

Abstract

This article examines the diffusion and adoption process of an electronic service delivery innovation, which can be seen as an example of e-policing – called SMS-alert – among Dutch police forces. It is not only important to pay attention to the question *how* an innovation has spread – and the factors and mechanisms that stimulated or frustrated this process – but also to the reasons *why* an innovation has spread. Therefore, it is important to look at what kind of different meanings organizations attach to an innovation, especially in a public sector context. This research shows that functional, political and institutional patterns of meaning should be taken into account. In this case, the functional and political meaning dominated the appreciation of the innovation, although elements of the institutional meaning also played a role. Furthermore, the case shows that it is important to look at the – in diffusion studies underexposed – influence of diffusion policies and strategies, which have been conducted.

Key words

Service delivery innovation, e-policing, diffusion and adoption of innovations

THE DIFFUSION OF ELECTRONIC SERVICE DELIVERY INNOVATIONS IN DUTCH E-POLICING: THE CASE OF DIGITAL WARNING SYSTEMS

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INTRODUCTION

In July 2004 the police force of the Dutch region of Middle and Western Brabant introduced a new warning and communication system, called SMS-alert. By sending text messages to mobile telephones, this system enables the local police force to improve its service delivery to citizens in terms of community policing. SMS-alert can be seen as an example of e-policing. E-policing – as an aspect of the broader concept of electronic government – can be described as the use of computer and other (tele)communication technologies, like cell broadcasting devices, in order to deliver police services to citizens, businesses and policy employees (Lincolnshire Police 2003). A better, location based service is provided because citizens are informed or mobilized in an early stage, for instance on the missing of a child or a burglar on the run in a specific area. Moreover, SMS-alert facilitates a new safety concept, in which citizens are mobilized to act as co-producers of public safety. By being the eyes and ears of the police in the neighbourhood, citizens become engaged in the fight against and prevention of local crime.

Three years after its introduction SMS-alert has spread to several other Dutch police forces. By now, ten out of a total of twenty-six police forces have adopted SMS-alert and several other police forces have voiced their interest. This raises the following research question: How can the process of diffusion of SMS-alert as an electronic service delivery innovation among Dutch police forces be described, analyzed and explained in order to get a better insight in relevant factors and underlying mechanisms?

Two concepts are central to this study. First, the diffusion of an innovation can be defined as ‘a process in which an innovation is communicated through certain channels over time among the members of a social system’ (Rogers 2003: 5). It is important to make a distinction between the diffusion and the dissemination of an innovation. Whereas diffusion refers to the informal and ‘uncontrolled’ spread of an innovation, dissemination refers to formally and centrally driven spread (Greenhalgh *et al.* 2004: 191–92). Second, the adoption of an innovation can be defined as ‘the [voluntary and/or coercive] process through which [an organization] passes from first knowledge of an innovation, to forming an attitude towards the innovation, to a decision to adopt or reject, to implementation of the new idea, and to confirmation of this decision’ (Rogers 2003: 20). Organizations can adopt an innovation in varying degrees, ranging from copying an innovation without making any changes, to using an innovation as an inspiration (Dolowitz and Marsh 1998: 52–53).

In order to answer the research question it is important to take into account that most diffusion studies are rooted in the private sector (e.g., Rogers 2003), while at the same time the diffusion of innovations in the public sector has not been extensively studied. Moreover, in this literature, a functionalist perspective prevails and the emphasis lies on the question *how* an innovation has spread, and not so much on the question *why* an innovation has spread. In these studies, the relative advantage of an

innovation, in terms of efficiency and performance gains, is perceived as a *conditio sine qua non* for adoption (Greenhalgh *et al.* 2004: 13). However, in public administration efficiency and effectiveness are not the only values that have to be taken into account in the assessment of an innovation (Pollitt 2002: 482). Not only economic and performance considerations but also all kinds of social and political factors, values and considerations, that can also generate external pressure, play an important role in the adoption decision of an organization (Greenhalgh *et al.* 2004: 102). Hence, the primarily functionalist literature insufficiently acknowledges the fact that the cultural environment of an organization, as a reservoir of meanings, which influence the legitimacy of organizations, can strongly influence the decision to adopt an innovation, especially in the public sector (Silverman 1971; March and Olsen 1989; Scott 2001). The perceived functional and economic meaning of an innovation is just one of many meanings that should be taken into account. This implies a more cultural or even constructivist oriented approach to the diffusion of innovations in the public sector in order to understand the different kind of meanings and the process of meaning creation that influence the adoption of an innovation (Pollitt 2002; Greenhalgh *et al.* 2004).

What does this imply for the structure of our article? First, some concepts and theories that are relevant to the study of innovation diffusion and adoption processes are discussed in order to understand the different kind of meanings that play a role in the diffusion and adoption of innovations. Next, inspired by several bodies of knowledge, a conceptual framework for the diffusion and adoption of innovations in the public sector will be presented. This framework enables us to discern relevant factors and relations between them, which help us to describe and analyze the diffusion and adoption process of SMS-alert. Finally, some conclusions are presented.

THEORETICAL BACKGROUND

In public administration two important bodies have contributed to our knowledge on the spreading of innovations from one governmental unit to another. These are the business studies diffusion literature (e.g., Rogers 2003) and the political science policy transfer literature (e.g., Stone 1999; Dolowitz and Marsh 1998). Whereas the diffusion literature focuses on examining the diffusion of innovations among American states by using merely quantitative research methods, the policy transfer literature focuses on policy diffusion in Europe by using qualitative research methods (Newmark 2002). Despite these differences, these two bodies of theory also have some similarities. Many of the same agents and processes are involved in the spreading of an innovation (Newmark 2002). They both explain the diffusion of an innovation by (primarily) referring to the influence of the nature of the innovation and the characteristics of the (potential) adopter. They only pay limited attention to the influence of the environment of an organization on its innovation adoption decision (Pollitt 2002).

A distinction can be made between two theoretical approaches of innovation diffusion: a functional approach and a cultural or constructivist approach (Pollitt 2002; Greenhalgh *et al.* 2004). According to the functionalist approach – which is dominant in the diffusion and policy transfer literature – adoption decisions are (primarily) driven by functional imperative of efficiency gains (Rogers 2003; Dolowitz and Marsh 1998). An organization's adoption decision is primarily based on a so-called 'logic of consequence': the assumption that organizations make choices among alternatives by evaluating their consequences in terms of prior preferences (March 1994: vii).

On the contrary, according to the cultural or constructivist approach, adoption decisions are not so much based on 'economical fitness', but on 'social fitness' or considerations of legitimacy, symbolism and fashion (DiMaggio and Powell 1991; Kingdon 1995). An organization's adoption decision is primarily based on a so-called 'logic of appropriateness': organizations have identities and/or fulfil roles by recognizing situations and following rules that match appropriate behaviour to the situations they encounter (March 1994: viii). Especially for public organizations this is important, because public organizations are political organizations in which legitimacy is based on the way to which state organizations are able to handle all kinds of societal challenges and problems for which they have to gain support, like the fight against crime and improving the social quality of neighbourhoods (March and Olsen 1989: 38; Stone 2002). The identity of public organizations is derived from this role. Important for the adoption of innovations is the idea that innovations should not only provide for mere efficient solutions but appropriate ones for which (external) public and political support exists (March and Olsen 1989: 160).

However, in order to fully understand diffusion processes in the public sector, it is important to combine the two approaches (March and Olsen 1989; Tolbert and Zucker 1983; Pollitt 2002) as we will show in our conceptual framework. Whereas the functionalist diffusion and policy transfer approach demonstrates the importance of innovation in terms of presenting a qualitative discontinuity with the past (in terms of relative advantage) in relation to specific, rather objective, adopter characteristics, the cultural or constructivist approach puts adoption in a broader perspective and emphasizes the different reasons and considerations for adoption that are much more related to the external environment. This environment is seen as a reservoir of different meanings, which are being shared – to some degree – by the organizations that are being part of a specific policy sector (Silverman 1971). From a cultural perspective, a policy sector refers to the existence of a community of organizations that partakes of common meaning systems and those participants interact more frequently and faithfully with one another than with actors outside the policy field (Scott 2001: 56). The way in which organizations embrace these meanings influences the way in which an organization is being perceived as legitimate. By adopting an innovation an organization tries to show its legitimacy in order to achieve conformity with (changing) patterns of meaning in its environment (DiMaggio and Powell 1991).

TOWARDS A CONCEPTUAL FRAMEWORK

Based on the insights from the theories discussed above, this section presents a conceptual framework for the diffusion and adoption of innovations in the public sector that integrates a functionalist and a cultural or constructivist approach, in which three patterns of meaning play an important role. Next, it is important to take into account a number of other factors that can also stimulate or frustrate the process of diffusion and adoption. These factors refer to the diffusion strategy, the organizational characteristics of potential adopters and the network characteristics.

Three patterns of meaning

At the heart of innovation diffusion processes in the public sector lies the exchange of innovation information and experience among the organizations in a network (Rogers 2003: 233). In this complex and non-linear process of communication and learning, organizations reduce uncertainty regarding an innovation. They create and share information about the innovation with one another in order to reach a (mutual) understanding on the (different) meanings of the innovation (Rogers 2003: 5). In other words, this communication and learning process can be understood as an (iterative) process of sensemaking, in which organizations express, test and re-frame their perceptions about an innovation in order to reduce the ambiguity and equivocality about the possible meanings of the innovation (Weick 1995). It is important to recognize that different patterns of meaning play an important role.

Functional meaning

Based on the functionalist literature, the first type of meaning of an innovation is (primarily) based on the logic of consequence and refers to the importance of the (perceived) characteristics of an innovation in terms of presenting an attractive discontinuity with past experiences (Dolowitz and Marsh 1998; Rogers 2003; Osborne and Brown, 2005). The functional meaning of an innovation is derived from six – empirically interrelated but conceptually distinct – characteristics (Rogers 2003: 16 – 17). 1) Relative advantage or the degree to which an innovation is perceived as better than the idea it supersedes (in economic terms, but also in terms of social prestige); 2) compatibility or the degree to which an innovation is perceived as being consistent with the existing values and norms, past experiences, and needs of potential adopters; 3) complexity or the degree to which an innovation is perceived as difficult to understand and use; 4) triability or the degree to which an innovation may be experimented with on a limited basis; 5) observability or the degree to which the results of an innovation are visible to others; and 6) reinvention, or the degree to which an innovation can be changed or modified by a user in the process of adoption and implementation.

Political meaning

The second type of meaning refers to the political environment in which a public organization operates. In this environment legitimacy considerations play an important role. The political meaning of an innovation is (primarily) based on the logic of appropriateness and refers to the opportunity structure an innovation can provide in order to deal with all kinds of societal challenges for which a government has to provide a solution. In the public sector, competing problem definitions, approaches and solutions (incremental and innovative ones) are constantly trying to get the attention of political and other stakeholders. For innovations to be adopted, (elements of) these streams of actors, problems and solutions have to be coupled. In other words, a so-called ‘window of opportunity’ has to be created. The opening of a window can be triggered by a change in one of the streams (e.g., a change in the perception of a problem or a possible solution), by a focusing event that draws attention to a problem (like elections or public pressure), or by so-called policy entrepreneurs or change agents that ‘soften-up’ policy communities to gain acceptability for an innovation (Kingdon 1995).

Institutional meaning

The third type of meaning is also derived from the logic of appropriateness and refers to the notion of ‘isomorphism’. Isomorphism is “a constraining process, that forces one unit in a population to resemble other units that face the same set of environmental conditions” (DiMaggio and Powell 1991: 66). As more and more organizations adopt an innovation – either through coercion or imitation – the innovation becomes a legitimate mode of operation. A distinction can be made between three types of isomorphism (DiMaggio and Powell 1991). Coercive isomorphism refers to formal power (like legislation) and informal power (like peer group pressure), which is used to adopt specific changes. Mimetic isomorphism results when an organization copies an (often successful) example. Normative isomorphism occurs when an organization adopts an innovation because the innovation is advocated by the professional and scientific community of which the organization is a member.

Enablers and barriers

Although an organization can attach different meanings to an innovation, which makes an innovation an attractive one to adopt, this does not automatically imply that adoption will occur. Research shows (e.g., Scott 2001; Rogers 2003) that other factors should also be taken into consideration in order to get a better, more detailed understanding of these rather complex adoption processes. Attention should be paid to the diffusion policies which have been pursued to promote an innovation, to the organizational characteristics of potential adopters and to the characteristics of the network of relations among the organizations involved.

Diffusion policy

A first category of factors and mechanisms that explains the adoption of an innovation refers to the diffusion policy. In the traditional diffusion literature, this factor is rather underexposed. However, inventors, (early) adopters and intermediary organizations – such as ministries, knowledge centres and commercial organizations – can play an important role in spreading an innovation. As Downe *et al.* (2004: 551) state, ‘the transfer of knowledge and the creation of innovation depend on the capacity and expertise of both the recipient organization and the originating organization’.

The diffusion of an innovation is influenced by the degree to which the inventor, (early) adopters and/or intermediary organizations are willing (in terms of attitude) and able (in terms of resources) to share their knowledge and experience about the innovation. This willingness and ability to share knowledge and experience has to be translated into a so-called diffusion- and codification strategy in which explicit dissemination activities are formulated (Rashman and Hartley 2002; Downe *et al.* 2004). This strategy should be both focused on the codification and distribution of gained knowledge and experience – for example by making brochures, protocols and project plans available – and on the creation of a mutual process of communication and learning – for example by offering potential adopters the possibility to exchange information and experience with adopters at a conference or by organizing site visits. The use of ambassadors – individuals or organizations that actively promote the adoption of an innovation – can also be part of a diffusion strategy.

Finally, the diffusion and adoption of an innovation is influenced by the attention the media pays to an innovation (Kingdon 1995; Newmark 2002; Rogers 2003), for example because an innovation has won an award.

Organizational characteristics of adopters

A second category of factors and mechanisms that explains the adoption of an innovation refers to the structural and cultural characteristics of (potential) adopters (Scott 2001; Newmark 2002; Rogers 2003; Greenhalgh *et al.* 2004). First, the adoption of an innovation is influenced by the organizational size. For larger organizations it is relatively easier to mobilize financial and human resources (organizational slack) for the adoption and implementation of an innovation.

Moreover, size sometimes is a proxy for other determinants, including centralization, complexity – which refers to the degree of specialisation, functional differentiation and professional knowledge – formalization and interconnectedness (Greenhalgh *et al.* 2004: 20; Rogers 2003: 412). Also, an organization’s receptivity to change – which refers to features such as leadership and a climate conducive to experimentation and risk-taking (Greenhalgh *et al.* 2004: 21), can influence the adoption decision. According to Burns and Stalker (1961), so-called organic organizations – flexible, adaptable organizations that are characterized by decentralised decision-making structures, semi-autonomous departments and units, a high degree of professionalism and strong

interpersonal networks are more willing and able to adopt an innovation than so-called mechanistic organizations. Hence, the formal, centralized and rigid structure and culture of the latter hinders change and frustrates the possibility of trial and error, which hamper the ability to consider the adoption of innovations.

Finally, the adoption of an innovation is influenced by the degree to which policy entrepreneurs (Kingdon 1995), champions or boundary spanners (Rogers 2003) – key individuals who have significant social ties both within and outside the organization and who are able and willing to back and promote the innovation – are present in an organization and are able to create or open a policy window for the innovation.

Network characteristics

A final category of factors and mechanisms that explains the spread of an innovation refers to the network characteristics (Dolowitz and Marsh 1998; Scott 2001; Rogers 2003). An organization's decision to adopt an innovation depends on ideas and information gleaned from outside – on what other organizations in the (social) network are perceived to be doing, and on the mutual sense-making that occurs between organizations in relation to an innovation (Greenhalgh *et al.* 2004: 23).

First, the willingness and ability to exchange innovation information and experience among the members of a network is influenced by the degree to which organizations are linked by (high quality) interpersonal networks. For example, a lack of mutual trust or a high degree of inter-organizational competition will hinder the exchange of knowledge and experience.

Second, the exchange of knowledge and experience is facilitated by geographical (Berry and Berry 1990) and cultural proximity (Dolowitz and Marsh 1998), because organizations tend to copy innovations from comparable (homophilous) organizations, like their neighbours (Berry and Berry 1990) or organizations that share the same frame of reference (Rogers 2003). However, a shared frame of reference or ideology can also hinder the adoption of an innovation, because cultural closeness can lead to the reproduction of the existing 'modus operandi' (Scott 2001; Rogers 2003).

Finally, interdependency – the degree to which the organizations in a network can control each other – can serve as an incentive to adopt an innovation, because interdependency can make an organization feel 'forced' to adopt an innovation (DiMaggio and Powell 1991; Rogers, 2003). An organization is more likely to adopt an innovation if more of the other organizations in the same network adopted previously (Rogers 2003: 364).

RESEARCH STRATEGY

In order to gain insight in the process of diffusion and adoption of SMS-alert among Dutch police forces, an in-depth case study was conducted. By using this case study research strategy, the holistic and meaningful characteristics of the case could be

retained and patterns of meaning, based on the interactions between relevant actors, could be reconstructed (Yin 2003); interactions and meanings which play a vital role in our approach of the diffusion and adoption of innovations in the public sector.

The selection of the case was based on two criteria. First, as argued above, following the logic of appropriateness, the adoption of innovations by public sector organizations is strongly influenced by (developments in) their political and institutional environment (March and Olsen 1989). Therefore, a case was selected from a policy sector that is currently highly politicized: safety. Hence, we expect that not only the logic of consequence but also the logic of appropriateness would play a role in the decision to adopt an innovation. Second, mainly due to extensive media attention, SMS-alert is an innovation that is rather widely known in the Netherlands. Also, the system has won one innovation award and was nominated for a second award. This raised the question whether this familiarity with (the success of) SMS-alert had led to the wide adoption of the innovation.

The qualitative data for the case study are triangulated (Yin 2003) and come from the study of relevant policy documentation, websites and in-depth interviews. Using a semi-structured schedule, ten different stakeholders were interviewed, working in different police forces and at different levels. First, the policeman who invented SMS-alert, the project manager of SMS-alert in Middle and Western Brabant who was set the task to spread the system, and his contact at the technology supplier of SMS-alert. Next, the project managers of four police forces that adopted SMS-alert, one police force that initially decided to reject the innovation but eventually did adopt SMS-alert, one police force that considered adoption of SMS-alert but eventually decided not to adopt the innovation (yet) (active rejecters), and three police forces that not (yet) really considered the use of SMS-alert (passive rejecters or non-adopters) (Rogers 2003: 178). The data are collected from March 2006 until July 2007. Based on these data, the diffusion and adoption process of SMS-alert among Dutch police forces has been reconstructed, the different patterns of meaning which have been attached to the innovation have been described and analysed and relevant factors and mechanisms that influenced the diffusion and adoption process were identified.

FINDINGS

This section presents the findings from the case study. In the presentation of our findings we follow the different elements of our conceptual framework.

Diffusion Policy

A first category of factors and mechanisms that explains the diffusion and adoption process of SMS-alert concerns the diffusion policy. This category refers to the attitude

and resources of inventors, (early) adopters and intermediary organizations towards knowledge sharing and its translation into a diffusion- and codification-strategy.

First, the police force of Middle and Western Brabant was very willing and able to share its knowledge about SMS-alert. After the invention of the system by a policeman in November 2005, a project manager (ambassador) was appointed who was set the task to implement SMS-alert in the region of Middle and Western Brabant and to diffuse the innovation to other police forces. This project manager developed – partially by means of grants of the Ministry of Internal Affairs and the province of Northern Brabant – an active diffusion strategy. This strategy was not only focused on the distribution of (codified) knowledge and experience by making the project plan, a brochure, protocols and an instruction movie available. By giving presentations to interested police forces and offering advice to (potential) adopters on the start of a pilot, the project manager also explicitly created a mutual process of communication and learning, in which the different meanings of SMS-alert could be explored. For example, one police force that initially rejected the innovation because it had recently developed its own system, eventually decided to adopt SMS-alert, because the project manager had personally shown how to combine the two systems.

However, in September 2006 both the project manager and the diffusion of SMS-alert were transferred to VTS Netherlands, an organization that is set the task to uniform the information systems of Dutch police forces. Although VTS Netherlands is interested in SMS-alert, due to limited resources, the organization has not prioritized the encouragement of the nationwide introduction of SMS-alert. Therefore, at this moment, the project manager is advocating the diffusion of SMS-alert on his own initiative (in his leisure time), for example by the recent introduction of a (structural) national SMS-alert meeting.

Technology suppliers often play an important role in the diffusion of technology driven innovations like SMS-alert, because they have a commercial interest in spreading the innovation. However, in this case, the role of technology supplier Emexus in spreading SMS-alert was very limited, due to strict agreements with the police force of Middle and Western Brabant.

Finally, the extensive (local, regional, national and international) media attention for SMS-alert made the innovation widely known and stimulated its diffusion. Due to the successful contribution of SMS-alert to public safety, at some police forces, local politicians pressed for the adoption of SMS-alert. As stated by one of the respondents: 'It is difficult to indicate exactly how we became familiar with SMS-alert, but we did hear about the system in the media several times'. Also, SMS-alert won one innovation award, and was nominated for a second award.

Despite the partial successful diffusion efforts that have been made by the police force of Middle and Western Brabant, how did other police forces assess the possible meanings of SMS-alert? Given the potential of SMS-alert, how did they value this kind of e-policing?

Functional meaning

The functional meaning of an innovation is based on the logic of consequence and refers to the influence of the (perceived) characteristics of an innovation on its adoption. First, the (perceived) relative advantage of SMS-alert strongly influenced its adoption. The adopters of SMS-alert stated that ‘the evaluation of the pilot in Middle and Western Brabant clearly showed the advantages of the innovation for both the police force and its citizens’. For example, several missing children and a stolen scooter had been found thanks to SMS-alert. As discussed above, these successes were also made visible by the project manager and by the media. Moreover, these advantages were combined with (relatively) low initial investments and (relatively) low costs for using the system.

However, the relative advantage of the innovation also influenced the decisions of the rejecters. Several police forces are participating in the pilot of an innovation highly comparable to SMS-alert, called Burgernet. Other police forces are themselves currently developing a system that is rather comparable to SMS-alert, but more closely connects to their specific needs and situation. As a result, for these police forces, at least at this moment, the advantages of SMS-alert are not high enough. In other words, the diffusion of SMS-alert was hindered by the competition with innovations – especially Burgernet – that are comparable to SMS-alert, also in terms of their advantages. At the same time, some of the police forces that are involved in the Burgernet pilot recently decided to adopt SMS-alert in the meanwhile, because ‘contrary to Burgernet, SMS-alert is easy and can be implemented in a short time span’.

Second, the adoption of the innovation was not handicapped by its complexity or its compatibility. Because its introduction requires adapting existing systems and rethinking the distribution of responsibilities among officials, the adoption of SMS-alert can be regarded as rather complex. As stated by a respondent: ‘At first sight, the innovation seems rather simple, but in practice it turns out to be much more complex, for example because of the many officials that are involved’. However, according to several late(r) adopters, this complexity was (partly) reduced by the diffusion strategy of the inventor that made (codified) knowledge and experience on the introduction and use of SMS-alert available to (potential) adopters. As indicated by a respondent: ‘The system can almost immediately be introduced, because it is ready-made’.

Third, this case shows the importance of trialability of an innovation. It demonstrates that test results reduce uncertainty about (the advantages of) an innovation. Many police forces – especially the smaller ones – waited for the results of the pilot in Middle and Western Brabant before they decided on adopting SMS-alert. Moreover, the adopters also wanted to test the system themselves, before introducing it in every district of their police forces. Therefore, almost every adopter decided to introduce SMS-alert in phases (per district). Finally, the importance of test results is also demonstrated by the fact that several police forces state that they decided to adopt SMS-alert instead of Burgernet, because ‘SMS-alert, as opposed to Burgernet, is an all ready and proven technology’ and ‘the system does not have growing pains anymore’.

Finally, the degree to which SMS-alert can be modified to the specific needs and characteristics of individual police forces did not handicap its adoption. Since police forces are free to decide which functions they ascribe to SMS-alert, several examples of reinvention can be found in this case. At the same time, this possibility for reinvention is limited by the fact that every adopter of SMS-alert has to sign a contract with the police force of Middle and Western Brabant in which agreements are made about product changes and the acknowledgement of intellectual property. However, according to the respondents, this did not hinder their adoption decisions: ‘Why would you want to change a successful model?’

Political meaning

The political meaning of an innovation is based on the logic of appropriateness and refers to the opportunity structure an innovation can provide. In this case, the political meaning of the innovation was very important. On the one hand, due to a number of political and societal developments, a policy window was created for SMS-alert at many police forces, which generated support and finances for the innovation. The improvement of safety – as indicated by the Cabinets program *Towards a safer society* – and the improvement of citizen satisfaction are goals that are high on the political and societal agenda. For the Dutch police forces, these ambitions are reflected in the realization of the so-called *National Plan Dutch Police 2003–2006* and the *Regional Covenants Police*. In these plans, performance agreements are laid down between the police forces and the Ministers of Internal Affairs and Justice. By adopting SMS-alert, police forces could show that they contributed to the goals of improving safety and citizen satisfaction and increase their performance and legitimacy. As stated by one of the police forces: ‘SMS-alert can contribute to the development of a set of instruments which can help us to further shape the processes of informing, advising and involving citizens in a digital environment. This fits with our aspiration to increase citizen participation in public safety’.

On the other hand, the policy window for SMS-alert was rather small, because the system had to compete for support and resources with highly comparable innovations, primarily Burgernet. Several police forces did not adopt SMS-alert (yet), because they participated in a Burgernet pilot. Other police forces decided to wait for the test results of this Burgernet pilot before investing their (limited) resources. At the national level, SMS-alert also had to compete with Burgernet for support and resources. Recently, in its coalition agreement, the Cabinet announced the nationwide introduction of Burgernet. Also, the Board of Commissioners is advocating the integration of SMS-alert and Burgernet by considering SMS-alert as the text message application of Burgernet. Moreover, as stated above, at this moment the focus of VTS Netherlands – as laid down in the policy document *Beckoning perspective* – is on uniforming the information systems

of Dutch police forces, which means that resources for (the adoption of) innovations are limited.

However, within some police forces, policy entrepreneurs facilitated the opening of a policy window for SMS-alert. An example of these policy entrepreneurs are the so-called innovation brokers of one of the police forces. These innovation brokers are explicitly set the task to identify interesting ideas and innovations – such as SMS-alert – inside and outside their own police force. By identifying these innovations and advocating them at their own police force they created a policy window for these innovations. Also, at the implementation of SMS-alert, many project managers served as entrepreneurs, because they educated their officials in using the innovation.

Institutional meaning

The institutional meaning of an innovation is based on the logic of appropriateness and refers to the notion of isomorphism. For the diffusion of SMS-alert, mimetic isomorphism has been very important. As indicated, the evaluation of the pilot in Middle and Western Brabant showed the (perceived) advantages of the innovation. Stimulated by the political and societal developments described above, other police forces wanted to mimic this success: ‘By adopting SMS-alert we follow the successful example of Middle and Western Brabant’. Moreover, this mimicking was facilitated by the availability of (codified) knowledge and experience about the innovation.

Next, this mimetic isomorphism was stimulated by some coercive and normative isomorphism. Coercive isomorphism resulted from the fact that the Ministry of Internal Affairs – linked to a subsidy for the development of SMS-alert by the police force of Middle and Western Brabant – insisted on regarding SMS-alert as a national example. Also, SMS-alert won one innovation award and was nominated for a second award. Hence, soft political pressure was generated which should stimulate police forces to adopt SMS-alert.

Some normative isomorphism resulted from the large number of professional networks in which experiences with SMS-alert were discussed and relevant knowledge was exchanged. For example, there are several collaborative efforts of – geographically linked – police forces. Some of these collaborative efforts discussed the possible adoption of SMS-alert and sometimes they even made joint agreements.

As shown, at this moment, coercive and normative isomorphism seem to play a minor role in the diffusion of SMS-alert in comparison to the functional and political meaning of SMS-alert. Although the compulsory legitimacy of SMS-alert is growing, police forces still feel free to make their own decision with regard to the adoption of SMS-alert. For now, due to political pressure, coercive isomorphism especially seems to hold for the adoption of Burgernet. However, SMS-alert is still a relatively new innovation and its diffusion process is not crystallized. Several police forces have not yet

decided about the adoption (or rejection) of SMS-alert. Consequently, the importance of coercive and normative isomorphism – and of the institutional meaning of SMS-alert – may change over time, while its effects will become more dominant when Burgernet, and SMS-Alert as the text message application of Burgernet, will be implemented nationwide.

Organizational characteristics of adopters

The adoption of an innovation is also influenced by the organizational characteristics of (potential) adopters, such as their size, formal structure and innovation preparedness. First, the size of the police forces influenced the ability to free time, people and finances for the adoption and implementation of SMS-alert. Many early adopters are larger police forces for who it was (relatively) easy to free the resources necessary for a pilot. Several smaller police forces, on the other hand, are still trying to arrange the resources – especially time and people – that are required for the adoption and implementation of SMS-alert. One of the non-adopters stated: ‘We do not have the financial and human resources to start a pilot by our own. Unless we can join another (larger) police force that takes the initiative, it is too difficult to adopt these kinds of innovations’. Other (often smaller) police forces decided to await the developments concerning the nationwide introduction of Burgernet before investing their (limited) resources.

Moreover, at several police forces the adoption (and implementation) of SMS-alert was endangered by the high turnover of project managers, sometimes because being a project manager only was a temporary job. Several respondents also pointed out that often the control of SMS-alert is too much concentrated: ‘When the project manager is on a holiday, SMS-alert is temporarily not being used’.

Second, the formal structure refers to the layered construction of police forces. Many officials are involved in the adoption – and especially the implementation – of SMS-alert. In order to make full use of the system, these different officials all have to become familiar with the innovation and convinced to use it. Therefore, an important role was given to the SMS-alert project managers in educating these officials.

Finally, the innovation preparedness of the police forces influenced their adoption decisions. Although examples of (institutionalized) innovation can be found at several Dutch police forces – such as the innovation brokers discussed above or the innovation workgroups and departments that are part of some police forces – innovation is not entirely anchored, especially at the national level. Recently, the (inofficial) Board Research and Innovation stated that ‘police forces make limited use of new technologies that are available. Innovation takes place to fragmentally, a general overview is lacking, while the national Board of Chief Commissioners has no clear vision on how to deal with innovations’. Therefore, both the Board and individual police forces argue in response to this case that a more structural and less fragmented exchange of innovative

ideas among as well as inside police forces should be organized to exploit ideas like SMS-alert.

Network characteristics

A final category of factors and mechanisms that influences the diffusion and adoption of innovations refers to the network characteristics. The respondents indicated that different types of officials regularly meet and discuss innovative developments (like SMS-alert), for example during meetings, site visits and conferences. Also, some police forces extensively use intranet. Moreover, knowledge and experience are for example exchanged in the geographically linked collaborative efforts mentioned above. As indicated by one of the respondents, this exchange of ideas sometimes influences the adoption decision: 'The fact that our police force borders two police forces that have already adopted SMS-alert makes it logical to adopt the same system'. Moreover, the SMS-alert project managers regularly meet at the recently introduced national SMS-alert meeting and some of these project managers also exchange knowledge and experience with project managers of comparable innovations, like Burgernet.

This exchange of knowledge and experience about SMS-alert among police forces is partly facilitated by their shared frame of reference: due to political and societal developments, they want to improve their performance and legitimacy by improving safety and citizen involvement. At the same time, the police forces differ in size (and linked to this – willingness and ability to innovate), working method and problems they are confronted with, which hinders standardization. Moreover, Dutch police forces do not have a tradition of collaboration and knowledge sharing, which could explain why the exchange of innovative ideas among police forces is still quite fragmented. Only since a few years – after a reorganization - they have started to intensify their collaboration, for example by jointly organizing processes.

Finally, attention should be given to the interdependency of the police forces, which could also influence the decision to adopt. Although several police forces discussed the adoption of SMS-alert and some of them even mimicked each other, the interdependencies between them did not determine each other's adoption decisions. SMS-alert as such is primarily used within one region and does not generate interregional coordination between the different police forces.

CONCLUSIONS

This article examined the diffusion and adoption of a service delivery innovation – called SMS-alert – among Dutch police forces. Based on both a functional and a cultural c.q. constructivist approach, a conceptual framework for the diffusion and adoption of innovations in the public sector was developed. By using data from documentation,

websites and interviews, the process of diffusion and adoption of SMS-alert was reconstructed and the factors and mechanisms explaining this process were identified. This case study shows that the diffusion and adoption of innovations is a rather complex phenomenon of which understanding cannot be reduced to a simple set of functional or instrumental considerations, especially if we want to understand *why* an innovation has been adopted. It is not only the relative advantage of an innovation in comparison to older practices that makes the difference. Furthermore, the framework we used, can be seen as a valuable and workable instrument that helps us to understand the complexity of the diffusion and adoption process of innovations in the public sector.

At this moment, SMS-alert can be regarded as an innovation that has diffused rather rapidly among Dutch police forces: out of a total of twenty-six, ten police forces have adopted SMS-alert and several other police forces are considering adoption. What have been the most striking factors that explain the success of the diffusion of SMS-alert?

The diffusion was strongly stimulated by the active diffusion strategy of the police force of Middle and Western Brabant. The project manager enabled police forces to exchange knowledge and experience and to express, test and re-frame their perceptions on SMS-alert. Also, the existence of different kinds of professional networks played an important role in the diffusion of SMS-alert. All these factors created a situation in which possible adopters could explore the different meanings of SMS-alert in a process of communication and mutual learning, which was also an explicit goal of the diffusion strategy. Our research has shown that it is important to pay more attention to the (implicit or explicit) diffusion strategy that the original innovator or intermediaries pursue in order to promote an innovation, which has also important policy implications. Diffusion strategies which are only focused on the exchange of information regarding the advantages of an innovation – using brochures, websites, etcetera – will not be so successful. Diffusion strategies – based on the willingness to share and codify gained knowledge and experiences – that create a situation in which possible adopters can explore the different meanings of an innovation and can learn from each others experiences and uncertainties, may be more successful.

Furthermore, an important factor in the adoption of SMS-alert, which is related to the organizational characteristics of potential adopters, is size. The size of some police forces, especially the early adopters, enabled them to free time, people and financial resources.

In the process of communication and learning about the added value of SMS-alert, we have noticed that it is essential not only to look at the functional meaning of an innovation but also at the political meaning of SMS-alert. SMS-alert provides an opportunity structure that enables police forces to show that they are able and willing to meet political and public concerns regarding the fight against local crime. The political attractiveness of SMS-alert was strengthened by the functional meaning of the innovation, especially its (visible) advantages, the availability of test results and rather low costs were important. Finally, the institutional meaning of the innovation was also present in this case, but in comparison to the functional and political meaning of the

innovation, it did not play a decisive role. The institutional meaning was to some extent created through the combination of the political and functional meaning. Stimulated by the public and political concern for public safety and convinced by the obvious functional advantages of the system, other police forces were quite eager to copy the success of Middle and West-Brabant, in order to be perceived as a policy force which was able to meet the safety needs of citizens and local politicians, which adds to their legitimacy.

However, we expect that the institutional meaning of the innovation will increase. Recently, both the Cabinet and the Board of Commissioners have announced the nationwide introduction of Burgernet and SMS-alert being the text message application of Burgernet. As a result, police forces will be forced to adopt both systems. This development has pointed us at the necessity to insert another factor in the conceptual framework, which is important if it is to be used in other diffusion studies. It is important to pay attention to competing, similar looking innovations and the opportunity structures they provide, as well as to understand the 'policy windows' their advocates use.

In short, the case confirmed the value of combining a functional and a constructivist approach in examining the diffusion and adoption of innovations in the public sector. It shows that for the explanation of the diffusion and adoption of innovations in the public sector, different patterns of meaning, based on the logic of consequence – stressing functional efficiency and performance benefits - as well as on the logic of appropriateness – stressing political values like support and legitimacy - are important.

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