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Unravelling Organizational Consequences of PSI Reform

An In-depth Study of the Organizational Impact of the Reuse of Public Sector Data

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Abstract

The success of Google Maps suggests that free access to public sector information (PSI) contributes to a prosperous economy. While there has been considerable attention for legal and economical considerations concerning the implications of policies on public sector information (PSI), also labeled as open data (OD), organizational consequences regarding the nature and shape of the public sector are hardly anticipated. We focus on organizational settings by comparing policies and outcomes of PSI reuse in EU member states and are looking into distinct market sectors within the European realm by making analyses of both a Dutch national case and a cross-national case.

In many discussions on PSI reuse, government is treated as a unitary phenomenon with a single voice. We found considerable differences among EU member states concerning the implementation of PSI policies and that there are indications that they are connected to the nature of the public sector in a specific state. Furthermore, we discovered that where specific actions stimulate the creation of arenas of opportunity with both public and private parties gathered around a specific information theme, new innovative arrangements emerge. Therefore we suggest that policies on PSI reuse to stimulate economic prosperity should be aimed at creating arenas of public and private organizations gathered around specific PSI themes. This will stimulate PSB organizations to engage actively in arrangements with multiple private organizations to develop new forms of reuse. When national government develops policies aimed simply at disclosing PSI without paying attention to the development of PSI reuse arenas, it runs the risk of unleashing narratives of control within the public sector, preventing them from releasing the innovative potential that PSI reuse intrinsically has.

Executive summary and management implications

We commence this summary by paraphrasing the initial research question. In Finland, public sector bodies (PSBs) are used to cover provision costs for their PSI information products with revenues generated from those products. PSB performance incentives lead to suboptimal behavior from the perspective of society as a whole (e.g. the same information is gathered by multiple PSBs because it's cheaper produce it themselves than buying it from the other unit). If the Finnish government decides to increase budgets for PSI provision to promote the availability of PSI against zero or marginal costs, what are the implications for the management of the public sector units/organizations? What kind of change would lead to the optimal behavior from the perspective of the society as a whole? An answer to these questions will be given below.

This summary is limited to the outcome of the empirical research. An in depth description is described extensively in the report, as attached to this summary. The main results of the research can be summarized as follows:

- Our research reveals remarkable contextual differences among settings where PSI is made available, which affect PSI reuse outcomes in a profound way. Depending on the business sector (geo-information, meteorological data, health, law, etc.) ways and modes of proliferation may differ considerably.

- The distinction between emerging and mature business sectors is likely to be an indicator of the nature of PSI reuse. Compared to developing markets, sectors with settled business relations are less inclined to transform existing patterns of PSI provision.

- The cases presented here both appear to have their own distinctive contributions to society. The Dutch GBKN/BGT case strengthens efficiency in the public sector as a whole through the enforcement of a system of key-registries, which is aimed at making mutual exchange of PSI among PSBs more efficient. The RIS case reveals that development of an innovative European transnational information system for the management of inland waterborne transport emerges from negotiations within an expanding consortium of participating public-, private- and hybrid organizations.

- Where the GBKN/BGT case intends to improve internal efficiency within the public sector, the RIS case promotes an intuitively developed innovative infrastructure serving a panoply of stakeholder groups. However, both cases are aimed to solve a problem that goes beyond individual organizations, only to be solved by multiple organizations of different nature.

- The cases reveal a significant difference between the implementation of PSI in an existing institutional field (GBKN/BGT) versus a new evolving institutional constellation (RIS). In the top-down approach of GBKN/BGT existing patterns of PSI dissemination evolve towards more efficiency between PSBs. In the RIS case, a diffuse network of committed actors produced a reuse model in a bottom up way. Ideally, existing institutional fields should be transformed into a new organizational setting to foster a new innovative reuse model. In term of management implications, we conclude that:

1. *Basic safety is a precondition*. In order to adapt a new PSI philosophy, managers need to perceive the notion of reuse as a possibility, rather than a threat towards current work routines and the 'survival' of their own organization. The main issue is that the management of PSBs have to feel secure enough to be able to disseminate PSI for reuse.

2. *Sensemaking serves as key driver for acceptance*. Managers are part of a double bind. Their work routines are based on an internal rationale as well as external benchmarks/ comparisons with 'peers'. Adaption of a new PSI philosophy goes with the availability of successful role models, a condense body of knowledge regarding the implementation of reuse experiences from colleagues and a platform for exchanging new experiences with PSI reuse.

3. *Develop new indicators, but safeguard performance 'mindset'*. Cost/ efficiency based indicators, as developed within the context of New Public management, are core aspects of current European management practice. In many ways, these indicators constitute the 'heart' of the performance cultures, which dominate European public sector organizations. Succesfull implementation of PSI reuse demands that new principles of reuse are internalized within these performance cultures. This means that indicator based management practice keeps intact, but shifts from cost efficiency based to cost societal based.

4. *There is no PSI sustainability, without a sound learning environment*. Managers should be able to reflect on and learn from the dilemmas which occur in the process of transition. These lessons should be propagated and proliferated by the learning organizations in order to be applied by others. The real challenge is to organize learning environments and 'arenas of opportunity', for which a central agency should be put in place to bring about cross-arena learning.

Table 1 Management scenarios

	Scenario	
Dimension	***The internal efficiency management scenario***	***The external innovation management scenario***
Organizational-Political dimension	Top down implementation of a centrally formulated policy rule on PSI reuse	Bottom up development , based on inviting business partners to reuse PSI in a consortium
Instrumental dimension	Sharp goals, to be enforced by a central authority	Loosely coupled consortia, respecting participants' autonomy, gathered around a unifying theme within an arena of opportunity
Cultural dimension	Towards a tight framework of registries, enabling the public sector to be efficient	Sharing public data, to be produced and shared in public and business domains
Change dimension	A centrally enforced, one-best-way approach, standardizing the public sector as a whole	Towards sector-specific programs of awareness, crossing and blurring boundaries of the public and business domain

Based on the research results of these distinct cases, two management scenarios for successful implementation of PSI can be discerned. The GBKN/BGT case is an example of fostering efficiency within the public sphere, an accompanying management approach will therefore be labeled as the internal efficiency scenario. The RIS case clearly shows autonomous organizations investigating new creative pathways which calls for traveling new roads, to be captured in a management approach called the external innovation scenario. Both scenarios are summarized in table 1 and will be explained below.

The organizational political dimension

The internal efficiency management scenario requires a central PSI policy, to be developed in a designated policy unit on the national level. The main issue to be dealt with is the lack of efficiency of PSI, either produced by PSBs or other organizations under governmental supervision. A plan describing harmonization rules for unified information storage and exchange will be implemented and ultimately lead to information stored at one place to be used anywhere in the public domain, following the WORM principle (Write Once, Read Many).

The external innovation management scenario facilitates towards unplanned relationships between organizations, be it either PSBs or private organizations, meant to realize an infrastructure relevant to society as a whole. These actions follow a pattern which can be envisioned as a narrative of change, a grand idea. Such an idea signifies where individual actions and moves should be aimed at. To ensure the evoked change process has fundamental qualities it is important to frame it as embedded in the existing situation working towards a desired goal, using terms that will be decisive and lasting. Figure 1 shows a common pattern in change processes (Veenswijk 2006). A narrative of change should be invoked and promoted by change activators, persons and organizations who are willing to cooperate in communities of practice, in this case consortia of public, private and hybrid organizations in an arena of opportunity. Communities of practice create new practices, leading towards modification of existing narratives of change and/or the creation new ones. It is this very narrative process that ought to be managed, invoking unplanned and unstructured activities towards innovative forms of PSI reuse.

Figure 1 The narrative change model

Instrumental dimension

The internal efficiency management scenario is guided by sharp, straight goals, laid down in a distinctive policy. The core policy, once defined, is intended to remain unchanged until it is fully implemented, following a predefined path. A central authority will be put in charge of all this, ensuring that the policy will be implemented in every corner of the national public sector realm.

When the external innovation management scenario is followed, the goal will be defined as a desired situation to which interested parties are invited to contribute. The path of implementation will be formulated in due course, using suggestions and hints from all participants. All efforts should work towards the creation of communities of practice ensuing both organizations and individuals stimulating towards new ways of doing things towards the achievement of the predefined goal.

Cultural dimension

The internal efficiency management scenario strives for universal rules to implement a unified system of information relations to guarantee information exchange between PSBs, resulting in considerable savings in budgets and manpower across the public sector. In this study, we have developed an internal, an external and a community perspective on the relationship between government and PSI. In this scenario, the internal perspective will dominate the scene. The system to be developed is meant to be centrally controlled and modified, according to centrally formulated policies, preferably conceived at the national level. Suggestions for policy changes have to go through the system to the highest level where they are assessed, approved and if necessary, converted into a new central policy.

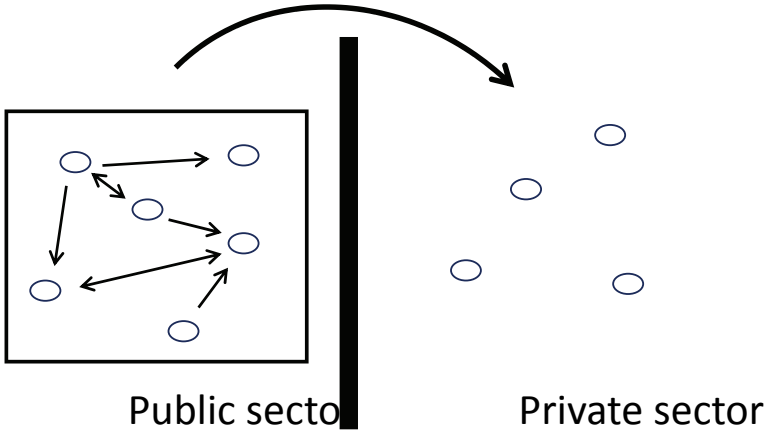
The external innovation scenario is meant to get together all organizations and stakeholders that could possibly contribute to or benefit from PSI dissemination. PSI is considered to be a public good, to be produced by the public sector for the benefit of society as a whole. There is some awareness about boundaries between the public and private sphere, but this is not considered to be an inhibitor, let alone an obstacle to innovation. Notions about transparency and accountability require that government is in charge and has overall responsibility, however business firms are intended to play a major role in order to boost innovation in order to make PSI work for society. Provided the process is guided by proper legislation, the business sector could even play a role in the registry and updating process of PSI, as long as this is beneficial to society as a whole.

Change dimension

The internal efficiency management scenario confines itself to the public sector and primarily aims at the standardization of PSI. A centrally defined policy is meant to enforce rules in order to discipline each and every PSB in order to enforce efficient PSI exchange within the public sector. Information relations among PSBs will become more efficient and standardized, sustaining processes of consolidation and centralization within the public sector. These processes will limit the ability of individual PSBs to establish alliances with stakeholders outside the

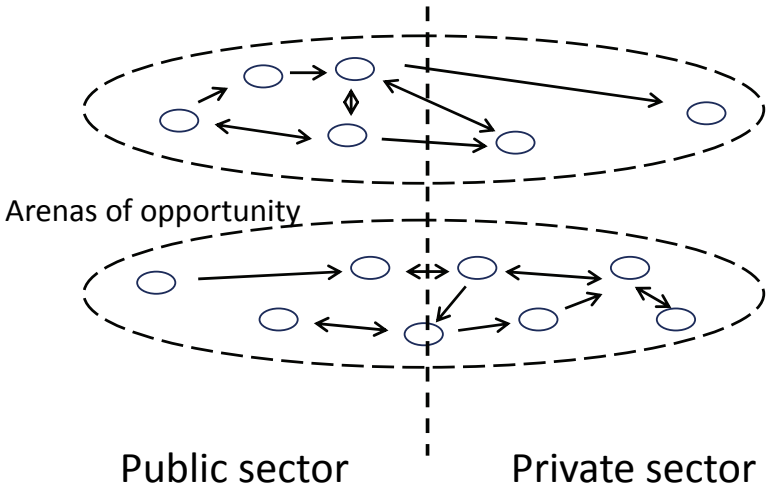
public sphere. Figure 2 visualizes how a public sector aimed at internal efficiency creates a wall between public and private spheres which will hamper innovation and will not stimulate the public sector to make PSI freely available or against marginal costs since because when PSBs are subjected to an efficiency policy it will not be in their interest to be innovative.

Figure 2 The internal efficiency management scenario



The external innovation management scenario is not primarily aimed at boosting efficiency in the public sector, but on optimizing 'chains of production' at the actor/unit level. Involved public and private actors are tempted to organize themselves in arenas of opportunity, which will have impact on the societal level. Innovative alliances with participants from public, business and hybrid backgrounds will bring their relationships in the open, allowing other stakeholders, both public and business to take notice and seek participation. Efficiency issues exist at the organizational level which might act as a thrust to actively participate within an arena of opportunity. Figure 3 illustrates how arenas of opportunity move across the public-private divide and organize themselves in thematic arenas of opportunity.

Figure 3 The external innovation management scenario



Conclusion and advice

From our comparative European research on the implementation of the EU directive on PSI, we have drawn the conclusion that the Finnish PSI policy has a combined focus on democracy, transparency and efficiency. The internal efficiency scenario would invoke a one-sided orientation on efficiency which is undesirable in the Finnish situation. In order to move towards an external innovation scenario, a transformation of existing institutional fields into a new organizational setting is needed to foster a new innovative reuse model. The ultimate target should be a balance between the two scenarios in such a way that managers are tempted to pursue new approaches which are based on existing patterns. Table 2 provides an overview.

In Finland, the notion of PSI to be collected and, if appropriate, disseminated for the benefit of society should be the core of a narrative of change. Arenas of opportunity have to be created where PSBs disseminate PSI for reuse. Going from an efficiency oriented institutional setting towards an innovation oriented environment requires thoughtful balancing of old and new values.

Managers of PSBs are only allowing themselves to move into new arenas if their very existence is not threatened in any way. It implicates that their organizational and budgetary contexts have to be maintained and guaranteed in the long run in such a way that managers commit themselves to new societal values.

Coming from a situation where PSI reuse is hardly an issue and PSI dissemination is only subjected to internal values and preferences of individual PSBs, now managers are tempted to participate in new organizational settings to bring about arenas of opportunity. In the long run they have to accept tightening approaches and standards on which they have to reach mutual agreement.

Managers must accept their performance is no longer valued upon its performance but rather on its value for and contribution to society. It creates a situation where existing practices may be appraised differently in a changing context based on different indicators. Managers have to be ready to adapt to these changing circumstances and to make sure their PSB is still able the role it is ought to play.

Learning has to take place within arenas of opportunity. It requires managers that look beyond the public sphere to look for learning opportunities. Accordingly, diffusion of best practices

Table 2 Transitioning the Finnish PSI reuse policy

Dimension	*From*	*To*
Basic safety	Impact on internal efficiency	Impact on society
Sensemaking	Diversity	Clear approaches and standards
Practices	Performance based indicators	Society based indicators
Learning and diffusion	The public sphere	Cross-sectoral dissemination

has to be arranged between arenas of opportunity in order to get the general message of reusing PSI across and to make sure all arenas of opportunity have all experience-based lessons-learned available.

In order to enable these transition processes, some central coordinating agency has to be in place to get the message of the advantages of PSI reuse across. Such an agency has to be trusted and valued by the public and business sphere and has the authority to set things in motion in order to be challenging for businesses and unthreatening for PSBs.

1 Introduction

The success of Google Maps has put the idea that free access of Public Sector Information (PSI) will contribute to a prosperous economy on the map. It demonstrates that freely available public information, in this case satellite photo images, can be beneficial to civilians and to society as a whole, and that private companies can make money out of web services reusing this information. The general public has already started to treat Google Maps as part of public infrastructure: many people know where to find these electronic maps on the internet or use apps based on free data and sometimes even develop their own Google Maps-based applications, without wondering where the information comes from.

There are many reasons why governments should enable private companies to reuse the data they produce. Free availability of government-produced data may stimulate the economy, promote innovation, improve public decision-making, make governments more transparent and foster democratic debate (Welle Donker 2009). The dimension mentioned most frequently is the innovative potential attributed to free accessible PSI. It is recognized that high-tech small-business firms can turn raw public data into intelligent business solutions serving both private and public organizations (Longhorn and Blakemore 2008).

The logic behind this belief is that free and digital availability of PSI stimulates the economy. Economic studies indicate a positive relationship between national disclosure policies of PSI and small and medium enterprises (SMEs) (Newbery, Bently et al. 2008; Koski 2011). Additionally, there are also indications that EU policies on free availability of PSI may stimulate the reuse of PSI, particularly in the Geo Information (GI) sector (Fornefeld, Boele-Keimer et al. 2008).

Pricing of PSI is generally seen as the main intervention instrument, so reuse policies are mostly focused on pricing of and investments in the disclosure of public data. The cost of PSI for reuse has been theoretically modelled from the perspective of the PSI supplier by means of a typology of four approaches: zero cost, marginal cost, average cost (cost recovery) and profit maximization (Newbery, Bently et al. 2008). Most studies, however, narrow these four approaches down to two: only marginal cost and average cost seem to be influential regarding data policies and are frequently used as a dichotomy in analyses (Van Loenen 2006; Newbery, Bently et al. 2008; Koski 2011).

The availability of PSI has been studied from economic (Newbery, Bently et al. 2008; Koski 2011; Vickery 2011), legal (Van Loenen 2006; Welle Donker, Van Loenen et al. 2010) and information science perspectives (Fornefeld, Boele-Keimer et al. 2008; Longhorn and Blake-

more 2008; Castelein, Bregt et al. 2010). These studies only marginally address organizational aspects of PSI, and rather prescriptively at that. To our knowledge, aspects of organizational arrangements, change and identity in relation to PSI have not so far been a major topic in policy development and research when it comes to reuse.

In Europe, the issue of PSI reuse has led to policies and directives on the European Union (EU) level, of which the directive on reuse of public sector information is the most prominent one (Council 2003). There have been reports depicting the situation on either the EU level or on individual member state level (Dekkers, Polman et al. 2006; Fornefeld, Boele-Keimer et al. 2008; Vickery 2011). Like the EU directive, however, these studies neglect organizational consequences for both private and public organizations.

It has already been recognized that information and communication technology (ICT) has a high, not to say fundamental, impact on democratic and bureaucratic processes (Van de Donk, Snellen et al. 1995; Zuurmond 1998). The fact that implementation of ICT has changed work processes and the structuring of organizations, has been widely observed (Zuboff 1988; Orlikowski and Barley 2001; Veenswijk 2005; Bekkers, Van Duivenboden et al. 2006; Homburg 2009; Koerten 2011). It is likely that PSI reuse, as it is strongly technology-driven, will not stop at the gates of the public sector but will have impact on how the public sector is organized and how it establishes relationships with wider society.

Organizational settings appear to be highly contextual, and we want to address this in relation to PSI reuse in two ways. First, we will focus on the European dimension by comparing policies and outcomes of PSI reuse in EU member states. Second, we will look at distinct market sectors within the European realm by making analyses of both a Dutch national case and a cross-national case. Our intention is to offer comparative insights to enable policymakers to get to grips with organizational aspects of PSI.

Our aim in organizational terms is to open the black box that has been identified in relation to PSI reuse policies and economic prosperity (Koski 2011), attempting to make it more specific in terms of public management and amenable to a culturally induced change approach. This empty box will be filled with a framework using three perspectives on the public sector. First, there is a perspective in which the public sector is defined as an inseparable whole that is closely tied to society. We call this the 'community perspective'. Second, the idea that the public sector is a dynamic field of autonomous units putting its own interests first relates to what we call the 'internal perspective'. Third, the public sector can be thought of as a dynamic entity, delivering (digital) 'modern' standardized services to society, based on contingent demands and technical developments. We call this the 'external perspective'. These three perspectives will be our main guide for mapping the terrain of approaches of the public sector towards PSI reuse. We are further going to relate these perspectives to its consequences in terms of organizational perspective, intervention logic, cultural dynamic and management implications.

Our research will be guided by two assumptions. First, we estimate that every individual EU member state has its own historical development towards PSI and thus interprets and implements EU directives accordingly. Second, different market sectors handle different kinds of PSI which lead to varying PSI approaches in each sector.

These considerations bring us to the following research questions:

– How can differences among EU member states and market sectors within the EU on PSI reuse be explained using the community, internal and external perspective?

– What consequences do these perspectives have on factors like organizational perspective, intervention logic, cultural dynamic and management implications?

– What lessons can be learned and advice given in the light of these lessons?

National preferences on reuse practices were studied by making a comparison of impact studies per nation-state on national implementation of the 2003/98/EC Directive. Furthermore, we conducted two in-depth case studies on PSI reuse: the GBKN/BGT case on large-scale base mapping in the Netherlands and the cross-border River Information Services (RIS). By offering a European perspective of PSI value and how policies are developed and implemented we intend to offer some tools for interpreting the results of these cases for other EU member states, such as Finland.

The structure of this report is as follows. Chapter two contains a theoretical elaboration where we further develop our research framework, specifying the three perspectives in relation to organizational factors. In chapter three we apply this framework to analyse the European situation using ePSI state-of-play reports.[1] The cases of topographic large-scale base maps in the Netherlands (GBKN/BGT) and the international River Information Services (RIS) are described in chapters four and five respectively. Chapter six is devoted to analysis, and chapter seven a discussion on lessons learned and prescriptions for the future.

2 Opening up the organizational black box of PSI reuse

This chapter is devoted to the development of a framework, which will be the theoretical guide for our research. Such an approach is essential for the structuring of views on PSI reuse, to analyze collected data and to help to put results into perspective. A stepping-stone for further elaboration is that different actors, both inside and outside the public sector, have varying opinions on how PSI should be used and reused, and these thoughts have to be reflected in an integrated framework. In this chapter we present three perspectives on government. In the next sections these perspectives will be developed and elaborated, and linked to PSI reuse. These perspectives will be our reference on how PSI reuse affects the relationship between the public sector and its environment. We distinguish a community, and an internal and external perspective on government which will be further specified for PSI reuse through aspects of intervention logic, cultural dynamic and management implications. Before we elaborate on our perspectives in detail they are briefly introduced below.

The 2003/98/EC rule on reuse of public sector information has invoked a lot of discussion and debate on legal and economic issues. Some argue that PSI reuse would stimulate economic growth and transparency, which would be beneficial to society as a whole (Vickery 2011). It is expected that individual business start-ups will be launched as a result which will in turn in-

[1] http://epsiplatform.eu/topicreports.

crease tax revenues as the result of a prospering economy. A democratic and transparent government is regarded as a prerequisite for PSI reuse, but democracy and transparency are also seen as improving the relationship between citizens and government. We have labeled this viewpoint the **community perspective.**

Up to now, the internal perspective regarding the public sector as the key actor responsible for enabling actual PSI reuse has hardly been mentioned. The implicit message seems to be that it is expected that the role of civil servants will remain unchanged, that they will do what they are told, doing all they can to disclose PSI for reuse. The fact that implementation of a general policy rule on reuse of PSI might have unintended, reverse or even negative consequences for public sector organizations and their internal and external relationships has not been a matter of discussion, let alone as having implications for individual public sector bodies (PSBs). This line of reasoning will be called the **internal perspective**.

The fast spreading digitalization of society has not stopped at the gates of government organizations. It made government feel obliged to offer services digitally that used to be delivered through conventional channels. In order to satisfy the needs of citizens and businesses, ICT began to change the nature of government, which started to deliver standardized e-services, also affecting internal processes and organizational structures. This trend influences how views on PSB reuse emerge and we refer to it as the **external perspective**.

Given these debates, we use these three perspectives as core concepts to develop our research framework. The perspectives all deal with citizens and groups of citizens in a different way. Consequently, the process of delivering public sector information, either as a tool for establishing a relationship with citizens or to boost the economy, plays a key role in the discussion on what should be expected of government.

In the next section, we elaborate on the above-mentioned perspectives with the aim of opening the black box in terms of the relationship between PSI reuse and government organizations.

2.1 The community perspective: government as inseparable from society

People want a government that behaves just like any other citizen and constitutes a solid and reliable counterpart. In consequence, government cannot be taken at face value; from government information collected either actively or passively a citizen will decide if action should be taken. Therefore, true and trustworthy information provided by the government is essential for society. There are all kinds of formal and informal, standardized and non-standardized, routine and ad hoc, overt and covert, mandatory and voluntary information coming from government to citizens, which also holds true, of course, for information flowing the other way. Civilians may act as individuals or team up and act as associations, committees, foundations and commercial enterprises. Accordingly, government comprises different organizational units, to be differentiated according to level and sector. All individuals and government organizations have to engage in information relations with others in order to perform their task as they see fit.

Government as a whole is approached as an essential element of society as a whole. Taking the community perspective as a guiding principle, it is necessary to have good relationships

and procedures in place between government and society 'to build the collective capacity to achieve public results and to pursue a shared vision of the future' (Bourgon 2010: p.197). This vision assumes a complex society and a government essentially unfit to be aligned with the complex problems it tries to address. Government change has to come from a build-up of institutional capacity rather than organizational change or, as Fukuyama (2000) puts it, societal capital reducing transaction costs in formal coordination mechanisms like contracts, hierarchies and bureaucratic rules. Public organizations should achieve high public value in ways that advance civic or democratic principles, using keywords like transparency, accountability, access, voice, choice and action. Government has an infinite number of ties to society to activate collective powers for societal governance (Bourgon 2010). Accordingly, public policies will have only limited effects when they are not firmly rooted in society.

The distinctive factor here is that government must be treated as a whole. There are, however, few countries where government is a single organization dealing with all citizens' concerns. Government is generally multi-faceted, dispersed, multi-layered and sometimes even consists of isolated, autonomous organizations. Government is complex only because society is complex, too. Therefore, it would be quite difficult, not to say impossible to make all these government organizations act as one. A powerful way of achieving this to some degree, however, is to follow the path of recognizing and acknowledging institutional and cultural patterns.

Consequences of PSI reuse

As government is treated here as an integral part of society, all information held by government bodies, has consequences for society as a whole. Ideally, reuse of information has to enforce societal capacity building. Therefore, financial gains from reuse of PSI have to be beneficial to society as a whole. In economic terms, reuse can be viewed like any other economic activity in society.

At the same time, we have to look into reuse of public sector information in relation to capacity building logic to make society anticipative, innovative and adaptive. As PSBs are seen as acting from within the same institutional environment, they are all willing to follow the same line of action. If some central actor should declare PSI reuse as beneficial to society as a whole, all PSBs would have to follow suit. The community perspective implies that every single PSB is regarded part of the entire public sector, which is in turn an essential part of society.

PSBs enabling PSI reuse feel responsible for their own PSI reuse, however, acting from their own perspective. Ideally, they are not inclined to put their own interests first but the interests of society as a whole. The way in which PSBs disclose information for reuse follows a more or less implicitly shared ideal of how government in general should behave.

Public sector managers following the community perspective are inclined to see their own position as part of the government whole, to be seen as serving both individual civilians and civil society. If a journalist manages to frame some PSB behavior as corrupt and unreliable and supports his/her case with information derived from PSI reuse, a manager acting from the community perspective sees it as his duty to restore confidence in government as a whole and will not blame the journalist or the actual mechanism of PSI reuse. S/he will stand firm for government in general and will do all s/he can to turn it into a PSB that can be trusted by society.

2.2 The internal perspective: from a public management point of view

As we have already mentioned in the introduction to this chapter, PSBs have to act in a responsible way. Every PSB within the government system has its own unique and specific task to fulfill. In turn, PSBs understand that civilians expect them to do the job effectively (do the right thing) and efficiently (do things right) (Drucker 1967).

The urge to be effective and efficient is derived from their own position in the network of PSBs forming the public sector, in which they all have their own unique role to play. Instead of government as a whole performing for the benefit of society, the internal perspective focuses on the role of PSBs in relation to their environment, being other organizations, such as PSBs, businesses and civilians. Government, then, is to be treated as a network of PSBs, each of them guided by their own interests and preferences and seeking alliances to establish and implement policies and also to enable the execution of public tasks (Jenkins-Smith and Sabatier 1994; Provan and Milward 2001).

Since the 1990s the fashionable trend of new public management (NPM) has spread from the USA across the Western world (Osborne and Gaebler 1993). In Europe, these ideas are influential in terms of how public management ought to be executed, leading to novel ways of public policymaking and reforms in the management of public tasks in many countries (Kickert 1997; Pollitt and Bouckaert 2011). The bottom line is 'to run government as a business', putting market-related principles and highly standardized organization to the fore as key examples to be followed. According to Pollitt and Bouckaert, this has led to some striking developments: (1) the separation of policymaking and policy implementation, (2) a customer and client orientation towards citizens, (3) output and performance orientation of public sector bodies (PSBs) and (4) the introduction of cost recovery models.

It has been argued that policymaking should be done in more streamlined, transparent and accountable ways by setting this process apart from policy execution. A significant consequence is that policy is considered as the output of a policy-making unit, acting as the main input factor for a policy execution unit (Kickert, Klijn et al. 1997). This method of organization has enabled the proliferation of policy-executing units: public tasks are executed by agencies, outsourced, or operated by public/private partnerships (PPP) (Kickert 1997).

New public management (NPM) started to treat civilians as customers rather than people participating and being involved in society, which had serious consequences for how public tasks were valued. It breaks the link of citizens' specific relationships with their government, encouraging PSBs to focus on one type of relationship at a time, depending on its purpose (Stewart and Clarke 1987).

According to NPM norms and values, PSBs should ideally be focused on their output (doing things right). For some, the inclination to be output- performance- and audit-oriented has led to an 'evaluation industry' (Power 2000). In addition, the preference for performance appraisal of single organizations may have unintended consequences and may have deleterious results when public sector organizations start to adapt their behavior with a view to appraisal instead of doing the right thing (Van Thiel and Leeuw 2002).

Administrative reforms have also led to serious budget reforms. Instead of being funded by ministries and local administrations, PSBs responsible for policy execution were encouraged to be cost-effective. This was often done by asking civilians and businesses to charge fees for services delivered adjusting tariff systems to internal budgetary needs (Gilmour and Lewis 2006). These new ways of budgeting have led to most PSBs being responsible for their own financing, and given them appropriate discretionary power to control their sources of income (Pollitt and Bouckaert 2011).

The result was that PSBs either struggled for or received independence. PSBs with their newly acquired discretionary powers started to behave as if they only had eye for their own change process towards independency, transitioning from an administrative unit into a externally-oriented public agency, being quite fundamental to their existence (Provan and Milward 2001; Veenswijk 2001). The bottom line is that PSBs were increasingly being made responsible for their own performance instead of following centrally made-up rules and instructions (Veenswijk 2005).

Consequences for PSI Reuse

When government is regarded as a set of organizations where every individual organization has its own responsibilities, government as a whole must be regarded as a dynamic network with organizations surviving in a maze of stakeholders (Provan and Milward 2001). Consequently, the pros and cons of PSI reuse are judged by a particular organization and judged against its own performance. The logic of PSI reuse boosting the economy does not fit that picture because it is unlikely the organization in question will benefit directly from increased tax revenues.

Ultimately, a central policy might be needed to enable PSI reuse to act as an economy-boosting tool to make it appropriate for every single PSB. The internal perspective uses the simple logic of cost-benefit analysis, which requires that the level on which a new policy is implemented should match the level where revenues are being collected (Provan and Milward 2001). If a government-wide policy is lacking, every PSB will use its discretionary power to make its own judgement. Then the only thing left to do is to persuade stakeholders about specific PSBs and make them ready for joint action towards cooperation.

If organizations are allowed to follow their own path when it comes to PSI reuse, it is likely every single organization will make its own analysis and develop a reuse policy based on its own perceived gains (Hadi and McBride 2000). These gains might be financial, a PSB seeing a market for its own PSI, but they might also be non-tangible: it can be argued that a national public health institution with the task of disease prevention and control will benefit from making its PSI available for reuse, only because every use and reuse will be linked to that institution and justify its existence, thus persuading politicians to maintain or even increase its budget.

Management skills that sustain public management reform have gained increased popularity during the last two decades. The management of PSBs is aimed at performance and budgetary responsibility (Gilmour and Lewis 2006). In the logic of being responsible for budgets at PSB level there is no room for solidarity with government as a whole. It is likely that PSB management is aware of utilizing PSI reuse for its own benefit; the real challenge is to make it act as being responsible for PSI reuse at government and community level (Provan and Milward 2001).

2.3 The external perspective: citizens and e-Government

During the last decade, client orientation and ICT have become strongly associated with one another in government. The world digitizes at an increasing pace and if government wants to satisfy the needs and desires from society it needs to go along that trajectory (Homburg 2009). E-Government has become a hot topic with the public sector being seen as followers rather than leaders. This feeling is reflected in the way it is treated in research: e-Government investigations have been positivistic in nature, not theory-driven or working towards generalization (Heeks and Bailur 2007). The common opinion is that it is still difficult for government as a whole to follow new ICT-enabled developments. It has been argued that government has to ensure access to e-Government services to be successful. Moreover, some argue for a guarantee that citizens will have access to e-Government in the same way they have access to drinking water, power, sewerage, telecommunications and other utilities (Jaeger and Thompson 2003).

When it comes to expectations about service delivery by government and public agencies, the general public as well as businesses have a client orientation (Greve and Jespersen 1999). It is believed the real world enjoys the benefits of the digital highway while government agencies are living in dullsville, having trouble in responding to the winds of change (Layne and Lee 2001). Government organizations, like municipalities, make efforts to implement e-Government and to adjust their organization to these new ways of making contact with citizens and businesses, but have trouble making it happen (Moon 2002).

The external perspective is manifest when PSBs make transitions towards e-Government, whereby they have to be able to master emerging new digital technologies. It is also assumed that higher-income citizens are digitally literate, whereas low-income citizens in general lack these skills and may need assistance to use e-Government services (Tolbert and Mossberger 2006; Van Deursen and Van Dijk 2009). Once that requirement has been fulfilled, the organizational structure of government ought to adapt to meet the requirements of the digital citizen who is assumed to have digital communication with the government high on his/her list of desires. Initially, government avoids complex e-Government relationships with citizens and businesses. Once a PSB has gained experience of delivering simple services and providing information for homogeneous populations of citizens, it may turn to more complex forms of standardized relationships (Buckley 2003). Starting by simply offering a digital catalogue, government needs to transform its internal organization to be able to handle transactions, leading to vertical integration of internal and external organizational processes and eventually towards horizontal integration, both intra- and inter-organizationally (Lee, Tan et al. 2005). Promoting e-Government puts the service-oriented business-like attitude first, leading towards a one-sided, client-oriented approach of the role of government which is in turn responsible for certain paradoxes between e-Government and the true nature of government (Fountain 2001). Although it has been hailed as a tool for keeping up with the technology-driven desires of the general public, it has also been criticized for sustaining executive-driven, managerial interaction models while allegedly unable to sustain participatory, democratic values (Chadwick and May 2003).

Implications for PSI reuse

E-Government is framing relationships between government and the outer world in terms of standardized services, assuming this is the way, citizens and businesses want to be treated (Chadwick and May 2003). This perspective will accordingly treat disclosure of PSI, as a

standardized service, unable to deliver PSI that is unstructured and ambiguous in terms of time, demand, consistency and formulation.

The e-Government perspective requires PSBs to act at different levels to deliver complex services. Simple requests for data might be handled by individual PSBs, but when complicated sets of data are to be disclosed and this process is taken up as an e-Government service, it might be that delivery of services requires more sophistication. PSI-disclosure as-a-service requires vertically and/or horizontally integration, where PSBs may act as a back office for the e-Government front. However, requesters knowing their way through the scene of PSBs still might try the back door, retrieving PSI directly from its source.

PSBs delivering PSI in an e-Government environment ideally contribute to jointly produced, complicated products. Although disclosure of PSI is relatively simple, PSBs might be reluctant to disclose their data because they run the risk that other, possibly commercial organizations, will offer services based on their PSI that they are supposed to deliver. PSBs might see PSI reusers as competitors and therefore PSI reuse as a threat to their very existence. As we mentioned while discussing the internal perspective, a general policy rule binding on all PSBs might help to ensure every public organization discloses PSI for reuse.

While focusing on service delivery, management has to be aware of keeping a balance between services and PSI disclosure, between standardized and ad hoc PSI requests and between public service delivery and private PSI reuse-based services.

Towards a framework for analysis

Now we have drawn a picture of three theory-induced perspectives it is time to put them into perspective in order to let them guide our focus in further reasoning. The black box has been opened and filled with notions to map the terrain of government and public organizations that are supposed to be offering data for reuse.

Over the last two decades the internal perspective has been in the driving seat when it comes to offering models of how government and government units in particular should be managed (Pollitt and Bouckaert 2011). The managers of PSBs were inclined to put the performance of their own unit first, seeking alliances with other units to get the job done and trying to be in control of their own budgets.

E-Government started to ride the waves of the ever-developing internet (Chadwick and May 2003). It stood for standardized services to society, ideally delivered by either separate or cooperating PSBs, leading to multiple forms of cooperation among PSBs.

The community perspective has been regarded as old-fashioned for many years, but is now working towards a comeback (Bourgon 2010). It is argued that within society actors work together in groups or organizations to improve the world we live in. What is needed is a government that is connected to all these groups and takes up its expected role in society so everybody is able to make this world worth living in.

As mentioned before, these perspectives are derived from a review of theory-oriented literature and may be seen as ideal types, a lens for the researcher. It is unlikely we will find empir-

ical evidence fully confirming any one of the presented perspectives. On the contrary, a situation may be dominated by one perspective, but other perspectives may play a role as well. Accordingly, through time, perspectives may emerge, flourish and fade away as specific contexts may require or rule out their utilization. It is also likely that the occurrence of perspectives will vary among European countries. Table 3 summarizes the framework that will guide further investigations. It will be completed with evidence from empirical work, which will be presented in the next three chapters.

Table 3 The research framework

Perspective	*Main focus*	*Organizational approach*	*Intervention logic*	*Cultural dynamic*	*Management implications*
Community	Democracy transparency				
Internal	New public management				
External	E-government				

3 PSI in Europe: a summary of perspectives on the national level of member states

The website of the European Commission on public sector information (PSI) claims PSI is still an 'untapped resource'.[2] In order to promote the use and reuse of PSI, the European Union passed Directive 2003/98/EC in 2003 for implementation in the legislative frameworks of member states. Although this was neither intended nor anticipated, a general EU rule transposed into national member state law is always vulnerable to translation, interpretation and/or reframing according to national preferences. In this section we investigate whether this is the case here and, if so, whether specific characteristics and patterns can be distinguished.

The MEPSIR report, which is the result of an economic study of the exploitation of PSI in Europe, estimates that the PSI reuse market in 2006 in Europe was worth EUR 27 billion (Dekkers, Polman et al. 2006). There are also indications that this market has expanded and will continue to grow (Vickery 2011). These figures suggest a golden future for PSI, which should be treated as a commodity.

Besides economic predictions for the EU as a whole, the MEPSIR report also provides a sketch of three possible scenarios of how PSI might develop within specific market sectors of EU member states. First, the *closed shop scenario* is envisioned as one supplier holding valuable information in a transparent and predictable environment, as in the case of many national cadastres or business registers. Second, an opposing situation is the *battlefield scenario,* whereby valuable information is disputed and high interests cause private parties to compete to take over the value-adding process from the public sector, which is probably the case with meteor-

[2] http://ec.europa.eu/information_society/policy/psi/what_is_psi/index_en.htm (accessed 24 November 2011).

ological or topographical information. Finally, in the *playground scenario* the government either steps in to strengthen the core public task of providing data which allow private parties to add value or voluntarily stands aside to leave value-adding processes exclusively to private parties and restricts itself to provision of the data. Whatever the case may be, the report suggests that PSI reuse might develop along different strategies and patterns, and that differences among market sectors are anticipated. Additionally, the report implicitly suggests differences among member states, too.

Being aware of differences between EU member states and among market sectors per state, Dekkers, Polman et al. (2006) still confine themselves to the economic realm, which envisions commodified PSI and explain the variety of approaches in terms of differences in how the information is valued. There is a lot more to say, however, about the essence of data and information in relation to differences among member states. To that end, we look into topic reports published by the ePSI platform.[3] Separate reports can be found here regarding the state of play of EU states implementing the 2003/98/EC directive. By November 2011, 15 country reports had been published describing the state of play in Belgium, Bulgaria, Denmark, Finland, France, Germany, the Netherlands, Norway, Poland, Portugal, Romania, Slovenia, Spain, Sweden and the United Kingdom respectively. Published between January 2010 and October 2011, these papers were mostly been written by local experts dealing with the implementation of the 2003/98/EC directive in a specific country, and describe the current situation in relation to national constraints and challenges. In analyzing these reports we want to gain insight into how PSI is viewed in these respective countries and how these notions affect the implementation process. Reflecting on developments analyzed in these reports, and using the theoretical framework developed in the previous section, we intend to provide insight by identifying differences and similarities among EU member states.

At first glance these reports suggest EU member states have transposed the 2003/98/EU Directive into national law only for the sake of complying with European law. Our analysis tells a different story, however. Nations use different definitions of PSI, and have different aims and motives for linking the PSI directive to other themes and topics, arriving at a panoply of ways to implement PSI reuse in their specific situation. We analyze these reports using the theoretical perspectives, which have been developed in the previous chapter. First, we distinguish between situations where PSI is considered as data and those where PSI is treated as information. Then we look at them in more detail, using a framework wherein PSI can be treated as a tool for democracy and transparency enhancement, as moving towards a new form of new public management (NPM) or as a task to be incorporated in e-Government. We end this section with some general conclusions.

3.1 PSI as data vs. PSI as information

In many cases PSI policy is treated as having effects on data, that is, a bulk of raw, digitally proliferated public data, made available in an electronic and machine-readable way, preferably through the internet. In some ePSI reports, however, PSI is referred to as information, in the sense of products coming from public service bodies (PSBs) in predictable forms such as official government letters, minutes, laws and rules, which do not necessarily require a digital format.

[3] http://epsiplatform.eu/topicreports.

The ePSI reports on the state of play in Poland, Romania and Bulgaria clearly demonstrate that PSI is treated as information. One has the impression that in these countries public service bodies (PSBs) only produce information products. The idea of a public sector producing raw and digital data, which can be proliferated apart from concrete information products is unknown here. Moreover, the reports reflect that PSBs are not even regarded as capable of producing data, because a general attitude or institutional 'embeddedness' regarding PSBs as upright, uncontroversial and unbiased is lacking. These reports give the impression that Poland, Romania and Bulgaria see themselves as newcomers in the EU, still in the transition process from a socialist/ communist state to a democratic state and using EU directives as an aid in this process.

Poland treats the 2003/98/EC Directive as an opportunity for advancement towards a full democratic state. The fact that Poland implemented a modern constitution in 1997 and access to public information was guaranteed in a law effective from 2001 is explicitly and extensively mentioned, but implementation of the 2003/98/EU Directive in the Polish legal system has not yet happened.

Bulgaria and Romania also connect the PSI Directive with democratic transitioning, but in a slightly different way. In these reports it is stated that international comparative studies demonstrate that in terms of transparency and democracy Bulgaria and Romania belong to the top 50 countries of the world, whereas compared with other EU member states they have to be ranked among the least transparent and democratic nations. The main problem to be tackled here is stated in terms of implementation and institutionalization. Both reports acknowledge the fact that a modern constitution is in place, to be linked to PSI as a tool to enhance the democratic process. Yet although all the relevant laws are in place and the EU Directive has been transposed into national law, Bulgaria and Romania lack practices firmly rooted in institutional transparency. The reports draw the conclusion that bribery and corruption cannot simply be banned by implementing laws. What is needed is a change of attitude of these nations towards more transparency. Institutional transparency is treated as beyond the scope of these reports and is consequently not addressed.

All other national reports treat PSI as data, which might foster democratic processes, the performance of PSBs or e-Government processes. Whatever the purpose of PSI may be, when it comes to proliferation, PSI is treated as electronic data, ideally being machine-readable and available to all.

Data then become seen as a product of PSBs, albeit detached from the goals of the public sector, which are generally regarded as information products. Data convey the image of a commodity, freely available for the benefit of all, whether civilians or businesses. The idea that the proliferation of PSI in specific cases might harm the interests of PSBs is not considered.

3.2 PSI linked to transparency and democracy

Some member states treat PSI as data to be connected with what they see as the essence of their society, which usually means health, government and the economy. Unlike the previously described Eastern European examples, Nordic countries such as Norway, Sweden and Finland are fully aware of having open and prosperous democracies. The respective versions of a Free-

dom of Information Act (FOIA), which established a longstanding relationship between citizens and government, is primarily seen as an instrument guaranteeing transparency and democracy. PSI is judged in the light of these virtues and may even act as an instrument maintaining the FOIA. Another opportunity is also envisioned, in which public data produced by public sector bodies are seen as meaningful in terms of innovation and boosting the economy, although these benefits are treated as secondary to such fundamental elements as transparency and democracy. Whereas countries like Poland, Bulgaria and Romania, and to a lesser extent Portugal, see PSI as an instrument for the pursuit of democracy, the Nordic countries treat it as an instrument to sustain democracy. A transparent mode of conduct is already in place here, and PSI will bring that to the digital realm, to benefit society as a whole, which is already familiar with Web 2.0.

The report on Portugal mentions the Carnation Revolution of 1974 as the origin of the modern, free, Portuguese state. The passing of a democracy-affirming constitution is regarded as fundamental to the legislative process, continuously improving the relationship between citizens and government. It has led to awareness of the power of information as a prerequisite for administrative transparency. Even the value of raw data is mentioned as beneficial to democracy, that is to say, putting a properly functioning civil society in place.

Denmark and the UK also seem to recognize PSI as having a relationship with democracy, but government agencies accompanied by proper legally assured processes are seen as essential. In order to facilitate and support democracy it is necessary to have an extensive public sector (Denmark), which operates properly or processes in place by the government serving citizens and businesses (UK). On top of that, UK policymakers are fully aware of their place in the international environment and are therefore looking abroad, outside Europe, for best practices and ways to comply with international standards.

The economic rationale behind the message to reap the benefits of PSI reuse is visible in the reports that have been mentioned here. They reflect the entrepreneurial call for increased economic activity, raising the taxation income of nation-states so societies as a whole will benefit. The advantages of PSI reuse for societal development are also extensively mentioned, especially in Norway, Sweden and Finland, who see a free and open society as a basic requirement for economic prosperity, and have a keen eye for democratic rules of play, acknowledging the role of transparency in the relationship between a state and its citizens. The PSI climate in Nordic countries seems to suggest that economic challenges through reuse of PSI are essential for a wired society, and are waiting to be achieved, yet democratic rules are to be respected as necessary for an open, prosperous society.

Whereas Nordic countries mention society as a whole as being related to PSI, in the UK and Denmark there is a more instrumental approach when it comes to reuse. Government agencies seem to be at the centre of society here. In the UK it is assumed that government needs to have an internationally compatible legal framework in place to enforce processes that enable the disclosure of PSI. Government agencies are primarily seen as enablers; the actual disclosure processes could be either a public or private affair. Unlike the UK, Denmark treats its public sector as a solid industry, delivering services to civilians and the business environment. PSI reuse has to be facilitated by delivering similar services through the public sector. Whereas in the UK government is only seen as a facilitator for PSI reuse, in Denmark government is seen as the essential partner holding all PSI and facilitating its disclosure.

3.3 PSI linked to New Public Management

The principle of new public management (NPM) is *to run government as a business*, implying that a public service body (PSB) should generate its own revenues. (Osborne and Gaebler 1993). If the PSI reuse principle is applied, new economic activities created by start-up businesses reusing PSI generate extra tax revenues. Instead of PSBs generating their own source of income, however, the increased tax income from PSI reuse has to be redistributed among PSBs disclosing data free of charge.

The logic behind PSI is based on the perceived benefits of internet clouds (Leadbeater 2010), which are in turn seen as based upon ubiquitous use of data and information free of rights to be linked and reused purely for the sake of innovation (Miller 2010). At first glance the basics of PSI reuse seem to be at odds with the NPM doctrine. PSI policies can be absorbed into NPM, however, and there is a lot more to say about the relationship between NPM and PSI.

In this section we look at the reports on the Netherlands, Belgium and Germany. They reflect, each in its own way, an ambiguous relationship between NPM principles and PSI implementation.

The PSI landscape in the Netherlands is highly dispersed, meaning that every government body has a high level of autonomy and is allowed to set its own rules in relation to PSI disclosure. Different PSBs take different actions, creating a varied and fragmented overall picture. The ePSI report argues that PSBs and even individual civil servants are in conversation with citizens about PSI reuse, creating a situation wherein it is hard to develop general rules. PSI reuse policies are not considered as having political priorities; the responsible Ministry of the Interior has a low-key approach towards national laws, stimulating and facilitating bottom-up approaches. The only exception is a widely promoted system of key registries which is intended to streamline government data as applicable to all PSBs.

In Belgium, the situation is complex, because it is a country with a federal state level, three language communities, three regions and some highly autonomous urban municipalities. They have created a highly diversified administrative palette, in which different levels claim autonomy in certain areas, which makes the situation regarding PSI reuse quite fragmented. Moreover, in a country with a diminishing federal administrative level, regions and municipalities in particular take over responsibilities that ought to be done nationally. Recent PSI reuse initiatives demonstrate, however, that all levels are aware of the possibilities and potential of PSI reuse and that autonomous PSBs do everything they can to make PSI reuse efforts a success.

In Germany, the autonomy of the national government, federal state governments and municipal governments is acknowledged and highly valued. This creates an atmosphere where every agency is allowed to have its own policy; a general overarching rule is lacking. Therefore, the report extensively reflects on laws tailored to specific fields of information, like data protection laws, consumer information rights and spatial data access laws, which are implemented on different government levels, creating a very complex situation. In the report it is stressed that PSI reuse principles are very hard to implement, which could create a situation in which PSI delivery looks like a data warehouse where government bodies can do as they please: from full cost recovery to free access, anything goes.

3.4 PSI linked to e-Government

There are studies supporting the argument that ICT envisioned through the approach of e-Government is causing fundamental changes to public administration practices (Tat-Kei Ho 2002; Homburg 2009), whereas others phrase it in rather conservative terms, claiming the discussion should limit itself to accessibility (Jaeger and Thompson 2003).

In the ePSI reports we found three state-of-play reports where PSI reuse is essentially regarded as a matter of providing access using digital technologies: France, Spain and Slovenia. Although it is acknowledged that PSI reuse has economic value, these ePSI reports reflect a rather narrow approach of disseminating PSI digitally, only because these techniques ought to be utilized. The public sector simply has to respond to the call to open up PSI resources for reuse by providing access points for PSI.

In France, a few government organizations are mentioned as being in charge of PSI, acting as the counterpart of associations of organizations representing specific market sectors. Some of these associations have collaboratively published a document with seven recommendations[4]. with which public PSI-disseminating organizations should comply. National government responds to the commercial market by making plans to put a single access point in place in order to provide data in a digital way. The overall impression is that national policies have rarely delivered tangible results when it comes to PSI disclosure, whereas local initiatives are spreading.

A similar approach can be found in Spain, where the government's Aporta project is trying to formulate an answer to the perceived PSI demand of commercial enterprises. Here it is stressed that Spain wants to follow the European trend of open government. The call is translated, however, into a technology-oriented drive for PSI, reflected in the slogan 'Digital Content for a Digital Society'.

Slovenia takes a strong legally oriented route, whereby PSI reuse regulation is limited to 'raw information'. Within this regulatory framework, an organization or citizen wanting to reuse PSI has to file a request with the appropriate PSB, giving details about the required data and the intended use. PSB are allowed to charge costs if the delivered PSI is intended for commercial reuse. Although it is not explicitly mentioned, the description strongly suggests these extensive bureaucratic regulations have been put in place for the sake of supporting digital reuse.

3.5 Comparing individual reports

Now we have delivered a sketch of PSI reuse policies and practices across Europe it is appropriate to give some examples of actual reuse that have gained media attention. They were covered by the media, either because interesting results could be shown, or they had led to uncomfortable reactions by PSBs. These PSI-related occurrences support the idea that reuse should be enforced and vested interests seem to be harmed and have to be taken into account.

The most striking example of PSI reuse's impact on society can be found in Britain, where *The Guardian*, a leading national newspaper, revealed in May 2009, excessive declaration behavior

[4] http://www.gfii.asso.fr/article.php3?id_article=3278.

by members of the British Parliament (Daniel and Flew 2010). It is a clear example of different public data sources combining to provide the right information for a story on extraordinary expense statements by elected representatives in Parliament, a story, which forced some of them to resign.

Another case from Britain concerns the alleged commercial activities of the British national mapping agency Ordnance Survey (OS) in marketing a service called Address Point, a match of data from OS files with files from the Royal Mail. Intelligent Addressing, a public/private partnership formed by the umbrella organization representing local governments, operates a similar service and filed a complaint at the Office of Public Sector Information, accusing the OS of activities obstructing fair play in this market (OPSI 2006). After further accusations and non-binding rulings by multiple advisory committees, on 3 December 2010 Intelligent Addressing issued a press release indicating the dispute had been settled by the formation of a joint venture.

In Belgium, a public debate arose about a young student who developed and launched an app in 2008 called iRail which was able to import the timetable of the national railway company NMBS into a smartphone. That student was sued by NMBS, which accused him of breaching several copyrights. The case stimulated discussion in the press and in the political sphere. It was obvious that NMBS had no reuse policy and the dispute forced it to put such a policy in place, after which the argument with iRail was settled.

In the Netherlands, the commercial map-maker Falkplan Andes objected to the decision of the Dutch water and infrastructure board Rijkswaterstaat to disclose its entire file of detailed digital roadmaps. Falkplan Andes argued that their own massive investments in the production of roadmaps would become worthless if government decided to disclose an alternative for free and started a court procedure, which awaits a final ruling.

Another Dutch case is the CarSpotter app: for only a few Euros one can obtain all the technical details of a specific vehicle merely by entering its registration number. This app is based on public data from RDW, the Dutch vehicle licensing agency. After RDW launched a similar service based on the same data for free it was accused of obstructing the development of commercial activities based on PSI.

It is easy to treat these cases as isolated incidents. They demonstrate, however, that PSBs are not really fit to play the role of PSI disseminator, which they are supposed to. The only case in which the course of events did not lead to accusations and court cases regarding PSI is the British MP expenses case. This is also the case where PSI was used in the way it was intended by PSI policymakers: multiple sources of data were combined in order to generate new information. All other cases, one way or another, amount to disputes on a single set of data held by one organization.

The description and analysis of the ePSI reports reveals a diverse and multi-faceted Europe when it comes to PSI reuse. Reuse of data rather than clear-cut information products as promoted by the 2003/98/EC Directive is seen as beneficial to the economy by most member states; however, the relationship between public administration and the economy is envisioned in many different ways. This analysis shows some resemblance to how Geert Hofstede depicts cultural differences (Hofstede 1980), but we prefer to present a less detailed picture to do justice to the rather general research data.

The main message from this analysis is that PSI should not be treated as a value-free phenomenon. On the contrary, how PSI policies are implemented and linked to societal goals and virtues is context-dependent, as recapitulated in table 4. The analysis suggests that cultural preferences and other local circumstances play a role in appraising the nature of PSI.

The European PSI reuse comparison clearly demonstrated that conceptualization of PSI is context-dependent, which suggests that how PSI reuse is introduced and executed in EU member states depends on national cultural and administrational contingencies. If we want to understand how organizational arrangements are emerging, formed and shaped we have to take local circumstances into account and be aware that they play an essential role. In the following chapters, two 'in-depth' cases are presented to reveal their connection with specific circumstances.

Table 4 Results of the European policy scan based on an analysis of ePSI reports

Perspective	*Information*	*Data*
Community	Bulgaria, Poland, Romania	Portugal, Denmark, Norway, Sweden, United Kingdom
Internal		Belgium, Finland, Germany, The Netherlands
External		France, Slovenia, Spain

4 In-depth case I: PSI reuse in the Dutch GBKN-BGT organization

In the early years after the millennium the idea started to grow that public organizations in the Netherlands were operating too much in isolation. Additionally, it was argued that if services were to be offered digitally to the general public, it was essential to align public tasks in order to enable one-stop shopping for the citizen (Postma and Wallage 2007). The Dutch government developed a policy to enable e-Government by putting in place a framework of key registries. Until then, PSI reuse was seen as an internal instrument, making the public sector as a whole more efficient.

The Dutch spatial information sector had been guided by the idea that efficiency could only be promoted, by optimizing spatial data exchange between government organizations and creating a spatial data infrastructure (SDI). One successful spatial infrastructure was the system of large-scale base maps called Grootschalige Basiskaart Nederland (Large-Scale Base Map of the Netherlands, GBKN). It started in 1975, when the Dutch cadastral organization (Kadaster) was assigned to build up this facility. In 1990, when only 20% of the nation was covered with base maps, Kadaster was relieved of this task and a public private partnership (PPP) was formed, representing users and producers (municipalities, utility companies and Kadaster), which managed to finish the base maps for the entire country in 2001.

Initially, the potential of unified large-scale base maps was only recognized by its users and producers but after the millennium national government attempted to make it part of a na-

tional system of key registries and it was renamed as key registry large-scale topography (Basisregistratie Grootschalige Topografie, BGT). It appeared to be an effective tool to connect administrative data with spatial data. Today, BGT it is seen as part of the public information infrastructure and is available at zero or marginal cost.

We learned from our European comparison that the Netherlands is among the countries whose public sector has an approach rooted in the internal perspective, firmly fuelled by new public management (NPM). During the 1990s there was definitely a trend towards agencies being distant from government, with a clear public task to perform and responsibility for their own policies and budgets (Veenswijk 2001). This case description reveals that the development of GBKN as a PSI supplier is closely connected with the trend of NPM, although its roots can be traced back twenty years.

In order to learn more about transition processes in PSI use and reuse, we look at how the sector-based registry of GBKN became the BGT as part of the national system of key registries.[5] In order to understand the actual position of BGT knowledge of its origins and maturation is necessary. We have chosen to present an ethnography to do justice to intentions, meanings, judgements, contextuality and reasoning in order to grasp the course of events. Ethnographers have to be convincingly authentic ('been there'), plausible (relevant to the reader) and relevant (engage in critical analysis) (Golden-Biddle and Locke 1993). In order to do so, this research project followed the writing conventions developed by Watson and extended by Duijnhoven concerning the transfer of field notes into convincing and authentic texts (Watson 2000; Duijnhoven 2010). To meet these requirements, we present some excerpts from our interviews and field notes. The research is based on 25 in-depth interviews and the study of policy documents, professional journal articles, research reports and film footage, together with a few observations of GBKN-related events after 2005.

The case can be chronologically divided into a definition and production phase (1968–85), a completion after stagnation phase (1985–2000) and a recognition and consolidation phase (2000–15). In the next few sections the ethnography is presented, followed by an analysis and a conclusion.

4.1 Definition and production (1968–85)

When GBKN started out in 1975, national mapping agencies were producing inconsistent, scattered and inaccurate maps, whereas large urban municipalities had sophisticated base maps of their own territory. Kadaster saw GBKN as an opportunity to improve its own inconsistent mapping system, and invited the cable and pipe industry to join in order to share costs whereas municipalities were systematically ignored. A key actor explains:

> It started before 1975 and change was in the air. The world of map-making was very chaotic in those days. Cadastral maps were used as a de facto standard, and although users knew they were unreliable and not standardized, they were the only thing available. I was asked to take the lead, but had no idea where to begin. The only thing I knew for sure was that Kadaster had to join, because it was the only Dutch organization with large-scale maps covering the entire nation.

[5] This case has also been described extensively in Koerten, H. (2011).

In those days, Kadaster had old-fashioned, not to say archaic, work procedures, which ruled out standardized mapping attempts. The results of an unstructured, 'muddle through' policy to upgrade cadastral maps had been far from successful, so a 'big bang' was needed to settle the problem of inferior maps once and for all. GBKN was regarded an external phenomenon that could make that happen. An independent national committee wrote a rather technical plan for a large-scale mapping system on a national level, stating that many public and semi-public organizations were in need of a system of large-scale topographic maps as a vehicle for information exchange.

Kadaster began production of GBKN in 1975 in rural areas, stimulating local initiatives, engendering a multitude of approaches to mapmaking, standardization and organization, as advertised by one of its directors in a television interview on GBKN in 1976:

> We only start a certain project in a certain area when it appears that there is a demand for the product. We don't start, so to speak, from north to south, covering the Netherlands with large-scale base maps.

Although Kadaster still produced GBKN maps on paper sheets, urbanization caused heavy turnover in the updating process. In order to manage this process, large Dutch municipalities produced detailed and well-maintained maps of the built environment using computers: Rotterdam in 1984 was the first municipality to have a computer file with complete large-scale municipal topography. Large municipalities were in a position to ignore GBKN.

4.2 Completion after stagnation (1985–2000)

Although in the 1980s information technology started to enter organizations with increasing speed, Kadaster still produced paper-sheet GBKN maps and large municipalities kept their smooth-running closed shop, producing digital base maps. Using these paper maps, however, it was impossible to follow the ever-changing built environment. A robust updating routine was needed, making municipalities more important as the originator of all environmental changes. Mid-sized municipalities demanded a rapidly updatable GBKN.

The 1980s recession brought a sense of crisis to Kadaster, turning GBKN into a financial burden and depicting Kadaster as a liability to government. With only 20% of the country covered by GBKN and Kadaster preoccupied with its own fate municipalities were spurred to take initiatives to gather utility companies and Kadaster round the table to make financial arrangements for joint production. With municipalities taking the lead, novel inexpensive digital techniques were introduced to produce an easily updatable, standardized, fully digital GBKN. Meanwhile, a consolidating utility sector was a powerful driving force towards more professional partnerships, balancing stakeholders' interests and boosting efficiency. Kadaster became privatized and financially sound again and was released from its obligations towards GBKN. A former Kadaster official observed:

> GBKN had cost Kadaster over a billion euros because the entire map-making process was a mess. GBKN distanced itself from Kadaster through the establishment of a national cooperative body. Only then was it possible to make GBKN cover the entire country in a standardized way. This did away with the culture of civil servants wearing overalls with a 'we are the real surveyors' spirit at Kadaster.

In 1992, the mood within GBKN became optimistic again. The established GBKN public-private partnership (PPP) with representatives of municipalities, utilities and Kadaster, enabled more balanced relationships between stakeholders. Kadaster felt it was released from a financial burden, municipalities were recognized as crucial for the updating process and utilities made their user role more distinctive. Novel technology was expected to boost productivity in such a way that the remaining 80% of the Netherlands would have base maps within ten years. A dual business model was proposed to serve both new regional cooperative bodies and municipalities with an established system of base maps. Agreement on multiple strategies meant that completion was by far the most important issue for all involved organizations, something which was further demonstrated by regular publication of the map production figure per province. One after another provinces were declared as completed, resulting in final completion in early 2001.

Upon completion, all three stakeholder categories changed their attitude towards GBKN. Kadaster had become a map-user with GBKN serving as a topographical base for the cadastral map. The cadastral organization had started to become a service provider, offering GBKN services for centralized map-selling, webhosting, billing, bookkeeping and legal advice. Municipalities had secured the updating process and utilities had downgraded their involvement by becoming map-users, being the major driving force to economize on mapmaking. All three stakeholders retained substantial financial responsibilities.

4.3 Recognition and consolidation phase (2000–10)

When it was made official in 2001 that GBKN was complete and covered the Netherlands as a whole, the responsible deputy minister distanced himself from the result:

> If it appears that GBKN as a base registration needs to be safeguarded by national government I see it as my task to manage that, together with the involved parties. It is not up to me, however, to take initiatives and it is certainly not my ambition to provide central funding.

Thoughts shifted towards safeguarding the overall essence of government through developing an ICT-enabled system of key registries on natural persons, and non-natural persons (organizations), property and topography. GBKN was the obvious candidate to become a key registry for large-scale topography and its management saw it as an opportunity to gain recognition. These developments made the ministry responsible for GBKN take action. The balancing public-private partnership (PPP) concept was given up in favour of a government-owned, funded and centrally managed resource. Although the Ministry of the Interior took the lead, at the Ministry of Urban Planning (VROM) there was a feeling of dealing with unfinished business, as a former policy executive explains:

> It took 25 years to get GBKN done because central government failed in that context, a historical error. It took so long because central government did not take action, so VROM got cold feet. Now justice will be done to that historical error. We have to invest 10 million Euros to get GBKN into the system of base registries. We managed to get these base registries thanks to the e-Government programme. A law was passed and accepted by large municipalities, which secured easy implementation.

Speculations were made about G-Day, when GBKN would become a key registry, but ongoing discussions on full-government financing caused an uncertain situation, making utilities suspicious:

> Now the system of key registries is near, the Ministry of the Interior wants our joint GBKN. They want to use it without charge. They want it for free, but it was our investment too that made it into a high-quality standardized product. If they want to have it they have to pay.

After two years of negotiations, utilities gave up their financial participation in GBKN and limited their role to become only GBKN users. Kadaster favoured base registries because they strengthened its role as service provider. They also strengthened the position of municipalities as focal data-generators for the public sector. GBKN as an organization ceased to exist as it was transformed into government-funded key registry large-scale topography (Basisregistratie Grootschalige Topografie, BGT). A first result of this development was a process towards further standardization, followed by the presentation of an extensive policy document depicting informational, organizational, financial and ICT consequences (Van Rossem 2009). The plan demonstrated that national government was ready to take full responsibility for BGT as part of the system of key registries, but that implementation and updating processes were highly decentralized, involving all former participants of GBKN.

The position of *source-keeper* was introduced, i.e. the organization responsible for the initial production and further updating of key-registry data in a specific jurisdictional area. Municipalities were the logical candidate for that role, but other government bodies like provinces and water boards could be source-keepers for a specific area and/or data type. The position of Kadaster remained largely unchanged as it was seen as the (IT) service provider for national exchange facilities of BGT. The role of the utilities as private parties was consolidated in a law regulating its role as user and provider of updates to national facilities. It was also agreed that national government would gradually take over its financial responsibilities.

Now that BGT is nearing the production phase, a lot of attention is being paid organizing the upkeep process. Source-keepers are free to organize the process as they see fit: either it can be outsourced to cooperative bodies and engineering contractors, or they can do it themselves, combining it with other internal surveying and updating activities.

4.4 Analysing the GBKN-BGT case

Guided by a community perspective, GBKN as a supplier of spatial PSI stems from the desire of specific organizations for a national system of base maps covering the entire nation to replace individual, dispersed, inconsistent mapping practices. Production was placed in the hands of a single organization which after some time proved to be unfit to deliver the expected national system of maps. Then a PPP was put in place, representing municipalities, utilities and the Kadaster as main stakeholders, as they were convinced that society as a whole would reap the benefits of GBKN, while only a specific part of the public sector was actually involved. This organizational arrangement was tailored to regional needs, enabling individual municipalities, utilities and Kadaster to achieve the desired product. This arrangement of disparate public and private parties was able to make GBKN into a national large-scale mapping infrastructure with a major standardization campaign. After the millennium multiple perspectives enabled GBKN to serve many purposes, culminating in the process of becoming a key registry, which acknowledged its full potential.

In 2001, GBKN was still seen as a self-supporting public infrastructure. Government was increasingly tempted, however, to deliver digitally integrated services. It reacted by building an integrated system of public key registries and GBKN was selected to become part of it. As a rather isolated facility serving a specific sector it became part of an integrated framework of key registries, opening up new possibilities for application, including reuse. Municipalities became the key actors in the management process as they positioned themselves as the linchpin for multiple key registries. As participants and investors in regional cooperative bodies, utilities at first felt they had been betrayed and not rewarded for their role in GBKN. Seeing base maps only as a means to an end, however, they accepted proper financial compensation. Kadaster sought ways to prolong its role of service provider either for GBKN or for a public key registry.

Table 5 Analysis of the GBKN/BGT case

Phase	*Perspective*	*Main focus*	*Organizational perspective*	*Intervention logic*	*Cultural dynamic*	*Management implications*
Initiation and production	Community	Civil society	The Kadaster solves a public problem	Executed by a single organization	A closed sector enabling the Kadaster to be a societal servant	The Kadaster as a public custodian
Completion after stagnation	Internal	New Public Management	A multi-level independent PPP arrangement	Change towards a new cooperative model	Novel technologies create momentum	Maintaining new organizational alliances
Recognition and moral panic	Community Internal External	Public facility NPM e-Government	All for one, one for all	More of the same	Moral panic (focal actor)/sit back and relax (other actors)	Seeking recognition and the comfort of national government

The GBKN-BGT case fits into the pattern of the Netherlands as a densely populated country with a complex public government structure (chapter four). The creation, development and maturation of an infrastructure of large-scale base maps by three categories of users/producers, and a fashionable PPP arrangement in place in the crucial phase of completion, created a build-up of vested interests insensitive to external opportunities. When national government wanted to align administrative data in order to enforce digitalization of government services, it used its powers to gain control of GBKN. The proposed BGT organization resembles the GBKN organization, with the PPP arrangement being replaced by national government finance and control.

The community perspective guided the first attempts to create GBKN, leading to narratives about the creation of an infrastructure that help to make the nation more efficient and to avoid accidents and disasters. In the late 1980s GBKN, Kadaster got the blame for poor production results, being accused of being conservative for decades and unfit to apply novel technology. The internal perspective seized hold of GBKN during the 1990s, as novel technologies applied within a PPP arrangement helped involved organizations to move towards completion. The narrative was goal-oriented, aimed at completion, with a keen eye on cost-effectiveness. During the first decade after the millennium narratives shifted towards GBKN being a standardized and unified mapping system ready for digital service delivery. Today, BGT is described as

an incarnation of GBKN, driven by all three perspectives, and part of a national information infrastructure. The external perspective claims BGT is important for e-Government, the internal perspective insists on its being a cost-effective public facility and the community perspective prefers the open data approach in which the system of key registries is the backbone of PSI reuse.

The focal position of Kadaster

As utilities started to confine their role to be just users of GBKN and municipalities continued to be originators of the GBKN data they were able to sit back and wait. Kadaster, however, was desperately looking for a new role. While it was trying to become a service provider for GBKN, the PSI reuse discussion started to affect GBKN policies. The transformation of GBKN into BGT caused a sort of moral panic at Kadaster. If BGT data became available free of charge to any organization, the PSI discussion would ultimately affect the 'crown jewels' of Kadaster: cadastral data. Implementing a generative policy on PSI reuse would mean Kadaster losing control over its main source of income: revenues from registering and selling cadastral information. Kadaster, which for 180 years had been the property registration office of the Netherlands and led discussion on cadastral information, started to lose control of its own fate. In 1975 Kadaster felt it was in control as it was awarded the assignment to produce GBKN, selecting other organizations to join as it saw fit. After the turnaround Kadaster created a new role of service provider of GBKN, a role separate from that of stakeholder, generating extra revenues. This new identity was cultivated as an opportunity to explore further diversification. Kadaster acquired the National Topographic Service in 2004 and the information exchange facility for subsurface cable and pipe location information (KLIC) in 2008. Increasingly, Kadaster profiled itself as a contractor for ICT projects within the public sphere, using revenues generated by regular cadastral activities as venture capital for considerable investments.

Since discussions on open-data policies and PSI reuse started to emerge, Kadaster has been guided by a narrative of denial, delay and refusal. Now the idea of PSI as open data is an international trend and has become highly fashionable in the Dutch public sector, it is seen by Kadaster both as an opportunity and as a threat. On the one hand, it has to act at the forefront of open data exchange. On the other hand, its vested interests in cadastral information allow Kadaster to be in control of its revenues from it, leveraging further investments. Meanwhile, these same revenues act as an impediment regarding cadastral open-data policy. This has forced Kadaster to secure its own position as a self-supporting government agency, preventing it from being a front-runner when it comes to PSI reuse. The logic behind open-data policies is that they should generate tax revenues from which government as a whole will benefit. The ultimate consequence for Kadaster would be that it would have to give up its independent role and become an organization financed by and under control of national government.

Now that national government is exercising power to enforce key registries, Kadaster is in a state of confusion, andfollows the narrative of embracing national PSI reuse policies, as it perceives itself after a period of diversification to be in a position to become less dependent on sales of direct information. The cadastral strategy of obstructing open-data policies has put it in a favourable position to benefit from EC and national government policies towards PSI reuse.

The GBKN/BGT case presents as an example of how the diverging interests of a limited set of stakeholders can determine the creation and fate of a rather isolated information infra-

structure. This infrastructure has now become a crucial element of a system of key registries which is designed and implemented under the supervision of national government, allowing the public sector to perform better. These developments are guided by community, internal and external perspectives, all fighting for dominance, with national government seeming to be firmly in control. Kadaster appears to be impressed by government officials and high-ranking civil servants paying lip-service to PSI reuse policies while the only thing that seems to matter to them is an effective and efficient public sector. This might explain the uncomfortable position of Kadaster, which is seeing both the dominant international trend of PSI reuse and a powerful force within the Dutch government focusing on government performance.

5 In-depth case II: River Information Services (RIS) in the logistic chain

Public service information (PSI) is present in a wide range of business domains. River Information Services (RIS) are presented as a PSI case for the business domain 'inland waterborne transport'.[6] RIS provides harmonized information services to support traffic and transport management in inland navigation, including interfaces to other transport modes. One of the features of RIS is the supply and transfer of electronic navigational chart data.

Transport systems are the result of a development taking decades or even centuries. After such a long period of 'evolution' it becomes more and more difficult to realize further improvements in the transport systems, whereas the need for improvements is becoming more and more necessary. Increasing pressure from society on traffic and transport and the foreseen growth of the volume of freight transport are important drivers for the required change and improvement. As in other transport modes, inland navigation is faced with these developments. The autonomous development of waterborne transport could be boosted owing to the increasing road traffic congestion in industrialized regions in Europe. On the other hand, extensive expansion of the waterway network and its structural works like locks and tunnels is thwarted because of limited free space in industrial and highly populated areas in Europe and because of limited finances. Furthermore, the need for safer and more environmental friendly inland shipping limits the free space for further development of inland shipping.

This contradiction asks for innovative solutions. One would be to enhance the transport systems by embedding information and communication technology (ICT) in all aspects of the transport system. This enhancement of transport systems is known globally by the term Intelligent Transport Systems (ITS). Part of this ITS development for inland shipping is covered by River Information Services (RIS).

From this perspective, use of public sector information is not limited to local or national scales; by its nature, inland waterborne transport is crosses borders. In the RIS case the scope is determined by the European scale: Europe has over 30,000 km of canals and rivers that link together hundreds of key industrial towns and areas. The backbone of this network is constituted by major rivers, such as the Rhine and the Danube and many tributaries and canals connect a variety of smaller towns and industrial centres. A considerable number of ports along the network provide access to and links with other modes of transport.

[6] An actual overview of inland waterborne transport can be found at: www.inlandnavigation.eu.

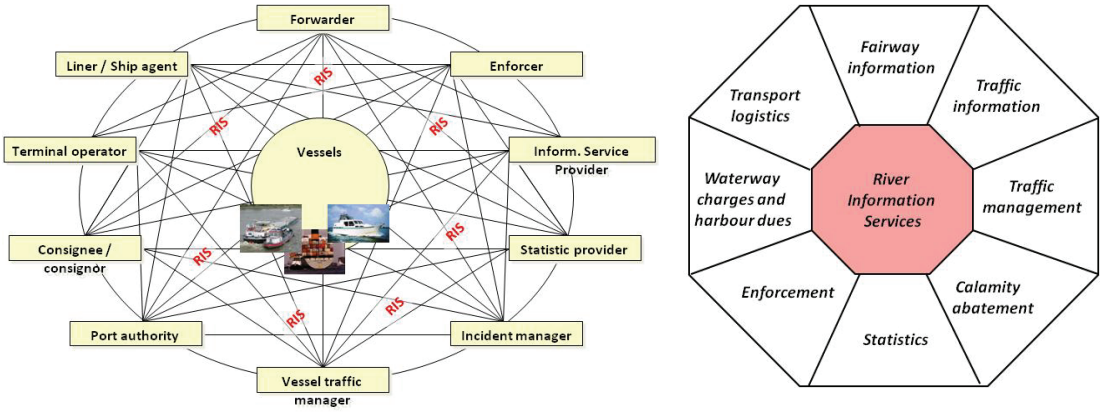
Although waterway users and administrative authorities are considered to be the direct beneficiaries of operational improvements, the implementation of RIS will significantly benefit society through traffic shifts, safer navigation, decreased pollution, and lower transport costs.

The enlargement of the EU, embracing Central and Eastern European countries, has caused a massive increase in freight transport demands. It is therefore necessary to modernize inland navigation and to make inland waterway transport more attractive in competition and cooperation with road transport.

Behind the policy statements, European research – especially within the Framework Research Programmes – has contributed significantly to the development and deployment of new RIS technologies. These research, demonstration and test activities have contributed at the levels of technology, organization and policy, and have helped to remove the obstacles to effective implementation of RIS.

The RIS context is characterized by its mutually dependent mixture of public and private information holders. River Information Service objectives can only be achieved by information exchange between public and private participants. This is illustrated in figure 5, where the involved actors and information types are presented:

Figure 5 Involved actors and information types of RIS



Phases in the development of RIS

The following concise narrative description of the development of River Information Services is derived from the vast amount of information available in the content of the various websites of the European Union. It can be roughly subdivided into documentation on policy, implementation and research.[7]

[7] See respectively: ec.europa.eu/transport/infrastructure/index_en.htm (policy), www.ris.eu (implementation) and www.transport-research.info (research).

In the development of the European River Information Services the following phases can be distinguished:

- reconnaissance and research phase (1998–2005),
- anchoring phase (2005–11),
- deployment end expansion phase (2011 onwards).

5.1 Reconnaissance and research phase 1998–2005

The development of RIS originates in the White Paper 'European Transport Policy for 2010: time to decide', which was published by the European Commission in 2001.(Commision of the European Communities, 2001) In this paper the European Commission prescribes:

> the installing of highly efficient navigational aid and communication systems on the European inland waterway network to make the inland waterborne mode of transport still more reliable, efficient and accessible.

Based on the White Paper a great number of reconnaissance initiatives have emerged, focused on: defining objectives and translating them into manageable programmes and projects, policy alignment with kindred institutions like PIANC (Permanent International Association of Navigation Congresses) and the Central Commission for the Navigation of the Rhine, constitution of high-level groups, working groups and platforms, development of information technological architectures and concepts, search and research for possibilities for test areas and pilots, testing technology and organization concepts, defining standards and working procedures, reporting to and prioritizing for the various government stakeholders involved.

All research activities were bundled in the EU Community Frameworks Programmes (FPs). These Framework Programmes were set up to cover research, technological development and demonstration activities. Three consecutive research projects largely determined the context for the development of RIS in this phase: INCARNATION, INDRIS and COMPRIS.(European Commision)

The INCARNATION project started in January 1996 and defined the functional and technical specifications for demonstrating and assessing an RIS consisting of these elements: traffic image on board, logistic information, calamity abatement and fairway information.

Starting in January 1998 the INDRIS (Inland Navigation Demonstrator for River Information Services) project enriched the results of the INCARNATION studies. The functionalities of the final RIS concept were defined and communication technologies, management procedures and information services for the RIS concept were demonstrated and assessed at four different European sites (Danube, Seine, Flanders and Rhine-Scheldt). The INDRIS project successfully proved the technical feasibility of the RIS concept and many of its elements. INDRIS confirmed the main benefits for users with respect to rationalized, timely voyage planning, reduction in fuel consumption, operating times near terminals and improved safety of shipping.

During the period from September 2002 to September 2005 the COMPRIS programme (Consortium Operational Management Platform River Information Services) dealt with the pan-

European standardization and harmonization of River Information Services, which was a prerequisite for full installation of RIS on all navigable waterways. Therefore, the completion of the COMPRIS programme was an important final milestone in the pan-European installation of RIS. The working groups were composed of participants from ministries, transport industry, research institutes and ICT companies. In total, 44 partners were involved in the execution of the COMPRIS programme.

> The outcome of the COMPRIS project was a pan-European consensus on the RIS architecture, the RIS system elements, applications and their interfaces. RIS applications for government and commercial use at a local, national, regional and pan-European level were developed and tested at operational test locations in Nijmegen, Oberwesel, Danube/Vienna and on board government and commercial vessels (about 40).
>
> In the COMPRIS project attention was also paid to the socio-economic aspects of RIS. Assessments reflected the economic effects on the different groups of actors, the satisfaction of prospective users with the system's final design and its demonstration and socio-economic aspects like cost/benefit, pollution, vessel emissions and employment.

The participants in all three projects finalized their collective research activities and dialogues defining key results and policy implications. These were submitted to the various policy platforms and the resulting decisions were input to succeeding projects.

The INCARNATION project proved that an automatic identification system (AIS) contributes to the efficiency of the use of the fleet, the inland resources and the infrastructure. Moreover, significant reductions in sailing time and fuel consumption could be achieved using traffic information. The project noted that discussions were needed within EU member states on adopting the INCARNATION results in their policies and that the European Commission and other responsible bodies (e.g. Rhine and Danube Commissions) should be informed at an early stage in order to improve prospects for implementation.

The technical operation of RIS has been demonstrated successfully in the INDRIS project in various locations in Europe. INDRIS proved that inland ECDIS (Electronic Chart Display Information System) was a very strong platform as a reference for geographic information and applications. It enabled the commercial suppliers of various types of systems to design, develop, build and sell their own applications. By upgrading the AIS standard INDRIS contributed to the standardization of transponders. During the course of the project it became clear that public authorities were responsible for safety, environmental protection and the maintenance of fairways and their proper use whereas transport companies were required to operate and survive in a highly competitive market-place. An essential policy point was that further development of public-private partnerships required careful and meticulous consideration and that cooperation between industrial partners should be stimulated and coordinated by non-commercial management. As a result of the enlargement of the European Union in 2004, the cooperation between the Rhine and Danube countries became a stepping-stone for the establishment of a link between the North Sea and the Black Sea and offered perspectives for developing new transport patterns supported by RIS.

COMPRIS proves that RIS was ready for implementation. The pan-European RIS architecture consisting of functional, informational, and organizational architecture was completed. System suppliers adopted the RIS standards in their systems and applications. Policy statements

guaranteed that RIS implementation was a high priority on the European political agenda for the next decade. At the same time member states took measures to implement and operate RIS on the national waterways and ensure that the transport sector met the requirements of the RIS Directive.

The end of the reconnaissance and research phase was marked by the approval and publication of the RIS Community Directive in the official journal of the European Union on 30 September 2005, thus uniting the collective results and concepts of the participants in an official frame.

During the reconnaissance and research phase important decisions of policy actors reinforced the programme. Decisive milestones were:

- The agreement of the European Parliament on a resolution considering the creation of high performance, geographically-comprehensive information systems on inland waterways to be extremely important and calling on the Commission to submit a proposal for harmonized provisions to wards the implementation of River Information Services.
- The European Commission's initiative to put forward a proposal for a Directive on River Information Services as presented at the session of the Transport Council of 9 October 2003.
- The Declaration of European Ministers of Transport signed in Rotterdam September 2001 calling on the member and accession states to implement European RIS by the year 2005.

In retrospect one can see that in the reconnaissance and research phase a number of interesting signals are apparent, indicating the maturity for implementation of the information services.

Fulfilment of prerequisites for RIS implementation and operation

At the end of the reconnaissance and research phase, the following essential pre-requisites were fulfilled:

- Clear policy objectives were defined.
- All actors shared common interests in these policy objectives.
- The core businesses of the actors were known.
- The interdependence of actors and services were indicated.
- The public roles were determined.
- The exchange of information was connected to the core business of the actors.
- Costs and benefits on sector and actor level were surveyed and discussed.

Furthermore the RIS community adopted and used a definition of RIS which was related to the policy objectives:

> RIS means harmonized information services to support traffic and transport management in inland navigation, including interfaces to other transport modes.
> 'RIS aims at:
>
> - contributing to a **safe** and
> - **efficient** transport process and
> - **utilizing** the inland **waterways** to their fullest extent.

RIS was primarily focused on the introduction of new, digital communication services, partly replacing existing analogue services like radio, fax and telephone, but also providing new jointly used services. Generally speaking, the core businesses of the different participants were not affected in the implementation process, although sometimes roles were (re)defined and activities were clarified and adjusted.

Distinguishing arenas

Another important signal resulted from cooperation during the successive steps in researching the RIS services. It became clear that inland shipping was in fact the generic term for a large group of interactions between the stakeholders in at least five different 'arenas', namely:

- *transport logistics arena*, in which parties that **cause the transport** (e.g. consigners, consignees, shippers) and parties that organize the transport (e.g. supply forwarders, freight brokers, fleet owners) cooperate;
- *transport arena*, in which parties that **organise** the transport and parties that **execute** the transport (e.g. fleet owners, terminal operators, customs) cooperate;
- *traffic arena*, in which parties that execute the transport, the shipmasters and navigators and parties that 'manage' the resulting **vessel traffic** (e.g. traffic manager, competent authorities) cooperate and the master of the ship navigates the vessel, supported if necessary by tug masters and pilots;
- *safety arena*, in which parties that organize and execute transport and parties that 'guard' the regulations related to **safety** (e.g. waterway authority, police, crisis team) cooperate;
- *supporting arena,* in which parties that organize and execute transport and parties that **enable transport** (e.g. bunker companies, repair companies) cooperate.

The awareness that the same information circulates in and contributes to different arenas, where the position of the stakeholders is determined by varying interests and opinions, was a first step in developing useful common RIS concepts and the use of a 'common language' where managerial, political and technocratic aspects were combined. In the ongoing process common knowledge was developed about the interpretative flexibility used in the different arenas and by the various participants and about successful and obstructive interaction patterns. As a result a set of informal 'rules of conduct' was adopted.

Designing architecture

Architecture – by its nature an introductory outline of the final 'building' – was the appropriate instrument to convert the common knowledge into a useful asset. A set of two related architectures were developed, presented as a reference model and officially accepted by the European actors in December 2005:

- *an organization architecture*, in which the roles responsible for the use and operation of River Information Services were defined, as well as their tasks. The collaborations between the roles and their tasks were the basis for the information and functional architecture which was needed to realize the policy objectives.
- an *information architecture* which outlined the information exchange between partners.

Comprehension of the distribution over public and private areas

The participants realized that RIS could only operate successfully if the new information services were properly distributed among the partners and were strongly related to their private or public core businesses. Combining the shared knowledge, the RIS objectives and the reference model the dialogue on the efficient and transparent distribution of existing and developing tasks and the related information sets began. It resulted in the following global overview which was the starting-point for further elaboration.

The public core business is directly related to the RIS policy objectives:
- utilizing the inland waterways to their fullest extent and
- safety.

and contributes to the core business of the private actors:
- efficient transport process.

The public RIS services are strongly associated with providing infrastructure and the related traffic management, law enforcement and calamity abatement. In the RIS architecture the following public roles were distinguished: infrastructure manager, port manager, object (lock, bridge) operator, competent authority.[8] These roles can be fulfilled by different public organizations on a central or regional level.

The private core business is focused on the efficient transport process connected with voyage planning, transport management, inter-modal port and terminal management and cargo and fleet management. The resulting logistic RIS information is used by: skippers, ship agents, terminal operators, forwarders and consignees.

Supportive cost/benefit analyses

An important issue for the successful implementation of widespread impact systems such as RIS lies in their acceptance by the actors involved and by society. As part of the research programme the acceptance of RIS was evaluated through an assessment exercise. An assessment of the entire system was conducted with respect to its costs and benefits to the different stakeholders. This was done through a dedicated cost/benefit assessment for the different private stakeholders as well for the public aspects of RIS. Furthermore, an acceptance assessment was carried out during the demonstrations. It assessed satisfaction with the final system design shown to prospective users attending the demonstrations. An important and challenging issue in the EU transport policy of the twenty-first century is the implementation and overall efficiency of an intermodal freight transport system with inland navigation as a core mode. RIS aimed at improving the efficiency of inland navigation, and as such constituted an incentive to a shift toward navigation. The wide socio-economic assessment of RIS, including the question of the externalities owed to transport, demonstrated the shifting potential of inland waterways and highlighted the incentives for such a shift.

[8] The competent authority is the authority made responsible for safety, in whole or in part, by the government, including environmental friendliness and efficiency of vessel traffic. The competent authority usually has the tasks of planning, arranging funding of and commissioning RIS.

The identified benefit/cost ratios for port managers, terminal operators, lockmasters, fairways authority, skippers, and fleet managers all proved to be greater than one, varying from 1.1 to 13.2. This was a stimulus for further implementation.

5.2 Anchoring phase (2005–11)

European playing field

Publication of the European RIS Directive created a strong conceptual base for the anchoring of the developed RIS concept in a first group of countries in the EU. In terms of investing in the further deployment of RIS management decisions had to be made. The guiding principle in these considerations was the contribution of information services to the core business of transport. The final decisions were translated to EU as well as national level and were secured in budgets and action programmes.

Whereas in the first phase of RIS funding was provided from research programmes, in this second phase European funding was made available by the Trans-European Transport Networks (TEN-T) budgets.

In 2006 the European Commission created the TEN-T Executive Agency. The Agency is in charge of all TEN-T projects and funding schemes. The projects represent all transport modes – air, rail, road, and maritime/sea – plus logistics and intelligent transport systems and involve all EU member states.

TEN-T projects aim to:

- establish and develop the key links and interconnections needed to eliminate existing bottlenecks to mobility
- fill in missing sections and complete the main routes – especially their cross-border sections
- cross natural barriers
- improve interoperability on major routes.

The TEN-T Agency manages its portfolio by prioritizing projects. The Agency uses so-called 'horizontal priorities' which relate to all modes of transport. Traffic management systems is one of these horizontal priorities.

Given the TEN-T objectives and using the key results of the reconnaissance and research phase the RIS community stated the importance of being part of the traffic management priority programme since RIS fulfilled the information demand of the transport mode inland waterway shipping.

The TEN-T Executive Agency manages priorities and budgets; in addition, the European Commission developed an action programme called NAIADES (**N**avigation **A**nd **I**nland Waterway **A**ction and **D**evelopment in **E**urope). It was based on extensive consultation with member states and industry. It focused on five strategic interdependent areas for a comprehensive inland waterway transport (IWT) policy: Market, Fleet, Jobs and skills, Image, Infrastructure. It included recommendations for action to be taken between 2006 and 2013 by the European Community, member states and other parties concerned. They were classified in legislative, coordination, and support measures.

Traffic Management Systems (TMS)

Traffic Management Systems apply information and communication technologies to the transport sector. Through TMS, transport can be made safer, cheaper, more reliable and 'greener' and can often be done rapidly and at less financial cost compared with other solutions. Some TMS applications are inherently easy to understand and we encounter them in our daily lives. Car satellite navigation systems or booking portals for train services fall under this category. Others, such as ERTMS and SESAR for instance, are less well-known by the general public, but are nevertheless of paramount importance for transport.

The Agency manages a number of TMS projects, spanning all the major transport sectors (road, rail, air, water) and encourages the deployment of TMS services across all transport sectors, in line with the European Commission's priorities.

The total co-financing for the TMS projects managed by the Agency is over €1 billion for the 2007–13 funding period.

The Agency groups the main TMS projects according to mode:
- Intelligent Transport Systems (ITS) – TMS for Road
- GALILEO – European global navigation satellite system (GNSS)
- European Rail Traffic Management System (ERTMS) – TMS for Rail
- SESAR (Single European Sky ATM Research) – TMS for Air
- River Information Services (RIS) – TMS for Inland Waterways

The action programme was published in January 2006 and in order to attain its objectives the European Commission invited member states to play an active role in the implementation of the action programme. The implementation of the programme should be carried out in close co-operation with national and regional authorities, River Commissions, as well as European industry. RIS is part of the strategic area 'infrastructure'.

The objectives of the NAIADES action programme were embraced by the inland navigation sector, who, together with the European Commission created a new research project (PLATINA), consisting of 23 partners from nine different countries, in order to accelerate the achievement of the NAIADES aims. This multi-disciplinary knowledge network created the momentum necessary to achieve the NAIADES objectives.

Strategic Area 5: Infrastructure
Objective: Provide adequate infrastructure

Improve multi-modal network
- Maintain and improve the European Inland Waterway Transport Network
- Forster mutual understanding of multi-purpose use of waterways
- Encourage the development of port and trans-shipment facilities – also in candidate and associated countries
- (re)develop industrial sites near waterways

Implement River Information Services
- Support and co-ordinate development and implementation of RIS in Europe

The PLATINA consortium included the active participation of:

- waterway operators and administrations
- representatives of the inland navigation and fleet operators
- promotion and development organizations
- inland navigation educational institutions
- experienced consultants and research institutes
- international river protection commissions.

Establishment of the RIS Directive, with funding from the TEN-T financial scheme and the adoption of RIS in the NAIADES action programme, meant that the next prerequisites for further implementation of RIS on a national level were met. Implementation of RIS services was executed 'in the field' by groups of – early adapting – counties. Conditions for a proper regional start were the implementation of the EU Directive on the national level and additional national funding for the specific RIS action plans.

The ongoing deployment of RIS in Europe is well illustrated in table 6, presented at the Smart River Conference in September 2007.[9] The flags shown horizontally belong respectively to: Hungary, Slovakia, Austria, Croatia, Serbia, the Netherlands, France, Belgium, Bulgaria, and Romania.

This chart illustrates that the Eastern, Central and Western European counties made a balanced contribution to RIS and the RIS system was implemented in both the Rhine and the Danube waterway systems. The common recognition that RIS delivered versatile pan-European services grew during the anchoring phase. Using the RIS Directive and the collective frame of reference countries selected those RIS services that fitted best with local priorities and possibilities for the first stage of implementation. This approach contributed significantly to acceptance in the various member states. In all countries the introduction of RIS was rooted in

Table 6 Deployment of RIS in Europe in 2007

Traffic Management										
Inland ECDIS charts										
Notices to Skippers										
AIS Data Exchange										
ERI Infrastructure										
ERI Data Exchange										
Hull Data										
Hull Data Exchange										
Calamity Abatement										
Waste Management										
Collision Avoidance										
Barge Identification										
RIS Demonstrator										

In Operation
Pilot Implementation
Feasibility Study

[9] In this conference the **Finnish** Maritime organization presented the 'waterway project assessment in Finland'.

three steps, feasibility study, pilot implementation, operation, which is more or less a copy of the general European approach in the reconnaissance and research phase.

In the dynamic RIS context the partnerships experienced in the research and pilot projects proved to be a good starting-point for long-lasting public-private cooperation. The existence of the different arenas however can lead to different public-private arrangements for information exchange, but all actions were based on the White Paper, the RIS Directive, the TENT priorities and the reference architecture.

Examples of organizational arrangements in the Netherlands

To sketch the variety of implementation two Dutch examples are outlined below.

- Stimulation of the introduction of ship-borne automatic identification systems
- LIVRA: a cooperative test project of central government and a foundation of private container companies.

Introduction of shipborne AIS (automatic identification system)

According to the RIS recommendations, the installation of the AIS transmitters on board of the vessels is essential for operational RIS. Using AIS, ship data (e.g. name, position, direction) are automatically transmitted for use by other ships and by the central traffic management control centres. Policy objectives can only be achieved if all relevant vessels in the RIS area are equipped with these transponders. The information infrastructure of AIS is characterized by public-private cooperation: public government provides the land-based communication and data storage infrastructure. Private parties supply the datasets using ship-based transponders.

To implement AIS the Dutch Ministry of Transport has chosen an approach based on stimulated dissemination. Preceding a formal decree on obligatory use of AIS, in 2006 the central government and the industrial sector signed a memorandum of agreement for the voluntary installation of AIS equipment on board. The agreement was based on the acknowledgement of all signatories that AIS significantly contributes to a safe and efficient transport process. Initially a limited set of data will be provided and central government will secure privacy aspects. For a period of four years a subsidy scheme for purchase and installation of AIS transponders has been established. During this introduction period a public grant of € 2100 per ship is available. The related total budget is € 14,7 ml.

The LIVRA pilot (logistic chain Information for the Rotterdam-Antwerp corridor)

As stated earlier, inland waterways have unused capacity available for transport. Generally speaking no traffic jam occurs but delay can occur at locks. The Rotterdam-Antwerp transport corridor is an important link in the logistic chain for container transport. Water-based freight transport is growing and in this corridor predictions are that container shipment will double in the next decade. Four lock complexes are present in the inland waterway infrastructure: Volkerak, Kreekrak, Krammer and Hansweert.

Proper, well-understood planning of lock operation combined with the planning of each voyage contributes significantly to an efficient logistic process. Public and private partners involved in the logistic chain assume that the best way to design the optimal process is by ex-

Figure 5 Map of the inland waterway infrastructure between Rotterdam and Antwerp

periencing the operation: the pilot LIVRA is supported by two public and private groups. Trendsetting container shipment companies formed a specially designed foundation (MIS Cobiva), and Rijkswaterstaat[10] plays the public traffic manager role on the corridor.

The private participants in MIS Cobiva started the development of a management information system to optimize the processes in inland container shipment. RWS is information provider for fairway information, maintains infrastructure objects like bridges and locks and manages their schemes of operation. Sharing and standardizing information and matching the connected processes means all parties can help to optimize the overall performance.

The leading partners in the LIVRA project were aware of the fact that two groups of actors are interested in the pilot performance: active users and curious observers. Not all the ships on the corridor were already equipped with the necessary systems, but every skipper was a user of the corridor and the locks. Consequently the effects of the introduction of new planning procedures for locks and voyages were monitored by all interested parties

From the start every inland transport entrepreneur was invited to participate in the LIVRA pilot. The collected information is publicly available in anonymous format. Active participants in the pilot have access to their own data and the data of all other active participants. The internet is used as the communication medium.

In this case too the participants opted for a stepwise introduction. First the actual situation at every individual lock complex was presented: the actual performance of the locking process, waiting times, the availability of mooring places. The next step was to present predictions

[10] Within the Ministry of Infrastructure and the Environment the Directorate-General of Public Works and Water Management (Rijkswaterstaat, abbreviated to RWS) ensures that policy is implemented.

about the locking process as well as the voyage planning. In this way the exchange of vital data originating from the lock operator and the skipper/voyage planner was established and could be used to optimize the collective process.

The last step is to present the information of all locks related to each other, make predictions for voyage planning as a whole and fit all the experiences into one automated information system. It should be noted however that the final operations depend on the human factor: the skipper and the lock operator, both acting by virtue of their responsibility for the asset: ship and lock. RIS information services will only be accepted provided that the actors involved are familiar with the information content and the information production process. The LIVRA pilot facilitates this mutual familiarization.

Funding

At the start-up of the foundation MIS Cobiva received a substantial grant from the innovation programme of the Ministry of Economic Affairs and the Rotterdam Port Authority. The LIVRA project is part of the innovation programme of RWS and therefore it is partly funded from the RWS innovation budget. Additional costs are integrated in the regular operational out-of-pocket costs of the involved parties.

5.3 Deployment and expansion phase (2011 onwards)

The development of RIS started with the White Paper 'European Transport Policy for 2010: time to decide' which was published in 2001 (Commision of the European Communities, 2001). After 2010 actions were agreed to reconsider the policy objectives and establish the transport policy for the next decade. As part of the management cycle of the European Commission the Directorate General for Mobility and Transport published a new White Paper on transport in March 2011. It was called 'Roadmap to a single European transport area; towards a competitive and resource efficient transport system'. It can be concluded that the important role of River Information Services is reconfirmed as an instrument for achieving the policy objectives. As the White Paper stated:

> Major improvements in traffic management are key to the overall improvements in efficiency and lower emissions in all modes of transport. That means the deployment of advanced land and waterborne transport management systems.

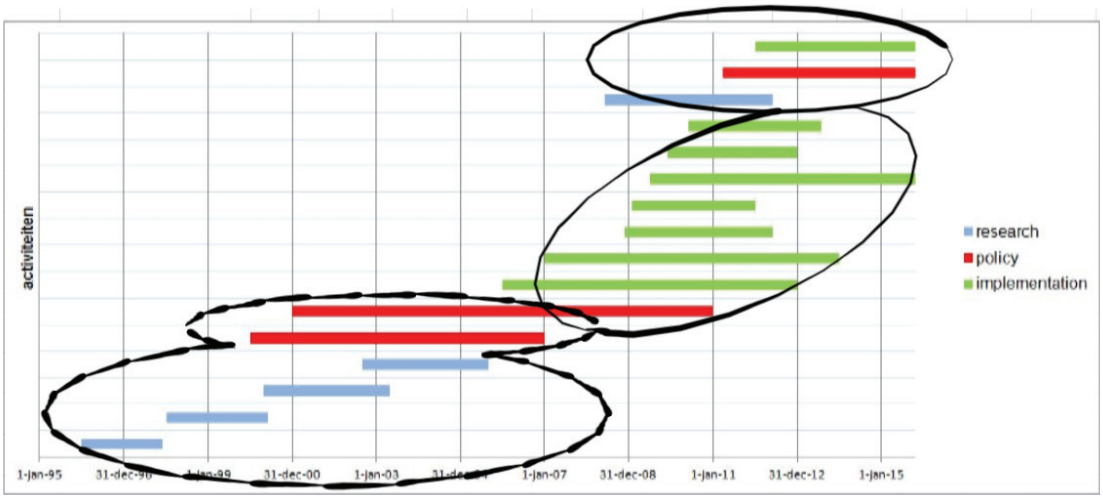
The new accenta in the White Paper are on sustainability, lower emissions, integration and connection with other transport modes. These subjects are considered in former RIS research projects, so there is a starting point for implementing these objectives in the running RIS activities.

The publication of the new White Paper on transport is the milestone for the next phase in the deployment of RIS. This phase is characterized by two main tracks:

- completing the national RIS implementation action plans, originating from the previous phases, which means entering the full operational state of the information services
- integrating the new items in the White Paper with additional activities in the RIS programme.

This is the next challenge for all partners in the RIS network. Whereas in the preceding phases two 'layers' had to be managed coherently, now an extra 'layer' is added. As shown in figure 6, in the first phase the combination of research and policy was the main issue; in the second phase the aim was to tune implementation and policy. Now, in the actual research phase, policy and operation should be combined and governed by the RIS network partners.

Figure 6 Phasing of RIS



5.4 Analysing the RIS case

The analytical framework combined with the essential notions originating from the different phases of the RIS case leads to an initial helpful overview:

The framework shows that the various perspectives are simultaneously applied in the phases of the RIS case and that all cells of the frame contain significant items. Because the deployment and expansion phase is still going on, the lower right-hand elements affect future development. In the light of the contents of the framework the following observations can be made.

Transport is by its nature cross-border; this affects the cultural attitude of the participants with respect to borders as an impediment. On the other hand the various countries in the EU have different cultural backgrounds. The enlargement of the EU with Central and Eastern European countries introduces new cultural elements. The RIS approach deals with this phenomenon by working in small groups of countries with participants from different cultural backgrounds. Moreover, operating test and demonstration sites in different regions in Europe has helped to achieve the best local fit.

From the beginning the stakeholders understood the potential opportunities offered by the introduction of the RIS concept. The information services add value to each business process and speed up the mutual information exchange, replacing old analogue techniques with digital ones. By considering all effects in the research setting – instead of in real live operations –

Table 7 Analysis of the RIS case

Phase	*Perspective*	*Main focus*	*Organizational approach*	*Intervention logic*	*Cultural dynamic*	*Management implications*
Reconnaissance & research	Community external	Benefits for society through traffic shifts, safer navigation, decreased pollution, and lower transport costs.	Simultaneous approval of different European institutions of the RIS framework, projects and guidelines.	Creating a 'safe' research environment to develop concepts and check effects on future positions of participants.	Persuasion by 'demonstration on location'. Action-based coupling between research, policy and operations.	Participants operate simultaneously in different arenas. Intentions and priorities differ depending on actors' position in the specific arena.
Anchoring	Internal	Utilizing the capacity of inland waterways to their fullest extent. Modernizing inland navigation.	National deployment, based on stepwise introduction.	Information demand originates from improvement of transport system performance; RIS-investments funded from prioritized transport budgets.	Local cultures of public and private parties determine first RIS. components adopted.	Stepwise deployment based on local opportunities and regional interest. No big-bang deployment. Accepting of phase difference in local implementation within a common frame.
Deployment & expansion	Community external	Embedding information in all aspects of the European multimodal transport system.	RIS becomes part of the operational TMS (traffic management systems) family	Inviting new actors in existing arena. Addition of new arenas.	Interaction with concepts and actors of other transport modes.	Three-layer management structure (research, policy and operations).

participants had ample time to consider consequences and place them on the relevant agendas. The value of information services was identified and discussed in relation to the relevant business processes of the stakeholders and estimated on the basis of individual and collective costs and benefits.

The awareness that different arenas can be distinguished and that actors operate and negotiate in these arenas with different interests and positions has a stimulating and accelerating effect, and the different arenas operate as 'friendly competitors' to stimulate action.

The RIS case demonstrates that public-private cooperation flourishes provided that potential conflicting topics are addressed and reviewed in the early phases of development, i.e. in the relatively safe research environment. The public and private participants proved to be capable of reviewing and assessing the situation from different points of view:

- European' ↔ transport system ↔ local context;
- public domain ↔ private enterprise.

The various groups of RIS participants arrived step by step at a collective network developing and implementing the services for exchange of information in a common chain. The management of chains is characterized by the lack of a strict hierarchy. In the RIS case formalization is achieved by approval of reference frames and directives by the European Commission and

simultaneously established institutions like PIANC, the Central Commission for the Navigation of the Rhine and Danube Commission.

In the RIS case information technology and policy were entwined. This has an interesting spin-off. Policymaking in the complex setting of the European Union is only possible through the application of sufficient interpretative bandwidth. In the various arenas of the RIS case participants were affected by this phenomenon and interpretative flexibility was introduced in the deployment phase, thus providing sufficient flexibility for implementation in the different regional government and technical settings.

The costs of information exchange are not settled at the end of the process (during operation), but are taken into account in the investment decisions taken by the management of the different participants in the early stage of the project. Consequently the costs of the information services are integrated in the regular budget schemes relating to the relevant core businesses.

Apart from regular operational tasks such as traffic management and maintenance of infrastructure, government – on a European as well as a national scale – defined objectives in relation to public research, innovation and stimulation. As a consequence European and national governments invest in research and match funds, whereas private partners invest in participation time and the development of information services and their application as commercial prospects. Thus both private and public actors act in the spirit of the entrepreneurial statement 'outlay must precede returns'.

The appearance of the second White Paper on transport(European Commision, 2011) in 2011 marks a significant milestone. It reaffirms the community and external perspectives and makes them more detailed. The participants in the RIS case used their assets to contribute to societal benefits such as traffic shift, safer navigation, decreased pollution, and lower transport costs, using the existing capacity of the inland waterways. It is all contained in the motto of the White Paper: 'towards a competitive and resource efficient transport system'. With respect to the information services the White Paper contains a clear objective: embedding Information in all aspects of the European multimodal transport system. Consequently information is not managed separately but considered in terms of its contribution to the performance of the various transport systems. This statement reaffirms the approach followed by the RIS community in the last decade.

The RIS case shows a stratification of interacting areas.

- research
- policy and funding
- operations.

At the start the focus was on research, policy and funding. With the sanction of the second White Paper the third layer 'operations' was emphasized. In the next period the conditions for continuing the successful union of research findings and policy development will be fulfilled. It is obvious that research should precede policy decisions. Only in that case will participants have enough time for the reconnaissance of the future playing field and to anticipate new positions. The RIS community has to take up the challenge of managing the 'layers' of research, policy and operation simultaneously, coherently and effectively. In the past decade the members of the RIS community proved to be capable of managing research, policy and funding.

Now operational RIS is deployed in an increasing number of member states. It can be expected that the operational aspects will dominate the various arenas. It is likely that the knowledge and competences of the members in the areas of research, policy and operations will be different. The challenge for the RIS community is to create additional shared references and common knowledge to manage the three layers simultaneously, proving that River Information Services contributes significantly to a competitive and resource-efficient European transport system. The experience of the first two phases of RIS makes this achievable.

Another challenge resulting from the White Paper is the integration and interaction of RIS with information services originating from other modes of transport. The particular culture of the RIS community touches cultures that have developed in different situations and that have a different maturity and knowledge base. The experience deriving from the tests and demonstrations performed in the various European regions will help it to face this challenge.

6 Analysis and conclusion

The research presented here signifies that changing approaches to PSI reuse have been influential in how the public sector has functioned up to now and, conversely, how developments in the public sector affect PSI reuse practices. We have conducted a comparative study on how different EU member states have implemented the EC Directive on PSI reuse (chapter three), as well as two in-depth case studies on actual reuse. The first case treats the emergence of a large-scale base-mapping system in the Netherlands, where vested interests create persistent narratives, acting as obstacles for stakeholders trying to apply revolutionary PSI reuse approaches (chapter four). In the international case on the development of a River Information System (RIS) we saw how stakeholders in a new arena of public, semi-public and private parties were establishing information exchange relations to bring about a dynamic system handling logistic information in the European inland shipping industry (chapter five). In order to analyse these studies, we referred to our research framework as developed in chapter two.

The theoretical framework holding three theory-induced ideal-type perspectives can be completed on the basis of our findings. The community perspective is focused on democracy and transparency, aimed at institutionalizing PSB reuse values through creating loyalty and aware-

Table 8 The research framework

Perspective	*Main focus*	*Organizational approach*	*Intervention logic*	*Cultural dynamic*	*Management implications*
Community	Democracy transparency	Government as a whole	Institutionalization of PSB reuse values	Society as a community	Creating societal loyalty and awareness
Internal	New Public Management	Dynamic network of separate units	Stakeholder management of PSBs towards reuse	PSB: mind your own business	Steering of values of internal responsibility
External	E-government	Adapting processes to societal needs	ICT enabled process-optimization forces organizational change	The power of innovation	From organization- to process-orientation

ness at the level of government as a whole, serving society. The internal perspective imposes new public management values on a network of public organizations where individual PSBs act in their own interests in relation to PSI reuse. The external perspective enforces e-Government on the government landscape through ICT implementation and organizational change towards the design of processes of PSI reuse. These perspectives have helped to map the European situation as described in chapter three, and might be of help in analysing the two ethnographic cases.

Comparison of the two case ethnographies reveals some analogies. Both cases reveal the formation of alliances between public and private stakeholders in the process of developing an infrastructure which will be of benefit to all participants. They started out with a problem defined as belonging to the public sphere in search of a solution. The definition of the problem brought together a disparate group of organizations who then approached a problem beyond the reach of individual organizations. Challenges were defined in terms of improving poor and incomplete information exchange relations regarded as essential for all participating organizations' future performance. Preferences were towards putting organizational arrangements in place to set things in motion.

Narratives of development and narratives of control

In the GBKN/BGT case, the development of a system of large-scale base-maps is assigned to Kadaster, a single organization which appears to be unfit to do the job. Only after the interests and financial responsibilities are more balanced in a PPP, can momentum be created to complete GBKN. After completion of GBKN, national government stimulates its further standardization, transforming it into BGT, and it is publicly financed and under exclusive public control. This exertion of public control forces municipalities and utilities to maintain their given roles, while Kadaster feels insecure. As a result, national government exerts more power, making Kadaster even more insecure and entering a state of moral panic.

In the RIS case it is initially unclear within the consortium of organizations who will perform what role. The process of unveiling who's got what information and for whom that information might be beneficial is guided by a research project. By and by, it becomes clear what information is needed, how it is going to be structured, who owns what information and which information relations need to be established. All participants seem to have an interest in exploring new avenues to make the most of it, both for themselves and in terms of the higher goal of developing an RIS. Its success makes the RIS system vulnerable as, when more parties are willing to participate in the success, the system itself could go out of control.

Two contradicting narratives can be discerned here. On the one hand, there is a narrative of control in the GBKN/BGT case. Here proliferation of PSI is seen as a public obligation, implying that a harnessed system of base maps should be in place. Formulated some 80 years ago, this concept has been and is still seen as the solution to the exchange and reuse of PSI. The transition of GBKN into BGT made it an exclusively government financed infrastructure, separating private users from public producers and further limiting the innovative powers of the key registry itself. PSI reuse is treated here as a static phenomenon, with clear roles for public and private sectors. The RIS case is guided by a narrative of development. It is the symbolization of how different parties create an arena where negotiations and trial-and-error strategies are engaged to create an information market as a prerequisite for an innovative RIS. A dynam-

Table 9 Analysis of the GBKN/BGT and the RIS case

Case	*Narrative*	*Main focus*	*Organizational approach*	*Intervention logic*	*Cultural dynamic*	*Management implications*
GBKN/BGT	Control	PSI distribution as a government obligation	Government-separated from society	Institutionalization of PSB reuse facilities and values	Fully separated public and private organizations	Government setting up reuse facilities
RIS	Development	E-government and new public management perspectives guide new arrangements	Dynamic arrangements of organizations adapting to societal needs	Public and private organizations are gathered around a reuse theme	Creating innovation-enabled safe-zones to explore new avenues	Engage in organic organizational processes based on shared targets

ic environment arises as parties try to find out which information can be used by other parties and which information they need to perform their task within the network. Instead of a shift between public PSI production and private reuse, parties treat each other as equal, as peers in sending and acquiring information. In the narrative of development information delivery costs are taken into account in the investment decisions made at the start of the negotiations and included in the business budgets of the appropriate party.

The role of policies on PSI reuse

In the case of GBKN/BGT, reuse of PSI became an issue after the year 2000 when GBKN was completed, causing clashes, misunderstanding, and unintended consequences. As a consequence, it took considerable time and effort to incorporate this rather isolated infrastructure as part of a system of key registries that were publicly accessible. In the RIS case, however, reuse seemed to be the crucial element keeping the whole project going. Consequently, reuse by third parties was also part of the deal. Both complex and basic data were proliferated and became public, enabling other commercial and public organizations to benefit.

Enabling/avoiding boundaries between the public and private domains

The closed shop-approach of GBKN towards completion, meaning a limited set of organizations was engaged made it relatively easy for national government to take control, forcing the utility industry to surrender its interests and become only a user of GBKN. The move towards BGT created a sharp division between the public and private domains. Whatever the purpose of BGT, the private sector was unable to participate since it had become a government-run affair. RIS has been and still is a product of public and private parties jointly venturing towards a hybrid system of information relations within an information arena. Instead of a government body taking control, here every interested party that cares to participate is able to join, regardless of whether it is a public or a private organization.

Standardization vs. flexibility

GBKN/BGT has become part of a government infrastructure in which standardization is a hot and recurrent issue. This tendency of working towards sophisticated standards seems to make

the system of key registries as a whole the inflexible backbone of intergovernment information relations. Standardization is seen as the ultimate force to make key registries effective. In the RIS case, standards are used for information exchange, but the system as a whole remains to be treated as a flexible instrument by all parties wishing to join. The system itself is still developing, using standards for exchange, but still working towards an ultimate version.

The cost of PSI infrastructure: who pays?

The GBKN/BGT case is an example of a limited set of stakeholders creating an arrangement for setting up an infrastructure for the benefit of all. They have worked to set up an organizational environment and financial obligations that are shared among participants. It looks like this limited set of public and private stakeholders has created the opportunity for national government to turn this PPP arrangement into a public arrangement with exclusively public finance. Compared to GBKN/BGT, in the RIS case, public funds are used in reversed way. Here EU funds are used to foster research that is intended to develop the RIS case as such, aimed at formulating possible arenas, participants and designs. These funds can only be used for developmental purposes. Once a RIS system is in place, it is likely that participants will finance their share of it, as well as central facilities when applicable.

So far, we have addressed topics concerning the architecture of GBKN/BGT and RIS cases, and these are recapitulated in table 10.

Table 10 General conclusions

Case	*Narrative*	*PSI policy*	*Public/private boundaries*	*Form of infrastructure*	*Financing of development*	*Financing of utilization*
GBKN/BGT	Control	Inserted afterwards	Maintained	Standardized	Public/private	Public
RIS	Development	In the initial design	Vague/absent	Flexible	Public	Public/private

7 Prescriptions and discussion

In many discussions on PSI reuse, government is treated as a unitary phenomenon with a single voice. The private sector is also treated as a whole, regardless of size, shape and sector. In this dichotomy, arguments too remain one-dimensional: the public sector has lots of hidden treasures of PSI that are just begging to be explored by the private sector and to be turned into innovative information products. In this gold-digging scenario, governments should not hesitate to ditch PSI in what might be called a reverse Facebook model. At Facebook, civilians voluntarily store their information, which is turned into user profiles to generate profitable marketing information, to be sold to interested companies. In the reverse Facebook or PSI model, civilians are forced to bring their information to the government and they sometimes even have to pay, although it will be made available to the business sector for free. This paper demonstrates that this image of PSI reuse needs considerable adjustment.

Following this reverse Facebook model, private PSI reusers need securities for proper information delivery. They only invest in PSI reuse when the actual data delivery is guaranteed, which in regular business relations is usually confirmed with a contract. Since PSI is treated as a public good, intended to be beneficial to all, exclusive contracts are out of the question since all potential reusers must have equal access to PSI. PSI, however, still has to come from a source that has to be extensive, neutral, reliable and sustainable (Burkert 2004: pp. 7–8), which is hard to maintain since the PSI concept has separated reuse from the process through which it is actually generated (p 3.). PSI, as it is vulnerable to being cut loose from its context, might start to live a life of its own. PSI can be made trustworthy by the exercise of a high level of standardization (Hanseth, Monteiro et al. 1996). These authors argue that an information infrastructure should ideally be highly standardized to be convincing and at the same time highly flexible to be developed according to user needs.

The information infrastructures in our in-depth case research are guided either by a narrative of control or by a narrative of development. We have identified across Europe a panoply of PSI reuse practices, varying according to national preferences. The two in-depth ethnographic studies show how information infrastructures and reuse arrangements are shaped according to (inter-)national circumstances. The narrative of control has guided organizational arrangements in the GBKN/BGT case towards a highly standardized, inflexible public infrastructure. In the European RIS case, public and private organizations established an arena where information could be exchanged, guided by a narrative of development where mutual trust leads towards an innovative infrastructure concept.

When boundaries between the public and private sector are strict and rigorous, the public sector establishes stable and reliable infrastructures which hardly allow the private sector to be innovative. When organizations from both the public and private sector are able to gather around a PSI reuse theme, however, they may form an arena where information can be exchanged and participants are treated equally in a process of innovative reuse arrangements. Our research suggests that public investment to bring about an arena of PSI sharing and reuse may boost such a development. Public investments in the exploitation of an infrastructure might, however, bring it to the public sphere again which will inhibit the development of new arenas.

Conclusion

We have concluded that the Finnish public sector is dominated by the internal perspective, when it comes to reuse of PSI. Therefore we suggest that policies on PSI reuse to stimulate economic prosperity should be aimed at creating arenas of public and private organizations gathered around specific PSI themes. This will stimulate PSB organizations to engage actively in arrangements with multiple private organizations to develop new forms of reuse. When national government develops policies aimed simply at disclosing PSI without paying attention to the development of PSI reuse arenas, it runs the risk of unleashing narratives of control within the public sector, preventing them from releasing the innovative potential that PSI reuse intrinsically has. The obvious intervention instrument for enforcing such a policy is investment in the development of thematic arenas of information exchange ensuing from both public and private organizations. It should be noted that this mode of policy enforcement might harm the public sector as a whole as it strives for increased internal effectiveness, but it would stimulate innovation and economic activity, leading to increased tax revenues.

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