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# The Impact of e-government on the organization; a case study in Amsterdam

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## The Impact of e-government on the organization; a case study in Amsterdam

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### Abstract

In order to improve service delivery and in order to achieve centrally formulated goals, Dutch local governments (municipalities) introduce innovative technologies in their organizations. The implementation of technology affects the organizations in several ways. The structuration model of technology defines elements in the organization which are affected by technology. This model is used to determine the effect of e-government technology on e.g. human actors and organization structure. We use the e-government maturity model to define different stages of e-government. This enabled us to analyze the impact of e-government during different stages of e-government development in practice. This study can be helpful for e.g. managers of e-government projects as these projects are often described to be unmanageable and complex, and this paper gives insight in the effect of e-government on the organization.

**Keywords:** e-government, technology, organizational impact

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# **The Impact of e-government on the organization; a case study in Amsterdam**

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## **1. Introduction**

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E-government is a worldwide phenomenon (Jaeger, 2003; Strejcek, 2002) to improve service delivery and internal efficiency of governmental organizations. It can be defined as “the use of internet ICT by a public organization to support or redefine the existing and/or future relations with ‘stakeholders’ in the internal and external environment in order to create value” (Bekkers, 2003). The Dutch central government has formulated policy about e-government which states that the internet should be used to enable more efficient management of organizations, effective execution of policies and better service delivery (Ministerie van Binnenlandse Zaken, 1998). E-government is developing in the Netherlands, most Dutch government agencies have a website, but when we consider the e-government maturity model (Layne and Lee, 2001) most initiatives are still at their beginnings.

E-government often involves the introduction of (new) technology in a government organization. Experiences in the private sector have shown that the implementation and use of information systems (like e-commerce) might have important impact on the organization because the information architecture and –infrastructure are affected. Introducing e-government in an organization can impact the employees and the dimensions of the organization (Orlikowski and Robey, 1991). The relationship between information and communication technology (ICT) and commercial organizations has been extensively analyzed in the private sector, the relation between ICT and government organizations however is relatively unexplored (Peristeras, Tsekos et al., 2001), although more empirical studies are becoming available (Bekkers, 2003).

In this paper the impact of e-government on an organization is analyzed by using theories from different scholars as e-government is described as a multi-disciplinary phenomenon and is difficult to analyze from only one perspective (Bekkers, 2001; Scherlis, Croft et al., 2003). In this study e-government based theories (Layne and Lee, 2001; Devadoss, Pan et al., 2002) and organizational theories are used (Orlikowski, 1992; Chu et al., 2003) to analyze the impact of e-government on the organization.

## **2. Theoretical framework & methodology**

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The theoretical development of e-government has been modeled by Layne et al. (2001). They developed an 'e-government maturity model' which is a stages-of-growth-model for fully functional e-government. They have used several government websites and related e-government initiatives to ground and explain their model. It gives insight in how e-government can be divided in different stages. The model implies more organizational and technological complexity when e-government is getting more mature. In order to describe the introduction and development of e-government in a structured and chronological way this model is helpful.

To analyze the impact of e-government on the organization the 'structuration model of technology' (Orlikowski, 1992) is used. The model consists of the elements human agents, technology and institutional properties, which all relate to each other.

To get insight into the impact of e-government on the organization a case study is conducted. The city of Amsterdam (capital of the Netherlands) is divided in fifteen town districts<sup>1</sup>. Each district is relatively autonomous and has its own governance for e-government. To select a town district for the case study we analyzed the districts based on two criteria, the number of online services the district offers and the number of online transactions. After an inventory study of online services (November 2004), it can be noticed that district Zeeburg and Oost-Watergraafsmeer both implemented the most, both sixteen, online services. When taking criteria two into consideration, the 'Voortgangsrapportage Loket Amsterdam' (Amsterdam, 2004) shows that town district Zeeburg has the most digital transactions online. Based on these criteria we choose town district Zeeburg most applicable for this study.

Based on the theoretical insights from the models of Layne et al. and Orlikowski, we gathered data by interviewing the ICT coordinator, responsible for the implementation of e-government in Zeeburg, and the manager responsible for the department of citizens' affairs. The goal of these interviews was to determine 1. the chronological development of e-government within the town district and 2. the consequences of these technological developments on the organization.

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<sup>1</sup> Amsterdam-Centrum, Amsterdam-Noord, Amsterdam Oud Zuid, De Baarsjes, Bos en Lommer, Geuzenveld / Sloterveer, Oost / Watergraafsmeer, Osdorp, Oud-West, Slotervaart, Westerpark, Westpoort, Zeeburg, Zuideramstel and Amsterdam Zuidoost

### 3. E-government stages

Layne and Lee (2001) propose four 'stages of growth' in their maturity model: 'catalogue', 'transaction', 'vertical integration' and 'horizontal integration'. In the model the Catalogue is the most elementary form of e-government and horizontal integration is, in theory, the ultimate goal. These four stages are explained in terms of the complexity involved and different levels of integration. The stages have similarities with studies in the private sector.

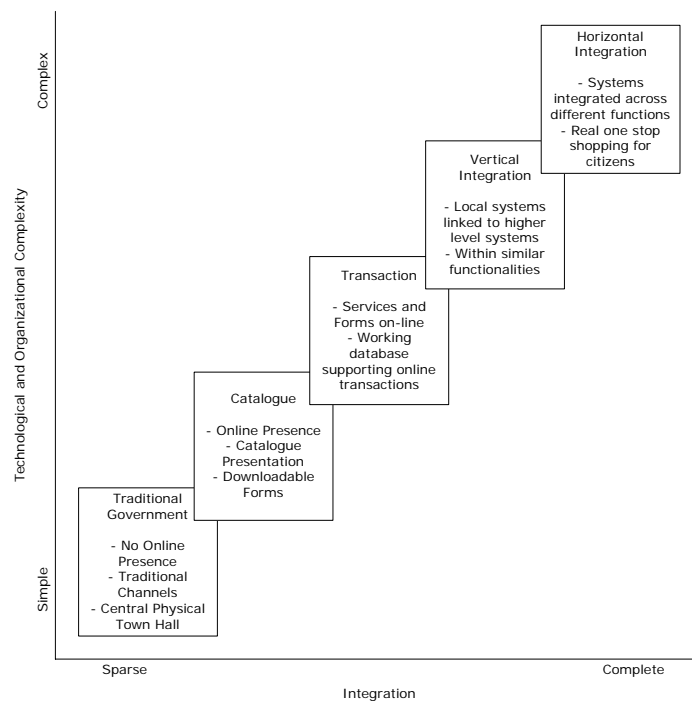


Fig. 1. Dimensions and stages of e-government development, based on Layne et al. (2001)

The vertical axe of the model shows the organizational and technological complexity. The horizontal axe shows the integration of services and cooperation, from sparse to complete, from the perspective of the potential user. The stages will be described from the perspective of the functionalities e-government offers to users, which is in line with the goal that e-government should enable better service delivery (Ministerie van Binnenlandse Zaken, 2002).

The different stages, including the added stage 0, will be shortly discussed:

Stage 0 Traditional Government; the organization has no e-government technology implemented.

Stage 1 Catalogue; this stage encompasses the provisioning of static information on a website.

Stage 2 Transaction; this stage encompasses two-way communication between the user and the organization enabling online service delivery.

Stage 3 Vertical Integration; in this stage government organizations transform government processes and possibly the concept of government itself.

Stage 4 Horizontal Integration; this stage is seen as using the full potential of ICT, from the users perspective, by horizontal integration of government services across different ‘functional walls’.

The transition of one stage to another doesn’t occur on one moment in time but seems to evolve over time. This is in line with the maturity model, which shows overlaps between the different stages, it is possible that a specific situation can be described in more than one stage in the model.

Based on an overall inventory of Dutch municipalities ([www.advies-overheid.nl](http://www.advies-overheid.nl)) we can conclude that all municipalities are (at least) in stage one of the model, and many municipalities are moving towards the transaction stage<sup>2</sup>. The municipality used as a case for this paper is in stage 2 and will be discussed on page 8.

#### 4. Relation between e-government technology and the organization

Orlikowski developed the structuration model of technology (1992) to understand the interaction between information technology and the organization. The structuration model of technology describes three elements that interact with each other, as shown in figure 2. The following elements are defined:

- ‘Human agents’ are e.g. employees, developers, managers
- ‘Technology’ are artifacts that can be used to perform tasks, e.g. information systems
- ‘Institutional properties’ are dimensions of the organization like structure

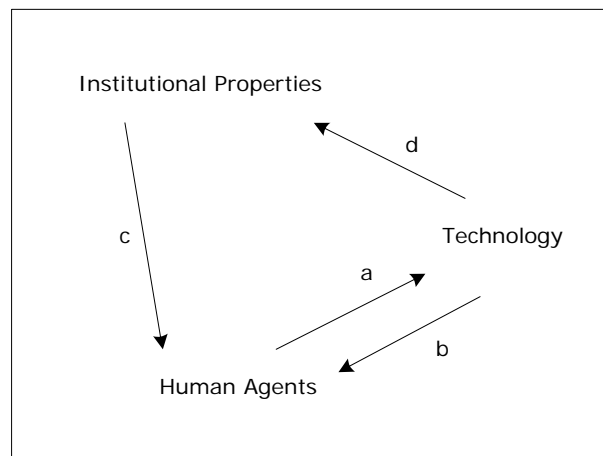


Fig. 2: Structural Model of Technology (Orlikowski, 1992)

<sup>2</sup> Central government formulated goals that in the year 2007 sixty-five percent of public services from central government, provinces and municipalities can be conducted online.



Orlikowski's structuration model of technology analyzes the impact of technology on the organization. The model is used as a 'gestalt' meaning that all relations or influences occur at the same time. In that view the elements are closely related, which makes it difficult to determine the impact of one element on the other. In our paper we analyze all relations individually. The different relations will be shortly discussed:

*Relation a- 'technology as product of human action'* shows that technology is an outcome of human action. The development, changing, maintenance and use<sup>3</sup> might influence the technology.

*Relation b- 'technology as a medium of human action'*. Use of the technology might constrain activities of employees.

*Relation c- 'institutional conditions of interaction with technology'*. Institutional properties might influence humans in their interaction with the technology of e-government.

*Relation d- 'institutional consequences of interaction with technology'*. E-government technology might influence the institutional properties of an organization.

The way these relations evolve during different stages of e-government development is studied and described in the following section.

## **5. E-government in Amsterdam district Zeeburg**

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Based on Layne and Lee we've defined five stages for e-government. In the Zeeburg district only the first three stages apply, namely 'traditional government', 'catalogue' and 'transaction'. The 'vertical-' and 'horizontal integration' stages can't be analyzed because these (hypothetical) stages have not occurred (yet). The starting point in our data gathering (interviews) was to define the object e-government. Because there is no e-government (technology) in the first stage (traditional government), there will be no impact on the elements of the structuration model. For the following stages, where e-government technology is introduced in the organization, the effect on the elements is discussed over time. The effect of e-government on the organization (in terms of the relations discussed in the previous chapter) evolving from one stage into the next is described in the following section.

### **Relation a: Influence of Human Agents on Technology**

The first e-government initiatives in district Zeeburg were developed in 1999. The head of the ICT department started an initiative to provide public governmental information via the internet. By introducing a website the district moved to the first stage of the e-government maturity model. The word 'e-government' was introduced in the organization.

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<sup>3</sup> or *non*-use of information technology.

### **Stage 1: catalogue**

The ICT department of district Zeeburg initiated the first website project. The information provided by the website was managed by the technical department. The departments involved determined the online content; the information however was put on the website by the ICT department. Employees of different departments could influence the technology (the content). Developers influenced the technology by developing, maintaining and improving it.

### **Stage 2: transaction**

People became aware that the Internet could become a more meaningful channel. On a more central level the district started to work together with external (governmental) parties like BIA (Bureau Informatisering Amsterdam). Together with BIA they have developed standards for e-government in Amsterdam. In this stage, different levels of 'management' (district and municipality) were involved. Policies were developed in order to further develop e-government. Some town districts are working together to create consensus on different subjects, like the use of the same technologies, procedures, etc. Because of this transparency, knowledge of internal processes is made explicit, and employees from different departments are involved in aligning business processes with the online service portfolio. The number of e-government stakeholders is increasing, management and employees of different departments are involved in aligning the technology with the organization.

### **Relation b: Influence of Technology on Human Agents**

Employees are using different artifacts to deploy their activities. These artifacts enable the employees to process their activities in a standardized and effective way. The influence of (e-government) technology on employees will be discussed.

### **Stage 1: catalogue**

When e-government evolved to the catalogue stage, it enabled citizens to view government information online. In this stage it is not possible to conduct online transactions. This stage of e-government did not influence the activities of the employees. Existing information from (different) departments was collected and made available online by the ICT department. In this stage there was little influence from the technology on human agents.

### **Stage 2: transaction**

As e-government entered the second stage of the maturity model, organizational and technological complexity increased. Although we expected (some) change in working processes, the effects of e-government in the second stage are relatively small. Online transactions are printed on paper and are handled the same way as other (non online) transactions. There was no or very little change on the working processes of employees; e-government hardly affected the working processes.

### **Relation c: Influence of institutional properties on human agents**

The working processes define the way work has to be executed. Governmental organizations should try to optimize the working processes so that work can be executed in the most efficient way (Heene,

2005). The institutional properties define the way human agents can do their work and interact with the technology.

**Stage 1: catalogue**

The district introduced a new channel by which they provide information. This development can be characterized in the catalogue stage since only static information was provided, and users can use the website like a paper brochure. The effect of this development on the working processes of employees is little. The way transactions are handled and the artifacts used in working processes, did not change.

**Stage 2: transaction**

Transaction possibilities are added to the e-government website. This means that bilateral communication is possible, and organizational processes can be triggered via an online channel. From an efficiency perspective it might be interesting to automate procedures, since the input of the process is already digital. The automation of processes however, did not take place; online transactions are printed on paper and are handled the same way as other (non online) transactions. There was no or very little change on the working processes of employees; e-government hardly affected the working processes.

**Relation d: Influence of technology on institutional properties**

Working processes within the organization should be organized in such a way that they can be performed in an efficient and effective way. Technology, as well as other characteristics like new market demands or new regulations, can influence the institutional properties of the organization.

**Stage 1: catalogue**

In the catalogue stage, no complex technologies are used, the technology used is relatively standardized and the effects of the technology on the organization are relatively small. There are no standardized protocols or procedures introduced which influence institutional properties. The effects on the institutional properties are small.

**Stage 2: transaction**

Transactions via the e-government website are printed in the back office and processed 'in the traditional way', it did not affect working processes or procedures other than the need to pick up the printed online-transactions. No different departments or regulations are introduced, so the influence on institutional properties is small.

## 6. Analysis

In the description of the case study above, the e-government stages are discussed within the relations of the elements of the structuration model of technology. Only the stages viable for the case study are described, not all (theoretical) stages apply to the Zeeburg case. The catalogue and transaction stages can be applied to the Zeeburg district, the horizontal and vertical integration stages can't, because these (theoretical) stages did not occur in practice. The traditional government stage has no e-government so there are no relations between the elements.

In the following overview the stages of the e-government maturity model are mapped onto the relations between the elements. Based on the interviews the strength of the influence between the elements is represented by 'none', 'weak' or 'strong'. If one element influences the other, the strength of that influence (weak or strong) is shown. Stages that did not apply in practice (yet) are left empty.

Stage Relation	0. Traditional government	1. Catalogue	2. Transaction	3. Horizontal integration	4. Vertical integration
HA → T	None	Strong	Strong		
T → HA	None	None	Weak		
IP → HA	None	None	Weak		
T → IP	None	None	Weak		

Fig. 3. The 'powers of e-government' within the Zeeburg case

In Zeeburg the initial e-government initiatives were originated from 'bottom up', some 'enthusiasts' from the ICT department started developing a website without formal management involvement. In this catalogue stage the impact of the technology on the elements was relatively small; it did not affect institutional properties or human agents. The institutional properties did not influence employees differently than in the traditional government stage (so there was no 'e-government effect').

When e-government went on towards the transaction stage, more human actors like developers, legal advisers and managers were involved. They all influenced the development of e-government in that stage, the influence from human agents on technology is considered to be strong. The impact of technology on human agents and institutional properties is weak but might increase, as management

plans to align (back office) processes with the technology. The organization deals with e-government by dedicating people on e-government related tasks, embedded within the existing organization structure. The influence of e-government technology on the institutional properties is relatively weak. When technology evolves, more services are online and the number of online transactions increases, the influence of technology on the institutional properties might increase as well.

## **7. Conclusion**

In this paper the e-government stages of Layne et al. are used to identify different stages in practice. Although it is sometimes unclear when a specific stage ends and when a new stage starts, the model is helpful to give insight in actual e-government developments. The first stages, traditional government, catalogue and transaction, can be recognized in practice while the horizontal and vertical integration stages are more or less hypothetical. There are indications the last stages do apply within governments but we found no empirical evidence in the Zeeburg case. Overall Layne's model seems useful for identifying different stages in the 'e-government evolution'.

The model of Orlikowski gives insight in the impact of technology on the organization. Technology in our study is seen as the technology used to implement e-government. Orlikowski's model gives useful insights in the way e-government has impact on the organization and its human agents, institutional properties and technology.

Based on our study in Zeeburg it can be denoted that in the catalogue stage the impact of e-government on employees and institutional properties is relatively small, the development of a website and providing online information did not affect employees or institutional properties. In the transactional stage, the impact of human agents on the technology is relatively high, many employees and departments are involved creating, developing and managing the e-government technologies. When the number of online transactions increases the influence of technology on institutional properties and employees might increase, but this is still hypothetical. New technological developments and new regulations, concerning e.g. digital authentication and verification, introduces new technologies which can influence institutional properties because new procedures, rules and regulations would then have to be implemented.

Soete et al. (2003) state that the quality (and accessibility) of e-government is highly fragmented: "in some countries such information appears widely available across a large set of public sectors; in other countries information remains limited to some specific public sectors.". They further claim that "causes seem to lay in the institutional structures, the specific local governance structure with the sometimes, active involvement of users, incentive-systems and interests.". Although this study did not involve quality aspects, our findings are in line with the causes mentioned by Soete et al. Active involvement of users (in the Zeeburg case these users are employees) and specific interests (some enthusiasts who started building websites) formed the basis of e-government. The institutional structures are affected by ongoing e-government developments in order to improve e-government quality. As e-government is developing, the impact on organizational properties is likely to increase, further research is needed, however, to substantiate this claim.

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