

Information quality as a mirror of government excellence

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Summary

Purpose – The purpose of this paper is to explain current processes which are part of the eGovernment agenda in Dutch governmental organizations: these processes are part of a transformation of government organizations and municipalities towards networked organizations (“infocracies”). The paper also aims to show which difficulties municipalities are faced with, and how an instrument for measuring information quality and management can help municipalities cope with these developments that come with the transformation.

Design/methodology/approach – The paper analyses current developments and the challenges that government organizations are confronted with, and shows how a measurement instrument can contribute in helping government organizations cope with these developments.

Findings – The findings show that IT is an enabler for government organizations to transform towards networked organizations. In a municipal setting, this has led to the creation of authentic registrations as a crucial element of the networked organization. The main challenges for municipalities with regard to the implementation of authentic registrations are not technical but organizational of nature: there is a need for information sharing and cooperation, process and chain orientation and an awareness of the interdependencies which are inherent to authentic registrations. The EGEM Thermometer makes the challenges and obstacles, which obstruct the successful implementation of authentic registrations visible, and provides municipalities with a base to start the implementation thereof.

Research limitations/implications – The Thermometer is currently based on a pilot project and a project that was the start of the Thermometer, which is made up of six municipalities.

Practical implications – The use of the EGEM Thermometer helps municipalities by creating insight, awareness, sense-of-urgency and a basis for organizational development.

Originality/value of paper – The paper illustrates how measurement and feedback sessions can help organizations cope with IT challenges in relation to cooperation, service delivery, enforcement and information management.

Keywords Information management, Organizational development, The Netherlands, Government

Paper type Research paper

Transformation of organizations

Today’s society can be characterized as very dynamic: a society which is becoming increasingly more complex and seems to be continually changing. Everything is possible and must be done faster, 24 hours a day, seven days a week. Not only are the supermarkets open all evening, you can book a vacation via internet or call a computer company’s helpdesk whenever you need assistance. The likelihood that you get someone on the other end of the line, who is on the other side of the world, is increasingly greater (Friedman, 2005).

Because of this, the world seems to be getting smaller. Due to an enormous growth in mobility, but especially in the diverse channels of communication, organizations throughout the world establish contact and enter working relationships with one another. With the help of modern channels of communication, such as e-mail, internet, telephone, fax, etc. everyone can make contact with any other place in the world from his/her own location.

At the same time, the world is becoming increasingly more complex. We can no longer speak of the customer. The first automobile that was assembled by mass production in 1908 is the well-known T-Ford. The famous quote that Henry Ford made is: "You can buy it in any color, as long as it's black". Nowadays customers are not only able to choose any conceivable color from all over the world, but also from diverse models, motor variations and interiors. With the help of IT information about customers, organizations, products and services can easily be registered and used. The accessibility of all of the information makes it especially difficult. Because when do you have enough information to be able to make the right decisions? And how do you gather all of the right information in order to make decisions?

The developments above are enhanced by the extremely extensive digitalization of information. Even though information always played an important role in society, due to the super-fast developments of information technology, such as internet, for example, increasingly greater amounts of information are transported faster and more securely.

Organizations must adapt to the dynamics of the society in order to survive. This is not new. The history of Western organizational structures started with traditional feudal organizations. Generation upon generation the work that had to be done stayed the same (Weber, 1920). Adam Smith made the connection between organizational structure and technology in the period of modernization and industrialization. He described rationalized organizational structures with high levels of division of labor. Frederick Taylor further expanded on this in his concept of Scientific Management. He described organizations as functional hierarchies with highly-specialized laborers who performed minimal duties. Max Weber indicated that a functional structure not only suffices in the need for efficiency but also in effectiveness and in loyalty to authority, which is typical of government organizations: The rational legal bureaucracy (Weber, 1920).

The Human Relations School (Dickson, Roethlisberger, Mayo) later discovers the importance of the informal organization. Groups, which create their own standards of productivity, operate outside of the traditional lines of authority in an organization. These standards are superior to the formal demands of production.

Woodward (1965) researched the relationship between the organizational structure and the technology implemented. She discovered that an organizational structure can vary from a non-hierarchical to a hierarchical structure and back again to a non-hierarchical one. This is dependent on the technology implemented and the degree to which this technology is applied in the organization. If an organization makes custom-made products (for example, a ship or a house) a simple, informal structure develops with much horizontal communication. A vertical, mechanical bureaucracy develops when organizations produce "batches" of a particular product. The organization uses primarily conveyor-belt technology to bring forth the products. This organizational structure can be compared to the Tayloristic organizations with dominant vertical communication and maximum division of labor. The third form is characterized by an informal, non-hierarchical structure. This differs greatly from the first form. These organizations do not produce in numbers but in bulk (milk, oil, etc.) Highly specialized professionals manage the factory in which machines are inter-connected by pipelines or production streets. Automation and mechanization create a production process in which people hardly are involved, if at all. A continual stream of production is managed. The professionals share their professional backgrounds and production protocols are a part of a shared, set infrastructure of knowledge. In this way, horizontal and informal communication become important instead of hierarchical positions and vertical communication.

Malone (2003) describes a similar kind of development as that described by Woodward on grounds of decreasing transaction costs of communication. Where Woodward (1965), focuses on production and the corresponding technology, Malone (2003), focuses on coordination and decision-making and the corresponding information technology. Communication costs are costs that organizations must make in order to exchange information. Malone reasons that new developments in the IT field, such as the rise of internet ensures that the cost of communication decreases. Due to this, it is financially

attractive to place decision-making authorities in other positions in the organization. He distinguishes three types of management formations. The first management formation he calls the “Cowboy-structure”, dominant at the beginning of the twentieth century. Cost of communication was high then. That is why organizations operated autonomously with relation to one another and tried to serve their customers independently as well as they could. There was custom-made work but the different organizations were not geared to work together: the decision-making process, the production, and the supply of services were done locally.

After the beginning of the twentieth century the cost of communication started to decrease due to new means of communication, such as the telephone. Throughout the entire twentieth century communications costs continued to decrease due to developments such as radio and television, for example, and later the rise of the large mainframe computers. This made it financially increasingly more attractive to send large amounts of information to a central point. At this central point the best decisions were made: The “Commander structure”. This is how integration came into being; organizations merged. Throughout the entire twentieth century we see a movement towards centralization; large bureaucracies came into being which were run from a central point. Because the center had access to more information than the local departments, it was decided from this center, so from the top down, how customers could best be served locally. As a result of the centralization economies of scale came into being and mass production and mass sales became possible.

Due to developments in the IT field, the cost of communication have decreased even further. The most important development in this context is the rise of international standards. The internet protocols are used worldwide, such as an exchange format like XML. Standards have been developed in the technical, functional and informational domain. In this way it is not only possible to collect great amounts of information at a central point, such as in centrally-steered entrepreneurship, but it is also possible to make this vast amount of information available locally to the departments of an organization. In fact, the shared information infrastructure forms one large organization, which delivers custom-made goods. “The Cyber cowboy structure” unites the advantages of locally- and centrally-controlled entrepreneurship within itself: “mass customization”.

It is becoming easier to achieve the necessary coordination between organizations and it is becoming easier to monitor relationships with other organizations. In other words, the costs involved in initiating transactions with organizations in the area, the so-called transaction costs, are decreasing. If transaction costs decrease, it is remunerative to outsource the activities, which were previously self-managed, to other organizations. This often includes those activities with which the organization does not want to compete, the so-called non-core tasks. An organization will always perform the core tasks itself, because in doing so it will attain competitive advantage. They can have other organizations perform different tasks, or get them done through cooperation with other organizations. Malone sketches an image of a modern organization, a network organization that decentralizes internal responsibilities and decision-making authorities and invests as little as possible in the organization, and one, which enters into many external-working relationships.

Hammer (2002) describes a similar overturned and chained network organization, which is process- and customer-orientated. He also is of the opinion that the classic bureaucratic management model must be left behind, because it leads to segregation, tribal war and in the end inadequate performance. An organization must therefore take on the following challenges:

- be a pleasant partner for your customers, by being open and honest with the customer and by allowing them to do as much possible on their own;
- provide additional value by offering solutions instead of products;
- prioritize process by turning over, by thinking about the total chain and by allowing your employees to understand the whole chain;

- work on structures of process so that you do not need “creative hagglers”;
- base management on measurements;
- end the tyranny of the organization chart, by stepping away from sharply-defined boundaries and by demanding teamwork at management level;
- set maximizing the value for the customer as priority, by using IT to share information and to streamline transactions;
- tear down outer walls and stamp out overhead (think of shared services); by redistributing activities among organizations and by sharing information openly; and
- embrace the radical vision of virtual integration, by looking at your own organization as part of a cooperating network.

The new control model, which Hammer outlines here, is in fact an overturned and chained network organization, which is completely process- and customer-orientated.

Zuurmond (1994) prefers to refer to the infrastructural organization instead of the term network organization for this new form of organization. It still implies that there are boundaries, not of individual organizations anymore, but of groups of organizations.

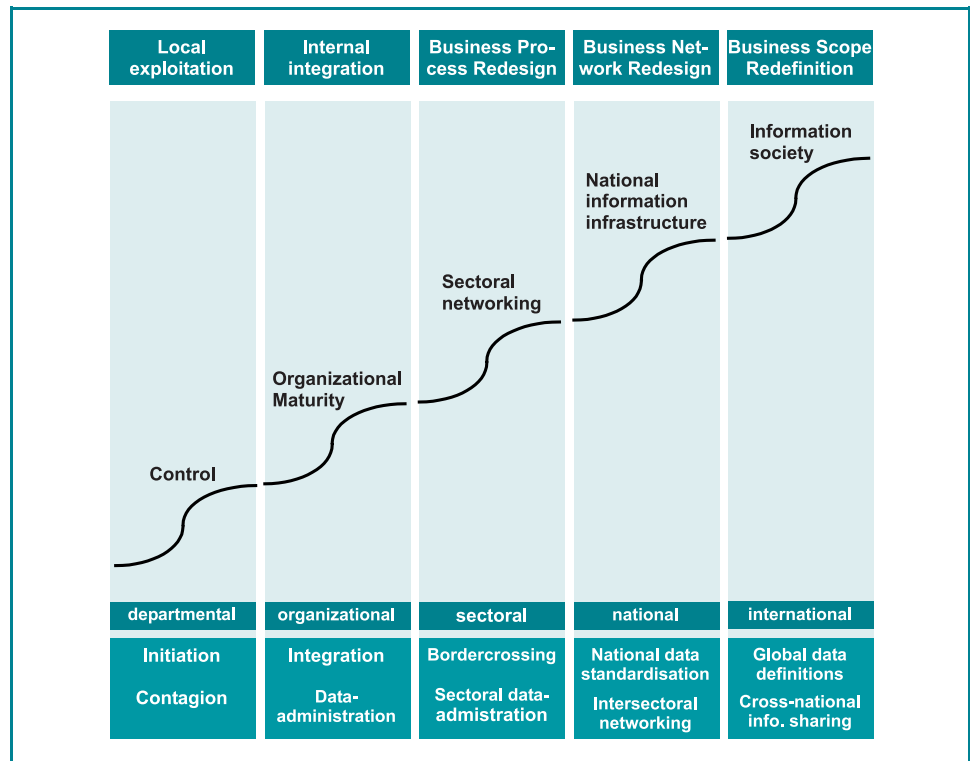
Infrastructure must be seen in a broad sense of the word. Democratic routines, financial routines, personal routines and informational routines are included and are completely standardized at an inter-organizational level. Judicial concepts will be inter-organizationally standardized. All of the organizations, which participate in this communal infrastructure, employ the same routines. By doing so, a network of infrastructural organizations is created which can work together quickly and adequately. Their customers can be jointly served, or serve themselves.

According to Woodward, Malone, Hammer and Zuurmond, IT has a big influence on the structure of organizations and the transformation of organizations. The rise of IT and the application of IT by organizations have been studied by Nolan. He describes different applications of IT within organizations in a three-stage model (Nolan and Gibson, 1974; Nolan, 1979). In the first stage, IT consisted of large back office systems, which were used to execute large routine-processes. The organization itself was not confronted with IT and practically never “experienced” the systems. In the second stage, progress in IT resulted in smaller and faster PCs and enabled the introduction of IT in the organization itself. Employees got directly in contact with IT because they had to use it for their daily work. The third stage consists of the introduction of network systems, which enable the connection of IT-systems among organizations. The perspective on the practical use of IT evolved from the back offices to the organization itself and eventually to organizations outside one's own organization. Also the deployment of IT changed. During the first stage, routine processes were automated, while during the second stage IT facilitated the employees in their daily work processes. During the third stage, IT changed communication patterns and enabled the transformation of processes.

The Nolan-model is later extended into a Nolan + / – model (Cavaye *et al.*, 1998; Zuurmond, 1998) (see Figure 1). The Nolan + / – model describes the relationship between business excellence, organizational development and the role of IT and information management.

In stage 1 the focus is on the department level and IT is used and implemented to optimize the performance of the department. Processes are optimized on department level, which also goes for the information that is used. This focus for example results in a situation in which each department in an organization has its own registration of (the same) addresses. In the second stage, organizations use an organization-wide focus. Processes are optimized and redesigned from the organizational perspective. This focus results in organizations that are structured around processes instead of areas of expertise and resources (and information is viewed as one of the resources) are allocated from an integral perspective. In

Figure 1 The Nolan + / – model



stage 3 the organization optimizes its processes in cooperation with its environment. This may lead to the situation in which parts of processes are outsourced to suppliers or customers (for instance electronic banking in which the customer performs part of the process). Standards for information are necessary. Stages 4 and 5 lead to the situation that processes are optimized on a national or even international level. Data definitions are standardized and information is shared among many (international) organizations. During each stage the quality of information improves due to standards and the fact that one registration of certain information leads to fewer mistakes than multiple registrations. A feedback mechanism contributes to the improvement of information, because there are many users who check the quality of information regularly by using it in their daily processes.

eGovernment as an accelerator of governmental transformation

That which is described above applies to government organizations as well. Countries all over the world have set up innovation programs with the objective to improve public service. This demands transformation of the government organizations with the help of the effort from IT. We are referring to eGovernment. Robben (2004) defines eGovernment as follows:

E-government has as objective continual improvement of government service and management by reshaping internal and external processes and relations with the help of information and communication technology. The internal processes and relations can be found in every government agency, among the government agencies and their personnel and among the government agencies themselves. The external processes and relations are those among governmental agencies on the one hand and the citizens, the entrepreneurships and their representatives on the other hand.

The initial eGovernment initiatives were focused on the digitalization of existing service processes in particular, along the path of information, interaction and transaction (Accenture, 2003). The digitalization of existing processes goes hand-in-hand with the automation of the existing inefficiencies and ineffectiveness. Concretely this means that government processes need to be fundamentally redesigned.

An example of redesign of processes supported by appropriate IT in The Netherlands is the RDW. This organization is responsible for the registration of vehicles and the owners of these vehicles. In addition to other responsibilities, the RDW registers vehicles, driver's licenses and they certify vehicles that are allowed on the Dutch roads. In the 1980s the RDW had to design a process to control the safety of vehicles. A normal approach up to that time was to set up new "front offices" throughout the country in existing government inspection stations. Instead of that the RDW chose for cooperation with private parties which did the same work, namely car garages. The process of assigning and reassigning license plate numbers was delegated to the post offices in the same way. Through the use of IT the partners have access to the information of the RDW and can alter it.

Now there is an active network of cooperating organizations, which make use of a communal infrastructure.

In 2002 the program *de Andere Overheid* (Alternative Government) started in The Netherlands. The formulated actions in this program form the basis for a modern government. Citizens, companies, agencies and other social organizations want the government to impose fewer rules and (subsequently) allow more room for one's own initiative. They also want the government to work more efficiently and effectively, including making more clever use of IT. Furthermore, they want the quality of work, especially the service to citizens, to improve. And finally a much heard request is that government not do everything itself, but depend on others who want to (and must) take responsibility, such as social organizations, joint government agencies and opinionated and capable citizens. The implementation of the actions from the Action program *Andere Overheid* (Alternative Government) must provide this. This program fits in with the eGovernment agenda of the European Union (Lissabon Agenda, 2003).

In order to realize the eGovernment agenda the following agreements must be realized on the IT side. The processes of government organizations need to be connected to a communal infrastructure in such a way that information can be exchanged from and to that communal infrastructure electronically. The network of organizations should be able to serve themselves from a communal information model, that reflects as best possible the actual use of information in the real world. Information is initially collected by the party that is closest to the place of change in the real world. We will call this agency the authentic administration and it is responsible for providing digital information to all other process owners within the government.

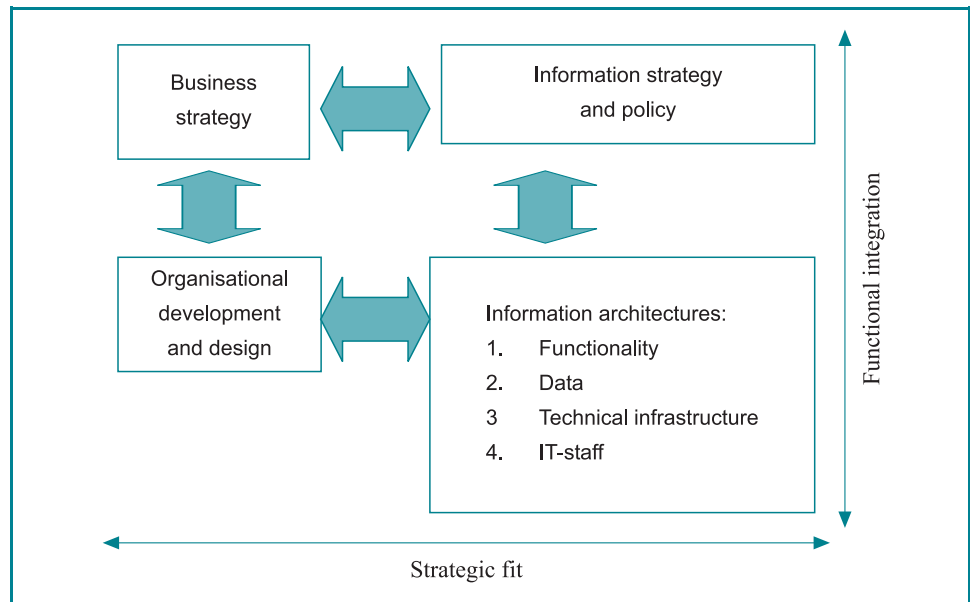
Securing the information is at an extremely high level, among other things by stringent privacy management (proportionality, goal commitment), security civil servants, logging, authorization and transparency.

Provision of information is a strategic responsibility, oftentimes to be connected with the manager who is assigned to the organizational development and improvement of service.

In order to realize the transformation of government organizations an IT provision is necessary which is suited for the organization and its objectives and an organization which recognizes and employs the strategic value of information and IT. Henderson and Venkatraman (1993) refer to Strategic Alignment in this framework: The development of organizations and IT must be in balance.

In Figure 2 they indicate that there must be a balance between the organizations on the one hand (left) and the provision of information and IT on the other hand (right): the strategic fit. In addition, they indicate that there must be a balance between the external orientation (vision and strategy, above) and the internal organization (below): the functional integration. In other words: the internal organization must support the external orientation (vision and strategy). If an organization wants to work in a customer-friendly manner (external orientation) then the internal organization must be process-minded. Furthermore, Henderson and Venkatraman indicate that there is more than one path that can be taken in doing this. Transformation can start in every "corner" of the model and in this way influence the other "corners". This means that there is not strictly spoken a from the top-down approach. Google for example started

Figure 2 The development of organizations and IT



with the search engine (lower right). Only later a business strategy was formulated for this wherein several business models were tested, before they came to the model which they now implement.

In practice it appears that the achievement of "strategic alignment" is not actually sinecure: Luftman *et al.* (1999) describe the following success factors and barriers, see Table I.

A government organization that wants to transform to a network organization needs managers who are more involved and aware, an IT organization that understands the "business" and uses performance indicators which help managers to give the correct guidance to the transformation process.

The EGEM Thermometer as a set of performance indicators

The program Elektronische (Electronic) Gemeenten (Municipalities) (EGEM) is a national program for support of municipalities in realizing the eGovernment agenda. Working according to procedure is new for many municipalities. Most municipalities still work according to the classic hierarchical structure with accompanying structures of information. Each department has its own register of births, marriages and deaths as well as its own register of addresses.

By now municipalities should be an authentic administration for people, addresses and buildings to be able to realize the principle "one-time provision of data, multiple usages thereof" within the government. In this way the Tax office would not be able to use its own register of births, marriages and deaths but would have to retrieve the information from the authentic register.

The EGEM Thermometer has been developed to help municipalities to work according to procedure in organizing and implementing the accompanying provision of information. The objective of the thermometer is to make managers and employees aware of the present situation of fragmented models of information and to be able to measure the progression if the organization transforms itself to an infrastructural organization with IT as a strategically-supporting means.

The idea behind the Thermometer arose in a large Dutch city (population 600.000) where the management wanted to improve the municipal service and maintenance in a strongly segregated organization with a strongly segregated IT. In order to make managers in this

Table I Success factors and barriers

<i>Success factors</i>	<i>Barriers</i>
Support of top management for IT. It is important that the managers of an organization recognize and support IT-innovation. The support expresses itself in managing and providing means	Poor relationship between "business" and IT. IT is not involved in strategy-making in the organization.
IT has know-how and insight into the "business" of the organization. With know-how and insight into the "business" of the organization IT is able to support the goals and opportunities of the organization	IT does not set the appropriate priorities. Managers must guide IT efforts. IT must, in return, set the appropriate priorities in its performance portfolio
The involvement of IT in the development of the organizational strategy. Alignment is better and more quickly attainable if the strategy of an organization is the result of multidisciplinary cooperation in an organization in which the IT people are also involved	IT does not fulfil its obligations. Too often IT is not capable of realizing projects on time or within the budget
Business-IT partnership. IT'ers are capable of communicating in "business-terms" with other divisions of the organization. Other divisions of the organization recognize and acknowledge IT as "strategic resource"	IT does not understand the "business"
Correctly prioritising IT-projects. Organizations must be capable of including its technology in its strategy on time to prevent falling behind the competition	Top management does not support IT. Innovations are only possible if top management recognizes and acknowledges the possibilities of IT
The leading role of IT in its organization. Often the interest of IT is apparent only after the competitor has successfully applied it	IT does not have a leading role in the organization

municipality aware of the importance of communal use of information, with the help of an authentic registration of persons, to work according to procedure, a set of performance indicators was developed.

The following results were shown (Balzer, 2005):

Question: At how many addresses do more people live than is permitted according to the building code?

Answer: Too many people are living at approximately 1,200 addresses on the basis of the building code;

Question: How many municipal tax forms are returned as undeliverable?

Answer: Approximately 15,000 letters are returned annually; and

Question: How many people who receive benefits have died, moved or emigrated?

Answer: There are approximately 150 people who have died, moved or emigrated who still receive benefits.

The answers have been retrieved by comparing the registrations of different services with the population administration of the municipality. In doing so it became painfully clear that the segregation of the information service and maintenance is being performed inefficiently and ineffectively. In addition it led to the managers jointly redesigning their processes on the basis of a communal model of information: a first step on the way to an infrastructural organization.

One of the processes, which was redesigned, was the process of collecting municipal taxes. Use is now made of the population administration to send the tax forms. If a form comes back as undeliverable an immediate check is made in the population administration whether the person concerned is registered at that address. If that is the case, the Civic Affairs Department (not the municipal Tax Office) sends a letter to that person. In the letter it states that if citizen does not pay, all of the rights to government services will be cancelled. A

communally set up process made possible by communal use of a communal provision of information.

A Dutch newspaper article (July 14, 2006) illustrated an example of lack of process management and bad management of information between municipalities. A Dutch widow received some nice flowers from her municipality because of her presumed fiftieth marriage anniversary to her husband. However, her husband had been deceased for seven years. The municipality in which her husband lived (in a nursing home) neglected to register the death of the man correctly and provide the other municipality with the information.

English (1999) shows that process-orientation and information quality is an international issue. In 1992 for example, 96,000 IRS tax refund checks were returned as undeliverable due to bad addresses. According to an audit comparing voter registration lists with the US Post Office change-of-address list, no fewer than one out of six US registered voters on voter registration lists have either moved or are deceased. Up to 1998, 20 percent of the 200,000-300,000 motor vehicle registration renewal notices did not reach the intended owner because of incorrect addresses.

A pilot

To develop the instrument in order to apply it in all municipalities, a pilot project was initiated in which five municipalities participated to test a set of nearly 20 questions, which make up the Thermometer. The focus was on five areas of expertise within the municipalities: the Registrar's department, the Social Benefits department, the Building and Housing department, the Local Tax department and the Fire department. For each area of expertise a set of three to five questions was created. The goal of the pilot project was to test the questions on clarity and usefulness. Additional goals were to look at what kind of results the questions would lead to and to see if the questions could be used in the future from a benchmark perspective. The municipalities answered the questions (where possible) and the researchers collected and compared the results. In most of the municipalities, a feedback session was arranged to discuss the results with the responsible managers.

Thermometer results and findings

The introduction of the authentic registrations is part of the earlier-sketched transformation and eGovernment agenda. The authentic registrations thus form a direct incentive to join government organization – including municipalities. Municipalities play an important part in this. The Thermometer prepares municipalities for what is to come when authentic registrations become legally binding and have to be implemented. The implementation of authentic registrations means a transition from sometimes more than forty registrations to one authentic registration – and to think municipalities have to implement at least three authentic registrations! This transition is by no means restricted to a mere change in the IT infrastructure: it requires a new way of working and thinking. The Thermometer makes clear to municipalities that implementing authentic registrations requires more than setting up a new IT infrastructure: it requires dialogue, agreements to be made (what to do with information and definition differences: who is responsible for specific information, who investigates possible errors in information, how to give feedback and to whom), fundamental redesign and improvement of processes and new competencies for civil servants and management of municipalities.

In short, the implementation of authentic registration requires: technological innovation, new perspectives, processes and cooperation between departments and organizations. During the pilot the Thermometer has proven to be a useful instrument in providing municipalities with insights into what is needed to come to authentic registrations, and three new ways of thinking, cooperating and working.

1. *Technological innovation*: Especially small municipalities will encounter problems on how to cope with the technological side of the story. The Thermometer in this respect shows municipalities a number of facets, which need to be addressed in order to successfully implement the registrations;

2. *Combining registrations*: Underlying the technological challenges, municipalities are faced with more challenges on a whole different level. Technological challenges often have a non-technological background and require solutions which technology alone cannot solve[1]. The Thermometer stimulates municipalities to think of how such a process should be set up and executed. It clarifies what actions should follow if differences are detected between information from different registrations;
3. *Cooperation between departments*: the Thermometer clarifies that cooperation is required in order to:
 - combine information;
 - solve differences; and
 - improve government as a whole.

After the phase of measurement, the Thermometer requires a feedback session to take place between the management of all departments, in which scores are discussed and explained and where needs for sharing information become evident. This feedback session initiates dialogue, which is a first step towards cooperation.

The thermometer has an additional advantage: it can help save costs and increase revenues because a number of questions helped to detect fraud, blind spots and inaccuracies in information and difficulties in processes. De Thermometer ensures that the necessity and objective of chain cooperation and process orientation become evident, in order to bring about a broad foundation within the organization.

During the project it has been emphasized, as will be done here as well, that the Thermometer is not meant as a way to hold someone accountable for bad scores. Instead, the Thermometer is meant as a first step towards proactive action: it should stimulate action rather than create a feeling of defensiveness. The thermometer does not have the objective to make judgments or to say a result is simply “good” or “bad”. Municipalities themselves should make this judgment. The objective of the Thermometer is to provide awareness and insight, which can be used to improve processes relating to authentic registrations. The management of different departments therefore should discuss the results in order to improve cooperation within the chain.

It is beyond the scope of this paper to describe and discuss all the results of the Thermometer questions in full detail. We will therefore describe some interesting findings, in order to give an impression of the Thermometer, and its effects.

imaginary houses

The question, “How many houses are registered as vacant?” is asked twice; it is addressed to the Registrar’s department and the Local Tax department. When compared, the two answers led to substantial differences in all five municipalities. One municipality came up with a difference of 900 houses (2,700 versus 1,800). This raised the question how it was possible that one department registered 900 vacant houses more than the other department. When looking closer at the discrepancy the main reasons were lack of cooperation (not using each other’s information) and unclear responsibilities. For example: houses, which were meant to be built but were not, were registered as a house due to the absence of feedback. Another example: if there is no clear process for registering the destruction of houses, this leads to removal of the houses in one registration, but not in the other. These errors can have important implications for public service delivery, enforcement and policy-making when unreliable information is used.

The findings of the Thermometer questions are discussed in an integral manner, with all managers of the five departments present. An interesting remark was made during one of the feedback sessions with a municipality that participated in the pilot. The Fire department came to the conclusion that they were interested in being notified by the Registrar’s Department when houses become vacant. The Fire department is interested in vacant houses because of the increased risk of fire caused by possible illegal activities, among

others. Thanks to the discussion of the results with the management of all five departments of that municipality, various departments started cooperating with one another, based on the findings.

Five passports in a year

The Ministry of the Interior in The Netherlands has created a policy for so-called “multiple-loss” of passports[2]. Citizens who apply for a passport several times a year points to possible illegal activities, so therefore special attention is needed from police and other enforcers (for example, from the Social Benefits Department). Citizens apply for a passport at the Registrar’s department, which makes it the best place to detect “multiple-losses” (“detection at the gate”).

Only one municipality could answer the question, “How many people applied for a passport at least twice a year during the past three years?” Some municipalities could answer it only for the past year and some municipalities could not answer this question at all. This indicates that in practice it is barely perceived as an issue for the participating municipalities, even though it is – or should be – very useful information for enforcers (not in the least enforcers from the same municipality). The scores varied from 13 to 135 “multiple-losses” a year. According to the findings, there have even been citizens who applied for a passport as much as five times a year!

Deceased people with social benefits

In all participating municipalities citizens were found who were registered by the Registrar’s department as deceased, moved, or emigrated but still received social benefits. The scores between the municipalities varied from two to 64 people. Some cases could be explained by the fact that it takes one or two months to tie up the procedure to terminate social benefits after someone dies but that still left a number of deceased citizens who received social benefits for a longer period of time.

Married?

Another question focused on the number of citizens registered at the Social Benefits department as “not married” and at the Registrar’s Department as “married”. These cases are an indication for possible fraud as well as inaccurate information and lack of cooperation. The answers varied from seven to 287 people. An interesting situation occurred in one of the municipalities. The application managers at first refused to answer the questions, because an automated connection (interface) was established between the Social Benefits system and the registration of the Registrar’s department. This led the application manager to the presumption that differences would be zero. After persuasion and investigation however, the results showed that there were in fact differences between the two registrations. Further investigation to what caused the differences led to the conclusion that civil servants of the Social Benefits department still based their actions upon the information provided by the applicants themselves instead of using the Registrar’s department registration. Furthermore they did not notify the Registrar’s department when they altered information. Despite the technical interface, the two departments did not cooperate, which made it easy for applicants to say that they were not married when applying for social benefits. This illustrates that technological linking is complementary for organizational cooperation and communication – not a substitute for it.

Companies with hazardous materials

One of the questions focused on the number of companies the Fire department had registered. In all five municipalities, no registration of companies was being maintained, except for those companies that work with hazardous materials or because of other specific criteria, which legally require registration. According to the Fire departments, there was no perceived need for registration of all companies because the companies of most interest to the Fire department were already registered.

On a periodical basis, the Fire department needs to check companies that have permits with regard to storage of, and working with, hazardous materials. The registration of these companies is being done solely by the Fire departments. This leads to a situation for instance, in which the Fire departments pay multiple visits a year to a company to check for safety measures, while the company went bankrupt in the meantime. Even though this information is available at other governmental organizations, there is no cooperation between the Fire departments and those organizations.

Return to sender

In addition to the national tax, Dutch citizens also pay local tax, such as real estate tax, sewer tax and so-called “dog tax”. Municipalities raise these local taxes. Every year owners (owner-part) and users (user-part) of real estate receive tax assessments for the real estate-tax[3]. One of the questions of the EGEM Thermometer focused on the tax assessments that were “returned to sender, address unknown”. Experience in one of the big cities in The Netherlands showed that a substantial part of these assessments were returned to sender to avoid paying taxes. In addition to these cases of deliberate fraud, other cases showed that citizens who should pay taxes simply did not receive the assessments, because of unqualified personnel and inadequate address information registration.

The answers on these questions varied from 100 to 15,000 assessments, partially depending on the size of the municipality. The “returned to sender” assessments are an implicit check on the quality of the information that is used. During the discussion with the involved parties in every municipality, it appeared that most municipalities did not register these assessments and did not know what was done with them. Most municipalities could not tell if there were procedures for the feedback of the information to the registration holders. In other words: in most cases, there was no feedback from the Local Tax department to the registration administrator about the poor quality of the information from his or her registration. Other processes in the municipality (such as social benefits and safety enforcement), however, continued to use this poor information.

Measuring with the Thermometer

During the pilot, it turned out that the *process* of using the Thermometer turned out to be of more value than the broadly based results of the Thermometer. The process of answering the questions turned out to have an impact of its own. The questions started an internal dialogue between management, IT-professionals and employees. Questions were raised such as “Why should we measure this?”, “Why don’t we know this already?” and “What’s the background of the results?” and “Why don’t we make more use of each other’s channels of information?” During the feedback sessions this dialogue continued. The dialogue took place on three levels, which relate to the concept of Strategic Alignment of Henderson and Venkatraman:

1. *Management – employees*. The first dialogue that started based upon the Thermometer was between management and employees. Management was faced with the “hard reality” of the workplace and employees noticed that management needs to be informed in order to make decisions.
2. *Business – IT*. The second dialogue that started based upon the Thermometer was between the “business” and the IT-professionals. The “business” often held the IT-professionals responsible for the (bad) results: “it’s an IT-problem”. The IT-professionals answered by telling the “business” that they were not clear in what they wanted from IT. By discussing the results it became clearer for both parties that they are depending on each other and that cooperation is needed instead of “blaming-and-shaming”.
3. *Between departments*. By discussing the results with different departments together, a dialogue started between the departments. Departments discussed the results together and the interdependencies between departments became clear. One administrator of the Civic Affairs registration for example never realized that so many departments were

depending on his registration. Another example was the fact that information that was available within the municipality was of great use for other departments. Because of the fact that departments did not know the information existed or that they had access to it the departments never used the information.

The main result for most municipalities was the dialogue that occurred during the process of the Thermometer. According to the Deming-circle (Plan-Do-Check-Act), this dialogue is needed in order to improve the organization on a structural level. Answering the Thermometer can be seen as the Check-step from the circle. In order to create improvements the Act-step is needed and in the case of the Thermometer this consisted of the integral dialogue that took place between all involved departments. Based on the dialogue, most municipalities took action in varying degrees. One municipality for example started immediate action, based on the concrete results, by focusing on the specific cases that were highlighted by the Thermometer. Another municipality started Business Process Redesign projects to fundamentally improve the processes, based upon what caused the faults that were highlighted by the Thermometer.

The pilot project showed that the Thermometer is a useful instrument for creating awareness and insight. It provides a useful first step towards the cooperation needed to make the introduced system of authentic registrations a success – and in a broader context, provide stimuli for the transformations of organizations. After the summer of 2006, the instrument will be made available as a Public Domain instrument. During the project, more possible Thermometer-questions were brought up. These questions may become available in a second version of the Thermometer.

Though the Thermometer has proven to be a useful instrument, it took the pilot municipalities a lot of time answering the questions and sometimes it was not even possible to answer a question. This confirmed the belief that this way of measuring quality of information and processes is relatively new to municipalities. The city where the idea for creating the Thermometer was born shows that this way of measuring with Thermometer-like questions can be used for governing purposes. Periodically, the management measures the quality of information and processes by using Thermometer-like parameters.

Managing with information quality-measures

In the municipality where the Thermometer has been developed, they have elaborated on the principle of it and on primary registrations. In this municipality a so-called “Car Wash” has been developed. The authentic registration of persons is present in several departments, which retrieve the information from it. These departments can check the validity and timeliness of the information in the authentic registration for use in their work processes. It is important for the quality of the information that there is sufficient feedback: That is to say, a department that discovers incorrect information, reports it to the administrator (in the case of the primary registrations of persons this is Civic Affairs). In the “Car Wash” the scores of all of the reports that have come back are kept track of by department. This “Car Wash” is dispersed among the employees involved and management. This renders important management information, because high as well as low scores with regard to the number of reports can be an important indication of the quality of the information and the functioning of the processes. Few or no reports can mean that the agreements between administrator and department are insufficiently being upheld. By means of the “Car Wash” this is apparent immediately.

Increased cooperation on the level of information-sharing requires high quality information. The quality of information can be looked at from different perspectives. Van der Pijl (1994) distinguishes a causal and teleological perspective. In the former perspective information quality is a result of the process that produces the information (including the process of building the information system that is used). Quality cannot be assessed solely on the information itself; the process also affects the quality. In the teleological perspective the quality of information is determined by the objective for which the information is intended to be used. Objectives can be derived from organizational, functional and personal goals.

Lee *et al.* (2002) distinguished four categories of information quality, based on earlier research:

1. Intrinsic information quality means that the information has quality in its own right.
2. Contextual information quality refers to the fact that information is used to perform a task and that this information has to be relevant, timely, complete and appropriate in order to add value.
3. Representational information quality means that the information must be readable, understandable and clear in order to be useful.
4. Accessibility information quality refers to the information systems that store and provide access to the information.

Van der Pijl (1994) and Lee *et al.* (2002) both refer to a distinction that is relevant in this context: the difference between data as a sole entity (causal perspective) and the use of that data in a context (teleological). Hu and Feng (2005) relate to this distinction by defining data quality and information quality and related quality dimensions:

- *Data quality*: Syntactic quality, inherent characteristics, intrinsic, contextual, ergonomic, accessibility; and
- *Information quality*: Semantic quality, pragmatic quality, pragmatic characteristics, representational, accessibility, representation.

The distinction between data and information is important when it comes to measuring or assessing quality. The measurement and assessment of data quality is an integral part in the field of database management. Within this field, multiple methods and tools have been developed to assess the quality of data and data storage. The measurement and assessment of information quality is less developed. Pipino *et al.* (2002) do not make a distinction between data and information quality, but they do make a distinction between objective and subjective measures to assess data quality. Objective measures refer to statistical and mathematical measurements. Subjective measures refer to tools that are used to reflect the needs and experiences of parties concerned. Literature shows that, when it comes to subjective measurement, questionnaires are commonly used.

The EGEM thermometer combines both objective and subjective measures. First, an objective measurement is made by comparing two registrations that store the same information or by extracting information from registrations based on some queries. Second, the results are discussed with the parties concerned (subjective measure) to measure the quality of the information from a teleological perspective. The results of the discussion can be seen from a causal perspective of information quality, because the discussion usually focuses on improvements in the information processes. The premise here is that a high quality information process will lead to high-quality information.

Concluding remarks

The paper started with an introduction of the relationship between organizational development (transformation) and IT. Transformation of organizations is more and more catalyzed by IT. Organizations need to be more and more process- and chain-oriented. This transformation also applies to governmental organizations. The goals set in the program “Andere Overheid” in The Netherlands require organizations to become process- and chain-oriented. Within this chain-orientation, information (sharing) plays a crucial role. This transformation requires high quality of processes and information and needs to be increased as more organizations depend on it and use it as a basis for enforcement, service delivery and policy-making. The transformation to process- and chain-oriented organizations starts with creating awareness and insight. The Thermometer shows what goes wrong with the current way of how processes are conducted and executed.

Based on the awareness and insight created by the Thermometer, municipalities articulated various propositions, depending on the local situation. Despite the contextual differences between the municipalities, it was clear that the transition could not be made on isolated issues. The transformation of municipalities applies to all aspects of the organization. The EFQM-model[4] classifies these aspects in the five following sections:

1. *Leadership*. The transformation of management in municipalities focuses on the shift from an internal activity orientation to an external result orientation. In the former situation, management participates in the daily work processes in which the more difficult cases will be handled by management. Management participates in “getting things done”. In the latter situation, management focuses on creating a setting (organization, process, civil servants-competencies, culture etc.) in which employees can “get the things done”. The focus rests not on the sole activities but on the results in the environment (for example chain partners and citizens). This also implies that departments should not be judged exclusively on the results of their own department, but also on results of the municipality as a whole. Focusing solely on departments stimulates sub-optimization of departments.
The current situation shows that municipalities manage on an ad-hoc basis. When an incident happens, management takes action. When transforming towards an external result orientation, management will need to manage on a process level instead of a case level. Structural management-information is necessary in order to manage the “condition” of the process. The Thermometer can be useful as an instrument to create structural management-information.
2. *Strategy and policy*. Strategy and policy will be more and more oriented on external partners and value-creation outside of the own organization. This requires an external focus of management and policy-makers. Instead of focusing on the internal organization alone, strategy and policy will have to focus on the impact of the organization (for example chain-partners and citizens) on the environment. The Thermometer shows on a concrete level where improvements can be made and where interdependencies exist between departments and between the organization and external partners.
3. *Processes*. In every municipality it became clear that one of the main causes of the results was the fact that departments operate as “silo’s” and processes are department-oriented instead of customer-oriented. Processes are optimized on a department level instead of optimized from an integral perspective. When a citizen moves for example, this is registered by the Registrar’s department, but the citizen has to inform other municipal departments of his move as well. The fact that a citizen moves has implications for example for the Parking department and the Social Benefits department. In an integral approach the Registrar’s department also notifies the other departments of the move.
4. *People*. Many responses during the feedback sessions came down to “I didn’t know that the other one is depending on my results”. Civil servants within municipalities will have to learn to look beyond the department boundaries and be aware of the fact that their work has implications for other civil servants at other departments as well. Job-rotation and integral teams (for example in the case of enforcement in the public space) are examples of means to improve the integral focus of employees.
5. *Partnerships and resources*. The “silo’s” that were mentioned earlier on also have their effect on partnerships and resources. In some municipalities departments could obtain IT-means (applications and database management systems) without having to worry about interoperability within the municipality. This hinders the exchange of information. Increased cooperation also implies that (financial) benefits do not occur in places where the investments are being made. When departments are judged solely on their own results, departments are hesitant to invest in (IT-) means from which the department will not profit.

An integral approach to means and partnerships is therefore necessary to make the transformation.

In a process- and chain-oriented setting, dependencies between (parts of) organizations are much larger. This means that errors have a much greater impact because it can lead to other errors at different places. Governing structures should therefore focus more on the quality of information and processes, and on quality management. When considering quality management, the Plan-Do-Check-Act-cycle from Deming, which was mentioned earlier, is very useful. The Thermometer focuses on the Check-step in the cycle. But even more essential is the Act-step, because only by acting upon the measurements, the organization can improve registrations and processes. During the pilot project it appeared that discussing the results in the presence of all departments during feedback sessions proved to be the real added value, because different departments were cooperating to create improvements. The feedback sessions ensured that the Check-step logically lead to the Act-step. The fact that the departments were in dialogue and cooperating was a first step towards process and chain orientation.

An important part of the philosophy behind the Deming-circle is the fact that the circle is not a one-time exercise but should be part of a structural organizational development. The Thermometer can be useful particularly in the Check- and Act-steps in the following three sections:

1. *Awareness and insight.* By discussing the results of the Thermometer with parties concerned, awareness and insight is created. Both on a management as well as on an individual level awareness and insight are input for the Act-step. Both top and middle management are able to articulate or enforce improvements (vision, strategy and policy) and individual employees are able to articulate concrete improvements on their own level. For municipalities awareness and insight on a political level requires special attention. The political context is important for the organizational priorities. The Thermometer-results can be used to create awareness and insight on a political level by focusing on issues that are politically relevant (safety, fraud, etc.).
2. *Guidelines for improvement.* During the discussion of the results the sources that are responsible are identified. With these insights, municipalities are able to direct the actions to make improvements. The Thermometer therefore can be used as a tool to identify possibilities on where to start improvements and what improvements are required.
3. *Process-management.* The Thermometer can also be used as a management tool such as a dashboard. By measuring the indicators from the Thermometer periodically, management can guard the quality of information and processes. When the results exceed a certain level, this is an indication that appropriate action might be useful.

By focusing on concrete results (which is also politically interesting), the Thermometer creates insight and awareness regarding the need to cooperate and to adopt a process and chain orientation. To implement authentic registrations, which will be used by all government organizations, improvement of the quality of registrations and processes is crucial. The Thermometer is a first step towards this improvement by showing what goes wrong (and which benefits are possible) in quite appealing terms. After all, which municipality wants to provide social benefits to deceased people?

Notes

1. Technology does not bring solutions: differences between records from two or more registrations, cannot be solved by technology, they require agreements, investigations, feedback, and other actions.
2. Normally a Dutch citizen app. lies for a new passport after five years.
3. Since January 2006 the user-part is abolished.
4. The Dutch equivalent of the EFQM-model is the INK-model. This is a model for organizational development that is commonly used within Dutch municipalities.

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