication science and behavioural change	**312**

			And-searching + year *(communication science AND behavioural change) AND PUBYEAR>2020*	
6	**25.03.2022**	**Researchgate**	intrinsic and extrinsic motivation sustainability And-searching *(intrinsic AND extrinsic AND motivation AND sustainability)*	**50**
7	**01.04.2022**	**Jstor**	Green Deal and social acceptance And-searching + year *(green AND deal AND societal AND acceptance) AND PUBYEAR>2020*	**493**
8	**05.04.2022**	**Jstor**	Human behaviour in energy transition And-searching; or-searching *(TITLE-ABS-KEY (human AND behaviour AND in AND energy AND transition) AND TITLE-ABS-KEY (communication) OR TITLE-ABS-KEY (sustainability))*	**100**
9	**08.04.2022**	**Jstor**	Communication strategies in renewable energy	**208**

			And-searching + year *(TITLE-ABS-KEY (communication AND strategies AND in AND renewable AND energy) AND PUBYEAR>2020*	
10	**11.04.2022**	**Jstor**	Stakeholder community engagement And-searching + year *(TITLE-ABS-KEY (stakeholder AND community AND engagement) AND PUBYEAR>2015*	**322**

Reflection

In the process of finding relevant literature for the research, I focused on the databases that I was familiar to and which I tried before when working on the university projects, specifically *Google Scholar, ReserachGate, Jstor and Scopus*. I made this choice because these databases were presented by previous teachers and offer a variety of scientific papers with the option to filter the results according to your requirements, such as including the year of publication, the field, type of publication, author etc. In the beginning I started the research with broader terms so I can get an idea of the topic that I will focus on because energy transition was a new theme to me. Therefore, the next step was to highlight specific terms and pick the concepts that fit best to the goal of my study. After collecting a variety of concepts about energy transition and communication, I narrowed down to a few concepts that were interconnected in most of the papers found.

All in all, I am satisfied with the literature retrieved because I found exactly what I was looking for, helping me provide theoretical concepts as strong foundation to my study and nevertheless, explain the findings in the discussion section.