Shaping Politics

The Place of Computing in the Netherlands of the 1980s

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Summer 2013

Handed in at the Descartes Center in the course of the program "Historical and Comparative Studies of the Sciences and Humanities"

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CONTENT

I Introduction

What role does computing technology[1] have in our society? Many might have asked this question, especially in the light of the recent disclosures concerning the world wide US and UK surveillance programs. The unauthorized and secret collection of billions of records giving insights in the communication habits of millions of internet users shocked entire nations. This thesis is a contribution to the question which role computing technology has in our society, as I investigate how computing's role developed and how it has changed our world, although I touch privacy issues only briefly.

This is, undeniably, an ambitious goal and the present research can only contribute a small part: it is the aim of this thesis to study the role of computing technology in the Netherlands and how public perception of computing interacted with technology policy, technological innovations, and the automation of the public sector in the 1980s. Two political case studies are at the core of this thesis: the Information Technology Incentive Plan (Informatica Stimuleringsplan) and the automation of the administration of the new Student Grants Law – both have never been investigated before. I will introduce these cases in a moment but let me first turn to the concept of 'Public Perception.'

I am using the printed press to represent public perception; but can the public perception or opinion of a whole nation really be reproduced? And does not the press usually represent many different opinions that do not give one homogeneous picture of the public? As this research will demonstrate, press coverage on computing technology issues throughout different newspapers (see section *ii* for more details) was very homogeneous in the 1980s. Moreover, newspapers not only reproduced their readership's views but had a decisive influence on their reader's opinion, especially with regard to computing technology and politics. But why use such a vague concept like 'public perception' in the first place? The two case studies under investigation here were strongly influenced by public perception and studying these direct and indirect correlations will help to define computing's role in Dutch society a little better. Moreover, perception is also an indication for the type of technology that was preferred and therefore implemented.

It is necessary to understand the public attitudes towards the two case studies but also to illustrate why these two measures were introduced in the first place. Therefore, I give a brief overview of the way computing was publicly depicted and discussed in the three decades preceding the 1980s. This period, that is the topic of the first chapter, was central for the perception which influenced the handling of and debate on computing in the 1980s. Between the 1950s and 1970s, significant attempts were made to make sense of computing technology, its implications for society, and its potential to support the growth of the national well-being. Digital computers were often perceived as external entities that were put upon society – for the good or the bad. This static concept of technology was widespread and was only recently overthrown by scholars as the historiographical section of this paper discusses.

[1] I use the term 'computing technology' because I refer to entire computing systems: not only hardware but also software is encompassed by this term.

In the 1970s, many voices called for a more responsible handling of science and technology and for a renunciation of the single-minded engineer's mentality that seemed to ignore all consequences technology had on society and the environment. However, for a number of reasons, which the first chapter discusses as well, attitudes towards technology seemed to have changed by the 1980s. In particular, information technology (IT) was publicly accepted as necessity for the future of Dutch society and efforts were made to integrate computing organically and sustainably.

After having set the stage, the second and third chapters will investigate the 'Information Technology Incentive Plan' (Informatica Stimuleringsplan: INSP)[2] and the automation of the administration responsible for the new Student Grants Law (Wet Studiefinanciering: WSF). The first was a large-scale program that aimed towards the stimulation of the Dutch private IT sector and IT education. The latter was a single project comprising the design and implementation of a computer system that automated the administrative processes of the student grants. Both programs were initiated by the same ministry, the Ministry for Education and Science, both ran between 1984 and 1988, and both were presented as benefactors for Dutch (IT) education.

At first glance, these cases might not seem comparable. The INSP comprised over a hundred projects while the latter was as a single automation project. While the INSP swallowed about ƒ1.7 billion (at that time about $600 million)[3], the WSF 'only' cost about ƒ80 million. Yet, in spite of these quantitative discrepancies, there are many reasons why these measures can and should be analyzed together. Both are typical for changes in the automation practices of the Dutch government; indirectly, the WSF automation project was a trial for a new policy as promoted by the INSP. In particular, the public responses to these two cases are of great interest. The scandal of the student grants in the 1980s is still remembered by many though perhaps not in detail. By contrast, the INSP, although put in the center of the political agenda in 1984 and mentioned in the Queen's Speech one year later, is forgotten. The possible reasons will be investigated here. Both cases are significant as they reveal valuable insights in the practices and opinions on information technology within the government, private businesses, and the press. They demonstrate how political promises and shifts in priorities misled public opinion but they also indicate why the acceptance of IT in the public played such a central role for public discussions and political actions with regard to IT.

Taking everything together, this thesis investigates the role of computing and how this technology had changed and influenced the work of the public administration and the political agenda. Both measures support these claims. They also allow conclusions regarding the way computing technology was seen by the public: although having

[2] The 'Informatica Stimuleringsplan' literally translates into 'Computer Science Stimulation Plan.' However, the term 'informatica' is rather broad in Dutch and considering the wide range of projects supported by the INSP, I decided to use 'Information Technology' as translation.

[3] It is very difficult to give the exchange rate of that time. Between 1984 and 1988, 1 Dutch Gulden could be exchanged from 3.5 – 2.5 Dollars. Currencies were very unstable. This of course does not indicate how much this amount would be worth today. Taking out the inflation, $680000 would be worth approximately $1.3 billion today (CoinNews 2013). A handsome sum!

great influence on public decision-making and the economy, information technology was usually put aside in public discussions. Computing was marginal in public perception, an entity that did not influence society. Moreover, both cases are exciting but mostly forgotten narratives that are brought back to life in this thesis.

The case studies, but especially the INSP, are very complex and numerous reports, committees, and interest groups were connected to them. In order to make it as easy as possible for the reader to follow the tangled relations, I designed what I call 'Reading Diagrams.' Starting in chapter 2, the reader will encounter schematic diagrams that illustrate the relations between the most important programs and committees. The diagram is extended throughout the paper and the complete overview is added to the conclusion. I do not refer to these reading diagrams literally as they are introduced as support of the written text. Moreover, a number of abbreviations are used throughout the thesis. Although all are explained at least once, the reader will find the breakdown of all abbreviations listed at the end (see chapter *5*).

i Acknowledgment

Foremost, I want to thank Gerard Alberts for fully supporting me and my work despite personal difficulties. I also want to thank Bert Theunissen for his valuable comments and his support as well as Jaap Bos for pushing me a little further. Much gratitude goes to the Descartes Center at Utrecht University for accepting me as graduate student but also to the Chair of Philosophy of Technology at the BTU for providing a most valuable bachelor education. In particular, Gerhard Banse, Karsten Weber, and Steffen Groß: thank you for the trust and support. However, I would have never been able to pursue my studies without the constant and devoted help and support of my parents whom I cannot thank enough. Johannes Koslowsky, thank you for always being there for me and believing in what I do! And lastly, I cannot say how much I appreciate and the amazing help of Antje Rumberg, Susanna Bloem, Jing Gen, and Iris van der Knaap. Thanks to everybody.

ii Sources

This thesis relies on a variety of sources as it depicts the opinions and positions of many different groups. As already indicated in the introduction, 'public perception' of computing technology is an important aspect of this research. Of course, the public is a broad and diverse group. I refer to perception of computing that was coined by the press and I rely on national newspapers as representation of the public voice. Important discourses can be retraced by looking into different types of printed papers with a wide circulation that reach different parts of society. I mainly draw from four national newspapers that had a wide and diverse readership throughout the Netherlands: NRC Handelsblad, Nederlands Dagblad, De Volkskrant, and De Telegraaf. Some articles are drawn from the paper De Waarheid. Using newspapers – a very rich but also very complex historical source – has been made much easier by recent developments in digital technology: some newspapers can be accessed and fully searched online. Yet, there is still a long way to go until the digitalization will be completed, and I was still required to

conduct great parts of my research with the help of microfilms. The image of the public opinion will be rounded by studies that were conducted by other scholars.

Especially important in this research are the political positions. This side is represented by official publications of the parliament, political reports, and correspondences between officials. I was lucky to have access to a small private archive regarding INSP, ESPRIT, and other measures concerned with the development of microelectronics and information technology but I also used the extensive resources of the National Archive in The Hague. Moreover, preceding this thesis was an Oral History project with senior professionals from the Dutch software sector. Information gathered in these interviews gave important direction to my research.

iii Historiography and methodology of the history of computing

At this point, I would like to introduce the reader to the historiography of the history of computing and introduce some theoretical approaches underlying this thesis. It will also be analyzed why most literature on computing technology is focused on the United States and why it is so important to investigate the computing history of other nations as well. In this context, a brief overview to the available literature on Dutch history of computing will be given.

This thesis can be placed within the history of computing. However, I do not investigate the realization of a specific system nor do I give many descriptions of technical details. Other scholars may be better qualified to detail the technicalities. Rather, I focus on the question which role computing technology had in the political and public discussion and how this perception contrasted the actual role computing had in certain areas of society. In this context I am interested in which respect computing has changed and influenced society. The following section gives a brief overview of the different approaches to the history of computing over the past decades and places this thesis within the current debate.

Since the introduction of computing technology, there have been a number of approaches to study the history of this discipline. In his paper *Understanding 'How Computing has Changed the World'*, Misa identifies thee different traditions and proposes at the same time a new approach (Misa 2007). The first and oldest he describes as "machine-centered phase," the second as the "professional historians of computing" that were investigating "the varied roots of the information age," and most recently, historians that have analyzed the influence of institutions on computing. Misa proposes a fourth "line of research" that should "focus on the interaction of computing [...] with large-scale transformations in economies, cultures, and societies" (ibid.:53).

Let us take a closer look at these different traditions. The earliest contributions to the history of computing were mainly made by former computer experts. They had put down their personal memories of the time they had contributed to the first computer systems. Although valuable in many respects as they bear many accurate technical details that would otherwise be lost, these accounts were usually a biased and sometimes incomplete recollection of past events. They often did not consider the impact computing had on society and usually told the story of heroes (Mahoney 1988).

A new generation of scholars wanted to overcome the historical contributions of computing pioneers and composed a history that focused on computers as information processing machines. These studies investigated the impact of information systems on corporations and institutions and analyzed the larger economic and political picture. For instance, James Cortada conducted an extensive three-volume study regarding the impact of information technology on the US economy (Cortada 2004; Cortada 2006; Cortada 2008). YoAnna Yates carried out a more focused research by investigating application software for US insurance companies during the 1960s and '70s (Yates 1995). Misa also counts Martin Campbell-Kelly's, Paul Ceruzzi's, and Jon Agar's studies as part of this tradition (Ceruzzi 1999; Campbell-Kelly,Aspray 1996; Campbell-Kelly 2003; Agar 2003).

The third school of thought proposed by Misa identifies studies concerned with the influences of institutions on computing systems. He put forward as examples the works by Janet Abbate, Arthur Norbert and Judy O'Neill, and Jeffrey Yost (Abbate 1999; Norberg, Arthur L., O'Neill, Judy E., Freedman, Kerry J. 1996; Yost 2009). However, I disagree with this differentiation of Misa who calls these studies "a pronounced shift in emphasis, if not an entirely novel dimension" (Misa 2007:55). Although explicitly studying the institutions that influenced the realization of computing systems, the methodology and aims of the 'third tradition' do not differ markedly from the second group of historians. They should rather be seen in the same traditional line. Although they have a different perspective they still tell, like the 'second tradition,' a one-sided story: the first exclusively investigates the role technology had on, for instance, the economy, while the second is restricted to external influences on technology development itself. They do not consider the complex interaction of both, external and internal factors.

As an alternative, Misa proposes a new approach that embraces methods from a variety of disciplines and that "situate[s] computing within major historical transformations" (ibid.:56). Engaging in a two-fold research of "analyzing the social shaping of technology as well as the technological shaping of society," a concept also known as 'co-construction,' would be central to this methodology. Perhaps inspired by Misa's call or maybe born as a child of its time, there have been recent studies that emphasize indeed the influence of computing technology on the 'daily lives' of people. Corina Schlombs, for instance, analyzed the reactions of Unions regarding the introduction of computing systems in Germany. She also conducted a study of changing work processes for female workers in banks and insurance companies (Schlombs 2010). Nathan Ensmenger can also be counted within this 'tradition' with his book *The Computer Boys Take Over* (Ensmenger 2010). In his account, he analyzes the professionalization of programmers and their place in and impact on society. There are additional examples that follow Misa's proposal. In some cases, scholars have taken a technological object as their 'main character' of investigation, as for instance Cristina Turdean who followed the Slot Machine into its age of digitization and explained its growing importance within US society, its economic impact, but also how the machine itself was shaped by new trends in society (Turdean 2011).

These few examples show that Misa's call for a new direction within the history of computing has been heard by a small number of scholars. This thesis is the attempt to contribute yet another study that investigates the changes computing technology provoked in society. In particular, the technology's meaning for today's democracy will be the subject of discussion. The aim is to investigate the difficulty of accepting and understanding these new relations. To meet these high and complex aims, a large body of theoretical approaches underlies not only my own study but a majority of the work that seeks to meet Misa's expectations. Although these methodological discussions are usually not placed within a historical paper, I would like to make them explicit as they make up an important part of this research.

a Studying the concepts of material artifacts

This thesis uses the ideas and concepts of many different human actors and brings their stories together. What combines all of these actors and their narratives are the changing concepts of computing technology or automation. By putting concepts of a material artifact in the center of this analysis, I want to demonstrate how this new technology was discussed by politicians and the press, how it was embedded and used, and how it changed daily practices. Not only did computing have a significant impact on political decisions, it was itself the subject of public debates. The meaning of computing changes several times throughout my story. The various actors each contributed their own conceptual alterations as did computing itself. I investigate these interactions between computing und society.

With the linguistic turn that took place in the 1980s, many scholars began looking for alternative ways to grasp 'reality'. This included the renunciation from the history of the 'big white men' and a turn towards group dynamics, acknowledgment of minorities, and the consideration of nonhuman factors. One prominent representative of this group is Bruno Latour who tries to include the material world within social and historical research. In this school of thought, machines have just as much impact on the formation of facts as the different groups that have an interest in them. Latour's approach for studying science and technology requires an analysis of conflicts or discussions and calls upon the investigator to follow them until they have turned into a 'solid fact' (Latour 1987). This methodology became known as Actor-Network-Theory (ANT).

Latour has been criticized from many sides for his radical positions and his denial of the concept of the 'social'. Moreover, many complications arose when his theory was applied in practice (Latour 2005; Russell 2012; Clarke,Star 2008). However, within the History of Technology as well as in Technology Studies but also in Gender Theory, Latour has become very influential as he opened the field for studying the interaction of the material and human world. It paved the way for new approaches and methodologies.[4] This turn towards the material acknowledges that computing can be an element influencing reality but also the perception of the world. The extent to which technology

[4] Making technologies visible and demonstrating their effects on our decision making as well as our perception of reality has also become a central element in the philosophy of technology. Latour plays a central role in this discussion (Verbeek 2005; 2011).

should be seen as an independent actor is, however, disputable: technology changes processes and practices, it can cause great distress and joy but it is rather disputable that computing acts with a goal. Nonetheless, considering technology's influence can reveal valuable insights regarding priorities and habits of the time under investigation.

This assumption implies another supposition: just like facts, technologies are never simply imposed upon their users. Already the discrepancy between planning and realizing any technological system is great. And the ultimate product that is produced should not be considered final either: every technology is shaped by its use and users. Technology obtains its meaning from being used. Many have urged the research world to acknowledge the importance of this interaction, most notably Oudshoorn and Pinch (Oudshoorn,Pinch 2003). They argue that interactions shape the objects which in turn shape their users. This process is usually referred to as 'co-construction.' It is also an important tool in history: it opens up the possibility to gain deeper understandings of cultural characteristics and implicit assumptions or opinions. Looking at these interactions reveals attitudes, emotions, and standpoints towards science and technology and their place in the society under investigation.

a A US bias? Computing in the Netherlands

To round this theoretical discussion on methodology and historiography, one final section is crucial for pointing out the importance of this study. There have been some studies and publications concerned with the complex social structures that led to the introduction and implementation of computing systems and the social and cultural changes they provoke. However, there is a distinct US bias within the literature. Most scholars studying the impacts of computing came from the USA and placed their studies within the history of their country. At first sight this might seem justified considering that the most important developments within computing took place in the US. Also, almost all known IT businesses, even in Europe, have traditionally been US-based, such as *IBM*, *Microsoft*, or *Intel*.

This bias came under criticism during the past decade. It was pointed out that a mere focus on the 'large players' neglected the important role many small and non-American companies or institutes played in computing development. Looking only at the most important businesses was considered the same as restricting the research to individual pioneers. This one-sided story would suggest that all innovations were made in the same country and were simply introduced all over the world and adopted without any impact. Technology would only influence work processes but would, at the same time, remain unchanged. Yet, as already pointed out above, technologies are not 'just adopted' but are changed by specific users and their customs. Recent studies have shown the importance of local and national influences on, for instance, *IBM* technology and the products of other major business. For this reason, many European scholars have

called for more awareness and attention directed towards these local characteristics (Schlombs 2006; Misa 2007; Lundin 2012).[5]

I am following this call by putting my focus on the Netherlands. Although a small country, the Netherlands can look back at a long and distinct history of computing. However, relatively little has been written on the topic thus far. In 2008, the Gewina journal *Studium*[6] published a special issue on Dutch computing history (Bogaard,Alberts 2008) with articles focusing on Dutch programming styles, the Mathematical Centrum Amsterdam, and the domestication of computers in Dutch society (Alberts,Beer 2008; Veraart 2008; Bogaard 2008).

Also in 2008, almost the same authors published an extensive volume, covering the entire history of Dutch hardware-implementation (SHT 2008). At the moment, a group of researchers is preparing a similar publication on the history of the Dutch software developments. Besides these recent efforts, there have been some publications based on dissertations concerned with the topic of Dutch computing and automation (Wit 1994). Moreover, professional journals for engineers and computer scientists have occasionally published articles on the history of computing and have investigated the role of the government as a client for automation technology (Westing,Band 1992). However, none of these publications has investigated the case of the WSF automation. Some publications mention the incentive plan, yet, only very briefly (Ende e.a. 2004). Others confused the reasons and aims of the IT stimulation program, placing it in the wrong context and thereby presenting an inaccurate historical image (Donk,Dael 2005).

It is usually assumed by the few studies conducted on computing in the 1980s that after the euphoric 1960s and the skeptical 1970, computers were organically integrated and accepted as part of a 'modern' Dutch society. It is also often argued that growing IT competence, the further spread of computers, and conscious political measures had contributed to this integration. Yet, as this thesis will demonstrate, computing was still treated as an external phenomena (although it was closely intertwined with society) and in return, the effects the technology had on political decision-making were put aside. The two case studies are valuable examples for showing the difficulties of accepting and integrating new technologies consciously within society. They also demonstrate how important computing really had become for the public administration.

[5] Per Lundin gave further reasons for this bias: not only the dominating position of US businesses supported the one-sided scholar attention but especially the absence of professional computer science societies in European prevented further scholarly work. Latter are important interest communities that support and commission scholars to investigate their professional history.

[6] "Studium is the official journal of Gewina, the Belgian-Dutch Society for the History of Science and Universities (est. 1913). It is published in co-operation with the Huygens Institute for the History of the Netherlands of the Royal Netherlands Academy of Arts and Sciences" (Gerwina 2012).

1 Computers in public perception

Before turning to the case studies, it is important to investigate the dichotomous attitudes towards automation and computing between the 1950s and 1970s. This is the time when the first impressions of computing influenced public perception, and this period also shaped later technology policies.

1.1 Celebrating Automation

Discussions on computing technology began in the 1950s with the rise of automation in the USA. The term "automation" was coined in 1947 as an alternative to "automatization" by Delmar Harder, manager at Ford.[7] It was brought to the attention of the wider public in 1950s with the book *Automation* by John Diebold (1926 – 2005). Diebold used the term to denote "both automatic operations and the process of making things automatic" (Wit 1994:78). He was a great advocate of automation, especially focusing on the possibilities that the implementation of computers could bring to businesses and the US military.[8] Computing systems had proven to be powerful machines for processing large data sets but they were still in their early stages of development. Diebold considered them the future of automation. He provoked an early and broad discourse regarding computers and their place in society.

Nonetheless, not everyone was as convinced of the positive effects of automation as Diebold. Norbert Wiener (1894 – 1964), for instance, claimed that sooner or later, machines would control people and would have, on a long term, a negative effect on employment (Wiener 1950). "From the various definitions of automation it became clear that the human operator would be replaced in the process" (Wit 1994:80). Yet, the majority foresaw mainly positive effects from automation; many even predicted a second industrial revolution. Contrary to Wiener's position, automation was considered a boost for employment since it was seen as having the potential to engage more specialized people. Corina Schlombs even claims that computers would soon be seen as 'productivity machines,' a stimulant for boosting the economy (Schlombs 2010). As de Wit summarizes, "unemployment and debasement versus upgrading of work formed important themes accompanying the discussion on automation [in the United States]" (Wit 1994).

Thus, this research begins in the United States with the, very broadly speaking, prediction of a social change and a disagreement regarding the implications of this shift. In popular talks and publications, it is very common to reflect upon these early US discourses and translate them unaltered into the histories of other western nations.[9] The impression is usually conveyed that the same restraints towards computing were expressed in all 'developed' countries throughout the 1950s and 1960s, including the Netherlands.

[7] It was an artificial term that originally referred to "the growing use of electromechanical, hydraulic and pneumatic special-purpose production and parts handling machinery" (De Wit:78).

[8] It is disputed which computer was the very first as the validity of this claim depends on the definition of 'computer.' Fact is that around the 1930s, concepts of digital computing were developed and first programmable devices were constructed by different people and institutions at different places around the world (Campbell-Kelly,Aspray 1996).

[9] This is amplified nowadays by popular talks on the internet; for instance (Brooks 2013).

The sources suggest a different story. Although the dichotomous US discourses had an effect on Dutch society, resulting discussions were limited and reserved to a political elite that mainly repeated the American standpoints. Public opinion towards computing was positive – maybe even euphoric. But why?

In the Netherlands of the 1950s, mainly leaders were concerned with the implications automation could have on the nation. As a result, committees were formed and meetings held in order to comprehend the developments. All things considering, the Dutch experts concluded that automation would have a positive influence on the economy. Many prominent figures stressed that automation could never be complete anyway since human labor would always be necessary to operate machines. Moreover, automation was described as a 'natural' evolvement: processes had been 'mechanized' for many decades, and automation was presented as the next step of this progression (Technische Commissie Automatisering 1957; Bosch 1958; Wit 1994:85).[10] It promised greater efficiency and was therefore considered to contribute to increasing wealth. It was generally presumed that digital machines would greatly improve working processes and thus productivity. Many groups in the Netherlands concerned with automation were also convinced that a radical social change was about to happen, a second industrial revolution, but in a positive way. This was the common opinion that was also reflected in the public perception of computing as will be seen.

There were a few Dutch intellectuals opposed to automation at the end of the 1950s. Remmer W. Starreveld (1907 – 1995), for instance, was an important Dutch representative within this side of the discourse. He tried to turn the attention to "the elimination of human labour" (Wit 1994:83) that was caused by automated processes, but he rejected the concept of a second industrial revolution. According to de Wit, Frederik L. Polak (1907 – 1985) was also a great opponent who considered automation a serious threat to social order. This threat was assumed to find expression in a devastating second industrial revolution. However, other scholars, for instance Ruud van der Helm, present Polak in a more differentiated light. As a cultural critic who became famous for his creation of the Dutch Futurology studies, Polak recognized that automation could lead to unemployment and social upheaval. Even so, in the first place, he was eager to see the positive effects automation could bring to society (Helm 2005).[11] An inner conflict – a great uncertainty regarding automation and its effect – was underlying Polak's work. Although these intellectuals were important figures, they did not form a coherent countermovement and their ideas had therefore little direct impact. They "were not well connected with relevant organizations and failed to attract public support" (Wit 1994:88). The movement did not touch the public at first. However, these critical but often dichotomized voices existed and had their long-term effect on the Dutch culture. They affected certain groups and individuals whose influence became decisive a few

[10] A very similar statement was given by Agar in his book *The government machine*. In order to justify its automation processes, the British government presented automation as "a natural sequel to earlier stages of mechanization" (Agar 2003:327).

[11] Polak got familiar with the concepts of automation during a trip to the United States where he got acquainted with Norbert Wiener.

years later, and they were indirectly present in the positive discourse of the 1950s and 1960s.

The positive images of computers, as spread by officials, were reflected by the press that informed its readers about the new miraculous machines. There was no balanced discourse regarding the state of the art of computing but rather a fantastic description of future applications. For instance, some newspapers reassured their readers that automation was indeed not a danger by repeating the US discussion: the technology was not taking over humanity but would instead require more and better educated people, it would remove the need for hard labor, and thus would enable people to have more time for thinking (Goudvis 1970). Many newspapers painted futuristic images of computer-supported automation that are so often recalled nowadays. They stated, for instance, that computers would soon translate foreign languages (Waarheid 1964) or that by the year 2000, people would only work three days per week for a couple of hours. By this account, robots, private airplanes, and the betterment of the whole of society were the results of automation (Suer 1966). Even De Telegraaf, a newspaper that usually reported on new US computer developments and Dutch computer installation, published an article that reported of "talking typewriters" (Telegraaf 1963). Most articles on computers were composed in this style.

Very few representatives of the public voice considered it relevant or convincing that automation could possibly have negative effects on the social order or on employment. Computers were instead seen as the key to progress, yet, the depiction had hardly anything to do with reality. Most elements were fictional and the reports painted a very abstract but positive image of the effects and the future of automation. To a certain extent, they portrayed a positivistic worldview with science at its center and computers were the key to a utopian world.[12] These findings correspond with de Wit's interpretation. He also states that newspapers concerned themselves little with 'real-world' computer systems but rather told the story of 'giant electronic brains.' Moreover, the way computing was presented and perceived by the public was in great contrast to the concerns of computing experts.

The importance of this discrepancy between public perception and the 'real-world' users cannot be stressed enough. In the 1960s, businesses and other users usually saw computers as advanced punch card machines. It was a conservative use in spite of the fact that real-time performance[13] had been achieved. These systems were far removed from the enthusiastic descriptions and the hopes spread by newspapers and magazines. But computers were increasingly used in the Netherlands, especially in public administration. Already from the 1950s onwards, public departments made contracts with *IBM* and other large IT companies in order to computerize their administration.

[12] Computers became the ideal instrument of science: they were objective and could never be wrong. Efficiency in this context was equaled with objectivity.

[13] Real-time: computer system that is responding directly to an operational input. This technology revolutionized the interaction between users and computers; SAGE was considered the first successful real-time implementation (Ensmenger 2010; Campbell-Kelly 2003)

These early automation efforts were mainly technocratic, ignoring the specific structure of the organization (for a more detailed description see 2.4.1).

Although actively engaged in automation, the government did not start any major initiatives to stimulate innovation within the national IT market. The government also promoted only a few initiatives concerned with the education of computer scientists or the introduction of general training programs. These efforts were mainly left to schools and private businesses. There were no reasons for supporting such initiatives: complex computing systems running on mainframes seemed not to be a public concern. After all, computers hardly affected the private lives of the people and the Dutch public seemed to be content with their perception of the 'super-brains'. Therefore, public opinion mattered little to nothing when it came to the realization of the first public computing systems in the Netherlands (Wit 1994:90).[14] The criticism voiced by some intellectuals was constantly present but it had no direct effect on public perception, yet.

Discussions concerned with the outlook of a cultural shift provoked by technological changes had arrived via the United States in the Netherlands. It was an intellectual but mainly political discourse, idealizing technological innovations and their future impact on the economy, and in doing so calming public responses to computing. This early discussion was not dominated by fears and uncertainties but rather by great hopes for a better future. This resulted in an ever growing gulf between the public concept of computing and actual implementations. Yet, there was no interest to overcome this gap. It seemed as if computing technology did not need to be grasped by the masses. This technology could be treated like a sophisticated tool, a peripheral entity, for a certain elite and in support of existing structures. In return, the public perception of this new technology was shifted towards the impossible: computers were modern superheroes that would 'save the world.'

1.2 The 'threat' of computers and microelectronic

In spite of these positive depictions, doubts that had been voiced by automation opponents never entirely disappeared. The constant, indirect presence of critical intellectuals as well as the increasing expertise regarding computer systems throughout society triggered a first shift in the discussions on computing in the Dutch public at the end of the 1960s. This discourse has to be seen in the context of the growing 'Flower Power' movement that demonstrated against nuclear power and called for a change in environmental policy due to the devastating results presented in the report of the Club of Rome.[15] These factors had contributed their part to the growing unease with technology. As a result, left-wing intellectuals gained ground in Dutch society and in the course

[14] Yet, it would be wrong to deny that futuristic concepts did not have any influence on the realization of computing systems. These exhilarating images of computers raised costumer's expectations and many were hoping that computer would bring great and fundamental changes. The fast developments of that time seemed to support this confidence. Machines also promised to enable total control over work processes – a prospect especially welcomed in Great Britain as Agar points out.

[15] The publication was more successful in the Netherlands than in any other country.

influenced the position of technology in public perception. These movements were all triggered and shaped by rapid technological developments.

This change in attitude towards computing found its first expression in the opposition against the fourteenth general Dutch census that was scheduled for January 1971.[16] The census can perhaps be considered the first large-scale resistance against computers in the Netherlands. Ten years before, a few people had already opposed the thirteenth census due to privacy concerns. One of the contractors involved in the census had copied and sold sensitive private data; this resulted in fines and lawsuits against civilians. The census of 1971 not only evoked these memories but made matters worse. For the first time, a computer was going to process and store all data.

Many officials involved in the census tried to draw the attention to the positive aspects: much more detailed – and less faulty – information would be collected to help make sense of certain groups, their difficulties, and desires. The census promised to provide a new image of Dutch society. Moreover, all data could be processed in only five months, thanks to the computer (Dijkman 1970; Hees 1969). Nevertheless, the majority did not care for the calming reassurances. The Hippie movement was just about to turn around the traditional power relations and many did not trust officials anymore (Blessing 2005). The idea that a computer would process and store all data was unacceptable for most, and they did not want to listen to the official's explanations. Also, the fears imposed by the Cold War – the possibility that Soviet forces could invade the country in a similar manner as the Germans had 30 years ago – contributed to the radical opposition to the census. It was considered possible that dictators – as the Nazis once did – could come and misuse all the data and nobody would have the power to battle the computer. The machine had turned into an undefeatable enemy too powerful and smart to resist and fight (Kleyn 1970).

But also the current parliament was not trusted. People did not trust the effect of the promised privacy measures and were convinced that the numbers representing each citizen could easily be matched with the real names by a computer (NRC 1970).[17] It did not matter how. For some, the major concern was that the census had opened the door for the 'Big Brother' state. In the future, this state would have each citizen registered as one number and X-ray all actions: "Entire Netherlands then sits in a mechanical brain, called 'database' in modern jargon. [… D]oes privacy exist at all or are we extradited to everybody who has an interest – of whatever kind – in our entire possessions and lives?" (Kleyn 1970).[18] Others saw themselves as guinea pigs in a big citizen-research whose results could easily be accessed by third parties, as, for instance, by the treasury

[16] According to Blessing there has never been a publication on the census besides the evaluations of the results in the 1970s (Blessing 2005).

[17] Regarding the procedure of the census: all gathered data was punched on cards on which the clear names as well as the number of the corresponding person was noted. When put on magnetic tape, only the number was used. The punch cards were supposed to be destroyed after three years. There was a discussion to keep a random sample of 10% in order to enable comparative studies with the next census that was scheduled ten years later (Kleyn 1970).

[18] You will find the original Dutch quote in Supplement 6.

or by spies. Moreover, many felt as if they were going to be literarily stuffed into a computer but they did not want to be "numbered and move into a computer" (Gans 1970).[19]

Since the debate continued to escalate, politicians had to reassure that the data of each citizen were safe under the existing law. Yet, few believed these reinsurances. Protests continued into the next year and as a result, some major changes to the census were introduced.[20] Yet, in spite of the resistance, the census took place and, 'only' 250,000 refused to participate. But a great number of people chose their own way of boycotting the survey: the questionnaires were returned with so many mistakes that they could not be processed by the computers (Blessing 2005). But also technical problems were contributing to the delay of the analysis because the magnetic tapes of the *IBM* computers were not compatible with the *Philips* mainframe (Dagblad 1971).

With the census, it was realized that the impact computing had on peoples' lives was of a different and less utopian nature than previously thought. A general unease with technology had grown. As a result, computing technology had become a serious topic in the public discussion. It had left the realm of fantasy and transformed into a force that tried to undermine the social order. The new technology had become the vehicle for a wave of public protest and shaped its discourse. Solutions were found to trick the machine which had turned into a real opponent. The overwhelming power of this resistance, triggered by computing, forced politicians to alter privacy policy.

But it was not only the abstract concept of a threatening super-machine that made the responsible administration worry. Rather, they were faced with quite 'normal' technical problems: missing hardware and software standards were a well-known obstacle at that time. They hindered and slowed down processes and caused great additional costs. There were more consequences drawn from the census: computing had forced the first serious confrontation with questions of privacy, and the technology had become an initiator of political movements. The protests, which computing had provoked, directly touched upon the question of how the technology should be implemented in society. For the protesters, it was clear that computers were supposed to stay out of their private lives.

Another incident that contributed to the growing distrust in computers was the economic crises of the 1970s. The public did not blame computers for the economic downturn. Nonetheless, right at the end of the 1960s, new developments within computing indicated great changes regarding costs and applicability of computing technology: microelectronics[21] and the resulting microprocessors[22] promised to open entirely new

[19] And the fine of *f* 500 was high for those that refused participation in the census.
[20] According to Blessing, this period was called "Stormy Fall" (Stormachtige herfst).
[21] Microelectronics: the realization of very small electric components from semiconductor material.
[22] Microprocessor: complete central processing unit (CPU) on one silicon chip. It is claimed that the first microprocessor was designed by Intel employees in 1971.

fields of applications. Also, the further spread high level programming languages[23] offered new grounds in computing. In many respects, computers had come much closer to daily life than ever before, and instead of contributing to the enhancement of society, they were threatening peoples' jobs. High salaries with a three day working week seemed to have moved further into the realm of dreams and now, many were worried about unemployment that faced them due to the economic crisis. Since microchips were cheap and could be integrated in all kinds of devices, many workers began to worry that they would be laid off for the electronic super brains.

However, microchips promised to open up a number of new business opportunities – a beacon of hope in times of crisis. Opposing all pessimistic views, experts from research and industry pointed towards the practical uses of microelectronics, seeing them as the best way to overcome the economic downturn. They stressed that the technology was not about to replace human workers. Rather, microelectronics would open up new job opportunities for highly qualified personnel. This technology was even considered to become one of the most central elements within the economy. A publicly held discussion between these two opposing camps erupted in August 1978 with J. van Boeckel's article criticizing the reserved position of the Netherlands with regard to microelectronics (Ende e.a. 2004). In many respects, it was a revival of the opinions exchanged in the USA during the early 1950s (see 1.1). Yet, the context and motives were different in the Netherlands: the country was in a time of crisis and faced with a double-edged question of identity. Could new technologies become an inseparable part of Dutch society? Would they indeed contribute to and help stabilize the economy or would they turn out to be a threat to the social order? This included the question of what to do when computers suddenly entered the household and indeed became part of everyday life. It was a discussion that had the fundamental question of modernity at its center and it was going to shape future substitutions and implementations of computing systems in the Netherlands. Society was divided over the issue.

The intensity of the debate called for government attention. Although engaged in automating its own administration, there had been little focused effort directed towards strengthening the place of IT in the Netherlands. The public pressure forced the government to take a clear position towards computing technology, in particular towards microelectronics. The public issue became a political issue that required a solution. The resulting decision of the Dutch government marks an important change in the handling of scientific and technological questions within the government. At the end of the 1970s and for the first time, an official technology assessment report was commissioned with the task of considering all the different public interests. This report will be the topic of the next section. It was so important because it was most central for the incentive program that is the topic of the next chapter.

[23] Programming languages that use code related to or deduced from natural languages. It made programming more accessible for a wider group. FORTRAN and COBOL, for instance, were often used in the 1980s.

Computing technology had made quite a development in the three decades after 'arriving' in the Netherlands. Starting out as an abstract concept that could change social order, it transformed in public perception from a world-saving character into a threatening enemy that could also potentially save the national economy. It became the cause for mass demonstrations and new laws and was the focus of many different interest groups. The decisions that were made over the next years increased the available funds for computing systems and changed public attitudes. But first, computing had to be made officially a necessary part of Dutch society.

1.3 Making sense of computers: the Rathenau Report

"Broad research regarding the consequences of microelectronics is necessary" was the heading of an article on the front page of the newspaper Nederlands Dagblad, published on December 4, 1979. It quoted directly from the report on the *Social Consequences of Microelectronics* (maatschappelijke gevolgen micro-elektronica) (Adviesgroep Rathenau 1980). The report had been composed by a consulting group under the same name (adviesgroep maatschappelijke gevolgen micro-elektronica).

At the end of 1978, the first Van-Agt government[24] installed a group of researchers as a result of the continuing disagreements on microelectronics and the general impact of computing. The group had been asked to assess the effects of these new technologies, taking into account the whole of society. The outcome is usually seen as the first technology assessment[25] contribution of the Netherlands – an important milestone often considered as a symbol for changes in attitude towards technology and citizen participation. The Rathenau Report, that was handed over to parliament in December 1979 and which was going to receive much public attention, emphasized that a future-oriented analysis of the public discourse on information technology was necessary. It gave differentiated advice to parliament and incorporated the interests of the public. Did the report indeed offer the solution to the extreme positions within the discourse on microelectronics and computing technology – a middle-way that appropriately weighed the different standpoints?

The chairman of the advice group, whose name was soon to be used for the report, was Gerhard Wolfgang Rathenau (1911 – 1989)[26]. Rathenau had been working for

[24] A central-right government coalition of CDA/VVD; 1977 – 1981.

[25] Technology assessment (TA) was a movement that originated from an US Congressman. It aimed towards anticipating the negative effects of new technologies. Many European groups were interested in a similar institution for their own national parliaments, though changing the interpretation of the TA approach to fit national characteristics. In the case of the Netherlands, public interests were considered as well as the possibilities for using TA as an assessment of possible economic growth (Eijndhoven 2000; Daddario 1972 [1968]; Daddario 1968). It was institutionalized in the NOTA (Nederlands Organisatie voor Technology Assessment) and is presently known as Rathenau Institute.

[26] Rathenau was born in Charlottenburg, a town that became part of Berlin, in 1911. He finished his PhD in Physics at the University of Göttingen in 1933. One year later, he left for Groningen – as a Jew, he had been accused of spreading Communist flyers in Germany. Four years later he began working for *Philips Electronics Ltd*. – he stayed with the company until 1953. He received a

Philips Electronics Ltd as manager of "the department for physics, specifically the groups Futurology, Magnetism, Metals, and Sterling Motor [...]" (Delft 2012). Rathenau's connections to futurology are of great importance; these interests indicate that he was familiar with Polak's ambivalent theories of automation (see page 12). The critical voices towards computing technology that only few people had paid attention to in the 1950s and '60s had now gained important representation right in the center of society. Computing's place was assessed anew by a group whose leader was familiar with two very different worlds: the business interests in microelectronics and the critical intellectual approach that pointed towards the many unpredictable side effects of it. Besides Rathenau, a large interdisciplinary group of researchers came together in order to compose the report – most of them from universities, some from the private sector (for a tabular overview turn to supplement 1).

In the report, detailed descriptions of the technology 'microelectronics' were provided and the wide range of its applications discussed. However, the major conclusion of the report did not only stress the necessity to investigate the consequences of the new technology as the Nederlands Dagblad had suggested. The most central statement dealt with the embracement of microelectronics. The group was certain that the future of the Netherlands depended on the further development of this technology – only by consciously stimulating microelectronics could it be guaranteed that the Dutch identity could further prosper. The group strongly advised to recognize the importance of microelectronics as they considered it as central for the Dutch identity. Education in information technology was seen and presented as the key to achieve these goals. Also, further research and especially technology assessment were suggested (see footnote 25).

The government voiced its satisfaction with the proposals of the Rathenau Report. In its official reaction, it agreed on most of the suggested points. Especially the public was to be introduced to the new technology; a center for microelectronics was to be opened for this purpose. Central and repeatedly emphasized were the aims to indeed support and stimulate IT education in all areas of society. The government hoped that every student would soon learn how to handle microelectronics as this technology was seen as the key to a prosperous future. Careful and considered integration would help to make the everyday work life easier for many people. Moreover, it was promised that more computer science teachers in higher education[27] were to be employed and the government also ensured that it would stimulate businesses to make more use of the new technology (HTK 1980). Indeed, microelectronics had become the center of public attention.

This open declaration of support had far reaching consequences for computing whose further development depended on microelectronics: it was no longer a marginal interest in politics. The technology had gained the attention of the entire nation and

call to the University of Amsterdam where he began as professor for Experimental Physics. However, after ten year he returned to *Philips*.

[27] HBO is a vocational training, comparable to the English polytechnics of that time.

was even put in the center of its cultural and social future. Education and better assessment were the slogans of that time. Entire political programs were brought to life only for the benefit of computing technology. It had indeed undergone a steep career.

This had not gone unnoticed by the national newspapers, which reacted almost as enthusiastically as the government. Many reported on the results of the committee, discussing the future possibilities for employment and emphasized the necessity of microelectronics. Thus, computers had also become the new focus of interest in the press. The technology was no longer an abstract fantasy but part of the 'real world.' Many articles stressed the positive aspects as, for instance, the new opportunities for boosting the national economy that were opened up by the new technology. Only a few doubted that microelectronics could really improve the job market. Those critical voices were concerned with the great loss of low-level work that was to be expected (Volkskrant 1979a; Dijk,Rozendaal 1979; NRC 1979). Altogether, most argument of this discussion had appeared in the press before.

One topic was new in the public discussion: IT education. It had not been a central issue in the public debate but due to the priorities set by the Rathenau Report, educating the public on the possibilities of microelectronics had become most central. The idea of introducing a center for microelectronics to coordinate these educative efforts was generally welcome. It was presented as the most efficient way to get the best out of the new technology, and integrate it adequately in society (Volkskrant 1979b). During the following years, the term 'Rathenau Report' became representative for handling, understanding, and integrating technological changes in society.

Microelectronics had become the central topic of discussion. This new technology, which stimulated new areas in computing, was of the greatest importance within the Dutch technology discourse. It became a symbol for an official change within politics. A number of studies and political actions central for Dutch technology policy were published as a result throughout the 1980s (Wentink,Zanders 1980), including the incentive plan, which is the topic of the next chapter. The Rathenau Report also conveyed the message that the most important element the Dutch government had to consider was IT education. Teaching computer science was presented as the most promising approach to guarantee a balanced but also future oriented handling of micro-technology and its great application diversity.

1.4 A preliminary conclusion

In the first chapter, I investigated how computing technology entered the consciousness of the Dutch public. Beginning with utopian concepts of computers, the devices were usually connected with automation and the improvements they could bring to society. However, a constant uncertainty regarding computing's effects on society was always present, although it did not gain wide-spread grounds. A shift in attitudes took place with the social movements of the 1970s: computers gained more ground throughout society and many felt threatened by their presence, feeling unable to comprehend the consequences. The results were expressed in the resistance against the fourteenths census but even more so in the discomfort with microelectronics that was,

inter alia, enabling the design of microchips – miniature versions of computers. The resulting discussions brought computing technology to the attention of the largest part of society and provoked first extensive debates on the topic.

This brief excursion revealed many central aspects. Not only did it demonstrate how computing became part of the public consciousness, it also pointed out how the technology itself influenced the formation of public movements. In public perception, computing was a superior technology that had to be publicly resisted. The unease grew when the technology became so small that it could be implemented anywhere. Ironically, this changing appearance provoked a greater presence. People wanted to know what they were facing, and they wanted to control it. However, this social countermovement did not diminish the position of computing but provoked rather the opposite. By bringing computing to the public attention, use and implementation of the technology were directly affected. Privacy issues but also potential for economic growth were becoming attributes directly linked to computers. Computing had become the center of attention at the end of the 1970s. And this was going to change future implementations of systems.

As a result, computing was turned into a necessity. The extreme positions had not disappeared but it was no longer acceptable to publicly oppose the technology – after all, it was presented as crucial to save the Dutch identity. It might seem that computers were seen more realistically in Dutch society and that the extreme positions regarding their positive and negative impact had been left behind. After all, a consensus was reached with the Rathenau Report that satisfied many different groups and it seemed as if this 'new' technology had finally arrived within Dutch society. It had apparently become integrated and was accepted coherently.

However, this 'acceptance' was linked to a central demand: education. It had been publicly promised that education programs for all generations could overcome the negative aspects of computing that many feared. The IT Incentive Plan, which the next chapter will investigate, seemed to fulfill these promises as it officially aimed to realize and implement the recommendations of the Rathenau Report. Yet, as the upcoming chapters will show, in the 1980s, computing systems were still perceived and handled as something external, touching society only peripherally and not as entities that influenced discourses and people's actions. Yet, computers were already decisively influencing decision processes and dominated official agendas and economic agreements.

2 Stimulating Computer Science: The Information Technology Incentive Plan

At the beginning of 1984, the Minister for Education and the Sciences, W. Deetman (CDA) (*1945)[28], made an announcement that surprised the public: he promised to invest half a million Gulden in computer science education. The program he proposed was the Information Technology Incentive Plan (Informatica Stimuleringsplan: INSP). Many wondered where all that money should come from (Cornelissen 1984b) – after all, the government was cutting budgets everywhere. However, it had been a central recommendation of the Rathenau Report to invest in IT education, and it therefore seemed justified. But why did it take so long to realize these demands in the first place? More than four years had passed since the publication of the Rathenau Report. The explanation might be easier than expected: from the early 1980s on, the Dutch political landscape had been unstable. The second and third Van-Agt government had both resigned before completing their legislation.[29] Therefore, the realization of the recommendations given by the Rathenau Committee was left to the new government, usually referred to as Lubbers-I[30]. Austerity measures in welfare and education were a central part of the government's policy. However, although money was short, the government did not hesitate to implement the proposals from the Rathenau Commission.

The venture by Minister Deetman to invest in computer science education was received positively as it promised a further and better integration of IT in Dutch society – in public eyes a necessity to prevent misuse. For this reason, many newspaper headlines presented the INSP – of which education was, in fact, only a part – as a measure of the Ministry for Education and the Sciences. It seemed as if these stimulation measures were solely in the interest of IT education and therefore installed for the greater good of the Dutch society (Dagblad 1984a; Cornelissen 1984a; Telegraaf 1984b). But Deetman's ministry was not the only one responsible for the INSP, nor was the program exclusively concerned with IT education. Also the Ministry for Economic Affairs under Minister G.M.V. van Aardenne (VVD) (1930 – 1995) and the Ministry for Fishery and Agriculture under Minister G.J.M. Braks (CDA) (*1933) were responsible for the program. The INSP made , around ƒ1.3 billion for IT stimulating projects available between 1984 and 1988; the greatest part of this money was not reserved for education but for the IT business sector stimulation.[31] Yet, the set-up of the policy suggested that it focused primarily on educa-

[28] Born in 's-Gravenhage, Wim Deetman started his career in a Protestant educational institute. In 1963, he became a member of the CHU (Christian Historical Union = Christelijk-Historische Unie) which later 'merged' with two other parties and became the CDA (Christian Democratic Appeal = Christen-Democratisch Appèl).

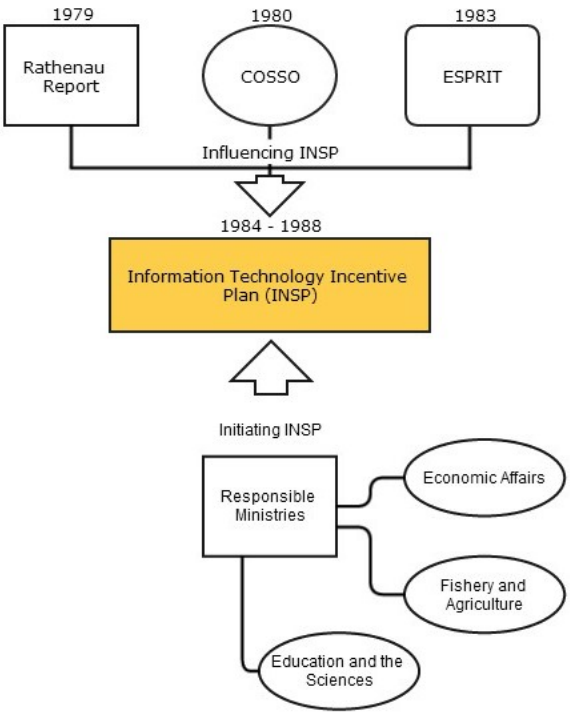
[29] The third Van-Agt government, a minority cabinet of CDA and D66, tendered its resignation due to great economic problems.

[30] This was (once again) a center-right coalition of VVD and CDA.

[31] Although the Ministry of Fishery and Agriculture was an official partner in this threesome, it had very little to say. Only a small part of the available money was reserved for the agricultural sector. Later on, the Ministry separated itself from the other two ministers and set up its own incentive program that became a very successful IT stimulation of the agrarian sector.

tion. Education was the topic with the most detailed description of goals and even received its own preliminary publication next to the official policy (O&W 1984a; O&W 1984b). Only the NRC Handelsblad dedicated an article on the INSP that clearly pointed out the central position of the market sector in the policy (NRC 1984b). All other newspaper reports were restricted to the advantages the program would give to IT education. There was a clear tension between the public presentation of the INSP and the actual realization of the law. This discrepancy will be most important in the analysis of this policy.

Before looking at the aims of the program in more detail, we have to zoom out for a moment and consider the INSP in its larger context. The Dutch government was not only pressured by the unrest provoked by microelectronics at the end of the 1970s and the urge of the Rathenau Report to promote better and more sustainable integration of computing technology in society. There was also an international aspect to the INSP policy that should not be underestimated: at the beginning of the 1980s, the European Community (EC) had introduced its own large-scale measure for IT stimulation. The EC directed incentives towards the European IT market and tried to link industry, universities, and research institutes in an innovative and international manner. The program, Strategic Program for Research and Development in Information Technology (ESPRIT), was the first of its kind – at least with regard to its scope and aims (EC 1984; EC 1983). It put the Dutch government under great pressure to present a similar national program, especially in light of the Rathenau Report.



Reading Diagram 1

Furthermore, there were other factors influencing the policy decisively. Although the INSP was mostly connected with the Rathenau Report due to its publicly declared focus on education, there were many other interests involved that had a much stronger say in the final version of the policy than the Rathenau Report. Most prominently, the group COSSO (Vereniging Computer Service- en Software Bureaus = Association for Computer Service and Software Houses), an interest group that represented all large software companies at that time, had great influence on the direction the INSP was heading. The association was founded in 1972 by twelve of the largest software companies in the Netherlands. It was COSSO's goal to advice companies, institutions, and the government to improve the professionalization of the sector and IT education by introducing quality standards and by setting

up an international network (Dagblad 1972). Companies like *Volmac*, *Philips*, and *C&G* were represented by the group, which grew over the years and tried to make its voice heard. And indeed, the interest group managed to draw the attention to the interests of the industry in the case of the INSP. COSSO's suggestions, compiled in the report *The Computer Service Industry in the Netherlands* by the Quantum Science Corporation (Quantum Science Corporation 1980), were taken very seriously within the INSP: the report stressed the deficits of the Dutch IT industry, urging the government to take action and introduce stimulating measures for the sector in order to enable Dutch companies to catch up with international competition. The report also emphasized that existing companies should be particularly supported in their efforts to contribute to the growing demands of the IT sector. In response to this analysis, the INSP focused on the importance to support and strengthen the national IT sector – for instance by giving expensive and innovative automation contracts of the public administration to businesses; a topic of interest in the upcoming sections.

For all these reasons, computing technology gained great importance and had won a central position in Dutch policy. Nevertheless, the role of the public should not be underestimated in this context. The public debates of the 1970s had made the topic one of interest for many Dutch citizens – many wanted to ensure that computing was used in a manner that was in the best interest of the entire nation. The INSP seemed to support IT education in order to secure a better integration of the technology and more acceptance which would eventually lead to more innovation and a growing economy. The public discussions on microelectronics had also been an important trigger for the government to act and it explains also why the INPS could be introduced despite the great financial difficulties the government faced. Austerity measures dominated many areas but information technology had the highest priority. The INSP seemed to offer the integration of computing into Dutch society; a claim in vast contrast to the actual realization, as will be seen.

2.1 The aims of the policy

This section gives an overview of the policy's context, demonstrating that the aims of the INSP were not primarily focused on education. The incentive plan was a most ambitious project. It promised the unconventional but fast stimulation of all areas of IT, always taking into consideration the interests of society. The policy consisted of five focus areas that were presented in the following order:

1. Advice and consciousness raising
2. Education
3. Research
4. Market sector
5. Government as Incentive for Innovation

In the main publication of the INSP, the descriptions of each section were broad, only sketching the general aims (O&W 1984a). First of all, the program was supposed to introduce elaborate advice programs for the wider public as well as for businesses: "The

business and public oriented advice programs have the goal to make the Dutch society aware of the chances of computerization so that the possibilities are made applicable" (HTK 1985d:4).

As already emphasized, the second focus area of the INSP – the measures for stimulating computer science education – was presented as the most central aspect. IT was described as the future of the Dutch society; creating human capital would strengthen the computing sector. Cooperation between businesses and schools was suggested as a crucial element. It was thought that within five to ten years, all students need to have general knowledge of information technology systems. Also, different areas of applications were suggested as, for instance, vocational training or the introduction to computing in special education. The incentive did not target education at the university but training on all other school-levels (Supplement 2 provides a detailed overview of the clusters making up the second focus area).

The third section, 'Research', was placed upon three pillars: basic scientific research at universities, specific research for intermediate- and long-term projects, and finally application research, aiming towards short-term projects. In particular, the need for interdisciplinary approaches and cooperation between different sectors was stressed. For the basic research, companies were to be supported financially, and there were plans to greatly expand the Center for Mathematics and Computer Sciences (Centrum voor Wiskunde en Informatica: CWI). For the other two research fields, many applications and topics were suggested, such as telematics and new programming techniques.[32]

Although not proclaimed publicly, the greatest focus of the INSP – at least in terms of budget – was placed on the Dutch national IT sector, the third focus area. The goal was to increase the automation of Dutch companies, support research, especially for bespoke software, and fund large-scale projects. This was thought to strengthen the sector as a whole. More cooperation, national and international, would support the structure of the companies. The emphasis was especially on well-positioned businesses – they should receive all support as they were considered capable to design and implement new software due to their good position. Special attention was also given to the possibilities the government could offer: stimulating innovation, supporting privatization, and funding advanced projects for state use.[33]

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[32] The goals were defined as follows:
1. "Greater quantity and especially quality in computer science research in the Netherlands, putting special emphasis on research areas in between computer science and other disciplines
2. Penetration of computer science as research tool in all scientific areas and in the whole of the research establishment
3. Awareness for (the use of) computer science in all existing research institutes.
4. Cultivation of the necessary "human capital" in research and educational establishment
5. [It is a proclaimed goal to realize] of a programmatic cooperation within computer science: on the one hand between the research world and businesses and on the other hand with social groups" (HTK 1986c:11).

[33] To boil it down to three points:
a) "Developing and supporting research

With respect to the last focus area, efforts were explicitly directed towards the automation of the public administration. The INSP aimed to support the private sector by putting it in charge of supplying hardware and software for the public administration. It was described as the responsibility of the state to focus and direct its great power of stimulation, especially in its role as 'leading edge customer,' asking for innovative but also costly solutions. The INSP clearly indicated that the public administration should hand over all automation responsibilities to the private sector, especially the expensive bespoke contrast. This fitted well with the neoliberal policy of the Lubbers government.

Considering the aims of the five focus areas, the INSP was indeed not a program for IT education. It was one of many goals to achieve better education but the means to reach it were seen mainly in the cooperation with businesses; a statement true for all five areas. Research was to be conducted by businesses, the government automation was laid in the hands of the private sector, and also the advice program was really in the interest of companies.[34] Computing had become a business opportunity, and it was a tool for improving the relationship between the government and private companies. It had gained a new role: computing, once an abstract concept, now made politics, and it had turned into the key player. The public controversy about IT and the following medial focus on IT education justified the high expenses of the INSP in the eyes of the public. But was the technology developed with INSP substitutions innovative? Did it compete with the international market? This remains to be seen.

It would be inaccurate to assume that all professional voices that had called for more IT stimulation were satisfied by the INSP. Rather the opposite was the case: although presented as a great step in the right direction publicly, various interest-groups that commented on the INSP policy indicated that many aspects of the incentive plan were insufficient. These critical voices were known to the ministries involved but they were never made public – another aspect that demonstrates the contrast between the public perception of the program and political motives behind it. Below is a summary of a few letters that were sent to the parliament in reaction to the INSP.

Although the Committee for Computing and Information Processing Hardware for Scientific Education and Research (Commissie Reken- en Informatieverwerkende Apparatuur Wetenschappelijk Onderwijs en Onderzoek: CRIVA) was thrilled by the announcement of a policy concerned with information technology, the committee had many points of criticism. For instance, the program was described as unfocused. The CRIVA claimed that the important role of the existing computing centers[35] was entirely underestimated and therefore not recognized in the INSP. The committee also pointed to a general lack of expertise when it came to the policymakers. This resulted in statements and formulations of the policy that were, in the eyes of the CRIVA, entirely outdated. The committee especially criticized the plans for privatizing the computer cen-

b) Strengthening of the market position of Dutch IT producers within and outside the Netherlands
c) Strengthening and spreading tailor made IT products within Dutch businesses" (ibid.:17).

[34] Already in the second progress report, the first focus area was called "advice for businesses" (ibid:11).

[35] The CRIVA referred to the state-owned computer centers *RCC* and CCL. More in chapter *2.4.2*.

ters. Yet, it also stressed the need for the incentive measures, calling for cooperation: "a stimulation of computer science only makes sense for a small country if the whole intellect is summoned and if the incentive policy targets all areas of science and education" (CRIVA 1984:15).

Another, even harsher critique, was given by the Council for the Advice in Science Policy (Raad van advies voor het wetenschapsbeleid: RAWB). Although the council considered it a positive decision to stimulate computer science, their judgment regarding the INSP was crushing, without any positive comments on the policy. To make a long story short, the council considered the policy as too general. The INSP had assumed that the market was homogeneous which led to an artificial equalization of many different aspects. The RAWB suggested more specialization that would enable the Netherlands to stand out against international competition. More precision and a clearer focus were needed for successful IT stimulation in the Netherlands. The INSP as presented was by and large described as insufficient (RAWB 1984).

The Committee for Technological Sciences (commissie technische wetenschappen), appointed by the Academic Counsel (Academische Raad), was also unhappy with the INSP. In particular, the committee disagreed with the INSP's negative depiction of Dutch IT education. The committee, in contrast, considered existing education to be quite advanced in many respects and it pointed towards the positive and innovative education and research that already existed in the Netherlands. However, it welcomed the recognition of the important position of the technological sciences and stressed that more staff was needed at colleges. The committee considered the investment in personnel to be more viable than the financing of quickly outdated hardware (AR 1984c).

In spite of these negative comments, the ministries did not change the policy. These critical voices never even reached the public, although the criticism touched many – for the public – sensible areas. As a result, no journalists reported on the INSP beyond the opinions published by the ministries. Given this, what exactly did reach the public with regard to the INSP? One event that was widely featured in the newspapers can be taken as representative for the aspects that the press covered: a conference in The Hague discussing the INSP in light of IT education. The group of experts that came together emphasized the need to substantiate IT expertise throughout the Netherlands. Prime Minister Lubbers invited everybody interested in the future of Dutch education, such as businessmen and researchers, to participate in the event. Key speakers were not only Minister Deetman and representatives from universities and business but also G. Rathenau. If the connection to the recommendations of the Rathenau Report had not been explicit enough yet, every doubt was eliminated by this conference (Telegraaf 1984a). The clear message was that the INSP indeed aimed at better and more coherent education with regard to Information Technology, which was considered poor and outdated by most of the conference participants. The future of the computing industry was dependent on the new generation that was to be educated by the INSP (Volkskrant 1984a; Telegraaf 1984b).

Despite all the negative responses it received, the ministries responsible for the INSP did not introduce any changes to the program. The INSP had turned out to be in a good and sound position. The public was successfully convinced – via the press – that all stimulation of the INSP was focused on education. For this reason, there was no opposition against the high costs of the program although the policy that had mainly business stimulation at its core, was poorly defined, and was based upon basic assumptions deemed faulty by independent experts.

2.2 The incentive plan is up and running

In order to understand what happened in the course of the INSP and to illustrate the opposition between the 'real' nature of the program and the way it was publicly depicted, this section provides an overview of the projects and processes of the incentive plan. Looking at all projects that were financially supported by the INSP during its five year period would exceed the scope of this thesis and obscure its aim. And even if one would aim at such a detailed description, it would turn out to be a great challenge: there is no overview of all projects that were supported by the incentive plan. Although the three ministries were required to hand in an annual report on the INSP,[36] the five progress accounts that were presented stayed in many regards imprecise and gave a biased picture of specific projects that were considered successful. A description of all projects would be made even more difficult as some of them were only described with respect to their aims, others were defined by their financial frame, while quite a few were only presented very broadly, naming the institution or company responsible for the realization. Very seldom, all these details were provided for one project. Not even the final evaluation gave an overview of all projects, their executives, participants, or financial details.[37] Besides these sources, there was no other publication analyzing the whole INSP.[38]

As will be shown in this section, there were also a number of other indications that many things were dubious in the process of the incentive plan. For instance, the eligibility criterions of the policy, the five-sector division, the communication of the ministries, but also the public representation of the program was questionable. Of course, at hindsight, it can be concluded that a few projects, most notably SPIN but also SURF, both will be described briefly (see 2.3.1. for details), were indeed successful and had impact on the Dutch development of information technology. Nonetheless, these were only two out of at least 120 projects (for a Dutch list see supplement 3).[39] On top of this, each project usually consisted of numerous sub-projects.

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[36] This was a consequence drawn from a request of the MPs Lansink and Van der Kooi (HTK 1985c). Involved ministries: page 22.

[37] That an incentive plan can be transparent and easily comprehended is demonstrated, for instance, by the ESPRIT. This European wide funded IT incentive program was running at the same time as the INSP (see page 22).

[38] The National Archive in The Hague has numerous documents that have not been made public, yet. For future research, it is possible to request permission to accesses these sources.

[39] 120 projects is an approximate number which I compiled by counting all projects listed in the evaluation reports and the final evaluation. Most projects that are named by the evaluation

Although generally accepted as sensible and necessary, the INSP policy had been harshly criticized by experts, mainly for its broad, unspecific, and often outdated approach. As it turned out, these remarks were no false accusations but they pointed to profound problems. The situation was as follows: the three involved ministries wanted to enable quick and unconventional stimulation in the light of the growing criticism triggered by the Rathenau Report. Yet, centralized in-house expertise and management were missing – a conclusion at which the evaluation committee of the INSP arrived in 1988 (Cramer e.a. 1987; CEI 1988b). The "quick incentive program" (O&W 1984a) was introduced nevertheless. Also, although each ministry had different interests, they tried to combine forces in order to convince the government and the public that their policy was relevant and needed. In many respects, the Rathenau Report had given the justification: computing was declared a major priority in the Netherlands and therefore, quick and unconventional solutions were necessary. This seemed only possible by circumventing the rules and standards that usually came with subvention schemes.

As a result, everybody – every company, every school, every institution, and even a private citizen – could apply for money from the INSP. There were no restrictions defined in the policy. The decision who would receive project report seemed rather arbitrarily. Moreover, not only was the possible group of those that could profit from the policy extremely broad; also, the object of stimulation was entirely unspecified: hardware or software, personnel or money for educational measures, studies, research – everything was covered by the INSP. On top of this, there was no standardized procedure regarding the application procedure.

The need for information technology was urgent – urgency seemed to justify this chaotic approach. And it went further: new proposals were always willingly accepted. It seemed to be a desperate situation. There was no deadline installed for applications: up until the end of 1988 – officially the end of the entire incentive program –, new projects were accepted and financed – in spite of austerity measures. This made it rather difficult for anybody to gain an overview of all running projects, especially since a standardized presentation and description of the projects was missing. There was more. Although the five focus areas were officially separated, there was much overlap when it came to

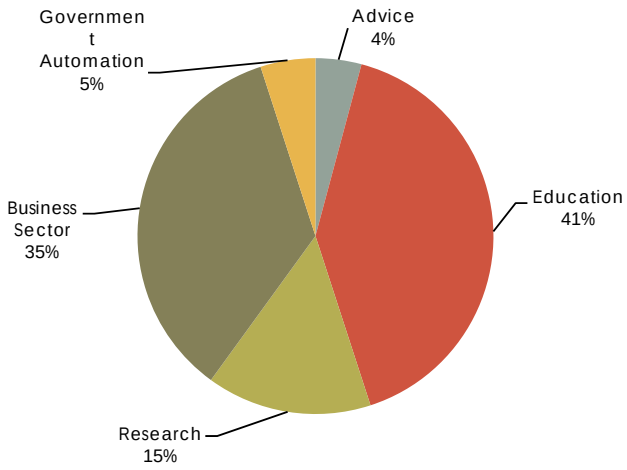


Figure 1: Number of projects per INSP focus area in % (n=120 projects) (CEI 1988)

were also mentioned by the progress reports at least once. However, this is not the case for every project. Either, they were named differently by the evaluation committee or were simply not included in the progress reports. It can therefore be assumed that an unknown number of projects was never mentioned.

the financing and management – at least in connection with certain projects. Larger programs, as for instance SPIN and SPIN-OV, cross-financed projects within other INSP focus areas.

As already indicated above, the INSP financed approximately 120 projects. Figure 1 gives an overview regarding the proportional distribution of the 120 projects per focus areas. Of course, the number of projects per focus area does not tell the reader anything about the monetary distribution. That 'Education' had the greatest number of projects does not reveal anything about the money the educational projects received. Hence, when it came to the budget of each focus area, things looked somewhat differently (figure 2). Of the available ƒ1.7 billion – the original sum had been ƒ1.3 billion but it was quietly raised – more than 50 percent were given to projects in the private market. Education did receive a large share, 22 percent of the money, but it was clearly not the major focus.

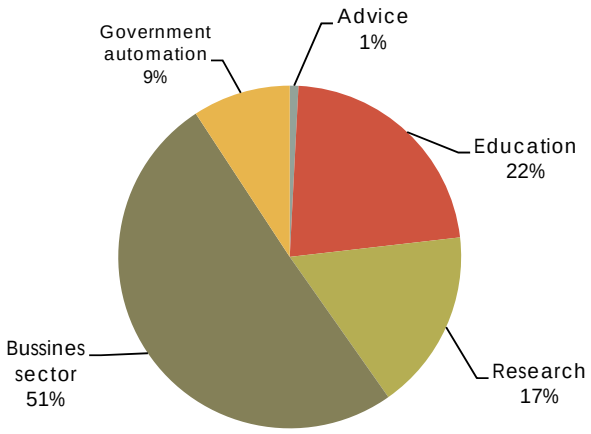


Figure 2: Monetary distribution per INSP focus area in % (n=ƒ1.7 b.) (CEI 1988)

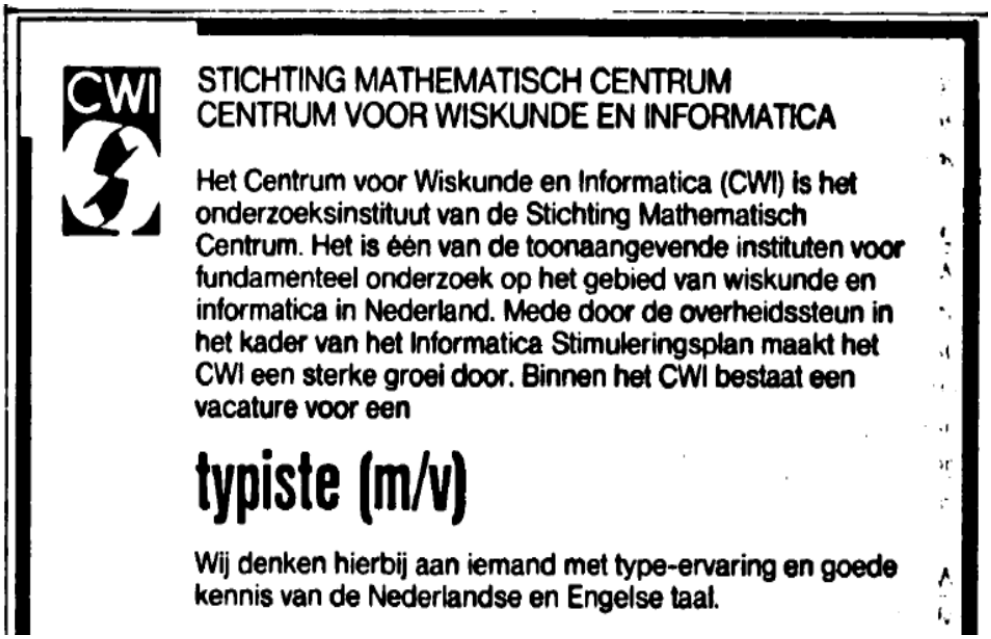
Before turning to a few project examples, a few final remarks regarding the realization of the progress reports have to be made. Each focus area had a different management team. By taking into consideration the incoherent form of the progress report – each focus area was presented differently – it can be assumed that these management teams hardly communicated or exchanged results. Yet, although these teams might not have communicated with each other properly, it is almost certain that there was an attempt to present the INSP in the most favorable light. It was the aim to convey the impression that IT was stimulated evenly in many different areas that were central for the future of computing. Dutch computing seemed to be in a healthy balance and on its way to become integrated in society. However, a close look at the progress reports would have revealed the inconsistencies which were pointed out in this section. But nobody seemed to be interested in a thorough investigation of this program. The reports and the implementation of the incentive plan were not criticized publicly although many aspects were obscure and in clear contradiction with the original promises.

2.2.1 Project examples

The vast majority of the 120 focus areas were in 'Education' and 'Business Stimulation.' In this section, I would like to look at the two most prominent projects, SPIN and SURF, both from the focus area 'Research.' Also the extension of the CWI and the most expensive project, MEGA, will be briefly introduced. These examples were chosen because they illustrate the enormous scale of the INSP and not because they were necessarily representative for the incentive plan. Most INSP projects were quite diverse and it is not easily done to present this diversity by taking only a few examples. Those that I

picked should be seen as an illustration of the differences but also of the complexity of some of the projects. The public usually did not connect these projects with the incentive plan itself.

SPIN was an abbreviation for Stimulation Project Team Computer Science Research (Stimulerings Projectteam INformaticaonderzoek). The project was placed in the focus area 'Research' and received an INSP budget of ƒ50 million. At least three times as much money was drawn from other sources. Its aim was to perform strategic research on topics that were not only touching computer science but also other disciplines. SPIN made proposals for interdisciplinary research, brought together researchers, business, and other experts and supervised these projects. In charge of SPIN was a technological-scientific advisory body composed of experts from the research and the business world. Just in the area of computer architecture, SPIN supported three different projects already in 1985 (HTK 1985d).[40] At the end of the INSP, SPIN financed nine 'Strategic Research Programs'[41]. Each of these programs came with a bundle of subprojects (HTK 1989).[42] What distinguished SPIN from most other INSP projects was the fact that it provided detailed annual reports (SPIN 1988; SPIN 1989; SPIN 1990). It was consid-


STICHTING MATHEMATISCH CENTRUM
CENTRUM VOOR WISKUNDE EN INFORMATICA

Het Centrum voor Wiskunde en Informatica (CWI) is het onderzoeksinstituut van de Stichting Mathematisch Centrum. Het is één van de toonaangevende instituten voor fundamenteel onderzoek op het gebied van wiskunde en informatica in Nederland. Mede door de overheidssteun in het kader van het Informatica Stimuleringsplan maakt het CWI een sterke groei door. Binnen het CWI bestaat een vacature voor een

typiste (m/v)

Wij denken hierbij aan iemand met type-ervaring en goede kennis van de Nederlandse en Engelse taal.

Figure 3: Section of a CWI job advertisement for a typist. Due to the INSP, the CWI received great amounts of subsidies and was for this reason expanding (Telegraaf 1985).

[40] Already in the same year, SPIN also considered projects in the area of industrial robotics, system development platforms, flexible automation, artificial intelligence, and many more.

[41] Analyses and Synthesis of Language, PRISMA (Parallel Inference and Storage Machine), FLAIR (Flexible Automation and Industrial Robots), SERC (Software Engineering Research Centrum), Program Small Research I and II, Three-Dimensional Image Analysis, Knowledge Based Systems, and Human-Machine-Communication with natural language (HTK 1989).

[42] SPIN is an example for a project that cross-financed INSP projects within other focus areas. For instance, the program FLAIR was a project in the focus area Market Sector but it was initiated and financed by SPIN (HTK 1985d).

ered successful and continued until 1994. In the annual INSP reports but also in the evaluation, SPIN was usually presented as a key project of the program.

Much less successful was the extension of the Centre for Mathematics and Computer Science Amsterdam (Centrum voor Wiskunde en Informatica: CWI). The CWI received great sums of money in order to employ new staff members and extend the scope of projects in the area of basic research. The job advertisement (Figure 3) gives the extension as reason why the center was looking for a new typist and even connects the increase of funds with the INSP. However, after 1988, all additional funds that the CWI had received were unexpectedly cut again. As a result, many employees had to be laid off and projects were terminated.

Another success was the project SURF (Cooperative Organization for Computing Service for Higher Education and Research = Samenwerkingsorganisatie voor Computerdienstverlening in Hoger Onderwijs en Onderzoek). SURF also published an own magazine that still exists today, although under a slightly different name (SURF 1987b; Kievith,Wijngaart 2000). The foundation conducted all kinds of research connected with the cooperation between higher education and research institutions. The users were in the center of SURF's research, especially the professionals. How could their work be made easier? SURF wanted to improve teaching and study processes, make the access to documents easier, and support experiments. Most central was the project SURFnet. It promised to enable access to colleges and research institutes around the world. In cooperation with PTT (State Owned Company for Post, Telegraphy, and Telephone = Staatsbedrijf der Posterijen, Telegrafie en Telefonie), SURF set up the infrastructure for a digital network and wanted to spread, for instance, electronic mail (SURF 1987a; Rosenberg 1987).

Financially, the largest project was MEGA, a collaboration between *Philips* and *Siemens* which was part of the 'Business Sector' focus area. The aim was the development of a new chip-generation. Surprisingly little was mentioned about the project in the progress reports on the INSP although it had a very central position in the program. MEGA's aim was to produce chips with more than 1 MB capacity. Van den Ende, Wijnberg, and Meijer let us know that "*Philips* would dedicate itself to static memory chips (SRAM) and *Siemens* to dynamic memory chips (DRAM)" (Ende e.a. 2004:199). The project failed as a Japanese company was faster in the development of this new chip generation. Nonetheless, there are indications that the DRAM project gave stimulation to a spin-off ten years later.

There were of course also many educational projects but none was considered a great success in retrospect. Most projects provided schools with hardware – that was, according to the CEI, quickly outdated and introduced insufficiently – or subsidized studies concerned with the possible improvement of curriculums. Substitutions for teacher positions or further education projects were rare.

Although not representative for the entire INSP, this section introduced some more and some less successful projects – none of them directly concerned with education. Since especially SPIN and SURF were both considered high profile projects, one could

expect that they would be presented to the public as positive examples for the success of the INSP. But this was not the case as the following section demonstrates.

2.2.2 The INSP in public perception

There were not many newspaper articles reflecting on the INSP or on one of the program's projects between 1984 and 1988; a rather surprising result if one takes in account that that over 120 IT projects were subsidized by the INSP. A peak of articles was reached in the second year of the program. Any thorough national news reader of the technology section interested in new IT projects would have found a reference to the incentive plan maybe once a month in 1985. In 1987, there was almost no article mentioning the INSP.

Considering the distribution of projects with regard to focus areas (Figure 1) one might assume a more or less fair share between economic and educational projects described in the newspapers. Also, the apparent successes of SURF and SPIN could be considered worth mentioning. In fact, there were hardly any articles published that were concerned with projects financed within the business or research focus area of the INSP. A few newspapers referred briefly to research projects as, for instance, an article that reflected on the development of a computer for functional programming (ANP 1985b). The major part of the articles was, however, concerned with the one topic generally perceived as most central to the INSP: IT education. The newspapers conveyed the impression that the INSP was primarily supporting educational projects – quite surprising when considering the amount of other projects. For instance, newspapers featured a program that promised computer science education to early school leavers (Dagblad 1985b). Great attention was also given to an initiative for better computer education. This was an agreement between Minister Deetman and *Volmac*, *Philips*, and *Compudata*. Creating a better foundation of IT education was the proclaimed goal (NRC 1985a; Telegraaf 1985b; Dagblad 1986b). These are only two out of many examples.[43] The INSP was presented as educative program while other projects were blended out by the media.

The impression that the INSP was indeed installed solely in the interest of the Dutch people and in order to embed computing properly in society was even more supported by the Queen's speech in 1985:

> "Many fields are being modernized. Computer science, automation, and telecommunication can be developed for the benefit of society. To achieve this, it is necessary to combine forces of the government and the involved economic sector. In the case of some important activities, as for instance the Information Technology Incentive Plan, we can point towards successes; but with regard to research and development there is still much ahead of us" (Koningin Beatrix 1985).

Queen Beatrix presented the INSP as a good example for the efforts of the officials to modernize the Netherlands for the benefit of its people. By including the INSP in the

[43] Further examples: (Dagblad 1985c; Dagblad 1985a; Dagblad 1986b, 2; Boogaard 1985).

official address from the throne and by calling it a successful endeavor, the incentive program was legitimized and endorsed by the Queen herself. Also, the focus on the business side was approved while the academic and research side were only mentioned as areas that needed to catch up.

The message was clear: there was no reason to worry about the INSP as it was apparently successfully fulfilling its requirements. Perhaps for this reason, the press stopped reporting about the incentive program. Only at the beginning of 1986, there were a few articles mentioning the INSP mainly in the context of education (Janssen 1986; Dagblad 1986b). Yet, less and less articles referred to it. The INSP was drifting out of the public consciousness. This was supported by the fact that newspapers began reporting on projects that were financed by INSP without mentioning this connection. For instance, SPIN subsidized the construction of a super computer – a collaboration between *Philips* and four Dutch universities. This most prominent INSP-project was not even connected with its financing program (Telegraaf 1986b). There are a number of similar examples, one of them is the Pannenborg Committee which is the topic of section *2.4.2*.

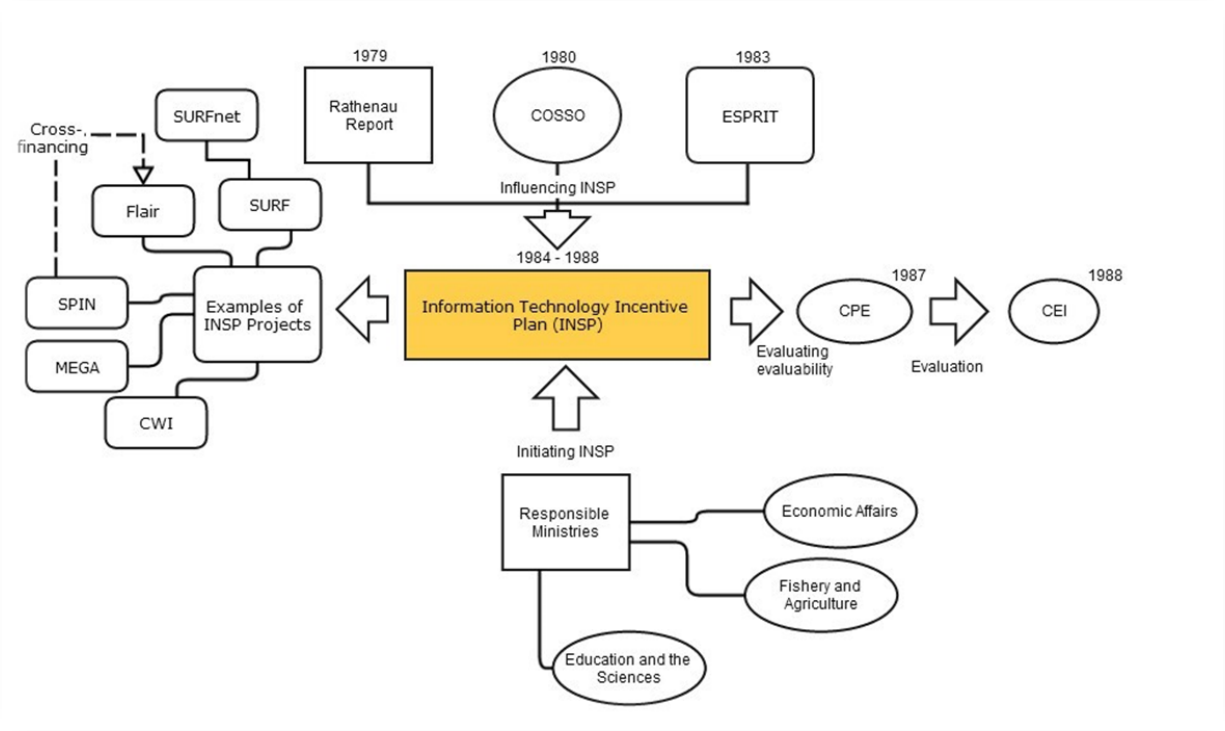
It has been demonstrated that newspapers reported on the INSP very selectively, mainly restraining their articles to projects within the educational sector. The image was maintained that the INSP was for the greatest part concerned with IT education which was realized in cooperation with the private sector. Other INSP projects were sometimes mentioned in the press as well, however, usually not in connection with the incentive program. Was this presentation due to a lack of expertise on the side of the journalists, insufficient communication in the press releases, or was it a general disinterest in the INSP? Probably all of the above! But it should not be underestimated that a large part of the public saw the program only as educative stimulation – it was seen as the realization of Rathenau's proposals and not as a cluster of unrelated projects for the benefit of a few large businesses. For this reason, the reporting was restrained to educative measures. This was also the reassurance that computing technology was taken care of and that it was integrated into society.

2.3 Evaluating the INSP

Perhaps it was not the lost interest in IT after all that fully explains the absence of references to the INSP. The incentive program was so extensive and comprised so many different areas that most people had lost the overview. Even within the ministries, it seems as if nobody was able to keep track of all the different projects that were part of the INSP. In support of this interpretation it may be mentioned that in 1987, a special committee was brought to life whose exclusive task it was to "evaluate the evaluability of the INSP." The Committee Program Evaluation (CPE) was an internal group of the parliament that received the task to investigate how the INSP could be evaluated and to suggest the approach for the official evaluation. The result was a report –*The Evaluability of the INSP* – that contained a preliminary evaluation of the entire program and a methodological framework for the final evaluation (Cramer e.a. 1987).

Altogether, the INSP received much criticism for its chaotic management, the opaque mass of projects, and the way the money was spent. In order to get a hold on

the five very different focus areas, the CPE suggested evaluating each focus area separately. Be that as it may, the CPE judged that these focus areas did not fit together and should not have been treated as one big project at all.[44]



Reading Diagram 2

On the basis of this pre-evaluation, another committee was introduced that received the task to prepare the official evaluation of the incentive plan between January and June 1988. The Committee for Evaluating the INSP (Commissie Evaluatie INSP: CEI) was a group headed by Prof. W.C.L. Zegveld, at that time managing director of the TNO (Nederlandse Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek = Dutch Organization for Applied Scientific Research) and lecturer at the economics department of the University of Amsterdam. He was especially concerned with the impact of technology on the environment and reflected on the role of politics on technological innovations (Zegveld 1987; Zegveld 1988; Cramer,Zegveld 1991). In many respects, Zegveld was in line with the careful and considering attitudes of the movement represented by Rathenau (see 1.3). He considered technology and especially innovation as essential[45] but also pointed towards the possible negative effects of IT. Installing Zegveld for the evaluation of the INSP was a reminiscence of the goals the incentive program

[44] The CPE put together all projects in 33 clusters of more or less related topics.
[45] Interview with Zegveld from 2007(fd.tv 2007).

had originally promised to follow, namely a responsible and sensitive introduction of information technology (for the other members of the committee turn to supplement 1).[46]

In the *Sober Evaluation* (CEI 1988b), the CEI called the incentive plan "a first step in the right direction" because innovation driven by the government was needed. Yet, the INSP itself was not considered a success. The message was clear: better management, more focus and aims, and more investment in the analysis of the social impacts of information technology were needed. A new incentive program would realize these aims – this was the underlying message. Although not made explicit, the CEI made a suggestion for an entirely new IT incentive program.[47]

The CEI presented six focus areas that were considered important for a growing innovative Dutch IT sector. External expert groups analyzed the INSP with respect to these six areas.[48] Their results were published as a supplement (CEI 1988a). The impression was given that the INSP project should have contributed to the six areas under investigation – in most cases they did not. Overall, the judgment was harsh: in the eyes of the CEI, hardly any of the projects had a measureable effect on the Dutch IT market.[49] Also, it was judged that the INSP had hardly contributed to IT education. Instead of securing the future of IT education by training new personal, most 'educative' INSP projects had only provided new hardware and software. Often, computers were simply put in a school, and the brief training was usually not sufficient for teaching the personal the functions of the systems. Therefore, teachers could not always convey enough knowledge to their students. Finally, the CEI criticized that projects concerned with the social consequences of information technology had been missed entirely in the INSP.

Instead of stimulating innovation and preparing a new generation to make their own contribution to IT, the INSP had turned into an opaque mass of unrelated projects. Technology occupied more and more space in society but hardly any efforts had been made to take society along and reflect on the consequences. INSP projects had for the greatest part been in the interest of the already existing industry. Computing had be-

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[46] He had already been part of the committee that evaluated the INSP's evaluability and now, he was in charge of the final and official judgment of the program.

[47] This approach by the CEI can be seen in a general change of direction regarding the Dutch technology sector. When the second Lubbers government was elected in 1986, the government commissioned an advice committee that was supposed to formulate recommendations for the further extension of technology policy (Adviescommissie voor de uitbouw van het technologiebeleid). W. Zegveld was also part of the committee that called for a greater focus on small and medium sized businesses and better knowledge transfers. The recommendations of this committee surely had its influence on the CEI that gave its evaluation of the INSP only one year later (Dekker 1987).

[48] (1) Product automation (*Berenschot)*
(2) Trans-business logistic *(P.T. Tanja, Instituut voor Ruimtelijke Organisatie TNO)*
(3) Educative software *(J.A.M. de Vos, Dumoulin Th.J.M.b Riphagen, Reiche & de Vos)*
(4) Software and the software sector *(CEI)*
(5) IT stimulation by regular and irregular training on the intermediate level *(W.J. Nijhof, C.H.L. Rijmerking, J.A. Thijse, Toegepaste Onderwijskunde, Technische Universiteit Twente)*
(6) The management of complex information systems *(Arthur Anderson & Co*

[49] Considering that most INSP projects were still running when the evaluation committee analyzed the program, this statement might be considered less surprising.

come a guarantee for insuring the status quo of the private sector that felt threatened by international competition. For this reason, there was not much innovation resulting from these projects. That at least was the CEI's evaluation.

Yet, how were these negative judgments received by the national press? After all, for years, the INSP had been presented as the program for computing education that had promised to ensure that the whole Dutch society would benefit from computing technology and would help modernizing the country. Yet, the CEI had given an evaluation which stated that ƒ1.7 billion had been swallowed by incomprehensible IT projects – that money benefited the existing IT industry the most but did not contribute to more innovation or better education.

But there was no public outcry as reaction to the evaluation. Newspapers simply repeated the CEI's results. Nederlands Dagblad titled its article "Coherence in Computer Science Policy Missing" and gave a true summary of the report. No further comments were added. The NRC Handelsblad went a little further by criticizing the general direction of the Dutch technology policy. Yet, the failed attempt to introduce IT to society and reflect on its consequences was not mentioned (NRC 1988b). Altogether, the newspapers demonstrated very little self-reflection in their presentation of the INSP.

Yet, when we consider the general decline in public interest in the INSP (see 2.2.2), it might not surprise too much that hardly any reactions followed the CEI-report. The public seemed to have forgotten the existence of the incentive plan. The initial interest had faded, probably due to the sheer complexity of the opaque program. And there was another reason: a lack of expertise. Although computers were no longer the evil and threatening entities – they had entered children's rooms in form of computer games and many offices had introduced electronic data processing – they were not understood. Challenging the INSP required competence that the majority of the public still lacked. Also, computing was modern and critique on a modernization process could have been interpreted as a sign of being reactionary. By allowing and celebrating the incentive program in the first place, responsibility was handed over to the government and businesses. Together they were trusted for taking care of the IT affair. Critique would also have meant that the INSP had been incorrectly understood and presented. The public seemed rather content with the INSP while it was running and the press later on decided to ignore its negative results entirely.

It is time to look at the interrelations between business and politics, but also to understand the power struggles within public administration. Therefore, I will present one concrete INSP example in detail: the commission of the Committee Pannenborg. It was installed in order to assess the automation efforts of the public sector and to present recommendations for a new plan of action. This project was very much in favor of the private industry, even strengthening the position of businesses – not the least because it was staffed by representatives from the private sector. Also, the reception of the Pannenborg committee in the press was important; although financed as part of the INSP, it was soon viewed as an entirely independent project, detached from the incentive plan.

However, what made the Committee Pannenborg most interesting were its political implications: the recommendations given by the group were not only in line with the neoliberal approach of the Lubbers government; they also express a power-struggle between the ministries and demonstrate the important role technology had within these conflicts. In many respects it was a result of the way computing was perceived: the public had turned a blind eye on all INSP projects that were not addressing education. This attitude made room for the internal shift in power relations within public administration that unfolded with the Pannenborg Committee.

2.4 Advances for Changing Power Relations

When it came to the automation of the public administration, traditionally, the Ministry of Internal Affairs was in charge. This had not always been approved by all public departments and over the years, much criticism grew. The INSP's focus area 'Government Automation' was not only an expression of the dissatisfaction with the work of the Ministry of Internal Affairs. The three ministries in charge of the INSP had decided to run solo, consciously excluding all other public departments that might have an own interest in influencing automation. This power struggle was enabled by the opacity of the INSP and the public disinterest but also by the complex historical backgrounds of the automation of the public sector which will be discussed first. The radical position of the Pannenborg Committee can only be understood in the light of the preceding history of the automation of the Dutch public sector. This section is about a scarcity in expert knowledge, growing interests in self-determination, and the influence of the private sector. It is also about a misconception within history writing.

2.4.1 The Dutch government as force for innovation?

In many countries, the military had been the driving force behind computing development and automation efforts. It would be wrong to claim that the Dutch military did not make any IT investments[50] but the department was not pushing the introduction of computer systems. Conversely, the PTT, at that time the state owned company responsible for mail, telegraphy, and telephone, was the driving force in this field. In the 1950s, a few influential individuals were pushing the technical development within PTT by trying to automate mass administration processes.[51] This particular effort within the PTT was, according to J.M. van Oostrom, influencing the Dutch government: in 1957, the Ministry of Internal Affairs began discussing the possibilities of a broader automation of the public administration (Donk,Dael 2005).

Only a year later, the Interdepartmental Committee for the Automation of the State Administration (ICAR) was formed. The committee was asked to "investigate the

[50] Van Donk and Dael claim that the Dutch military did not contribute to innovation in the IT sector at all (Donk,Dael 2005:161). It is probably true that the military was not a front runner in the field. However, there are many sources that show that military departments were using computing systems from the early 1960s onwards. Throughout the 1960s, larger investments followed.

[51] PTT had been consulting with US companies and wanted to introduce advanced IT technology for a number of services. For a more detailed description of the automation of the PTT please refer to (Wit 1994).

possibility and desirability to automate the state administration with computers [...]" (ICAR 1958). Within a year, the committee published a report that was clearly in favor of automation. It also suggested that all actions should be bundled with the ICAR. This decision granted considerable power to the Ministry of Internal Affairs. Both, de Wit and van de Donk/van Dael stress the importance of this: computing systems were a "tool for power" (Wit 1994:139). Whoever was in charge of the automation of a system could decide on responsibilities and make important decisions within a department (Donk,Dael 2005:166).[52] In the first decades of Dutch government automation, the Ministry for Internal Affairs had 'won' the contest, making computing their personal responsibility. Yet, at the same time, computers were not considered having any importance within politics. They were seen as means to the end of making administrative processes more effective. The changes within work processes were usually underestimated. Using computers as an external political instrument, for instance, to stimulate the economy, was particularly not on the agenda.[53]

Around the turn of the 1970s, the number of computers within the public administration had grown immensely due to the decrease of hardware prices. It was almost impossible for CAR – ICAR had been renamed in Commission for the Automation of the Public Services (Commissie automatisering rijksdienst: CAR)[54] – to coordinate all systems. Also, expertise of computing systems and information technology in generally was less scarce, at least compared to the 1960s. As a result, more departments requested the control over their automation processes; they had their own trained personal that could make decisions in the interest of their department. The Ministry of Internal Affairs and CAR recognized the changing attitudes towards IT within the administration and decided to react: in September 1970, the Board of Government Organization and Automation (Directeur Overheid organisatie en -automatisering: O & A) was formed. O & A was required to adjust and relate all computing systems directly to the scope of duties of the department in question. There was an attempt to establish a harmonic organization between all departments (O & A 1970). IT had become more than a simple way to make administration more effective: the focus had turned as technology had now to be integrated within organization and that had impact on work processes (Wit 1994). Van de Donk and van Dael called O & A an overarching plan for the introduction of information technology in order to secure the power position of the Ministry of Internal Affairs[55] (Donk,Dael 2005).

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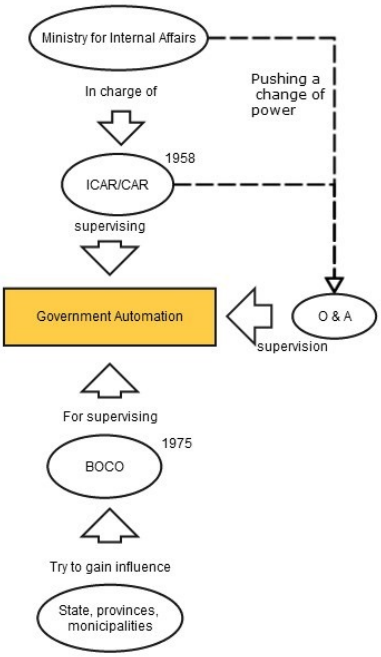
[52] N. Ensmenger had come to similar conclusions in his study of the American software sector (Ensmenger 2010).

[53] This – purely technical – struggle for power was decisive for many decisions regarding public IT investments. The ICAR was mainly concerned with technical questions. It decided on the computer systems which were only chosen with regards to their performance. These decisions were target oriented and detached from the organization the technology was implemented within.

[54] This name change took place between the 92nd and 93rd assembly of the committee on August 28, 1966. In the reports there is no indication why the name changed, however, it did not affect the scope of duties (CAR 1966; ICAR 1966).

[55] The O & A was still managed by the Ministry of Internal Affairs.



Reading Diagram 3

Around the same time, more groups began taking an interest in advising the public sector on matter of IT. For instance, the state, provinces, and municipalities introduced their own consultative body for information technology in 1975. The so-called Administrative Consultative Body for Government Automation (Bestuurlijke Overlegcommissie Overheidsinformatievoorziening: BOCO) was supposed to present, among other things, automation plans for the entire government, give information on education, as well as software and hardware (SOAG nieuws 1974). However, it was not, as claimed by van de Donk and van Dael, a competitive initiative to overcome the dominant position of the Ministry of Internal Affairs in questions of automation. On the contrary, the ministry took over the coordination of BOCO. Yet, as correspondences between officials show, BOCO was indeed installed to ensure a better communication between the different departments. It was an effort to overcome the ever growing fragmentation of the government automation. BOCO was an attempt to involve all ministries in the process (BZ 1974).[56] In spite of these initiatives, the different departments and ministries never came to a satisfying agreement regarding the implementation of computing systems. It was a constant fight concerned with the question of responsibility, especially when prices of hardware fell, the size of the machines decreased, and the high level languages made more applications possible (see footnote 23).

Computers had ceased from being abstract machines in the eyes of most government departments. They had become an inseparable part of the work processes. Having more control over the way the machines were used meant at the same time that the departments themselves could determine their work processes, independent of centralized management decisions. Systems could now be placed within any process. As a result, every department wanted to have computer systems integrated organically within their organization, and all wanted to have a say in the realization.

With the growing understanding of computing's position in administrations, groups began criticizing the efforts of the Ministry of Internal Affairs. Although the ministry had tried to distribute the decision power when it came to the automation of different departments, many were dissatisfied with the central position of the ministry. The Pannenborg Committee – an external advisory body commissioned as an INSP project – was the first to overcome these disagreements. Yet, there is a central misconception of the role of the Pannenborg Committee. Van de Donker and van Dael claim that the com-

[56] There were more initiatives for coordinating the efforts of the government but they stayed for the greatest part unsuccessful.

mittee preceded the INSP and even was the reason for the introduction of the incentive plan. As we have already seen, however, the Pannenborg Committee was financed as a project within the INSP. Just to set this claim right it is important to revive this case study. But let us first consider what the relations were between the public sector and the private IT industry.

There was much money available for the automation of the public automation, and therefore, many businesses were interested in having this sector as their client. Yet, although large sums of money were available for public automation, the money was not used in order to stimulate innovation in the private sector. Instead, the government was primarily concerned with its own processes and not with the new IT economy. The interests were focused towards keeping the economic status-quo, namely securing the market position of those technology businesses that were already well placed. A decision from 1971 has to be seen in this context. Before that year, automation contracts were given to big US companies such as *IBM*. However, in order to protect the own national champion, a decision was made to give all automation contracts of government institutions to the largest Dutch technology business, *Philips* Electronics Ltd. (Ende e.a. 2004:192 et seq.).[57] Indirectly, the Rathenau Report criticized this approach of the government: by supporting only its national champion, the government was consciously hindering the innovative powers of the market – the latter was a mechanism very much favored by the Rathenau Committee.

The Ministry for Internal Affairs was in a deadlock. Any change in policy would have been equal to a great loss of power. This is the moment when the Ministry for Economic Affairs saw its chance to realize two things: to gain a central position within the public sector automation and to force the privatization of the IT sector in general, granting more power to a wide range of private businesses. The INSP was the key to realize these aims. By commissioning a group of selected experts and by asking them to answer very specific questions regarding the importance of the private industry as well as to assess the need for privatization, the ministry set the agenda for a new policy regarding government automation: the aim was to shift the meaning of computing technology and to interlink it inseparably with the private industry. This part of the INSP was indeed far away from the public image of the educative incentive program.

2.4.2 The Pannenborg Committee

In March 1984, Minister van Aardenne, in collaboration with Minister Deetman and the Minister of Internal Affairs J.G. (Koos) Rietkerk (VVD) (1927 – 1986), called for the introduction of a committee to analyze public IT investments.[58] The Minister for Internal Affairs was officially included when the committee was formed since government automation had been his responsibility. But just as in the case of the entire INSP, much indi-

[57] In the 1960s, CAR took proposals from many computing companies, among them *Volmac*, *Remington*, or Siemens. According to van Ende et al, from 1971 onwards, all departments were required to request *Philips* proposals first

[58] Later documents stress that also the Ministry of Fishery and Agriculture as well as PTT were involved (HTK 1984-1985).

cates that it was really Minister van Aardenne whose plans were realized.[59] The other ministries were included to demonstrate unity. The committee that was formed was the "Committee for Government Expenses regarding Information Technology" (Adviescommissie Overheidsbestedingen op het gebied van Informatietechnologie: COI). It was asked to analyze the possibilities for a greater involvement of businesses when it came to the automation of the public sector. Additionally, its task was to consider the possibility of privatizing public enterprises. COI was also supposed to set-up and manage projects commissioned by the public to the private sector and give advice to realize better cooperation between businesses, research institutions, and the government (Pannenborg 1985). Van Aardenne chose A.E. Pannenborg (* ca. 1919) as chairmen of the committee. Like Rathenau, he was a former *Philips* employee. He had been responsible for Research and Development in the electronics company until 1984. Pannenborg had spent his entire career at *Philips* (Ende e.a. 2004: 207).[60] As Vice-Chairmen of *Philips,* he had been active in promoting initiatives of the private sector, lobbying for research and development in science and technology driven by the 'mechanisms' of the free market. He openly opposed the idea of regulations since he was convinced that "invention thrives best in a climate of freedom" (Pannenborg 1979:229). He was responsibile for the R&D activities of *Philips*.[61] This long experience had provided Pannenborg with a large network that enabled him to get in contact with many business representatives on behalf of van Aardenne during his work as chairman of the COI.

In January 1985, the COI, or Pannenborg Committee, presented its report. On 31 pages, the committee called for fundamental changes regarding the involvement of businesses in the automation of the government's administration, proposed the privatization of the state owned computer centers *RCC* (State owned computer Centrum = Rijkscomputer Centrum) and CCL (Computer Centrum Limburg), and presented elaborate plans for a new committee that would overlook state automation (Pannenborg 1985). The latter was supposed to manage a new stimulation project within the INSP, that would be called Incentive Program Computer Science on Behalf of the Government (Stimulerings Programma Informatica ten behoove van de Overheid: SPIN-OV).

Most importantly, the relation between public administrations and private businesses was redefined. The government was primarily described as responsible for making policies and "global information planning" (ibid.:16). It was suggested that the government should concentrate on these two tasks and let businesses take over the responsibility for technology. The committee had done interviews with a number of businesses

[59] The final report, for instance, was handed over to van Aardenne personally and not to Minister Rietkerk!

[60] After completing his dissertation in physics at Delft University in 1950, he began his career at *Philips*' Research Laboratory right away. Between 1963 and 1968, he was senior director of the laboratory and joined the Board of Management in 1969 (Pannenborg 1950). He was also an outspoken anti-communist – a clear position in the Cold War that separated him from many other intellectuals at his time.

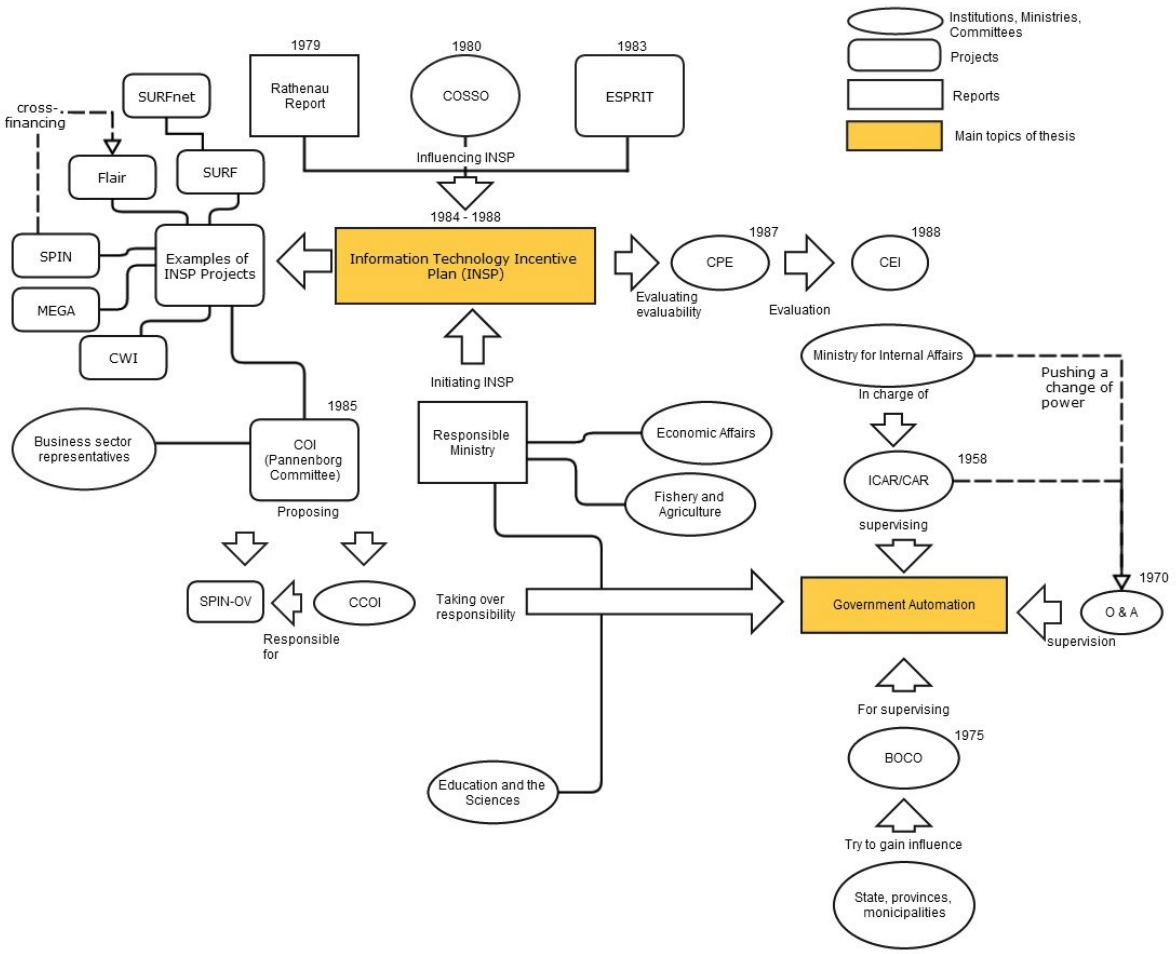
[61] He left *Philips* in September 1984 because he had reached retirement age and went to the TU-Delft as professor (Limburgsch Dagblad 1984)

and representatives of the public sector. Talks were held, *inter alia*, with COSSO, *Philips*, *Volmac*, CMG, Samsom, Minihouse, and Pandata (for the complete list see supplement 4), and as a result of these interviews, the committee compiled a brief paper that summarized the "perception of the IT business community." This statement urged the government to spend more money on machinery, change their software policies towards more product orientation, and pay their bills quicker.

The underlying cause was that especially software companies wanted to have responsibility and gain more influence when the government commissioned projects. Many businesses complained about the little representation of small and medium-sized companies in the automation of the public administration. However, in the center of these complaints was the position of the state owned computer centers which were described as a distortion of competition. The *RCC* was usually first contractor, responsible for the management and conduction of a project. It was managing all projects while private business were only hired and had to follow *RCC*'s instructions. This relation between the public and private businesses will be of great importance when we come to the case study of the automation of the Student Grants Administration (see chapter *3*).

These interviews with representatives from the private sector, conducted by Pannenborg and the other committee members, were held in private. And they did not primarily circle around the businesses, concerns and opinions regarding their relationship with the government, and the public sector as a whole. Already before these talks it was clear that in the future, private businesses were to be further included in the automation of the public administration. Minister van Aardenne already suggested this direction in the official commission-text of the COI (Pannenborg 1985). A discussion with a representative from the private sector who had been the contact person with the Pannenborg committee revealed another interesting dimension: during the private talks between businesses and the committee, quiet agreements regarding future contracts between the state and different companies were drafted. Publicly, the COI was calling for more competition and more innovation, yet, what really happened was an infiltration of the market, insuring promising contracts in future years to preselected businesses.

Besides giving a voice to IT businesses in the Netherlands, the COI was suggesting the set-up of a committee that was supposed to coordinate the automation interests of all ministries. As already described in detail in the previous section (2.4.1), the automation of the different departments had run out of hand, was fragmented, and the Ministry for Internal Affairs hopelessly trying to coordinate the automation efforts. The COI judged that especially communication between the departments was lacking. Therefore, a new committee, the Central Commission for Governmental Information Supply (CCOI), was being suggested by the Pannenborg Committee. This commission was supposed to define the responsibilities for government automation anew and ensure the proper coordination between the departments (ibid.:13). CCOI was to be staffed at least partially by representatives from the private sector.



Reading Diagram 4

The CCOI was also recommended to manage the SPIN-OV projects. The Pannenborg Committee had drafted the stimulation program SPIN-OV to become a permanent project within the INSP. SPIN-OV was planned to occupy a central position in the focus area for government automation and was a clear analogy to the already successfully running INSP project SPIN. SPIN-OV was designed to bundle innovative government related commissions. The project range was wide and comprised, among other things, communication infrastructure, standardization, and management supporting expert systems – topics very similar to SURF. The plan was to include CCOI "in the decision process" (ibid.:21) regarding the awarding of projects. In other words, the CCOI was responsible for passing the projects on to private IT businesses.

The COI set strict time limits for the duration of SPIN-OV projects. It was promised that this set-up would support research and a target-oriented cooperation between the public sector and businesses. What was most notably about the Pannenborg Report was that the committee already presented a number of projects that were to become part of SPIN-OV. Every year, ƒ30 million were to be made available for government automation. Everything was set for a new power distribution in the automation of the

Dutch public administration. Moreover, it was already decided which technologies were going to be developed in the course of the program.

The suggestions made by the committee were welcomed by the government. Minister van Aardenne commented that the recommendations were providing a "broad picture of the problematic," and he stressed that they were offering a step into the right direction towards an efficiently working government (HTK 1985a:1). The task was to find ways to use the government as a 'tool' for stimulating IT, and the suggestions of the Pannenborg committee offered such. More of the government's IT equipment spending was to be directed to the free market, more research stimulated, and more software projects handed over to private software houses. Particularly the suggestion for a paper-free office by 1995 was given quite some attention, especially by the press (Telegraaf 1985a). Also, the recommendations regarding the CCOI and SPIN-OV were welcome and promised to be implemented immediately. It was planned to evaluate these short-term measures within a year and a half (HTK 1985a) – a prospective report that never reached the public.

The COI's suggestions as well as the positive government standpoint were received enthusiastically within many ministries. The measures were discussed at once and approved in the report of the Netherlands Court of Audit. The audit office had suggested earlier that the government should pass on more responsibility to the private sector when it came to IT in the public sector. In this context, the Court of Audit criticized the Ministry of Internal Affairs for its work (HTK 1985 - 1986b:35). Also, the policy survey on technology positively commented on the Pannenborg committee's report, stressing the fact that expertise regarding IT was little within the government and that the competence of the private sector was therefore needed. Bundling the decisions regarding government automation by introducing one expert committee was seen a positive step that would influence future projects in a most desirable fashion (HTK 1985 - 1986a:30). Most welcomed the idea that the CCOI would define binding rules regarding the supply of IT in the public sector (HTK 1985 - 1986b).

Overall, there were hardly any critical voices in parliament. A number of MPs questioned the composition of the CCOI. The government wanted to include representatives from the industry in the committee[62] – still a delicate topic for many politicians (EZ 1985). Yet, only MP van der Doef asked questions regarding the criteria and goals of SPIN-OV (ibid.:3). But he stayed the only cautious voice. Nobody seemed to have any interest in hindering the realization of the recommendations given by the Pannenborg Committee. With one exception: the suggestions to privatize the state owned computer centers was very much opposed, not least by the computer centers

[62] Discussed for the chair of the committee were: Dr. J.M. Goudzwaard, ex-member of the Board of Managers at Unilever, Ir. W.L. van Dinten, director RABO-bank, dr. J. Rosenberg, member of College Management Univ. Utrecht, J.A. Bakker, ex-minister of Economic Affairs, Dr. B. Scheepnaker, Publisher Kluwer, Dr. Th.J. Steenbergen, chairmen advice-committee PTT (BZ 1985).

selves.[63](Anonymous 1985) Also the opposition disagreed with these privatization plans, but these reservations stayed without consequence (EZ 1985:11).[64]

What had become of the power struggle regarding the decision making process for information technology in the public administration? Over the years, it had not only become accepted that an organic integration of IT could drastically improve work processes. This case also shows what impact technology had on the political discourse and the decision process itself. Many groups within public administration were directly concerned with computing technology. Because computing had become so central and had moved away from its peripheral position, entire debates and political programs revolved around it. At the same time, these discussions were difficult to follow for most politicians as they required expertise which most did not possess. They had to rely upon parties they considered competent.

And what was the public view on the results of the Pannenborg Committee? After all, the committee's recommendations were the central project in the INSP focus area 'Government Automation,' and it asked for a number of central changes in automation policies, especially with regard to business involvement. Education played an entirely subordinate role. To be precise, the Pannenborg Committee was in a great contrast to the public concept the INSP. Therefore, the connection to the INSP was simply not made by the press. So what did newspapers say about Pannenborg's suggestions? All papers had a brief report on the results presented by the COI. Yet, these articles only repeated the committee's demand to include private businesses in the automation efforts of the government. They pointed to the macroeconomic advantages and the need to privatize *RCC* (Volkskrant 1985a). None of the articles connected the committee with the INSP (Telegraaf 1985a; NRC 1985c), and follow up analyses or opinions were missing. The Pannenborg Committee seemed to be detached from the government's general efforts to implement IT in the Dutch society. There was a general lack of interest in such abstract questions like the automation of the public sector. Dubious arrangements that disagreed with the principles of the INSP, the Rathenau recommendations, and the free market stayed unnoticed due to the little public interest. The public had simply accepted computing technology's place in the hands of the private sector.

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[63] An internal paper from *RCC* to the CCOI suggests that *RCC* had done its own research which indicated that the provision of information by third parties was not always trustworthy. The core of the argument was that the major objective for decisions made within governments was not the quality of an information system but rather the interests of the private sector. Additionally, the note stressed that the choice which hardware or software was bought usually depended upon personal contacts and not on objective criteria. Objectivity was a characteristic *RCC* claimed for itself. The note also criticized consultancies which were seen as biased towards certain businesses. Besides asking for a careful inspection of third parties, the brief report also emphasized the need to turn towards the own personal and investigate which know-how and experience was already present within the public administration . It was an outcry to recognize the contributions made by the state owned computer centers.

[64] The plans for the privatization of the computer centers were realized at the beginning of the 1990s although the process was rough (Volkskrant 1996). The computer center Heerlen was for instance taken over by *Volmac* (LD 1989).

Yet, the Pannenborg Committee had been commissioned and paid as part of the INSP, and the three ministries celebrated it as a distinctive success of the incentive program. Although the upcoming INSP progress reports stressed that the activities of CCOI had been detached from the actual incentive program, CCOI's activities were meticulously described (HTK 1988c:22). It was one of the few projects actually realized in the focus area of government automation.[65] The SPIN-OV project, albeit considered as central to the focus area 'Government Automation,' was only mentioned briefly. The descriptions of SPIN-OV stayed vague and although the last progress report offered a list of pilots supported by SPIN-OV, there was no indication which companies had received the contract, what exactly was financed, or how the projects were implemented (for a detailed table refer to supplement 5).

SPIN-OV was only one – rather small – project in the ƒ1.7 billion INSP policy: it cost about ƒ30 million per year. However, it had tremendous influence on public administration. The Pannenborg Committee was supposed to bring order in the chaotic automation process of the government. The latter had been the topic of many disagreements and power struggles for years. The solution to install the CCOI to bundle and coordinate efforts by a disinterested group was seen as a relief. That the Pannenborg Committee had already decided which company was granted which automation contract seemed to be of peripheral interest.[66] There are a number of other aspects that make the recommendations of the Pannenborg Committee a relevant case study of this thesis.

In many respects, the Pannenborg Committee can be seen as a good example for the many INSP projects. Great efforts were put in a measure that had nothing to do with IT education. Moreover, even the second most important argument for the INSP was nullified by the Pannenborg Committee: large IT projects were given to the biggest and most influential companies in the sector, preventing small (and maybe) innovate businesses from entering the market. It was a political measure that ensured and even strengthened the status quo of the Dutch computing market –a great success of the interest group COSSO (see section 2).

Yet, this arrangement was also changing the meaning of computing in the public administration. For years, computing had become more and more accepted as inseparable part of administrative processes. Departments educated and trained their own personal which led to many individualized solutions, but also missing standards, and

[65] Also the upcoming privatization of the computer centers was mentioned in the progress reports. Due to missing financial overviews, I am not able to make an absolute statement; yet, since other ministries took over CCOI and the privatization I consider them both outside INSP-financing. It is, however, possible that INSP money still financed some parts but this has never been made explicit.

[66] Although there are no official records that confirm this ex ante procurement, interviews indicated this practice. Also, looking at the list of interviewees of the Pannenborg Committee (Supplement 4), it is rather unlikely that businesses were only asked for their objective opinion on the public IT sector, considering that their interview-partner was a former *Philips* CEO and the questions Aardenne had given to the COI. Their interest in this promising sector was naturally great because it offered a secure contract that was worth a great deal of money.

confusion. Instead of appreciating and integrating this scattered expertise, the Pannenborg Committee asked the public administration to return to the role of a client and leave all expert questions to private businesses. In this context, technology was made less accessible. It became the incontestable competence of the private sector that asked only for the contracts and the payment of the government. Computing had not come closer or was more integrated in public administration. By being declared the sole responsibility of companies, it became abstract and was alienated. For the public, government automation was irrelevant as the lack of news coverage demonstrates; it did not seem to affect an average person's life. Yet, this was a clear misconception as the next case will demonstrate. Before we come to the next chapter, let us conclude on this extensive analysis of the INSP.

2.5 Concluding on INSP

Investigating the reasons for the introduction of the INSP, its aims, what it meant for Dutch IT in the 1980s, and especially its perception in the public has not been a walk in the park. The INSP was probably one of the most ambitious IT incentive programs the Dutch government ever introduced, and it failed to reach its original goals in many respects. Stimulating computer science education, especially in schools on the intermediate level and in special education, advising and counseling the public on the chances of computing, and assessing the possible risks of the technology for society had been the initial aims. All these aspects were supposed to bring computing technology closer to the public. The policy indicated that a closer interrelation with the business world would make these promises come true. Additionally, computing would stimulate innovation, ensure economic growth, and create new job opportunities. And indeed, the incentive plan was helping a number of businesses to strengthen – at least short-term – their position. Its drive for innovation was, however, highly doubtable. The aim of this chapter was to demonstrate the great gap between the public perception and the realization of the incentive plan.

In many ways, the INSP had been introduced in order to satisfy the public. Politics had promised to ensure the beneficial integration of computing and the INSP was the ideal instrument. Two things happened with respect to technology perception in that time. First of all, the public was ensured that politics took care of the integration of computing by turning to the business sector. Computing was no longer a threat but it was safely monitored by experts. This resulted in the second reaction. Since the technological development seemed to be in the right hands, interest faded away. Indeed, it had turned out that computing did not result in mass-unemployment, alienation, or extreme social changes. The machines did not seem to have any negative influence; they did not provoke any tangible changes in people's lives. Is this an explanation for the absence of a reaction when the negative results of the CEI were made public? Was computing really not touching people's interests anymore?

Looking at the rather chaotic results of the INSP, it seems as if many projects had simply wasted money. Those projects that had been realized were far away from the public interest, and even educational initiatives stayed often abstract as they mainly

concentrated on the technical but not on the user side. Although ƒ1.7 billion was indeed a great amount of money in a time of austerity measures, it was spent for professionals only.

However, doubting the results of the INSP not only required an interest in IT; in order to give valuable judgment on the projects, competence was need which most people lacked. This was also not overcome by the report of the evaluation committee CEI that stayed rather abstract and reserved on a number of topics in order to make its own program suggestion stronger. Of course, people could have criticized the lacking structure, the missing criteria, and the opaque monetary practices of the INPS. Yet, they did not: it seemed as if experts were taking care of a technology which also did not seem to do any harm. The reactions to the Pannenborg Committee demonstrated that especially the automation of the public sector was of very little interest to most. However, the introduced changes regarding the handling of computing technology in the public administration did have severe impact on the general public as the next case study will demonstrate.

3 Automating the Student Grants Administration

As discussed in section 2.4.1, the automation of the public administration has usually been connected with a struggle for power and influence. How a process was automated could determine the future of an entire organization. It was also mentioned that the Dutch government started its automation efforts by imposing computing systems without considering the particularities of the department in question. This resulted in insufficiently integrated systems. For many years, different groups within public administration were struggling for more influence, trying to change the practices of automation. This chapter investigates an automation experiment in the public administration that failed to a great extent.

When it comes to automation there is never a blueprint that shows how the technical design and implementation should be done. Often, spontaneous arrangements are necessary to fit the situation. The automation case we are turning to now was the attempt to realize the recommendations of the Pannenborg Committee a year before the publication of the report. For the automation of the new law for the Dutch Student Grants, an equal cooperation between *RCC* and a private company, *Volmac* Software Group, was arranged. Although an external company was installed in order to ensure a professional realization, it did not prevent the project from failing. We will see that computing technology was crucially intertwined with the new law, yet, its centrality was hardly perceived as an issue – neither by the public nor by politicians.

3.1 Outlining the new law

When W.J. Deetman became Minister for Education and the Sciences in 1982, he had ambitious plans: for many years, his predecessors had tried and failed to reform the law for the student grants. In the Netherlands, all students could receive financial support for their studies. It was a complex system without any legal security that was composed of three different grants: child allowance for children from their birth up until their 21st birthday, a state study allowance (Rijksstudietoelage) for all students from the age of 21, and subsidies for the study costs (tegemoetikoming studiekosten). Students were greatly dependent on their parents, the three allowances were often in conflict, and the system discriminated between different types of education, disadvantaging those in lower education. Students received between *f*339.75 and *f*689.58 a month, depending on their age and whether or not they were living with their parents. Deetman wanted to overcome the deficits by introducing one legally binding law that would cover all student allowances (Runia 1987:15).

The first outline of the new law was presented early in 1984. Deetman's message was clear: his main aim was to make education accessible for every student on every training level between the ages of 18 and 27. Nonetheless, he disagreed with the demand of many members of the parliament to make students entirely independent of their parents. Since the new proposal for student grants (studiefinanciering) was to replace all the other allowances, it also affected the child allowance law: child allowance was only to be paid up to the age of eighteen. By giving each student the same

basic scholarship (basisbeurs), it was ensured that everybody had the same starting position when beginning a study.

This basic scholarship was a gift and therefore similar to the old child allowance system which also granted money without repayment claims to families. Additional allowance could be borrowed but had to be repaid with interest – Deetman wanted to make the interest dependent on the type of education. This additional monthly contribution was to be determined by the income of the parents and the student's partner. It was planned to make the amount variable, depending on travel costs, the student's living situation, and the contribution to the health insurance. Additional income was possible but only limited. The aim of making these demands legally binding was central. Until then, students could not sue for their right of entitlement. In this first outline, it was assumed that about 450 000 students would apply for the students grants (HTK 1984). [67]

As reaction to Deetman's proposal, the Academic Counsel published a critical comment on the new law (AR 1984a), also inviting universities and student representatives to make a contribution to the discussion. Most of these reactions were similar or even more negative:[68] although most agreed that a new law should be introduced, they preferred the old regulations as long as the new proposal would not guarantee an equal treatment of all students, regardless of age and education. The students' financial independence from their parents was demanded as well as no or very low interest rates on the loan in order to keep student's future debts down (AR 1984b).

Besides the reaction published by the Academic Counsel, numerous comments on the law proposal were made in the national press. The automation system, however, was not a topic at that time; it was not a public issue to talk about the supportive computing technology when discussing a new law. Therefore, I will reflect on the general feedback in the press. Right from the beginning, the new law for the student grants was a topic closely monitored by the media. Nederlands Dagblad tried to give a neutral account of the proposal but criticized that students stayed dependent on their parents. Yet, in a separate comment, it was remarked that the expectations for the new law had been too high right from the beginning (Dagblad 1984b; PDdV 1984). An article in De Telegraaf found only criticism for the new law while De Volkskrant was eager to present the positive sides of it, however, also pointing to many deficits of the presented outline (Volkskrant 1984b; Telegraaf 1984c). Especially the NRC Handelsblad elaborated on the topic. Besides two articles that only stated the facts of the proposal, the newspaper featured the student federation's critique. The NRC also gave an elaborate report arguing

[67] The basic system introduced by Minister Deetman is still used today, although much was changed over the years. At the moment and due to the financial crisis the Netherlands is exposed to, all scholarships from the government paid for study purposes are being transfert into an allowance.

[68] Universities and institutes that replied to the Academic Counsel's call: Rijksuniversiteit Limburg, TH Wageningen, Katholieke Universiteit Nijmegen, Rijksuniversiteit Utrecht, Studentenvakbond LSVB, Rijksuniversiteit te Leiden, Rijksuniversiteit te Groningen, Erasmus Universiteit, Vrije Universiteit, Academische Raad, werkende jongeren – cnv, TH Twente, Landelijk Beraad van Studentendecanen.

that the 'new' law really was not new at all but only a slightly changed version of previously drafted laws for the student grants (NRC 1984c; NRC 1984a).

The negative echo to the proposal forced Minister Deetman to adjust and refine the law over the next two years. For instance, the supporting age for students was raised to 30 years and the precise amount of the scholarship and allowance defined. The basic monthly scholarship for students that lived at home was set at ƒ262.08. Students that lived alone were to receive ƒ595.41 per month.[69] The amount of an additional allowance, depending on the type of education, varied between additional ƒ83.33 for students in further education and ƒ291.66 on the university level per month. Interest rates were not made dependent on the type of education. Yet, despite the protests and complaints, the new law was not designed to make students independent of their parents. The Law Student Grants (Wet Studiefinanciering: WSF) came into effect on October 1, 1986, yet, only partially.

The law was split into three different parts. The WSF18+ comprised all regular students between the ages of 18 to 30 – this part of the WSF analyzed by this thesis. The other two parts, WSF17- and WSF55-, were introduced much later due to the continuing troubles with the computing system. WSF17- was designed for students younger than 17 in secondary and tertiary educations, while the WSF55- was relevant for part-time students between the ages of 18 and 55 (Runia 1987).

Already at the end of 1985, it became clear that the introduction of the WSF was going to cause more complications than expected. It was not until the end of 1988 that all students received their allowance, having gone through many difficulties and complications. These were to a great part connected with the development and implementation of the computer system that was supposed to store the data and calculate each student's claim. Right from the beginning, the system design had been directly intertwined with the development of the law and had in this process become an inseparable part.

3.2 Automating the system: a mutual dependency

The automation process of the WSF was special in many respects as the following section will show, especially when it came to the organization of the development team. Next to a description of the system, this section also gives a first impression of the difficulties with the computing system. What role did computing have in the realization of the WSF, and how was this role perceived by the public and parliament?

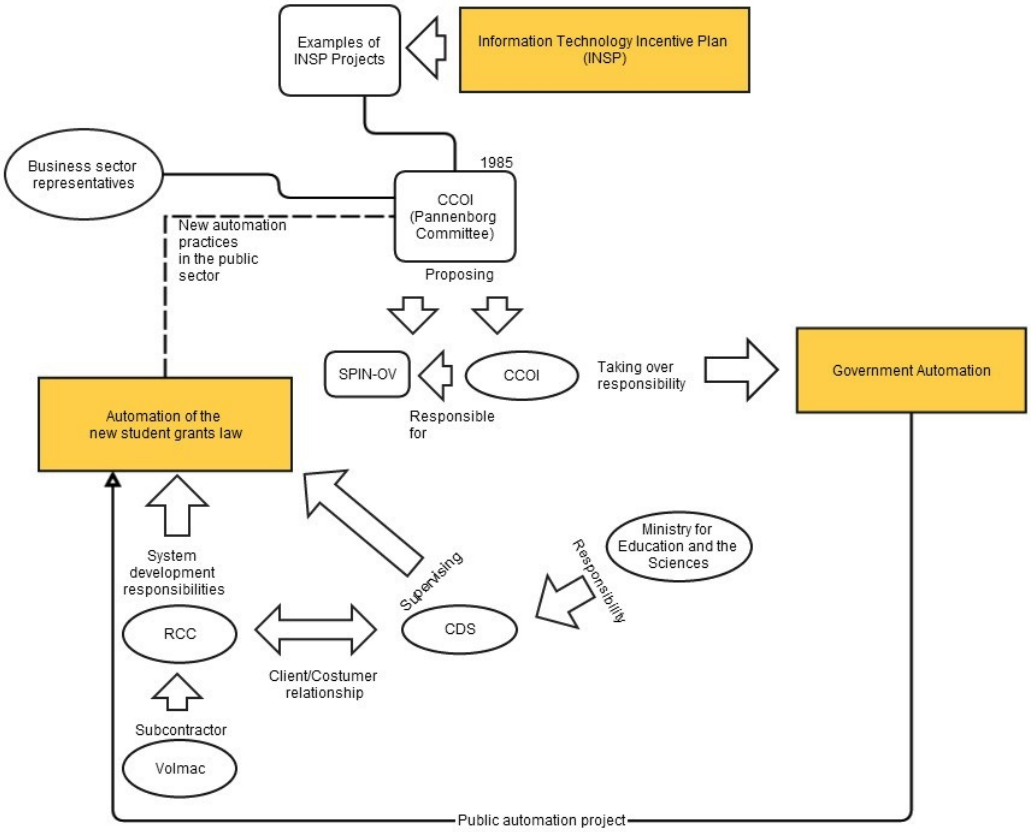
3.2.1 Organization and technology

In August 1984, two months after the outline of the new student grants law had been presented, *RCC* received the contract to design, realize, and implement the computer system for the WSF. The Central Management for Student Grants (Centrale Directie Studiefinanciering: CDS) was the client, working closely together with *RCC*. The CDS was part of the Ministry of Education and the Sciences. The office was responsible,

[69] There were a number of exception that could increase the entitlement for the basic scholar ship such as own children.

among other things, for the coordination and awarding of the student grants. At the CDS office were already old computer systems in place but since these had been implemented for the three different allowance systems (see p. 50), each based upon different procedures, it was decided that an entirely new system had to be designed. The old system was supposed to be switched off the moment the new law got enforced. Moreover, the CDS expected that the system would have to handle about twice as many requests than the old due to the changing child allowance law and the consideration of the parents' income. It was presumed that about half a million additional data sets had to be handled (Runia 1987). Therefore, the new system had to be designed for heavy use.

The *RCC* had much experience with automating processes – after all it was the official computing center of the public administration and it was responsible for the state's computer systems.[70] Usually, *RCC* hired external system developers and programmers from private companies as programming support. This practice, referred to as 'body shopping,' was very common in the Netherlands. Software companies like *Volmac* and *CMG* hired out parts of their staff to a specific project. These external employees were integrated in a team that was usually managed by the company or institute that had



Reading Diagram 5

[70] "The State Computer Center houses the automated data processing for the student grants law and develops and monitors the automated system." (HTK 1987c:3).

hired them. However, the project to automatize the student grants was different in many respects. First of all, the law had not been written when *RCC* signed the contract. The computer center was asked to be directly involved in the development of the written law and therefore was inclined to shape the realization of the student grants. This arrangement was necessary because Deetman wanted to have the new law and the system running within only two years. Next to this rather unusual task, *RCC* was – of course – asked to design and implement the new system. These broad tasks exceeded the capability of state's computer center by far.

Due to this special arrangement, *RCC* not only hired a number of *Volmac*[71] employees – as it was customary – for supporting the system development. Rather, the *Volmac* Group was installed as a subcontractor of *RCC* and received the same project responsibility as the computer center. Yet, this arrangement was not only made in order to cope with the additional work load. The close cooperation between *RCC* and *Volmac* has to be seen in the light of the neoliberal policy of the Lubbers government that was interested in handing over responsibility for automation project to the private sector. Only half a year before the new student grants law was presented, the INSP had been passed which suggested and supported the same private sector friendly policy as the set-up of the WSF indicated. Although the automation of the student grants law was officially not a part of the incentive plan, it was nevertheless in accordance with the program. Also, the Ministry for Education and the Sciences was responsible for both measures. It is rather unlikely that the resemblance of the project set-up with the recommendations given by the Pannenborg Committee half a year later was accidental. This evidential connection was even pointed out in later discussions (HTK 1987e:18; HTK 1987f:3).[72] Although never made explicit, it is highly likely that the project 'Student Grants Law Automation' was seen as a test run of the proposals made by Pannenborg. It did not work out the way it was supposed to and was therefore never taken as official example for the aims of the government.

But let us return to the details of the cooperation between *Volmac* and *RCC*. It was a loose agreement: the actual scope of the project was not made explicit at the time the contract was made. In order to stay flexible in case of changing demands, it was agreed that the arrangements regarding the organization as well as the financial matters would be reviewed and newly defined on an annual basis.

In 1984, before the design and development process of the law and the system began, *RCC* and *Volmac* prepared a preliminary study. This study was going to provoke much controversy in later years as it clearly stated that a save introduction of the computing system would not be possible before October 1988. Yet, Minister Deetman wanted to introduce the new law in the same legislation. For this reason, he asked *RCC* and

[71] *Volmac* was at that time the largest software house in the Netherlands. It had much influence on the whole sector and was usually contractor of *RCC* and many other large institutions and companies

[72] "The choice of *Volmac* by the *RCC* and the manner [of this cooperation] was ahead of the Pannenborg Rapport." (HTK 1987f:3).

Volmac to develop another case study that demonstrated that the introduction of the law would be possible until October 1986 (HTK 1987f).

It is time to pause and reflect for a moment. A private business and a state computer center, cooperated with a ministry department to develop of a new law that was going to affect every single student from the age of 18 in the Netherlands. The law itself was designed to fit the demands of a computer system. The law was not only a simple law anymore. Everything, its entire content, had to be translated into software. At the same time, the system designers were faced with an entirely new challenge. They were usually not involved in the development of a law, yet, their judgment was crucial. Without the computer system there was no chance that the new law could be enforced. The increasing number of students asked for a fully automated system.[73] So things had indeed changed. The peripheral position of computing had turned entirely. The systems were no longer a simple support of a process but they had actually become pivotal for the realization of new laws.[74]

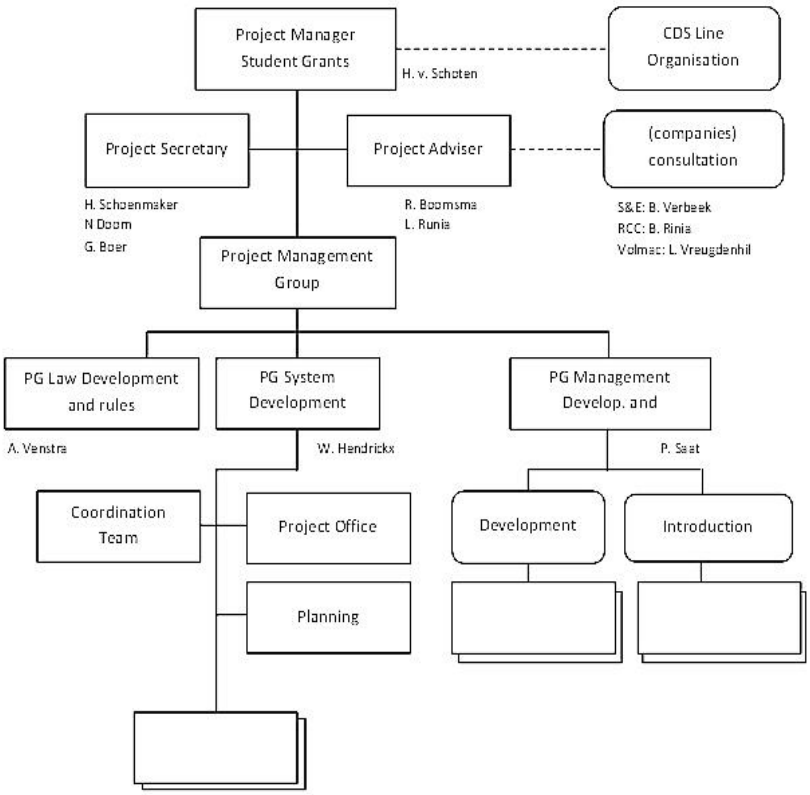


Figure 4: organization chart of the cooperation between the CDS, RCC, and *Volmac* in the spring of 1986 as given by Runia (1987:18).

[73] That the law indeed was dependent on the realization of the system will become more clear throughout the following sections.

[74] This is only one example. I do not claim that the WSF was the first law that was co-constructed with its computer system.

At the beginning of 1986, it became clear that it would not be possible to introduce the system in time. Costs had exploded: in the first year, *f*437 000 were spent on the system. One year later, it cost another *f*6.7 million and there was no foreseeable end to the project. Until 1987, another *f*62 million were to be added.[75] It was clear that things were not going as they should (for detail on the problems see section *3.2.2*). Something had to be done, and the first solution was to finally define the organizational structure of the cooperation between *RCC*, *Volmac*, and CDS (see figure 4). As already indicated above, there was no overall concept written for the development of the computing system in 1984 – the agreement was adapted to the circumstances year by year; a fact which led to unpredicted increases in developing costs and to problems with the system implementation. Deetman later stated that the project had been following the SDM (System Development Method), an approach that structures a software project in different stages but does not provide a comprehensive project plan (HTK 1986a).[76] SDM was brought forward as justification for the flexible arrangement but it is very likely that it was an excuse for the chaos that had broken out.

In order to ensure that the software development would not turn into an even greater disaster, and after introducing a hiring freeze as *Volmac* employees recall, the project members were organized in a fixed structure in the spring of 1986 (figure 4). There were three project groups responsible for the realization:

- Project Group Development of the Law (Wetsontwikkeling)
- Project Group System Development
- Project Group Development of Organization.

All three groups were managed by the Project Management Group which was headed by the Manager for the Student Grants. *RCC* and *Volmac* both gave project advisors to the management group that were responsible for their company and representing each company's interests (Runia 1987). The CDS employed about 300 people. About 110 employees from the CDS, *RCC*, and *Volmac* were fulltime occupied with the automation of the system – it was a rather unfavorable balance.[77]

But what was the project really about? What were *RCC* and *Volmac* developing? The *RCC* had invested in the new *IBM* 3090 series, that was released in 1985 (figure 5).[78] All data was stored on this device. This mainframe was running on the operational sys-

[75] "This concerns the costs made and to be made by *RCC* and *Volmac* for (a) the system development, (b) the external support of the CDS-organization and (c) (since 1986) the management and maintenance of the system parts that are being implemented." (HTK 1987f:6).

[76] The SDM method is a Dutch version of the Waterfall Model. It is a linear approach to software developing moving from the top (concept) steady downwards towards the final realization and the constant maintenance.

[77] Many projects have shown that an increase in programming personal does not improved the quality of the program but rather contributed to more confusion and more delays.

[78] It was not specified which *IBM* 3090 was used. It was a mainframe system that allowed numerous extensions – both for hardware and for software.

Figure 5: Image of the *IBM* 3090 (PCpedia 2013)

tem MVS (Multiple Virtual Storage),[79] and the IMS DB (Information Management System Database) was the database in use. The software was written in COBOL (Common Business Oriented Language) (HTK 1988b). The system was installed at the main office of the CDS. In June 1987, the entire computer system consisted of "approximately 1010 programs and six large databases" (HTK 1987f:4). Parts of the software were 'on-line' while the rest had been set-up as a batch process.

The 'on-line' software enabled the officials to enter data directly into the system via a computer terminal, equipped with a screen.[80] The software was 'on-line' because the CDS terminals were all connected "via the *RCC*-network resp. the PTT's Datanet-1" (HTK 1988b:7). In other words, the data that was entered at one terminal was directly sent to the database of the *IBM* mainframe via an internal network. All terminals had a graphical user interface (GUI). Having GUIs installed for entering data directly in a computer was not an innovation. Most personal computers offered their users GUIs since the late 1970s. Microcomputers got cheaper and more widely used in the 1980s as for instance the Apple Macintosh (1984) or the Atari ST (1986). Although it was not an innovation, it was still an important feature: a GUI enabled a more direct interaction with the computing system and was supposed to make the integration of the computing system easier. GUIs were made for the user. Also the network was supposed to make a fast and direct communication and data query possible.

The 'batch process' referred to the databases that were needed within the administrative processes but were irrelevant for the 'on-line' input.[81] Here, all data was saved and processed. *RCC* and *Volmac* also developed a rather innovative feature that has become ordinary nowadays but which was rather unique at that time: a small program was written that could be run on a personal computer. It was stored on a floppy disk, and it allowed students to calculate their student grants claim beforehand. Of course, only few people had a PC at home, yet, theoretically, every public library or public institution could offer this service to students.

The computing system for the CDS administration was designed to be used by officials. It relied on databases, automatic processing, networks, and graphical interfaces that were supposed to make the interaction with the system easy; at least in theory. Realizing these goals was difficult, especially under the circumstances of this specific pro-

[79] Standard *IBM* mainframe operating system at that time.

[80] Entering data into a computer via a keyboard seems normal today. However, it has to be considered that at that time much data was still fed into the computer via punch cards or magnetic tape and not with a keyboard.

[81] In computing, batch processing describes a serious or loop of programs that run without the intervention of a person.

ject. Many programmers and system architects were asked to design a system from the scratch without a clear organizational structure. Since the law was written while the system was designed, the team of software developers did not have any defined goals not even by the time when the software was implemented. Moreover, the team had only two years for the realization of the entire project despite the original study that had indicated the need for four years development time. It was usual that such large-scale automation projects took many years.

The developing team was only organized in a set structure when the law was more or less completed – which was in the spring of 1986; the law was to be enforced half a year later. This final organizational structure came too late and was only a reaction to the many encountered problems. The writing of the WSF had not been the central issue – although it surely had its pitfalls – but translating the law's demands into a computing system was. The 'reality' of co-construction was rather messy: it was a mutual dependence – the law could not work without a functioning system (as will be seen) but the system could not be realized without a completed law.

3.2.2 First problems get public

Already before it came in force, the WSF drew much public criticism. The modification of the child allowance law and the higher degree of automation promised to affect the work forces in the public sector. For instance, the Labor Council claimed that between 1100 and 1200 employees had to be laid off within the upcoming three years (Telegraaf 1985e). But especially students, the opposition, and the media were criticizing Deetman's plans which they considered as a discrimination of students from lower income families, forcing them into high debts (Waarheid 1985; JPdV 1985). The protests were initiated by the new draft for the WSF that Deetman handed in at the end of July 1985. It was only the beginning of a series of protests organized by student representatives that wanted to ensure that everybody had the same point of departure as a student (ANP 1985a). These protests were only concerned with the content of the law. That it could come to delays due to technical problems was not foreseeable, yet.

First indications that there were more extensive problems beyond contextual disagreements manifested in November 1985. Following the call of the Nederlands Staatscourant, – a public newspaper that published, for instance, government announcements – many comments and suggestions regarding the WSF were sent to the ministry. This led to a report that was presented to the parliament, in which the opposition raised serious doubts regarding the realization of the law (HTK 1985b). In this context, it was announced that the WSF might not be introduced in August 1986 after all. There were troubles with the implementation. Transitional arrangements were seen as possible solution (NRC 1985b; Telegraaf 1985d; Volkskrant 1985b). In January 1986, the protests against the law spread and even led to the occupation of the administrative office in Amsterdam. Students had the central demand that accompanied the protest since the very beginning: the student grants should enable everybody to study without the support of their parents (Telegraaf 1986a; Waarheid 1986; Volkskrant 1986b). The transitional arrangements or possible delays of the law introduction were still not an issue.

Next to the public protests, internal issues piled up but these had not reached the public, yet. For instance, the problems with the loose set-up of the organization and the absence of clear criteria got more severe. Although the report from November 1985 indicated that the WSF could under no circumstances be introduced, – at least not without additional measures – Minister Deetman did not dare to give a clear statement on the matter. Much indicates that he pressured the staff of *RCC* (Runia 1987) and of *Volmac*[82] and that the fast introduction of the WSF was more important to him than anything else. An internal letter from the CDS in December 1985 warned that the introduction of the new system would not be safe and that the indecisive position of the Minister had made it nearly impossible to turn back. The letter further stated that Deetman had to decide either to postpone the introduction of the law or to introduce transitory measures. He decided for the latter.

Minister Deetman wanted to ensure that the law would be enforced. Therefore, an additional paragraph was added to the WSF that allowed preliminary payments of student grants under all circumstances. This 'emergency' measure was supposed to be installed between October 1986 and April 1987 (HTK 1986b:14 et seq.). The reasons for this step were clear: the system could not handle all claims of the over 500 000 students that were expected to apply for student grants from July 1986 onwards. Not only had the expected student number risen by 100,000, which meant that a much greater computing capacity was necessary; more severe was the fact that the systems were not running with full capacity, yet. The computer was too slow for the rush of forms that was expected from June onwards. Too many changes in the law had led to a number of mistakes in the software. In order to prevent chaos, it was made possible for every student, whose details had not been processed in time, to ask for an advanced payment. These preliminary payments were the only way to realize the WSF, and Deetman was hoping that they would grant the system developers another half year to have the computer system fixed.

In June 1986, Minister Deetman ensured parliament that the CDS, *RCC*, and *Volmac* had decided that organization and technology were both fully developed and could handle the incoming requests. Therefore, the law could come in force in October (HTK 1987c). The press picked up these insurances: Nederlands Dagblad stated that the computing program was considered functional and that the law could therefore be enforced without any difficulties (ANP 1986a). This was one of the first references to the computer system ever made in the press. For the public, it seemed as if everything was in order. Yet, due to technical difficulties – there was no references to these problems in the press – only the WSF18+, the system for the regular education (see 3.1), was temporarily introduced. For the first half year, the student grants that were paid did not take in account all personal details of the students but made only an estimate sum available.

Although many newspaper articles on the law were published that were, for instance, concerned with the fact that low income families had to make at least a thousand additional Gulden available for their studying children (Volkskrant 1986a), hardly

[82] Personal conversation with with ex-*Volmac* employees.

anything was written on the advanced payments. Also the fact that only the WSF18+ was introduced seemed not to have been communicated to the press. Everything that could have indicated a problem with the computing system was evidently withheld. Very few articles suggested that students were entitled to advanced payments (Dagblad 1986a) or implied that the WSF was in a transitional arrangement (ANP 1986b). Communication was flawed between the Minister and the public. It took until January 1987 – around that time it became clear that many students had received too much or too little advanced payments – that newspapers began discussing topics that concerned the automation of the system (ANP 1987d). And that was only the beginning of the problem

The difficulties with the introduction of the law were not only downplayed; all aspects connected to the computing system were entirely kept away from the public. The impression was given that the system itself had no influence on the law whatsoever. The hesitations of the Minister to introduce the law were not interpreted as an indication that the organization and the application of the law could be at stake. Publicly, it was rather interpreted as doubts regarding the content of the law. That a computing system could indeed influence – maybe even hinder – the smooth introduction of a law was not even considered possible.

3.3 Escalation: computing's role

The relation between CDS, *RCC*, and *Volmac* as well as the complications that had arisen due to the entanglement between the system and the law should be clear at this point: for two years, there had been no defined organizational structure and the system's central role was crucially underestimated with the result that the system was too slow to process all data. In the following section, an overview of the events that led to the escalation of the WSF affair is given. Problems with the payment of student grants already started in 1986, right after the introduction of the law and they culminated at the end of 1987.

3.3.1 Culmination

Already before the introduction of the WSF, serious problems with the system had been foreseeable. Foremost, the software was too slow – the time pressure had resulted in programming mistakes and faulty implementations. That the program was running so slow became an even greater problem due to the unexpected increase of students applying for the student grants. A slow computing system was indeed unfortunate because each student had to fill in an overview of his or her financial situation but also the students' parents were requested to send in such a financial statement. This was needed in order to calculate each applicant's individual allowance claim. Besides the sheer amount of requests, many statements were filled in incorrectly and had to be returned – this resulted in even more data that had to be processed. Overall, a few million forms had to be handled between August – the month in which the WSF was enforced – and the end of September; at that time, students were supposed to receive their allowance. But *RCC* could only process between sixteen and eighteen thousand forms a day. The

immaturity of the system became even more distinct when a student wanted to declare a change in his or her living situation. This usually resulted in great confusion, often leading to an entire stop of payment – a great deficit for students who had, for instance, become parents.[83] In a reflection a few months later it turned out that the switch from the old to the new system had been entirely underestimated by the development team.

Moreover, the number of unforeseen problems was increased by non-technical issues which should have been considered as exceptions in the program design. Most severe, a number of parents did not hand in their financial overviews. Therefore, the student grant claims of these students could not be determined. Other parents refused to pay their children the required sum for their study. There were other problems that had not been considered beforehand: how to handle the financial overview of 'lost parents' – the term referred to unknown parents – proved to be a great complication and also the determination of the travel cost claims was unexpectedly complex (HTK 1987c:9). The situation seemed out of control, and the solution still appeared far away, even half a year after the initial introduction of the WSF.

One year after the law had been enforced, the problems still had not been solved. On the contrary, the situation grew more acute. The CDS was still struggling with wrongly filled in forms. Still in 1988, about 10% of the parents' statements – which equaled about 70 000 letters – had to be returned and filled in again. This delayed the payout remarkably, especially since the computing system did not work with full capacity. But there were not only troubles with the data processing of forms. As briefly mentioned (see 3.2.2), there were also problems with the preliminary payments – students whose data had not been processed in time had to face more difficulties. The newspaper De Volkskrant reported that about 140 000 students had received too much money. Students were not asked to repay the surplus money after finishing their studies but instead, their scholarships were cut by ƒ203 per month (see figure 6); after a sequence of protests, the cuttings were reduced to ƒ76 a month (ANP 1987b). But not only were those students in trouble that had received too much money; those that had received too little allowance over the past year were now also in a difficult situation because they could not pay their bills anymore. Also the tuition fee had to be covered by the students – it was promised that the money would be repaid by the state a year later (Volkskrant 1987a). In September, some municipalities decided to grant those students in the greatest financial difficulty an advanced payment – independent of the ministry (Telegraaf 1985c). Also the CDS agreed on another round of interest free advanced payments after protests continued (ANP 1987c; Telegraaf 1987g). Yet, the Minister insisted that the realization of the law had been successful.

[83] Students with children were entitled to more money.

DIT BERICHT IS VAN BELANG VOOR ALLE STUDENTEN EN SCHOLIEREN DIE RECHT HEBBEN OP STUDIEFINANCIERING 18+

Omstreeks 10 april 1987 wordt de studiefinanciering 18+ betaald. Dat is een voorschot voor één maand. In mei worden voor het eerst de definitieve toelagen uitgekeerd. Vanaf dat moment wordt steeds rond de 20ste van de maand uitbetaald.

Waren de voorschotten van oktober 1986, januari 1987 en april 1987 te laag? Dan wordt het verschil rond de 20ste mei in een keer bijgepast. Als de voorschotten te hoog waren, wordt het verschil vanaf de betaling in mei met de toelage verrekend. Er wordt maximaal f 203,35 per maand ingehouden totdat het teveel is ingelopen.

HOE IS HET VOORSCHOT BEREKEND?

De directie Studiefinanciering van het Ministerie van Onderwijs en Wetenschappen heeft de voorschotten berekend aan de hand van de antwoorden op het aanvraagformulier. Die berekening kan leiden tot voorschotten van verschillende hoogte.
Bepalend is:
- of alleen een basisbeurs is aangevraagd of ook aanvullende financiering;
- of de studerende uit- of thuiswonend is;
- of er een financieel afhankelijke partner is;
- of de studerende alleenstaande ouder is.

Maar met een aantal andere gegevens is nog geen rekening gehouden bij het bepalen van de hoogte van het voorschot. De inkomensgegevens van de ouders, de studerende zelf en een eventuele partner van de studerende zijn niet in het voorschotbedrag verwerkt.
Wie behalve een basisbeurs ook aanvullende financiering heeft aangevraagd, mist in het voorschot een bedrag voor het lesgeld of collegegeld. Dat wordt eind mei met terugwerkende kracht tot 1 april wel uitbetaald. Voor aanvragers van de aanvullende financiering geldt ook, dat het bedrag voor de ziektekostenverzekering niet in het voorschot zit. Aan diegenen die daarvoor in aanmerking komen, wordt een bedrag voor de ziektekostenverzekering nabetaald met terugwerkende kracht tot het moment waarop voor de studerende de voorschotperiode begon.

VOORSCHOTBEDRAGEN (per maand)

Studerende met basisbeurs:

Thuiswonend	f 265,96
Thuiswonend, toeslag financieel afhankelijke partner	f 1.028,91
Thuiswonend, een- oudertoeslag	f 876,32
Uitwonend	f 604,22
Uitwonend, toeslag financieel afhankelijke partner	f 1.367,17
Uitwonend, een-oudertoeslag	f 1.214,58

Studerende met basisbeurs en aanvullende financiering:

Thuiswonend	f 484,37
Thuiswonend, toeslag financieel afhankelijke partner	f 1.247,22
Thuiswonend, een- oudertoeslag	f 1.094,73
Uitwonend	f 822,63
Uitwonend, toeslag financieel afhankelijke partner	f 1.585,58
Uitwonend, een- oudertoeslag	f 1.432,99

De bedragen worden verhoogd met een tegemoetkoming in de reiskosten, als de studerende thuiswonend is, en meer dan 8 kilometer moet reizen naar de onderwijsinstelling. De tegemoetkoming in de reiskosten is f 4,08 per kilometer per maand. Het maximum is f 229,17 per maand.
De directie Studiefinanciering stelt de afstand tussen woonadres en onderwijsinstelling met behulp van de postcodes vast.

Publikatie van het Ministerie van Onderwijs en Wetenschappen.
Centrale directie Studiefinanciering Postbus 30006, 9700 RH Groningen

Ministerie van Onderwijs en Wetenschappen

Figure 6: Advertisement informing students that received too much or too little advanced payments of student grants about the new scholarships and allowances that would be paid from April 1987 onwards (Telegraaf 1987).

Just as severe for the CDS administration in Groningen were the so called 'white' letters. In 1987, students began sending letters to the main office – the CDS offices were overcrowded and the telephone lines constantly busy. Therefore, all students that had difficulties with their student grant sent mail to Groningen.[84] As a result, the CDS main office was flooded with letters. In a parliamentary debate in June, Deetman insisted that the letter problem would be solved within two months (HTK 1987d); however, he underestimated the persistence of the students: between June and September 1987, approximately 400 000 letters reached the CDS-office – it was an incomprehensible amount

[84] There are even indications that some students had called to bring the CDS administration to a collapse by encouraging everybody to send a letter.

that overburdened the 300 CDS employees completely (HTK 1987c). Overall, only a very small number of the letters was ever processed. It was tried to filter the most urgent requests but most stayed unanswered. The problems with the computers were directly reflected in these letters. Wrongly processed forms forced students to hand in handwritten complaints which resulted in an overload of the system. For this reason, officials could not enter any changes of personal information in the system, and payments were often stopped. It was a vicious circle.

After running for already one year, the situation with the WSF seemed all but solved. Problems piled up due to the difficulties with the automation system. Forms were not processed in time, and even the advanced payment was calculated incorrectly. Serious mistakes had been made especially when it came to the assessment of the role the computing system had in the execution of the WSF. Nobody considered the full scope of consequences that followed the poor implementation of the system which led thousands of students in difficult financial situation, hindering their study process.

Let us quickly consider the implications of this close system-law intertwining: the automation allowed the design of a law that could make complex welfare claims, such as student grants, enforceable despite a small office staff. Looking at it from a different angle: the automation system made further education for a great number of students with a low socio-economic background possible and prevented those students from sliding into high depths in their early professional years. But why was that important? Traditionally, families had always been required to support their children's education. What had changed? It was not only that students wanted to have equal rights for higher education. Society demanded a better educated work force that could face the changes the labor market had undergone. Was automation a reaction to these changing social demands? Or were social groups directly or indirectly influenced by the possibilities computing offered? I will return to this question later.

However, the system was not working. As a result, the securities and the equal treatment which the law had promised were denied – a fact that hit the underprivileged most. The ones that the law was supposed to support were most vulnerable when the computing system failed. But the computer's centrality was not seen by the ministry. At least it was denied – after all, it was not considered necessary to grant the development of the automation more time, and the system was also not a topic that was publicly discussed. Yet, what were the public reactions when it finally became clear that the automated system had not been working properly? Was public attention turning to the technology that was causing the problems?

3.3.2 Whose fault?

Until September 1987, the discussions in the newspapers continued to revolve around the disadvantages of the new law for underprivileged students and their families. Although some had criticized the delays and irregularities of the payments, the technical realization of the WSF was never directly questioned. However, after *RCC* project manager for the student grants, L.A. Runia, published an article on the development of the WSF computing system, the focus shifted. Runia made public that already in

1984, *RCC* and *Volmac* had given advice to Minister Deetman that they could only guarantee a fully functional system for the WSF by October 1988 (see also section *3.2.1*). The opposition and the press were outraged but they were unsure who was to blame. Had the Minister consciously mislead the parliament and the public by claiming that the technical realization would not lead to any problems, or were *RCC* and *Volmac* responsible for the Minister's ignorance? Were the businesses maybe even pushing their own guilt aside? MP Lansink (CDA insisted that those responsible for the software should answer for the damage in case that it turned out that faults in the software were the reason for the delays and mistakes in calculating the claims (Volkskrant 1987b; Telegraaf 1987b). However, other groups – according to the Newspaper De Waarheid, for instance, the Association for Cooperation of Dutch Universities (Vereniging Samenwerkende Nederlandse Universiteiten) – were convinced that it was entirely Minister Deetman's fault and that software had nothing to do with the problems (Waarheid 1987b).

In order to get control over the escalating situation and to help students in tight financial situations, it was decided to introduce new measures. On September 17, the 'by-pass' [85] was promising to bring quick help to all students in need. The solution had been developed together with universities and students, and both parties were directly involved in the realization of these measures. The by-pass measure enabled every student in need to turn to the regional CDS office, have his or her personal claim calculated, and receive an interest free loan for the upcoming four months (HTK 1987c). A new standard form was designed that could be processed electronically within four weeks. Only eighteen data points were asked by this form; the hope was that this would make the computer calculations faster (Volkskrant 1987c). The forms were also seen as possible solution to the mass of requests that had been sent in by mail (the 'white letter' problem).

These emergency solutions revealed that the system was not working. The initial advanced payments of 1986 had been downplayed. This by-pass, however, was made widely public. It could also no longer be hidden that there were serious issues at hand with the WSF and that costs had exploded. It was planned to spend even more money in order to give security to students and to finally fix the WSF computing system. The by-pass asked for more personal efforts and greater sums of money on a short-term basis. And the system had to be fixed; especially the response time and the on-line software needed to be optimized. One year of half-hearted efforts to belittle the extent of the problem with the system had not fixed its shortcomings. This had to change (HTK 1987c).

Nonetheless, the public discussion did not turn towards the difficulties of combining law and technology. Rather, many began calling for Minister Deetman's resignation. In order to clean his name, the Minister not only gave an elaborate statement of the

[85] At the same time, publications appeared on the topic: for instance, D. and H. Backx published a book, criticizing the new law and presenting an alternative to the by-pass measures (Backx and Backx 1987). Yet, the lawyers did not mention the law's intertwining with the computing system at all.

events that had led to the disaster but also commissioned three 'authorities' in the field of information technology, asking for their assessment of the situation. Deetman was convinced that he could prove that he had done everything right. Although he still stated that there was no chaos with the student grants and that the computer programs were running fine (Telegraaf 1987f), his actions indicated that he was convinced that the problems had been on the technical but not on his side. However, the MPs took Deetman's action as a proof that he was blaming parliament for the problems with the WSF because he claimed that the parliament had pressured the early introduction of the law. Also *RCC* and *Volmac* felt wrongly accused by Deetman's claims.

The Minister also swept aside criticism that the CDS administration had not been prepared enough for the computer system. Some saw insufficient training as central reason for the delays. Yet, Deetman insisted that the officials had been used to "a higher grade of automation for years" (HTK 1987f:2). He was also convinced that there had been no structural mistakes in the process as a whole. In order to prove these points, he commissioned the three 'authorities' to analyze the events. The advisors that the Minister installed in order to assess the realization of WSF and to strengthen his position were C. de Hart, Chairman of the Advisory Body for Higher Education, C. E. Hunter, Head of Information at Shell Netherlands, and J. Vermaat, chairman at the University for Applied Science Windesheim. This so called Advisory Committee Student Grants came to be known as the 'Committee-De-Hart' or the 'Committee of Three' and was asked to hand in its report to parliament until December 1, 1987.[86]

When the committee presented its findings, it pointed towards twenty difficulties with the WSF but gave also a list of solutions. The argument the newspaper De Waarheid found most important was that it was not the automated system that had caused the problems but the organization.

> "The cooperation between the automation experts and the specialists in the field of the student grants did not go spotless when the Minister took the decision to continue with the introduction on June 23, 1986. In this context, the committee referred to 'technology without management' and therefore to an 'imbalance'" (Waarheid 1987a:4).

The concept of an imbalance between technology and organization was happily picked up (ANP 1987a). Also the Nederlands Dagblad stressed a similar argument. The confusion had, according to the newspaper, been caused by the clash of different worlds or cultures, the IT experts (*RCC*) and the users (CDS administration). For De Telegraaf it was clear that the committee had freed Deetman from his responsibility, finding the reasons for the failure of the project in the misjudgment of his advisors that had overlooked the possible risks. Especially the missing expertise of the CDS staff regarding automation projects was pointed out (Telegraaf 1987a). One thing was clear in

[86] Unfortunately, this report was never made publish, resp. made available for the public

the discussion: technology was not to blame, and what role it played in the realization and execution of the WSF was not considered.

In the meantime, student protests continued. Most were dissatisfied with Minister Deetman's educational policy as many students still had money problems and some were forced to leave their schools as they were no longer able (and maybe not willing) to pay their tuition fee (Telegraaf 1987c).

In mid-December, Minister Deetman was asked to answer parliament's questions. The opposition was challenging Deetman's position as Minister for Education and the Sciences, calling for his resignation. This debate heavily relied upon the results presented by the Committee De-Hart. In the debate, the MPs, foremost the spokesman W.A.F.G. Vermeed (PvdA), questioned Deetman's actions and responses to the problems of the student grants. Mr. Vermeed stressed that the parliament would make a great mistake if it would focus its attention primarily on the technology issue. Rather, the government itself should be under investigation as it had been responsible for the poor realization of the law (HTK 1987a).

The debate recapitulated all events that had led to the debacle at the end of 1987. In the center of the discussion was the claim of the CDS that Minister Deetman had pressured the introduction of the WSF in 1986, in spite of the advice the CDS, *RCC*, and *Volmac* had given. The explosion of development costs that had accumulated to nearly *f*80 million at the end of 1987 was in particularly criticized. Many MPs wanted to know why the old computer system had been replaced entirely and was not kept as backup. The MP Leerling (RPF) even claimed that "due to the fixation on the technical incidents, namely the automation project, the human aspects were neglected" (ibid.:76). Also MP Nuis judged that the problem had mainly been caused by the hopes that Minister Deetman had put in the technology. He should have had considered the organizational aspects more carefully. This opinion was shared by many. "The time pressure was too great, technology was put above the policy and there were too few tests. Did the Minister not recognize this too late?" (ibid.:78) was the comment by MP van der Vlies.

Once more, the role of technology was minimized. It had been the Minister's fault who overestimated computing but not a problem with the lack of understanding the incorporation of technology in new legislation. Most MPs demanded to trust less in technology – a claim in extreme contrast to the ever growing synthesis of the political life with computing technology. In many respects, these discussions resembled early debates on automation: computers were depicted as threatening and uncontrollable entity that should not be trusted. Computing became more involved in politics every year. The problems with the organization were a result of the lacking acceptance that processes were changing radically due to growing numbers of data sets and changing economic demands – industrial work was left behind slowly, making room for a

'knowledge base' economy.[87] Computing was needed in order to meet these new demands.

Deetman answered to the accusations by stressing that he had not been responsible for the mistakes that had been made. He acknowledged that things had not gone as planned, such as communication between the responsible organizations and the information policy with the students. The complications between the technology and the organizations had led to the difficulties, yet, the system itself had not been designed incorrectly. He ensured parliament that he would realize all the suggestions made by the Committee De-Hart, install a preliminary team of experts that would help reorganizing the CDS, and give regular and extensive reports on progress of the WSF (HTK 1987b). His explanations and excuses were accepted. Minister Deetman did not lose the trust of parliament and he was allowed to stay in office. Yet, the Minister's image was delicately touched. His reputation had suffered but the new approach to automate government processes had not been corrupted.

There was much speculation in the press concerning Deetman's position beforehand. Many doubted and speculated whether or not he would stay in office, calling his position shaky, especially when it became clear that Deetman had known about the difficulties accompanying the project much longer than he had confessed earlier. The Minister, his knowledge, and his political future were in the center of the attention (Telegraaf 1987e; Cornelissen 1987; NRC 1987b) but not the difficulties of implementing technology. It came unexpected when the newspapers reported that the Minister had 'survived' the parliamentary debate, but the public had accepted his version of the events. The explanation that it had simply been an unfortunate imbalance between the involved parties was considered plausible. Deetman was now asked to fix the WSF (Telegraaf 1987d; NRC 1987a). Although computing had become central for the realization of a law, this issue was never raised in the press and it therefore never became a public topic. A few years earlier, people were protesting against the growing influence of technology on society. Now that computing really had become part of law itself, it was no longer an issue.

3.4 The system blends with the background

The case study of the WSF automating system is coming towards an end here. Although the troubles with the student grants were everything but solved, a judgment had been made: the technology was not responsible for the troubles. It was simply not possible to assign so much importance to a non-human entity. Problems had been on the organizational and the communicational side. Nowhere else! For the interested reader, I want to give a very brief overview of the events that followed the debate in parliament before coming to the conclusion.

In the first week of the year 1988, Deetman installed a group of ten experts that was supposed to help re-organize the CDS office and realize the suggestion of the

[87] There are of course discussions regarding the validity of this claim; see for instance (Webster 2006).(RW.ERROR - Unable to find reference:709)

Committee De-Hart. The director-general for higher education, R.J. in 't Veld, took over the group's responsibility, which was supposed to present their results in July 1988 (ANP 1988a; Waarheid 1988). An extensive report by Minister Deetman from February showed that a few hundred students were still in need of the by-pass arrangement (HTK 1988a).[88] Also, the number of students applying for the student grants was still much higher than calculated. Therefore, more money had to be spent – a sensitive issue for the ministry. Most severe, the 'white-letter' problem was still not solved. Each month, 11,000 letters arrived of which only 8,000 could be processed. Another form was introduced that made standardized changes in the application possible, and it was decided that only complaints in a certain form were to be accepted by letter (ibid.). Especially the fact that the realization of the WSF was still costing ƒ250 million more than planned remained a constant public concern (Dagblad 1988a).

The tense situation nearly escalated when students were asked to repay the surplus money they had received all at once. The situation culminated even further with the announcement of the parliament that the additional loans would in the future be granted by banks (Dagblad 1988b). Once again, students protested and occupied office buildings. The protests were not only directed against the bank loans but also against plans to raise tuition fees again (ANP 1988b). The student grants were in serious trouble: money was running out and it was desperately tried to cut costs.

In July, the committee managed by 't Veld had finished its work of reorganizing the CDS main office in Groningen successfully. Employees of the CDS soon stated that the situation was indeed improving. They were no longer overrun and busy trying to understand the system and the law, but they were now in the position to help students to fill in forms and to inform them about their rights. At the same time, officials asked themselves what their position had become. It was no longer their job to judge a claim but they had turned into "data typists" (Westerik 1988).

In spite of this release of tension, there were still many problems with the WSF: the law was adopted and changed over and over again in order cut costs (NRC 1988a). This was not only a result of the tight financial situation the government was confronted with. The sloppy realization of the WSF had cost so much money and had received so much public attention that the government was forced to limit the financial budget (ANP 1988c). There were more issues to come, as, for instance, the introduction of the free public transport tickets (OV kaart), which became a topic later in 1988 (Weger 1988). But although difficulties continued, the WSF was established in spite of its many faults. It had become a public symbol of the things that could go wrong when complex and difficult changes in law were introduced.

The case of the WSF automation did not only feature the developments that led to one of the biggest legislative disasters of the 1980s. It showed much more. It revealed the difficulties of integrating computing technology into public administrations that are responsible for hundreds of thousands or maybe even millions of people. The automat-

[88] Overall, approximately 13 000 had received money from this measure between September 1987 and February 1988.

ed system was not simply implemented after the WSF was developed but both, system and law, formed a symbiosis. This interdependency was expressed on many levels, not the least by the involvement of the two software companies (*RCC* and *Volmac*) in the writing of the law itself. The interconnection became most obvious the moment students were left without student grants. Although the law had been passed shortly before August 1986, the administration was not ready. And this was not because the employees of the CDS had been insufficiently introduced to the law but rather because the computing system did not work. Perhaps, the chaos could have been reduced by introduction the CDS staff better to the system: student grants could not be paid without a workforce that knew how to handle the computer terminals and knew how to read the results. At the same time, the best educated staff was not going to fix a slow and faulty implemented computing system. The student grants were not working because serious mistakes had been made in the software implementation and the responsible parties refused to accept the computer's central role in the execution of the law.

There are other aspects of the case WSF that should be further discussed, especially in comparison with the INSP. These elements are of the upmost important as they further tackle the question which place computing had in Dutch society in the 1980s. Therefore, the final reflection on the WSF will be found in the conclusion.

4 Coming to a conclusion

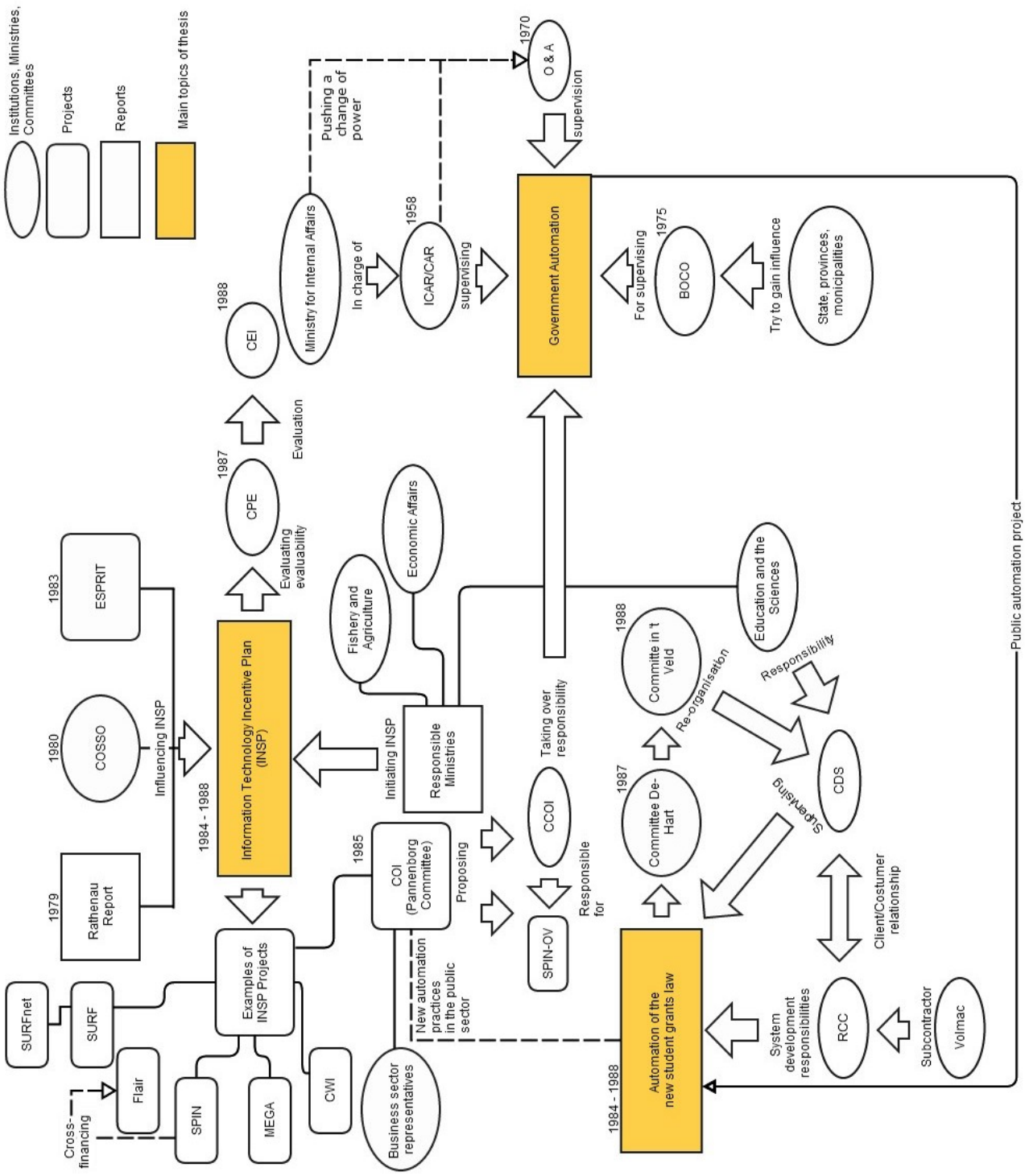
This thesis had two complex case studies – which had never been investigated before – at its core, both concerned with Dutch technology policy during the 1980s: the Information Technology Incentive Plan (INSP) and the automation of the Dutch Student Grants Administration (WSF). Both measures, although different in nature, were excellent cases for demonstrating the role of computing technology in Dutch society at that time, showing how the technology entered the political debate. They granted important insights in the entanglement of IT innovation and technology policy. At the same time, an analysis of the press emphasized the difficulties of the public to comprehend and reflect on computing's growing importance and to accept and understand the interdependency of technology and society.

I used different national newspapers to draw an image of what I called 'public perception.' Newspapers not only give insights in public debates. When it comes to computing technology, the media has shaped and influenced opinions and public views. Although newspapers usually give diverse opinions, I demonstrated that the reports were homogeneous with regard to technology policy, allowing me to use these sources as representation of public opinion on technology. Studying the media responses to the two case studies at hand indicated how little the central role of computing technology was recognized and understood. The public was most certainly not aware of computing's influence on legislation.

It was also demonstrated how the trust in the expertise of private IT businesses was used by politicians and businesses to realize their own interests. This exploitation of power was made possible by the declining interest of the press in political technology measures. The following section of the conclusion investigates the further implications of the case WSF and compares it to the INSP. After a summary, the discussion is opened up for a more general reflection of the case studies: this epilogue is a broad consideration of the finding and serves as inspiration for future research.

4.1 The perception of technology: WSF vs. INSP

Most important in this research was to investigate computing's role in Dutch society during the 1980s which was made most explicit by the last case in this thesis. The great dependence of the modern welfare state on computing systems was demonstrated by the case of the WSF automation: the failure to implement a faultless computing system for the WSF resulted for ten thousands of students and their families in great financial difficulties. At the same time, the case showed how the public discourse avoided the confrontation with technological questions and instead saw the faults with politician. As in the case of INSP (a policy introduced to grant more political consideration to IT), the public but also the involved politicians were neither concerned with technology nor the central role it had gained in society. At the same time, the INSP had made IT an official political topic which it had never been before.



Reading Diagram 6

Before turning to the comparison of the INSP and WSF, I would like to elaborate further on computing's central role for the WSF that was very much underestimated by the public administration and the ministry but also by the media. The misjudgment of the system's position was expressed most severely in the lack of understanding that the law WSF could not be realized without the software – especially not with only 300 employees. *RCC* and *Volmac* were at least to some extent aware of the complications which such a complex implementation could cause – the ministry was not. It is very unlikely that Minister Deetman would have pressured the WSF otherwise in only two years. After all, the entire realization of the WSF – which was Deetman's most prestigious project – depended on a well implemented and functioning computer system. In the eyes of the ministry, the system was only necessary to make the processes faster and cheaper. That not only the law would influence the system but that this relation could also work the other way around was not considered, as the case study demonstrated. The image of a one sided relation was also projected on the public and it fitted the common perception. After all, computing was important but it was only technology that functioned as a tool; it seemed as if it had no direct influence on people's live. There seemed to be no recognition that the problems with the WSF were caused by the complex intertwining of the law with the IT system. Therefore, the press ignored the technology issue.

Minister Deetman had his own concept of automation. He was aware that the automation of an office influenced internal power relations. The Pannenborg committee – that had been commissioned as an INSP project – had just given recommendations that would grant the private sector equal rights in the automation of the public administration, and the WSF became an unofficial test-run of this policy. Gaining control over the internal processes in administration was a central element of the new law for the student grants in the eyes the Minister. In case of success, Deetman would have proven that all the long lasting automation projects of the past had followed the wrong organizational structure. The suggestions of Pannenborg would have been underpinned. In case of failure, an experiment that had been necessary due to a tight schedule had failed. The latter was the case. To the disadvantage of public education, internal political power struggles were fought. Perhaps the struggle for more influence blurred the considerations of the effects these actions had on the execution of the law? In any case, these fights stayed unnoticed and ignored by the public.

There are a number of questions that need to be asked that were never touched by the public and parliament: did the equal cooperation between *Volmac* and *RCC* really improve the implementation of the system? The government was in a tight financial situation. But were private IT businesses really cheaper? Was there ever one indication that *Volmac* provided more innovative solutions or did a better programming job? All these were improvements promised by the Pannenborg Committee but were they fulfilled? Deetman continuously pressured the fact that no greater architectural mistakes had been made when it came to the WSF software. Yet, was it good software, besides the fact that it did not work because of constant changes in the law and due to time pressure? Nobody ever dared to ask even though the evaluation of the INSP had

indicated that the substitution of the old private IT sector did not seem to support more innovation. This thesis unfortunately cannot answer these questions further. Rather, I want to understand why there was no public interest in scrutinizing these claims, considering that this was an entirely new arrangement for automating the Dutch public sector. Let us quickly remember the conclusions drawn in the case of the INSP.

Great attention had been paid to the incentive program in the beginning: it was all about educating Netherland's present and future generations in the mastery of information technology. IT for the benefit of the whole society was the slogan. The policy was the first of its kind to stimulate IT technology in the Netherlands actively and it had made IT prominent. Yet, when it came to the assessment of the results, the once enthusiastic public turned quiet. It was more than disinterest: nobody dared to make a judgment regarding the success or failure of the projects that were subsidized by the incentive plan, probably because most people did not consider themselves competent enough to give a valid statement. Although the evaluation committee (CEI) had given a clearly negative judgment, hardly anybody dared to make an own contribution. Over *f*1.5 billion were spent on ominous projects but there was no discussion regarding the effect the projects had had or a demand to give clear financial statements. The situation was similar when it came to the automation system of the WSF. Many questions were asked, the press was all over the case, filling columns almost daily, especially regarding the Minister's political ambition and the technological affinity of the involved parties. Yet, the technology itself was never questioned.

Even though INSP projects might not have touched people's life, the WSF automation most certainly did. To understand why no doubts were raised with respect to the INSP project, the recommendations of the Pannenborg Committee, or the technical success of the WSF, we have to consider the perception of technology and computing. Journalists often did not have the expertise to give a value judgment of a computer system's quality; especially not because this technology was still indirectly perceived and presented as (threatening) 'superhuman' entity, incomprehensible for a 'normal' human being. This entity was publicly considered as decisive for the national economy but it was nevertheless an external social phenomenon. In the media, which influenced public perception, computing technology itself was 'untouchable', exceeding the comprehension of most. Therefore, the public, of which the parliament had become part of, restrained itself to ask 'traditional' organizational and power-related questions. As a result, nobody – except the INSP evaluation committee – questioned the INSP projects or the work of *RCC* and *Volmac* publicly.

But who was considered competent? As demonstrated, the honor was given to private IT businesses; they were seen as experts in the field. This is also the reason why nobody questioned the set-up of the WSF-development team and the Pannenborg recommendations. If not even a private company could handle computing systems, who else could? This attitude also explains why the money issue was not raised in case of the INSP but instead with the WSF. As already suggested, the public had accepted all INSP projects as valid because they had been in the hands of private businesses which

were considered working in the interest of the Dutch society. That the INSP had cost ƒ400 million more than declared in 1984 was never made an issue. At the same time, it was not acceptable that the WSF exceeded its financial plan by ƒ250 million. Although the exceeding costs had at least partially been caused by the faulty system, the financial expenditure was solely explained by the rising number of students. It would have required accepting the software's centrality in the realization of the law (and of course grant education a higher priority than businesses). But that is not how computing was perceived: it was seen as a necessary but external entity with no direct influence on processes, let alone society.

This brings us to the underlying paradox: computing had been overestimated for years – for instance, with regard to artificial intelligence – but it was entirely underestimated in its influence on law and therefore the perpetuation of the welfare state. Accepting the crucial role computing systems were having in the realization and execution of the most basic laws would have asked a conscious confrontation that required more than sector oriented technology policy. Much more was needed than saving the Dutch identity by stimulating the private industry. Computing had changed policy and affected people's lives; it even influenced whether or not people could proceed undisturbed with their daily routines since the distribution of financial support depended on it. Computing technology was not an external entity but it had become the means for securing the welfare state and therefore the direct support of the social system that the Netherlands pursued. Indeed, it had shaped politics.

4.2 Summary

To round this thesis, I would like to give a summary of all findings and end this conclusion by elaborating on the further implications of this research in an epilogue.

The first chapter provided a brief overview of the changing public concepts of computers in the Netherlands between the 1950s and 1970s. It was demonstrated that these concepts spread by the media were not only abstract but had little to do with actual computing installations. Although stimulated by the US American discourse, the public perceived computers and automation primarily as positive or maybe even miraculous in the 1950s and early '60s. Public perception in the Netherlands changed at the end of the 1960s. Many negative concepts of computers replaced the hopeful future images that had dominated the press up to that point. Privacy issues – the example of the census was given –, fears of unemployment, and social upheaval turned computers into threatening entities. Whatever the public perception was, it tended towards the extreme, alienating itself further from the actual possibilities computing systems offered.

Representatives from businesses and research strongly opposed these negative opinions spread by the press. They launched an influential campaign, stressing the need of computing technology, especially microelectronics, for the future of Dutch society. This discussion resulted in the commission of the Rathenau Report that assessed the possibilities, chances, and issues of microelectronics. Besides putting computing on the political agenda, the report made one aspect clear: to secure the preservation of the

Dutch identity in the fast changing and globalized world, microelectronics and in particular microchips were necessary. Research and especially the industry were presented as responsible authorities to secure the Dutch position in the international market. At the same time, the need for a comprehensive education of the entire Dutch society with regard to information technology was stressed. The suggestions made by the committee stopped the open hostility against the new technology. The promise that computers' extraordinary abilities could be turned to benefit society was taken seriously. As a result, the government promised computing education; despite financial difficulties.

Action followed: a package for stimulating information technology, making over ƒ1.5 billion Gulden available, was passed. Despite its escalating costs, the Information Technology Incentive Plan (INSP) – topic of the second chapter – was widely accepted for a central reason: it was sold as a program for stimulating IT education. The consensus had been reached that education was the only way to turn computing to the benefit of society. People expected that this program was an indication for the successful integration of information technology in society. Computing had become the future of the Dutch economy and therefore society, and it was promised that the incentive plan was going to educate the present and the future generations.

However, as demonstrated, the INSP was only little concerned with education but was rather a large scale program that had the aim to ensure the status quo of the influential Dutch IT industry. Besides a few projects that indeed supported innovative research, most contributions to computer science education were material, and great parts of the money that went to the private sector were spent on projects that missed clear definitions and aims. Their innovative nature was also strongly questioned by the INSP evaluation committee. Overall, more than ƒ1.5 billion was given to different projects, even though the Dutch government was in great financial difficulties at that time. But in spite of this, there was never a public complaint regarding the costs nor was there a discussion concerned with the INSP's (apparent) failure to stimulate IT education. Taking this neglect in consideration, whom and what did the incentive plan benefit? The stimulation program was not only used as a tool to support the established IT industry but the program also helped to pressure new power structures within the automation of the public administration. This struggle was entirely ignored by the public. Rather, the suggestion to hand over responsibility to businesses when it came to the automation of the public administration, made by the Pannenborg Committee – the group had been commissioned as an INSP project –, was celebrated. Businesses were trusted and considered as highly competent.

Although publicly, computing technology was accepted, the last case emphasized most vividly how difficult, perhaps even impossible, it was for most to comprehend and reflect on computing's central role in society. Automating the WSF administration, the topic of the third chapter of this thesis, was supposed to be a project equally shared between a public and a private business. It was a project conducted behind closed doors: automating the processes of a new law was under normal circumstances never brought to the attention of the public. There was no reason to do so. A successful im-

plementation might have led to a public appreciation that the government's neoliberal policy was the right direction for the country. However, the public was not made aware of the WSF automation project due to its success: the implementation of the new law, that was supposed to guarantee all Dutch students security for their studies, was a disastrous failure.

Despite the fact that the problems were caused by the poor implementation of the computing system – the execution of the law was delicately dependent on its automation system – the public entirely ignored this correlation. National protests were directed against the Minister but no debate was initiated that questioned the implementation of the devices and the software that had caused the difficulties. Automation in the public sector was not a topic. Even though the WSF demonstrated to what extent a modern state and the execution of its tasks depended on computing technology, this relation became never an issue. The public was directly confronted with the mutual dependency of modern legislation and new technologies but this interdependency was not recognized. Instead, the WSF became the playground for rather 'traditional' power struggles. The Minister was blamed for the problems who in return tried to point to the responsibility of others. Although the technology itself played such an important role in the WSF, all issues were reduced to organizational and communicational difficulties. That a technology could possibly have influenced the outcome and feasibility of a political agenda was not considered.

This thesis demonstrated how political agendas were adjusted to fit public demands without actually fulfilling these promises and that the press, which was central for the public perception of computing, did not investigate these matters further. This realization might not come as a surprise but it allows further conclusion about computing technology's role in society. Computing had gained much prominence with the INSP and had become most central for society as it affected almost every person; but the public still perceived it as a completely external entity without direct impact and effect on people's life. This conclusion can be drawn due to the absence of debates on the issue in the national press.

4.3 Epilogue

There is much more that has to be discussed as a result of this research – implications that go beyond the historical analysis and that should be investigated in future studies. The findings of this thesis certainly support my claims but more research is necessary to substantiate them further.

Of the many questions that could be raised, I would like to restrict myself to four issues that are related to this thesis and that have the concept of public perception and the role of computing in Dutch society at their core. First of all, I am curious how public perception of computing granted competence in questions of IT and how perception mattered for policies and political discussions concerned with computing technology. Second, I would like to investigate the claim in how far technology can be a central element in political movements. Third, it is most important to consider in how far modern welfare processes depend on the functionality of computing systems. Last, I would like

to discuss whether or not the perception of computing influenced the type of computing technology that was developed in the 1980s.

Let us first turn to the issue of competence and public perception and how the latter influenced the political technology discourse. Many newspaper articles were reviewed for this thesis that discussed computing technology – both with and without regard to the two case studies. How was computing described in these reports? It is striking to point out that specific technical details were missing throughout all newspapers. An explanation for this absence can be found in the priorities of the newspaper readers: the public was not interested in technicalities.

It is not far-fetched to claim that this non-technical reporting shaped the public perception of computing. Throughout the 1960s and 1970s, newspapers mainly reported on an emotional level when it came to computing, discussing the positive and negative aspects of the technology. Especially the negative fear driven concepts that were spread as a reaction to the census and microelectronics were very intense and provoked political intervention. This emotional perception of technology was clearly influencing political priorities; after all, the Rathenau Report was to a great extent a reaction to public criticism and the educative orientation of the INSP had also been in the interest of the opinions spread by the press. The public perception was also the reason why another group became involved in the discussion: representatives from the industry and from research that were considered experts began calling for a better integration of computing. A clash erupted which provoked a change in Dutch technology policy. A public movement that did not have any expert knowledge (remember the concept of being literarily stuffed in the computer raised in section *1.2*) made computing visible and provoked the installation of commissions and new policies.

But although computing had moved to the center of society, most still did not understand the technology and it was not tried to hush up the lack of expertise. After all, the public openly admitted that neither laymen nor officials could be trusted when it came to information technology. Rather, competence in questions of IT was granted to the private industry alone. Businesses were considered the only experts to trust in matters of computing technology. In my opinion, this public allocation of expertise encouraged the neoliberal technology policy of the Lubbers-government that was expressed by the Pannenborg Committee. The public entirely supported the responsibility transfer from the not-trusted politicians to the private sector in the 1980s – a fact that can be deduced from the positive newspaper coverage on the topic that never questioned the neoliberal approaches.

This brings us to the second topic, technology as a key motivator of political movements. As already indicated above, the emotionally loaded coverage of the privacy issues released a great potential of public resistance. Although computing was an abstract and misleading concept, the technology became the inspiration and the reason for resistance. I can make my point more clear when I turn this statement around: the movements of the late 1960s and early 1970s were to a large extent a product of technology. Many different technologies, nuclear power, industrial machines, but to the

same extent computers, seemed to oppose the concepts of a good life that were shared by many people at that time. Even though modern society had been shaped and manufactured by the use and integration of many new technologies, the public was no longer accepting the way technologies were implemented and used. To make my claim even stronger: these movements provoked by technology were not really anti-technological. On the contrary, the protesters supported technology by turning it into their element of resistance. There was no possible way that these technologies would suddenly disappear from Earth – deep insight most protesters probably knew this. Rather, the technologies had to be made useful, be 'won' for the 'good' purpose, and be shaped for the people. The responsibility for technology had to be taken away from politicians and put in the hands of the public; in our case, the private industry was entrusted with the task as it had officially been declared competent.

The venture of changing technology to the benefit of the public had not been a conscious movement but rather the consequence of the resistance. As a result, computing gained new but also stronger grounds. But instead of becoming an element that would support the quest for a better life, it became the plaything between the industry and politics. Politicians gave lucrative contracts to the most established IT companies that happily took these save and profitable commissions. The public stood next to these developments, with eyes wide open, hoping for more and better computer science education. IT education had been the political buzz word that took the wind out of the protest movement's sails. The political promise to integrate computing better in society by educating the people was accepted as best solution. As a result, technology was no longer an element that provoked resistance but it had to be embraced as the savior of the national economy. The cold war with computing was over. Only sporadic protests arose – those that did resist were considered conservative and technophobe individuals that ignored the importance of technology for the Dutch identity.

Yet, this thesis demonstrated also that the actual intertwining of technology and the maintenance of certain democratic processes – in our case the welfare system – had come very far. This leads us the third point of observation and touches also the question how computing has changed the world or maybe enabled changes in our society. Between 1950 and 1985, the Dutch population had grown by over four million people (from 11 million to 14.4 million, an increase of 30% in 35 years) – a handsome sum when considering the size of the country. At the same time, citizens and the government called for a more and better educated population due to changing demands that faced the workforce while fiscal politics were further restricted. This conclusion might sound obvious but it has, in my opinion, never been discussed sufficiently: in order to grant as many people as possible an individualized but fair welfare state, public administration had to embrace digital computing. Ever growing amounts of information had to be processed while the actual administrative staff was constantly reduced. The entire bureaucratic structure was turned around in order to make this new, large scale data processing possible and grant as many people as possible a security that enabled a life style beyond low level manual work.

It is of course not new that computing systems could (and increasingly can) handle enormous amounts of data. However, it is usually not considered what the implications were for the citizens. Computing enabled millions of payments which were also individualized and had to fulfill the demands of a modern democracy with a large and educated population. At the same time, and this is most important, all these processes had to be adapted to the restrictions of the computing system itself. Digital processing was the next level of standardization as it promoted categories and classifications, just like standardized forms but to a much greater extent. Individualized welfare claims only go as far as they fit preliminarily defined categories which cannot comprise the life situation of every person. In other words, the standardization of people's life forged ahead with the introduction of computing. It is of course debatable whether the changing social structures that asked for more individualized solutions supported the introduction of computing systems or whether the existence of faster processing machines opened up these new possibilities that were in return implemented. This hen-or-egg question cannot be answered but it is important to consider as it makes room for future contributions on this topic. The analysis demonstrated that these relations were neither seen nor understood by the public and the ministry. The public debate even concealed these relations by ignoring the central position computing had in the realization of the WSF and by handing over all responsibility to the private sector.

That leads us to the last question: considering the findings and conclusions drawn, has the perception of computing influenced the type of technology that was developed in the 1980s? I am most certain it has. Computers were conceived as external entities that were simply imposed on society – the mutual influence of the user-technology interaction was never considered by the media. Computing was depicted as a finished product. At the same time, the Rathenau Report had turned IT in a (necessary) 'economy stimulation tool'. The incentive plan which declared that information technology was the responsibility of certain private businesses was the result of public acceptance that IT was necessary for the Dutch economy.

These premises say much about the computing technology that was produced in the Netherlands of the 1980s. Trust was put on the already existing IT industry that in returned tried to secure its comfortable position. The INSP and the automation of the WSF did not support any innovative technology beyond the mainframe era but they spawned what the 'old' IT industry had already been producing for many years. One might not be surprising to hear that *Volmac*'s turnover in the years after the WSF affair suffered delicately. It was probably not the failed project that had caused the company's declining position – although we cannot entirely exclude the possibility – but the shift from mainframe technology to more decentralized and flexible computing solutions. Many companies were too indolent to accept these changes. Public perception had contributed its part to this artificial preservation of some IT businesses that were too slow to adapt to the challenges of new technological developments. After all, the public accepted the outdated presumptions that dominated the INSP policy although it was criticized by a number of independent researchers.

I do not claim that the missing public reflection on new technologies was the only reason for the backwardly developments. Without a question, there were many other political and economic reasons most notably the international pressure. However, because the public had accepted that information technology was a business responsibility and outside of the layman's understanding, it directly supported the stimulation plans of the government. Yet, the INSP was only reserved for the 'old' IT industry and for experts that earned much money for studies that were mainly in the favor of certain private businesses. In other words, the public perception of computing contributed to the implementation of outdated technology that was subsidized by the public sector in the 1980s.

Many more questions can be raised with respect to this research, especially when we turn to IT innovation and the question why computing projects fail so often or at least are accompanied by profound problems. Yet, these questions, although entirely valid with regard to both case studies, exceed the scope of this research; it should be tried to answer them in future studies.

What this thesis did was to reveal the role of computing technology in the Netherlands of the 1980s. It was demonstrated that the modern welfare state delicately depends on automated systems but that this centrality was often not recognized. The press and its presentation and influence of the public opinion were taken as example for the absence of public interest in IT. Although computing was publicly accepted by the 1980s, it was not considered more than a useful tool. Nonetheless, the world had already changed due to computing technology: it enabled the perpetuation and expansion of the welfare state. The failure of a computing system resulted in chaos for a great part of the Dutch population – only a hint that indicates the great entanglement. But the acceptance of the dependency was still far away.

When we think about computing technology today, we have quite a different perspective. Much has changed since the late 1980s – if not else, because almost everyone carries around small computing devices, called smart phones in today's terms. Interconnected decentralized digital networks that are dominated by a few giant companies contributed their important part to this fascinating spread of information technology. Many have called these developments a revolution for democracy, but were they? Computing has changed the world but what place does it have today? Are today's democracies not undermined by technophile governments and secret services that have the means of affording and maintaining the perfect surveillance state? One thing is clear: computing expertise has most certainly grown in the public sector over the past decades. How came these developments about? Does the public also understand computing better nowadays than in the 1980s? We only begin to sketch computing's recent history. And it is a long way to go before we understand what a crucial role the technology has gained in politics and in our society.

5 Abbrevations

BOCO	Bestuurlijke Overlegcommissie Overheidsinformatievoorziening0	Administrative Consultative Body for Government Automation
CCL	Computer Centrum Limburg	Computer Center Limburg
CCOI	Centrale Commissie OverheidsInformatievoorziening	Central Commission for Governmental Information Supply
CDS	Centrale Directie Studiefinanciering	The Central Management for Student Grants
CEI	Commissie Evaluatie INSP	Commission for evaluating INSP
COI	Commissie Overheidsbestedingen op het gebied van Informatietechnologie	Committee for Government Expenses regarding Information Technology
COSSO	Vereniging Computer Service- en Software Bureaus	Association for Computer Service and Software Houses
CPE	Commissie Programma Evaluatie	Commission Program Evaluation
CRIVA	Commissie Reken- en Informatieverwerkende Apparatuur Wetenschappelijk Onderwijs en Onderzoek	Committee for Computing and Information Processing Hardware for Scientific Education and Research
CWI	Centrum voor Wiskunde en Informatica	Center for Mathematics and Informatics/Computer Science
EC	Europese Gemeenschap	European Community
FLAIR	Flexibele Automatisering en Industriele Robots	Flexible Automation and Industrial Robots
HBO	Hogere Beroeps Onderwijs	Higher Vocational Training
ICAR/CAR	(Interdepartementale) Commissie voor de automatisering van de rijksadministratie	(inter-departmental) Committee for the Automation of the State Administration (ICARj
IMS DB	Information Management System Database	Information Management System Database
INSP	INformatica Stimulerings Programma	Informatics/Computer Science Stimulation Program
MP	Parlementslid	Member of Parliament
O & A	Directeur Overheid organisatie en -automatisering	Board of Government Organization and Automation
PTT	Staatsbedrijf der Posterijen, Telegrafie en Telefonie	Public Enterprise of Mail, Telegraphy, and Telephony
RCC	Rijks Computercentrum	State Computer Center
SPIN	Stimulerings Projectteam INformatica-onderzoek	Stimulation Project Team Informatics Research
SPIN-OV	Stimuleringsprojecten Informatica ten behoeve van de Overheid	Stimulation Project on Behalf of the Government
SURF	Samenwerkingsorganisatie voor Computerdienstverlening voor het hoger onderwijs en onderzoek	Cooperative Organisation for Computing Service Grants for Higher Education and Research
TNO	Nederlandse Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek	Dutch Organization for Applied Scientific Research
RAWB	Raad van advise voor het wetenschapsbeleid	Council for the Advice in Science Policy

6 Supplements

- Supplement 1: Members of the Advice Group Social Consequences of Microelectronics
- Supplement 2: Overview INSP-Education Cluster
- Supplement 3: INSP-projects as listed in the five progress reports
- Supplement 4: Interview Partners Pannenborg
- Supplement 5: Overview SPIN-OV projects
- Supplement 6: Original (Dutch) quotes

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Supplement 1

Members of the Advice Group Social Consequences of Microelectronics (Rathenau Committee)
(Source: Adviesgroep Rathenau 1980:95)

Name	Background
Prof. Dr. G.W. Rathenau (chairman)	Retired former manager of the Philips Research Laboratory and emeritus lecturer for Physics at the University of Amsterdam
Prof. A. Heetman	Lecturer for Telecommunication and Digital Systems at Eindhoven Technical University
Dr. H. Bosma	Employed manager at Philips Research Laboratory
Prof. Dr. S. Middelhoek	Lecturer for Electronic Materials at Delft Technical University
Prof. Dr. E.M. Uhlenbeck	Lecturer for General Linguistics and Javanese Language and Literature at State University Leiden
Prof. Dr. J.P. Kuiper	Lecturer for Preventive Medicine at Free University Amsterdam
Prof. Dr. H.J. van Dongen	Lecturer for Social Psychology at the Interuniversity Institute for Economics Delft
Prof. H. den Hartog	Lecturer at Technical University Eindhoven and employed manager at the Central Planning Bureau
Prof. Dr. J.J. A. Vollebergh	Lecturer for Internal Organization at Catholic University Nijmegen, manager at Communal Institute for Applied Psychology
Prof. Dr. A. Bosman	Lecturer for business economy at State University Groningen
Observers in the name of the Ministry of Science Policy:	
Dr. J.J.G.M. van Boeckel	Consultant for Aerospace of the director-general for Science Policy
J.P.W. Schneider	Consultant for Computer Science of the director-general for Science Policy
Further supporting members	
M. Gevers, E.D.A. Dantum (DGWB), D. Overkleeft, G. Slagmolen, J. Strikwerda, J. de Witte (DGWB)	
Secretaries	
C.J.A. Beekhuizen, A.A. Pedro (DGWB), G. ter Riet	

Members of the the Committee Program Evaluation (CPE) (Cramer et al. 1987)

Name	Background
Prof. Dr. J.S. Cramer	Foundation for Economic Research, University of Amsterdam
Prof. Dr. J. Scheerens	Lecturer at the Department for Applied Educational Sciences, University of Twente, Enschede
Prof. ing. W.C.L. Zegveld	Managing-director for Administrative Computer Science and Information, TNO, Delft. Lecturer at the economic department of the VU, Amsterdam

Members of the Committee Evaluation INSP (CEI) (Source: CEI 1988b)

Name	Background	Position
Prof. ing. W.C.L. Zegveld	Managing-director for Administrative Computer Science and Information, TNO, Delft, lecturer at the Economic Department at the VU, Amsterdam	Chairman CEI
Prof. dr. J. Scheerens	Lecturer at the Department for Applied Educational Sciences, University of Twente, Enschede	CEI
Mr. T.L. Stehouwer	Advisor for information and automation policy, Aerdenhout	Independent advisor for CEI
Horringa & de Koning	Supporting advisors for organizations	Supported CEI
Mr. H.H. Driesser	Project manager of the INSP and secretary of the steering committee INSP, Ministry EZ	Participated in CEI activities
L.S.J.M. Henkens	Head of PSOI, Ministry O&W	Participated in CEI activities
Drs. R.P.M. van Schie	Director of Organization and Efficiency, coordinator of the INSP, Ministry LV	Participated in CEI activities
Drs. P.G. Schipper	Study center for Technology and Policy, TNO, Apeldoorn	Participated in CEI activities

Members of the Committee for Government Expenses regarding Information Technology (COI/Pannenborg Committee) (Source: Pannenborg 1985)

Members
Dr. A.E. Pannenborg (Chairman)
Prof. Dr. A.B. Frielink
Drs. Ph. Leenman
Drs. A.J. Merx
Prof. J.M. van Oorschot
Drs. A.A. Soetekouw

Supplement 2

The aims of the INSP educational cluster as described in the progress reports to the second chamber (HTK 1985d):

- **Cluster I** *Infrastructure*: Realization of an infrastructure to support software development, description, and evaluation of software

- **Cluster II.1** *Basic and special education*: Exploring existing possibilities in IT for the basic and special education.

- **Cluster II.2/3** *NIVO projects*: Supplying machines and software for schools, providing further training, developing of a curriculum information science and integrating computer science within exam-classes.

- **Cluster 11.4** *Lower and intermediate vocational training*: Supporting and further integration of IT in the curriculum of different school types.

- **Cluster II.5** *Higher Vocational Training*: Supporting and further expansion of IT elements in the curriculum within the different educational facilities.

- **Cluster II.7** *Adult Education*: Adjusting of the existing curriculum regarding aspects of IT whereas use is made of the developments in the INSP-educational cluster.

- **Cluster III** *Further training*: Providing further training for teachers in the most general sense (including judgment of expertise, advice, and awareness).

- **Cluster IV** *Initial teacher education*: Promotion of IT-aspects within the curriculum.

- **Cluster V** *Educational Research*: Facilities and other problematic factors that are connected with the introduction of computers in education.

- **Regular Education** The role of the EZ is focused upon the co-financing of priority projects, particularly in the technological and economic/administrative vocational education. The EZ contribution accounts for a maximum of 50% of the acquisition costs of machines and software, as well as the involvement of external experts.

- **Irregular education** (NII): With the NIIO, the government sets itself the goal to overcome the discrepancy between qualitative and quantitative demand and supply for occupational groups that can be considered important for IT stimulation

Supplement 3

Projects 1 - 5:	Advice
Projects 6 - 54:	Education
Projects 55 - 62:	Research
Projects 63 - 114:	Sector Stimulation
Projects 115 - 120:	Government Automation

INSP-projects as listed in the five progress reports

Cluster	#	Projectnaam	Verantwoordelijke	Descriptie, e.a.
Voorlichting	1	Beleidsvoorlichting		Gezamenlijke brochure van de drie ministeries, waarop door een aantal televisiespots (postbus 51) de aandacht werd gevestigd.
Voorlichting	2	Ondernemen en Automatiseren	Ondernemersorganisaties, Vereniging van Kamers van Koophandel	...tot 1986 13000 deelemers.
Voorlichting	3	Stichting Publieksvoorlichting	O&W, EZ	Het bevorderen van een evenwichtig maatschappelijk draagvlak voor wetenschap en techniek, door in brede kring actuele en toekomstige ontwikkelingen en toepassingen duidelijk te maken, waarbij onder meer aandacht kan worden gegeven aan de culturele (sociaal-) economische, maatschappelijke en ethische aspecten en de betekenis hiervan voor mens, maatschappij en milieu.
Voorlichting	4	Stroom van Informatie	O&W, EZ	Gericht op het stimuleren van de publieksvoorlichting over toepassingen en gevolgen van de informatietechnologie - in schools and businesses.
Voorlichting	5	Subsidieregeling Bedrijfsvoorlichting Informatietechnologie (SBI)		Tot op heden (1986) hebben bijna 50 branche organisaties van dit instrument gebruik gemaakt. De indruk bestaat dat de belangrijkste bedrijfssectoren op dit moment voorlichtingsprogramma's hebben laten ontwikkelen. Nieuwe projecten betreffen vooral herhalingsbijeenkomsten.

Onderwijs	6	100-scholenproject (2e)		Ontwikkeling van een leergang informatiekunde.
Onderwijs	7	Aanvullend beleidskader voor de bovenbouw		Integratie van informatica in een aantal daarvoor geschikte examen-vakken. De integratie wordt ondersteund door een «basisprogramma informatica» voor de «middenbouw» van HAVO/VWO.
Onderwijs	8	Actieplan '84		Om concrete software ontwikkeling te stimuleren zijn drie ontwikkelpunten ingericht met een afgebakend werkgebied, n.l. één voor basis- en speciaal onderwijs, één voor het AVO/VWO één voor het beroepsonderwijs.
Onderwijs	9	Basisprogramma informatica		…voor de «middenbouw» van de HAVO/VWO.
Onderwijs	10	Beleidsplan 1986/1990 Informatica	Informaticaplatform	Aantal speerpuntprojecten (bijvoorbeeld kantoor-automatisering, COO, telecommunicatie, computer integrated engineering). Bij de opzet en financiering van deze projecten wordt het bedrijfsleven betrokken.
Onderwijs	11	Bijscholing van overheidsmanagers	ROI, CIVOB, het Rijksopleiding Instituut en het Centraal Instituut Vorming en Opleiding Bestuursdienst	Beperkt programma voor de toppen van Rijks- en Gemeentelijke overheden.
Onderwijs	12	Bijscholingsprogramma voor informatici	Centrum voor Informatiebeleid	200 aangeboden cursussen ca. 35 uitgekozen die in het kader van het nationaal inhaalprogramma informatica-opleidingen geacht worden in de huidige behoeften te voorzien.
Onderwijs	13	CAD/CAE	TNO, CIAD, TU-Delft, faculteit Industrieel Ontwerpen	…program ontwikkeling.
Onderwijs	14	CAM (computer aided manufacturing)	Metaalinstituut TNO	...«proef» cursussen.
Onderwijs	15	Computer Ondersteund Onderwijs	Courseware Midden Nederland bv; Hogeschool Midden Nederland	
Onderwijs	16	Computers op School		Tijdschrift wordt gedurende twee jaar gratis verstrekt aan scholen voor basis-, speciaal, en algemeen voortgezet onderwijs.
Onderwijs	17	Cursusaanbod	NLO's, MO-opleidingen; Post Academisch Onderwijs (PAO)	

Onderwijs	18	Definitiestudies		Voor de volgende terreinen: informatica in het HBO, telematica, computer integrated manufacturing, systeemontwikkeling (software engineering) en informaticasystemen voor management, bedrijfseconomische innovatie en bouwinformatica.
Onderwijs	19	Demonstratieprojecten voor het midden- en kleinbedrij		
Onderwijs	20	Diepteprojecten voor het BO en SO	COI	Computer geïntegreerd in het onderwijs kan worden ingezet met het oog op de doelen uit de WBO en ISOVSO. Zij hebben de beschikking over geavanceerde apparatuur. Leerkrachten van die scholen zijn nageschoold.
Onderwijs	21	Digitale technieken luchtvaarttechniek		Apparatuurverstrekking
Onderwijs	22	FPA (flexibele produktie-automatisering)	ROFA-laboratorium (Robots en Flexibele Automatisering) in Delft	Bijscholing van personeel.
Onderwijs	23	Groep Educatieve Uitgeverijen		
Onderwijs	24	Handleiding voor de ontwikkeling van educatieve programmatuur		
Onderwijs	25	HBO	Hoger Huishoud en Nijverheids Onderwijs, Hoger Informatica Onderwijs (HIO), microprocessorenlabo-ratorium	Computerapparatuur
Onderwijs	26	Informatica Kleine Handelsvaart- en Visserijscholen		Apparatuur- en programmatuur verstrekking.
Onderwijs	27	Informatica middelbare scholen Scheepswerktuigkundigen		Leerplan-ontwikkeling en apparatuurlevering.
Onderwijs	28	Informatietechniek voor ITO-scholen (Individueel Technisch Onder-wijs)		Apparatuurverstrekking voor drie scholen.

Onderwijs	29	ISl-project	O&W, EZ, SoZaWe	2431 cursisten toegelaten tot de cursus (er waren totaal 3939 aanmeldingen). Van de 986 deelnemers bij de eerste lichting deden er in december 1985 925 het IT-examen. Daarvan slaagden 62,5% voor dat examen (120 meisjes, 460 jongens). Ook bij de 2e lichting bleef de instroom van meisjes beperkt: 19% ofwel 283 meisjes zijn toegelaten.
Onderwijs	30	Kantoorautomatisering (Enschede)		
Onderwijs	31	Kunstmatige Intelligentie	Hogeschool der Kunsten te Utrecht	
Onderwijs	32	Landelijke Pedagogische Centra		Advies aan de scholen op te stellen voor besluitvorming bij voorgenomen aankoop van met name programmatuur en apparatuur. Dit advies is in brochurevorm direkt na de zomervakantie 1987 naar alle basisscholen en scholen voor SO (VSO) verzonden.
Onderwijs	33	LMBO: leerplanontwikkeling en/of apparatuurverstrekking en software-ontwikkeling		Informatica binnen het vak kantoorpraktijk: apparatuurverstrekking aan 12 scholen, leerplanontwikkeling. COO in het IBO: software ontwikkeling. Informatica in Middelbaar Horeca onderwijs: apparatuurverstrekking. Informatica MEAO: apparatuurverstrekking aanvullend en vervangend. Actualiseren leerplan informatica MEAO: enige apparatuurverstrekking, leerplanontwikkeling. Informatica in middelbaar middenstandsonderwijs, apparatuurvoorziening in 31 scholen.
Onderwijs	34	Middelbaar Technisch onderwijs		Computerkunde: apparatuurverstrekking t/m '86 aan andere MTS'en nadat vijf scholen geëxperimenteerd hebben met computergebruik. Speerpuntproject werktuigbouwkunde: introductie van computerge-stuurde werktuigmachines, in regionale centra; beschikbaar stellen van leermiddelen, aanpassing van aanwezige werktuigmachines. Micro-elektronica: nu het leerplan aangepast is aan actuele stand van de micro-elektronica zal moderne apparatuur aan alle 68 scholen worden verstrekt. Besturingstechniek: apparatuurverstrekking aan 6 scholen; software ontwikkeling. Computer Aided Design: apparatuurverstrekking aan 3 scholen om toepassing van CAD uit te proberen. Computertechniek: uitbouwen van de tweede fase van het onderwijs in computertechniek door apparatuurverstrekking en software ontwikkeling.

Onderwijs	35	NaBoNT (Nascholing Beroeps-onderwijs Nieuwe Technologieën)		De bekostiging van de nascholing vindt bij NaBoNT plaats via de vraagkant: de cursisten krijgen (in plaats van de opleiding) geld om een NaBoNT-cursus te volgen. De NaBoNT-cursussen worden daarnaast niet alleen door lerarenopleidingen verzorgd maar ook door andere (commerciële) instituten. Het gaat bij NaBoNT grotendeels om additionele gelden.
Onderwijs	36	Nascholingsprogramma opgezet, er zullen drie leerkrachten per LBO-, MAVO-, HAVO, VWO-school worden nageschoold		
Onderwijs	37	Nederlands Genootschap tot Opleiding van Leraren (NGOLB)		Voorzien van apparatuur, die deels voor de nascholing wordt ingezet. In de opleidingen wordt gewerkt aan inpassing van IT in de curricula.
Onderwijs	38	Nieuwe Informatietechnologie in het Voort-gezet Onderwijs (NIVO)		Het zal de scholen mogelijk worden gemaakt met doelsubsidie bepaalde educatieve programmatuur aan te kopen.
Onderwijs	39	Nieuwe Leraren Opleiding		Voorzien van apparatuur, die deels voor de nascholing wordt ingezet.
Onderwijs	40	Nieuwe media in Nederlands	Stuurgroep Nieuwe Media	
Onderwijs	41	Onderzoeken		10 onderzoeken (1984): op allerlei terreinen, voor diverse onderwijssectoren. Onderzoeken naar het 100-scholenproject en beroepskwalificaties in het MBO-veld zijn inmiddels afgerond.
Onderwijs	42	Opleidingen van het Nederlands Genootschap tot Opleiding van Leraren		Voorzien van apparatuur, die deels voor de nascholing wordt ingezet.
Onderwijs	43	Proefstations		Samenwerkingsverband tussen een universitaire onderzoeksgroep en enkele proefscholen.
Onderwijs	44	Programmatuur Ontwikkeling voor Computers in het Onderwijs (POCO)		Educatieve programmatuur te laten ontwikkelen onder leiding van een projectmanager.
Onderwijs	45	Regionale steunpunten onderwijs en informatietechnologie	Landelijke Pedagogische Centra (LPC); het Centrum voor Onderwijs en Informatietechnologie (COI)	Vervullen in hun regio een belangrijke rol bij voorlichting en demonstratie van informatietechnologie in het onderwijs.

Onderwijs	46	Rijkspedgogische academien voor basisonderwijs (PABO)		Voorzien van apparatuur, die deels voor de nascholing wordt ingezet; 30 PABO's.
Onderwijs	47	Schooladministratiesysteem		Het (dag-)avond AVO/VWO eveneens centraal.
Onderwijs	48	Soft- en Courseware en Evaluatiecentrum Nederland (SCEN)		Publiceert elke twee maanden zijn bevindingen.
Onderwijs	49	Softwarecoupon		Scholen kunnen met deze coupon, beschikbaar gesteld uit INSP-gelden, bepaalde educatieve programmatuur voor het NIVO-pro-ject aankopen.
Onderwijs	50	Stichting Leerplanontwikkeling (SLO)		
Onderwijs	51	Technische computerkunde		Uitbreiding apparatuurverstrekking voor drie scholen
Onderwijs	52	Technische informatica bovenbouw Lager Technisch Onderwijs		Leerplanontwikkeling en apparatuurvoorziening
Onderwijs	53	Transito- en transportscholingsprojekt in Rotterdam	Opleidingscentrum «Jan Bakx»	Introductie- en vervolgcursussen lopen, een derde cursus (effecten van informatietechnologiesystemen) start binnenkort en de topcursus is in voorbereiding.
Onderwijs	54	Visserijsimulatie nautisch		Apparatuurverstrekking aan vijf scholen.
Research	55	Centrum voor Wiskunde en Informatica (CWI)		Uit te groeien tot een toonaangevend centrum op het gebied van funda-menteel en toepassingsgericht informatica-onderzoek. [...V]ersterking apparatuurbestand en de infrastructuur van het CWI, en anderzijds aan een zevental zorgvuldig geselecteerde onderzoekprojecten op het gebied van interactieve planningsmethoden, vectoralgoritmen voor supercomputers, interactieve systemen, gespreide bedrijfssystemen, prestatieanalyse van computersystemen, gedistribueerde informatiesystemen, en expertsystemen en kunstmatige intelligentie.
Research	56	Commissie Nationale Faciliteit Informatica (CNFI)		Systematisch ontwerpen, gespreide gegevensverwerking en beslissingsondersteunende systemen.
Research	57	De aansluiting van de Nederlandse universiteiten en hogescholen op het European Academie Research Network (EARN)		Toegang verkregen worden tot de grote netwerken in Europa en de Verenigde Staten.

Research	58	Expertisecentra	ZWO	Initiatieven op het gebied van de organische chemie, van lexicale gegevensverzamelingen en van de ontwikkeling van programmatuur voor de sociale wetenschappen.
Research	59	Haalbaarheidsstudies		Een benadering die voornamelijk gericht is op het certificeren van programmatuur en mogelijk ook apparatuur, en anderzijds een demonstratiefaciliteit waar voor Nederland nieuwe apparatuur en programmatuur onder de aandacht kan worden gebracht van potentiële gebruikers.
Research	60	Internationale verankering in het zuiver-wetenschappelijk onderzoek		Plaatsen voor promovendi en gepromoveerde onderzoekers; 50 mensjaarplaatsen voor Nederlands toptalent te creëren en voor tenminste 15 mensjaar buitenlandse toponderzoekers aan te trekken.
Research	61	ISNaS	Energieonderzoek Centrum Nederland (ECN), het Maritiem Research Instituut Nederland (MARIN), het Nationaal Lucht- en Ruimtevaart Laboratorium (NLR), het Waterloopkundig Labora-torium (WL), de Technische Unversiteit Delft en de Universiteit Twente.	Ontwikkelen van een informatiesysteem voor het simuleren van stromingen gebaseerd op de Navier-Stokes-vergelijkingen.
Research	62	Klein onderzoek		Aantal kleine, innoverende onderzoekprojecten binnen de informatica of de directe toepassing daarvan ondersteund.
Research	63	Ontwerpen en manipuleren van moleculen en voor het interactief ontwikkelen van efficiënte synthesewegen	CAOS/CAMM Center	Aan de vakgroepen organische chemie van de universiteiten en hogescholen en aan enkele bedrijven worden via lijnverbindingen gegevensbestanden en program-matuur ter beschikking gesteld.
Research	64	Prioriteitsprogramma informatica	ZWO	
Research	65	RARE (Réseaux Associés pour la Recherche Européenne)		Secretariaat van RARE is in Nederland gevestigd met financiële steun vanuit het INSP voor het eerste jaar. De financiering is vervolgens door de EG overgenomen.

Research	66	Samenwerkingsorganisatie voor computerdienstverlening in hoger onderwijs en onderzoek (SURF)	Stuurgroep Samenwerking Universitaire Rekencentra (SUR)	Onder auspiciën van de stuurgroep Samenwerking Universitaire Rekencentra (SUR) is voor deze planvorming vanaf januari 1985 een projectorganisatie opgezet, die zich onder meer heeft verzekerd van de medewerking van vertegenwoordigers van de buitenuniversitaire onderzoekinstituten, de PTT, TNO, het bedrijfsleven, de landbouwwereld en het hoger beroepsonderwijs. In ruim acht maanden tijd is op deze wijze een veelomvattend meerjarenplan 1986-1990 opgesteld.
Research	67	SPIN		Samenspraak met het bedrijfsleven, met wetenschappelijke onderzoekers en met andere deskundigen strateg sche onderzoekprogramma's op te zetten, en deze vervolgens te beheren.n
Research	68	Standaardisatie		Belangrijke voorwaarde voor het verder ontwikkelen van telecommunicatie" en informatiesystemen; voor het onderzoek op dit gebied zijn enkele subsidies toegekend.
Research	69	Stuurgroep samenwerking Universitaire Rekencentra (SUR)		Werkprogramma voor de planvorming ingediend, waarmee ruim f5 min. gemoeid is. Van dit bedrag is f 3,64 min. gefinancierd uit het INSP, terwijl de universiteiten en hogescholen zelf ruim f 1,4 min. hebben bijgedragen.
Research	70	Supercomputergebruik	Werkgroep Gebruik Supercomputers (WGS)	Subsidies beschikbaar gesteld voor de stimulering van supercomputergebruik.
Research	71	Twaalftal projecten	Commissie Nationale Faciliteit Informatica (CNFI)	
Market Sector	72	Aantal Nederlandse bedrijven, actief op het terrein van i.c.-ontwerp, een bezoek gebracht aan de V.S.		
Market Sector	73	Actieplan Computer Services Industry 1983-1985 (ACSI '85)		Subsidieregeling Computerdienstverlening. Stimuleert de ontwikkeling van geavanceerde programmatuurprodukten en streeft naar een kwalitatieve verbetering van de programmatuur bedrijven, enerzijds door een verhoging van het kennisniveau en anderzijds door een versterking van de strategische beleidsvorming.
Market Sector	74	Adviseringsproject		Toepassing van micro-electronica in produkten.

Market Sector	75	Beleidsonderbouwende studie		Het verkrijgen van inzicht in het huidige gebruik; inzicht te verkrijgen in de gebieden waar toepassing van kantoorautomatisering noodzakelijk wordt; de positie van Nederlandse aanbieders; de mogelijkheden om deze positie met het oog op technologische en markttrends nader uit te bouwen, zowel op de Nederlandse als de internationale markt; inzicht te verschaffen in de kennisinfrastructuur op kantoorautomatiseringsgebied. Concrete suggesties voor het beleid, te stellen prioriteiten en te ondernemen projekten.
Market Sector	76	Branche Informatie Raamwerken (BIR's)		Bedrijfstak wordt ingedeeld in een beperkt aantal bedrijfstypen. Per bedrijfstype wordt de informatiebehoefte vastgelegd. Het BIR leidt tot functionele specificaties die als basis dienen voor latere software-produktie.
Market Sector	77	CAD/CAM		Initiatief waarbij via een optimale begeleiding van een aantal projekten door een aantal adviesbureau's ervaring wordt opgedaan met de invoering van CAD/CAM ten behoeve van gebruikers; werkzame adviseurs, teneinde de kwaliteitsverbetering van deze dienstverlening te bevorderen.
Market Sector	78	Centra voor Micro-Electronica		Na een overgangsperiode gedurende 1986 en 1987 zullen een aantal taken van deze centra worden geprivatiseerd. Daarna zullen de centra - in een gestroomlijnde organisatie - zich concentreren op adviseren, voorlichting en de coördinatie van speerpuntonderzoek.
Market Sector	79	Certificatie van Informatie Technologie (ICIT)		In het bestuur zijn de belangenvereniging COSSO (Computer Service Industrie), COMGE (Computergebruikers), NIVRA (Register Acountants), ROA (Organisatie Adviseurs) en VIFKA (Importeurs en Fabrikanten van Kantoorapparatuur) vertegenwoordigd. Tevens maken de KEMA, PTT en de Overheid deel uit van het bestuur. Er wordt naar gestreefd begin 1988 een eerste ICIT-certificaat af te geven.
Market Sector	80	Commissie Steenbergen		Het bedrijf zal de N.V.-status krijgen waarbij Post en Telecommunicatie in aparte B.V.'s zullen worden ondergebracht. De B.V. PTT-Telecommunicatie zal voor de levering van bepaalde diensten en voorzieningen in vrije concurrentie gaan functioneren. Het proces dat moet leiden tot een zelfstandige N.V.-PTT op 1 januari 1989 is reeds in volle gang.

Market Sector	81	Commissie Zegveld onderzocht		Relatie tussen telecommunicatie en kabeltelevisie netwerken. Wenselijkheid en de mogelijkheid van integratie van beide netwerken, waarbij aan zowel technologische als beheersmatige aspecten aandacht wordt gegeven.
Market Sector	82	Demonstratieprogramma		Gericht op toepassing van micro-electronica in produkten.
Market Sector	83	Demonstratieprojecten		Toepassing van IT in een bepaalde omgeving (branche o.i.d.) heeft een nuttig effect en daarmee ook een uitstraling naar de kleine en middelgrote ondernemingen (KMO) kan worden bereikt. De bedoeling is daarmee drempelverlaging en kennisoverdrachtterzake van informatica-toepassingen in de eigen beroepsomgeving te bewerkstelligen.
Market Sector	84	Demonstratieprojecten Flexibele Produktie Automatisering» (FPA)	NEHEM	25 projecten met een totale overheidsbijdrage van f 24 miljoen. De meeste projecten worden uitgevoerd in de metaal-en electrotechnische branches. Enkele projecten zijn gesitueerd in de textiel, hout en kunststofverwerkende branches
Market Sector	85	DITZITEL		Kabelabonnees van Amsterdam een variatie van nieuwe diensten aanbie-den. Zowel het kabeltelevisienet als het openbare telefoonnet worden hierbij gebruikt.
Market Sector	86	Evaluatie drie Centra voor Micro-elektronica (C.M.E.'s)		Met het oog op het bevorderen van de toepassing van en voorlichting over micro-elektronicatechnieken, componenten en produkten in de produktie en het produktenpakket van bedrijven.
Market Sector	87	Flexibele Automatisering en Industriële Robots (FLAIR)		Omvat drie grote projecten. Het project «Werkvoorbereidings-systemen» wordt uitgevoerd door de Universiteit Twente met ondersteuning door het CWI, het project «Intelligente montage cel» door de Technische Universiteit Delft en het project «Flexibele Assemblage en lascel» door de Technische Universiteit Eindhoven met participatie van het TNO instituut voor Informatica Toepassingen voor Productieautomatisering.
Market Sector	88	Flexibele Productie Automatisering (FPA)	NEHEM	Demonstratieprogramma; De belangstelling van het bedrijfsleven is groot. Meer dan 50% van de deelnemers aan dit programma zegt plannen te hebben om op korte termijn te gaan automatiseren.
Market Sector	89	Informatiebemiddelingsbureau (IBB)	Wolters-Samson Groep TNO	
Market Sector	90	Innovatiegerichte Onderzoekprogramma		Onderzoek op het gebied van de opto-electronica.

Market Sector	91	Internationaal technologiecentrum in Nederland	Advanced Semiconductor Materials (A.S.M.)	Dit heeft geleid tot een sterk verhoogde R&D inspanning onder meer gericht op het automatiseren van de i.c.-produktie. Hierbij wordt internationale kennis gebundeld en co-makership en gezamenlijke ontwikkeling met Nederlandse universiteiten en bedrijven gerealiseerd.
Market Sector	92	IPV-methodiek		Produktievernieuwing; Kenmerkend voor de integrale benadering is dat aandacht wordt besteed aan strategische, organisatorische en technische aspecten en hun onderlinge verbanden.
Market Sector	93	Kabelexperiment Limburg	B.V. Kabelexperiment Limburg	
Market Sector	94	Kantoorwijzer	Nederlandse Vereniging voor Management	Het gaat hier om een «checklist» waarmee werknemers hun behoeften aan kantoorautomatisering in kaart kunnen brengen.
Market Sector	95	Managementcursus		
Market Sector	96	Megaproject	Philips, Siemens	Verkrijgen van de technologie en produktie van de volgende generatie chips in Nederland; Daarnaast wordt het R&D-potentieel in de sector van de i.c. produktie-apparatuur versterkt en wordt de betrokkenheid van de i.c. toeleverende industrie geactiveerd.
Market Sector	97	Met behulp van electronische hulpmiddelen overheidsdatabestanden toegankelijk te maken voor de burgers en het bedrijfsleven		
Market Sector	98	Micro-electronica plan		In dit kader zijn een aantal voorstellen van de TU's gehonoreerd. Het zgn. Pico-project en het Delfts Instituut voor Micro-electronica en Submicron Technologie zijn in de realisatiefase. Voor dit laatste instituut is in april een Wetenschappelijke Raad geïnstalleerd. Deze bestaat uit vertegenwoordigers van wetenschap en bedrijfsleven.
Market Sector	99	Normalisatie		In nauwe relatie met certificatie staat de normalisatie. Binnen de EG wordt hier veel aandacht aan besteed. Een voldoende deelname door het Nederlandse bedrijfsleven wordt gestimuleerd.

Market Sector	100	Onderzoek databankuitgeven		Aanbevwelingen: in het onderwijs dient aandacht te worden besteed aan het raadplegen van databanken; - van het ontsluiten en commercialiseren van bepaalde overheidsbestan-den kan een stimulans op de markt uitgaan. Deze laatste aanbeveling is eveneens een conclusie van de Commissie Pannenborg.
Market Sector	101	Onderzoek verricht naar de trends en kansen op het gebied van de kantoorautomatisering	EZ	Kantoorautomatisering in Nederland fors groeit en dat Nederland in de pas loopt met het buitenland. Verwacht wordt dat in 1990 60 a 70% van alle kantoorwerkers gebruik zullen maken van informatiesystemen
Market Sector	102	Overheidsdatabestanden door bedrijfsleven met behulp van electronische middelen toegankelijk maken		Demonstratieprojecten. Er werd tevens een studie afgerond naar de juridische en organisatorische problemen die bij dit soort projecten een rol spelen. Dit jaar zullen eveneens een drietal themadagen worden georganiseerd op gebieden waar de overheid over interessante informatiebronnen beschikt. Ca. 450 geïnteresseerden bij overheid en bedrijfsleven worden regelmatig via een nieuwsbrief van de voortgang van het project op de hoogte gehouden.
Market Sector	103	Raad voor de Informatietechnologie (RIT)		Medio 1987 zijn de belangrijkste projecten de ontwik-keling van een standaard encyclopedie voor softwareontwikkeling van een standaard encyclopedie voor softwareontwikkeling (SEES) en een onderzoek naar geïntegreerde dienstverlening (ISDN).
Market Sector	104	Rijksnijverheidsdienst (RND)		Adviserings-project over de toepassing van micro-electronica in produkten. De RND zal enkele honderden bedrijven bezoeken waarvan de produkten zich zouden kunnen lenen voor toepassing van micro-electronica.
Market Sector	105	SAR-project (Strategie en Automatisering Rijmond)	Rotterdam INTIS B.V.	Aanvullend onderzoek verricht om de economische haalbaarheid in kaartte brengen van een geavanceerd communicatienetwerk ten behoeve van een optimale verwerking van goederen via de Rotterdamse haven door middel van efficiënte informatieverwerking in de gehele vervoersketen.
Market Sector	106	speciale netten voor geavanceerde diensten		Gemeente Amsterdam een rapport, waarin voorstellen werden gedaan voor een uitgebreid en geavanceerd telecommunicatie-netwerk voor zakelijke dienstverlening in de regio Amsterdam/«smart buildings» in Sloterdijk
Market Sector	107	Specifiek op branches gerichte programmatuur	EZ, Raad voor de Informatie Technologie (RIT)	

Market Sector	108	Subsidieregeling Advisering en Begeleiding Automatisering (SABA)		Deze regeling had tot doel ondersteuning van bedrijven op kennis en ervaringsniveau bij de invoering van informatietechnologie. Er hebben ruim 1000 bedrijven een aanvraag ingediend, voornamelijk midden- en kleinbedrijf. Hiervan zijn er ca. 800 toegewezen.
Market Sector	109	Subsidieregeling Databankuitgeven		De bedoeling van deze regeling was een krachtige impuls te geven aan kansrijke, maar risicovolle projecten.
Market Sector	110	Telecentrum Amsterdam (TCA)		Aanbod van nieuwe diensten en telecommunicatiefaciliteiten in de Amsterdamse regio. De ontwikkeling van een Teleport-concept voor het in aanleg zijnde centrum Sloterdijk begint, als een der voorstellen van de groep, concreet gestalte te krijgen.
Market Sector	111	Trainingsproject voor het ontwerpen van semicustom i.c.'s	Technische Universiteit-Eindhoven, het CME-Eindhoven in samen-werking met het bedrijfsleven	
Market Sector	112	Verkennende studie		Overzicht te geven van de stand van zaken en van een identificatie van knelpunten op het terrein van de telematica. De overheid zal, mede op basis van deze studie, in samenspraak met de betrokken partijen, zich nader beraden over het te voeren beleid. De studie zal eind 1986 zijn afgerond.
Market Sector	113	Verkennende studie naar de opzet en de resultaten van het franse Télétel/Minitelproject	Centrum voor Informatiebeleid	
Overheid	114	Adviescommissie Overheidsbestedingen op het gebied van Informatietechnologie (COI)	A. E. Pannenborg	Ministers te adviseren over de mogelijkheden tot vergroting van de betrokkenheid van het bedrijfsleven, waaronder middelgrote en kleine ondernemingen, bij het vaststellen en uitvoeren van informatiserings-projekten bij de overheid.
Overheid	115	Centrale Commissie Overheidsinformatie-voorziening (CCOI)		Herstructurering van de coördinatie van het overheidsbeleid op het gebied van de informatievoorziening. […B]evordering van de doelmatigheid en doeltreffendheid aan de informatievoorziening binnen de overheid en de verbetering van de inschakeling van het bedrijfsleven op dit terrein, tot taak om op het gebied van informatievoorzieningsbeleid bij de overheid voorstellen te ontwikkelen op hoofdlijnen en de voortgang te bewaken.

Overheid	116	Concrete onder-zoeken noodzakelijke marktonderzoek		Concrete onderzoek bij de voor de eerste fase geselecteerde rekencentra van start zal worden gegaan.
Overheid	117	Nationaal Inhaalprogramma Informatica Opleidingen (NIIO)	Rijksopleidingsinstituut (ROI)	Stelt zich ten doel in die periode 5 a 6000 ambtenaren op managementnivo in de gehele overheid bij te scholen.
Overheid	118	Stimuleringsprojecten Informatica ten behoeve van de Overheid (SPIN-OV)		Zoals aangegeven vormt de samenwer-kingsvorm met de marktsector het belangrijkste criterium voor het al dan niet toekennen van aangevraagde subsidie. De SPIN-OV regeling zal na anderhalf jaar tussentijds worden geëvalueerd. Op dit ogenblik is voor ongeveer f 20 min. aan projekten in behandeling.
Overheid	119	Werkgroep Privatiseringsonderzoek	Departementale Rekencentra, voorzitterschap drs. A.J. Merkx	Mogelijkheid en de mate van verzelfstandiging te onderzoeken van (delen van) de algemene en bijzondere (departementale) rekencentra en/of (delen) van hun taken.

Supplement 4

Overview Interview Partners COI (Source: Pannenborg 1985)

COSSO
- F.A.G. Kraak
- Th. van Kooten

VIFKA + CENTRUM VOOR INFORMATIEBELEID
- M.A.H. van den Akker

PHILIPS (PTIS)
- H. van Bree
- R. Westerhof
- E.H. Haselhoff
- J.L.C.N.M. Suijs

OCE NEDERLAND B.V.
- M.J.J.M. Vola
- J.W.C. Verscharen

VOLMAC
- H.J. Gilissen
- H.A.J.A. van Gaalen

CMG NEDERLAND B.V.
- S.C. Waalboer
- D.G. van Vliet

SAMSOM DATA SYSTEM B.V.
- L.G.F. Pinckaers
- A. de Ruiter

ABECON
- A.H.J. Bentvelzen

DIGIAL EQUIPMENT B.V.
- J.M. Scherphof
- H.A. Jordan
- R.B.J. van Elswijk

RIJKS COMPUTER CENTRUM
- J. Roos

COMPUTER CENTRUM LIMBURG
- F. van der Walle
- A. Glass

GEMEENTE AMSTERDAM
- W. Etty
- Dr. B. Kruijt
- Th.J. Hagen
- W.J.P. Kok
- D.S. Tan

VERENIGING NEDERLANDSE GEMEENTEN
- H. Bos

PROVINCIALE GRIFFIE VAN UTRECHT
- P. van Zanten

NEDERLANDS NORMALISATIE INSTITUUT
- H. Bok

SION/RIJKSUNIVERSITEIT LEIDEN
- Dr. A. Verrijn Stuart

SION/TECHNISCHE HOGESCHOOL EINDHOVEN
- Prof. Dr. T.M.A. Bemelmans

CENTRUM VOOR WISKUNDE EN INFORMATICA
- Dr. P.C. Baayen

CENTRUM VOOR AUTOMATISERING OOST-NEDERLAND
- J.J.A.M. Baart

MINISTERIE VAN ALGEMENE ZAKEN
- J.P. Kieboom
- H. de Wilde

MINISTERIE VAN BINNENLANDSE ZAKEN

Directoraat-generaal voor Openbare Orde en Veiligheid Directie Politie
- N.H.E van Helten
- B.J.W. Engbers

Directie Brandweer
- J.C. Lodder

Directie Overheidsorganisatie en –Automatisering
- A. Glass
- P.A. Tas

Afdeling Automatische Informatiesystemen
- J.G. v.d. Broek
- G.N. Jager

Afdeling Coördinatie Documentatie Informatievoorziening
- A.W. Wamsteker Rijks Opleidingsinstituut
- F.H. Lindhout

MINISTERIE VAN VERKEER EN WATERSTAAT
- P.R. Kreft

Rijkswaterstaat
- E.R. Bosman
- S.S. van Breda
- H. de Jong

Dienst Informatieverwerking
- W. Spijkervet

- Th. Bruins

Directoraat Automatisering PTT

- P. Smits
- A.J.M. Schage

MINISTERIE VAN LANDBOUW EN VISSERIJ

Directie Organisatie en Efficiency

- R.P.M. van Schie
- J. Schijf

MINISTERIE VAN WELZIJN, VOLKSGEZONDHEID EN CULTUUR

- M.J. van Dalen
- H.C. van Hummel
- A.F.C. Bosscha

INFORMATION TECHNOLOGY ECONOMIC DEVELOPMENT COMMITTEE (United Kingdom)

- D. Fraser

CENTRUM VOOR AUTOMATISERING NOORD-NEDERLAND

- A.A.W. van Oven

KONIKLIJKE NEDERLANDSE UITGEVERS BOND

- G.J. Roozendaal (VNU)
- R.M. Vrij
- .C. Minderhout (Samsom)
- B. Scheepmaker (Kluwer)

MINISTRIE VAN JUSTITIE

- J.H. Pot
- J.H. Grosheide

MINISTERIE VAN ONDERWIJS EN WETENSCHAPPEN

- J. Porsius
- J.J. Riphagen

MINISTERIE VAN FINANCIEN

Directie Organisatie

- A. Schulze

Directie Automatisering Rijksbelastingen

- R.W.M. Paijmans

Directeur Generaal van de Rijksbegroting

- J.K.T. Postma

MINISTERIE VAN DEFENSIE

Directeur Automatisering

- H.J. Koenen

MINISTERIE VAN VOLKSHUISVESTING; RUIMTELIJKE ORDENING EN MILIEUHYGIENE

- W. de Jong
- E. Meijer

MINISTERIE VAN ECONOMISCHE ZAKEN

Centraal Bureau voor de Statistiek

- J.W.W.A. Wit
- J. Egbers
- H.J.D. de Lanoy Meijer

Afdeling Organisatie

- C.A. van der Houwen

Directie Research en Ontwikkeling

- P. Holdert

MINISTERIE VAN SOCIALE ZAKEN EN WERKGELEGENHEID

Centrale Afdeling Organisatie en Informatica

- P. van der Hijde

Directoraat Sociale Zekerheid

- J.B.M. Pierik

CENTRAAL COMPUTER AND TELECOMMUNICATIONS AGENCY (UK)

- D. Freeman
- R.M. Paynter
- M.O'Connor

COMUTER SERVICES ASSOCIATION (UK)

- D.A. Eyeions

Supplement 5

Overview SPIN-OV projects (HTK 1989)

Service (English if available/Dutch)	Number of Pilots	Final contribution in Mln.	Year first commission
Category Running PILOT-projects			
Ministry Internal Affairs (BiZa)	6	9.878	1986
Ministry Social Affairs (SoZa)	1	7.500	1987
Fin	3	2.061	1987
VROM	2	1.980	1986
V + W	2	1.799	1987
WVC	4	1.412	1987
Ministry of Agriculture and Fisery (LaVI)	1	1.125	1987
Foreign Ministry (BuZa)	1	0.356	1988
SURF	4	14.400	1986
Politieveld	7	11.861	1987
CAFA	2	9.544	1987
Cadans + RUL	3	3.691	1987
Ambulance (Ambulanca) ,TIK	2	2.192	1987
Municipalities (Gemeenten)	6	2.000	1987
Amsterdam, Haag (A'dam, Haag)	5	1.217	1987
VNG	1	0.252	1986
IPO	1	0.248	1988
PBC	1	0.075	1988
Running Projects	52	71.591	
Category Finished Pilots			
Politieveld	1	0.360	1987 - 1988
Cadans	1	0.302	1987 - 1988
Prov Kruisver	2	0.233	1986 - 1988
Ministry of Economic Affairs (EZ)	3	0.135	1968 - 1988
Ministry Internal Affairs (BiZa)	1	0.026	1986 - 1987
Finished	8	1.056	
Not Started Pilots			
gecomm. AZ	1	3.000	

Supplement 6

Page	Dutch Translation
15	“Heel Nederland zit dan in een mechanisch brein, in hedendaags jargon 'databank' geheten. Bestaat er dan nog zoiets als privacy of zijn we dan met ons hele hebben en houden uitgeleverd aan iedereen die er, om wat voor reden dan ook, belangstelling voor heeft?” (Kleyn 1970)
15	“die niet genummerd en wel in de computer willen verhuizen.” (Gans 1970)
17	“Breed onderzoek nodig naar gevolgen micro-elektronica." (Dagblad 1979)
18	“Hij leidde er de afdeling natuurkunde, in het bijzonder de groepen futurologie, magnetisme, metalen en de Stirlingmotor, een potentieel milieuvriendelijke en stille automotor.” (Delft 2012)
24	"Het aangekondigde bedrijfs- en publieksgerichte voorlichtingsprogramma heeft tot doel de Nederlandse samenleving bewust te maken van de kansen die informatisering biedt teneinde de mogelijkheden ervan te kunnen benutten". (HTK 1985)
26	“Een stimulering van de informatica kan voor een klein land slechts zin hebben, als het gehele intellect wordt opgeroepen en het stimuleringsbeleid zich over alle gebieden van wetenschap en onderwijs uitstrekt.” CRIVA 1984
33	“Op velerlei terrein komen vernieuwingen op gang. Zo kunnen informatica, automatisering en telecommunicatie ten bate van de samenleving ontwikkeld worden. Daartoe is nodig een gemeenschappelijke krachtsinspanning van de overheid "en de betrokken maatschappelijke sectoren. Bij enkele belangrijke activiteiten, zoals in het kader van het informatica-stimuleringsplan, wordt reeds succes geboekt; maar er is aan onderzoek en ontwikkeling nog veel te doen.” The speech was covered by every Dutch newspaper". (Konigin Beatrix 1985)
38	“indien geconcludeerd mocht worden tot de wenselijkheid van automatisering van bepaalde onderdelen van de rijksadministratie.” (ICAR 1958)
52	“Bij het Rijks Computercentrum zijn de geautomatiseerde gegevensverwerking voor de studiefinancieringsstelsels en het ontwikkelen en beheren van de geautomatiseerde systemen ondergebracht” (HTK 1987c
54	“[D]e keuze van Volmac tot stand is gekomen en op de wijze waarop Volmac door het RCC is ingeschakeld vooruitlopend op de lijn van het rapport Pannenborg” (HTK 1987f)
	“Dat betreft dan de door RCC en Volmac gemaakte en te maken kosten voor (a) de systeemontwikkeling, (b) de externe ondersteuning van de SF-organisatie en (c) (vanaf 1986) het beheer en onderhoud van de systeemdelen die in produktie zijn” (TKS 1987f)
56	“het gaat om op dit moment circa 1010 programma's en 6 grote gegevensbestanden”
65	“De samenwerking tussen de automatiseringsdeskundigen en de spe-

	cialisten op het gebied van de studiefinanciering verliep nog lang niet vlekkeloos toen de minister op 23 juni 1986 de beslissing nam dat de invoering door kon gaan. De commissie spreekt in dit verband over 'techniek zonder beleid' en dus van 'onbalans'." (Waarheid 1987a)
66	"bij de fixatie op het technische gebeuren werden de menselijke aspecten met betrekking tot het automatiseringsproject veronachtzaamd" (HTK 1987a)
66	"de tijdsdruk was te groot, techniek werd boven beleid gesteld en er waren te weinig proefronden. Heeft de minister dat niet of te laat onderkend?" (HTK 1987a)