Algemene Rekenkamer

Lessons Learned from Government ICT Projects Part A

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Summary

Introduction

This report considers government ICT projects that run into problems. They are often far more expensive than budgeted, need more time than planned or do not deliver the intended results – problems, incidentally, that are not confined to ICT projects alone or to the Dutch government. A great deal has already been published on how to manage major ICT projects and the attendant risks, but the problems persist.

According to recent reports in the media (Dekker, 2007a and 2007b), ICT experts reckon the Dutch government spends between €4 and €5 billion a year on ICT projects that fail to one degree or another. These figures, however, should not be taken at face value (see section 1.2). What they show is that failed ICT projects are a major problem in both the public and the private sectors. Major ICT projects are a management problem at all larger organisations, regardless of whether they are public or private. Problems in the public sector, however, are in the spotlight more often. We would like to also note that problems with major ICT projects are not unique to the Netherlands. In the United States, for example, serious ICT failures led to the adoption of the Clinger-Cohen Act in 1996 (Congress of the United States of America, 1996). This Act requires all budget holders in American federal government to take a portfolio approach to IT investments in the same way that asset managers and fund managers do in the financial markets.

At the request of the House of Representatives, the Court of Audit has investigated problems with ICT projects and answered questions on the causes of such persistent problems. The aim of our audit has been to increase the proportion of successful ICT projects carried out by central government.

This report (part A) answers the following three questions asked by the House of Representatives:

1. What are the main underlying causes of problems with ICT projects in central government?
2. What is the quality of the information provided to the House of Representatives on such projects?

3. What recommendations can be made based on the answers to the first two questions?

To answer question 1, we used the following three sources: previous audits we had carried out, national and international literature, and interviews with external specialists. To answer question 2, we studied previous audits by the Court of Audit, and we based the answer to question 3 on the answers to the first two questions.

Publication of part B is planned for June 2008. Then we will report on an in-depth investigation of a number of issues raised in this present report and answer the following questions asked by the House: How are the efficiency and effectiveness of expenditure on ICT projects accounted for? What indication can the Court of Audit give of avoidable costs and avoidable delays? What view does this give of the opportunities and limitations of a broad-based investigation into the avoidable costs and avoidable delays in central government ICT projects since 2000?

Causes

Our audit found that ICT projects carried out by central government failed to one degree or another chiefly because a combination of political, organisational and technical factors makes them too ambitious and too complex. Such complex projects lack balance between the ambitions and the available human, financial and time resources. Political complexity is a characteristic of the political environment, organisational complexity a characteristic of the project's organisational goals and technical complexity a characteristic of the project's technical development and implementation.

The underlying causes lie in the legitimate interests of the actors that play a role in the initiation of an ICT project. These actors are the minister, the House of Representatives and the ICT providers. In its role as co-legislator, the House expects the government to solve complex problems, preferably as quickly as possible. Ministers like to be seen as decisive. Decisiveness is exhibited in the presentation of an ambitious project subject to a definite and tight deadline. ICT providers need such projects, the bigger the better, to survive. All these actors tend to think in terms of 'big solutions' and each has an interest in large and ambitious projects and a 'natural' tendency to opt for big answers to big problems. In this respect, they do not keep each other in check. Indeed, they entrap each other and the resultant spiral of reliance inevitably results in a complex project that enjoys the status of political fact and from which there is no elegant way out.

Quality of information

Without good information, neither a minister nor the House of Representatives can keep a firm grip on the execution of ICT projects. Ministers need policy information to steer a project efficiently. The House must be able to rely on the information it receives from the ministers so that it can exercise its supervisory and legislative tasks properly. Yet the House does not always receive the information it needs to fulfil these tasks. In the initial phase of one of the projects we audited, the House, despite repeated requests, was not informed about the operationalised policy goals. During execution of two other projects, progress reports requested by the House on one project were not provided and information on the progress of the other was too optimistic.

Recommendations

We are convinced that ministers hold the key to break out of the spiral in which projects become too complex. A minister not only has a voice in the political decision-making but is also responsible for the management and execution of a project. In his[1] capacity as client, moreover, the minister is in direct contact with the provider. Our recommendations are therefore designed to strengthen a minister's position. The underlying thought is that if a minister has 'put his house in order' he can act more decisively in the dynamic environment in which ICT projects become increasingly ambitious. We can summarise our recommendations as follows: be realistic about the ambitions and make sure you keep a firm grip on your ICT projects.

Realism means being aware that:

- ICT is not a 'quick fix' to a problem;
- Political deadlines can be fatal to a project;
- ICT ambitions also display a gap between policy and practice;
- Changes during the project are often inevitable;
- An exit strategy prevents muddling on.

To keep a grip on ICT projects:

- The minister should be an authoritative counterpart for both the House and the ICT provider;
- Decisions should be taken in phases;
- Decisions should be based on well-considered plans, and projects should be evaluated as part of an overall project portfolio;
- Reconsideration should be possible.

[1] Where we refer to 'the minister' and 'he' in this report, all references to 'he' should also be read as 'she'.

The Court of Audit recommends that the Minister of the Interior and Kingdom Relations (BZK) find out in the near future what her American counterpart's experience has been with the Clinger-Cohen Act in the United States (introduction and results to date) so that it can be applied to the situation in the Netherlands.

Response of the Minister of BZK

The Minister of BZK responded to our report on behalf of herself and the State Secretary of Economic Affairs (EZ) on 20 November 2007.[2] She agrees in broad lines with many of the observations made in our report, which she thinks provides valuable insights. In her opinion, however, it pays too little attention to differences in responsibility for steering the use of ICT. She makes a distinction between projects for which a minister bears sole responsibility and projects in which an autonomous administrative authority is the client or that are executed in a policy field for which a minister is responsible. These differences in steering are reflected in the accountability information and have consequences for the financial information that a minister can provide to the House. The minister also notes that her plan to reform the civil service includes action points to improve the approach to ICT in the public sector. Finally, the minister says she looks forward with interest to the Court's in-depth audit.

Afterword

We are pleased that the Minister of BZK, also on behalf of the State Secretary of Economic Affairs, agrees with many of our observations. Where beneficial, she is already putting our recommendations into practice. We presume that the plan to reform the civil service will be adapted where necessary to take account of our conclusions and recommendations.

In part B – publication foreseen in June 2008 – we shall use our case studies to try to answer the issue rightly raised by the minister about the differences in the positions and opportunities of ministers when they themselves are the clients, when autonomous administrative authorities are the clients and when an ICT project is part of a minister's policy field. Part B will also consider American experiences with the Clinger-Cohen Act. In the meantime, we hope the ministry will discuss the observations and insights presented in this report in detail with the public sector. We, too, shall do our best in this respect.

[2] The full response of the Minister of BZK and the State Secretary of EZ can be read on the Court of Audit's website (www.rekenkamer.nl, in Dutch).

1 A closer look at ICT projects

This report considers government ICT projects that run into problems. They are often far more expensive than budgeted, need more time than planned or do not deliver the intended results. This is a serious problem because government ICT projects often cost a great deal of public money. Moreover, a failed project can have considerable and socially undesirable consequences. This is illustrated by ICT problems at the Tax and Customs Administration that led to people not receiving allowances.

On 9 July 2007, the House of Representatives (2007d) asked the Court of Audit to answer the following questions on the basis of, amongst other things, previous audits carried out by the Court of Audit and national and international literature:

1. What are the main underlying causes of problems with ICT projects in central government?
2. What is the quality of the information provided to the House of Representatives and what use can be made of the records on such projects?
3. What recommendations can be made based on the answers to the first two questions?
4. How are the efficiency and effectiveness of expenditure on ICT projects accounted for? What indication can the Court of Audit give of avoidable costs and avoidable delays? What view does this give of the opportunities and limitations of a broad-based investigation into the avoidable costs and avoidable delays in central government ICT projects since 2000?

The Court of Audit (2007f) agreed to the request on 7 August 2007.[3] We undertook to report on the first three questions in 2007 (part A) and do so by means of this publication. We expect to answer question 4 in June 2008 (part B).

[3] The first part of question 2 is answered in this report (quality of information provided to the House of Representatives). The second part of the question (utility of records) will be answered along with question 4 in our second report, which is planned for June 2008. Since no audit material is available regarding the utility of the records, a new audit will have to be carried out.

To prevent readers from thinking that the findings in this report relate specifically to ICT or typically to the Dutch government, we first place the subject in a broader context.

1.1 Broader context: not only ICT, not only the government

ICT projects are not the only ones to run into problems. We have audited many non-ICT projects that went over budget, took longer than planned or did not deliver the intended results. They include infrastructure projects such as the Betuwe freight railway (Court of Audit, 2001), which suffered from difficulties in project management and financing, and the high-speed railway line (Court of Audit, 2007b), which suffered from a lack of overall risk management. Another example is the protracted tendering procedure to purchase eight new helicopters for the police service and the ultimate cancellation of the contract after seven years because the manufacturer could not meet the certification requirements and conditions for the new aircraft (Court of Audit, 2007c).

It is not only the government that runs into problems with ICT projects. All larger organisations, in both the public and the private sectors, struggle to manage major ICT projects. Problems in the public sector, however, are in the spotlight more often than those in the private sector.

Finally, we would like to note that problems with large ICT projects are not confined to the Netherlands. In the United States, serious problems with ICT projects led to the adoption of the Clinger-Cohen Act in 1996 (Congress of the United States of America, 1996). This Act requires all budget holders in American federal government to adopt a portfolio approach to IT investments in the same way that asset managers and fund managers do in the financial markets. Overnight, IT managers became asset managers and their organisations now have to rise to the challenge of maximising the return on the portfolio without losing sight of coherence or risk. The organisations are also obliged to prepare a report on their ICT investments and have it approved by their legally required Chief Information Officer. The report must consider a variety of prescribed subjects, the most important being:

- the relevance of the new system to the organisation's core processes;
- the relationship with other systems;
- whether there is a better alternative, perhaps one that is already in existence;

- the business processes, in order to make improvements where possible;
- a cost benefit analysis;
- a project assessment in the light of the organisation's overall IT portfolio.

1.2 Financial volume of the problems

According to recent reports in the media (Dekker, 2007a and 2007b), ICT experts reckon the Dutch government spends between €4 and €5 billion a year on ICT projects that fail to one degree or another. They arrived at this figure by applying the success rate of ICT projects in an American survey (Standish Group, 1995) to Dutch expenditure on similar projects. The survey revealed a ratio of 30:50:20 which means 30% of all ICT projects failed completely, 50% were in a grey area of being over budget, late or of poor quality, and only 20% were completely successful. This ratio was applied to the total expenditure on ICT in the Netherlands in 2004 of €18.5 billion to produce the figure of approximately €6 billion in complete failures and a further €9 billion in partial failures in both the public and the private sectors together.[4] About half of all ICT investments (and failures) are thought to be for the account of the government.

These figures should not be taken at face value, however. Firstly, several attempts have been made to calculate the cost of ICT projects and failures. The results are, to say the least, 'soft' and should be treated with caution. The calculations rely on the definitions applied, the analysis methods, the information sources and the assumptions made. In the media, total ICT expenditure in the public and the private sectors together is put at €18.5 billion. This figure is used to calculate the amount 'wasted' (€4 - €5 billion). Information from Statistics Netherlands (CBS, 2006 and 2007), however, shows that the Netherlands invested about €12.6 billion in ICT in 2004, not €18.5 billion. About €2.1 billion of this was for the account of the public sector (central government, legal entities with statutory tasks – RWTs – and other authorities). Central government itself invested just €0.5 billion in ICT and we would like to note that this figure includes expenditure on hardware and software for standard operations. After allowing for these factors, the total ICT investment by the public sector (€2.1 billion) and central government alone (€0.5 billion) was considerably lower than the figure given in the media, 50% (for the public sector) of €18.5 billion. These figures are summarised in table 1.

[4] According to the article, based on data from Statistics Netherlands.

Table 1 ICT expenditure in 2004 (in billions of euros)

Source	Private and public sectors together	Public sector (central government, RWTs, other authorities)	Central government alone
Media	18.5	9.6	Not given
CBS	12.6	2.1	0.5[5]

RWTs: Legal entities with statutory duties

Secondly, the 30:50:20 ratio is based on an American survey dating from 1995 (The Standish Group, 1995). A more recent Dutch survey based on figures from 2003 from the same American consultancy presents a more favourable ratio of 15:50:35 (Beenker, 2004) and a recent survey of Dutch directors, IT managers and IT professionals produced a ratio of 4:48:48 (Ernst & Young, 2007). The results are not comparable because the methods and respondents differ (particularly between the third survey and the previous two). Results from different years cannot simply be regarded as being part of a time series. What the figures in any event do show is that unsuccessful, or not completely successful ICT projects are a substantial problem.

1.3 Debate in the House of Representatives

Problems with government ICT projects have frequently led to political debates in the House of Representatives and they are currently in the political and media spotlight again. There are problems with, for example, the payment of allowances and the compatibility of systems used by the Tax and Customs Administration and the Employee Insurance Agency (UWV) to implement the Social Insurance Act (Reduction of Administrative Burden and Simplification).

On 5 June 2007, members of the House asked the Minister of the Interior and Kingdom Relations (BZK) about the media figures considered in section 1.2. In her reply of 11 June 2007, the minister said she had doubts about the value of the 'billions wasted' on failed ICT projects (BZK, 2007a). She noted that government ICT projects were exceedingly varied: ICT projects in central and local government covered all conceivable management and policy fields. There were no central records of ICT projects or failures and, she pointed out, decision-making powers within government were not centralised. A debate about failed ICT projects should therefore involve all the ministers concerned and a debate

[5] Including standard hardware and software for, for example, workstations.

about projects implemented by other government organisations should involve the managers and the supervisory bodies concerned. The House asked the minister to make 'strong coordination' of large central government projects part of the plan to reform the civil service.

Further to this debate, two motions were passed. The first (House of Representatives, 2007a), addressed to the House of Representatives, was to have the BZK standing committee ask the Court of Audit to investigate the amount that central government spent on failed ICT projects and the underlying causes. The House's perception was that:

- ICT contracts awarded by the government often led to considerable budget overruns and government ICT projects could be better coordinated;
- although various government ICT projects had failed in recent years, there were no quantitative data on them and there was a great deal of uncertainty about why government ICT projects did not succeed.

We have investigated the causes of problems with ICT projects in the past, often at the request of the House of Representatives. In the C2000 ICT project (Court of Audit, 2003a), we found that the project budget was of poor quality and not all costs had been included in the estimates. Our audit of ICT in the police service found that various aspects of programme management were open to improvement (Court of Audit, 2003c). In another project we audited, P-Direkt, poor management led to the failure of the outsourcing of the ICT component (Court of Audit, 2007d). In 2006, we published *Grip on Information Systems, IT governance at ministries* (Court of Audit, 2006b), an in-depth audit of the management of ICT systems at ministries.

The second motion (House of Representatives, 2007b), addressed to the government, was to make an analysis of large ICT projects and to include the coordination of large-scale government ICT projects in the plan to reorganise the civil service. The Minister of BZK (2007b) presented her analysis to the House of Representatives on 1 October 2007 and noted that the plan to reform the civil service would consider improvements in the coordination of ICT projects in the civil service's operations. For ICT projects concerned with primary processes, she would first wait for the Court of Audit's recommendations.

1.4 Content of this report

Chapter 2 considers the audit questions and audit methodology. Chapter 3 presents our analysis of the causes of problems with government ICT projects. In chapter 4 we consider the provision of information to the House of Representatives. Chapter 5 presents our recommendations and chapter 6 the Minister of BZK's response, on behalf of herself and the State Secretary of EZ, and the Court of Audit's afterword.

2 About this audit

A great deal of literature has already been published on how to manage large ICT projects and control the risks. Despite the many manuals and methods, large projects – not only ICT projects – still run into problems. This audit is directed not at improving the implementation of project management (risk management, creating support, etc.) but at identifying the main causes of the stubborn problems that dog the development of government ICT systems. Our aim is to help increase the proportion of successful ICT projects in central government.

Our audit considered the first three questions asked by the House of Representatives (see the beginning of chapter 1). To answer these questions, we used the following definition of an ICT project:
An ICT project is a project whose aim is to develop and/or introduce an ICT system. We understand development to mean the specification, procurement and internal or external construction or modification of the system. Introduction means technical and organisational implementation.

An ICT project comprises not only the purchase of hardware or software but the entire process surrounding a schedule of requirements, technical realisation and system implementation (successful or otherwise), including all related organisational and personnel matters.

We collected information by means of the following activities:

1. Background study of the causes given in national and international literature.
2. Consultation of experts from diverse backgrounds: government, ICT services, academia and IT audit (see appendix 3).
3. Analysis of the causes found by the Court of Audit in previous audits of ICT projects. We considered the following audits: *ICT in the Police Service* (Court of Audit, 2003c), *The C2000 Communications Network and Integrated Emergency Switchboard* (Court of Audit, 2003a), *Collection of Employee Insurance Contributions* (Court of Audit, 2005a) with the *Impact Assessment 2007* (Court of Audit, 2007a), *Immigration and Naturalisation Service* (Court of Audit, 2005b), *Outsourcing the ICT Component of P-Direkt* (Court of Audit, 2007d),

State of Policy Information 2007 (Court of Audit, 2007e) and the regularity audits we have carried out since 2000.

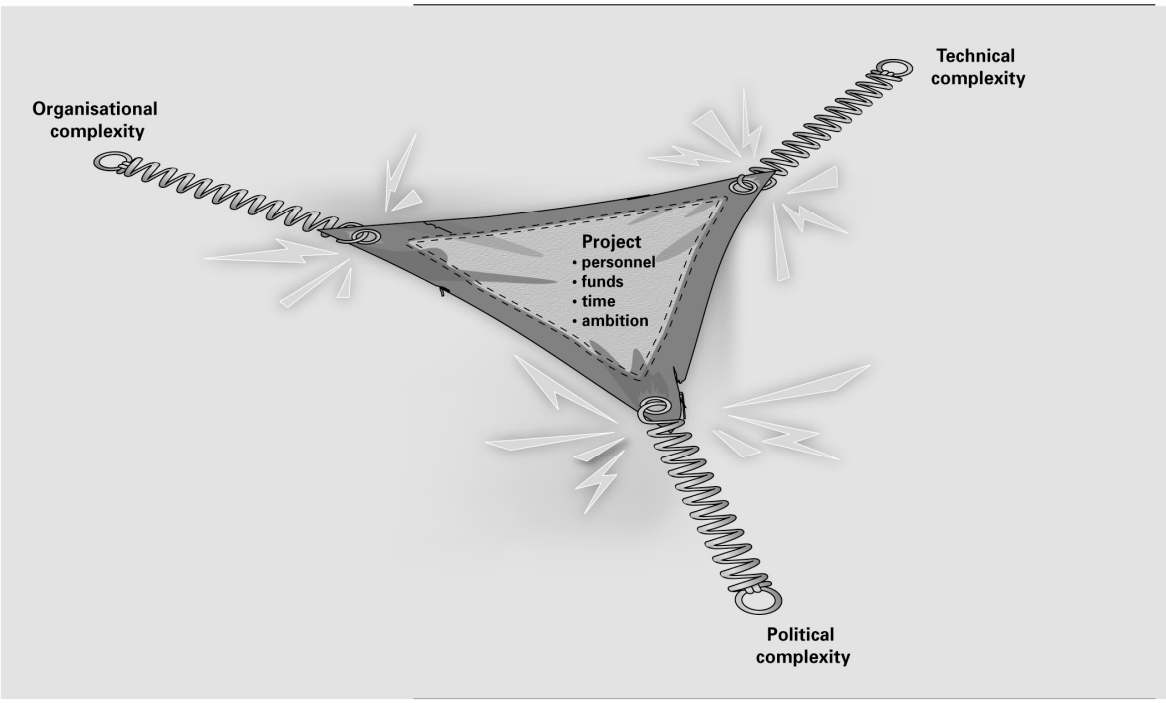
We also used *Grip on Information Systems* (Court of Audit, 2006b) in our analysis of the source material. This report was of only limited use, however, because it did not focus on the audit of ICT projects. *Grip on Information Systems* considers the management of information flows within a ministry. This present report, by contrast, considers projects that often transcend ministerial boundaries.

3 Causes of the failure of ICT projects

Government ICT projects come under pressure from three forces: political, organisational and technical. The combination of these forces often leads to government ICT projects becoming too complex. There are three forms of complexity:

- political complexity: characteristics that reflect the project's political environment;
- organisational complexity: characteristics that reflect the project's organisational goals;
- technical complexity: characteristics that reflect the project's technical development and implementation.

Figuur 1 Tension between organisational, political and technical complexity



3.1 Political complexity

This section considers characteristics of the political environment that make ICT projects complex: the ICT enthusiasm of managers, political deadlines, and lack of reconsideration during implementation.

3.1.1 ICT enthusiasm

A factor that contributes to the complexity of ICT projects is the enthusiasm shown by senior civil servants, ministers and the House of Representatives. Political decision-makers tend to believe in ICT as a miracle cure for all manner of policy issues: the ideal solution to any problem. Yet managers often do not fully understand what ICT can do and, more important, what it cannot. This increases the risk of their overestimating the technical capabilities. At the same time, they underestimate the amount of time, money and human resources that will be necessary for implementation.

If a minister subsequently takes a decision without adequate advice from ICT experts and management consultants, there is an even greater risk of the project becoming too ambitious. In consequence, the project is organisationally and technically unfeasible and its goals are no longer formulated in SMART-C terms (specific, measurable, agreed, realistic, time-bound and consistent). Without a realistic business case, the project can be a source of great disappointment.[6]

Vendors of ICT products and services also contribute to a project becoming too ambitious. For commercial reasons, they tend not to be overly critical. And since they are in direct contact with the managers in the political field, the latter quickly come to think that an ICT solution is within reach.

3.1.2 Political deadlines

The House of Representatives expects quick solutions to urgent problems. Ministers also tend to time solutions to their political ambitions, which dictate that goals must be achieved before the end of the government's term of office. Deadlines are often the outcome not of reasoned and realistic plans but of political considerations. If other conditions are also set in advance, such as the number of organisations involved and the required functionalities, there is a risk of an ICT project becoming too

[6] The utility and need of the project must be reasoned and backed up by a cost benefit analysis that considers not only the financial but also the qualitative pros and cons.

ambitious and therefore incapable of being completed successfully and on time.

Possible implications of political deadlines

The Work and Income (Capacity for Work) Act (WIA) was submitted to the House of Representatives and the WIA Implementation Bill, which regulated the financing of the WIA, was submitted to the Council of State for advice at the end of March 2005. The proposed introduction date was 1 January 2006. At the time, both the UWV and the Tax and Customs Administration said introduction of the WIA would be possible as from 1 January 2006, provided there were no significant amendments during the Bill's passage through the House. The UWV said the systems would have to be operational by 1 September 2005 at the latest. At the time it was uncertain when the Bill would become law. There was a risk of the UWV not being able to make the necessary changes in its policy records on time if the Council of State's advice and/or the parliamentary debate had consequences for the systems.
Source: Court of Audit, 2005a.

Unrealistic timing might represent a serious risk to a project's success but there is also a risk of not enough time being taken to define the project's goals and requirements. Uncertain, vague or poorly defined goals and requirements further add to the risk of failure.

3.1.3 Too little reconsideration during implementation

The dynamism of the political environment may lead to changes in a project's terms of reference or to new demands being added to the wish list by, for example, the House of Representatives. Significant changes should prompt a reconsideration of the assumptions underlying the project. This, however, is more the exception than the rule. As a result, the original development path becomes entrenched and project management considerably more complex. Seemingly small changes can have significant consequences for the development process.

The assumptions underlying a project should also be reconsidered if there are signs of problems or new risks in the project planning, staffing or budgeting or in the required functionalities. Again, this rarely happens, chiefly because political decisions are difficult to reverse once they have been taken. This might be because of the lengthy negotiations the minister had to conduct with the organisations concerned, or because the individual signs are too small to be worth considering whereas all the signs together are not. Not building reconsideration points into the project reduces the chance of recognising the signs for what they are and making appropriate changes at the right moment.

No reconsideration during implementation

We can illustrate the problem of not reconsidering a project during its implementation by means of the P-Direkt project. In this project, the Second Opinion Committee (CSO) was consulted on the plan to complete the preparatory phase for a Shared Service Centre for Human Resource Management. The CSO made several critical comments but concrete action was taken on only one of them. The General Project Consultation (APO) stated that the response to the CSO's comments had to be clearer. The action plan, however, was not considered in subsequent APO meetings.

Source: Court of Audit, 2007d

A characteristic that is more common in the public sector than in the private sector, finally, is that a project muddles on instead of being stopped when it should be. The private sector must obey the rules of the market and bring projects to a halt when they are no longer feasible.

3.2 Organisational complexity

This section considers characteristics that make government ICT projects organisationally complex, namely the involvement of more than one organisation and the strong link between ICT and the organisation.

3.2.1 More than one organisation

Government ICT projects are often organisationally complex because they involve several organisations. The autonomy enjoyed by the organisations means there is little if any central steering or commitment. It is often very difficult to take decisions on a project that involves several participants, such as local authorities and implementing bodies. Organisations work together on ICT projects for a variety of reasons. Several organisations might work together, on their own initiative or otherwise, to develop and use a joint ICT system that standardises their business processes and thus increases their efficiency. The P-Direkt project is an example of this. Organisations also work together because their business processes require an exchange of information or because they are part of a chain. The ICT project's aim is then to improve (or enable) the exchange of information among the organisations in the chain.

In practice, organisations act primarily in their own interests. Their contribution to and acceptance of ICT solutions often depend on the extent to which the solutions serve their own interests or solve their own problems.

Steered by own organisational interests

The following example illustrates the organisational complexity that arises when several organisations work together in a chain. In September 2002, the Minister for Immigration and Integration (V&I) and the Ministers of Justice and BZK launched the 'Regular Admission and Intensive Supervision' programme. The programme arose from attempts to shorten the time needed to handle applications for temporary residence permits. Programme implementation was a joint responsibility of the participants in the chain, the main ones being the Ministry of Foreign Affairs, the police, the Royal Military Constabulary and Border Police, the Immigration and Naturalisation Service (IND) and the municipalities. Each participant was responsible for its own project and the underlying subsidiary projects.

We found in 2005 that the chain did not have any shared goals. The individual organisations pursued their own interests. They might not have been contrary to the Minister for V&I's goals but they did not necessarily help to achieve them. Conversely, the goals pursued by the Minister for V&I played no part in the chain participants' implementation processes. The Court of Audit concluded that the participants did not always look upon each other as partners, did not always think they were appreciated as partners and did not always accept directions.
Source: Court of Audit, 2005b.

3.2.2 Impact of change

ICT projects generally lead to organisational change and, conversely, organisational change can have a significant impact on the ICT infrastructure. The pursuit of a political goal often overlooks the relationship between ICT and the organisation (this is not unique, incidentally, to the public sector).

Pursuit of a political goal can sometimes lead to significant organisational change when an organisation is given additional tasks or when tasks are transferred from one organisation to another. Owing to the strong interrelationship between business processes and ICT, a change in one will often have serious consequences for the other. The impact that this can have is frequently underestimated.

Impact of change

Developments at the IND illustrate the impact that organisational change can have on ICT. Preparations to transfer tasks from the Aliens Department to the IND started in 2002. When it became clear that new ICT systems would have to be developed, the IND carried out an internal study to determine what changes would have to be made for its information systems to work in the new situation. It found that the planned completion date was not realistic and the implementation date had to be postponed by six months.
Source: Court of Audit, 2005b

Conversely, ICT systems are frequently developed without considering the consequences for the organisations that have to use them. A new ICT system often entails a redesign of business processes. There is a risk of the system operating sub-optimally if it is not fully compatible with working practices or because users are inadequately prepared or trained.[7]

3.3 Technical complexity

This section considers certain circumstances that make ICT projects technically complex, namely that ICT development requires precise definitions of the goals and requirements, that technical compatibility between ICT systems is often difficult to achieve and that the technology itself is subject to rapid change.

3.3.1 ICT development requires precise definitions of goals and requirements

ICT projects are different from other projects because ICT systems are relatively inflexible. Many political and organisational processes, however, are dynamic and flexible. Once a decision has been taken to develop a particular ICT system, it is difficult to change it. Changes during development are also technically difficult to make. Development of an ICT system benefits from a stable political and organisational environment and from the early and precise definition of goals and requirements. If this is not done, the requirements the system must satisfy will not be known. If an external ICT provider is responsible for development, there is then a significant risk of it delivering something the government did not intend. Without sharply defined project goals and associated product requirements, the provider forms an incomplete and possibly incorrect picture of what the client expects from him and the products he delivers. In any event, the subsequent changes will inevitably lead to time and budget overruns.

[7] This is not a new phenomenon. As long ago as 1989, the Court of Audit (1989) revealed that an information system had been introduced without the necessary technical and personnel conditions being satisfied.

Definition of goals and requirements

The definition of goals and requirements can come under pressure. In 2003, for example, the IND was under great time pressure to make the required ICT modifications. Owing to this pressure, the new ICT systems had to be developed when some of the processes had not yet been defined. The process designers were only one step ahead of the system designers. At one point the IND's ICT department was actually leading the development of the business processes.

Source: Court of Audit, 2005b

3.3.2 Compatibility with other ICT systems

A complicating factor in the development of ICT systems is that the systems themselves often do not work in isolation but have to be connected to other systems already in operation. In such cases, the successful technical implementation of an ICT system depends on its compatibility. Compatibility within a single organisation is often a daunting undertaking. But if several organisations are involved, there are additional organisational and technical complications. ICT systems must be able to communicate with each other, something that is often overlooked, and data from two or more organisations must be collated even if they do not agree with each other (conversion problems).

Old and polluted systems connected to each other

A survey by the Court of Audit revealed that there was a 17% variation in 2004 between the stock records and actual stock levels at the Royal Netherlands Air Force Logistics Centre / Woensdrecht Logistics Centre (LCKLu/LCW, currently Woensdrecht Logistics Division). The stock variation found at the National Supply Agency/Clothing and Personal Equipment (LBB/KPU) was 28%. The warehouse stock records at both organisations were unreliable. The variations were due in part to old and polluted systems being connected to each other. Furthermore, the old batch-processing systems were connected to modern real-time systems, which created discrepancies in the files. The Court of Audit concluded that producing reliable stock records would remain problematic in the years ahead, certainly for as long as the old systems were still in operation.

Source: Court of Audit, 2005c

3.3.3 Speed of developments

Another complicating factor in ICT projects is the speed at which advances in ICT succeed each other. Expertise and know-how quickly become obsolete. New techniques that become available during the development of an ICT system place the chosen strategy in a new light.

3.4 Main cause: too ambitious, too complex

Our main finding is that government ICT projects are often too ambitious and too complex because of the combination of political, organisational and technical factors. A project that is too complex lacks balance between the ambitions and the available human, financial and time resources.

In theory, the solutions to reduce complexity are relatively simple, if not obvious. The motto is: start small and proceed in small steps. Minimise the organisational and technical complexity. Organisational complexity, for example, can be reduced by limiting the number of organisations involved. Depending on the type of project, pilot schemes can be carried out or developments can be 'piggy backed' with one organisation developing an application and others adopting the functionalities they need. Technical complexity can be reduced by opting for standard software. The '80/20' rule is also often applicable. About 80% of the work required to develop an ICT application is concerned with the last 20% of the application's functionality. Do all exception rules really have to be programmed? Or can some exceptions be replaced with manual procedures?

Complexity is sometimes a given, for example because legislation must apply to all citizens at the same moment. If it is a given, other conditions, such as completion time, must be adapted for the project to remain realistic. A project can also be made more manageable by dividing it into smaller, more controllable subsidiary projects.

All the 'recipes' given above are known. But they are often not applied even though those involved know that projects are doomed to failure if they are too ambitious or too complex. Why is this so? The Court of Audit understands the cause to be in the area of legitimate interests of the actors concerned.

3.5 Legitimate interests lead to complex projects

The actors involved in the initial stages of an ICT project are ministers, the House of Representatives and ICT providers. Each of these actors, for its own legitimate reasons, has an interest in large and ambitious projects.

The House of Representatives not only exercises parliamentary control over the government but also takes its own initiatives to steer the government's actions. In this latter role, the House often expects the government to solve complex problems, preferably as quickly as possible. These demands usually culminate in complex projects with tight deadlines.

Ministers like to show they are decisive. Decisiveness is best displayed by an ambitious project subject to a definite and tight deadline. Announcing a feasibility study or a small-scale pilot scheme is not usually seen as decisive action.

To survive, ICT providers need contracts, preferably big ones. And they are unlikely to refuse the additional work brought about by additional requirements.

Since all these actors have a 'natural' tendency to think in terms of big solutions to big problems and therefore cannot keep each other in check during this critical phase, an ICT project can quickly be sucked into a spiral of growing complexity during the process of discussion and negotiation. The parties entrap each other in the spiral and inevitably agree upon a project that is too complex but has the status of political fact from which there is no elegant way back.

4 Information provision

Without good information, neither a minister nor the House of Representatives can keep a grip on the execution of an ICT project. A minister needs policy information to manage a project efficiently. The House of Representatives must be able to rely on the information it receives from the minister so that it can exercise its supervisory and legislative tasks. This is true of all projects, not only ICT projects. The provision of information is the subject of this chapter.

This chapter considers projects executed by or under the responsibility of a ministry. Signs seem to be emerging of another administrative arrangement in which major ICT projects are financed as part of a client/contractor relationship in the form of a foundation, such as Stichting Elektronisch Kind Dossier (Electronic Child Files Foundation). We wonder whether there are more of these arrangements and whether they clearly lay down how and when the House of Representatives must be informed and about what. We might return to this matter in our second report in June 2008.

4.1 Information from the outset on utility and need

4.1.1 Clear goals

In *State of Policy Information 2007* (Court of Audit, 2007e) we noted that when a minister informs the House of Representatives of what he[8] intends to achieve, how he will do it and what it will cost, he should formulate the goals as accurately as possible. Otherwise it will not be possible during implementation to determine whether the project is still on course and the minister will subsequently not know whether he has achieved his goals and whether the money was spent as agreed. We can illustrate the importance of well-formulated goals by means of the ICT in Education project (see box).

[8] Where we refer to 'the minister' and 'he' in this report, all references to 'he' should also be read as 'she'.

The goals of ICT in Education

The House of Representatives and the Ministry of Education, Culture and Science (OCW) did not doubt that 'something' had to be done with ICT in education. The minister thought the Netherlands was trailing other EU member states in the use of ICT. At the end of the 1990s, the Ministry of OCW accordingly began to develop a new policy on ICT infrastructure, equipment, teacher training and digital teaching aids. At the beginning of the project, the House repeatedly requested operationalised policy goals, but never received them. The policy goals were formulated in general terms that were difficult to measure, such as 'taking an integrated approach to embed the use of ICT into education', 'taking a lead on neighbouring countries in the effective use of ICT', 'full integration of ICT in education' and 'preparing children and young people for the knowledge-based society'.

Source: Court of Audit, 2007e

4.2 Periodic reconsideration during implementation

ICT projects often have similar characteristics[9] to projects that the House of Representatives qualifies as large projects within the meaning of the Large Projects Regulations (House of Representatives, 2006). Many ICT projects, for example, are non-routine and large-scale, involve new technologies and relate to organisationally complex management and implementation processes. These characteristics make it difficult to state at the outset exactly how long a project will last and precisely how much it will cost. It is therefore important for a minister to inform the House as quickly as possible of any changes in his goals, what he will do and what it will cost.

4.2.1 Progress reports

A procedure is in place to report on the progress made with 'large projects'. Progress reports should also be prepared for ICT projects that have similar characteristics. The minister should periodically inform the House of Representatives about the status of implementation. Regular progress reports were issued on the following projects: ICT in Education, C2000, Collection of Employee Insurance Contributions and P-Direkt.

[9] The characteristics are:

- there are non-routine, large-scale and time-bound activities;
- central government bears all or most of the responsibility for the project;
- there are substantial financial consequences and/or considerable implementation risks attached to the project;
- there are significant consequences for society or the government organisation;
- new technologies or financial arrangements are involved;
- the management and implementation process is organisationally complex.

Under the Large Projects Regulations, progress reports were actually obligatory for the ICT in Education and C2000 projects because the House of Representatives had classified them as large projects. No project reports were issued on the ICT in the Police Service project in the period 2000-2003 even though the House requested them (see box).

ICT in the Police Service

The House of Representatives can request periodic progress reports on ICT projects. It did so in 2000, for example, when the Rietkerk motion (House of Representatives, 2000) asked the government to introduce a single information system for the police service. The same motion also asked for annual progress reports to be submitted to the House. In 2003 the Court of Audit found that the second part of the motion had not been followed up and recommended that it should be. The Minister of BZK subsequently undertook to inform the House of the implementation of the activities by means of an annual progress report as from 2004.
Source: Court of Audit, 2003c

4.2.2 Completeness

An agreement between the House of Representatives and a minister on the periodic provision of relevant information is no guarantee that the information the House receives is complete. The information provided on the C2000 project, for example, largely did not meet the House's requirements (see box below). In the P-Direkt project, the minister was reluctant to provide information on operational disagreements as long as there was hope that the project would be brought to a successful conclusion. The ministry argued that the government service had to allow for commercial interests. The Court of Audit (2007d) noted in its report, *Outsourcing the ICT Component of P-Direkt*, that the House of Representatives could have been informed in confidence.

C2000

The C2000 project shows that information provided on ICT projects is not always complete. The government wanted the project to improve communication between the fire service, the ambulance services and the police service so that they could provide emergency aid to members of the public faster and more effectively. In June 2003, the Court of Audit concluded that, on two thirds of the checkpoints, information on C2000 did not satisfy the requirements of the Large Projects Procedural Regulations. Some information, including information on delays, was available at the ministry but was not provided to the House. Other information, for example financial information, was not available to the state secretary. The Court of Audit's review of audits also revealed serious shortcomings regarding the Procedural Regulations. In the period investigated (March 1997 – February 2003), the House of Representatives was unable to form a reliable picture of the financial, substantive and planning aspects of the C2000 project. There were systematic quality weaknesses in the financial information and progress

information.

Source: Court of Audit, 2003a

4.2.3 Unclear information

The information provided to the House of Representatives is not always clear. Clarity is essential, especially if the information influences the House's decisions. The information provided on the P-Direkt project until mid-2005 was at times too optimistic and unclear (see box below).

P-Direkt

The information provided to the House on the P-Direkt project until mid-2005 was at times too optimistic and unclear. On 30 June 2004, for example, the Minister for Government Reform and Kingdom Relations submitted a progress report to the House entitled *Establishment of the Shared Service Centre for HRM Personnel and Salary Records* (BVK, 2004). This progress report did not clearly state that the government's approval of the report would in effect be a government decision to go ahead with the implementation of P-Direkt. Before a decision could be taken on the establishment of the SSC HRM, a number of conditions had to be satisfied that the government had set regarding final approval of the implementation phase of the P-Direkt project. When the decision was taken, the minister knew there were risks and that the conditions might not be satisfied. The picture the minister presented to the House on 30 June 2004 did not clarify these risks and shortcomings. The House had to suffice with comments made by the Second Opinion Committee (CSO) in an appendix to the progress report.

Source: Court of Audit, 2007d

4.2.4 On the right course?

It is also important that a minister periodically checks that the project is still on course and informs the House accordingly: is the problem the project was designed to solve still a problem? Should more stringent or different measures be taken? The House is not always well informed of such matters. The box below provides an example in which the House was well informed.

Dialogue with the field on ICT in Education

At the beginning of the ICT in Education project, the main policy goal was to purchase equipment and set up internet connections. It emerged during implementation that a new goal should be set of using the equipment to teach, which would require a certain amount of teacher training. The Minister of OCW discussed this change in direction with the House. Several years later, the minister asked the educational institutions to develop a vision of the integration of ICT into education. In 2003, the minister also consulted the House on whether and how the project should be continued. This led to another shift in policy focus, with more emphasis being given to improving the quality of education. Such an approach, in which there is close contact with the participants during implementation, makes it possible to revise policy while the project is still being implemented.

Source: Court of Audit, 2007e

5 Recommendations

5.1 In advance: the minister holds the key

Now that we have answered the House of Representatives' first two questions (underlying causes and provision of information to the House of Representatives, see chapters 3 and 4 respectively), we can consider the third: 'What recommendations can be made based on the answers to the first two questions?' All too often, the government makes difficulties for itself by making projects too complex. There are successes, but there are still too many failures. This is a recurrent problem. It is therefore far from simple to make recommendations that will help resolve the problem. Nevertheless, we do have a number of suggestions.

Our observation that many government projects are not manageable is nothing new. The 'recipes' for better project management are also well known. In chapter 3 we noted that the actors entrap each other. The question is how can they break free. Since all the actors – ministers, civil servants, the House, ICT providers – feed the spiral, they should all take to heart the lesson learned from our analysis of the causes of why they entrap each other. This is particularly true of the ministers (i.e. ministers and their civil servants). We are convinced that they hold the key to break out of the spiral in which projects become too complex.

A minister not only has a voice in the political decision-making process but is also responsible for steering and implementing those decisions. In this latter role, he has to deal with the concrete problems caused by the decision-making. In his capacity as client, moreover, he is in direct contact with the ICT provider. Our recommendations are therefore intended to strengthen the ministers' position. The underlying thought is that if a minister has put 'his house in order' he can act more decisively in the dynamic environment in which ICT projects become increasingly ambitious. We can summarise our recommendations as follows: be realistic about the ambitions and make sure you keep a firm grip on your ICT projects.

5.2 Be realistic

Ministers should be aware that:

- ICT is not a 'quick fix' to a problem;
- Political deadlines can be fatal to a project;
- ICT ambitions also display a gap between policy and practice (Court of Audit, 2003b);
- Changes during the project are often inevitable;
- An exit strategy prevents muddling on.

The ministers will then be in a better position to develop the attitude necessary for a more professional approach to managing ICT projects (project governance).

5.3 Grip on ICT projects

5.3.1 Be an authoritative contact

The minister should be an authoritative counterpart for both the House of Representatives and the ICT providers. The ministry concerned should have sufficient know-how and expertise about ICT and business processes. Furthermore, the minister should ensure that his plans are properly reasoned (see section 5.3.3). Assurances on the feasibility of the plans will strengthen his own position in both the political debate and the negotiations with and steering of the providers.

5.3.2 Take decisions in phases

To ensure that a project begins with a realistic ambition level and that there are evaluation points during its implementation, decisions should be taken in phases. It is often difficult to say in advance exactly what a project must deliver, how long it will last and what it will cost. Decision-making, project preparation and even project implementation often overlap. For an orderly decision-making process, not only should a project's utility and need be discussed before the actual project preparations, so should the business case. A specific and well-reasoned decision can then be taken in the form of a project plan on whether to proceed or not with implementation. It is also useful to plan decision points during project implementation.

5.3.3 Don't take decisions without good reason

The minister should ensure that decisions taken in every phase of the project are based on well-reasoned plans, i.e. plans in which the ambitions are demonstrably in agreement with the available people, funds and time. An objective second opinion from an independent consultancy or other experts in the form of a peer review might also confirm he feasibility of the plans. ICT investment projects are not isolated phenomena but are part of an organisation's overall ICT portfolio. New investments in ICT should therefore be judged on their compatibility with the portfolio, if only for sound business reasons.

Since keeping a firm grip on ICT investments is an international problem and the American government passed legislation in this area several years ago, we think the Minister of BZK should find out in the near future what her American counterpart's experience has been with the legislation (introduction and results to date) and determine whether it can be applied to the Dutch situation. In particular, serious consideration should be given to the appointment of a CIO, Chief Information Officer, with appropriate powers at each ministry or government organisation – in so far as one has not yet been appointed. To complete the next part of this audit, we will find out whether our American counterpart, the GAO (Government Accountability Office), has already investigated the legislation's effectiveness.

5.3.4 Make reconsideration possible

If there are signs of risks, problems or changes in circumstances, make sure that plans can be reconsidered. Project applications should include an exit strategy. This requires the minister to think specifically about the conditions under which a project can or must be terminated and the action that will be taken in such cases. An exit strategy should be followed up if the business case can no longer justify a project's continuation.

6 Response of the ministers and the Court of Audit's afterword

6.1 Response of the Minister of BZK and the State Secretary of EZ

We sent our report to all ministers and state secretaries. The Minister of BZK, whom we addressed as the coordinating minister, responded to our report on behalf of herself and the State Secretary of EZ.[10]

The minister agreed in broad lines with many of the observations made in the report, which, she said, also provided valuable insights. The qualifications made in the report regarding the size of the underlying problem agreed with her own impressions but she noted that this did not detract from the House of Representatives' concerns about the success of government ICT projects.

In the minister's opinion, however, the report pays too little attention to significant differences in responsibility for steering the use of ICT. In this respect she makes a distinction between projects for which a minister bears sole responsibility and projects in which an autonomous administrative authority is the client or that are executed in a policy field for which a minister is responsible. These differences in steering, according to the minister, are reflected in the accountability information and have consequences for the financial information that the responsible minister can provide to the House of Representatives.

The Minister of BZK notes that in the Court of Audit's opinion ministers hold the key to break out of the spiral in which projects become too complex. Although the minister will consider how she can put the recommendations into practice, she asks the Court of Audit whether 'the characteristics of this key' do not vary with the different project responsibilities.

[10]The full text of the response of the Minister of BZK and the State Secretary of EZ can be read on the Court of Audit's website (www.rekenkamer.nl).

The minister further writes that her plan to reform the civil service (Minister of BZK, 2007c) explains how the use of ICT in the civil service's operations will be improved.

Finally, the minister says she looks forward with interest to the Court of Audit's in-depth investigation. She would welcome practical recommendations from the follow-up audit on how to keep a grip on ICT projects. She also looks forward to the Court of Audit's findings on experiences abroad, such as those with the Clinger-Cohen Act in the United States, the utility of which the Minister of BZK and the State Secretary of EZ will themselves investigate.

6.2 Court of Audit's afterword

We are pleased that the Minister of BZK, also on behalf of the State Secretary of Economic Affairs, agrees with many of our observations. Where possible, she is already putting our recommendations into practice. With regard to her reference to the plan to reform the civil service, we assume that the plan will incorporate our conclusions and recommendations where necessary. It did not escape us that a minister's position and responsibilities differ if a project is carried out under his responsibility or that of an autonomous administrative authority or if the project falls within the minister's policy field. We would note that the minister has a responsibility to protect the public interest regardless of who carries out the project. In part B – publication foreseen in June 2008 – we shall use our case studies to answer the question rightly raised by the minister regarding the differences in a minister's position and responsibilities when he is the client, when an autonomous administrative authority is the client and when an ICT project is in his policy field. We shall also report in part B on American experience with the Clinger-Cohen Act. In the meantime, we hope the ministry will discuss the observations and insights presented in this report in detail with the civil service. We, too, shall do our best in this respect.

Appendix 1 Conclusions, recommendations and the minister's response

	Conclusions of the Court of Audit	Recommendations of the Court of Audit	Response of the Minister of BZK
Realism	Many senior civil servants and politicians look upon ICT as a miracle cure for all manner of policy issues.	Be aware that ICT is not a 'quick fix' to a problem.	The minister agrees in broad lines with many of the observations. She will see how the recommendations can be acted upon and awaits the follow-up investigation for practical recommendations on how to keep a grip on ICT projects. She notes that the report pays little attention to differences in responsibility for steering the use of ICT. These differences in steering have an influence on the accountability information and thus the information provided to the House of Representatives. The minister refers to the approach to the operational use of ICT proposed in the plan to reform the civil service.
	Deadlines are not clearly reasoned but are based on political considerations.	Be aware that political deadlines can be fatal to a project.	
	In ICT projects, too, there must be more balance between the ambitions and the available people, funds and time.	Be aware that ICT ambitions also display a gap between policy and practice.	
	It is often politically undesirable to reconsider a project or its preconditions. The response to signs of problems, risks or changes is therefore inadequate (this is also true of the grip on ICT projects).	Be aware that changes during implementation are often inevitable and make them possible (this is also true of the grip on ICT projects).	
	ICT projects are rarely stopped even if there is no longer any economic reason to continue them. Political decisions are difficult to reverse once they have been taken.	Be aware that an exit strategy prevents muddling on.	
Grip	Managers often do not have enough insight into what ICT can or, more important, cannot do.	Be an authoritative contact for both the House of Representatives and the ICT providers.	
	Projects are often started too quickly without sound reasoning. The time is not taken to determine whether or not the project is realistic.	Take decisions in phases.	

	Important decisions are often based on inadequate or incomplete reasoning.	Do no take decisions without proper reasoning.	
	Experience has been gained in the United States with the Clinger-Cohen Act.	The Minister of BZK should find out what experience her American counterpart has of this legislation.	The minister undertakes to do so and will welcome information from the Court of Audit on the American experience.

Appendix 2 Terms and abbreviations

APO	General Project Consultation.
Business case	The commercial justification of a project, including reasoned arguments of the utility and need, supported by a cost benefit analysis that considers both financial and qualitative pros and cons.
BVK	Ministry of Government Reform and Kingdom Relations
BZK	Ministry of the Interior and Kingdom Relations
C2000	A national digital radio network for mobile communication between the police, fire service, ambulance service and the Royal Military Constabulary and Border Police.
CBS	Statistics Netherlands
Clinger-Cohen Act	US legislation introduced in 1996 to improve the federal government's procurement of business critical or otherwise essential ICT systems.
CSO	Second Opinion Committee.
EKD	Electronic Child Files.
ICT	Information and communication technology.
ICT project	An ICT project is a project whose aim is to develop or introduce an ICT system. Development is understood to mean the specification, procurement and internal or external construction or modification of the system. Introduction means the technical and organisational implementation.
ICT system	All actions necessary to maintain or improve the information provided by means of ICT.
IND	Immigration and Naturalisation Service.
OCW	Ministry of Education, Culture and Science.
P-Direkt	Central government system for personnel and salary records.
Shared Service Centre	An organisational unit within the government that combines support tasks.
SMART-C	An acronym for the requirements that goals must satisfy. They must be: specific, measurable, agreed, realistic, time-bound and consistent.
SZW	Ministry of Social Affairs and Employment.
UWV	Employee Insurance Agency.
V&I	Ministry for Immigration and Integration.
Walvis	Social Insurance Act (Reduction of Administrative Burden and Simplification).

Appendix 3 Experts consulted

We consulted the following experts for the purposes of our audit:

- Prof. D.B.B. Rijsenbrij, Radboud University Nijmegen / Information systems, software architecture
- L.J.E. Smits, director of Expertise Centrum
- M. Frequin, director general of the Ministry of Economic Affairs / Energy and Telecom
- A.J.M. de Bruijn RE RA, partner in PricewaterhouseCoopers and former chairman of NOREA, the professional association of IT auditors
- B.W.E. Taselaar, operational director of ICT~Office, professional association of IT, telecom, office and internet firms in the Netherlands
- Prof. C. Verhoef, Free University Amsterdam / Information Management & Software Engineering
- Prof. J.F. Groote, University of Eindhoven / Systems Design and Analysis
- S.J. Schaaf, CBS, investment specialist
- Geert H.M. Nielander, CBS, government innovation project manager

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