MAKING A STATISTICS NETHERLANDS (CBS) DASHBOARD

How a Communication Platform reflects an Ideological Stance

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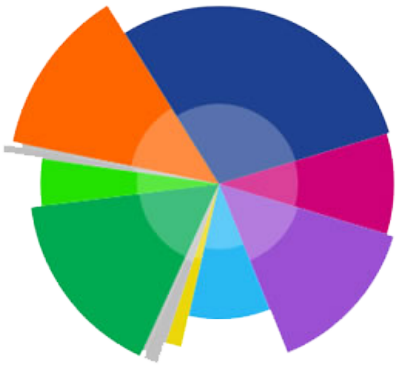

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Lena W. Tichem. *Making a Statistics Netherlands (CBS) Dashboard: How a Communication Platform reflects an Ideological Stance,* Research Master Thesis for the 'Media and Performance Studies' programme.

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LOCATION:
Media & Culture Department
Faculty of Humanities
Utrecht, The Netherlands

Voor TUF,
de vrienden die er zijn over hoge bergen en door diepe dalen.

Vere scire esse per causas scire
(To know truly is to know through causes)

— Francis Bacon

ACKNOWLEDGEMENTS

Thanks
to Chiel Kattenbelt,
for his profound interest in my topic and
his illuminating writing guidence.

Thanks
to Statistics Netherlands (CBS),
for allowing me access to the necessary resources
to conduct this study.

Thanks
to Edwin de Jonge,
without whom I could never have conducted
this study in first place.

Thanks
to the CvB employees working on the dashboard,
for allowing me to critically look at their output.

Thanks
to Nick Tukker,
for not remotely caring about the content of my thesis
and instead reminding me to do whatever makes me happy.

Thanks
to Djoeke Vielen,
for the numerous cups of Japanese tea when needed.

I'm grateful that my supervisor has guided me on this thesis journey and allowed me with the freedom to find my own way in this topic. The road towards this final thesis has not always been smooth, as combining different fields of study tended to create some friction on either side. Yet, the hurdles have made me even more grateful that I received so much support from my close friends during this process and I that brought this thesis to an end. In fact, this thesis research made me realise more than anything that I have a sincere interest in the cross-section of data, technology and ethics. This thesis has given me the confidence as well as the enthusiasm to start planning a PhD research on a related topic. Just for that, I did not want to miss this writing experience for the world.

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Part I

DEFINITIONS AND LISTS

ACRONYMS

CBS	Statistics Netherlands, Centraal Bureau voor de Statistiek
CCS	Central Commission for Statistics, Centrale Commissie voor de Statistiek
CvB	Centre for Policy Statistics, Centrum voor Beleidsstatistiek
DG	Director General
EC	European Commission
EEA	European Economic Area
EMOS	European Master of Official Statistics
ESS	European Statistical System
EU	European Union
ISA	Ideological state apparatus
NSI	National Statistical Institute
OS	Official Statistics
RSA	Repressive state apparatus
SNA	Statistics Netherlands Act, CBS-wet
UN	United Nations
UNSD	United Nations Statistics Division

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Part II

THE RESEARCH

ABSTRACT

Statistics Netherlands (CBS), the Dutch National Statistical Institute (NSI), disseminates Official Statistics. Its statistics have significant societal relevance as its statistics form the basis for policy making. CBS has an indirect influence on societal decision-making: if its indicators are misunderstood, groups in society may make misinformed and potentially harmful decisions. This thesis explains why and how institutionalised OS disseminations are ideologically value-loaded. On the basis of that, this thesis examines how ideological values in CBS are being communicated to the audience through dissemination design of a dashboard. In order to identify these ideological stances, an audit has been made of influencers on CBS's statistical production process. Through mapping the various influences on the work of CBS, an organisationally shared ideological values are identified, and these influences are critically assessed as to how they influence final disseminations such as the dashboard. I have also looked at a specific type of dissemination and study which affordances have been included in the dashboard design, to identify representations of various different actor aims and how these representations may affect the dashboard design. By relating to the design, I describe the ideological beliefs that are incorporated in that CBS dashboard.

1

INTRODUCTION

Statistics Netherlands (CBS)[1][2] is a Dutch governmental institute that produces Official Statistics. Official Statistics (OS) are statistical disseminations summarizing or describing the state of a country or region. CBS's aim is to produce and publish accurate numerical information on a variety of topics that are relevant for government, academia and the private sector. It compiles statistics on the Netherlands, and it contributes to statistical publications on a European level[3]. In their words, it publishes statistics on topics that affect society, individuals and organisations.

Statistics Netherlands Logo

At the end of the 19th century, the Dutch government wanted to develop more informed policies. The statistical office was established to provide the government with informative input for decision-making (*Centraal Bureau voor de Statistiek: Organisation*). Since its foundation, the number and variety of statistical indicators it produces has fluctuated over time, but overall mostly increased.

CBS's statisticians realise that numbers need to be placed in a relevant context in order for them to be rightly interpretable, as the calculation of statistics heavily relies on an extensive list of assumptions and assertions. However, there are indications that not all users of OS may fully grasp this subjectivity of statistical information. The following anecdote illustrates a notable incident at the communication department of CBS.

> A telephone operator oversees the phone line for statistical questions. Today, unemployment statistics were scheduled for announcement. That means that today, the official day of publication for those statistics, politicians, companies, individuals – anyone really – can call with questions on (the construction of) the unemployment rate.[4]

1 Het CBS heeft gastvrijheid verleend bij het schrijven van de scriptie, maar geen inhoudelijke bijdrage geleverd. De auteur is volledig verantwoordelijk voor de inhoud van de scriptie.

2 In Dutch: Centraal Bureau voor de Statistiek

3 CBS contributes to European statistics by delivering Dutch information to Eurostat, the European statistical office, which in turn compiles all EU and EEA nation's information into umbrella statistics.

4 For most indicators other than statistics sensitive to the stock market, the publication procedure is slightly more complex. Those statistics are usually shared under embargo with journalists and media outlets a day before the statistics are officially allowed to be published. This standard procedure allows journalists one day to prepare news items and ask questions about the statistics to ensure insightful interpretation of the numbers.

> The phone rings and the operator answers the phone. On the other end of the line, an unemployed individual is angry. Statistics Netherlands has stated that the Dutch population on average can spend more this year than last year and that the unemployment rate has decreased. The individual disagrees with this dissemination. What CBS says must be a lie: the caller cannot spend more than he used to last year and none of the unemployed individuals in his environment have found a job. The numbers must be wrong.
>
> The phone operator explains that the disseminations account for average country trends. Therefore, not all personal situations can be accounted for in a single number. Meanwhile, the caller becomes furious and threatens the employee. He experienced these statistics as ruining his life, arguing that politicians will now not take his unemployed situation as serious anymore as when the unemployment rate would have increased.

Although such incidents do not occur on a daily basis, they are not exceptional either. For any statistic, some organisations or groups experience it to work in their favour and some to work against them. The incident illustrates that communicating statistics is not a straightforward task. Communication of statistics is of two-sided concern, where the sender needs to communicate clearly, while the receiver needs to put effort into understanding what was being communicated. On the one hand, CBS is responsible for clearly communicating their statistics so that others can understand them. On the other hand, not everyone concedes that CBS describes aggregate populations rather than individuals. It is beyond the scope of CBS to educate all recipients on how to interpret nationwide percentages. For these reasons, CBS can never do justice to all nuances in a statistic in their disseminations. At most, it can aim to communicate assuming high school level of knowledge[5].

CBS's work is strongly defined by different external and internal influences, from legislation to politics to individual employees. For example, CBS is legally restricted in the methodologies allowed to reach their conclusions and how they present on them; e.g. CBS ought to refrain itself from subjective interpretations of the indicators (see for example The European Parliament and the Council 19.5.2015), of which one may wonder whether any objective interpretation even exists. The existence of these potential influences raises the question what values are reflected in CBS's statistical disseminations, aside from communicating the value of a specific indicator.

5 In the Netherlands specifically, the assumed minimum level of understanding is 'havo 5', sixteen-year olds.

Being a statistician myself, this made me wonder to what extent the statisticians are free to perform the methods and use the means they ideally would want to use, compared to how they do it in practice. In this thesis, I address how legal, institutional and productional frameworks shape how CBS employees operate.

CBS develops a number of output types in order to facilitate various aspects of statistical information. One output type currently in development is that of a *dashboard* in the programming language *R*. Dashboards can be used to communicate quantifiable information. Dashboards entail software created for a specific purpose that can contain visualisations or numbers, allowing users to draw their own conclusions (Few 2004, p. 3). Dashboards do not have a fixed format or size, nor are they limited to specific content. Therefore, a dashboard can be developed so that information can be taken from it by users with various interests. Dashboards do tend to draw around a particular topic to attain coherence and support deeper levels understanding of that topic[6].

The interest in dashboards rose because they tend to allow users to select their preferred contextual variables. For example, a user may want to see the unemployment rate, but only of the last five years. The user may also wish to study a line graph depicting the changes in working population proportions. A dashboard could depict all this information in one glance when requested[7].

What sets dashboards apart from most other CBS web publications is the absence of explicit textual interpretations on the statistics. The main reason for the absence of interpretation is that it can hardly be known beforehand what contextual variables users may be interested in. Offering all possible interpretations to a statistic would be practically impossible[8]. Instead, dashboards ought to contain enough information that users can interpret the provided statistical information by themselves (i.e. through legends, explicit variable definitions, etc). By presenting information in this way, the angry phone caller should ideally not have had a reason to become angry: dashboards allow for more nuanced stories to be extrapolated from statistical information than a single number could ever capture. Even in the absence of textual interpretation, the question remains nevertheless what values are incorporated in disseminations as dashboards.

Dashboards, or any dissemination in fact, reflects part of the underlying beliefs, aims and assumptions of CBS. McLuhan (1964) regards any medium as "an extension of ourselves" (p. 1), because of its inherent beliefs and values. From this perspective, a dashboard

6 For the time being, this definition of a dashboard suffices. A further elaboration of the concept follow in chapter 5.

7 With the only reservation that a user can only visualise the options that have been pre-programmed by developers: otherwise the respective option would not be available within the software.

8 For your interest, this phenomenon is referred to as a 'combinatorial explosion'.

can be seen as an extension of CBS and its inherent values and beliefs. McLuhan assumes that the difference between technology or software and a medium is that the latter has values and beliefs connected to it: once a technology starts shaping people's thoughts, feelings and behaviour, a technology no longer is a neutral being (Postman 2000, p. 10; McLuhan 1964, p. 1). In this light, a dashboard forms a medium through which CBS can practice what they preach. Given that CBS aims to produce high quality OS, one could expect CBS to make sure that that is also the impression they leave upon the people looking at and reading their disseminations, for example. Through the dashboard, as well as through all their other disseminations, CBS is visualising their underlying beliefs about what makes appropriate statistical communication. In other words, *ideological stances* shared by CBS employees are being reflected through design and content choices of the dashboard software.

This is what Verbeek (2008) calls *technologically mediated intentionality*, i.e. that "human intentionality takes place 'through' technological artifacts" (sic). Media designed for disseminating statistics also reflect a certain intentionality: if CBS chooses to include a functionality in the dashboard, it implies that it considers that particular functionality important. If CBS finds the feature important enough to conclude, it communicates this assigned gravity to users. Therefore, chosen software and the respective options it offers are key to understand why dashboards have been developed in a certain way.

To summarize, dashboards communicate statistics. But they also implicitly communicate values about those statistics and about what CBS considered appropriate statistical output. Therefore, studying the dashboard design and dashboard content also reveals something about what CBS assumes to be a priority in terms of societally useful knowledge. In other words, CBS assumes it can make a calculated guess on what society needs to know or wants to know. CBS's internal priorities are therefore strongly susceptible to needs and requests coming to them from the community.

In this thesis, I have conducted an ideology critical approach. I have made explicit what kind of choices underly the first self-developed CBS dashboard. For this, I have assessed what influence stakeholders have that CBS and the dashboard developers have to deal with. That influence has been related to design choices made in the actual dashboard. The stakeholder aims that are reflected in the dashboard have provided insights into what ideological values of the various stakeholders are prioritised.

To do that, I have mapped the production process of an R dashboard in CBS. The advantage of studying a new type of dissemination, is that the development is driven by extensive thought processes rather than conventions. This makes it more reliable to identify ideological values shared by the employees within CBS, compared to

disseminations that have been used over multiple years out of convention. Because the specific R dashboard is not yet published at the completion date of this thesis, I cannot provide detailed information on the specific dashboard and the topic it deals with.

Notable is that I have not conducted this ideology critical study with an outside perspective. I have been at CBS for about a year before starting this study, and I am a certified statistician. I have been trained in topics of Official Statistics specifically, so I can relate to CBS's processes, considerations, and methods. Because I conducted my research inside CBS, it means I observed the process, rather than only the final output medium.

This thesis is built up in several chapters. In the upcoming chapter, I mainly provide definitions. I elaborate on what CBS does as an organisation, what I mean with ideology, and which (external) factors could influence that ideology. In that same chapter, I identify various hierarchical levels of the production process that explain how beliefs can be identified in what CBS employees do. Also, I elaborate on my exact research questions for this thesis. In the third chapter, the values and beliefs of Statistics Netherlands are discussed on the basis of theoretically likely ideological influencers. In the fourth chapter, I state the aims set for the dashboard and use the concept of affordances to identify how those aims have been translated into design choices. Through those aims and design choices, I describe the underlying values inscribed in the dashboard. In the fifth chapter, the values in the dashboard are compared to the ideology ascribed to CBS. On the basis of similarities and differences, I describe what [actions/manipulations] they have used that lead to accordance or disagreement between ideology and dashboard design.

2

OFFICIAL STATISTICS AS AN IDEOLOGICAL FORCE FIELD

In order to understand ideological viewpoints and policy-based practices of Statistics Netherlands, one should understand what responsibilities CBS has. This chapter contextualises CBS as an organisation. Then, it explains how ideological stances are identifiable based on the organisation's identity as well based on their output. The connection is made between ideology and various levels of abstraction of what CBS does: i.e. through various hierarchical levels of production.

After elaborating on the organisation itself and its levels of production, I introduce the concept of ideology and how that concept can be used to describe the belief system behind CBS. Then, I further introduce the dashboard used as a case study in this thesis and explain how the framework of this chapter is insightful when studying the relation between ideology and the dashboard.

2.1 STATISTICS NETHERLANDS: AN ORGANISATION DESIGNED TO SERVE A PURPOSE

Official Statistics (OS) are all about aggregating statistical information over regions, however large or small. CBS calculates OS for the Netherlands. The Netherlands comprises of only relatively small landmasses, which are parts of larger reasons such as Europe and the European Union, and the world. In order to compare Dutch statistics to international ones, CBS operates in a framework of institutions in other countries that also produce and disseminate OS. Therefore, CBS should be discussed in relation to its international counterparts, such as OS agencies in neighbouring countries and internationally overarching initiatives such as the European Statistical System (ESS), which CBS is a part of. In the following section, it is explained what OS exactly are, and what sets CBS apart from many other OS agencies from an organisational point of view.

CBS produces and publishes OS. Dissemination of OS within Europe is legally allocated to National Statistical Institutes (NSIs)[1] (Eurostat and European Statistical System 2011, p. 2). NSIs are all assigned OS agencies operating in the ESS. As CBS produces OS within the European Union and is assigned to do so by the European Parlia-

1 In fact, a National Statistical Institute is a term for those institutes producing official statistics *in the European Union and ETFA*. Outside of these regions, similar organisations may be referred to otherwise. To avoid confusion and getting lost in detail distracting me from my main argument, I neglect this nuance in my main text.

ment and The Council, it too is an NSI. All NSIs produce or collect information to produce a selection of their regional indicators. Yet, the definition about what makes an indicator in OS overall is hard to define, as interpretations of a certain indicator can vary per NSI.

The domain of OS indicators cannot be defined unequivocally, other than that – by definition – they are produced by NSIs only. What all OS share, is that the calculation and dissemination is commissioned by a government. The NSIs need to make sure the statistical indicator is eventually being produced. In some countries, the data collection may be allocated to private research facilities or universities. However, the NSI is always ultimately responsible for the final result: it is the NSI's duty to deliver high quality, objective statistics, *not* of other agencies contributing to the collection or analysis.

Aside from being responsible for disseminating government assigned statistics, one can hardly associate other specific characteristics to the field of OS. Not all NSIs publish on the same topics. Also, NSIs may have widely varying definitions of any indicator they may produce along with other countries, due to cultural and historical differences or due to practical considerations. Also, not all statistical offices have access to the same methodological expertise and resources. Therefore, NSIs may have diverging methods to cover the same topic. All this variability in the way of working make it nearly impossible to come up with one all-encompassing definition of what OS entail[2] and what all NSIs do.

The Netherlands has one NSI, Statistics Netherlands. CBS has offices in three separate locations: Heerlen, The Hague, and Bonaire in the Leeward Antilles.[3] Overall, CBS has approximately 2000 employees. CBS is the only NSI in the Netherlands. This means that no other organisation is allowed nor able to produce statistical information on, for example, macro-developments in the Netherlands.

The relationship between NSIs and society tends to be complex. NSIs publish information on society, whether that entails individuals, companies or government. In terms of collection, CBS is dependent primarily on outside sources, aside from some data collection it does itself through surveys. The statistical institutes cannot produce any such numbers unless these other organisations contribute to shar-

2 In the past 1.5 years of doing research amongst official statisticians, I have noticed that it hardly never even seemed to be a relevant question what exactly the term 'official statistics' entails and what denotes its boundaries. What the statisticians considered more important than defining the range of their work (i.e. what is an official statistic and what isn't) is that the process of making an individual statistic was well defined and made explicit. In other words, the 'how' and 'why' are leading questions, i.e. its methodology, whereas the question 'what makes up an official statistic' (the philosophical question) is not so much.

3 The work in the Bonaire office is limited to data collection only and it has only three employees. Statistical production is outsourced to the offices in Heerlen and The Hague. Because this office is not related to statistical communication and production, this office is not spoken about on or referred to any more in this thesis.

ing sensitive personal or corporate information. For example, CBS requests financial information from private companies and information on population mutations from municipalities. The information NSIs disseminate is then used again by those same actors. The combination of dependency on external information and others being dependent on the disseminations, makes NSIs very sensitive to trust issues (Kuijlaars 1999, pp. 476-477): if they treat the shared information carelessly or share the provided information with the police or other investigation services, actors in society may not be willing to share information with NSIs, which in turn harms the quality of the statistics. Without societal trust, the accuracy of the disseminated statistics is likely to decrease.

The state has assigned the responsibility for OS to CBS only. CBS consults occasionally with government agencies how governmental data could ideally be collected and what definitions it should have. In terms of methodological approaches, CBS can be considered as being more on the innovative side, which plenty of technological resources available.

2.1.1 *Dependent Yet Independent: Is CBS Kept on a String?*

NSIs vary tremendously from one another from an organisational point of view. Italy, for example, has hundreds (!) of NSIs, all together responsible for compiling the country's OS. In Belgium, the National Bank is engrained within the NSI. As that Belgian NSI produces the nation's financial statistics, one may wonder whether the OS are collected with the interest of the National Bank in mind. Because of these characteristics, individual OS agencies can hardly be compared to one another. The case of CBS is therefore rather unique. Therefore, ideology and policies operated within CBS should be viewed in its own light, rather than contextualised in the field of OS as a whole. That also means that conclusions drawn in this thesis cannot be generalised across NSIs.

Although generalisations about NSIs and their way of working cannot be made, CBS can be characterised by itself. In CBS, statisticians recollect events and states of being in the past with their statistics. The employees express numerically what *has* happened, not what *may* happen: CBS produces mainly summaries, not prognoses[4]. The far majority of the statistics it publishes and the respective methods that ought to be used are broadly dictated by international agreements and laws in order for numbers to be comparable across nations[5]. To

4 There is one notable exception. CBS does make one single prognosis: the population size of the Netherlands. As they have access to information about all the Dutch citizens and mutations in the population registers, they are the organisation with all the required information to make a prognosis on that number.

5 An overview of their contemporary statistical programme, i.e. an overview of all statistics disseminated by CBS, can be found on their website.

illustrate, CBS is obliged to produce statistics requested by Eurostat, making up about 75% of all indicators it produces.

Eurostat's EU umbrella statistics should be based on similar assumptions and definitions for all the cooperating NSIs. Therefore, CBS has to adhere to definitions and practices set by Eurostat. Then, there are international agreements and legislations that define what values CBS should adhere to above all (United Nations General Assembly 29.1.2014; The European Parliament and the Council 19.5.2015; Eurostat and European Statistical System 2011). To be fair though, these agreements and legislative guidelines have followed discussions amongst statisticians regarding which points should be included in the law *in order to* produce the most accurately possible statistics. Regardless of whether individual NSIs have the best intent at heart and whether they have contributed to establishment of agreements, one may argue that CBS cannot truly act as independently as it legally is set to.

CBS has a rather specific relationship with government and the elected administration which defines the domain of their statistics and methods, which exemplify the difficulty of acting fully independent in practice. On the one hand, CBS is legally assured that it can do their job without political interference by its official status as an independently operating organisation within the government[6] ("Statistics Netherlands Act" 11-01-2011 / 01-01-2017, art. 2(3)). This status allows CBS to make decisions on their statistical programme, i.e. all indicators that CBS is responsible for and the frequency in which they are released, without having a minister assigning or approving what CBS may not or must do ("Kaderwet zelfstandige bestuursorganen" 1-1-2015, art. 1(a)).

Because CBS can make their own decisions on their statistical programme, it can operate fairly independent from and disconnected to contemporary political powers. The choices CBS makes internally about statistics are not directly impacted by the government, elected representatives, nor by private organisations. In short, CBS is politically independent.

On the other hand, CBS's work *is* indirectly affected by politics through money. Two thirds of CBS's budget are allocated to CBS by the Ministry of Economic Affairs[7] (EA). Because of this, CBS is legally assigned to work with the minister of EA as a superior. This minister allocates a sum of money towards CBS, but the minister cannot assign what statistics CBS should spend it on. Furthermore, the minister can-

6 In Dutch: Zelfstandig bestuursorgaan (ZBO)

7 To be precise, the contemporary name of the ministry is the 'Ministry of Economic Affairs and Climate Policy'. Historically speaking, CBS has been part of Economic Affairs (EA) and is officially controlled by the Minister of EA. All CBS employees I spoke to referred to EA only. On top of that, I wanted to avoid confusion about the role that climate policy may play in this discussion. Therefore, I refer to EA only in this thesis.

not influence methodological choices underlying the indicators, nor the specific implementation of the money in certain projects. Yet, CBS could be forced to adjust their statistical programme or underlying methods in order to comply with the available budget.

The other portion of the budget, one third, has to be acquired by CBS itself. How and through whom this money is acquired is unspecified. CBS can, and in many ways must, steer their policies in a way that it can attain this money flow. Practically, this portion of the budget tends to come from other ministries. Those can allocate the production of specific statistics to the NSI. Private organisations are also allowed to request CBS to work on a specific statistical indicator, but in practice they rarely make use of it. For corporations, it is beneficial to have more information on the market than other companies in the same sector. However, legislation dictates that NSI has to publish all their statistics to all their potential audiences at the same time. By allocating market research to CBS, corporations have to pay a significant sum of money. Yet, those corporations then do not attain a competitive advantage because of this publication obligation.[8] CBS is *by design* established to be politically independent through legislation. However, the complex funding situation illustrates that there is a financial dependency of CBS that should not be overlooked.

Because of varying defining organisational features, NSIs in multiple countries can be expected to attribute different meaning to varying statistical principles. In the Netherlands, a politician cannot directly command how statisticians ought to calculate statistical indicators. Therefore, CBS's work can be perceived as relatively politically unbiased. On the other hand, CBS is solely responsible for the Dutch OS. The organisation thereby receives a lot of authority and agency. Because of their perceived political independence, as well as being the single Dutch NSI, its influence on public knowledge on Dutch society should be acknowledged.

As an NSI, CBS is legally required to disseminate high quality statistics to serve its users. Therefore, the NSI needs to work in service of the numbers and methods more than in service of people to avoid accusations of conflicts of interest. Yet, without delivering accurate and useful information to users and the Dutch government, the work of CBS is practically useless. As any other organisation, CBS is subjected to direct and indirect balance of powers. Therefore, it is crucial to investigate how conventions, beliefs and political influences are reflected in their disseminations.

8 There is also another reason why corporations usually do not go to CBS directly for specific research, which is a bit beyond the scope of this study. CBS is by law not allowed to compete with private companies in their business model [@...]. If there are private companies specialising in market research for specific organisations, CBS may not offer services in that field because they are a governmental organisation.

2.2 IDEOLOGY AND POLICY: THE RELATION BETWEEN THOUGHT AND PRACTICE

In the previous section, I noted a number of characteristics that set CBS apart from many other OS agencies. Also, I explained their position within several political and structural influences. These political influences and international corporations can be expected to shape CBS's work, or at least the boundaries of what it is expected to do. In the following section, I provide further insight in the underlying influences mechanism by referring to the works of Antonio Gramsci and Louis Althusser.

Gramsci and Althusser's ideas are strongly inspired by the Marxist dogma. Althusser's notion of ideology may appear outdated and to have a socialistic orientation for contemporary society. However, his framework relates to how ideology can be put into practice, and specifically the relation between government and ideology in public organisations. Because this perspective so neatly fits in with questions on the role of government organisations in the state, this notion of ideology is still a relevant framework of reference to place CBS's ideology in.

On the basis of Althusser's work, I define how CBS conforms to their framework of ideology. Particularly, I relate ideology with the work of intellectuals and the influence on the state. On the basis of that, I elaborate on how the ideology takes shape in CBS. Once the meaning of ideology within CBS has been clarified, the relation between ideology and practice is made explicit.

The work that CBS currently does, requires primarily highly qualified personnel, in line with the increasing complexity of the statistical methods (Kuijlaars 1999, p. 284, p. 383). This has not always been the case. In the past, when data were mostly collected and processed without computers, the majority of CBS employees were lower-educated. With the increase of computerized collection and analysis, and more overall technologically advanced practices in the last few decades, so too has the level of education of its employees increased. From the foundation, academically educated people have been involved in the development of CBS. From the 1930s onwards, there have been occasional initiatives to attract more higher educated personnel (p. 284-285).

Contemporary CBS employees can be acknowledged as the experts in the field of OS. That is, the statisticians at CBS are the "dominant social group" in Dutch official statistics, they are professionals "in connection with the more important" of societal numerical information, in Gramsci (1971)'s framing of what he calls "intellectuals" (p. 9).

Gramsci (1971) considers intellectuals a social group who are *professionally* considered intellectuals (p. 9): they do intellectually demand-

ing work in terms of reasoning and understanding in an objectifying way. Gramsci identified a relationship between the 'upper class' and those who are considered the intellectuals. Without a high social status, extensive thought-processes in work-related settings are not usually appropriated to the people taking part in them. This notion is supported by the recent study by Bovens and Wille (2011), who noticed that highly qualified personal in Dutch governmental organisations still tend to work in positions with high societal impact (sec. 1.1).

With this definition, Gramsci (1971) acknowledges that there is a relation between acquired knowledge and presumed influence on society. He says that

> [t]he relationship between the intellectuals and the world of production is not as direct as it is with the fundamental social groups but is, in varying degrees, "mediated" by the whole fabric of society and by the complex of superstructures, of which the intellectuals are, precisely, the "functionaries". (p. 12)

This statement implies that intellectuals speak and do in order to ensure what that they do is being translated ("mediated") into a practical outcome (p. 10). The work in the field of OS is not performed for sheer interest: it provides a leading numerical perspective on the world. What official statisticians produce is perceived as matter-of-fact: their indicators are benchmarks to which the current state of a country can be held. CBS is the dominant social group in the intellectual field of OS. Therefore, the intellectual work of statisticians has implications on productive practices in society, i.e. the decisions companies make in terms of how and what they produce. Considering that the level of education of the CBS employees has fluctuated over the past hundred years, the relation between society and CBS will have fluctuated as well. For now, I assume that the current state is the one of interest though.

The notion of superstructure in the aforementioned quote comes from the distinction that Karl Marx makes between productive, economic forces (the 'infrastructure') and the 'superstructure'. The superstructure consists of legislation and the State on the one hand and ideology on the other hand.

By referring to the superstructure, Gramsci emphasizes that intellectuals have a relation to the economic infrastructure and production, i.e. that what is being produced. The relation he identifies is one in which intellectuals are positioned as a parental, overlooking force. However, the relation is argued to be more complex due to intellectuals

> being formed in connection to all social groups, but especially in connection with the more important, and they un-

> dergo more extensive and complex elaboration in connection with the dominant social group (Gramsci 1971, p. 10)

Intellectuals and intellectual organisations can arguably indirectly affect policy making and legislation. Gramsci (1971) argues that intellectuals are considered intellectuals, because of the social network they are in. He argues that intellectuals are considered knowledgeable by other social groups, particularly those of the dominant social group. The dominant social group happens to take key positions in the superstructure, namely the State and the law. Because the superstructure also entails legislative boundaries, the superstructure regulates the circumstances in which the infrastructure has to perform. Because those who are considered intellectuals are acknowledged by the superstructure, they are usually also indirectly influential in shaping legislation. This in turn affects a broad range of people in society, i.e. all those people who are working in the field of production.

However, legislation cannot provide boundaries for all human behaviour within a society. There is another force at work: ideology. To understand the relation of intellectual work, the state and ideology, I first describe a number of properties attributed to ideology.

As the role of intellectuals can only exist within those other social groups that acknowledge such a group to be intellectually superior over others, Althusser (1970) explains that ideology can only exist when individuals *believe* that it exists.

Ideology requires time to come into existence. One thought must be developed into consensual thought shared by more individuals. One thought develops into a series of thoughts and eventually into a belief system shared by many. Without time to develop, no framework of belief - and thereby no ideology - can crystallise.

Therefore, the existence of an ideology requires people reifying it. Without them responding to the ideas developed within a belief system, a common thought framework cannot be identified, and thus nor can an ideology. This also means that ideology can only exist in the middle of those individuals who adhere to its respective beliefs. Ideology must take centre stage in their lives, either in their personal of professional life. If people are not aware of the beliefs shared within an ideology, they can hardly be considered patrons. Without patrons, the ideology cannot further develop nor exist because then there would be no social group furthering it. Consequently, an ideology also cannot exist if it exists in human thought only: it must be put into practice by those who support it. If ideas remain in one's head, unshared and not leaving any physical traces, the ideas are not identifiable as a coherent belief system.

What does this discussion mean for ideologies within governmental organisations in general? Ideologies may consist of a set of ideas of which a certain group of people feels affiliated. The opposite can also be true: a group of people sharing similar characteristics may affiliate

themselves with a common ideology. This is how organisational ideology can establish itself: through shared work responsibilities and a shared work spaces, ideas, thoughts and believe are spread within the social group naturally distinguishable and identifiable by its employee base.

For CBS specifically, certain aspects related to the establishment and development of ideology are more noteworthy than others. Considering that CBS has a long history of aiming towards the goal of producing and disseminating statistics, its employees have evolved to serve CBS in line with that particular goal. It has been doing so by building upon the methodological and analytical practices within CBS, which have been there since its foundation. In that way, ideology has been created and is being sustained within CBS through the continued existence of the organisation. Hence, its employees are repeatedly backing CBS's main cause through the continuity of their work. Thereby, a social group has been created reinforcing CBS's ideology and purpose.

If an ideology is what binds a group of people together, the ideology must be acknowledgeable by outsiders too. Otherwise, mere thought is not translated into practice. An ideology cannot exist in abstract thought only: an ideology has to be translated into practice (Althusser 1970). It must take a shape in a way that is palpable, tangible or both. Considering that the work within CBS is centred around the goal of calculating and dissemination statistics, one can infer that publications reflect the belief system on which they are based. The question remains how ideas are then put into practice.

2.2.1 *CBS Building upon and Serving* as *Ideology.*

In the previous section, the characteristics of an ideology have been elaborated on, how such a belief system is contributed to and shared by a group of people. What is still missing is the relation of how ideology in a governmental organisation can be put into practice. Althusser (1970) explains governments tend to do so through specifically designed organisations. I elaborate on these organisations and explain how CBS fits into that respective framework below.

Althusser (1970) elaborates on how ideology in the superstructure is translated into practice: through an *apparatus*. In his view, any ruling state requires two types of suborganisations in order to maintain itself: Repressive State Apparatuses (RSA) and Ideological State Apparatuses (ISA). An RSA operates as a regulatory force. It sets explicit boundaries on what behaviour in society is acceptable and enforces those boundaries. One example of an RSA is the police, an executive state force which enforces the law. An ISA, on the other hand, assures societal conviction in the contemporary state system. An ISA shapes thought: it emphasizes and educates on what the state con-

siders important and necessary to know. It provides access to certain knowledge and not some other. Think, for example, of a school (Althusser 1970). Children are taught what the state presumes the children ought to know. This presumption is based on assumptions about what is necessary to know in order to participate in society and serve as accountable and beneficial citizens.

Aside from ISAs creating a foundation for societal ideology through education, they also aim to multiply their own thought systems to future generations and broader groups of people in this theoretical framework. The government, a dominant social group within a nation, uses ISAs to establish in society what it considers important or relevant. Because schooling is aimed to serve that nation, the younger generation is taught how it is best suited for that particular society. Given that that generation grows up with certain views on what playing a role in society means, it too is likely to share the opinion that the generation after them should engage in a similar type of education. This is in line with how ideologies develop over time: a group of people shares a certain belief, and new people, in this case children, are engaged with the same ideas. More specifically,

> [an ISA] drums into [citizens], whether it uses new or old methods, a certain amount of 'know-how' wrapped in the ruling ideology (French, arithmetic, natural history, the sciences, literature) or simply the ruling ideology in its pure state (ethics, civic instruction, philosophy) (Althusser 1970)

This is how ISAs spread ideological views from the state level to the broader society. An ISA represents the ideology of the ruling class. ISAs are, for instance, state funded and operated by civil servants. Usually they are even officially government institutions. Therefore, an ISA is very much an extension of the ruling class. Educational material in schools can be considered as thought shaping and thereby as a consolidation of state ideology into practice.

CBS functions like the ISAs in this theoretical framework on two levels. On the first level, the State uses CBS as an extension of itself for statistical knowledge production, and thereby the practices within CBS also reflect (a part of) the State's ideology. CBS aims to publish relevant information, but that is dependent on what is culturally deemed relevant. And what is culturally considered relevant is to some extent dependent on what the State communicates to its citizens to be relevant. Through that chain of logic, CBS's disseminations somewhat reflect the belief system driving the government. The fact that two thirds of CBS's budget is allocated by the government, supports that relationship more directly. The allocation of funding to certain statistical projects indicate what the government considers purposeful numbers. Aside from funding projects in general, the government also decides up the range of grouping variables to a large

extent. For example, because of how adulthood and retirement age are defined in the Netherlands, it makes statistical sense to define the age range of the working class in disseminations to be between 18 and 67. Only through CBS adhering to statelike definitions of people, the statistics are truly compatible to user's interests. More ethical questions can be raised through societal desires to publish statistics, for example, males and females. One could question whether that's a practical or rather a political decision. The fact that CBS has to make decisions on such practices to be coherent with the government implies that OS are used as an extension of state practices.

On the second level, CBS itself can be considered a dominant social group through their intellectual authority in statistics in the Netherlands. That means that CBS also functions as a 'State in statistics': it sets the tone of what are sound indicators and educates the public on what is the 'right' datafied information. Therefore, CBS also serves as the 'government' in its own statistical belief system.

CBS also shares other resemblances with ISAs. CBS is not strictly an educational institute, but they do set the baseline for quality statistics. From a societal perspective, CBS is the main provider of the nation's aggregate numerical information. In that sense, people rely strongly on the content of what they provide and use it as starting points for further investigations and creating insight for themselves. From a statistical perspective, it is seen as a statistical authority. Hence, their way of treating numerical information is exemplifying how other institutions should deal with their respective information.

Althusser's Marxist inspired framework is not a perfect fit for CBS. His notion of ideology does not account for independently operating government agencies, which CBS legally belongs to. Nor is CBS educating the Dutch on strictly government approved content: certain statistical indicators it publishes could condemn contemporary policies if certain trends are oppositional to what leaders have promised citizens. Still, this model does account for a relationship between CBS with the Dutch State as well as society. The model also explains how ideology can exist within an institution. For those reasons, this framework is relevant enough to apply it in this case.

ISAs are arguably not purely ideologically oriented. Althusser (1970) argues that all ISAs share a minor repressive component and all RSAs share an ideological component. In his view, the combination of repression and ideology is necessary to let citizens comply to the ruling ideology. In CBS, this translates to enforcing penalties on companies which do not submit their administrative financial information (on time). By enforcing penalties, CBS reinforces the idea that their statistics and consequent disseminations hold enough importance to charge companies for 'misbehaviour'. As long as an ideology is merely set of thoughts without consequences of not adhering to those thoughts, ideology will never take off. Some level of enforce-

ment is necessary to let one belief system become dominant over another one.

To sum up the previous argument, CBS reflects a great number of characteristics assigned by Althusser to ISAs. Therefore, CBS also shares some part of Dutch government ideology. But the relationship between CBS and ideology is more complex. The government affects through funding and legislation what CBS can do, even when it assigns CBS to make its own choices with regards to data analytics and communication. CBS affects public opinion and publicly available information through their disseminations. In that way, CBS can be considered to function as a State within a state. CBS is a 'State in statistics' within Dutch society. They set the standard of what statistical values are more important than others to adhere to by leading by example. CBS does not 'publish' its opinions in the strict sense of the word, but it is certainly able to set the agenda of public opinion. For example, its direct communication with media outlets strongly influences what citizens in the Netherlands know about, for instance, the economy. Through that agenda setting they could thereby affect policy making of companies and the government.

CBS's disseminations reflect ideology on various thought levels: ideology of the Dutch government, ideology of being a statistical authority, and part of them repressing other statistical thought that is not in line with their practice. These various levels of repression and ideology leave traces in disseminated (and non-disseminated) output.

Thus far, I have argued that intellectuals have a relation to productive forces in society. Also, I have addressed that CBS reflects what Althusser considers an ISA. Yet, I have not elaborated yet how specifically intellectuals carry out (state) ideology according to this framework.

The missing link up to now, is that it is in the benefit of intellectuals to remain part of or at least associated to the superstructure. As mentioned, intellectuals are part of the dominant social group. They are thereby also indirectly part of the superstructure. Through their social network, their views and statements are related to societal production. The intellectual position of influence is provided and strengthened through the interactions with other social groups. Therefore, intellectuals should remain supportive of the system in order to continually pertain to the dominant social group.

In that sense, intellectual development can be used in order to reach a higher level of (perceived) civilisation. For this, the connections need to be made between higher levels of civilisation and OS. In terms of CBS, this would translate to CBS publishing information on the Netherlands to affect public knowledge with – what is in their eyes – *right* and *correct* data. Objectification of statistics is used to steer public debate in the direction of 'facts'. Through the creation of relevant, necessary and accurate statistics, OS is assumed to provide

required knowledge in order for policy makers to raise the societal living standards to a higher level.

However, a belief that OS is a prerequisite, or at least a valuable tool, in the advancement in societal knowledge is key. Without that belief, the idea that official statistics is related to a higher perceived level of civilisation is non-existent. In other words, policy makers and society in general need to adhere that objectifying meaning to OS disseminations. Only then can they be seen as a means to reach a higher level of societal knowledge. Only then a higher level of civilisation in terms of knowledge and policy making can be reached.

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How could CBS ensure that its disseminations serve as objectified information which can be turned into further belief in the system? Based on the theoretical framework, one could expect that CBS encourages the recreation of people believing and working with OS. In other words, CBS recreates its own social group, or lets that group remain part of the superstructure through its authority and regard. The consequence of a larger group of people encouraging and standing behind the creation and usage of OS is that it automatically strengthens CBS's position as an institution through its acknowledgement by other groups (inspired by Gramsci 1971, p. 10). In other words, to believe in OS, the conditions have to be created in order to have OS be believed in:

> The essential point is that on condition that we interpret the imaginary transposition (and inversion) of ideology we arrive at the conclusion that in ideology "men represent their real conditions of existence to themselves in an imaginary form." (Althusser 1970)

Other Dutch social groups must support CBS's ideology in order for CBS to act according to the ideology and spread it accordingly to represent the view that numbers represent facts and thus that OS are necessary. For that, CBS's ideology must somehow reach those other social groups. In the theoretical frameworks developed by Gramsci (1971) (p. 10) and Althusser (1970), states are argued to use education as a leading means.

> One of the most important characteristics of any group that is developing towards dominance is its struggle to assimilate and to conquer "ideologically" the traditional intellectuals, but this assimilation and conquest is made quicker and more efficacious the more the group in question succeeds in simultaneously elaborating its own organic intellectuals. (Gramsci 1971, p. 10)

Because of how CBS 'educates' the general public, it shares characteristics of an ideological state apparatus. As an ISA or educational

SA, CBS sets the tone of what is considered acceptable, normalised and relevant information in society.

CBS does not use a specifically educational institute or create school programmes for the non-statistically oriented students directly. CBS does not 'own' schools or 'direct' schools outside of their own internal educational system. However, CBS educates society through its publications: without them, their audience could simply not have access to the same level of information, and its numbers can provide insight and trend analyses that other organisations cannot. Through the indulgence of its indicators in a wide variety of media outlets, CBS solidifies its position in the public perception and thereby in the public eye. Consequently, also its ranking in society's social groups are cemented. In other words, through its communication, CBS amplifies its own considered societal value, and thereby its own importance. CBS's cooperation with universities and research institutes also contributes to this 'education' of other social groups of its relevance and importance. In this way, CBS receives its authority for its accumulation of knowledge and expertise.

This ideological framework illustrates the political tensions underlying CBS. Although CBS is not strictly part of the ruling government, i.e. its administration, and should work independently of it, CBS is somewhat dependent on societal opinion on them. Without society positively evaluating their work and the necessity of their work, employees cannot remain part of the social group of intellectuals and superstructure, according to this theory. CBS needs to put into practice that which is in line with its beliefs. Simultaneously, it needs to stimulate the belief of others in them. These tendencies are likely to be reflected in CBS's production process and the consequent published output.

2.3 THE PRODUCTION-IDEOLOGY HIERARCHY

The question remains how strong political influences really affect the work within CBS, and how the interchange of them affect statistical disseminations. I have explained that education is a way in which CBS, and OS in general, can broadcast its values and create its own prominence. While Althusser (1970) addresses in his framework that ideology and states have to be put into practice, he does not elaborate on *how* exactly that happens. Although education broadly summarizes how CBS does that, it still needs to be made identifiable on a more specific level. This section explains how the production process within CBS is arranged, so that ideological values can be identified on its various levels.

I conceptualise various levels of abstraction relevant within CBS's production process to be able to determine the translation from ideology and policy decisions to statistical output. First, I provide a

more elaborate explanation of how one specific piece of output can arguably reflect ideological values. Then, I explain when exactly the ideologically-loaded choices are made while CBS is working on a dissemination. Lastly, I sum up how the relation between technology, ideology and practice can be made explicit through a hierarchy of the production process.

The relation between ideology and specific, practical output has not been made explicit enough. I have established that ideology only exists when it is somehow turned into practice. CBS's underlying beliefs are therefore recognisable in, for example, their disseminations. Althusser (1970) stated the relationship between ideology and practice but has not made explicit how to identify and describe the relationship.

Assuming a dissemination takes the shape of technology, media ecologists Neil Postman and Marshall McLuhan and philosopher of technology Peter-Paul Verbeek provide a framework for explaining the relationship between values and beliefs, and practice. A medium is defined as a technology with certain values and beliefs attributed to it: a medium can shape people's thoughts, feelings and behaviour as a consequence of the technology not being neutral (Postman 2000, p. 10; McLuhan 1964, p. 1). Because media inherently carry values and beliefs in its design and how people use it, McLuhan (1964) sees any medium as "an extension of ourselves" (p. 1). [A medium therefore reflects thoughts, feelings and priorities of the respective user]. Therefore, a dissemination could be seen as an extension of CBS and the ideology of CBS.

The choice for a certain type of technology is also telling in what values the organisation cultivating the technology wants to communicate. Postman (2000) argues that the usage of a technology inherently entails a belief that the medium has good virtue, at least at the time of choosing for it (p. 12). Therefore, he believes that studying medium in combination with morality or ethics is nearly a requirement (p. 11). A medium of choice also reflects what kind of relationship both the user and owner have with that particular medium. Verbeek (2008) elaborates on various relationships that humans and media can have. He argues that any type of relationship frames how users see and experience the world: otherwise they would not choose that technology. The fact that there is an inherent relationship, also means that the choice for a particular technology exemplifies what beliefs are associated with that technology.

How does the relationship between values in technology relate to the politics behind ideology? To study CBS's ideology, all the various political influences, i.e. society, superstructure, historical beliefs of employees, need to be discussed in how they shape the production process of a dissemination. In turn, the output also reflects values through its choice and respective design.

All choices regarding the shape and form of a technology (and successive medium) are made within the production space of CBS. To demarcate CBS as an entity and the interactions the organisation has with other actors, the concept of the *studio* can be used to make the boundaries of the statistical production workplace explicit. The studio is defined as a place where the 'director' can manipulate the objects in order to prepare them for communication with the outside world. The studio is a place to do research in (Rijcke 2014, p. 227) and experiment (Esner 2014, p. 125) with e.g. various dissemination styles. In this case, the studio is CBS as a whole, i.e. the statistical offices of CBS in The Hague and Heerlen together[9]. The manipulated objects form the data and information within CBS, that are eventually 'put on display' outside CBS through a publication. All choices made within CBS regarding design, content and manipulation *before* publication, are therefore considered part of the studio, which in turn comprises the whole production process.

To deconstruct how CBS's ideology is turned into practice, I have studied the production process of one of their disseminations, acknowledging both ends of this production spectrum: from the abstract and political to the practical.

I have defined various levels of abstraction regarding Statistics Netherlands in relation to what aspects could influence output ideologically. On all these levels of production, values are incorporated in one way or another. In the upcoming chapters, ideological characteristics per levels are discussed in turn. The production process of a statistical dissemination contains three hierarchical levels as I see them:

1. External: the superstructure, society and organisations commissioning specific disseminations, i.e. the (legal) framework within CBS operates[10], international agreements, societally held beliefs and values
2. Internal: employees within CBS, i.e. the people involved in production of a dissemination, such as statisticians and developers and the communication office
3. Practical: the design and content of a dissemination, i.e. functionalities, options and information/variables

Each level shapes to a certain extent what a final dissemination looks like. Each additional level is increasingly more specific and less abstract: while the external defines the more fundamental requirements and thereby outlines more philosophical starting points

9 The work in the Bonaire office is limited to data collection only and it has only three employees. Statistical production is outsourced to the offices in Heerlen and The Hague. Because this office is not related to statistical communication and production, this office is not spoken about on or referred to any more in this thesis.

10 The type of statistics that CBS produces, are called "Official Statistics". Much of the legislative framework that defines the regulations that CBS has to adhere to, are not so much the regulations for the specific institution, but rather for this whole working field (with the exception of the Dutch "CBS-wet").

of Statistics Netherlands as a whole, the practical level involves identifiable traits of a specific dissemination. How strong each level influences a dissemination may be fluid depending on the type of dissemination, who worked on it, and the time period. The aspects in this hierarchy that I have created, are in this thesis related to the ideological framework to critically assess ideological values in the dashboard dissemination.

CBS's production studio is roughly the equivalent of the internal and practical level. The internal represents the transformation of ideology into practice through people, i.e. the role that people play and the rationale between choices they make. The external level involve those external forces (i.e. legislation, clients or otherwise), which assign work and responsibilities to CBS. The ideology of CBS can be found partly on the external and internal level: while legislation defines what CBS gives importance to, CBS needs to give its own spin internally to it to turn that ideology into practice.

The levels of the hierarchy are inherently intertwined. What happens at the internal level, is inherently defined by how employees approach their work based on the external influences. Also, the legal framework in the external level defines what information should and may not be put in a dissemination, i.e. the practical. In other words, one can see the external as shaping the internal and the practical, and the internal as affecting the practical. Therefore, studying a dissemination for its underlying ideological values requires the acknowledgement of the hierarchy in the production process. One needs to assess the interaction between and within these three layers to explain how each layer shapes the final dashboard design.

2.4 THE CASE STUDY DASHBOARD: MOULDING OUTPUT TO ADHERE TO AN IDEOLOGY

The foundational framework outlined above is that the production process provides insight into values in the medium and organisation that develops it. This is built on the assumption that employees make choices in the production process that shape the output of a dissemination. Understanding the production process requires insight into the why and how of those choices. The choices applied to a dissemination can only be understood once characteristics of a disseminations have been studied. These characteristics are the elements that can be manipulated.

Therefore, a description of how the case study is used in this research follows. One dissemination of CBS has been used as a case study: specifically, an *R* dashboard. I point out why this dashboard was particularly suitable as a case stud to identify ideological values. Moreover, a foreshadowing is provided how relevant characteristics of the dashboard are to be determined. Then, I explain which char-

acteristics of the case study I believe to be of interest in relation to studying ideological values: i.e. its affordances. From there onwards, the connection can be made between these affordances and belief systems underlying CBS.

Stephen Few was the first person to define the term 'dashboard' in more academic terms:

> A dashboard is a visual display of the most important information needed to achieve one or more objectives; consolidated and arranged on a single screen so the information can be monitored at a glance. (Few 2004, p. 3)

As this definition does not remotely capture what features dashboards may or may not have, Few later identified a subdivision specifying the communicative aim. He identifies that *dashboards* are used "for monitoring what's going on", while *faceted analytical displays* "combine several charts on a screen for the purpose of analysis" (Few 2007, p. 1). He suggests that such displays include various (slightly different) perspectives on a particular topic by the inclusion of multiple, interactive charts.[11] He argues that each should have a remotely diverging design to achieve its aim.

When CBS designs a dashboard, it assembles various statistics into one digital application. The dashboards focus on one main topic, but display various aspects related to that topic. For example, a dashboard about transportation may provide statistics on car accidents, bicycle use and public transport costs in the same overview. Interpretation and mental conclusion drawing is however left to the user: CBS just provides their available information together. Linguistic interpretations are, theoretically, not included in a dashboard. In practice, that does not mean that explanations or conclusions are not included.

The dashboard can be related to ideology on the basis of its interface. Interfaces in this context are taken to mean that which is visually apparent to the users, i.e. what the dashboard users can see when the dashboard in front of them that either provides them with information or allows them access to other information. An interface reflects choices made regarding functionalities and options that are worth including. Because the design options are not pre-defined in the R dashboard, nor have conventions been established, this production process is particularly interesting to study for this thesis: no standard interface design is institutionalised yet. In other words, the interface is a point of current and continuous discussion. This dashboard production process, therefore, allows insight into the current ideological views instilled upon it, without being affected by arguments of convention.

11 Stephan Few does not define what he means with charts, but he describes that charts refer mostly to graphs and tables.

The dashboard studied for this thesis is in development at the Centre for Policy Statistics (CvB),[12] a section within CBS founded in 2002. Fig. 2.1 displays the organogram of CBS, in which CvB is a sub department of SDI (not further specified in this overview). The CvB has been set up around 2014 with the aim to enlarge the range and use of CBS's information (CBS 2013, p. 24). Employees of the Centre for Policy Statistics have built this dashboard and have agreed to compute the relevant statistics on behalf of an external non-profit client. This client provides certain information on individuals and institutions to CBS. CBS then enriches this information to summary and aggregate statistics covering the Netherlands and specified for various regions. As this client commissions this work to CBS annually, it has to pay for both the production and disseminating these statistics regularly.

A dashboard is assumed to have a couple of advantages over other dissemination types. For instance, it allows for updating of the underlying data, without having to rework the design of graphs, figures and databases. In the longer run, using a dashboard for dissemination of a specific domain of statistics is said to save development time for CBS. Therefore, it should also reduce the amount due under the line for the client.

Over halfway of the production period of the dashboard, the project for the dashboard development was suddenly put to a halt for reasons beyond CBS. Eventually, the client wanted to publish the dashboard at a later moment, which takes place after this thesis has been completed. This also means that this thesis describes a working copy of the dashboard, and not the final version.

The stalling of the project had consequences for this study. CBS does not share any portion of their internal statistical projects until the date set on the official publication planning. This procedure is imposed to avoid certain groups of people having an unfair competitive advantage through early access to statistical information. As it is unsure at the time of writing when this particular dashboard is disseminated, I may not specify the name of the client, nor the topic of the dashboard, nor (subsets of) the respective data set. Therefore, I refer to the dashboard by generic terms such as 'the dashboard' and the commissioning party as 'client'. Text that is sensitive in one of those categories is blurred in screenshots in this study. Visualisations included in the displayed dashboard screenshots are based on sample data, and not reflexive of realistic values of indicators.

The withdrawal does not make the conclusions of this thesis less valuable or insightful. Rather, this sudden break-off provides another side to the production process of statistical disseminations. The with-

12 In Dutch: Centrum voor Beleidsstatistiek (CvB). This section is part of the department of Statistical services and information (In Dutch: Dienstverlening en Informatieverstrekking, SDI), which is in turn part of the department of Socio-economic and spatial statistics (In Dutch: sociaal-economische en ruimtelijke statistieken, SER). The two organisation charts can be found here and here.

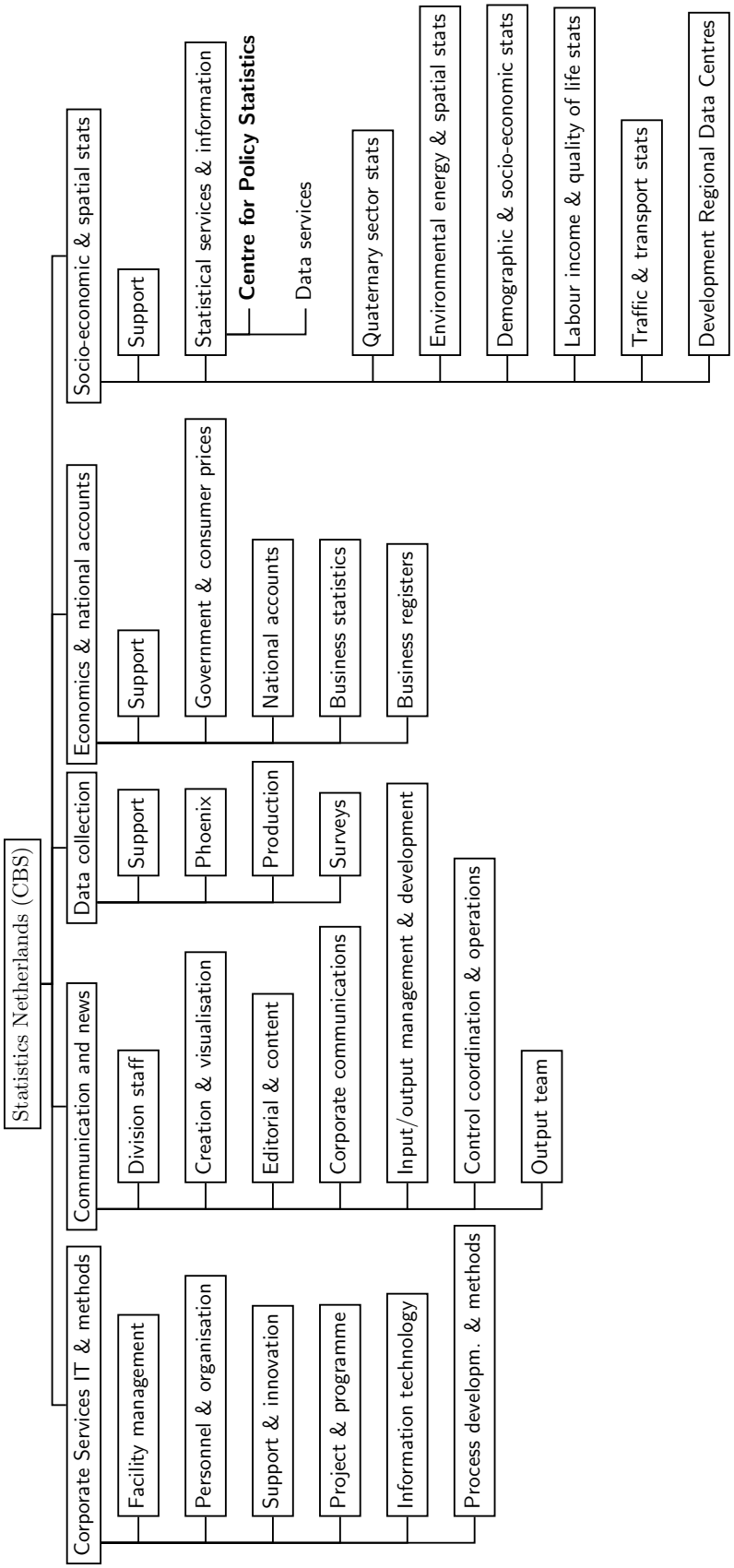

Figure 2.1: Simplified organogram of CBS

drawal may provide an insight into how the work of CBS may clash with external expectations.

The dashboard for this thesis is programmed in *R*. R is a programming language and environment aimed at computing statistics and creating data visualisations (The R Foundation 2018). Programming a dashboard from scratch provides freedom regarding design choices: even minor details can be adjusted through code. For example, alternative dashboard software *Tableau*[13] is less flexible in data visualisations , because you are restricted to the options incorporated in the software by the Tableau company. R allows for as many options as the developer is willing to spend time on in development. To mitigate the dashboard development, CBS draws upon software packages in R such as Shiny and Highcharts. Such packages included tested default settings to alleviate the workload.

2.5 THE DASHBOARD INTERFACE AS IDEOLOGICAL PRACTICE

Eventually, the interactions of the two higher levels of the hierarchy assimilate into a dissemination, bringing the discussion to the third level of the hierarchy. The design of a dashboard reflects interactions between the external and internal level. More specifically, the dashboard reflects an operationalisation of CBS's ideology as well as the result of internal discussions amongst employees on what content should be included in the dashboard.

The question remains how to identify performative aspects in the design. The third level of the production process requires studying characteristics of the dashboard. Many different aspects of the dashboard design are manipulable: a dashboard design in R can be created from scratch. Therefore, a variety of design characteristics could be studied in order to assess ideological values in the design. Thus far, I have established that CBS dashboards can be approached as an output established within a legislative framework and prevailing ideology: CBS's dashboards serve as one of CBS's ways to communicate about values and beliefs, through the publication of statistics in a specific way. Because CBS wants to communicate something with the dashboard, particularly the identifiable aims in a dashboard should be studied. Because this thesis makes the connection between ideology and performance with design, affordances form an insightful starting point. In this section, a brief description is provided on what

13 Thus far, CBS has produced only dashboards in Tableau, a third-party, point and click software. An example dashboard on Dutch product prices is included in fig. 1. An overview of the current Tableau dashboards of CBS can be found here. Because the R dashboard is the first one CBS is making in R, there is no such overview for the latter type of dashboards yet.

affordances are[14] and how they can provide understanding of CBS's beliefs and values.

I have already noted that technology contains certain values, and this holds for software as dashboards specifically too. Drucker (2011) explains that every medium and interface is built under specific assumptions that are important to make explicit. Without noting those assumptions in the production process, making judgements of the software or producer is hard to do at all (p. 2).

How could beliefs translate into a finalised design? In line with the underlying values at CBS, certain options and information in the dashboard should be given more emphasis or more easily accessible than others. Stanfill (2015) explains how certain priorities can be given in design to certain functionalities and information and not to others. It "operates from the premise that making something more possible, normative, or 'common sense' is a form of constraint encouraging that outcome" (p. 1060).

The choice on what functionalities and information are included in the dashboard can be assumed to be guided by the aims set to the dashboard. The relation between design functionalities and the aims of the organisations and its developers can be made explicit through the concept of *affordances*.[15]

Identifying affordances requires linking functionalities and aims (Hartson 2003): what does the dashboard *add* that a user does not have (access to) yet? What does the dashboard incorporate in terms of information or functionalities that may not have been there before? Identifiable affordances thus represent characteristics in the dashboard that have been included there with a certain aim. Because affordances are driven by aims and intended usage of a technology, rather than a specific technological platform, and therefore it can be applied to any type of technology (Bower 2008, p. 9). Thereby, the concept can be applied to dashboard interfaces too.

> [A]ffordances cut across the subjective/objective barrier. They are objective in that their existence does not depend on value, meaning, or interpretation. Yet they are subjective in that an actor is needed as a frame of reference (McGrenere and Ho 2000, p. 2),

as each user may have a varying aim as to why they are using the software.

A study of affordances can hardly take place without relating it to another topic of study specifically. Aims are always situated in a particular framework of reference, and this framework needs to be

14 More specific details on the concept of affordances and its operationalisation will follow in chapter 4.

15 More specific details on the concept of affordances and its operationalisation will follow in chapter 4.

satisfied. Varying scholars would be able to identify very different uses and thus different affordances of the dashboard depending on the chosen user perspective. As Drucker (2011) argues, "on its own a typology of graphical elements does not account for the ways in which format features provoke meaning production in a reader or viewer" (p. 6). It is all about seeing the graphical elements in a context. Specifically, the context of a user. The framework I look at is what the dashboard developers and the client want the dashboard to afford them.

By no means do I provide an exhaustive account of all the available or possible affordances the dashboard offers. Instead, I looked at what the dashboard *affords* CBS and its client on a statistical and ideological level. The value of the affordances concept is mainly in that it relates interface design to values and ideology. It does so by explicating aims, which are in many ways the intermediary step going from ideology to actual design.

A full elaboration of how I have identified affordances in the CBS dashboard follows in chapter 5. For now, it suffices to say that I have looked through documents and talked to developers to note the aims that were said to be incorporated in the dashboard. On the basis of that, I have examined how these aims are reflected in dashboard functionalities.

2.6 GUIDING RESEARCH QUESTIONS

Thus far, I have established a theoretical framework serving as a solid reference throughout the rest of this thesis. I summarize the most important points here. First, ideology entails a belief system that takes various (groups of) actors, time and interactions to take shape. CBS also has such a belief system, where some of its dependencies, i.e. superstructure and its user base, are affecting CBS's values to some extent. However, CBS employees take up the task of placing the OS ideology into practice, so they too have a strong relationship to CBS's ideology and what values are assigned priority over others. Thus, their work practices hold strong indications of the beliefs that underlie them. The aims incorporated in their beliefs are reflected in their disseminations. These values can be identified through affordances of the case-study dashboard. In this way, the production process of a dissemination reflects the values a specific team of CBS employees hold regarding the practice of OS.

Through identifying affordances, a relation can be made between the dashboard design and ideological views. The affordances reflect (some of the) aims of the developers. When ideology is translated into practice, one can assume that people's dominant belief system urges them into a certain direction. In other words, people's own ideological views provide directions for their behaviour. Their views shape

the aims that they have. Because affordances manifest aims, they reveal ideological frameworks underlying developer's design choices. The design choices are in turn actions in the production process in order to commit to the ideological framework.

Based on this theoretical framework, I address the following research (sub)questions in my thesis:

> How do ideological values of OS represent themselves in various hierarchical levels of the production process of the R-dashboard at CBS?

a. How do external influences define or emphasize statistical principles that are being used in CBS?
b. Which aims and affordances can be identified in the dashboard?
c. What do these aims and affordances of a dashboard indicate about the ideological values and statistical principles held by CBS and what they communicate?

In this thesis, I first question a) to c), after which I compile the insights gained in answering those questions to address the overall research question in the conclusion. I elaborate on each in turn. I assessed a number of external factors that affect or shape CBS's work and the expectations others have of its work. This lead to several statistical principles on the internal and external level. Second, I identify aims and affordances in the dashboard design that indicate priorities in the production process.

To substantially answer the main question, I then make connections between the various hierarchical levels based on the collected information. I assess what relationship there is between dashboard adjustments and perceived affordances, and how those perceived affordances in turn relate to the various internal contributors and the overall CBS ideology.

For clarity, hereby an overview of what to expect in this thesis. Chapter 3 describes how society and interorganisational relationships have shaped policies and ideological stances within CBS. In chapter 5, I describe the development of aims and affordances in order to describe the design part of the dashboard production process. In chapter 6, the discussion and conclusion, I relate all the aforementioned aspects of the production process to how ideological values are identifiable within CBS, and what questions this study raises for further research.

3

CBS: ONE DECISION REFLECTING THOSE OF MANY

I have established that CBS's ideology is initiated by the superstructure and sustained and further developed by its employees. This chapter elaborates on these, and various other influences that contribute and have contributed to the contemporary held ideological values within CBS. Specifically, the role of the held beliefs on the external and internal level of production is addressed. First, I discuss how an ideology is related to a means of self-expression and identity, and how insight in the ideology can lead to understanding of this expression of CBS's organisational identity. Then, it is explained how various superstructure elements hold values on data that frame the production of statistics. I dive into how current and past employees have shaped CBS's way of working and priorities from the inside out. I conclude with explaining which values primarily shape the work within CBS, and how one could expect those to be incorporated into disseminations.

3.1 DISSEMINATIONS FOR SELF-REALISATION

Given the theoretical framework, one can assume that ideology and practical output are related, i.e. one influences the other. However, between the relationship of ideology and practice, there is an intermediary variable that can explain *why*: self-realisation, the fulfilment of one's potential. One cannot speak about values and practice before elaborating on this intermediary. The physical space where self-realisation happens, defines the boundaries of the internal level of the production hierarchy: self-realisation takes shape on the internal. The practical is merely a means of portrayal of this sense of self-realisation. In other words, while I have given an overview of the various levels of production, the exact boundaries between the levels can only be set through examining this new variable. The space where self-realisation takes place in CBS, defines who and what belongs to the internal level of CBS, as compared what separates it from the external and the practical.

Self-realisation speaks to the sense of belonging of CBS. The concept accompanies thought convictions on *intention* to create matters of expression, substantial objects or output. In other words, ideology and production are intertwined: through production, CBS attains itself a means of self-expression and thereby communicating and (re)setting its identity.

3.1.1 *Self-realisation through Political Communication*

In this section, this relation between thought and practice is further elaborated on. I elaborate on self-realisation through communication with external actors: what does it mean for CBS, and how is it reinforced through the external. To relate self-realisation more specifically to production, I introduce the concept of the studio, to explain where this shift from self-realisation to performance takes place. Then I explain how this notion of the studio relates to the production hierarchy.

When expressing oneself, one makes a choice what is worth sharing. Self-realisation implies decision-making on what one thinks is more important than something else to communicate. This makes self-expression political. Information that is chosen to be shared – and thus also what is chosen not to be shared – is inherently political (Rogers 2006, p. 4). As expression is a means of sharing information, that too is political. This works on an individual level, but also on an organisational level. Rogers (2006) refers to 'informational politics' in institutions based on their intentions behind what the institutions decide they want the world to know (p. 2).

Notably, Castells (2009) informational politics in government organisations frequently take shape through the communication of the media.

> The key point is that electronic media (including not only television and radio, but all forms of communication, such as newspapers and the Internet) have become the privileged space of politics. Not that all politics can be reduced to images, sounds, or symbolic manipulation. But, without it, there is no chance of winning or exercising power. Thus, everybody ends up playing the same game, although not in the same way or with the same purpose. (p. 369)

The contemporary media infrastructure all around us, with numerous communication devices around software around us, including networks such as the internet media and those people using them. This implies that the autonomy of those in power are strictly ruled by those who get the 'right' information out in the open (p. 370). While this works on a nation-wide scale, it works similarly for a single organisation as CBS. The media frequently serve as an intermediary between government agencies and citizens (Rogers 2006, pp. 5-6).

Castells strictly emphasizes that media are not simply an extension of governmental organisations. As the anecdote in the introduction (chap. 1) exemplifies, messages may be (purposely) misunderstood by the receivers of those messages. Nor can one generalise amongst all media outlets: one news outlet may provide more relevant context and interpretation than another. Media may thereby steer interpretations in widely varying directions (p. 369). CBS cannot have full

control over how other channels communicate their information, nor about which numerical interpretations receive more attention than others. However, that does not change that a large part of the politicising of information happens *through* media.

CBS relies on media to get their information across too. On the one hand, it creates its own media, such as its corporate website and more specific medium types as dashboards, to frame their disseminations. On the other hand, journalistic media channels broadcast a representation of CBS's statistics society-wide. A medium CBS itself develops could differ significantly from the representation of the same information in external media outlets. Although these two indicate an important difference, the latter does not receive more attention in this study, as this thesis aims to investigate what CBS itself produces.

CBS's dashboard is a dissemination in the form of a software application that CBS shares with the public after development. Hence, the dashboard represents a part of the 'informational politics' of CBS. More specifically, data visualisations in the dashboard can be used with the specific intentionality to communicate an argument.

> Informational and statistical visualizations engender the rhetoric of clarity, precision, and fact, though they are, of course, constructed interpretations. When done well, they can make persuasive visual arguments, allow something new to emerge, or even be subverted for poetic effect. (Burdick et al. 2012, p. 43)

It is this intentionality that is being described on the external and internal level of production. However, the intentionality cannot be described without making explicit connections to the practical level. Given that CBS's dashboard is used to communicate information to people outside CBS, the question is what exactly this dashboard communicates, to whom, and with what aim. CBS's dashboard relies on a combination of visualisations and information in order to let users draw their own conclusions. The design and content of the dashboard form the framework of reference that users have of CBS. In other words, the self-realisation and intentionality are formed on the higher levels, but the practical is required to make it happen.

3.1.2 *The Studio: A Place to Create Meaning*

To explain how content and design are developed with the aim of communicating in mind, CBS should be seen as a place of thoughtful and creative and thoughtful production, a *studio*. In this place, disseminations are created by turning aims into matter. To understand who in CBS engages in self-realisation and how that translates into a dashboard, it is relevant to consider CBS in terms of the studio concept.

The studio is defined as a locational, productional concept originating in the arts (Esner 2014). A studio is a workplace, but often exceeds it. "[T]here is a strong argument for understanding the artist's studio as a kind of laboratory, a space of experimentation as well as (or even: rather than) personal expression" (p. 125).

CBS's purpose is to provide knowledgeable information and seeing CBS in light of an artistic bureau may appear random. Creative spaces do not imply that the work in the studio is done *without* careful considerations. Rather, studios can be seen as "almost sacred spaces in which to do research" (Rijcke 2014, p. 227). The 'art' that CBS disseminates is not so much defined by outer aesthetics, as one may expect from the field of the arts, but rather by its informative content. The studio concept captures that CBS conducts research on data and experiments to find the most suitable methodologies to calculate indicators.

While CBS may focus on the communication of information mainly, it does not mean that the shape it takes is not important. The content of disseminations may be defined by statistical research, CBS also decides upon the aesthetics of the design as a framework in which CBS's indicators are communicated. The studio concept acknowledges that the 'artists', statisticians in this case, disseminate the output of that research process and that the choice of a specific design framework and its respective aesthetical look indicates something about CBS as an organisation. In the studio, CBS conducts research mostly in order to decide *what* to communicate, but there is also the creative framework needed for CBS to decide *how* they want to communicate.

The studio, as a place of self-realisation, is similar to CBS's organisational facilities: all employees within CBS can be considered as working in the studio. However, CBS is not quite the same as a studio. For the dashboard case study of CBS, one could argue that the client is also strongly engaged or even part of the studio. The client namely engages in discussions on how CBS should frame their dashboard information, and thereby what CBS communicates to the world, i.e. how it expresses itself.

For the majority of CBS's disseminations, statistical research and communication are separated tasks at CBS. That is, one department dives into an indicator's subject matter and appropriate statistical methodologies. Another department improves, adds to and prepares this dissemination content to enhance clear external communication. This lets the statisticians focus on primarily on getting the intended number out of the calculations, and lets communication specialists concentrate on transferring information to the right people.

Creative output that *is not* disseminated, may say more about the workplace than what *is* disseminated. This is in line with Rogers (2006) view of informational politics. Or as Rijcke (2014) puts it: "[w]hat do artists put on display, and what do they hide from view?" (p. 226).

These choices require a sense of identity on behalf of CBS on what is appropriate and 'worth' disseminating. Esner sees "the studio as the stage of self-realization and self-presentation" (Esner 2014, p. 127): people in the studio can grant meaning and purpose from what they aim to produce and communicate. She argues towards the studio *itself* being a piece of art to admire and study because of what they do. What CBS publicly publishes on, for example, their website, is basically CBS's exhibition space. All of these documents are made publicly available by CBS. Therefore, the complete set of disseminations reflect CBS's self-image and what CBS aims to be through what they put on public display.

The studio helps to establish the role of various actors and the available resources in the production process as a means of self-realisation: the studio acknowledges that creativity and research are conducted inside by employees in line with the organisational ideology. However, the concept also acknowledges that CBS is a space that may be influenced by external forces: a creative team gets creative input or information from outside their workspace, which they may need to integrate in their way of working.

For the case study dashboard, research and communication are not dealt with by strictly different departments. The CvB collects the required data, applies the appropriate methodologies, and builds the dashboard that will be published largely as it is. Maybe the communication department will add a couple of lines of text for guidance. Moreover, the CvB is in direct contact with the client. One the one hand, the client is the external party that assigns a project and respective requirements to CBS. The client assigns the project and receives the output eventually as dissemination. On the other hand, the client also directly cooperates and exchanges views with the dashboard developer team within CvB on the design and content selections of the dashboard. Although the client is an organisation external to CBS, it is very much internal in terms of shaping what CBS will eventually communicate. Thereby, the client partakes in CBS's studio and thereby contributes to CBS's sense of self-realisation.

The studio concept helps to separate the performative acts of CBS on production from its external influences. The performative aspect is defined by the production with the aim to communicate. In those performative acts in production, the creativity, research and design take place. It is in the performance creation, i.e. the dashboard that decides what ought to be communicated. In that, inherently a decision is made about what is worth spending time on in production. And what is spent time on, is that which is believed to valuable or notable above other possible aspects of production, given a restricted amount of resources.

3.1.3 *Self-Realisation through Interaction*

Because a studio allows for self-realisation and self-presentation, producing disseminations provides meaning to both users and employees of the organisation. The users of statistical information see mainly how CBS presents itself through its output. The fact that people use CBS's output, reinforces CBS in what they are doing. Possibly to continue exactly how they are doing. At the bare minimum, it reinforces the assumption that CBS's work is purposeful enough to be beneficial to others. In other words, users provide CBS with self-realisation through their appreciation and dependence on CBS. That the self-presentation of CBS to the outside has this effect, in turn provides the people within CBS with a sense of self-realisation in their purposes and values.

This is particularly true regarding commissioned assignments. Interactions with the client steers CBS in a certain direction, reasserting decisions that the client approves of. Organisations assigning work to CBS have decided beforehand that they agree with CBS vision on work and hence its output. Otherwise, they would not have made the decision to work with CBS. Assigned work can be expected to more strongly encourage a certain sense of self-realisation, because of the innate endorsement.

CBS is the only Dutch NSI. That is, they are the only Dutch provider of OS. Therefore, one may argue that I overrate the innate endorsements in terms of importance. I belief this relationship with users holds to some extent at least, regardless of their dependency on CBS for OS information. The fact that users rely on CBS's information, does mean that they hold dear to the disseminations and grant CBS their responsibility.

Because informational politics frequently take shape through the communication of the media,[1] the media also require some attention. Although the topic of this thesis is not how other media *reframe* CBS's statistics, it does not mean that other media do not play a role in the development of CBS's ideology. When society or the government critique CBS's work, the foundation that CBS holds within the superstructure may crumble and thereby their position of intellectual influence too. Such critique can take shape in, for example, critical research articles. Journalists and news outlets writing positively or negatively on CBS can indirectly shape public opinion, and thereby urge CBS to continue with their work or make some changes. In this way, the media affect CBS's self-realisation.

If produced output directly or indirectly reinforces self-realisation, then the responses to CBS's work shapes what CBS decides to do inside its production studio. A choice of what is communicated and produced, inherently also means that a decision has been made about

1 As explained in section 3.1.1

what is happening inside the office. By deciding what to disseminate and how, CBS intrinsically indicates what is especially deserving of time and attention in the production process, in order to create that result.

Therefore, a published dissemination is a reflection of CBS's self-image: it is the part that CBS wants others to know about the organisation. This does *not* mean that CBS wants to hide everything that may cause them to receive criticism. It rather means that disseminations are reflections indicating what statistical aspects are spend time on more so than on others. To illustrate, the inclusion of wordily interpretations with many of their statistics explains that CBS prioritizes spending time in their production process on writing devoted interpretations and conclusions over something else it could have spent the same amount of money on.[2]

Seeing CBS as a studio allows for studying the production process of CBS as a way to achieve a certain self-image, namely that of being a statistical authority. This background vision surely affects what it considers appropriate output to put on display on its dashboards.

The question that remains is how all these external influencers can affect CBS's values, as well as the beliefs and positions CBS employees themselves bring to the table. Now that I have established the role of self-realisation as an explanatory variable between ideology and practice, I can describe how certain external influences relate to the external level of the production process.

3.2 THE SOCIETAL DESIRE FOR INFORMATION

Summarizing a complete culture is impossible,[3] and therefore my approach is to discuss two societal assumptions underlying the use of data in a societal context. Thereby, a context is created in which CBS can flourish.

Throughout my education in OS and my time at CBS, no colleague has explicitly mentioned that producing OS is only sensible in democratic nations. Until I came across art. 1 of the United Nation's Fundamental Principles of Official Statistics, which mentions that "[o]fficial statistics provide an indispensable element in the information system of a *democratic* society" (emphasis mine). This sentence does not state that democracy is a prerequisite for OS, but it does imply that OS are needed *in* a democracy. From there, it can be argued that a democracy cannot do without OS, and possible, OS cannot do without democratic polities.

2 It should be emphasised that the communication of statistics is actually one of the main pillars of CBS in the law, so this is not intended as a critique on CBS's spending habits.

3 Some would even say summarizing a culture is unethical because it implies pigeonholing groups of people.

As explained in section 2.2, the superstructure relates to ideological views and frames the way of working through resource allocation CBS. Divergent polities[4] could be expected to have varying relationships between government and citizens, as well as between the government and OS agencies. A democracy is one type of polity, which happens to be a system of governance that CBS is adhering too because politically the Netherlands is democracy.

Aside from the political realm, society and the state are positioned in a cultural realm. Laying out the whole of Dutch culture in impossible, and therefore I address one aspect that is directly related to the work of CBS. CBS collects quantifiable information and scientifically transforms that information into indicators. In this way of working, there is a basic underlying assumption such quantifiable information is informative and useful. The framework of *datafication culture* addresses this exact assumption. I studied the relationship between CBS and datafication culture in the Netherlands.

In the following sections, the relationship between CBS and OS in democracy and datafication cultures is discussed in turn.

3.2.1 *Democracies as Enablers of Official Statistics*

Why is the illumination of a political system important in a discussion on how to produce OS? The structure and content of superstructure as well as the responsibilities assigned to ISAs and RSAs, depend on the nation's polity and governance. The position that CBS takes in the governmental hierarchy (see section 2.1) follows from the political system that the Netherlands adheres to. The position of CBS as a governmental agency is a consequence of that governance structure. As long as this governance remains the political foundation, it is unlikely that CBS will abruptly adopt a considerably different position in relation to the government. In this section, I elaborate on why the influence and accuracy of OS is related to the type of polity in which they are employed. Currently, CBS is positioned in a parliamentary democracy.[5] The following sections explain what defines a democracy and what CBS's role is in it.

3.2.1.1 *A Democracy of Information and Accountability*

Schmitter and Karl (1991) describes democracy as a polity in which the relation between citizens and the governing agents is defined along the following lines:

4 A *polity* is a particular form or system of government of a nation.

5 Diving into the 'parliamentary' aspect of the parliamentary democracy would be suitable for this research. However, given the broad scope of this thesis to begin with, I leave the addition of this aspect for other researchers to investigate.

> Modern political democracy is a system of governance in which rulers are held accountable for their actions in the public realm by citizens, acting indirectly through the competition and cooperation of their elected representatives. (p. 76)

Simply said, democratic governments represent citizens or groups by making policies. Policies need not be in line with preferences of those whom they represent. Yet, democratic rulers can be held accountable for decisions they made on behalf of the citizens who elected them.

Providing a comprehensive definition of democracies is hard, as implementations can vary tremendously (Lipset 1959; Schmitter and Karl 1991, p. 76, p. 83-86). Schmitter and Karl (1991) list, for example, eleven characteristics on the basis of which "subtypes" of democracies can be differentiated (p. 83). They conclude that, aside from elections, citizens "should have an equal opportunity to express their preferences if they choose to do so" in all democracies (p. 83). However, in some polity implementations contribution is required, whereas in others it is optional. In all democracies, decisions have to be taken by people who are representing the citizens. However, whether a final decision depends on a majority vote, consensus or other form is not defined (pp. 83-84). Boyte (2005) emphasizes that the meaning adhered to democracy has also shifted over time. Boyte (2005), for example, argues that there is a trend in democracies in which civilians take up a more active role in contributing to policy-making through civic society initiatives, while in the past, this work was more likely to be left to governmental institutions only.

The inclusion of some form of elections comes back in most discussions on democracy. Therefore, I am taking that characteristic as a given in this discussion. Rulers are *elected* to be in charge in democracies. Because of the inclusion of elections, democracies imply an aftereffect: those in charge can continue with whatever they are doing as long as the citizens support them in doing so (Castells 2009, p. 369). Democracies invite accountability.

When there is accountability, there is responsibility and those who rely on that responsibility (Boyne et al. 2002, pp. 692-693). Also, there are expectation between the responsible and the dependencies of that responsible. Boyne et al. (2002) noticed that "research on accountability varies in the emphasis it places on the giving of account and the holding to account" (p. 693). While internal accountability refers to accountability between "superiors and subordinates within an organisation" (p. 695, quote of Steward 1984), external accountability "operates when public organizations give an account to, and are held to account by, external individuals or agencies" (p. 693). These external agencies entail both the political administration in charge as well as non-public entities (p. 694).

Accountability in democracies can take various forms. As citizens elected representatives to put them in a position of power, citizens can hold their representatives accountable for their deeds, whether they have introduced accomplishments or mistakes during their term. This regards external accountability. Winner (1989) says that "[a]ll great thinkers about democracy said that the key to democracy is access to information" (p. 110). Similar arguments are still being made in favour of spreading information as a way of democratisation (Flichy 1999, p. 37). The reasoning being that through the sheer access or availability of information, the government can be held accountable for their decisions and actions.

That argument does not hold. Winner (1989) argues that political representatives sharing information is *not* the same as acting democratically. The creation of a framework to share information is not either. Information itself does *not* necessarily invite critical investigation of a government. Totalitarian regimes, for instance, may apply state propaganda (p. 110): while state propaganda involves information shared by the government with its citizens, it is not necessarily information that helps the citizens to hold government representatives accountable for their actions. One could argue that accountability may not be a normalised political aim in a totalitarian regime. However, the bottom line still holds within a democracy: the level of dedication to critically inform citizens varies throughout implementations of democracies as well as for different individual government representatives. While sharing information is one mechanism that can encourage accountability, it is hardly a certainty (Boyne et al. 2002, p. 691).

Notably, it may even be advantageous for a government to publish information that will be negatively perceived in society. At some point, a politician wanted CBS to publish sensitive information on the government debts, as that revelation were useful for justifying why citizens would have to pay more taxes (Kuijlaars 1999, p. 260). OS were used here as an explanation for certain policy measures. Thus, it is not at all true that governments would only want to publish information that supports how well the current government representatives are doing. This example emphasizes again that all OS can be given a positive and negative swing, and that is in fact one of its inherent strengths.

During the Second World War (WWII), an opposite situation occurred in which the head of the CBS decided *not* to share information known within CBS. In WWII, the German occupier wanted to receive economic indicators, but it wanted to receive 'sole' access. The Dutch side needed not to know. On top of that, German leaders wanted to look into confidential personal records.[6] Kuijlaars (1999) had reason

6 Personally, I was impressed and humbled by what some CBS employees had done during WWII to protect people and values according to Kuijlaars (1999). Operating

to believe that the contemporary head of CBS declined in order to protest non-public statistics to be shared with the government, while it was the public duty to not withhold information and be involved in politics. "Political independence, objectivity and openness had after all always been CBS's device" (pp. 260-261, own translation).
Strictly speaking, WWII does not represent a democratic reign, the example is relevant to discuss nevertheless, as it indicates how much power CBS has with the information it has. It also presents how difficult it can be for the organisation to stay away from contemporary politics.

Information itself does not encourage holding representatives accountable. Rather, holding people accountable requires a decision being made on the basis of that information: are government representatives allowed to continue to do their job after having gotten insight into the information (Boyne et al. 2002, p. 693)? Because of this question, varying stakeholders require different information in order to hold other agencies and the government accountable for their work.

Accountability of a governance can be upheld by diving into information that can be used to check upon the functioning of the nation and thereby the policies executed through a government. Specifically, available information has to allow insight into the performance of a government and a state. That information should at least be of high quality (p. 693). What is considered 'good enough' depends on what the stakeholder wants to hold the government accountable to, what information is available, and the level of criticism they apply (p. 693). This may very well depend on cultural conventions.

Ideally, accountability, responsibility and democracy go hand in hand. Although implementations of democracy, and thereby the mutual relationship between these, may vary, these aspects are basic presumptions for democracy. Because accountability is so closely associated with democracy, so is the availability of critical information to hold government representatives accountable. Such information could, for example, be OS.

3.2.1.2 *Encouragement of Democracy through Official Statistics?*

Saying a democracy is a *guarantee* for accurate and representative statistics is an exaggeration. Democratic values are appreciated nevertheless. The purpose of OS is to provide insightful information on the state of a nation, its commodities and its citizens. In order to uphold to that purpose, democratic government values are welcomed for a number of reasons.

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during a period of war does not yield particularly 'standard procedures', and WWII has been quite a long time ago now, so I do not go into it anymore. Yet, I do think that some of the actions CBS contributed to in this period indicate the dedication of some of CBS's employees to values such as political independence.

In some governance systems, leaders may be inclined to want to have a hand in publicly available government performance information, such as disseminated statistics. Potential government influence on the available information does not assure the numbers' reliability or comparability. However, practicing democratic governance is often not as ideal in practice as on paper: in democratic states, similar points of discussion may be raised behind closed doors. It can never be promised that people in democratic polities, or any form of governance really, would not want to attempt to let NSIs' output work in their advantage.[7]

On the other hand, NSI operating in societies that adhere to democratic values can be more inclined to produce societally relevant and insightful OS. Serving in a democracy implies several accountability relationships. I specify the main ones of CBS, based on the aforementioned types of accountability:

- CBS disseminates information on the state of the nation and the government, so that the political administration in charge can be held accountable. A democratic administration itself ought to attest this want too, as this system of democracy put them in power in the first place.
- Democratic values of the state also reflect upon CBS itself. That is, CBS can also be held accountable and be asked to testify or explain themselves in the Dutch House of Representatives or in the media.

Those levels of democratic accountability take place on an external and organisational level. Accountability matters can also be attributed on the internal and practical level of production, in order to suit the societally shared democratic principles. CBS can be held accountable for its work, and it should actively account for its work. In terms of the options to hold CBS accountable, various possibilities arise. CBS does not have to defend themselves for many of their chosen methods: CBS has bookshelves full of manuals with specific guidelines as to how to compile certain (national) indicators that are requested by Eurostat. These indicators alone form the far majority of CBS's output. Eurostat can check CBS's work, e.g. their used statistical definitions and methods, when compiling the EU and EEA statistics. Individuals and groups in society can also hold CBS accountable, or put CBS in a position to be held accountable. CBS can be asked to be accountable by providing explanations in parliament. Also, journalists are

7 In Greece, the country in which the concept of democracy ironically initiated from, the government also steered the calculations done by NSI to work in their favour in terms of its values and trends. This happened before the recent Greek financial crisis in the 2000s. A new head of the Greek NSI corrected the mistakes. Because of him, Greece position on the financial market was weakened considerably. A link to an article for the interested reader. The foreman of the NSI has not been welcome in Greece since.

not denounced for being critical about CBS.[8] Although occasionally such measures can be taken, my experience is that there is quite a lot of trust in CBS as a producer of OS, since critical articles on CBS as a whole do not occur regularly. CBS also contributes to accountability by partaking in direct communication with society. If requested, the communication department offers statistical explanations through live streams with Dutch news and its call centre.

This discussion of democracy indicates democracy is not a strict requirement for the field of OS to function in. However, it does make it more likely that a government should want to cooperate and support the work within an NSI: the numbers could serve as a foundation on which to advance policy plans. The 'democraticness' of the nation can serve as a safeguard in that its NSIs publish accurate statistics on the state of a nation. In other words, it can vouch for the purpose of the NSI being its actual goal. If the NSI disseminates false or misleading information, the respective state can be held accountable for mismanagement, falsification of information, and deception. Democratic governance does not assure high quality publications. However, it can ensure that government representatives can be held responsible if the quality of statistical disseminations is below the standard of that country.

3.2.2 *The Data behind the Truth & Truth Adhered to Data*

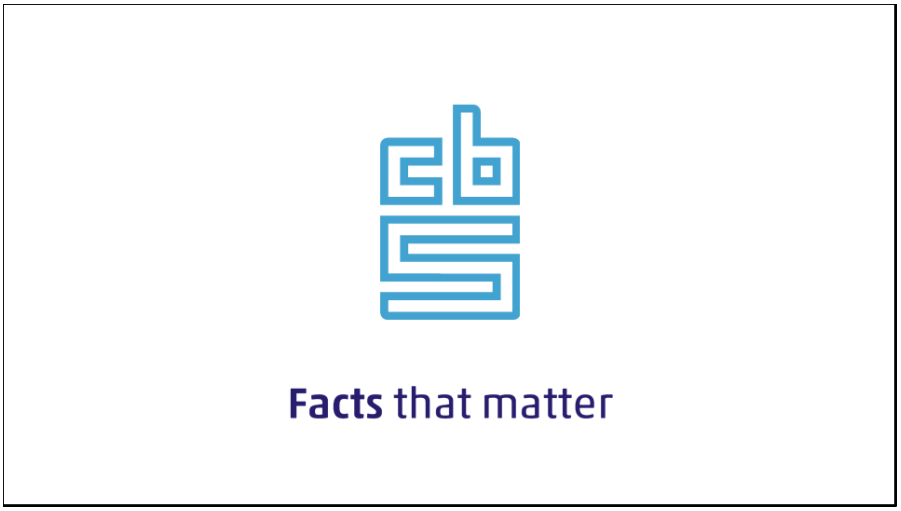
As explained in section 2.2, governmental policy decisions can be translated through apparatuses into societal beliefs in the long run. From the previous section, it has also become clear that there is a notion that OS are relevant in democracies, because of the information that high quality statistics contain. This assumption that data is informative, is part of a more general conviction that recording, retrieving and manipulating numerical data can be used for attaining new and storing old information.

The notion that numbers, statistics and indicators are required to make informed decisions, indicates a fundamental belief in the power and insightfulness of numbers. I dived into the underlying belief by placing the practice of data production in the context of *datafication*. Mayer-Schönberger and Cukier (2013) coined the term to summarize the practice to convert any type of information "into something that allows it to be recorded, analyzed and reorganized" (sec. 1st datafication chapter, sic). By placing the work of CBS in this context, I explain the societal relevance of an NSI such as CBS.

In its external communication, Statistics Netherlands uses the following slogan since at least 2015 according to the corporate communication department (see fig. 3.1:

8 See for example sec. 4.1.2 for an explicit case.

(a) Earlier version



(b) Contemporary version

Figure 3.1: House style Powerpoint slide with English slogan

> Statistics Netherlands: Facts that matter [CBS: Voor wat er feitelijk gebeurt] (sic)

With this motto, CBS hints at the belief underlying their position as a public service: the idea that numbers represent facts and thus represent a sense of objectivity. An internal strategy document in the 1960 even says that

> [t]he most important rationale for CBS is the need for neutral and reliable, honest statistical information. [De belangrijkste bestaansgrond voor het CBS is de behoefte aan neutrale en betrouwbare statistische informatie.] (Kuijlaars 1999, p. 476, own translation)

Both statements imply a belief that quantification of society has relevance. If only because having accurate statistical information always

leads to more understanding than having *no* information. In other words, political deceit is easier without any statistics on contradicting respective claims. OS intends to prevent that from happening through their indicators. And seeing that they are funded by the government, the government supports that such importance is given to data.

Mayer-Schönberger and Cukier (2013) emphasize how reliance on data significantly alters our understanding of the world:

> Seeing the world as information, as oceans of data that can be explored at ever greater breadth and depth, offers us a perspective on reality that we did not have before. It is a mental outlook that may penetrate all areas of life. [...] Tomorrow, subsequent generations may have a "big-data consciousness" – the presumption that there is a quantitative component to all that we do, and that data is indispensable for society to learn from. (sec. 'The datafication of everything')

The contemporary abundance of information and data urges societies to feel that they *can* and *should* fully grasp all event and circumstances they are subjected to, as well as project future societal developments.

Mayer-Schönberger and Cukier (2013) coined the term *datafication* to summarize the practice to convert any type of information "into something that allows it to be recorded, analyzed and reorganized" (sec. 1st datafication chapter, sic). Transforming any type of social of societal or personal action into quantified data can also be put under the umbrella of datafication (Dijck 2014; Ayankoya, Calitz, and Greyling 2014, p. 193).

CBS is doing nothing else than *datafying* the country: its statisticians collect, analyze and present quantified information on events, circumstances, and (groups of) people. By producing numerical information on the country, CBS provide us with an alternative worldview compared to if statistics on the nation had not been available.

In the aforementioned quote, Mayer-Schönberger and Cukier (2013) implies that the abundance of data also as a potential problem. The "oceans of data" may be overwhelming in nature. Although the quote refers to 'big data' mainly, its point still stands: data are used to make sense of the world.

The practice of datafication had steeply increased over the last decades, thereby the contemporary influence of CBS on society also expanded. The acceleration of datafication is owed to digitalisation. Digitalisation is about "turning analog information into a computer-readible format" (sec. 'Quantifying the world'). The information itself does not change through digitalisation, but it does make the information searchable through the inclusion of indexes (sec. 'When words become data'). Contemporary technology collects information in a computer-readable format almost automatically. Studying data

is therefore becoming less time-consuming (Ayankoya, Calitz, and Greyling 2014, p. 192). Datafying has therefore become a stepping stone to investigating behaviours with an ease that has never been possible before (Dijck 2014, p. 19). In turn, the increased digitalisation urges CBS to provide statistics sooner. That is, timelier and consequently at a time that is more relevant for the users (The European Parliament and the Council 19.5.2015, art. 12(c); Eurostat and European Statistical System 2011, prin. 13.3). As the societal demands of CBS increase, as well as the speed and ease with which statistics are disseminated, one can expect higher demands on CBS on behalf of governments, media outlets and other stakeholders.

So how come that data can shape our lives do much in terms of how we understand and interact with the world? The belief that numerical data offer information is reflected in trust in data. Etymologically, the term 'data' itself already contains a reference to facts: the term means "[that which is] given" in Latin, or simply said 'a fact' (Mayer-Schönberger and Cukier 2013, chap. 5 intro). A belief that is so inherently stuck with data, that CBS thousands of years later in their tagline tautologically states that their data *is* factual. Particularly statistics based on big data ignite the sense of "mechanical objectivity": because computers have generated the data and its outcomes, its results must be 'true' (Rieder and Simon 2016).

If data are used for informed decision making, users of indicators and statistics are basically validating statistical analysis practices, merely through their usage. Rieder and Simon (2016) acknowledge that policy-decision are increasingly based on wide-ranging types of data. Lycett (2013) explains this policy development through the attributed interest in 'data'. This interest can be traced to datafication being considered a value creation process for businesses and government agencies. As policy makers, private companies, journalists and academics turn to CBS for their information, one can argue that users experience disseminations as relevant and useful sources of statistical information. The decision by the Dutch government in the end of the 19th century to found CBS is very telling: apparently it was agreed upon that data was a value creation process over 120 years ago. That such a varying user base is interested in statistical disseminations indicates that the trust put on data is part of a greater contemporary, societal trend in Dutch society.

By disseminating OS, CBS contributes perceived informative value to society. Being an NSI, Statistics Netherlands is specialised in the collection, computation and dissemination of aggregate quantities, indicators and statistics on The Netherlands. To produce OS, CBS has access to, for example, the population register, governmental, administrative data sources, and company records. CBS is a very knowledgeable organisation regarding how much it knows about personal

and corporate information, through the combination of its data access and its comprehensive expertise in data analysis.

Notably, it is also up the government want to make use of this information. In periods when Dutch government did not acknowledge the potential value of OS, CBS did not receive as much recognition and resources. In certain periods when the government did not prioritize OS, international satisfaction about the Dutch statistics was low (Maarseveen 1999a, pp. 13-16). In some periods, a ruling government even used the reasoning that OS were quite unnecessary to justify budget cuts. The level of belief that a government placed into datafication and OS, affects how much space and possibilities CBS could get. CBS currently belonging to the world's best agencies indicate that currently datafication is perceived as a highly necessary and useful means to study the country.

In many ways, the increasing availability of data increases the need for CBS. The more available data, the more potential information, the more perceived informative value: a force to be reckoned with. Several decades ago, an employee even went as far as to say by automation of information and statistical process was purely based on attaining more quantitative information to base policy on (Kuijlaars 1999, p. 404). Without NSIs, politicians could potentially sweep together data suiting their own political aspirations, and thereby undermine the quality that statistics require for democratic accountability. Therefore, more data can in practice imply lesser understanding, if no-one caters to careful analysis and interpretation. The abundance requires specialists and a critical eye to select only the relevant part and making sense of that. The field of OS can fill this gab with the longevity of their experience with exactly that.

In order to deal with the dilemma of data abundance in combination with data understanding, critical and knowledgeable institutions as CBS are also needed. CBS statisticians are trained not to take data, nor the calculations inflicted upon them at face value, or as 'a given'. Statisticians being institutionalised as the intellectuals of this topic, can serve as a way to preserve data being used as a way to enhance democracy instead of undermining it.

The use of data assumes the belief that data is necessary and useful. The more data is being used, the stronger and more engrained in society this belief can become. What is for sure, is that the more data there is, the more the accountability principles underlying the democratically assigned role for NSIs become relevant.

Although it is complicated to perfectly identify the whole of societal culture that affects the practices and thereby the ideology of an NSI, nor can it be strictly proven that datafication culture had lead to the existence of CBS. It can, however, be noted that the belief that numerical data is certainly an underlying belief that affects both society

as well as CBS. This belief makes CBS's work be experienced as more important.

3.3 COMMUNALLY ESTABLISHED OS PRINCIPLES

The superstructure consists of two parts, the state and legislation. The first has been addressed through addressing the democratic polity and culture [supporting/engaging with] datafication in the Netherlands. The second part of the superstructure affecting CBS's ideology is the legislative part.

There are several national and international agreements that strongly impact the work of CBS's statisticians. The advantage of coordinating the field of OS internationally is that statistics of wide-ranging countries can be compared when they have been computed on the basis of similar underlying assumptions, values, definitions and methods. European NSIs are subjected to EU legislation and many of them signed international agreements on – what statisticians consider – appropriate OS practices. Therefore, agreements and legislations in many ways resemble the communal opinion on what comprises high quality statistics. For instance, statistical agencies send delegates to meetings of the United Nations (UN) and Eurostat[9] to discuss developments in the field of OS. These meetings can lead to new research projects or agreements. CBS too contributes to these meetings by sending representatives to these meetings to share CBS's insight into topics, after which they help draft upcoming plans and legislation. Aside from international collaborations and legislation, CBS is subjected to Dutch legislation. Again, CBS itself contributed considerably to drawing up the current legislation before the new laws were proposed in the Dutch House of Representatives (e.g. Kuijlaars 1999; Maarseveen 1999b).

To decide upon the most relevant legislation of interest, CBS's legislative module within the educational programme of the European Master of Official Statistics (EMOS) programme[10] were included. In this module, legal specialists at CBS teach students which legislations they consider of key importance for doing OS (i.e. "Statistics Netherlands Act" 11-01-2011 / 01-01-2017; The European Parliament and the Council 19.5.2015; Eurostat and European Statistical System 2011; United Nations General Assembly 29.1.2014). Having completed the EMOS programme myself, I am familiar with the respective legal documents and its contents. The legislative and agreement framework of those agreements are set out in the following sections.

9 On an EU level, there are, for example, 'working group meetings'. There are meetings on several layers, from very practically oriented teams to groups working on more visionary questions as what OS should entail in the far future.

10 This course programme consists of mini-courses on all aspects of statistical production by experts in the respective fields: from data collection to dissemination, and from international agreements to more subjective privacy considerations.

3.3.1 *United Nations, United Statistics, United Values*

The UN has a Statistics Division (UNSD). On the one hand, this division compiles global OS in cooperation with national and international OS agencies. On the other hand, the UNSD works on advancing OS practices by "develop[ing] standards and norms for statistical activities, and support[ing] countries' efforts to strengthen their national statistical systems" (The United Nations Statistics Division 2018). For the UN, various working groups meet regularly to discuss e.g. methodological, ethical and topical issues in relation to OS. These discussions have led to UN Resolution 68/261 on the 'Fundamental Principles of Official Statistics', principles on production and communication of OS that members of the UNSD agreed upon. I address the statements and principles in the resolution that relate to democratic values as those further frame the work of CBS. None of the principles deal with communication of data specifically. Logically, such statements can therefore not be discussed.

As a side note, the statistical principles are set for all the UN member states. Yet, the nations are not all held to the same standards in terms of how the principles are implemented. The principles are stated in a *resolution*, not a legally binding document. Rather, the official declaration is a display of sincere intent. Countries with extensive OS infrastructures are expected to take more advanced and elaborate measures to adhere to these statistics. Conversely, nations with few resources and a [partial] government may need to work on the basic democratic requirements needed for a statistical agency. Those nations are not expected to have attained the same level of OS production as the countries who have OS more engrained in the same time span. CBS has extensive experience with the production of OS, relatively many resources and much expertise, and is operating in a democratic society. Therefore, CBS is expected to work in line with all the set principles.

More so, because CBS is highly concerned with sending CBS representatives to UN meetings and actively contributing their opinions in those negotiations. CBS does so for various reasons. First, it is beneficial for CBS that the values it holds and methods it applies become amongst the international standards, rather than alternative ones. If CBS's ways of working are not considered mainstream or something to strive working towards, it would require CBS to reallocate resources and adjust their way of working. Secondly, partaking in the discussions allows CBS to remain up to date with contemporary debates: it provides CBS with insight what future developments it should anticipate on. Thirdly, CBS is held in high regards in the international field of OS, so partaking in discussions allows CBS to share its expertise with nations which aim to attain the same level. By engaging in conversation with colleagues worldwide, CBS is in-

cluded and can be influential in longitudinal, cross-country OS strategies. Therefore, CBS can be expected to be held accountable on how it implements each of the UNSD principles: some of its employees have had a hand in shaping these principles. Thus, it is reasonable to assume that the OS principles also underly practices within CBS.

For instance, the resolution states that indicators need to be "calculated on grounds of integrity and impartiality"[11] as a strictly guiding principle for calculating or disseminating anything. This is intended to avoid political interference colouring statistical interpretations (prin. 1).

As referred to in section 3.2, the UNSD explicitly refers to the need for OS in a democratic society. More of their principles refer to those elements. Fundamentally, it recognises that statistics allow for the recognition and understanding of societal developments and to let institutions react upon them through policy-making (consid.). Without upholding these principles, there can be no "openness and transparency" amongst states and amongst its citizens (consid.).

Transparency is laid out more concretely in multiple principles. On the one hand, there are specific requirements for communicating statistical information. "To facilitate a correct interpretation of the data, the statistical agencies are to present information according to scientific standards on the sources, methods and procedures of the statistics" (prin. 3). This reflects a clarity of interpretation on behalf of the user and requires a logical build-up of information. It requires balanced information too: that is, the full picture, not only the better half of the information.

Transparency is also translated into openness about operations, errors and critical examinations of statistical information. To evoke trust, "[t]he laws, regulations and measures under which the statistical systems operate are to be made public" (prin. 7). This resolution urges OS institutions to be open about their practices. It also requires an accountable and open government, i.e. a democracy. Coming back to the OS agencies, "[they] are entitled to comment on erroneous interpretation and misuse of statistics" (prin. 4). The principle seems to be applicable to CBS both having a critical look at their own work, as well as other people's work, as long as they speak from their statistical expertise. Thus, OS agencies are supposed to fare well in a democratic society, in which they too can be held accountable for their practices and by engaging with societal statistics.

Aiming to produce information useful for policy-making, OS requires the public's "trust", which is why

> statistical agencies need to decide according to strictly professional considerations [...] on the methods and proce-

11 Hence the requirement of democracy: without democracy, integrity of the statistics cannot be guaranteed.

> dures for the collection, processing, storage and presentation of statistical data. [prin. 2]

The emphasis on professionalism is closely related to working according to academic standards and as well as adhering to ethical considerations.

Because of the attention in this resolution on transparency to evoke trust, I expect to see a reflection and openness in CBS's disseminations, and if necessary a disclaimer on what information the dashboard does and does not cover. Particularly, I expect explicit variable definitions and a disclaimer about what information is included or purposely neglected in the calculations. In this way, CBS would encourage the sense that they aim to be transparent, they are trustworthy and open, if only because it encourages accountability of CBS as an organisation.

Although the characteristics on their own are sensible, the combination of them together may wring in practice. Because of the suggestion that its needs to voice concern regarding ethics, I do also expect CBS to play an active role in the public debate on OS and statistics in general. This includes CBS to be open about its own practices and methods, as well as that it allows it to comment on other people's statistical work if it is societally relevant and associated to CBS's disseminations. The principles give the impression that NSIs need to be involved. Yet, they are also supposed to remain independent from political influences, which may be troublesome to do when actively participating in the public debate.

3.3.2 *Legislation within The Dutch and European Periphery*

Aside from the UN principles, there are also two particularly relevant laws for the practices of CBS. The *Statistics Netherlands Act* (SNA)[12] institutionalises and establishes the role of CBS as a part of government, and elaborates on CBS's relation to other institutions and information sources (i.e. "Statistics Netherlands Act" 11-01-2011 / 01-01-2017). The SNA is a Dutch regulation, and thus only relevant for Statistics Netherlands. On the level of the European Union and EEA countries, regulation 223/2009 is relevant (The European Parliament and the Council 19.5.2015).[13] To some extent this regulation overlaps with the Dutch act. However, the EC regulation adds a framework for how OS in the EU context should be done. A regulation is a directive that *has* to be implemented. If not, there are consequences for a re-

12 In Dutch: Wet op het Centraal bureau voor de statistiek

13 The latter regulation has been translated into more practical guidelines for NSIs (i.e. Eurostat and European Statistical System 2011). While these guidelines are relevant for production and communication of disseminations, I left them aside, as they have been build based on the fundamentals outlined in the 223/2009 regulation.

pudiating nation. CBS is hence required to stick to the articles in this document.

The EC regulation frames what starting points CBS has to work from, making this regulation relevant from an ideological standpoint. The EC in this case is the state, and the NSIs can all be considered its ISAs. In this specific regulation, the ideological grounds on which the NSIs base their way of working are made explicit. The regulation does not prescribe specific methodologies and selections of data to be used per se.

Specifically, the regulation states that "[t]he development, production and dissemination of European statistics shall be governed by the following statistical principles": *professional independence*, *impartiality*, *objectivity*, *reliability*, *statistical confidentiality*, and *cost effectiveness* (The European Parliament and the Council 19.5.2015, art. 2(a-f)). The official definitions of these terms are listed in the respective article of the regulation. The relevant principles for dashboard communication are briefly expanded on below.

The principles of objectivity, impartiality, reliability and professional independence all somehow assume approaching statistics as a professional. That implies working according to standards used within the industry in terms of applying appropriate methodologies, definitions and sources. From a more ethical point of view, political interference should be avoided, and ethical boundaries maintained, for example by timing publication moments equally for different users.

The cost effectiveness principle deserves specific attention, since it overlaps with one of the main reasons why CBS wants to introduce more dashboards. The legislation states that

> the costs of producing statistics must be in proportion to the importance of the results and the benefits sought, that resources must be optimally used and the response burden minimised. The information requested shall, where possible, be readily extractable from available records or sources. (art. 2(f))

As this regulation illustrates, cost effectiveness can be implemented broader than only from the perspective of required money for the NSI. For example, the reduction of response burden[14] implies that the required time and money should be limited for the *data providers*, such as individuals or companies.

Comparing these professional principles for NSIs to the UN agreements, it is noticeable that many of them overlap. In fact, the main difference is that the EU explicitly mentions cost effectiveness. Cost effectiveness is so broadly defined, that in many ways it encompasses

14 Response burden can be defined as the effort required by a respondent to answer a questionnaire or to provide other information.

a whole branch of new principles, from minimising the response burden up to potential IT innovations that allow for easy database access.

4

THE ENGAGEMENT IN POLITICAL TUG-OF-WAR

In section 3.2, several external influences related to the superstructure and society have been addressed as a framework of assumptions and boundaries in which CBS operates. Following the steps of the production-ideology hierarchy outlined in section 2.3, ideological viewpoints are also contributed to on the internal level, the studio space of CBS. That is, within and by people of the organisation itself. This section elaborates on contributing influences of CBS's former and current employees.

In this section, I highlight two aspects of CBS's employees that affect CBS's ideology. On the one hand, CBS is defined by the majority of its employees, the statisticians. The employees' communal values have developed over time, and to get an idea of the highly held statistical principles, I studied historical accounts of CBS.

Aside from historically shared ideological stances within CBS, there are contemporary aims and strategies that CBS upholds. As the case study dashboard is being developed *now*, currently upheld strategies should receive particular attention in terms of assessing CBS's ideological framework. The contemporary aims and strategies are set out by a group of people within CBS, and the Director-General is responsible for implementing these strategies within his[1] term. This vision for CBS receives attention in my analysis. On top of that, I dedicated attention to responses in the media to CBS's current communication practices to provide a societal perspective on CBS's way of working. The media responses are relevant as they reflect CBS's exhibition space as perceived by the media. That in turn may provide insight into how CBS may be influenced by external sources in terms of self-realisation of what it produces within their studio (see section 3.1.2).

4.1 THE CORPORATE STRATEGY: ACHIEVEMENT OF RELEVANCE

The historical perspective acknowledges intermittent debates in OS production. Yet, historically developed ideological values do not explain all the continuity in CBS's work. Every couple of years, new priorities are set, shaping contemporary aims and motives in statistical decision-making, as suited in that time period and societal conditions. A contemporary vision does not necessarily reflect the same ideals as those engrained in historically evolving workplace conventions.

1 Given that the current DG is a man, I use male pronouns to refer to the DG.

To illuminate the contemporary aspect of the organisational ideology, I refer to CBS's strategic multi-annual plans. The Director-General (DG) is an influential person within CBS in this respect. The DG is assigned to implement the strategic plans as well the statistical programme[2] during his term [3] ("Statistics Netherlands Act" 11-01-2011 / 01-01-2017, art. 15.1, art. 18; The European Parliament and the Council 19.5.2015, art. 5a-2(a)). Consequently, he discusses with a team which statistics should be disseminated given the available resources and he allocates the remainder of the CBS budget to departments and internal projects, for instance statistical innovation ("Statistics Netherlands Act" 11-01-2011 / 01-01-2017, art. 15.2, art. 18; The European Parliament and the Council 19.5.2015, art. art. 5a-2(d)). Basically, the DG is responsible for CBS's overall 'business plan'. From 2014 onwards, the DG has been Tjark Tjin-A-Tsoi.

Tjark Tjin-A-Tsoi (ANP Photo)

The vision was laid out in plans for during the DG's first four-year term in office (i.e. CBS 2013, 2016). The DG remarked on the devised CBS strategic plans around the start of his term (in Sangen 2014, 2015, 22 January 2016, 22 January 2016; Hinrichs 2015). This plan outlines what aspects in the statistical programme and operations receive emphasis and why. Those documents serve as evidence of CBS's aspirations and concerns, if only because CBS wanted to have them enforced by the head of CBS.

The main points for the strategic agenda are internally summarized in 4.1. On top of that, the strategic agenda hangs on the walls within the organisation in the corridors to remind employees about these points. The wall signs of the last few years are displayed in 4.2.

4.1.1 *Strategies through Priorities*

The strategic multi-annual plan for 2014-2018 characterizes itself by being brief, to the point and lacking explanations or elaborations as to why certain priorities were chosen over others. Through identifying what statistical value aspects the plan addresses, an overview can be created of those aspects that employees within CBS thought should receive DG's priority. The statistical values that are not addressed, leave an impression what may not be on CBS's priority list.

A priority set out in the strategic plan is further international co-operation. From this document I distil that CBS is proud on CBS's international acclaim.[4] Cross-country collaboration is also framed as

2 The statistical programme outlines all the disseminations of CBS, including when and how often they are published.

3 It should be noted that the strategic plan was already divised *before* the DG started his job, so he is not solely responsible for its content. Yet, he is responsible for putting this plan into action.

4 In 1993, CBS was named amongst the best statistical agencies in the world by The Economist ("The good statistics guide. (Economics Brief)(rating government statistical agencies)" 1993; Maarseveen 1999a, p. 13).

Figure 4.1: Main Strategic Agenda Items

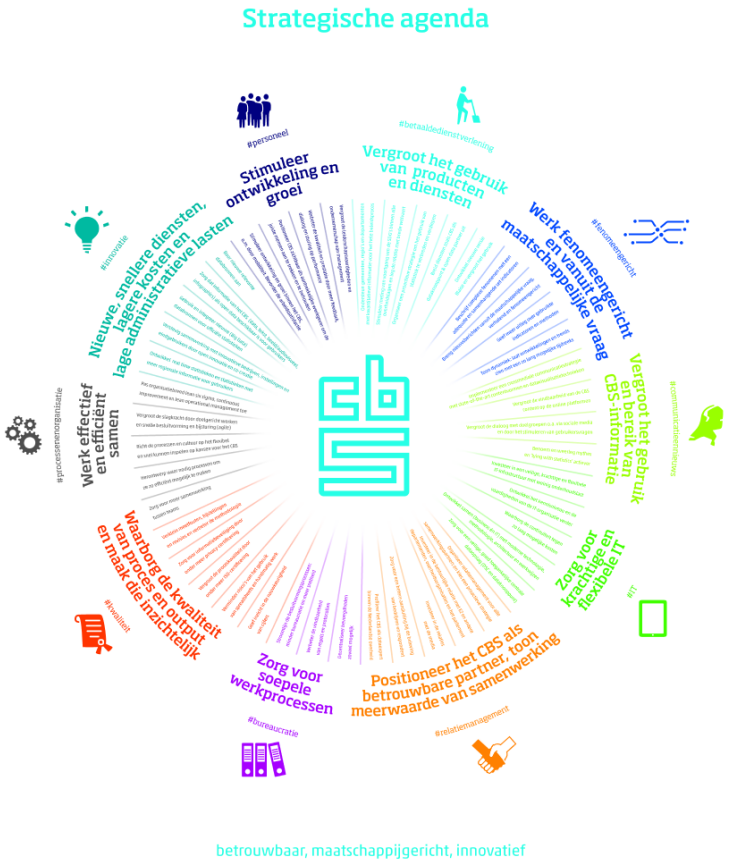


Figure 4.2: Current strategic agenda wall signboard

a strict necessity: CBS cannot deal with the all future challenges on its own, specifically as it has to deal with a scarcity of resources (CBS 2013, p. 29). The inclusion of the international cooperation in the strategic plan indicates that external level of the production ideology hierarchy rightly consists largely of international forces such as the UN and Eurostat for the EU.

What is further notable in CBS (2013) is the priority set to attaining more relevance through responses to societal needs and wishes. The organisations bets on publishing coherent and related[5] information to do so:

> CBS has as a job to produce and publish reliable and coherent statistical information, which should respond to the needs and wants of (Dutch) society [Het CBS heeft als taak het produceren en publiceren van betrouwbare en samenhangende statistische informatie die inspeelt op de behoefte van de samenleving] (p. 6, own translation).

Furthermore, is notable that the plan emphasizes the need to work on innovations and changes that prepare CBS for the future. Gaining more efficiency through e.g. economies of scale are encouraged (p. . . .). Although not explicitly related, efficiency measures could be valued to prepare for a future with increasing budget reductions in combination with working towards more IT innovations (p. . . .), notably:

- inclusion of new data sources
- reduction of processing time[6]
- actualising indicators[7]
- reduction of response burden
- encourage open data[8] and improve StatLine[9] accessibility

Through the inclusion of new data sources, various advantages can be obtained that are hinted at in the strategic plans. For example, the production of certain indicators could reduce in price by applying new data sources. This, in turn, could provide room for new indicators to

5 In Dutch: "samenhangend".

6 To given an indication that this development does have some urgency: currently, indicators may require up to four days full time to be computed. Considering that CBS has to stick to their publication planning, an accidental or circumstantial hickup halfway through the process can get them into severe problems.

7 Actualising means that indicators on a certain time period are published more closely to that respective time period, rather than later.

8 Open data are freely available datasets, which may be downloaded and interacted with and reproduced by anyone who wants to. CBS aims to have open data versions of all its internal data sets, although its information is anonymised and grouped to avoid issues with privacy protection.

9 StatLine is the free electronic databank of Statistics Netherlands. It provides access to anonymised datasets (i.e. open data) from CBS for research purposes. Statline is accessable through a webinterface, as well as through the R-package 'cbsodata'.

be disseminated instead. While processing surveys take up relatively much manual labour, collecting electronically stored data sources can ease automatization principles. Using more electronic data sources can be employed as a catalyser to reduce processing time, actualise statistics and reduce response burden at the same time. Automated systems and procedures can enhance an infrastructure to share data sets with users through, for instance, StatLine.

At first glance, those broad arguments for IT innovation may not seem remotely relevant for dashboard design nor communication, but nothing is less true. The listed IT innovations are arguably aimed to improve efficiency. Yet, the IT innovations are realised with the 'relevance aim' in mind.

> Investing in new types of services and the use of new communication channels and distribution channels are essential in order to remain fulfilling the role of the (Dutch) NSI. [...] Further improvement of the existing publication channels, i.e. the StatLine database and the website, are a priority. [Het investeren in nieuwe vormen van dienstverlening en het gebruik van nieuwe communicatie- en distributiekanalen zijn essentieel om de rol van het nationale statistische instituut te kunnen blijven vervullen. [...] Het verder verbeteren van de bestaande publicatiekanalen – de databank StatLine en de website – staat hoog op de agenda.] (CBS 2013, pp. 31-32, own translation)

The listed IT innovations are mostly implemented with the aim to communicate more societally relevant to users. Developing a new type of dashboard suits this innovation phase. First, a dashboard is a new communication medium and thereby opens possibilities for new channels of communication. Second, dashboards assemble a variety of indicators. IT infrastructures enable faster computation of the individual indicators and can provide an infrastructure that allows easier access to the required databases to have access to the respective information. One could wonder whether a dashboard would have been developed if IT innovation in combination with societal relevance had not been placed as high on the strategic agenda.

Fundamentally, the listed strategies all somehow deal with expanding communication means and/or resource scarcity. Allocating more resources to advancing technology and infrastructure is almost perpendicular to cutting indicators and providing contemporary resource processes with less funding. Priorities remarkably lacking in the interviews and multi-annual plan is assuring that CBS remains the highly regarded statistical office it currently is or attaining the quality of their current work. Efficiency is chosen over further improving accu-

racy and quality of methods. For employees within CBS, priority is set to outside communication more than internal quality improvement.[10]

Curiously, the strategic plan phrases CBS's aims as if the budget cuts are subjected upon CBS by the government. While it is true that the Ministry of EA wanted to reduce the cost of producing OS, the DG could have requested the minister to allocate more funding but did not do so. The document does not mention that detail. Whether the DG himself or the CBS employees who constructed the plan did not feel additional funding was necessary, is not clear. Regardless of who's behind this strategic plan, the main point is that CBS's focus is now on statistical reforms. Other than attaining societal relevance and saving money in the long run, the plans do not explicitly focus on *improving* statistical quality. Note that I emphasize improvement: the improvement may not be as highly regarded, but that does not mean that attaining CBS's current quality is not considered important.

4.1.2 *External Critique: Making or Breaking the Numbers*

Although strategic plans demonstrate the organisation's current concerns, it exhibits corporate communication: it is plausible that the bright side has been encouraged. Corporate communication is unlikely to contain critical side notes and may be ignorant of external judgement. Aside from those considerations, the production-ideology and studio framework acknowledge that external influences on CBS exist that could consequently influence CBS's thoughts, values and ideology.

For those reasons, I use this section to address some points of critique on CBS's way of working as pointed out by outsiders. External criticisms are important to consider. First, they provide insight into what is societally expected of CBS. Second, ideological values only exist when they are recognised by outsiders to the practice of the ideology (as explained in section 2.2). Since external criticism on the practices occur, the remarks also serve as a validation that the critics believe that CBS has a value system in place which its employees ought to adhere to. Points of disapproval in relation to the strategic plan are highlighted below.

Several articles in the media argued that neutrality in CBS's disseminations was not particularly achieved through the new communication guidelines it set out. The main argument revolved around the current emphasis placed on communication as in being in line with OS values. One line or reasoning is that emphasizing journalistic tendencies in publications can lead to confusion and consequently faulty interpretations. Journalist Bregman (2016) named several examples when CBS published an article with statistics responding

10 To emphasize what I mean: there is less emphasis on quality *improvement*, but that does not mean that quality itself is not considered important.

to news circulating at the time. The articles CBS published did not cover the exact same topic, but dealt with related or similar statistics. CBS seemed to have the intent to provide users with a more comprehensive understanding of the topic. By publishing a different but related statistic, society could see the respective topic from complementary angles. However, confusion swiftly appeared as CBS's indicator seemed contradictory to the earlier information being published. The contradiction originated from different underlying variables and correspondingly alternative statistical definitions. Not all recipients of the statistics can be assumed to immediately and accurately grasp these statistical variations when confronted with them. Ironically, the attempt to respond to topical societal debates lead to less relevant publications due to misunderstandings.

Bregman (2016) argues that the authority and independence of CBS are in jeopardy. While CBS aims to communicate statistics to interested citizens in a relevant manner, this strategy arguably lead to speculation whether CBS publishes certain information to make a political statement (Fransman 2014).

What comes across in the strategic plan as well as journalistic critique is the increased emphasis on communication and interpretations[11] in the disseminations. Several years have passed since this critique. CBS did not respond publicly to these points of critique. In the CBS corridors, employees mentioned that the communication department took measures in order to remain more neutral and thereby avoid the inclusion of potentially distorting content. I understood that especially textual clarifications on contexts were reconsidered.

Including contextual explanations on statistics endangers the careful balance between the statistical values of providing relevant information as well as remaining independent and remaining to *look* independent. Considering that the dashboard is a newly developed publication type, I expect that these experiences are taking into consideration in the design, albeit not necessarily consciously. Dashboards tend to include minimal textual interpretations, yet emphasize coherence of certain indicators and encourage interpretation on behalf of the user. Therefore, it appears to be no coincidence that in the years after this critique, development is going into a new type of dissemination which strictly aims at communicating and interpretation, yet without the vital, interpretive risks noted by Bregman.

This one critical example is not representative of all the external opinions that exist about CBS. Through the implementation of its newsroom, CBS's information has taken more centre stage in the news and it has also lead to positive responses. CBS now, for example, awards prizes according to what it considers fact-based-journalism articles,[12] and one could argue that this mainly due to the emphasis it

11 What Bregman (2016) refers to as "duiding" in Dutch

12 The prize I refer to is called the *CBS Talent Tegel*

has given to communication in the last years. Given that it is practically impossible to address all externally voiced opinions about CBS and their rationale, I limited myself to this one only, as it tied in directly with my aforementioned discussion on its strategic plan, and one article was enough to be able to apply my developed methodology to this case study. Other researchers are invited to investigate more external opinions on CBS.

4.2 HISTORICALLY ENGRAINED VALUES

CBS has a history of over a century and the field of OS is not any younger.[13] Section 2.2 explained how an ideology alters over time. Changes to the ideology are built upon ideological values that have been established thus far. Considering that a significant portion of the employees tend to remain employed at CBS for several decades,[14] a considerable portion of the statistical practices can be assumed to have been based upon conventions. That is not to say the practices may not be academically grounded, but awareness of alternatives or reasons why certain choices were made may have faded over the years.

Interactions with the external level affect the framework within the employees' work. Media critique is one example of a contemporary influence. Over the past century, there must have been a multitude of interactions such as the media that affected CBS's professional work. Historical events have changed CBS's employees and thereby the ideology binding CBS and its employees together too. The current way of statistical production has thus been formed by events and long-existing, organisational values. Time shaped the contemporary shared ideology shared within CBS.

I address the choice for specific statistical strategies within CBS in its history to understand the impact historical events may have had on statistical dissemination processes today. I investigated several texts that have been written about historical, internal discussions within CBS on how to produce statistics (i.e. Kuijlaars 1999; Maarseveen 1999a) to identify the more stable, historically driven part of CBS's identity and ideology. I studied priorities and guidelines set for statistical production, primarily focussing on events since the Second World War (WWII). In the discussion, I emphasize the more contemporary guidelines and priorities over older ones. I do not address these historical topics chronologically, although I do mention the time period in which something happens if it provides additional context or as an indication how long certain debates have been going on.

13 CBS was founded on 9 January 1899.

14 Internally, I have occasionally heard the joke that once someone works at CBS for a year, it is inlikely for that person to leave within the next thirty.

Furthermore, I simply the following discussion of statistical discussions by neglecting one very important instrument of CBS: the Central Commission for Statistics (CCS).[15] The CCS existed from its foundation until very recently, the end of 2016 to precise (Centraal Bureau voor de Statistiek 2017). Broadly speaking, the CCS "evaluated and approved the long-term work programme of Statistics Netherlands" (Centraal Bureau voor de Statistiek 2017). It was legally a separate organisation from CBS which checked upon the work of CBS. This commission could operate independently from CBS. It was intended to avoid politically loaded decision-making regarding statistical methods and practices.[16] From 2017 onwards, the CCS and CBS have been merged into one organisation: no independent panel anymore. It was supposed that the status of CBS as an independently operating organisation within the government should secure the position of independence of CBS (Maarseveen 1999a, p. 15). This separate organisation does not exist anymore and an occasional reference to it makes a discussion about the contemporary CBS more complicated than necessary. Therefore, I ignore the nuance between CBS and CCS, unless referring to the CCS is strictly necessary for my argument.

The upcoming historical account has some parallels with our case study dashboard. For it to make sense, it is important to read it through, although initially the upcoming subsections may appear to lose connection with the current case study.

4.2.1 *Smoothing Out the Public Image*

Over the decades, CBS worked on developments to improve communication of their statistics to outside CBS. Although this trend already started in the 1940s, discussions on the topic were particularly prevalent in the 1990s. The communication of statistics to a wider audience has been a recurring topic within CBS. The first explicit mention was during the WWII by Idenburg, head of CBS at the time.

> "Er is in dezen tijd toenemende belangstelling voor de statistiek. (...) Daarnaast geloof ik aan een - ten deele nog eerst potentieel aanwezige belangstelling bij het publiek voor de uitkomsten van statistisch onderzoek. Ik ben van meening, dat het niet noodig is, dat wij statistici ons opsluiten in onze bureaux en ons werk verrichten voor een uitgelezen schare speciaal geïnteresseerden. Tot op zekere hoogte heeft de statistiek in Nederland dit altijd wel verstaan. [...] Het Centraal Bureau voor de Statistiek

15 In Dutch: Centrale Commissie voor de Statistiek

16 This Dutch structure of an NSI with an external CCS was considered examplary for Eurostat and in fact for all NSIs within Europe. Ironically, other countries are now advised to implement the former Dutch structure, while the Netherlands has abolished his.

> doet van de uitkomsten van zijn werk van ouds geregeld mededeling in de pers. Reeds jaren wordt getracht aan de publicaties een aantrekkelijker uiterlijk te geven. Maar er liggen hier grootere mogelijkheden. De statistiek kan in dienst der volksvoorlichting een zeer belangrijke taak vervullen. En ik meen, dat aan deze voorlichting, vandaag bijzondere behoefte bestaat." (Kuijlaars 1999, p. 283, quote in Kuijlaars's text, sic)

Idenburg attached value to external communication of statistics: it would be societally advantageous to have information on which policies could be based and more citizens were interested in knowing Dutch OS.

In the following decades, the topic occasionally recurred to the foreground, often as a result of something going wrong. For example, civil servants from other ministries with questions could not get the expert on a certain statistic on the phone. Or ministries used disseminations without asking CBS if they had rightly interpreted the content, thereby initiating misunderstandings (p. 430). Actual misinformation was also a topic of discussion. At some point, CBS has published a statistic on butchery in the Netherlands. A ministry inspector did so too, but the numbers did not add up. CBS did not manage to harmonize the two indicators, which was regarded by CBS a failure of statistical practice (p. 427): having two different numbers of the same statistic could lead to misinterpretation and misunderstandings.

In due time, the first two concerns have been dealt with as hoped for at the time. Some employees worked on issues regarding client communication by tackling miscommunications and timely publications (Maarseveen 1999a, p. 43). Another plan to improve communication was by making past and current indicators and tables more accessible through the online databank StatLine (p. 45). Regarding the harmonisation problem, it is worth emphasizing that the latest strategy is to *highlight* the contradiction between two different but similar indicators (see section 4.1.2). From what the historical accounts tell, this seems to be a practice CBS employees would have stayed away from in the past. The contemporary policy strategy within CBS appears to be a clear shift from past choices made in terms of how to maintain clarity and clear communication.

The issues on misinformation, miscommunication or lack of accessibility of CBS employees were mostly internal concerns: practicalities that were improved upon through reorganisations and/or allocating employees responsible for client communication. However, also certain other issues were addressed specifically to improve the image of CBS to the outside world. In the 1940s, a Secretary-General from the ministry wrote CBS with harsh critique. He did not believe that anyone except CBS statisticians were willing to read the 282 page monthly (!) bookwork that CBS published. It was a full book with all

the CBS indicators and tables of that month. The Secretary-General could not defend the use of CBS any longer if this is how CBS were to communicate (Kuijlaars 1999, p. 258-259). Already in the 40s, CBS aimed to "popularize" disseminations so that they would reach a wider audience *and* to make sure that CBS leaves a smoother impression (p. 285). A couple of decades later, more citizens heard of CBS's indicators. Yet, the organisation experienced a lack of appreciation for its work: at the time, board members felt that the media took credit for its work by publishing graphics based on CBS's data (p. 421). Consequently, CBS wanted to improve its public image (p. 421-422, p. 285).

The image of CBS has generally been one of an uninspiring, boring, old-fashioned organisation (Kuijlaars 1999, p. 421-422; Maarseveen 1999a, p. 44). Aside from the average citizens not being energized by CBS, that public image also did not help attract new, skilled employees. A renewal of the public image was important for that cause, as the head of the NSI even stated after WWII that he could not imagine that anyone would want to work for CBS merely because of "idealist considerations" (Kuijlaars 1999, p. 285). No, CBS had to become appealing through sleeker communication.

Particularly, communication had to be improved with academia and to a lesser extent also the industry. CBS wanted to clarify academia and the industry that delivering information should never result in a conflict of interest (p. 288). One point of concern was, namely, that citizens or companies could be legally punished if CBS happens to find out they have done something against the law through (combining) their available databases. CBS was firm in never informing law enforcement about such cases. Providing this reassurance was intended to make external people more willing to participate in research and surveys.

Such reassurances needed to be communicated, because particularly academia was negative towards collaboration with CBS regarding data collection or the use of OS. Scholars could barely cross the figurative moat (p. 421). CBS had been focusing excessively on its own work, rather than investigating who else may want to use its results and providing those people access. Additional collaboration was not just beneficial to achieve a wider user base: it was advantageous to keep academia close, because future employees could come from academia. With a wider variability of statistics and data sources, the statistical practices became more dependent on academic research and academically trained personnel (p. 284).

4.2.2 *Societal Distrust: Privacy Interfering in Statistical Practices*

The increasingly amount of work on an academic level had to do with new, complex circumstances presented to CBS with the increasing use of computers systems and databases. In the 1980s, Dutch society had

become one in which information took centre stage (p. 243). From the 60s onwards, a societal reluctance flourished that technology may take over human knowledge and understanding. This scepticism affected CBS: questions were raised whether linking databases to assemble information on individuals should be allowed (pp. 392-393). This fear was heightened regarding the topic of personal identification numbers, e.g. social security number that are stored in multiple databases (p. 393). A government could abuse such data, and computers may enhance that process through automation (p. 241).

It was a careful balance: on the one hand should CBS delete personal information as soon as possible to adhere to privacy concerns voiced by the government; on the other hand were research institutes desired complete access to extensive data sets, which demanded storage of data over longer period of time and with as little deletion as possible (p. 406).

This issue urged CBS to take position as where and how to store societal information. In terms of disseminating statistics, CBS wanted to keep as much information on citizens inside its walls. There was some rivalry, as some other ministries wanted to be granted exclusive access to certain databases: CBS was part of EA, so the databases should not contain interesting information associated to the Ministry of Internal Affairs (p. 409). The overarching problem was that one organisation storing large amounts of citizen information could potentially damage trust of citizens, regardless of whether that was CBS or any other organisation. Without trust in an NSI, OS are rendered useless. Concentration of all citizen data internally at CBS was thus unadvisable.

Also, democracy could be endangered through a concentration of information (p. 399). As Kuijlaars puts it:

> One of the biggest dangers were that the boundary between statistics and registration would fade as a consequence of automation processes. [Eén van de grootste gevaren was immers dat de grens tussen statistiek en registratie zou vervagen als een gevolg van het automatiseringsproces.] (p. 395, own translation)

CBS had the purpose of making statistics, not to be able to let the government punish people based on information it may happen to come across in data collection. The increase of automation stimulated CBS to be even more explicit about working independent from policy makers and staying away from storing all information itself (p. 399). Only then, democracy can be ensured.

The aforementioned historical tendencies highlight similar reasons as being used in favour of the contemporary dashboard development. Historically, it has been a challenge for CBS to combine many sources on sensitive information without external critique. Dashboards funnel

these concerns. On the one hand, the dashboard is intended for users to make sense of, by assembling related statistics into one overview. In this way, information is brought to users in a coherent fashion. This allows the OS to be *used* by people interested in a certain topic with relative ease, and this usage provides CBS with a sense of purpose. On the other hand, interpretations are left to the user, thereby avoiding critique that CBS attempts to steer public debate.

Furthermore, these events indicate that Statistics Netherlands has long been invested into upholding democratic values, other than remaining professional and independent of politics. For that reason, CBS did not want to provoke Dutch citizens by crossing their boundaries in terms of privacy or questioning data-provider's trust by cooperating with law enforcement.

These data protection debates also emphasise the need of the existence of societal belief in what CBS is doing. Without the belief that CBS contributes to society through their datafication practices, there cannot be any urgency for an NSI to exist. This historical account illustrates how the belief of external actors not only shapes the attraction to have an organisation as Statistics Netherlands, but also defines CBS's boundaries.

4.2.3 *International Collaboration and Rivalry*

The societal concerns seemed settled through the deconcentrating of information. Yet, there was a catch. CBS had to consider its own position as an NSI too. CBS had to be on top of new developments: if CBS missed the boat by, for example, not floating along international developments on linking databases, the whole purpose of CBS as a producer of useful information could be questioned. Responding to new developments, whether those entailed new data sets, new types of data, new methods, or new technologies, was key (Kuijlaars 1999, p. 395). This also applies internationally. Without continuous development of statistics and automation, CBS may lose its internationally recognised position as an authority in OS (p. 423).

This tension explains why CBS is keen on brisk responses to new developments, whether it entails IT strategies, publication channels or output types. The organisation wants to maintain its well-established national and international status. Only then can CBS remain part of the superstructure and have an influential voice, even if that means it occasionally has to mentor other countries' NSIs in pursuing their statistical programme. Responding to innovation not only keeps disseminations relevant, but CBS as a whole as well. Dashboard development is one of the ways in which CBS is trying to maintain itself and its position for the future.

CBS was not only concerned with its purpose and societal perception of them in the Netherlands: CBS participated in the global OS

debate too. CBS also cared considerably about its relative position compared to other OS agencies abroad. Towards the end of the 1960s, CCS addressed its concern of starting to lag behind Scandinavian countries, Canada and Japan, because CBS acted rather easy-going once it had achieved the international status of disseminating high-quality OS (p. 423). There was true international cooperation from the foundation too. The founders of CBS already had collaborative contacts with other OS agencies on several continents. Specifically, CBS was interested in harmonising statistics and statistical practises globally, i.e. that throughout the world, similar methods and definitions were applied so that statistics could be compared across countries (p. 469). Thus, CBS did not shun cooperation nor some healthy rivalry in order to prevail amongst the top OS agencies.

Circumstances urged CBS to become more critical towards European OS collaboration. The EC and EU have demanded increasingly more information from the NSIs. Eurostat did not pay for all additional cost NSIs had to spend to conduct their research. The rest of the statistical information required by Eurostat had to come from the NSIs' own budget. This caused friction as many Eurostat surveys were not even relevant for policy-making in the Netherlands (p. 469).

Consequently, CBS had to reduce its spending on the Dutch statistical programme that *was* relevant for the Netherlands. Of that European budget that was allocated to CBS, the organisation had little input regarding the definitions and methods underlying those Dutch contributions to the Eurostat statistical programme (p. 449, p. 269). Furthermore, CBS rather worked on global harmonisation than on regional harmonisation of statistics to avoid additional harmonisation work from European to global statistics (p. 469).

Given CBS's aim to be relevant for Dutch society, the grumbling of CBS on Eurostat statistics becomes more understandable. It was also not helpful that, in practice, CBS had to provide statistical "development aid" to other European countries which were not as advanced in terms of technology and statistics (p. 469). This cost the organisation additional resources that could otherwise have been spent on Dutch statistics. Additionally, CBS fundamentally criticised the legal position of Eurostat. Eurostat was not an independent organisation within the EC. Therefore, CBS was afraid that the confidentiality of personal data shared with Eurostat could not be guaranteed (p. 469). To summarise, the expanding European international collaboration was accompanied with new international requirements and demands set upon CBS. These requirements left it with less freedom to decide for itself what worked best for Dutch statistics.

This historical account of international collaborations emphasizes that CBS has long been seeking cross-country collaborations. If CBS had critique on international collaboration in the past, the concerns revolved mainly around achieving relevance for Dutch tax payers.

When statistics could not be tailored to them, or if resources had to be spent on EU definitions that were not globally beneficial, or when non-optimal methods had to be used, it was not as cost efficient to invest in such practices. In other words, attaining and providing high quality statistics and doing that through cost-efficient resource allocation were higher goals for CBS. Still, international collaboration was high on the agenda, indicating the relevance of acknowledging these international agreements within the production-ideology framework.

4.2.4 *Different Times, Similar Considerations*

Since the 1940, CBS's image has frequently been one of an uninspiring assembly line of information, urging employees to redefine CBS's external image. The argumentation in the contemporary strategic plans reflect a similar policy urge as a response to these beliefs: CBS should communicate 'more and better' to be relevant and useful for people.

Many other arguments and circumstances are also reoccurring in today's strategic plan. Technological developments ask for innovation. Privacy is a hot topic that CBS has to respond to, there are budget cuts which affect the span of the statistical programme, and new data sources need to be responded to in order to reduce the response burden for survey respondents.

My impression from the history books was that there were occasional periods when the emphasis was laid on communication specifically. The priority to communication appeared to be given following a period of high satisfaction with CBS's work and particularly its quality. Additional allocation of resources to communication did not usually go together with or follow upon a period of budget cuts. In the current day and age, the budget cuts and development of new communication strategies go together. The dashboard somewhat suits this development, because it is being developed to make disseminating statistics more economical in the longer run.

When comparing CBS's concerns over history to current statistical legislation, one may notice that many points of concerns of CBS have made it into legislative documents that NSIs are subjected to. Its considerations have somehow transformed to the legal framework in which OS can be produced and disseminated. It is far beyond the scope of this study to dive into the exact international dynamics between NSIs and the resulting legislative frameworks, but I think it is no coincidence that CBS actively engages in international collaborations and many of its ideas have ended up in respective legislations and resolutions. Lots of progress has been made within CBS to improve statistics and how are communicated and similar developments occurred in the field of OS as a whole.

Lastly, this historical section has shown how much CBS has achieved in terms of statistical communication strategies in the last decades.

Citizens are now exposed to CBS through the media almost daily. Statistical indicators have become available through a wide variety of specifically developed media types. New communication methods and media have been developed.

4.3 CONGLOMERATE STATISTICAL PRODUCTION-IDEOLOGY

In this chapter, the external level of ideology has been connected to the internal level. While in chapter 3, external influences, such as societal belief in datafication and the adherence to democracy, have manifested themselves within CBS. That is, internally, these principles have been shaped through CBS history, thereby becoming part of CBS's ideological fabric. This section concludes what the former discussions have taught us about this interaction between the internal and external level. Towards the end, I specifically address how this interaction relates to expectations on the practical level, i.e. the dashboard.

External forces, however philosophical or abstract, inflict a practical counterpart within CBS. These actors provide practical boundaries in terms of what it is able and allowed to do. For example, once society, i.e. Dutch citizens, were more at peace with datafication of their personal information, CBS was granted permission to have access to personal databases and connecting them with one another when needed to calculate a specific aggregate statistic. By acknowledging the will of the people, CBS was indirectly confronted with democratic values. As citizens were tentative about datafication practices, the NSI arguably had be ensure it was transparent and could be held accountable for its statistical practices and guaranteeing privacy considerations. The exchange of opinions between the state and society, as well as the polity framework that allowed for that exchange, provided CBS with boundaries. This connection is even clearer for (international) legislation: regulations define directly what CBS is supposed to do and in broad terms they even define how. In other words, the external formed the internal. The communication with the outside shaped the production process on the inside. CBS changed its exhibition space depending on its clients and the society around it.

In terms of dealing with data and statistics, high expectations exist for CBS. If the principles and frameworks mentioned in chapter 3 and 4 did not provide yet make that clear, one should realise that far from all boundaries and starting points have been outlined here. The developers and statisticians must adhere to professional guidelines and methodological considerations guiding them through specific production process too. Specific methods exist for certain data types or research questions, and I have not elaborated on any of those detailed assumptions and conventions. Consequently, statistical principles such as 'professionalism' in fact comprise of a wide array of

varying principles associated to the data itself. Thus, CBS employees have far more considerations to make than the macro-level ones I described.

These expectations and rules that CBS indicate what choices it has to take into consideration within its production studio, and thereby also what it wants to put on display. The statistical principles such as democraticness and adhering value to privacy are noted before CBS disseminates any product. New developments in communication and technology are also likely to be broadcast with specific effort, because that is what CBS is proud of. Also, displaying new developments and methodological advancements can foster international appeal and praise.

The principles and beliefs that have flourished within CBS as an organisation, narrow down the variability of its produced work. As an NSI, CBS chooses to disseminate statistics that indicate its regard for responsible indicators and appropriate reporting to enhance its sense of authority in the field of OS. In line with the studio concept, CBS disseminations, therefore, mirror CBS's sense of self. These disseminations in turn shape the perceived ideology outsiders have of the organisation and its beliefs. Clients, who pay for the additional part of CBS's budget, can judge its exhibition space and thereupon choose whether to assign CBS a commissioned assignment. Those clients too can experience CBS's principles being reflected in earlier CBS disseminations, and consequently decide whether its services are for them. In this way, the NSI is presented with further self-realisation.

Having to adhere and respect all these complex frameworks and boundaries, CBS arguably has to be considerate of sensitive issues and act accordingly. Legally, the organisation is provided with a lot of responsibility to find its own course of action within all these expectations. Emphasizing responsibility and accountability can be reached through open and honest communication in CBS's exposition space, i.e. disseminations. The fact that ideology can be put into practice, provides CBS with responsibility and accountability of adhering to OS beliefs. Ideology does not only transfer top-down, but also requires a component of bottom-up. Disseminations are not merely a way to put an ideology into practice, disseminations in this case also serve as an enforcement of remaining in a respectable position within the superstructure.

Nowadays, CBS strategic plans attach more weight to communication and procedural (technical) aspects of statistics, than fundamental methodological research on statistics. This point out that the impact of external factors may shift over time. Maybe international collaborations currently affect more of how CBS is approaching internal IT developments than about sharing knowledge on statistical methods. With is not to say that the latter is not important at all anymore. Rather, the network of external factors may chance in terms of what

CBS provides stresses at the time. When a societal concern regarding CBS's work becomes more prevalent, maybe international discussions may be given less attention to than the Dutch concerns. One cannot speak of 'static' or stable influences of the external actors on internal decision-making.

The principles enlisted above do contain almost contradictory principles. Universities and research institutes may desire detailed personal information, but CBS may want to avoid public dismay over equipping external people with more access than strictly necessary. Detailed, high quality statistics do not always go together with going with public opinion to avoid linking databases. Transparency, accountability and openness do not always combine well: in line with the UN resolution, CBS is encouraged to voice its professional opinion on statistics in general *as well as* remaining politically independent. Attaining more societal relevance by interacting with contemporary issues may jeopardise public understanding of certain topics according the journalist critique in the past years, indicating the sweet spot between those aspect still has to found as well. Such expectations may wring with one another, as hardly either side of the argument can be fully satisfied.

The boundaries that CBS is given are fluid and sometimes vaguely defined. It is up to CBS to anticipate societal debates on choices that may be acceptable now, but could cause havoc in the future. The only boundary appears to money. CBS receives a certain amount of the government with which it has to do its job. It can somewhat influence how much other income it receives by preparing commissioned assignments for clients and the DG can request some more funding from the ministry of EA, but that is about it. Money in some way supersedes the influence of the external factors: money defines how broad the boundaries of SN are, and how many complex solutions could be developed or thought about for the complex issues.

All those issues mentioned in the past chapters and just now, one can expect to see back in the dashboard design one way or another. The dashboard is supposed to adhere to the influences of more prevalent external actors, as well as internal beliefs following from those external influences. Issues that have come up during its history can be expected to be reflected in the dashboard as well, including principles that may at some points be perpendicular to one another. The next chapter discusses exactly how these principles are translated into the dashboard, and what that says about the relationship between the internal and external on the practical dashboard dissemination that CBS works on.

5 THE DASHBOARD AS IDEOLOGICAL PRACTICE

In the previous chapters, a number of beliefs underlying statistical production and communication within CBS have been elaborated on. Theoretically, the employees are expected to act based on the organisational ideology. Hence, CBS's belief system is reflected in its disseminations. In this chapter, I study one dissemination for its underlying ideological assumptions: the R dashboard introduced in section 2.4. As noted before, this R dashboard is new type of dissemination. Less flexible dashboards have been applied by CBS before, but this is the first time a dashboard is built from scratch by CvB for a client. Therefore, this dashboard arguably reflects contemporarily shared ideological values. These values may he held by the dashboard development team at least and the whole of CBS at best. Considering the specificity of this case study, conclusions on this *one* dissemination cannot be generalised to all disseminations, nor to all employees of CBS. Still, the values underlying this output provide insight into the thought process and the values behind the design of a new type of statistical communication.

In section 5.2, I explain how the concept of affordances let me identify what the dashboard communicates. Next, I present the methodology I applied to identify affordances in the dashboard. Further on, I note the identified affordances and explain what that means ideology being put into practice for this specific case study. On the basis of the type of affordances identified, the importance of certain statistical values is more prevalent than others, and this difference is reflected on. To conclude this section, I relate the ideological values identified on the external and internal level of the production-ideology to the afforndances patterns on the practical level. Specific attention is provided to how the dashboard design reinforces certain high-level values and contradicts or problematizes others.

5.1 DEFINITION AND DESIGN: DASHBOARD FOR STATISTICAL COMMUNICATION

CBS develops dashboards in order to disseminate statistics because dashboard designs are intended to communicate data and quantifiable information. It is in the nature of dashboards to communicate on a certain topic, and partically when that topic requires data. Few (2004) argues that, at the bare minimum, dashboards entail software created for a specific purpose. This software results in a screen allow-

ing users to use and study the visualisations or numbers it contains (Few 2004, p. 3).

Yet, dashboards are only as good as their design allows them to be:

> Dashboards can provide a unique and powerful means to present information, but they rarely live up to their potential. Most dashboards fail to communicate efficiently and effectively, not because of poorly designed technology [...], because of poorly designed implementations. No matter how great the technology, a dashboard's success as a medium of communication is a product of design, a result of display that speaks clearly and immediately. (Few 2006, p. 4)

Therefore, studying design is necessary to understand what the dashboard communicates to users and how users could use the software (pp. 3-4).

The dashboard has a different nature than the majority of CBS disseminations. Articles, tables and graphs, published on paper and on its website, are for the most part presented as information that is not manipulable by users. That is, the visualisations or text do not change or adjust accordingly when a user indicates it wants to see another year or variable.[1]

I say 'for the most part' as CBS also publishes open data. While one could argue that tables do not strictly comprise disseminations, CBS does publish them, and other users can make use of them for their own gain. The information in those tables need not only to be taken in and 'received' as the majority of the articles are. The same holds for certain additional worksheets produced online which include visualisations that adjust accordingly when users play around with variable values.[2]

The dashboard does present a break with those more 'traditional' statistical disseminations. Lev Manovich identified several characteristics of newer media, which are key to understand the nature of dashboard applications. One of the aspects is *automation* (Manovich 2002, p. 32). A dashboard drives on the implementation of algorithms which shape the content that users are subjected to. For any user, the underlying programming code is loaded again in the form of a software, and it depends on users' choices what they see. The algorithms for a statistical dashboard define, for example, which visualisations are visible and how those appear. The algorithms use underlying data from some database as input.

1 A notable other CBS dissemination are StatLine tables. Those too allow the production of tables and figures and enable filtering on certain variables and subgroups.

2 I avoid the term 'interactivity' here, although many readers may relate software adjusting to input of users to that word specifically. This term is often used in public discourse, but highly critised for its lack of specificity and its ignorance of how older media were often also highly interactive (Manovich 2002, p. 55-61).

User input, such as clicking a button, activates a respective algorithm that developers intended. Therefore, the experience of using a dashboard is highly personalised. This is exactly why an OS dashboard can be used by varying users: they all experience only those algorithms which they activate. The multimodal dashboard versions that exist for different users describe a related new media characteristic, namely *variability* (p. 36-39). Because of the dependency of software, i.e. coding algorithms, "media elements [...] can be assembled into numerous sequences under program control" (p. 36, sic).

With the characteristics of automation and variability identified, Manovich (2002) argues media can be understand in two multiple layers: the cultural layer and the computer layers. The computer layer refers to the technical, the coding, the infrastructure of the dashboard (p. 46). Broadly speaking, the part the developers have exclusive access to. The cultural layer refers more to the interpretive side of the dashboard: the choice to make use of a dashboard, the conventions used and understood in the interface of the software, as well as the subjective screen that users get to see (p. 46). These layers are referred to as the *transcoding* characteristic, where information is translated into another format, in this case software code into a cultural interpretation (p. 45, p. 47).

For this specific case study, this makes it al the more relevant to separate between users and developers. The developers have access to and need to think about both layers, whereas users only experience the cultural component. Developers have more understanding about the nature of the medium and the incorporated assumptions. The users are subjected mostly to the interface. This aspect of the software defines their interpretation.

The nature of the CBS dashboard is explained in this section and screenshots are included in fig.5.1 to 5.14.[3] Table 5.1 summarizes the terminology used for each of the dashboard elements, and which pages fall under which categorisation.

The first impression of the dashboard is that of visually appealing software incorporated in a webpage (fig. 5.1): the initial image users see is one with a minimalistic menu bar on the left (fig. 5.2) and an almost screenfilling photo contains a participant of the target population, i.e. the participants described in the dashboard data.[4] Underneath the relatively large photo, a few sentences provide contextual information and explicitly names the client, the use of the indicators for the client, and the part CBS played in the production of the dashboard statistics.

The menu bar contains buttons linking to main pages, as well as subpages. Blue bars left of the buttons indicate the current page the

3 The images represent an intermediate version of the dashboard in its stages of production

4 To protect the client, I cannot publish a screenshot of this first glance of the dashboard.

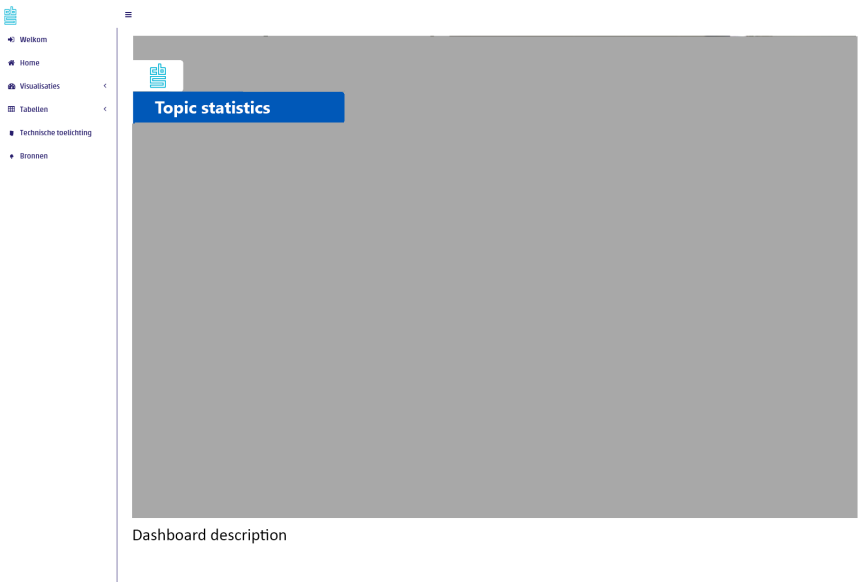


Figure 5.1: Welcome screen dashboard

Table 5.1: Linguistic dashboard section references used in this thesis

X__1	Text hyperlinks	English text for resp. pages
Main pages	Home	Home
NA	Intro	Intro
NA	Dashboard	Dashboard main page
NA	Tabellen	Tables
NA	Technische toelichting	Technical explanation
NA	Bronnen	Bibliography
Stats pages or subpages	Deelnemerskenmerken	Participants' characteristics
NA	Regio	Region
NA	(Beter) werk gevonden	(Better) job found
NA	AMP (arbeidsmarktpositie)	AMP
Screen	Content right of menu	NA

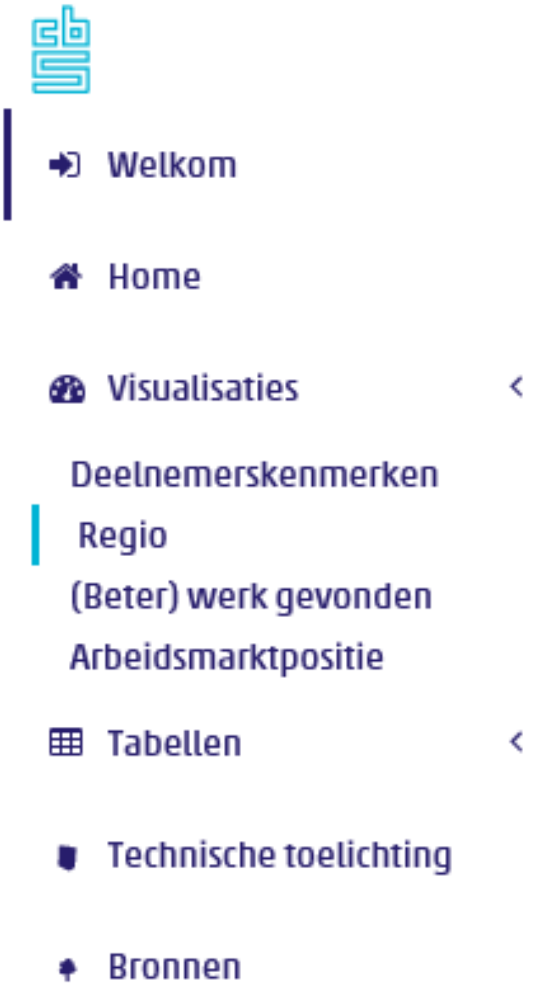


Figure 5.2: Menu bar of the dashboard

user is on, and which button is hovered with the mouse (see fig. 5.2). When clicking on a menu item, the screen on the right of the menu bar is updated with the information suitable to the respective menu bar title. Variables, statistics and background information become visible when users click on the respective main page or subpage.

By accessing the various sub and main pages, users can let the information on the various pages take effect to identify relationships, correlations and possibly causalities between variables relevant to them. At the time of writing, the screens contains largely categorical and ordinal data visualisations.[5]. In due time, visualisations that incorporate time series are to be introduced. Time series allow users to interact with historical data and statistics covering earlier time periods once there is enough historical information to allow for a timely comparison.[6]

As indicated before, a design dictates what is being communicated. Stephen Few (2007) distinguishes two different aims that tend to be associated with dashboard. On the one hand, he identifies *displays* that allow for analysis and insight (p. 1). In his opinion, *dashboards* are suited to monitor events over time, but are not optimized for analysis or interpretation of the included variables (Few 2006, p. 8). Taking Few's definition, this design is not strictly considered a dashboard. The lack of time series in the current design make it by definition impossible to monitor events over time. Instead, CBS provides information that users themselves are encouraged to make sense of. In other words, this dissemination represents a display more than a dashboard in terms of the aims incorporated in it.

Also, Few emphasizes that making connections should happen in a glance (Few 2004, p. 3): this dissemination design requires users to switch between pages and subpages to compare and relate information. The continuous switching between pages and subpages puts a strain on the working memory of users. Combining insights of multiple variables is, therefore, quite labour-intensive in this dashboard. In other words, both in terms of aims and usability the client dissemination does not suit a typical dashboard definition. However, to avoid misunderstandings within CBS on what dissemination I refer to in this thesis, I stick to the institution's terminology of its dissemination type.

Designing new software, such as dashboards, requires developers to empathise with users' wants and needs. If there is a discrepancy between what users want and the design offers, the medium may not be used for the intended communication. Therefore, the focus on functionalities in software may correlate with less effective com-

5 Categorical and ordinal data types are tend to be grouped in certain categories whether or not in a particular order. Continuous data type can take up any number on a continuous scale within a reasonable range.

6 Currently, the time series is considered a bit too short to include this specific feature now.

munication. "In a genuine attempt to please their customers, software engineers focus on checking all the items, one by one, off a list of required features" (Few 2006, p. 5). However, as a consequence, this process lacks the proper product designing with the aim to *effectively* communicate (pp. 6-7). Few (2006) argues that the usage of dashboards shifted from aggregating and displaying information in the 90s to showcasing functionalities. At the same time, there was a notable increase in demand for organisations to monitor trends. Monitoring allowed executives and external committees to feel like they were in more control. Appropriate methodologies to decide upon usefulness and availability of information in dashboards were thereby undermined (p. 8). For dashboards, the emphasis has shifted from thinking about effective communication to including features simply because they are technologically advanced (Few 2006, p. 8; Norman 1990a, 1990b).

Patrice Flichy (1999) disagrees that designers look mostly at technological features when making their designs. Rather, a design indicates what developers expect the software to be used for. He says that

> the forms chosen for new media are not based on technology; they correspond to the designers' representations of uses, and to the strategies they perceive to be most effective for marketing the product. In other words, these choices are social rather than technical. (p. 34)

However, it should be noted that Patrice Flichy was talking about the -introduction- of a new medium, rather than the optimalisation and getting the most out of existing technology and software. Dashboards already exist, so these would not fit his explanation. Still, Flichy's main premise is that software is designed to sell, and for that, designers need to think about people.

In this case study, the opinion of the client is highly representative of what CBS developers take as a baseline of user's wishes. In this case, the client is one specific user, or rather a group of users represented by a spokesperson of that group, that is in direct contact with developers throughout the production process. The client can set certain demands, as it pays for the production of the dissemination of its included statistics. Demands could, for example, entail the inclusion of certain indicators, population characteristics, the structure of the data or the formatting of graphs. Preferences of other potential OS users can barely be accounted for, as those users do not have a spokesperson to negotiate with the CvB development team. CBS itself also has an internal user-test team, the "Horzels", which consists of employees from all corners of CBS to comment on disseminations from a user perspective, but the Horzels only provide feedback until after publication. The actors that can affect the *design and production* part of the process are summarized in fig. 5.3. Although severely simplified, in this study the client is assumed to be the user relevant of

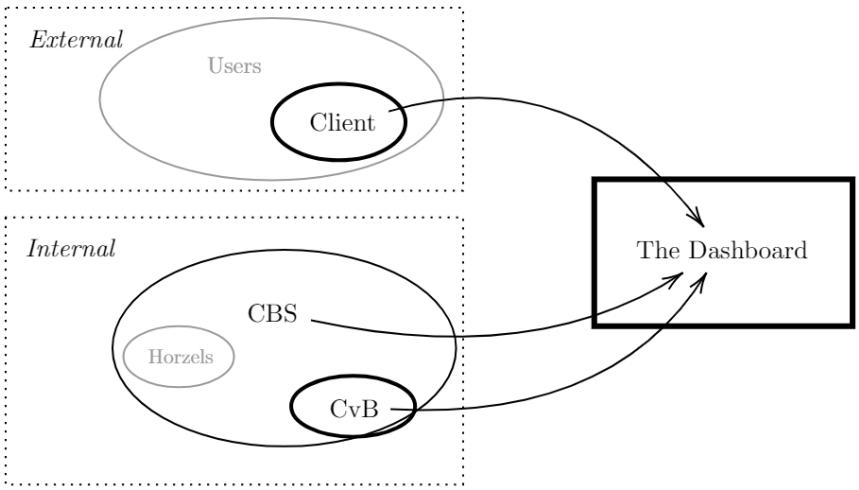


Figure 5.3: Various actor contribution to the dashboard design

attention: the client provides input regarding the dissemination's content and design during the design process, whereas other user groups cannot.

Assuming that the wishes of the client are acknowledged, how can one be sure that a design is suitable and effective to communicate exactly what it aims to do? Don Norman (1990a) explains that a well-chosen design allows for straight-forward understanding of the purposes and options of an object (p. 8). The problem is that "added functionality generally comes along at the price of added complexity" (Norman 1990a, p. 27; Gaver 1991, p. 79): the more complex a software programme, the harder the software is to fully comprehend as a user. The added complexity does not only affect the technological layer, but also the cultural layer.

Norman (1990a) explains that visibility is a primary principle of design (p. 4). Considering that I study software, visibility is the main way to interact with the software: to my knowledge the dashboard does not contain sound effects, and physically 'holding on' to software is impossible. Thus, the developers of the dashboard communicate to users through visuals mainly. Therefore, I focus on the part of the screen which shows the dashboard into detail. Importantly in visual design is that "the right things have to be visible" (p. 8): what is visible, is what users can take in. Regardless of the aims of the developers, that which is invisible cannot communicate. The invisible, therefore, cannot display an underlying statistical principle. CBS's exhibition space in the dashboard is defined by the visual, and consequently the visual should contain the ideological content.[7]

7 Statistics Netherlands also needs to take into account that the output is accessible to, for example, people who are blind or have less than optimal sight. That is another reason why all datavisualisations are offered as downloads.

The dashboard is positioned somewhere on the continuum of the tension field between communication and the complexity of technical functionalities.
There is a careful balance between designing based on what is technologically possible and what is communicatively desirable. In the upcoming section, the relationship between technology and communication is further explored through the concept of affordances.

5.2 DASHBOARD AFFORDANCES

Thus far, it has been made clear that functionalities and visual design together comprise what the dashboard communicates to users. Dashboard and display definitions are too uninformative to define specifically what a dashboard communicates, nor does it explain how users interpret the information they receive. Certain identifiable characteristics need to be looked for.

Dashboards contain elements aimed at communicating a message with the features they include. This means that through noting the software intentions, recognisable software traits or features can be noted. Specifically, the created software has certain *affordances*. In this section, I elaborate what affordances are, what types there are, and how they can provide insight into the relation between functionality and communication.

Affordances provide insight into an object: not in terms of characteristics of an object, but in terms of a relationship between the object and people interacting with it. Affordances of an object are defined by James J. Gibson as "[that] what it *offers*" a person (Gibson 1986, p. 127, emphasis in original). The concept is based on the idea that there is some interaction between the object and its environment. In other words, people relate in a specific way to an object depending on, for example, its location. What this interaction is, is affected by recognisable and identifiable characteristics of the respective object. In other words, affordances are a transformation of the internal into the practical, in which an outreach is made to the external.

Notably, Gibson (1986) emphasizes that affordances of an object "have to be measured *relative to the [person]*" (p. 127): what may be an affordance to one actor, may not be so for another actor. For example, a dashboard may offer the opportunity to test out new interactive graphs for the CBS developers. The same dashboard offers the client the opportunity to get more insight into its topic of choice. Applying the affordances vice versa to developers and the client does not work: the IT developers are not as likely to have to apply knowledge on the topic in practical terms. Seeing the statistics does not suddenly make them understand all the nuanced associated to the topic to the same extent as the field experts have. Affordances can only be identified in relation to the *opportunity* that people *see* in using the object. Thus,

affordances may be perceived depending on the actor (Gibson 1986, p. 127; Hartson 2003, p. 322; Gaver 1991, p. 81). In this case study, the actors relevant to discuss are the developers, representing CBS, and the client, representing the external.

Dashboards are comparable to Gibson (1986)'s *objects*. He defines an object as something that "affords behavior" (p. 133, sic). Dashboards can, for example, be "manufactured and manipulated" (p. 133); they can be programmed, read and interpreted. Gibson assumes that what we see when we look at an object is not its quality, but its affordance (p. 134): we take from an object what we think is useful, relevant or interesting to us. This also means that people act in accordance with the affordance they perceive.

A dashboard is not strictly speaking a *physical* object as referred to by Gibson, but interfaces have a similar role in relation to affordances as physical objects do. Drucker (2011) argues that:

> the constructivist subject of the digital platform emerges in a codependent relation with its affordances. This is the 'subject of the interface' when interface is conceived as a dynamic space of relations, rather than as a 'thing'. (p. 3)

Any software interface – just as any object – is interacted with differently by distinct (groups of) people: the same piece of software is applied otherwise by a cultural researcher as compared to a corporation. What matters is that various groups and individuals have varying and distinct relationships to the same interface, depending on their relative position. And that relationship to the interface can be portrayed on the basis of the affordances offered to those respective people.

Recognising dashboard affordances indicates what kind of usage the dashboard offers. Consequently, the usage of a dashboard explains why and how certain actors attribute relevance or interest to the medium. In other words, affordances clarify who are *served* by the dashboard and why. Consequently, the affordances allow for an investigation what CBS's dashboard is implicitly communicating, how it is doing so, and to whom. In turn, CBS dashboard communication exemplifies a way in which (part of) CBS's ideology is being practiced.

5.2.1 *Identifying Affordances*

The dashboard is communicating something that represents, to some extent, CBS's values. To study how internal statistical principles are being transformed into practice, the affordances first have to be identified and categorised. For that, I built upon the methodologies and affordance characteristics suggested by Hartson (2003) and Bower (2008).

To identify the aims driving the dashboard design, the actor perspectives of the client and the developers need to be taken into account. The client assigned the statistical production and dissemination and has specific expectations of it. On the other hand, the developers and statisticians adhere to professional guidelines and conventions which guide them through the production process.

Because of the relative ontology of affordances (Hartson 2003, p. 322), the input of each of these groups of people are considered. Documentation on the project development has been kept within CvB. This documentation included project proposals and notes on what changes have been made to the dashboard within the process. These documents do not contain *all* agreements between CvB and the client, but they contain the main ones. Relevant notes on intended aims as well as functionalities of the dashboard have been collected from those documents, after which they were further specified or nuanced by the project leader in case of misinterpretations on my behalf.

When the aims have been determined, so can the qualities be determined that one would expect to find back in the dashboard to include the information and functions underlying those aims. Hartson (2003) identifies various design stages of which the affordances created in Planning and Translation are mainly relevant for this thesis. These two stages deal with respectively "how well an interaction design supports the user in determining what to do with the system to achieve work domain goals" and "how well an interaction design supports the user in determining how to do what was planned in" (p. 329). That is the part that decides what CBS has selected, and regarding these aspects it can be established to what extent CBS has tried to enable that, in line with their own focal points and legal obligations.

Hartson (2003) developed a methodology to identify affordances based on their use in software specifically (p. 317). He categorises four types of affordances:

1. cognitive affordances: afford users with their cognitive actions
2. physical affordances: afford users with their physical actions
3. sensory affordances: afford users with their sensory actions (p. 316)
4. functional affordances: afford aiding users in doing something (p. 321)

Any user encounters affordances in each of these categories when interacting with software.

According to Hartson (2003), the two design stages reply on *cognitive* and *sensory* affordances. The cognitive and sensory affordances are related to developers putting ideas into practice and focus more on usefulness than usability. Therefore, these two types of affordances are related to the larger picture of CBS identity and ideology. Hartson (2003) has listed an extensive list of how these affordances may be

recognisable in a final design. Using this list as a starting point, I describe how I see that the set aims are represented by identifiable affordances in the dashboard. I should emphasize that some affordances are implemented more explicitly than others, because of varying levels of priorities given to specific aims (Hartson refering to McGrenere and Ho 2000).

Summarizing the aforementioned points, these points describe my procedure of identifying affordances in the CvB dashboard:

1. identify aims that the dashboard ought to adhere to
2. determine what sensory and cognitive qualities should come back in the dashboard for that (in line with tables in Hartson (2003))
3. determine which sensory and cognitive affordances are being considered by the designer and which ones are deployed and (which not) (Hartson 2003; Bower 2008)

In the conclusion of this chapter, I relate the dashboard affordances to the CBS's ideological principles identified in the previous chapters.

5.2.2 *Dashboard Aims: Actor-Associated Aspirations*

The first step to identify affordances is to acknowledge the aims underlying the dashboard. In line with fig. 5.3, aims have been identified for the notable actors, namely CBS as a whole, the client representing the users, and the development team. For CBS as a whole, the reasons to develop a dashboard are rather generic: what can a dashboard contribute to the available disseminations? The reasons for the organisation in general are based on advantages that dashboards have in statistical production, i.e. reasons why to choose dashboards over another type of dissemination. Partly, they have been based on my own experiences with statistical production, partly they follow informal discussions with CBS colleagues.

Dashboard type of software offer specific features that are interesting for NSIs as developers as well as beneficial to user's needs. Several features of this specific dashboard attractive for CBS are listed below:

1. Dashboard software structures the visible content separately from the data. In other words, the underlying data can be updated without affecting the formatting of the visualisations and tables: a new data upload adjusts merely the *values* depicted in graphs and tables.
2. Various statistical information on a single topic is incorporated in one piece of software: a dashboard encourages phenomenon-based publishing.

3. Dashboards allow a wide variety of visualisations. Specifically, this dashboard being programmed from scratch comes with visualisation flexibility. Regular and extraordinary data types can be visualised as the statistician sees fit, even if that data does not suit more standard visualisation practices. Plots can be included to contain as much information in a single graph as is wished for.
4. The dashboard can be interacted with on the majority of screens, such as mobile phones or computers, through the coding of responsive designs. Responsive designs allow visuals and text to be adjusted in terms of size and proportions to the screen on which it is being watched.[8]

The role of the client and CvB in formulating the aims have been found elsewhere. Several documents, specifically the dashboard proposal and client offer, contained descriptions on what the dashboard should consider or what it should contain (**voorsteldashboard**Centre for Policy Statistics 2017). The requirements from those documents have been noted, and summarized per group of actors in table 5.2.

Table 5.2: Aims for the dashboard per user group

Requirements	Reasoning
General users	
Usefulness	Straight-forward filtering of tables, options immediately recognisable
Recognisability	Using the same layout for every new publication instance
Accessibility	
Relevance	Relevant content
Understandability	
Efficiency	Filtering and selecting the information of interest without much effort
Analytical flexibility	Downloadable data sets allowing users to do other analyses
Client	
Recyclable	Re-usable dashboard to update the statistics periodically without having to go through the complete publication process

8 Technically, this feature was not developed by the dashboard team itself. They produce the dashboard in R Shiny, and it so happens to be that R Shiny code has been coded to support responsive designs. Although the design team did not code this feature directly, this advantage had been taken into consideration when choosing to develop the dashboard this way.

Table 5.2: Aims for the dashboard per user group *(continued)*

Requirements	Reasoning
Data access	Source data are accessible
Monitoring	Periodic data inclusion to allow the client to monitor the respective topic over time: the client can be held accountable for the societal developments of this topic
Analytical flexibility	Downloadable data sets allowing the client to do other analyses
Relevance	Visualisations need to be included that the client requests even if those do not necessarily enhance usability; main reason provided is that the client pays, so it has a say in how indicators are most valuable to them)
Design flexibility	The incorporation of new visualisations and data should be possible to account for the client changing its mind on what information should be included
Automated processes	Automated processes reduce effort client to share topic performance information with agencies that it has to account to
Cost efficiency	Fewer costs involved compared to regular production process in which Excel tables, Excel layers and factsheets are produced
Development Team (CBS)	
Cost efficiency	Re-usable and updateable dashboard allow lower production costs and fewer time investment in the future
Adjustability	Flexible content adjustment facilitates adjustment of visualisation types with ease
Recognisability	Agreement with corporate identity style eases communication with clients on design aspects because comparability is enabled
Open data	Underlying data should be made public to all (as far data security allows)

Notably, many aims and respective requirements are related to functionality as compared to the statistical principles identified in chapter 4, the internal level. Conversations with the development team cast a more nuanced view on this. If those views provide more depth to certain functionalities and design choices in the dashboard, they have been explicitly included.

The documents were not exhaustive in terms of describing the dashboard requirements. Since the start of the project in August 2017, the CvB development team and the client had regular discussions on new or adjusted dashboard requirements. I was not present for these meetings, but based on conversations with the coordinator, I include the provided reasoning for certain choices.

It is, for example, relevant to expand on the relationship between CBS and the client. The client pays, and thus the dissemination should therefore suit the client's wishes and needs. Broadly speaking, the CvB takes on the role of consultant for the client: the latter has a question, and the former does the research and needed development work. CvB does not turn the client's wishes into immediate actions though. The CBS employees consider what the best way was to visualise the requests of the client by using their own expertise: the more appropriate ways to go with the statistical indicators and consequently the design to present them in. One request was to publish information on the population. Such a request leaves plenty of liberty to the development team to come up with a proposal on how to visualise such information. Next, CvB communicated a suitable advice to the client. The documents presented an image that the CvB mainly presented the client with pros and cons for each advice they offered. At the very least, this procedure assured that the client could make an informed decision for a specific output over another. Whether the ultimate choice was then made by the developer team, the client or both, is not obvious to me. I suspect it was a collaborative choice.

The project coordinator indicated that, generally, the client had an open mind on the dashboard design. Given the underlying variables that the client was interested in, CvB came up with a proposal to which the client mostly agreed.

For one specific discussion point, points of view of *both* the client and developing team were incorporated in the dashboard. The visualisations are mainly based upon variable categories preferred by the client. As the client is a primary user of this dashboard, the information ought to be presented optimally for them to interpret: otherwise, the dashboard is less useful.

At rare occasions in the process, CvB set some hard requirements. Data delivered to CBS by the client was not allowed to be any selective subset. If the client were to deliver a selection of data that 'scores well', the dashboard would give a too optimistic view of the outcome variables. But the client explained that this was not the case.

Also, another situation occurred during the development process that required adjustment. The client indicated that it was interested in the 'success' category of a certain variable, hence that the client wanted to have that visualised in the dashboard. The developers declined depicting only the desired outcomes to avoid a transgression into one-sided statistics, and therefore advised showing all the vari-

able categories for a more complete picture. The design and set-up of the statistical graphs had to be agreed to and laid out with generated data before the client, or anyone external, could see the actual trends.

This decision to withhold from publishing directional information also had to do with the importance the team held to usefulness of the dashboard by a wide group of people. The coordinator commented that the dashboard should be useful. However, she noted that it does not imply that the dashboard speaks to the needs of a *widely varying* audience: the dashboard is a success if it is useful to the audience that *is* interested in the data of this topic, regardless of the audience's size.

The adherence to the principle of societal relevance is hereby further defined by the development team. Specifically, it is implied to be relevant for the subset in society that it can apply the statistical knowledge, however small that is. This hints to there indeed being a relationship between internal ideological values and a practical implementation of those values.

5.2.2.1 *Dashboard Design Elements*

Thus far, the starting points for developing a dissemination have been addressed, such as visual characteristics and aims. However, one can only relate aims to ideological practice when the actual dissemination has been included in the discussion as well. In this section, the various screens in the dashboard are briefly explained in terms of design and functionality. Following the dashboard survey, the identified affordances on each of those pages are briefly discussed.

The dashboard menu bar is depicted in fig. 5.2. Notably, the order of the menu items is organised as expected from a more traditional storytelling perspective, that is an introduction, main part and closing remarks. A title page ("welcome") is followed by a home page ("home") with overview of all the included variables on the subsequent dashboard pages. The main statistical content is noted in the several buttons following the button on "visualisations" and "tables". The menu continues with information one would expect to find a research appendix: tables as background information, technical and methodological information, sources.

A screenshot of the home screen is included in fig. 5.4. Every block depicts text and a linguistically associated visual icon. This screen does not provide any statistical information itself, but it rather serves as a referral to other screens in the dashboard with the respective information. The blocks are categorised in three groups: visualisations, tables and other information. When clicking on a block, the dashboard page that displays that information is depicted instead of 'home'.

Following the order of the menu from top to bottom, the first page of statistical information depicts descriptive statistics regarding a group of people associated to the dashboard topic. Fig. 5.5 portrays

Figure 5.4: Home screen dashboard

the screen contains various pie charts informing users about various cross-sections of the topic's population.

Figure 5.6 indicates the detail with which these pie charts have been designed. Pie charts are known to providing a rough visual indication how certain categories relate to another. However, percentages by itself appear to not have been accurate enough: the exact numbers have been included as well, thereby including more contextual information what size of people those percentages are based on. In pie charts, small categories can notoriously be overlooked. The developers have found a solution to that as well by noting the category name around the pie chart visible nevertheless. When hovering over the category, the respective section in the pie chart lights up, and the absolute number of cases is shown. A subset of the population can be selected in the grey drop-down menu at the top, after which the pie charts below take up the associated values, labels and shapes.

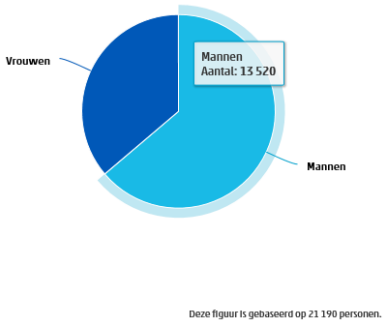
The dashboard provides multiple options for contextual information through the drop-down menu. Sub populations can be further explored in terms of summary statistics and by specifying particular contexts. These additional options are nested through, thereby imploring that the necessity of those options is considered of lesser importance to the user than the overall aggregate statistics. The filtering itself is very intuitive though. The dashboard was supposed to make filtering of information more straight-forward in if the data were presented in Microsoft Excel, indicating that usability and access to relevant information was considered of high importance.

Figure 5.5: Pie charts for categorical variables

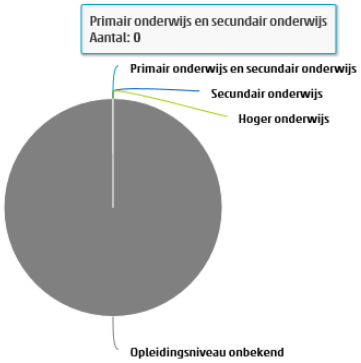
Additionally, the drop-down menu to select specific data do encourage CBS presenting themselves as a transparent organisations: not only did CvB make it clear which subpopulations it produces information on, the dashboard also allows for downloading and sharing data on sub populations so that further investigations can be done by users.

Another screen is captured in fig. 5.7. The map contains a visualisation of absolute values capturing information on people in different regions of the Netherlands. The map in combination with the bar charts on the right incorporate a geolocation variable and make it explicit through the use of the map.

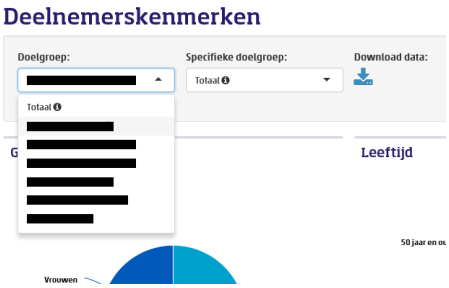
In a conversation, the project coordinator briefly mentioned that the client initially preferred to have the percentages over the absolute numbers. However, it were the developers who brought up the point that percentages are not suitable in this case. Percentages can be depicted through lighter and darker shades of a certain colour. The disadvantage of that method is that the size of the area influences



(a) Mouse hover



(b) Small margin additions



(c) Selection menu variables

Figure 5.6: Details pie chart

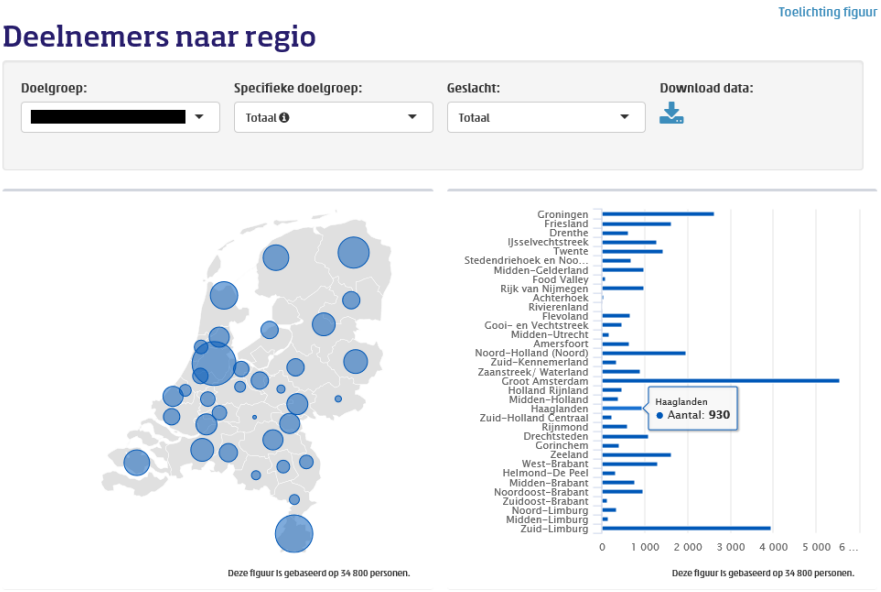


Figure 5.7: Dorling cartogram of the Netherlands

how notable a certain colour is. A small dark area would easily be overlooked, while a large area with the equally dark shade would stand out. Since the circles on the map only give a global indication of the absolute numbers, the bar chart on the right side of fig. 5.8 was included.

The bar charts in fig. 5.8 again emphasize transparency as well as accuracy through the option to hover over sections of the bars. The hovering encourage access to more specific information on subgroups and variables, and the real-life numbers associated to these sections.

The third visualisation in the dashboard, a Sankey diagram, is displayed in fig. 5.9. The screen contains a single visualisation that combines several variables: time, persons, and categories that apply to units of the population. The visualisation tells what portion of people belonging to a certain category at the first moment in time, stay in the same category or move to another category in a next moment in time. Again, the dashboard offers the possibility to select which subsets of the population are represented in the diagram with the selection menu.

Aside from the visualisations, tables on the topic are included as well. Alike the statistical visualisations, a selection menu on various variables on the top supersedes the tabular output on the bottom of the screen. Here, absolute numbers are the more explicitly highlighted category: for every two absolute numbers, there is one relative number, i.e. percentage, displayed.

The inclusion of the tables with downloadable data serves various purposes. All visualisations in the dashboard must be reproducible based on the provided tables. In that sense, the visualisations enhance a sense of accountability of the graphs CvB incorporated. On top of

Figure 5.8: Bar charts for percentages

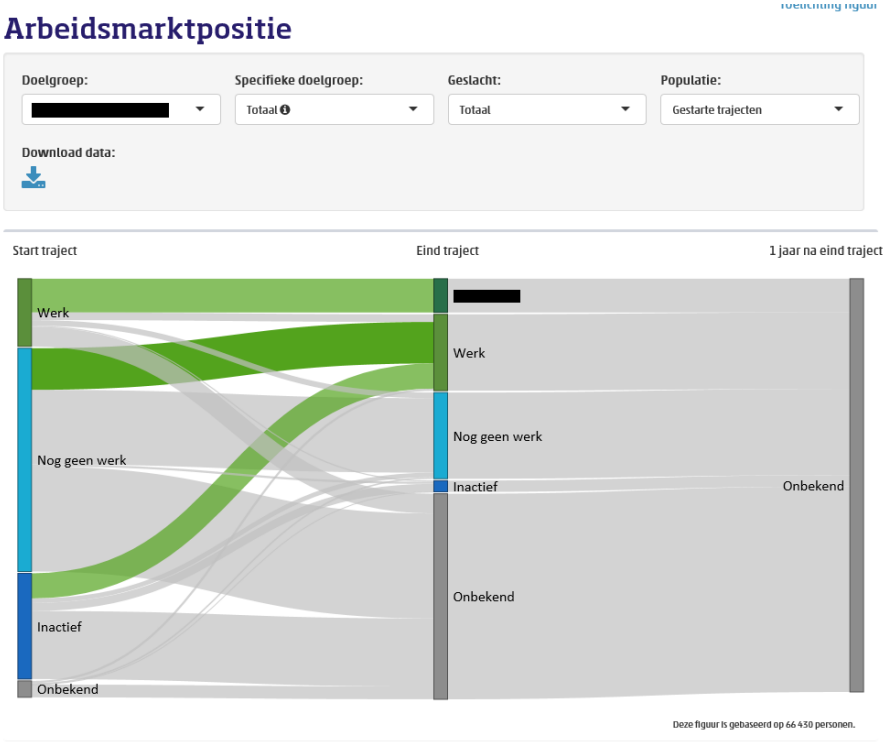


Figure 5.9: Sankey Diagramme

Figure 5.10: Tables underlying data

that, all CBS disseminations, this dashboard included, should provide data sets for external people to make use of.

Certain details are recurrent on all statistical pages, and those deserve distinct attention. Fig. 5.11 point out those two. The first is a message box. If recently new figures or data were added to the dashboard, users are told so to avoid confusion due to differences in numbers in an earlier viewing as compared to the contemporary one. Second, the variable selection menus for the visualisations all display a 'download data' button. Dump files in csv format have been developed so that any user can play around with the underlying data in a way they see fit: the principle behind open data.

When downloading data, a notable difference can be caught sight of in the data. When users download the data, both the preferred classifications of the client as well as the regular classifications used by CBS are included in the dump files. In this way, CBS meets expectations of what users other than the client may be interested in. The access to the dump files is more nested though, i.e. more clicking is required in order to download them. This does indicate that this functionality is not considered by CBS to be one that the majority of users would like to have access to. Otherwise the developers would

have decided to give this feature a more prominent position in the application.[9]

It should be noted that the download function has also been included for another reason. The life span of the dashboard is considered to be relatively short. That is, CBS does not count on this specific dashboard to still be used in 20 years. For this reason, all the underlying data is presented in csv files, which are expected to be reasonable for a longer period of time through programming languages or pre-prepared software. This means that even if the dashboard were malfunctioning for some reason, the data would remain accessible. In contract to the earlier observation, this could be interpreted as CvB prioritizing open data nevertheless. Although the option itself may be nested, those who would like to find the data will find them.

Aside from visualisations and tables comprising a complete screen, additional details are included for the curious and accurately inclined users of the dashboard. Fig. 5.12 portrays an explanation button (fig. 5.12-a) and an example of the underlying explanation (fig. 5.12-b). In this case, it provides a brief explanation of the options that a drop-down menu offers and which categorisations have been used.

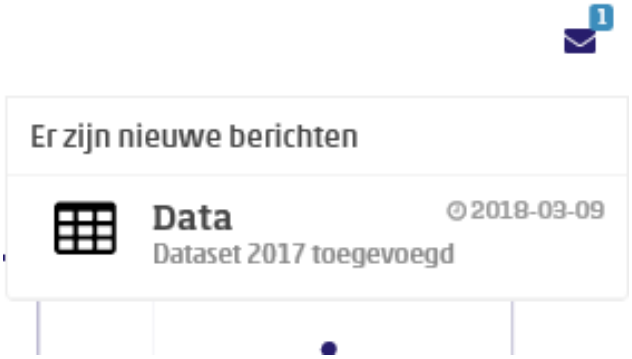
Two screens are specifically designed to provide the necessary information for users to draw informed conclusions. Those screens are depicted in fig. 5.13 and 5.14. The former screen explains abbreviations and dives more into the sources underlying the datasets and visualisations in the dashboard. Fold-out sections allow for more detailed information when hearing about the name of a data source only is not enough for a user. This allows users to search online for more additional information on related topics and to contact data providers. The latter screen, still very much a work in progress in the included images, is designed to include methodological details on data collection and data calculations as well. Through the incorporation of these screens, CvB encourages the impression of CBS having an open attitude: transparency of CBS's work is prevalent. On top of that, the content on the screens broadcasts CBS's professional knowledge on the topic.

5.3 DASHBOARD IDEOLOGY: IDEOLOGY THROUGH PRACTICE

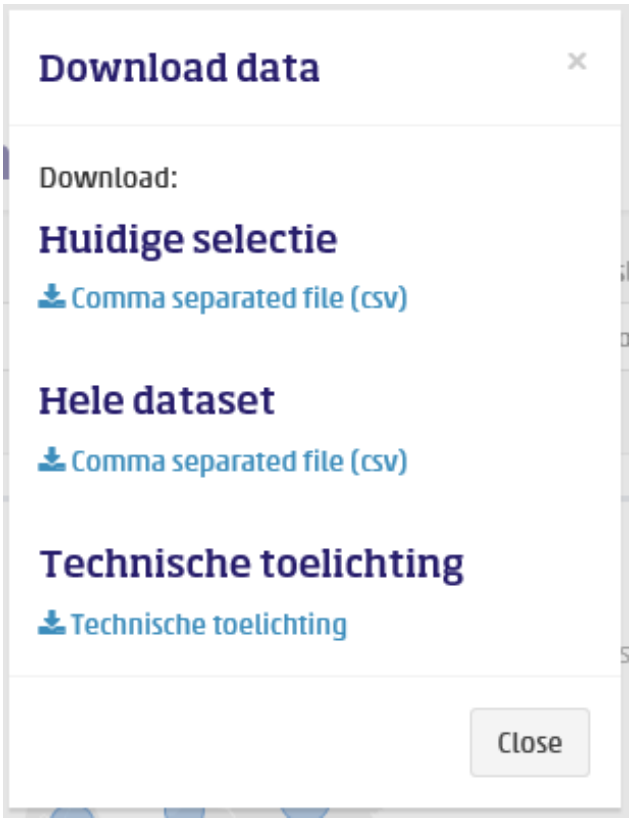
Table 5.3 summarizes several findings regarding to the affordances. The relation on these findings in combination with the production-ideology framework is reflected on in this section.

In terms of statistical principles noted in the affordance overview, the majority deals with conceptualisation, usability, transparency and reproducibility. Although these are abstract principles, each of these

9 I was notified that in the published version, a download page has been included in the dashboard. This download page includes all the downloads the dashboard offers.



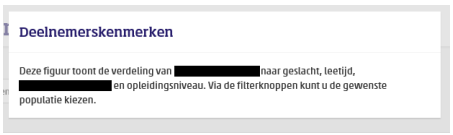
(a) Message box



(b) Download data pop-up

Figure 5.11: Recurring buttons in the dashboard

(a) Explanation button



(b) Explanation pop-up

Figure 5.12: Explanation buttons in the dashboard

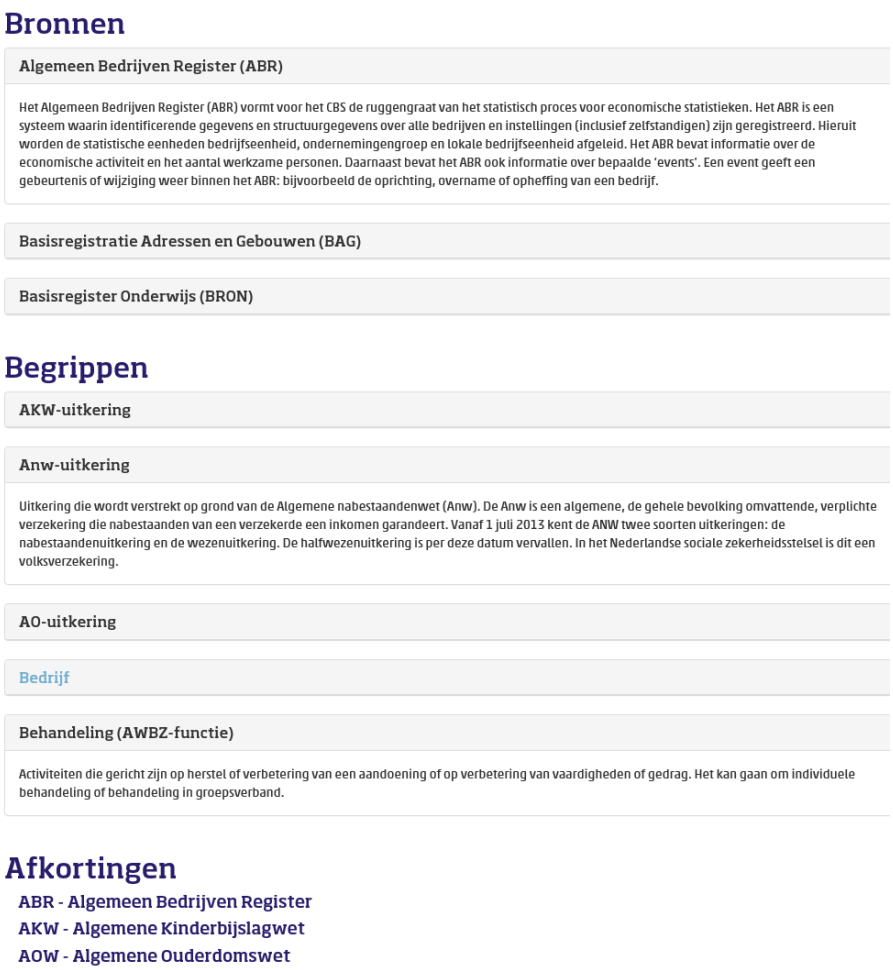


Figure 5.13: Sources page of the dashboard

Figure 5.14: Technical explanation

is relatively practical. Each of these principles can be applied to specific datasets and visualisations. Values such as usability or reproducibility would never make sense to have been noted from the external level: what would it mean of legislation required reproducibility of everything CBS did, and what would it mean if usability of OS agencies would be discussed within the UN? Such principles need to have a practical appliance in order to have a purpose. Therefore, it makes sense that these values present themselves on the practical level of the production hierarchy and not on the higher levels.

Table 5.3: Aims and Affordances

page	Description functionality	Who benefits?	Related (statistical) principle or aim	Levels of nesting
Menu				
menu	Buttons in order of article story telling	client and other users to set content expectations; developers to not overlook incorporating content used in other disseminations	recognisability	0
menu	Texual hyperlinked buttons as referrals to the respective subject information	client and other users for navigation; developers to ease checking connectivity between different pages	usability	0
menu	Navigation buttons visible in every page of the dashboard	client and other users to enhance navigating through the information, developers when testing	create overview	0
Home				
home	Textual hyperlinked block buttons as a referrals to the respective subject information	client and other users	create overview	1
home	Block text indicatory of the underlying variables in the dashboard	client and other users	NA	1
Statistical Visualisations and Tables				
stats. visuals & tables	All - variable filtering in order to let user decise relevant information to be visualised	client and other users	transparency, usability, information provision	>2
stats. visuals & tables	Visualisation including relative and absolute characteristics on the population	client	NA	1
stats. visuals & tables	Visualisation to provide information on relationships between variables	client, potentially other users	contextualisation	1
stats. visuals & tables	visualisation including relative and absolute characteristics on subsets of the population	client, potentially other users	reproducibility, transparency	>3
stats. visuals & tables	All - downloading underlying data	CBS (for its image), client and other users	transparency, reproducibility, accountability	>3

The aims and affordances table indicates also that more detailed information on the population is consistently further nested than more general information. This can be perceived in several ways, of which its intended nature is not clear for the design itself:

- information of the subpopulations is considered less relevant or useful;
- information of the subpopulations is less accurate, therefore it has been designed takes more time to find;
- information on the subpopulations is relevant to fewer users than the general information, hence more effort is required to get access to that information.

This nesting indicates that in terms of relevance of the data, sub populations and sub categories are considered less relevant than the aggregate Dutch statistics on the topic. Otherwise, the subcategories would have been made more accessible by not having to click more in order to get there. Having said that, from a storytelling perspective it is sensible to start broad and more general before diving into details. Having details readily available over more general information would probably reduce the overview of the application.

While many of the aims are tailored to the client, CBS does offer advantages in their publications that are usable to many other potential users as well. By tailoring the content to the client, CBS does evoke societal relevance in its dissemination: it ensures that its publication is going to be used.

CBS makes it harder for others to identify erroneous statistical practices in them, because there is no interpretation included: as long as the numbers itself are not 'faulty', any misinterpretation can hardly be blamed upon CBS. Regardless of all the additional information mentioned in the dashboard, CBS does not seem to acknowledge anywhere that the sheer selection of variables may already affect the interpretation on behalf of the users. From that perspective, CBS does not play into the acknowledgement of potential politics and subjectivity, and the consequent accountability issues as much as it could, if it were to explain more about the included selection of variables and the underlying model assumptions.[10]

This discussion indicates discrepancies between dashboard proposal and the outcome. Certain statistical principles and aims were highly emphasized in the initial documents, and not so much identifiable in the dashboard itself. Efficiency is one of those aspects. In the proposal, cost efficiency on various occasions, and all mentions referred to the aim of saving cost in shorter run and longer run and reducing the required resources.

10 I was notified that in the published version, model assumptions were described on the technical explanation page in the dashboard.

This ideological principle which also occurred on the external and internal level, was not found by studying the dashboard itself. Yet, that it was not found does *not* mean this principle was not acknowledged: the dashboard has been developed in a way that updating the information is relatively inexpensive compared to starting anew, and thereby the client can save money in the future.

One other statistical principle that did came up explicitly in project proposals as well as discussions with the team, but was not noted in the affordances table was that of *plausibility*. The plausibility check briefly implies that the outcomes of a statistic are being compared to StatLine tables and other reference material. Only when the outcomes are considered reasonably likely given the other information, or differences between sources can be explained through methodological choices, they are good to go for publication.

Plausibility is not so much a principle that users need to adhere to, but rather one that the statisticians need to take care of before publishing a dissemination. This value cannot strictly appear in the dashboard *design*: rather, all published statistic is subjected to it. Therefore, this principle was not scrutinised for this specific case study. Yet, I do want to draw attention to this value, because it indicates the importance held to avoid publishing incorrect indicators. And one could argue that the team indirectly enhances accountability of CBS indicators as well by providing the non-sensitive version of the underlying data as open data. In that way, plausibility of CBS information could be applied by users as well when they are conducting their research.

The project coordinator emphasized to me many times that all the information in the dashboard should be published simultaneously to everyone. It was clearly a high priority, but a statement only mentioned between the lines in the proposal documents I had access to.[11] It indicates that strategic plans on paper do not always represent the reality of what CBS does. Not because CBS wishes to lie, but rather because certain assumptions on what should be done with data are already firmly in the back of heads of the statisticians. Yet, the importance of a single dissemination moment has starkly shaped the production process in the sense that the client can get no access to the actual data before the rest of the world can. It is however so 'normal' in daily statistical practice at Statistics Netherlands, that the developers do not think about it anymore to make this assumption explicit on paper.

This discrepancy may be attributed to various causes. First and foremost, a proposal for a medium has a different nature than the

11 As the project coordinator noted on hindsight: "Dit dashboardproject is in dit opzicht bijzonder omdat dit project niet resulteert in een publicatie. Het betreft puur de ontwikkeling van het dashboard. De publicatie van het dashboard volgt pas bij update van de data (in een ander projectvoorstel). Om deze reden staat in dit projectvoorstel geen opmerking over publicatie. Er is afgesproken dat de publicatie van het dashboard pas volgt, op het moment dat ook geüpdatete data beschikbaar zijn."

actual medium. Thus, the emphasis may lay on different aspects of statistical production. Also, the mere assumption that drives the client to request the services of CBS already indicates that certain statistical principles that are key in the actual dashboard may not need to be explicated as such: the client would not go to CBS if not for those qualities that CBS is known for.

The proposals left the impression that the developers are not be vividly aware of many of the statistical principles from chapter 3. In fact, the principles may not be consciously aware. Yet, externally set principles such as reproducibility, transparency and accountability are engrained in the developers' workflow nevertheless. In fact, those values are so engrained, that the project coordinator did not even notice the (subconscious) awareness of them in her team. In other words: the team acted according to the statistical principles, but did not always notice it was doing so.

One cannot distil whether these principles were mostly adhered to, because this is the way disseminations are prepared, or whether every developer and statistician inherently felt the ideologically urge to adhere to them. However, in practice the outcome remains the same. In other words, historical conventions and collegial practices matter.

In terms of the production-ideology hierarchy framework I set out, these examples imply that not every ideological value can always be found on a lower level. The intention of the framework was that such values should have been identifiable through studying the dashboard, i.e. the dissemination that was put on display, rather than through the proposals on the dashboard. That implies that this theoretical framework still needs work on how to account for the *intentions* of incorporating statistical values in a final product.

The identified principles may also provide a further expression of the relationship between CvB and clients, or at least about this client in particular. In this specific case, the client was susceptive to CBS's expertise: the client may have had its preferences, but the team could discuss pros and cons of various visualisation styles, and CBS has a fair amount of input in the discussion on what it considered important.

From that perspective, it did not matter that proposals for the client did not rigorously list all the statistical principles statisticians have up their sleeves. The dashboard could be designed in such a way that OS could be adhered to anyway. However, one could question what it would mean of there is a client who is more strong-willed. It is impossible to generalise, but from the aforementioned analysis, we at least know that certain values are very likely to be adhered to. Other principles, those which I did not find to be represented in this process, may be more at risk to be undermined in negotiations. One could wonder whether those should not be the first points that an external client should sign for when making a deal to let CBS

produce statistics for them, or whether the choice for aid from an NSI shield for that already.

While I cannot argue solidly that CBS is trying to be subjective through its choice of inclusion of the variables, I am also not able to reason for the exact opposite: that it is aiming to be as 'objective' and independent as possible. The organisation may have decided to include all the statistics that it has information on within CBS and that the client could offer. In a hypothetical worst case scenario, the developers could have made a selection based on what they consider important only. I know that for this dashboard, the former is the case. Yet, I cannot distil this from looking at the dashboard itself only. Inside access and discussions with the coordinator were, therefore, necessary to draw the right conclusions about CBS's intentions.

The development team was highly aware of important professional considerations for statistical *production*. Yet, by merely looking at the proposals, this was not always immediately apparent. Rather the affordances and aims I identified regarding their dashboard displays what statistical principles the team *thought of making explicit*. The discrepancies between papers and dashboard indicate that principles may not be explicated, but the knowledge about internal values and high-level statistical considerations is surely there amongst the employees.

In many ways, the identified affordances indicated that CvB did not have the same values explicitly stated as what one would expect based on the organisational and external ideological values identified in chapter 3. Having said that, CvB did not remotely leave an impression of deliberate ignorance or irresponsible statistical production.

6 DISCUSSION AND CONCLUSION

6.1 MACRO-TO-MICRO IDEOLOGY

Over the past decades, CBS has been working on producing high quality statistics and how to communicate them. Now, the question is more how to raise this to an even higher level: how to communicate statistics in such a way that communication is best in line with all the standards and values CBS upholds. This thesis aimed at understanding this aspect by diving into ideological values and providing a framework to understand how those are translated into practice. For that, I investigated ideological values within the production process and related that to one specific dissemination of CBS.

From the elaborate discussions in the previous chapters, one thing became clear: identifying ideological values in the dashboard based on levels in the production-hierarchy is not straightforward. Although legislation may be acknowledged as a frame of reference in which CBS works, the organisation contributed to the content of legislation as well through (international) working groups on respective OS topics. Such interactions, i.e. CBS interacting with the external level, increased the difficulty of distinguishing between the contribution of the external level and the internal level. In other words, it was not as easy to strictly separate the two.

Additionally, the internal level could have been separated into various levels. Corporate communication and the strategic plans represent a different perspective from the average applied statistician within CBS. While corporate communication is aimed at external actors, applied statisticians have different interests and priorities. Therefore, those two cannot be equated. Yet, both were considered internal aspects in the production hierarchy.

In future studies, the production hierarchy should be further defined in order to do justice to those differences. Specifically, a clearer separation of values according to the level in the production hierarchy can exist once more specific groups within the organisation are identified and explanations are provided of their contribution to the production process. For this case study, a more specific disquisition on the members of the development team would have added more depth to the discussion.

A more fundamental critique to this study could be that the levels of abstraction in the production hierarchy divert too much between both ends: macro-societal developments and beliefs can hardly be argued as a convincingly having a direct influence on one specific

piece of output made by individuals, within an organisation, within society. Having said that, based on Gramsci's theoretical framework, macro and micro could be defined with relatively clear boundaries, as long as the relation between macro and micro is also associated. The expected influence of the different levels on one another could be further elaborated on beforehand.

6.2 PHILOSOPHICAL UNDERPINNING

It was difficult to fully separate the philosophy driving OS from a discussion of CBS's ideology. Through explaining what OS is, and how it came into being, I already made ideological assumptions as to what OS mean and why they are needed. This in itself indicates that the use of data and statistics for 'checking purposes' is very much woven into my life and my overall 'nurture' i.e. referring to the nature-nurture debate. This does not lead to an 'as independent view' upon CBS's ideology as could be. On the other hand, if I had not been a statistician, i.e. if I had not been trained in the use and appropriate statistical production of OS in particular and statistics in general, I could never have inquired CBS's ideology in my own way.

Due to Gramsci having its roots in Marxist theory, one could argue that this framework may not be suitable. The various nuances between the levels of production as well as the different priorities that different factors in the production hierarchy give, make it hard to assess the role of CBS as an ISA. Because no particular principles were overpowering on all levels of the hierarchy, one could hardly speak of both an educative part nor a repressive aspect to the organisation. On top of that, Marxist ground work inherently does not assume the power of democracy, while that was a major consideration on the external level. One could argue that societal value was a contradiction in terminis with the theoretical framework, and may therefore not have been used. The theoretical framework could, therefore, be further elaborated on to make a more in-depth investigation between societal ideology and a product that is not directly associated or dependent on the political system on which the theoretical framework is being based.

Having based my ideological framework on a Marxist perspective, the government is mostly seen as a sender to society. In democracy, citizens can rather play an active contribution in societal debates and governmental policies as is usual in democracies.

Especially the journalist critique and the fact that CBS responded to it, indicate that the users form a very important part in this ideological discussion. Although the user base have been given a minor share of attention through the discussion of societal aspects such as the assumptions of democracy and datafication, the influence of the individual users may be underlit. The choice to neglect these users

was made deliberately, as the specific case study dashboard focused primarily on the client side, which in many ways can be considered users, expect that the cooperation with the client is more intense during the production process. For an average dissemination, users do not directly engage in the production process.

Considering that I have used a Marxist perspective anyway, it could also be expanded in further research in order to provide more understanding given the assumptions taken thus far. Given that CBS's funding and 'income' are defined by the disseminations, one could regard those disseminations as commodities. Those commodities can in turn be connected in the ideological framework of Gramsci and Althusser, who both assume a Marxist framework for ownership, sales, and the role of the government in those exchanges. Including the financial transactions and income dependencies of CBS with their final products, may also provide an indication of where CBS needs to place their statistical priorities in terms of production: CBS needs their products to 'sell', otherwise they may lose their project funding. That may lead to curious dependency relations which ought to be further investigated.

Then, the choice for datafication and democracy as external was more intuitively than logically decided. The influence of the state and society was summarised mainly by what I thought made sense. Although that choice could surely be criticised, for the purposes of this thesis it worked. It turned out that the abstract, societally shared democratic values relate to practical considerations in the dashboard such as transparency of underlying methods and the choice to not include specific opinions. The belief in data as a factual source of information explains the acceptable absence of an argumentative explanation in the dashboard for the choice and combinations of variables: the data are assumed to speak for themselves. In many ways, these observations show that the theoretical framework of my thesis has value and relevance. Ideological values external of an organisation can be identified on the level of an individual statistical dissemination: it makes sense to assess ideological values based on various levels of abstraction in production.

While reality always tends to be more complicated than it tends to portrayed in writing, the topic of this thesis proved to be ever more so. All these additionally suggested nuances indicate how complicated the debate of and ties between OS and society have become. Media serves as a prevalent mediator in this, especially now CBS on a strategic level aims to intercede more in contemporary public debates. This makes the line between societal impact on CBS and vice versa very nuanced and complex. This issue raises the question how statistical agency takes place through and with the media? The role CBS takes in this exchange of information is worth investigating into more detail.

It was noted in section 4.3 that certain internally and externally established statistical principles can wring with one another. These contradictions are indirectly recognisable in the dashboard as well. Democratically, accountability is of high importance. From there follow that transparency, access to relevant information, such as potential biases in the indicators, as well. Through the nature of its design and purpose, the dashboard ought not to urge people in a certain direction in terms of interpretation, while the mere selection and availability of indicators shapes the story that is being communicated. While dashboard tend to avoid explanations as to why certain indicators were chosen, this can be perceived as a lack of transparency on their behalf on what CBS considers the relevant context to publish these indictors in.

6.3 REFLECTION ON THE STUDY ITSELF

This study addresses different levels of influences that affect the production process. Therefore, it cannot be assumed that all aspects have been studied in as much detail as when I would have zoomed in on one of them only. Albeit this thesis intended to paint a complete picture, I may have overlooked some aspects and influences, which may deserve attention when someone aims to draw conclusions about CBS or NSIs as a whole. To exemplify, the DG was appointed new into the organisation. His strategic plans were drafted at the beginning of his term. His position may therefore be considered those of an outsider more than those of an insider, even though he was from the start officially part of the staff. Such nuances are not included in this thesis. The aim of this thesis was to provide a review of various different influences and understand how those influences can affect the practical output of CBS. That is exactly what this study did, but it may have been at the cost of perfect understanding of each influence separately.

In future research, more emphasis could be laid on the internal level. In this study, a limited number of people in direct relation to the dashboard were spoken to. Because employees are not uniform in their priorities, skills or responsibilities. Studying this in depth would lead a better grasp of the role departments and groups employees play in CBS's ideology. One department may, for example, be more concerned with one particular statistical principle, while another department is primarily concerned with another. In other words, various (groups of) people within CBS relate differently to its ideology, depending on their position and tasks. Employees have thus far been described as an homogenous group of people, which is surely an oversimplification. While this thesis produces an insight into an 'average' perspective of the team working in the dashboard, this cannot and therefore does not cover all nuances of CBS's ideology.

CBS does not make dashboards in a vacuum. Dashboards tend to be built on the request of the commissioning organisation. Then, statisticians have to see which relevant indicators are available, while the dashboard developers see what visual and auditive features can be prepared for the dashboards with the available resources. In other words, design and content is incorporated in the dashboards on the basis of interactions between the different actors. The exchange between people thus affects design and content and hence the meaning conveyed with the dashboards.

This thesis was innovative in terms of its approach in studying the assumptions of a medium through various levels of abstraction. This new approach did imply that the method taught a number of considerations for future studies.

Because of the analyses of various levels in the production process in combination with connection two fields of studies (media and statistics) which are usually not intertwined that way, my thesis turned out to be rather lengthy and descriptive. There were relatively few argumentative sections in this thesis for a humanities research, because the aim was to create an overview of the contemporary issues with regards to ideology and performance within CBS as an NSI for OS. Statistics is a topic rarely addressed in the humanities anyway, and OS is an even more specific branch within statistics which deserves a thorough introduction. Consequently, this thesis resulted in a rather bulky read, in which it is hard for an interested reader to simply flip through only the pages of relevance: without such background information, it is hard to fully understand the topic and the subsequent reasoning.

The disadvantage of my operationalisation of affordances is the requirement of the explication of aims. In my specific case, I could come up with an elaborate list of aims for all the sign posts in the dashboard plans I looked at. I was lucky enough to have had the opportunity to ask the dashboard coordinator which of my assumptions were relevant. Without any kind of direct connecting to the developers of the dashboard, it would be merely impossible to make an accurate list of the aims for various actors. Consequently, analysing a medium without internal knowledge may not be possible with the approach that I have set out. I myself would have been too biased if I had not checked my suggested aims with the dashboard developer team to nuance them or give a reason for that specific aim.

Aside from studying this specific case study, I belief this thesis illustrates the importance of diving more into statistical or data-driven practices from a humanities perspective. It is important to also look at the larger picture that statistics take in in this society. Scholars as José van Dijck and Cukier and Mayer-Schönberger have already laid out some groundwork, but they have barely scratched the surface. Statisticians are skilled in discovering the strengths and disadvan-

tages of equations and predictions within their set of assumptions]. The humanities allow a critical glance of the *system* in which data are analysed and statistics are produced and talked about as a whole. Whereas Statisticians are experts in translating worldly information into numerical summaries that can be used for comparison, humanities scholars acknowledge the 'why' of such systems and 'how' of such systems in a more societal context.

Part III

BACK MATTER

A

AFTERWORD

For me, Statistics Netherlands is a fascinating organisation. Almost every Dutch person has heard about it at least once. CBS is mentioned in news articles on a daily basis. Still, it was mostly a mystery what was happening inside before I first visited CBS. I was told by an employee that many interns were pleasantly surprised about CBS as an organisation once they were working there. On hindsight, I can say I share that experience.

In the academic year of 2016–2017, I conducted research for my master in *Methodology and Statistics for the Behavioural, Biomedical and Social Sciences* for about nine months at CBS in Heerlen. In that period, I encountered the politics on computing statistics based on non-standard data sources, such as social media or big data. I realised how many discussions take place before new indicators were developed and it intrigued me. When I had completed this first master thesis, I did not feel like leaving CBS yet. I wanted to find out more about the OS politics of CBS and its international collaborations and I simply wanted to learn more from all the experts at CBS. That is how I decided to look for a way to do my second master thesis, in *Media and Performance Studies*, at CBS too. I am very grateful that the methodology department provided me with that opportunity.

The past months of research for this thesis were still not enough for me to fully grasp CBS as an organisation. It took a long time to develop my final research question. The approach I had towards my topic changed considerably in this process. As I had been submerged in the world of the statistics and social sciences in the years leading up to this study, I started out with a more quantitative approach. Soon, I realised that that the value of humanities research lay in *making sense of what is happening*. Consequently, I started to reframe my research topic into what it has now become.

In this thesis, I wrote about what I perceived as characteristics and ideological values of CBS. For me, it was never a question that various levels of abstraction impacted the production process of CBS: it came to me intuitively that it was a sensible approach. Other humanities scholars have pointed out that they were pleasantly surprised by this perspective. Only towards the end of my thesis, I realised that my source of inspiration for this operationalisation was my background in statistics. A branch of statistics dealing with *multilevel models* or *hierarchical linear modelling* assumes that there are influences on a variable on various levels, each becoming increasingly more specific. Not until the very end, I understood that through using this approach,

and thereby through my backgroud in statistics, I managed to introduce a new, layered method of study of production infrastructure in the field of the humanities.

Amongst humanities scholars, I have often received suspicious glances when my master's degree in statistics came up in conversation. Many were sceptical of me being able to be critical and nuanced enough to do the type of research required in the humanities. However, I belief that – under the right circumstances – statistics and humanities can go well together. The academic and professional relevance of this thesis proves that. In fact, the past year of research made me realise how valuable the connection between statistics and humanities can be. Topics assessing the assumptions underlying statistical practices have been on my mind for years. I never thought much of my ideas actually: I took my perspective on these matters for granted: what some people would refer to as 'the imposter syndrome'. Thesis reviewers from either field have made me realise that statisticians and humanities scholars alike are intrigued to hear me voice this perspective on doing statistics, because it is new to both. Statistical production is too much of a leap to critically engage with for humanities scholars, while the argumentative, contextual voice is beyond the scope of what statisticians are trained for. I, therefore, would love to see more studies addressing this cross-section. I would like to remind researchers that both sides should be equally valued though, as I often experienced prejudices from either approach to the other.

I may have understood both the value of this project and the ideological layers underlying CBS work of production, but neither of these insights helped me through the writing process. Getting a sense of the sensitivities of the literature and the project within CBS was one thing. Capturing all in text was quite another. It was a challenge to get the first words down on paper and to find the coherency and structure in all my thoughts. To be honest, I think I was impaired from having too much information gained at some point: it was a bit overwhelming at times. Yet, it was simultaneously the incredible benefit of being inside of CBS: I heard so many views on the work of CBS that it could provide me with a nuanced perspective that I could not have obtained as an outsider. I did not manage to cover all my thoughts in this thesis, so I would like to encourage someone else to do so. One thing is for certain: I have learned a lot by being within CBS, by diving into this specific topic, and from the thesis writing process in general. I wouldn't have missed either of these experiences for the world.

This study includes many of my thoughts on CBS, but due to its scope of my research questions I could not include everything I wanted to mention. Above all, I believe this thesis and its conclusions lack the acknowledgement of the incredible helpfulness of CBS employees. Regardless of which department they were in, CBS employees made time to talk to me concerning my research when I asked

them too. Even if they did not agree with my points of view, they valued my intent as a researcher to dive into their way of working.

Now this thesis has been completed, CBS may be out of my sight, but it will surely not leave my mind.

Lena Tichem
Utrecht, August 2018

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Layout design based on the “classicthesis” stylesheet of André Miede.

Final version as of August 2018.