

# **‘Johan Remkes’ the key component bringing actors together.**

Case study of Johan Remkes boundary spanning  
activities/strategies in the Dutch Nitrogen crisis



Source: <https://www.nd.nl/nieuws/nederland/1132772/met-een-omgekeerde-vlag-verzeil-je-in-complotdenken#closemodal>

**Bachelors Thesis**  
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# Colophon

**Title:** “Johan Remkes” the key component bringing actors together. *Case study of Johan Remkes and his boundary spanning activities in the Dutch nitrogen crisis*

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## Table of contents

<b>Colophon</b>	<b>2</b>
<b>Abstract</b>	<b>4</b>
<b>1.1 Background</b>	<b>5</b>
<b>1.1.2 Connection to boundary spanning</b>	<b>5</b>
<b>1.2 Introduction of Johan Remkes &amp; Dutch Nitrogen crisis</b>	<b>5</b>
<b>Introduction Dutch Nitrogen crisis</b>	<b>6</b>
<b>Introduction to Johan Remkes</b>	<b>6</b>
<b>1.3 Research Aim</b>	<b>6</b>
<b>1.3.1 Research questions</b>	<b>6</b>
<b>1.4 Reading guide</b>	<b>7</b>
<b>2. Theoretical Framework</b>	<b>7</b>
<b>2.1 Institutional logics</b>	<b>7</b>
<b>2.2 Boundary spanning activities (BSA)</b>	<b>8</b>
<b>2.4 Conceptual model</b>	<b>9</b>
<b>3. Methodology</b>	<b>9</b>
<b>3.1 Data Collection</b>	<b>9</b>
<b>3.1.1 Collection Qualitative data Twitter posts</b>	<b>9</b>
<b>3.1.2 Collection Sentiment analysis by AI</b>	<b>10</b>
<b>4. Data Analysis &amp; Examples</b>	<b>10</b>
<b>4.1 Different BSA used in the Nitrogen Crisis</b>	<b>10</b>
<b>4.2 Examples of tweets and articles</b>	<b>11</b>
<b>4.2.1 Connecting BSA:</b>	<b>11</b>
<b>4.2.2 Informing BSA:</b>	<b>11</b>
<b>4.3 Ethical considerations</b>	<b>13</b>
<b>5. Results</b>	<b>13</b>
<b>6. Conclusions</b>	<b>14</b>
<b>6.1.1 Institutional logic of Farmers</b>	<b>14</b>
<b>6.1.2 Institutional logic of national government</b>	<b>14</b>
<b>6.1.1 Sentiment of Tweets</b>	<b>15</b>

<b>6.1.2 Twitter Valuation of BSA</b>	<b>15</b>
<b>6.1.3 Abusive language in tweets</b>	<b>15</b>
<b>6.1.3 Supportive language in Tweets</b>	<b>15</b>
<b>6.2 Discussion/Future Research</b>	<b>16</b>
<b>7. References</b>	<b>17</b>
<b>8. Appendices</b>	<b>20</b>
<b>Appendix 1: Coding and data Selection of Tweets by Python coding</b>	<b>20</b>
<b>Appendix 2: Sentiment analysis by AI</b>	<b>22</b>

## **Abstract**

In current society with increased influence of stakeholder a limited time for solving conflicts the pressure upon Boundary spanners has increased immensely. In this thesis I will be looking further into which boundary spanning activities are used by Johan Remkes and their effect on collaborative processes between conflicting actors within the Dutch Nitrogen Crisis; Johan Remkes. By a combination of current literature the effect of certain boundary spanning activities will be defined. By analysing Twitter responses the general opinion on those activities will be researched which isn't addressed in the current literature. My key findings are that boundary spanning activities Mediation and Coordination resulted in the most negative twitter responses. But according to the literature these are the boundary spanning activities that are most effective on the collaborative process. The reason for this difference in twitter responses and literature is related to Trust and other personality bound characteristics of a boundary spanner. These findings are important to show the discovery of different variables that have effect on the collaborative process and could be an interesting starting point for further research.

### **Key words:**

*Nitrogen Crisis*

*Johan Remkes*

*Boundary Spanning*

*Institutional logic*

### **Abbreviations:**

BSA= Boundary Spanning Activities

## 1.1 Background

With the increase of complexity of problems in nowadays society the notion of wicked problems increases. These wicked problems have different origins/causes and therefore have no single identifiable solution (*Daviter et al. 2019*). The roots of this problem originate from the conflict between short-term interests and long-term benefit of each stakeholder (*Levin et al. 2012*). One of the most important characteristics of these wicked problems is the diversity/increasing influence of stakeholder according to (*Rittel & Webber, 2019*). Also more involved stakeholders or citizens make it so policy-makers experience more tensions between the fact that they need to solve crises in a quick matter, but also have to create support and get all the affected stakeholder on board (*Rauws and de Jong, 2019*). But according to (*Farinosi et al., 2019*) these civic engagements are a more progressive image of the public opinion. Because most of the citizens/committees consist of progressive actors. Therefore both of the representations of public opinions (politics and civic committees) are not representative because they not only express collective opinions but also want to address the civil society in the political decision-making process.

### 1.1.2 Connection to boundary spanning

According to (*Mannes, 1996*) the key point of a successful boundary spanner is to diagnose problems and the ability to prescribe the appropriate to solve the problem/conflict. With the increased experience of tension towards policy-makers to solve crisis's faster while also accumulating support across actors. Boundary spanners are in need of a framework that defines each boundary spanning activity and their effectiveness improving the collaborative process between actor in a conflict. By also analysing real-time Twitter data effectiveness of boundary spanning activities can be measured while also visualizing the public opinion about the activities to see if there is a difference between literature and Real-time data.

### 1.1.3 Scientific/Societal Relevance

The literature on Boundary Spanning investigates the best ways to solve these wicked conflicts in the most efficient way and with the highest quality solutions, by addressing different boundary spanning activities. Which increase the collaborative process between two opposing parties within a set timeframe. Most of the papers written on the subject on effectiveness of boundary spanning activities on a collaborative process are structured with a data collection process that only involves self-reported data as seen in paper written by (*Satheesh et al., n.d.*). Self-reported data within a paper creates the opportunity for self-reporting/self-rating biases because people want to have social desired outcomes of a study (*Rosenman et al., 2011*) or a bias in self-rating of their own boundary activities and their performance (*Jiayuan and Murphy, 1993*). Therefore creating the research puzzle regarding which boundary spanning activities were most effective on the collaborative process between actors and the reactions upon these boundary spanning activities. But because most of the political and civic committees have different opinions that not align with the public opinion (*Farinosi et al., 2019*). To solve the research puzzle open access Tweets will be analysed by the type of response and coding them into different boundary spanning activities. This will decrease the chance for self-reporting/self-rating bias. And have the most accurate real-time responses that are representative public opinions.

Most of the societal relevance of my thesis lies in the exploration of boundary spanning activities and their impact on conflict resolution, acknowledging potential biases in self-reported data, and proposing an alternative method data analyzing method to combat this therefore other researchers can gain insights about an alternative method for data analyzing. This is inline with the growing interest in researching social media data for studying and understanding public perspectives of societal phenomenon (*Zachlod et al., 2022*).

## 1.2 Introduction of Johan Remkes & Dutch Nitrogen crisis

To create a clear understanding about my research it is of great importance to explain my case study for this thesis to also introduce Johan Remkes and the Dutch Nitrogen crisis to people who are not familiar with the case.

## Introduction Dutch Nitrogen crisis

The nitrogen crisis is a long lasting problem within the Netherlands regarding a decrease in biodiversity due to the intensification of traffic and agriculture. To solve this problem and protect nature and biodiversity the European Union implemented a Nitrogen emission guideline (Midolo et al., 2019) and appointed Natura 2000 zones which are zones where nature needs to be preserved to save biodiversity. The Dutch government made a program call “Programma Aanpak Stikstof (PAS) which started in 2015 (State, n.d.) to regulate the allowance of nitrogen polluting activities. But after 4 years (2019) the Dutch political organ “Raad van State” that concluded in 2019 that PAS is not a solid base for granting nitrogen rights(State, n.d.). This created legal uncertainty about contract for nitrogen polluting activities but forced farmers to leave near the appointed Natura 2000 areas because it did not meet the European guidelines. The Farmers and other organizations disagreed with the decision and the Nitrogen crisis/conflict emerged.

## Introduction to Johan Remkes

Johan Remkes has been an active member of the political party VVD for several years. But after his retirement he has been involved into different boundary spanning activities such as being an informant for the elections or in the Nitrogen crisis. In 2019 he started of as an chairman of the advisory board regarding the Nitrogen crisis to write recommendations to the government how to solve the conflict. With this advisory board the report “Niet alles kan overal”(2019) to give the government a final advice on how the Nitrogen crisis can be solved with respect to both of the actors interests (Farmers & Government). This advice already created more perspective for Farmers but they weren't satisfied with a big part of the report according to different farming see quote underneath by (LTO Noord, n.d.).

To be able to bridge the interests of both actors Remkes was selected as an independent moderator/ boundary spanner of the conflict.

‘Het is goed dat Remkes oog heeft voor wat er aan de hand is op het platteland’, zegt de voorzitter van boerenorganisatie LTO Noord. ‘Hij stelt vast dat de kloof met Den Haag groot is en dat het kabinet echt daar aan wat moet doen.’

It is good that Remkes has an eye for what is going on in the countryside,' says the chairman of farmers' organization LTO Noord. "He notes that the gap with The Hague is large and that the cabinet really needs to do something about it."

## 1.3 Research Aim

The aim of this research is to better understand the different logics that drive a disagreement between different actors or stakeholders, how the different boundary spanning activities can increase the efficiency and quality of the collaboration process. This all by decreasing the self-reporting bias in the current literature by analyzing public tweets to visualize the different responses on boundary spanning activities. I will study the relationship between different institutional logics, boundary spanning activities and their public responses in the Case study of Johan Remkes in the Dutch nitrogen crisis

### 1.3.1 Research questions

*Which boundary spanning activities, implemented by Johan Remkes, were effective on the collaborative process between farmers and the government within the Dutch nitrogen crisis?*

To answer my main research question and the relation between all the variables, it is of most importance to recognize each element individual beforehand. With that, sub questions are formulated to generate further knowledge to be able to answer the main question.

1. *What different institutional logics do the government and farmers within the Dutch nitrogen crisis have?*

To understand the different institutional logics each actor have and why this would result in disagreement but also describe the reason for conflict in the first case.

2. *What kind of boundary spanning activities did Remkes implement to bridge the differences between the opposing parties?*

After understanding the logics I have analyzed the different boundary spanning activities especially the case of Johan Remkes to create a standardized way of grouping each boundary spanning activity.

3. How did people perceive/value the implemented boundary spanning activities by Johan Remkes according to Twitter the opinions between 1<sup>st</sup> of May 2019 and 30<sup>th</sup> of October 2022? After all of the concepts are explained I will answer this sub question by coding the derived data and showing graphs and evidence that will explain the results of my analysis.

## 1.4 Reading guide

The layout of this thesis is structured in 5 chapters. In my second chapter I will discuss the various connections between theoretical concepts which will be summarized in a conceptual model. This will be used to gain present the current theoretical concepts on the topic discussed in this thesis. After this I will be discussing the methodology of the study, the methods of data collection and the analysis used in this thesis. Chapter four will be used to show my literature study of the theoretical concepts and the results of the empirical research of the analyzed data. This data will be used to answer the main research question. These data will be used and interpreted in chapter five which will be focused on interpreting the obtained data and drawing conclusions upon this knowledge, this chapter will also be used for gives suggestions for future research.

## 2. Theoretical Framework

### 2.1 Institutional logics

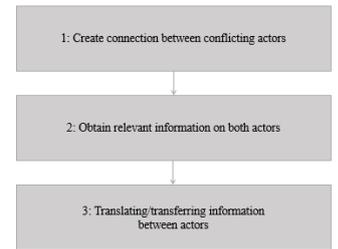
One of the key concepts mentioned in the literature about wicked problems is the concept of institutional logics. Institutional logics is the term used to describe the contradiction of different practices or beliefs of individuals or institutions (Friedland, 1985). The main institutional orders that are described in this concept are capitalist market , state bureaucracy and political democracy (Greenwood et al., 2013). But according to (Friedland and Alford, 1991) family, democracy and religion could also have a big influence on the behaviour of individual, organizations and society. Because all of these institutional logics have different practices and beliefs it shapes the way individual interact with political struggles and therefore this is also the main reason for political conflict according to (Thornton and Ocasio, 1999).

These logics are less powerful than direct rules but act as a more subtly guiding principle for individuals, organizations and society. With underlying processes that are less tangible according to (Friedland, 2012). For example social construct, historical patterns, or (personal) values, beliefs, assumptions and rules could have an influence on institutional logic (Thornton & Ocasio. 1999). But why are these logics so important for a boundary spanner in the case of a conflict? Well in most conflicts these rules and routines of the institutional logics contradict each other. Traditional institutional logics could be a barrier that creates tension between actors (Nederhand et al., 2019). But the institutional logics can always change during the interaction between actors (Edelenbos, 2005). The role of a boundary spanner is to align these institutional logics the best they can by applying different boundary spanning activities in the right way to help align logics, make collaboration possible and avoid problematic clashes (Nederhand et al., 2019). These boundary spanning activities activities will be discussed in more detail later in this thesis (2.2 Boundary spanning activities).

## 2.2 Boundary spanning activities (BSA)

To align institutional logics a boundary spanner needs to implement various boundary spanning activities (BSA) in the right way to solve conflicts between actors. But what are boundary spanning activities and how can they be implemented in an effective way to align institutional logics? Within the current literature there are different ideas existing about the definition of a BSA. But the basic concept of a BSA *see figure 1.* is to (1) create a connection between the different actors and processes across both organizational boundaries or institutional logics (Nederhand et al., 2019). (2) obtain relevant information regarding logics on both actors involved. In the final stage (3) translating/transferring the information to the other actor/boundary within the conflict (Van Meerkerk, 2014). Due to the central/independent position of the boundary spanner he can strategically control information or shape perceptions by accessing different parts within the networks of both actors (Nederhand et al., 2019). Not only to connect but also align actors with different logics (Lodge and Wegrich 2014).

Figure 1: Basic Concept of BSA



But in general most BSA concepts are more than simply translating information between actors and can include a lot of different activities such as relationship building, outreach, communication, facilitation, evaluation and conflict mediation (Hatch et al., 2023). In most of the literature the four main types of BSA are discussed/analysed.

## 2.3 Effectiveness on collaborative process

All of the BSA mentioned in *Boundary spanning activities 2.2* all have the same aim, to create a more efficient/smooth collaboration process between conflicting parties. This can be done by implementing BSA, but for a BSA to be effective it needs to be implemented in the right way and at the right time. How do we measure effectiveness of BSA and what is effective for a better collaborative process. An effective collaboration process is characterized in three different aspects according to (Agranoff & McGuire, 2003; Ansell & Gash, 2007; Huxham et al., 2000) in the paper written by (Satheesh et al., 2023). The first one being joint problem-solving in the case of unexpected events, the second one is by the development of shared norms and responsibilities and the third is the way of dealing with conflicts so increasing or decreasing one of these aspects has an effect on the collaboration process between actors. To complement these, according to results done by (Williams, 2002), 3 factors are recognized when implicating the effectiveness on a collaborative process. The key factor being building and sustaining relationships, this is part is a necessary part to increase an effective collaborative process. By increasing the knowledge about different parts within the actor such as roles, responsibilities, problems, accountabilities, cultures, professional norms and standards, aspirations and underlying values (logics) (Williams, 2002). This allows boundary spanners to identify potential areas in which actors have communality or interdependency that could have effect on the collaborative process.

The second factor is communication and listening: the ability to express the position of himself or actors with clarity by oral, written and presentational communication is essential and effective to the collaborative process. Listening also is of great value in a collaborative process in particularly 'active listening' which is an open way of listening to create the feeling of willingness and openness to interests of different actors (Williams, 2002).

The third one that has an effect on the collaborative process between actors is the Personality of a boundary spanner. By certain personality traits, characteristics or values a boundary spanner could have effect on the collaborative process. Qualities such as Sensitivity, reliability, approachability, tolerance, openness, honesty and respect are desirable and have effect on the collaborative process.

## 2.4 Conceptual model

My conceptual model is separated in three different stages which follow the same order as my sub questions *see figure 2*. First of is the difference in institutional logics which is the core of the conflict between partners. so the Theoretical framework I explained and identified institutional logics in the existing academic literature. Upon this knowledge the different institutional logics per actor and their conflict will be discussed. The second stage is: type of

BSA which I discussed and defined types of BSA based upon the existing academic literature. The BSA used in the analysis, how these are analyzed and examples of analyzed tweets. To conclude the last stage will be about the effectiveness of each BSA on Collaboration process. In the theoretical framework I discussed how Effectiveness is measured in a boundary spanning process. In the Data Analysis and Conclusion Ch4 and 5 I will further discuss each type of BSA and the effectiveness on the collaboration process using the empirical twitter analysis and other existing literature to support my statements/conclusions .

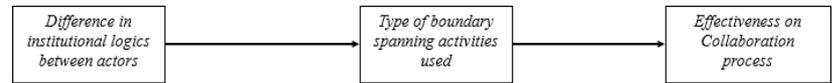


Figure 2: Conceptual model

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## 3. Methodology

### 3.1 Data Collection

#### 3.1.1 Collection Qualitative data Twitter posts

To study the different responses on boundary spanning activities Twitter posts are studied and scraped by a Twitter scraper constructed with Python coding *see appendix 1*. The twitter posts are selected by different hashtags to make sure the research questions will be answered. The codebook of the tweets consists out of a scraping of tweets and is focused to scrape/provide the following tweets with the one or multiple of the following hashtags: #Remkes, #Stikstofcrisis, #JohanRemkes, #Stikstofbemiddelaar& #Stikstofonderhandelingen but also including one or multiple of the key words: Johan Remkes, Stikstofonderhandelingen, Stikstofcrisis & Stikstof in between the between 1<sup>st</sup> of September 2019 and 30<sup>th</sup> October 2022.. The reason for this time period is to analyze the most recent tweets in-between both of the highly influential report Johan Remkes published about the nitrogen crisis. This insures that all of the tweets are posted within a close timeframe of the boundary spanning activities implemented by Johan Remkes to only analyze real-time responses.

In total the scraped dataset contained 754 tweets collected by the Python scraper, after deleting irrelevant tweets such as bots or link only tweets the total collected tweets is 213, those will be used in the data analysis.

Choosing twitter as data to analyze has different advantages: First of the research gap addresses the self-reporting bias in the current literature (Rosenman et al., 2011) & (Jiayuanu and Murphy, 1993), to combat/decrease the bias and have an academic valuable research paper choosing twitter data was a great solution. The real-time twitter data also has other benefits that could be exploited in this research paper, the twitter data represents experiences and responses but also different perspectives of a specific moment in time which could generate a chronological pattern in the data results. These data results are also not limited to the response percentage as in interviews or questionnaires.

In this thesis I chose to interpreted the data with a more loose and less controlled way of interpretation, this results in a small interpretation bias that could occur when interpreting data in your own way. I will be analyzing the data by coding the data in the excel file extracted from the python coding, each boundary spanning activity mentioned will be coded into its own groups therefore creating a qualitative data study to see which boundary spanning activities are mentioned in which sentiment. This will visualize the twitter opinion on each different boundary spanning activity within the researched data base. To give a clear overview of the tweets that are coded in each boundary spanning activity I added examples of each tweet and the boundary spanning activity they are coded into see Ch 4 data analysis.

### 3.1.2 Collection Sentiment analysis by AI

To make sure the sentiment/language all of the tweets are analyzed in a structured matter without any bias by my personal opinion or interpretation Chat GPT (*ChatGPT, Sentiment Analysis, June 6, 2023*) see appendix 2 is used to make a sentiment analysis from all of the tweets: A sentiment analysis is a natural language processing technique that identifies the polarity of a give text (*Hendrikse, 2021*) To make a clear division between sentimental language in tweets three parameters are chosen: Abusive supportive and neutral language to analyze the different data, these parameters were discussed with Dr. Venhorst to get the most accurate sentiment analysis with the most valuable data outcome. By using an AI model the data is analyzed, the analyzation method is shown see appendix 2. The analysis has been done by an AI model that recognized the type of language by scanning the text and its contextual information available on the internet, therefore creating a structured analysis without different interpretation biases. By only applying one type of data analysis scheme the AI analyses all of the data the same way and therefore have a less disseminative result on the language of the tweets.

## 4. Data Analysis & Examples

To explain my data and create collective understanding about the example of the different BSA I will first explain the different BSA used by Johan Remkes, afterwards examples are shown and explained to give a insight in how certain variables are coded. To give a clear idea about what these BSA are used for examples newspaper articles are used to give a general idea about the how each BSA type was implemented by Johan Remkes. To connect this to my analysis examples of tweets will also be included for further understanding and connection between Johan Remkes and the Twitter responses.

### 4.1 Different BSA used in the Nitrogen Crisis

The first one of four BSA is about the connection between actors also called the connecting BSA(1). Which is mostly focussed on face to face contact with actors to build trust and create a mutual understanding of the conflict (*Smink et al., 2015*). These connections are not only based upon contractual arrangements but also with personal and informal relationship (*Meerkerk and Edelenbos 2018*). Such daily encounters (Noble and Jones, 2006) or other social activities are the main ways in which boundary spanners connect across different actors (*Lundberg, 2013*) develop a connection between actors across social, societal or cultural logics (*Aldrich and Herker, 1977*).

The aim of the Informing BSA(2) is to exchange and share knowledge after collecting, processing and translating relevant information across actors/boundaries (*Tushman and Scanlan, 1981*). But a boundary spanner also needs to moderate and prioritize information, which could increase the informed way of making decisions in a conflict (*Delozier and Burbach, 2021*). With the dynamic nature of conflicts adapting to the changing circumstances and dealing with different information sources is crucial for a smooth collaboration between actors (*Dollinger, 1984*). But especially in the case of a conflict it is also of most importance for a boundary spanner to take into account how to attain the information and the actors that need to be made aware about the information (*Miller, 2008*).

The Third BCA is focussed on mediation between parties and ensure fair representation of the various interest of actors involved (*Smink et al., 2015*) and is therefore called the mediating BSA (3). This can be done in different ways, first by using factual arguments that persuade actors to change their logic or bend existing rules/policies according to (*Nederhand et al., 2019*). The other is focussed to facilitate compromises based upon knowledge and showing respect to each actors interests. The main focus of mediating BCA is to bring actors that are unlikely to collaborate together (*Williams, 2002*). Even if their interests or logics are not aligned.

The fourth BSA focusses on the coordination of the boundary spanning process and is called coordinating BSA(4). A good boundary spanner is also the main character in negotiations and the coordination of the process. Being a coordinator of meetings, manage administration or monitor the progress of the conflict (Williams, 2012). Which creates smooth running collaborations, and coupling between actors (Ancona and Caldwell, 1992). The coordination between actors requires a balance between both internal & external actors included in the conflict (Van Meerkerk and Edelenbos, 2018).

To create a clear visualisation of all of the BCA a figure has been created with all of the characteristics/aims see figure 3.

Types of BSA in current literature	General Aim
Connecting BSA:	Informal relationship to build trust and connect actors across different logics
Informing BSA:	Exchange knowledge in a thoughtful distributed way to stimulate collaboration
Mediating BSA:	Representing the various interests of actors to gain competence and create unlikely collaboration
Coordinating BSA:	Managing the negotiation process with a balance between actors

Figure 3: Types of Boundary Spanning Activities and their General Aims

## 4.2 Examples of tweets and articles

### 4.2.1 Connecting BSA:

According to the theoretical framework the connective BSA is focused on building (in)formal relationship that build trust and create mutual understanding about the conflict. In the case of Johan Remkes in the Nitrogen crisis that could be done in various ways by engaging with both actors in daily encounters such visits or other daily activities in which smoking breaks were a characteristic connecting BSA that Remkes used see examples connecting BSA. Connecting BSA is also presence in the analyzed tweets in which less specific activities are mentioned (Reason for this could be that informal activities are not recorded in most cases, so twitter responses are more general in that case) In the twitter responses most people mentioned the active listening or openness to listen by Johan Remkes or other personality based Connecting BSA see examples connecting BSA.

### Examples Connecting BSA:



**Johan Remkes and his characteristic smoking breaks: discussing and listening to farmers interests in a face-to-face informal manner.**

Source: <https://fd.nl/politiek/1450313/alle-ogere-in-het-stikstofdebat-zijn-nu-gericht-op-johan-remkes>

### Example of analyzed tweet

Oct 7, 2019

“De rust, inzicht en vriendelijke wijsheid en het luisterend oor ook buiten het debat van #johan Remkes is ontbrekend bij veel hijgerige kamerleden”

### 4.2.2 Informing BSA:

According to the theoretical framework the informing BSA is based upon exchanging knowledge between actors in a way it stimulates the collaboration process. In the case of Johan Remkes and the Nitrogen crisis most of the online news articles and twitter responses see examples informing BSA where focused on both of the advisory reports by Remkes ‘niet alles kan overal’ & ‘wat kan wel’ (Rijksoverheid, 2020) & (Rijksoverheid, 2022). These reports where of major importance to inform the both of the actors about the possibilities regarding the current laws and regulations within the nitrogencrisis. In the examples of tweets and articles you can see that the aim of the reports is to inform actors in a clear way and give perspective.

## Examples Informing BSA:



*'This report is not going to lead to joy, but there is a future for the farming sector: Johan Remkes presenting his advisory report 'wat kan wel' to inform and give perspective to farmers*

Source: <https://www.ogroaf.nl/artikel/556387-rapport-qaot-niet-tot-vreude-leiden-maar-er-is-toekomst-voor-boerensector/>

### Example of analyzed tweet

Sept 17, 2019

*"Het rapport van #Remkes "Niet alles kan overal" was hardstikke duidelijk, maar Rutte3 heeft hier nauwelijks iets mee gedaan.*

## 4.2.3 Mediating BSA:

According to the theoretical framework the Mediating BSA is focused on representing and balancing the interests of both actors. In the case of Johan Remkes and the Nitrogen crisis this can be done by inviting actors to discuss their interests or the in the way a boundary spanning formulates his aims based upon knowledge during the collaboration process to meet both of the interests with respect regarding both actors *see examples mediating BSA.*

## Examples Mediating BSA:



*Johan Remkes has invited the farmers and government to sit down and negotiate about the current nitrogen plans.*

Source: <https://www.rtbnieuws.nl/nieuws/nederland/artikel/5323867/stikstofbemiddelaar-remkes-boeren-overheid-stikstofmarkt>

### Example of analyzed tweet

Oct 5, 2020

*"Remkes tracht met zijn denklijn tussen de belangen van partijen, incl. het kabinet, door te manoeuvreren, zonder dat het Kabinetsbeleid substantieel aangetast wordt. Het onteigeningsspook blijft. Lokale uitwerking prima, echter moeilijk realiseerbaar. MinLNV had een beter betoog."*

## 4.2.4 Coordinating BSA:

According to the theoretical framework the coordinating BSA is based upon managing negotiations, coordination of the collaborative process but also being a coordinator of meetings, manage administration or monitor the progress of the conflict. In the case of Johan Remkes you there is a clear image about this boundary spanning activity. Most tweets and articles mention the Remkes being a moderator that coordinates the negotiations. With his calm, down-to-earth and reactivating attitude he keeps the negotiations going and prevents escalations *see examples coordinating BSA.*

## Examples Coordinating BSA:



**Example of analyzed tweet**

"Oct 9, 2022  
 2#Buitenhof wat een verademing is #JohanRemkes toch. Rustig, broodnuchter, relativerend en #bovendepartijen staand een echte debatleider, omdat hij daar de leeftijd voor heeft aldus Remkes zelf."

'Moderator of negotiation' Johan Remkes presents results of months of nitrogen consultations

Source: <https://www.rvooost.nl/nieuws/2149229/terugbijRem-gesprek-leider-johan-remkes-presenteert-waardemingen-van-waardenlijst-stikstofverleg>

### 4.3 Ethical considerations

Hence the twitter posts are publicly available and accessible for everyone with a Twitter account. Therefore no-one's privacy is deliberately attacked by the collected tweets. The names of respondents will not be used in the data analysis nor paper, therefore the location of the different tweets will be fully anonymous. This will be the best way to handle the data in an ethical way to respect people's privacy on social media without losing out on useful data in the process.

### 5. Results

In total 212 tweets are analyzed both with a sentiment analysis and a personal boundary spanning activity analysis *see figure 4* you can see the results of the analysis conducted, *see figure 4 and 5*. In the combination of figure 7 and explanatory figure 8 you can see that most of the analyzed tweets have an abusive language towards the Johan Remkes and his implemented BSA. You can see that most of the analyzed tweets have an abusive language towards the boundary spanning activities of Johan Remkes 79% of the total tweets are coded with abusive language by the AI and therefore only 21% of the tweets have a supportive statement. In the data we can also distinguish the different types of boundary spanning activities mentioned. When abusive language is used most of the tweets are about the Mediating and Coordinating BSA implemented by Johan Remkes and with supportive language mention Informing and Mediating BSA.

Type of boundary spanning activity	Connecting BSA	Mediating BSA	Informing BSA	Coordinating BSA	Total:
Sentiment of tweet					
Abusive language	30	61	19	57	167
Supportive language	11	21	17	6	45
Neutral language/not included in research					533

Figure 4: Results of twitter data analysis

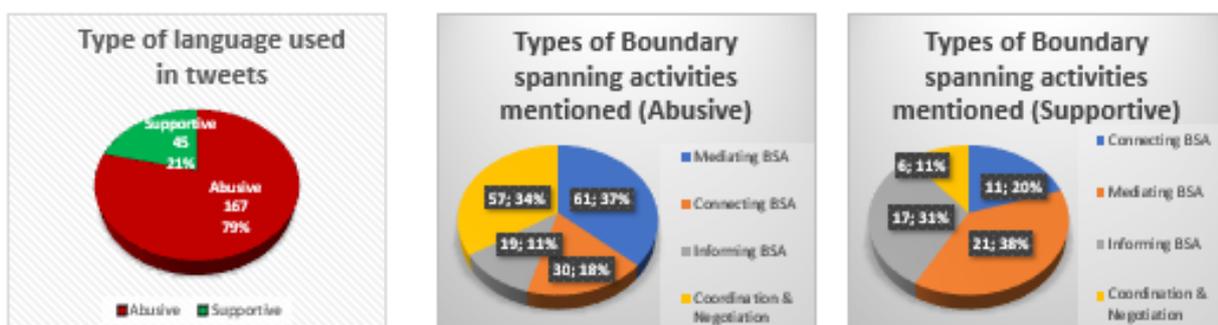


Figure 5: Models of data analysis outcome

## 6. Conclusions

1. What different institutional logics do the government and farmers within the Dutch nitrogen crisis have and how are these conflicting with each other?

### 6.1.1 Institutional logic of Farmers

In the case of the Nitrogen crisis the institutional logics of farmers are based on the maximization of food production which is the Business/Market logic (Knook and Turner, 2020). To maintain the family business, so farmers focus mostly on keeping the business running in the most efficient way to maintain the family business with ambitions to keep the farm running for the next generation which is the Farming lifestyle/Family logic. Therefore they will try to make decisions that benefit the farm in the long-term such as increasing size or more profitable form of farming (Copland and Stevens, 2012).

### 6.1.2 Institutional logic of national government

In the case of the Nitrogen crisis the logics The institutional logics of the national government based of the Environmental and State logics. The most powerful logic is the State logic and is mostly powered by top-down laws and regulations with technical rationality such as the Natura 2000 agreement and the PAS earlier mentioned in the case introduction Ch1.2. The environmental logic mostly focusses on the need for sustainability to adopt a change of mindset: from competitive to collaborative advantages for multiple stakeholders (Nath et al., 2010). The environmental logic is also a way to meet the criteria in the short-time frame set by the State logic's laws and regulations.

To create a clear visualization of all the institutional logics of each actor a table has been created with the aim and key aspects of each type of logic see figure 6.

Type of logic	Aim of logic	Key aspects
Market	Exploit opportunities	Increasing profit through mechanism of transaction
Environmental	Aiding to help solve climate change	Less pollution, focussed on saving nature and biodiversity
Business	Increase actors company size	Increase the size of firms or maximise profits
State	Operation in orderly & fixed procedures	Differences in status following a hierarchical order
Family	Increasing family honor	Loyalty, household position and patriarchal domination

Figure 6: Table of institutional logics with aims and key aspects

Sources: (Knook and Turner, 2020), (Ansari and Wijen, 2013) & (Smink et al., 2015)

### 6.1.3 Conflicting Logics

According to the theoretic framework a dissimilarity of institutional logics are the main reason for political conflict (Thornton and Ocasio, 1999). But how are these logics conflicting in the case of the Nitrogen crisis?

In the case of the Dutch nitrogen crisis most farmers need to reduce their emissions or close their farms according to the current Environmental and State logics of the Government to the procedures/laws to meet the environmental regulations, for the case of the government these are more important than obtaining the most efficient outcome: guided by procedural rationality not economic rationality (Smink et al., 2015). This is to increase the community good by bureaucratic mechanisms without looking at the individual good of the farmers. Implementation of environmental measure that would have environmental benefits but will decrease maximization of food production Business/Market logic (Knook and Turner, 2020). These logics do not align with the farmers logics and therefore the results is farmers adopting less or no new practices if the practices do not align with their dominant values and beliefs about 'good farming' (Burton et al., 2020) such as maximization of production, increase size or more profitable form of farming. This is the main reason for a conflict within the institutional logics of both actors.

2. What types of boundary spanning activities did Remkes implement to bridge the differences between the opposing parties?

In the case of the Nitrogen crisis there was a big gap between both actors regarding interests. By connecting actor through daily encounters, such as informal visits or smoke breaks in-between Remkes tried to build a relationship and

connect. In this case he was especially focusing on the Farmers as an external actor. To make sure all of the actors were informed about the rules and regulations in place but also the opportunities and perspectives within the conflict Remkes used advisory reports to express his findings based upon knowledge about the conflict. To mediate within the conflict Remkes main focus was to invite different actors to discuss their interests to be able to get an insight of all the actors interests. When coordinating the conflict Johan Remkes coordinated the negotiations by being a independent entity which made sure the conflict did not escalate and the progress of the conflict was monitored.

*3. How did people perceive/value the implemented boundary spanning activities by Johan Remkes according to Twitter the opinions between 1<sup>st</sup> of May 2019 and 30<sup>th</sup> of October 2022?*

### **6.1.1 Sentiment of Tweets**

Generally most tweets perceived the BSA with an abusive opinion/language (79% of total data is abusive and only 21% supportive). There could be various reasons for this to occur for example negative language is more likely to spread than positive language (*Goldenberg and Gross, 2020*), people tend to use negative language to signal other group member their values and beliefs (*Crockett, 2017*). Reaching the most amount of people to share your values and beliefs is as listed in the theory of great importance in general twitter responses and therefore is one of the main reason for the high percentage of abusive tweets in the analysis. So the farmers did not feel like the existing rules/policies could be changed with the implementation of their interests

### **6.1.2 Twitter Valuation of BSA**

#### **6.1.3 Abusive language in tweets**

According to the data presented in subheading 5. Results most of the abusive language is used for both the Mediating and Coordinating BSA the reason for this phenomenon could be that these BSA are focused on the relationship with actors and the balance between interests of actors within the collaborative process. In most of the tweets analyzed you can see that farmers feel like their interests are not incorporated into the decision-making process by asking their opinion on how to solve the problem, due to the fact that they have been informed in a later stage. In a later stage were the farmers were included into the negotiations there was no balance between internal and external actors by not including important actors such as the 25 biggest nitrogen polluting companies which is clearly visible in the analyzed tweets.

#### **6.1.3 Supportive language in Tweets**

The data in subheading 5. Results states that most of the supportive language is used for both the Informing and Connecting BSA. The positive language in these tweets is focused on how Johan Remkes is trying to fill the gap between rural and urban areas. In the Connecting BSA positive his personality is the most discussed, by being down-to earth, interested but also open to talk to these are the main features that contribute to connection between actors. In the Informing BSA most of the tweets mention the clarity of the presentation of the advisory reports. Which not only gave farmer information about the European rules and regulations but also gave the farmers more perspective.

*4. Which boundary spanning activities, implemented by Johan Remkes, were effective on collaborative process between farmers and the government within the Dutch nitrogen crisis?*

According to the theoretical Framework the effectiveness of boundary spanning measures is measured by an improvement in joint problem solving, increase in developed shared norms and responsibilities and efficient way of dealing with conflicts within the process. One of the key aspects to reach is building sustainable relationships. In the case of Johan Remkes you can see that the Informing BSA or the advisory reports were of great importance, they operated as a basis to develop the shared norm and responsibilities within the conflict. That gave the external actors (Farmers) in the conflict a better perspective on the opportunity to improve the idea of a collaborative way of solving

the problem. In the first stadium of the mediating BSA had a lot of abusive responses but due to the origin of an imbalanced representation of both actors interests. The mediating BSA improved the collaborative process, by bringing actors together created a balance of representation with the respect to interests. This also increased to knowledge about each actors logics, norms and values regarding the conflict. Which created the possibility to bend existing rules/policies and could result in an unlikely collaboration between actors.

Also mentioned upon in the Literature are the general personality bound skills such as active listening, openness or respect. These personality bound skills are used by Johan Remkes while implementing certain BSA to maximize the effect on the collaborative process. This is not really a boundary spanning activity but is of great importance, Johan Remkes used these personality bound skills to create a competent, invested, knowledgeable but also open feeling towards both actors. Therefore creating a greater environment to share interests or negotiate.

## 6.2 Discussion/Future Research

After analyzing the data I also found another pattern within the analyzed data. Which is that some sort of statement according to the trust in Johan Remkes as a boundary spanner. Trust is mentioned in 81 out of the 212 analyzed tweets with examples such as shown underneath. The key factor for doubt in trust could be the fact that Johan Remkes is still a member of the VVD political party which is part of the internal actor, but also because he is one of the writers of a nitrogen paper that was really biased against the farmers logics. This all happened before Remkes became a boundary spanner in the conflict. So most farmers still see Johan Remkes as a biased boundary spanner who is not really independent but adheres the governmental logics. This could be a great opportunity for future research regarding the effect of trust in the collaborative process being Johan Remkes in the Nitrogen crisis.

5-10-2022:

*Dus @JohanRemkes de architect van het #stikstofbeleid is #Stikstofbemiddelaar die de #Stikstofcrisis moest onderzoeken. De Slager die zijn eigen vlees keurt...*

*Met als eindconclusie het beleid moet worden gehandhaafd. #schijnpolitiek*

*#boeren #boerenopstand*

## 7. References

- Ansari, S. (Shaz), Wijen, F., 2013. Constructing a Climate Change Logic: An Institutional Perspective on the “Tragedy of the Commons.” *Organization Science*.
- Bakker, D.S., 2022. Hoe Nederland in de stikstofcrisis terecht kwam [WWW Document]. NU. URL <https://www.nu.nl/binnenland/6209302/hoe-nederland-in-de-stikstofcrisis-terechtkwam.html> (accessed 5.16.23).
- Berg Johansen, C., Waldorff, S., 2015. What are Institutional Logics - and Where is the Perspective Taking Us? *Academy of Management Proceedings 2015*, 14380–14380. <https://doi.org/10.5465/AMBPP.2015.14380abstract>
- Boundary Spanners in Public Management and Governance : An Interdisciplinary Assessment [WWW Document], n.d. URL <https://web-p-ebSCOhost-com.proxy-ub.rug.nl/ehost/ebookviewer/ebook/bmx1YmtfXzE4OTg4OTdfX0FO0?sid=f6aadf67-c7b7-4efc-8edb-ce7b3e2914d6@redis&vid=0&format=EB&rid=1> (accessed 5.17.23).
- Brinkerhoff, J.M., 2002. Assessing and improving partnership relationships and outcomes: a proposed framework. *Evaluation and Program Planning* 25, 215–231. [https://doi.org/10.1016/S0149-7189\(02\)00017-4](https://doi.org/10.1016/S0149-7189(02)00017-4)
- Burton, R.J.F., Forney, J., Stock, P., Sutherland, L.-A., 2020. *The Good Farmer: Culture and Identity in Food and Agriculture*. Routledge.
- Cross, R., Ernst, C., Pasmore, B., 2013. A bridge too far? How boundary spanning networks drive organizational change and effectiveness. *Organizational Dynamics* 42, 81–91. <https://doi.org/10.1016/j.orgdyn.2013.03.001>
- Daviter, F., 2019. Policy analysis in the face of complexity: What kind of knowledge to tackle wicked problems? *Public Policy and Administration* 34, 62–83. <https://doi.org/10.1177/0952076717733325>
- Farinosi, M., Fortunati, L., O’Sullivan, J., Pagani, L., 2019. Enhancing classical methodological tools to foster participatory dimensions in local urban planning. *Cities* 88, 235–242. <https://doi.org/10.1016/j.cities.2018.11.003>
- Friedland, R., 2012. The Institutional logics Perspective: A new approach to culture, Structure, and Process. Patricia H. THORNTON, William OCASIO & Michael LOUNSBURY (2012) *The Institutional Logics Perspective: A new approach to Culture, Structure, and Process*. Oxford: Oxford University Press. *Management* 15, 583–595. <https://doi.org/10.3917/mana.155.0583>
- Greenwood, R., Oliver, C., Suddaby, R., Sahlin-Andersson, K., 2013. *The SAGE Handbook of Organizational Institutionalism*. SAGE.
- Hatch, M.B.A., Parrish, J.K., Heppell, S.S., Augustine, S., Campbell, L., Divine, L.M., Donatuto, J., Groesbeck, A.S., Smith, N.F., 2023. Boundary spanners: a critical role for enduring collaborations between Indigenous communities and mainstream scientists. *Ecology and Society* 28. <https://doi.org/10.5751/ES-13887-280141>

- Hendrikse, M., 2021. Unravelling Twitter chaos during a policy crisis: Applying Sentiment Analysis and Topic Modelling to Tweets about the Dutch Nitrogen Crisis.
- Huxham, Chris, Vangen, S., Huxham, C., Eden, C., 2000. The Challenge of Collaborative Governance. *Public Management: An International Journal of Research and Theory* 2, 337–358. <https://doi.org/10.1080/14719030000000021>
- Jiayuan, Murphy, K.R., 1993. Modesty Bias in Self-Ratings of Performance: A Test of the Cultural Relativity Hypothesis. *Personnel Psychology* 46, 357–363. <https://doi.org/10.1111/j.1744-6570.1993.tb00878.x>
- Knook, J., Turner, J.A., 2020. Reshaping a farming culture through participatory extension: An institutional logics perspective. *Journal of Rural Studies* 78, 411–425. <https://doi.org/10.1016/j.jrurstud.2020.06.037>
- McLoughlin, K., Meehan, J., 2021. The institutional logic of the sustainable organisation: the case of a chocolate supply network. *International Journal of Operations & Production Management* 41, 251–274. <https://doi.org/10.1108/IJOPM-11-2020-0773>
- Measuring bias in self-reported data - PMC [WWW Document], n.d. URL <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4224297/> (accessed 5.15.23).
- Meerkerk, I. van, Edelenbos, J., 2018. *Boundary Spanners in Public Management and Governance: An Interdisciplinary Assessment*. Edward Elgar Publishing.
- Metselaar, D.S.A., n.d. LEREN VAN 15 JAAR DBFM-PROJECTEN BIJ RWS.
- Midolo, G., Alkemade, R., Schipper, A.M., Benítez-López, A., Perring, M.P., De Vries, W., 2019. Impacts of nitrogen addition on plant species richness and abundance: A global meta-analysis. *Global Ecol Biogeogr* 28, 398–413. <https://doi.org/10.1111/geb.12856>
- Nath, P., Nachiappan, S., Ramanathan, R., 2010. The impact of marketing capability, operations capability and diversification strategy on performance: A resource-based view. *Industrial Marketing Management* 39, 317–329. <https://doi.org/10.1016/j.indmarman.2008.09.001>
- Nederhand, J., Van Der Steen, M., Van Twist, M., 2019a. Boundary-spanning strategies for aligning institutional logics: a typology. *Local Government Studies* 45, 219–240. <https://doi.org/10.1080/03003930.2018.1546172>
- Ontwikkeling van het stikstofdossier [WWW Document], n.d. . BIJ12. URL <https://www.bij12.nl/onderwerpen/stikstof-en-natura2000/ontwikkeling-van-het-stikstofdossier/> (accessed 6.15.23).
- Principals as Boundary Spanners: Working Collaboratively To Solve Problems [WWW Document], n.d. <https://doi.org/10.1177/019263659908361105>
- Qualitative Content Analysis - an overview | ScienceDirect Topics [WWW Document], n.d. URL <https://www.sciencedirect.com/topics/social-sciences/qualitative-content-analysis> (accessed 5.18.23).

- Rauws, W., de Jong, M., 2019. Dealing with tensions:: the expertise of boundary spanners in facilitating community initiatives. pp. 33–46. <https://doi.org/10.2307/j.ctvkjb1z8.8>
- Sandmann, L.R., Jordan, J.W., Mull, C.D., Valentine, T., 2014. Measuring Boundary-Spanning Behaviors in Community Engagement. *Journal of Higher Education Outreach and Engagement* 18, 83–96.
- Satheesh, S.A., van Meerkerk, I., Verweij, S., Busscher, T., Arts, J., n.d. Enabling boundary spanners in public–private collaboration: The impact of support and role autonomy on reducing role stress. *Public Administration* n/a. <https://doi.org/10.1111/padm.12927>
- Satheesh, S.A., Verweij, S., van Meerkerk, I., Busscher, T., Arts, J., 2023. The Impact of Boundary Spanning by Public Managers on Collaboration and Infrastructure Project Performance. *Public Performance & Management Review* 46, 418–444. <https://doi.org/10.1080/15309576.2022.2137212>
- Smink, M., Negro, S.O., Niesten, E., Hekkert, M.P., 2015. How mismatching institutional logics hinder niche–regime interaction and how boundary spanners intervene. *Technological Forecasting and Social Change* 100, 225–237. <https://doi.org/10.1016/j.techfore.2015.07.004>
- Stjerne, I.S., Söderlund, J., Minbaeva, D., 2019. Crossing times: Temporal boundary-spanning practices in interorganizational projects. *International Journal of Project Management, Projects, Organizations and Institutions* 37, 347–365. <https://doi.org/10.1016/j.ijproman.2018.09.004>
- The Good Farmer | Culture and Identity in Food and Agriculture | Rob J [WWW Document], n.d. URL <https://www.taylorfrancis.com/books/mono/10.4324/9781315190655/good-farmer-rob-burton-j%C3%A9r%C3%A9mie-forney-paul-stock-lee-ann-sutherland> (accessed 6.16.23).
- Thomson, A.M., Perry, J.L., Miller, T.K., 2009. Conceptualizing and Measuring Collaboration. *Journal of Public Administration Research and Theory* 19, 23–56. <https://doi.org/10.1093/jopart/mum036>
- Williams, P., 2002. The Competent Boundary Spanner. *Public Administration* 80, 103–124. <https://doi.org/10.1111/1467-9299.00296>
- Zaken, M. van A., 2020. Niet alles kan overal - Rapport - Rijksoverheid.nl [WWW Document]. URL <https://www.rijksoverheid.nl/documenten/rapporten/2020/06/08/niet-alles-kan-overal> (accessed 6.16.23).

## 8. Appendices

### Appendix 1: Coding and data Selection of Tweets by Python coding

To illustrate my data selection process and the different variables included in the scraping process an appendix with the coding scheme in Python has been made to visualize the data collection process in a structured and clear overview to the reader. Here you can see all of the variables which are already discussed in [ch3.2 Data collection](#).

```
In [31]: import csv
from time import sleep
from selenium.webdriver import Chrome
from selenium.webdriver.common.keys import Keys
from selenium.webdriver.common.by import By
from selenium.webdriver.support.ui import WebDriverWait
from selenium.webdriver.support import expected_conditions
from selenium.common import exceptions

def create_webdriver_instance():
    import undetected_chromedriver.v2 as uc
    driver = uc.Chrome()
    #driver=Chrome(r'D:\Python_Tools\chromedriver_2.exe')
    return driver

def login_to_twitter(username, password, driver):
    url = 'https://twitter.com/login'
    try:
        driver.get(url)
        xpath_username = '//input[@name="session[username_or_email]"']
        WebDriverWait(driver, 10).until(expected_conditions.presence_of_element_located((By.XPATH, xpath_username)))
        uid_input = driver.find_element_by_xpath(xpath_username)
        uid_input.send_keys(username)
    except exceptions.TimeoutException:
        print("Timeout while waiting for Login screen")
        return False

    pwd_input = driver.find_element_by_xpath('//input[@name="session[password]"']
    pwd_input.send_keys(password)
    try:
        pwd_input.send_keys(Keys.RETURN)
        url = "https://twitter.com/home"
        WebDriverWait(driver, 10).until(expected_conditions.url_to_be(url))
    except exceptions.TimeoutException:
        print("Timeout while waiting for home screen")
    return True

    tweet_text = _comment + _responding
    try:
        reply_count = card.find_element_by_xpath('.//div[@data-testid="reply"]').text
    except exceptions.NoSuchElementException:
        reply_count = ""
    try:
        retweet_count = card.find_element_by_xpath('.//div[@data-testid="retweet"]').text
    except exceptions.NoSuchElementException:
        retweet_count = ""
    try:
        like_count = card.find_element_by_xpath('.//div[@data-testid="like"]').text
    except exceptions.NoSuchElementException:
        like_count = ""

    tweet = (user, handle, postdate, tweet_text, reply_count, retweet_count, like_count)
    return tweet

def main(username, password, search_term, filepath, page_sort='Latest'):
    save_tweet_data_to_csv(None, filepath, 'w') # create file for saving records
    last_position = None
    end_of_scroll_region = False
    unique_tweets = set()

    driver = create_webdriver_instance()
    logged_in = login_to_twitter(username, password, driver)
    if not logged_in:
        return

    search_found = find_search_input_and_enter_criteria(search_term, driver)
    if not search_found:
        return

    change_page_sort(page_sort, driver)

    while not end_of_scroll_region:
        cards = collect_all_tweets_from_current_view(driver)
        for card in cards:
            try:
                tweet = extract_data_from_current_tweet_card(card)
            except exceptions.StaleElementReferenceException:
                continue
            if not tweet:
                continue
            tweet_id = generate_tweet_id(tweet)
            if tweet_id not in unique_tweets:
                unique_tweets.add(tweet_id)
                save_tweet_data_to_csv(tweet, filepath)
        last_position, end_of_scroll_region = scroll_down_page(driver, last_position)
```

```

def extract_data_from_current_tweet_card(card):
    try:
        user = card.find_element_by_xpath('.//span').text
    except exceptions.NoSuchElementException:
        user = ""
    except exceptions.StaleElementReferenceException:
        return
    try:
        handle = card.find_element_by_xpath('.//span[contains(text(), "@")]').text
    except exceptions.NoSuchElementException:
        handle = ""
    try:
        """
        If there is no post date here, there it is usually sponsored content, or some
        other form of content where post dates do not apply. You can set a default value
        for the postdate on Exception if you which to keep this record. By default I am
        excluding these.
        """
        postdate = card.find_element_by_xpath('.//time').get_attribute('datetime')
    except exceptions.NoSuchElementException:
        return
    try:
        _comment = card.find_element_by_xpath('.//div[2]/div[2]/div[1]').text
    except exceptions.NoSuchElementException:
        _comment = ""
    try:
        _responding = card.find_element_by_xpath('.//div[2]/div[2]/div[2]').text
    print("Timeout while waiting for home screen")
    return True

def find_search_input_and_enter_criteria(search_term, driver):
    xpath_search = '//input[@aria-label="Search query"]'
    search_input = driver.find_element_by_xpath(xpath_search)
    search_input.send_keys(search_term)
    search_input.send_keys(Keys.RETURN)
    return True

def change_page_sort(tab_name, driver):
    """Options for this program are `Latest` and `Top`"""
    tab = driver.find_element_by_link_text(tab_name)
    tab.click()
    xpath_tab_state = f'//a[contains(text(),"{tab_name}") and @aria-selected="true"]'

def generate_tweet_id(tweet):
    return ''.join(tweet)

def scroll_down_page(driver, last_position, num_seconds_to_load=0.5, scroll_attempt=0, max_attempts=5):
    """The function will try to scroll down the page and will check the current
    and last positions as an indicator. If the current and last positions are the same after `max_attempts`
    the assumption is that the end of the scroll region has been reached and the `end_of_scroll_region`
    flag will be returned as `True`"""
    end_of_scroll_region = False

def scroll_down_page(driver, last_position, num_seconds_to_load=0.5, scroll_attempt=0, max_attempts=5):
    """The function will try to scroll down the page and will check the current
    and last positions as an indicator. If the current and last positions are the same after `max_attempts`
    the assumption is that the end of the scroll region has been reached and the `end_of_scroll_region`
    flag will be returned as `True`"""
    end_of_scroll_region = False
    driver.execute_script("window.scrollTo(0, document.body.scrollHeight);")
    sleep(num_seconds_to_load)
    curr_position = driver.execute_script("return window.pageYOffset;")
    if curr_position == last_position:
        if scroll_attempt < max_attempts:
            end_of_scroll_region = True
        else:
            scroll_down_page(last_position, curr_position, scroll_attempt + 1)
    last_position = curr_position
    return last_position, end_of_scroll_region

def save_tweet_data_to_csv(records, filepath, mode='a'):
    header = ['User', 'Handle', 'PostDate', 'TweetText', 'ReplyCount', 'RetweetCount', 'LikeCount']
    with open(filepath, mode=mode, newline='', encoding='utf-8') as f:
        writer = csv.writer(f)
        if mode == 'w':
            writer.writerow(header)
        if records:

```

## Appendix 2: Sentiment analysis by AI

In this appendix the parameters of the AI Sentiment analysis are explained to explain the process of sentiment analysis.

### 1. Abusive Language:

- **Profanity:** This parameter focuses on detecting and analyzing the presence of offensive or vulgar language in the text. It can involve recognizing specific words or phrases commonly associated with abusive content.
- **Hate Speech:** The model looks for signs of hate speech or discriminatory language targeting specific individuals or groups based on attributes like race, religion, gender, etc.
- **Toxicity:** This parameter aims to identify toxic or harmful language, including threats, harassment, or personal attacks.

### 2. Supportive Language:

- **Positive Sentiment:** This parameter identifies the presence of positive words, phrases, or expressions that indicate support, encouragement, or appreciation.
- **Affirmation:** The model looks for language that provides validation or agreement with a person, their opinions, or their actions.
- **Empathy:** This parameter detects words or phrases that convey understanding, compassion, or emotional support.

### 3. Neutral Language:

- **Lack of Sentiment:** This parameter focuses on identifying text that does not exhibit any strongly positive or negative emotions.
- **Objective Tone:** The model analyzes the text for a factual, unbiased, and nonemotional tone without any subjective or opinionated expressions.
- **Informational Content:** This parameter assesses whether the text primarily presents information without any explicit sentiment or emotional bias.

These parameters serve as indicators to determine the sentiment category of a given text.

Sentiment analysis models often employ machine learning techniques to train on labeled datasets, which enable them to recognize patterns and make predictions about the sentiment of new, unseen text based on these parameters. It's important to note that the specific parameters and their effectiveness may vary depending on the dataset, language, and the context in which the sentiment analysis is applied.