

FROM NATIONAL TO SUPRANATIONAL GOVERNMENT INTER-ORGANIZATIONAL SYSTEMS: AN EXTENDED TYPOLOGY*

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Abstract

While inter-organizational systems (IOS) driven by supranational government (here referred to as supranational IOS or SN IOS) are increasingly being developed and implemented in practice, this phenomenon remains largely unexplored in the existing literature. What makes such SN IOS specifically interesting to study is that their development and implementation is driven by supranational bodies (rather than businesses or national governments), implying that Member States have given up some of their sovereignty and decision-making power to a higher level body and are bound to implement the decisions of this higher-level body at their respective national level. In this process Member States are driven by their own agendas, which are often diverging and even conflicting with that of the supranational government. While standards are essential for the development and implementation of IOS, in a supranational context the processes of agreeing on standards as well as the subsequent development and adoption of systems based on these standards are quite challenging. This is due to diverging and conflicting agendas of Member State and supranational bodies. A key question then becomes: Are SN IOS a distinct organizational form of IOS such as industry IOS and, if so, what makes them different? In order to better understand the characteristics of SN IOS we develop a novel uniform and integrative typology, considering current IOS studies along two dimensions: (1) the type of interactions they support (business-to-business; government-to-government or business-to-government), and (2) scope (national, transnational). This typology then provides a comprehensive overview of how different types of IOS studies can be derived conceptually and related to each other across several levels of analysis, enabling us to reason about similarities and differences as well as suggesting improvements and knowledge transfer. In addition we provide an in-depth case study of the development and implementation of a SN IOS (i.e. here the New Computerized Transit System) in Europe in order to provide a better understanding of the processes that drive the development and implementation of such SN IOS. Building on the typology and the case study, our findings suggest that both industry and SN IOS exhibit similarities in terms of the role that intermediary organizations play as well as the processes through which standards are negotiated. These similarities can be used for transferability of knowledge between the two domains. We also demonstrate that there are inherent differences in terms of drivers, focus, approach, adoption incentives, and unit of analysis for examining their performance and structural effects. These differences make SN IOS a distinct form of IOS requiring different considerations.

Keywords: supranational IOS, typology, standards, standards development, adoption, diffusion

1 INTRODUCTION

When investigating inter-organizational systems (IOS) used to control European cross-border trade activities one encounters the importance of the supranational transit system, the New Computerized Transit System (NCTS). The nature and scale of this IOS development is somewhat surprising. We discovered a legal obligation at the EU level that a transit system needed to be developed and implemented by all Member States and businesses involved in transit. The new transit procedures as well as the system requirements were then defined at the EU level, where representatives of all the 27 Member States defined the legal and system requirements via its committee structure. Subsequently, the governments of all Member States were obliged by law to develop national systems based on these EU specifications, resulting in 27 interconnected national systems. Finally, all the businesses involved in handling transit goods were also obliged by law to develop an interface towards the system of their national transit authorities. This illustrates the scale, but also the supranational character of this IOS development, where the decisions about IOS are driven neither by businesses nor national government but by supranational governments at the EU level that have the power to make these systems obligatory.

NCTS, however, is only one example; there are numerous other such systems currently being introduced in the EU for different procedures such as excise, and export (see European Commission, 2007). While IOS driven by supranational government (here referred to as supranational IOS or SN IOS) are increasingly being developed and implemented in practice, this phenomenon remains largely unexplored in the existing literature.

What makes such SN IOS especially interesting to study is that their development and implementation is driven by supranational bodies (rather than businesses or national governments), implying that Member States have given up some of their sovereignty and decision-making power per se to a higher level body and are bound to implement the decisions of this higher-level body at their respective national level. In this process Member States are driven by their own agendas, which are often diverging and even conflicting with that of the supranational government.

While standards are essential for the development and implementation of IOS, in a supranational context the processes of agreeing on standards as well as the subsequent development and adoption of systems based on these standards are very challenging. This is due to the diverging and conflicting positions and agendas of the Member States and the supranational bodies.

A key question then becomes: Are SN IOS a distinct organizational form of IOS and, if so, what makes them different? In order to better understand the characteristics of SN IOS, building on a literature review on IOS we develop a novel uniform and integrative typology, considering current IOS studies along two dimensions: levels and scope. With respect to levels, we distinguish between businesses, government level 1 (national government) and government level 2 (supranational government). With respect to scope we distinguish between national and transnational. Based on

this typology, we are better able to position SN IOS with respect to other types of IOS studied today.

In order to gain detailed understanding of the characteristics of SN IOS, we provide an in-depth case study of the development and implementation of an SN IOS (i.e. the New Computerized Transit System) in Europe. We pay specific attention to collective action processes taking place at the supranational level and the interactions between supranational, national bodies and businesses in that process. Our findings suggest that both industry and SN IOS exhibit similarities in terms of the role that intermediary organizations play as well as the processes through which standards are negotiated. Such similarities can be used for transferability of knowledge between the two domains. We also demonstrate that there are inherent differences between industry and SN IOS in terms of drivers for setting up the supporting organizations (business vs. government), focus (industry vs. procedure), approach (bottom-up vs. top-down), adoption incentives (business vs. legally driven) as well as the unit of analysis for examining the performance and structural effects (industry vs. the network involved in a specific procedure). These differences clearly indicate that an SN IOS is a distinct form of IOS requiring different considerations. The implication of this is that findings from earlier IOS studies as well as management approaches cannot be directly transferred to the areas where differences were identified. Further investigation of SN IOS is therefore needed in order to derive research and management implications that reflect these specifics of SN IOS.

The remainder of this contribution is structured as follows. In section two we provide a review of the IOS literature and key issues that have been raised. In addition we develop a typology, which enables us to better position SN IOS compared to other types of IOS studied today. In section three we present our research methodology, and section four presents our NCTS case study. We discuss our findings in section five and end with conclusions and recommendations in section six.

2 THEORETICAL FRAMEWORK

2.1 Overarching theoretical perspectives

There are two overarching theoretical perspectives we would like to address and deploy in our study: (1) supranational perspective and (2) collective action. The research setting we are examining functions within the context of a supranational information system. The leading theoretical perspective we utilize in our research is derived from the theory of collective action. Briefly we would like to address both framework perspectives.

2.1.1 Supranational perspective

“At any given moment in time, the question of which authorities possess the capacity to make binding rules (competence, jurisdiction) has varied across policy sectors. In some domains, competence is organized, relatively exclusively, at the national level (national governance); in other domains, European Community (EC) organizations possess relatively exclusive jurisdiction (supranational governance); in still others, authority is mixed, and must be co-

ordinated. In those areas, in which a meaningful degree of supranational governance has been established, national control over the determination of policy is incomplete or secondary.” (Sandholtz et al., 1999).

Supranational means above states or nations, suggesting that decisions are made by a process or an institution that is largely (but not entirely) independent of national governments. The subjects (in the case of the EU the Member State governments) are then obliged to accept these decisions (Bomberg et al., 2008). While in political science the debate about supranational governance has been going on for many years, it has not yet been addressed in the IOS field. We consider though that such a debate needs to be initiated due to the increasing influence supranational bodies have on decisions about IS at the level of national governments and businesses. Here we use the term supranational government IOS (or SN IOS) to refer to cases, where decisions about the development and implementation of IOS in national governments and businesses are to a large extent influenced and driven by supranational bodies. In such situations, national governments are bound to implement the system, whether or not they fully agree with it. We argue that SN IOS have distinct characteristics compared to other IOS studies available today and we seek to explore and make explicit what makes them different.

2.1.2 *Collective action perspective*

Collective Action refers to the pursuit of a common goal by more than one person. Presumably the achievement of the goal will then benefit all of society (e.g., Sandler, 1992). The term dates back to some of the work by Vilfredo Pareto in the 1930ies and Mancur Olson (1965) as he applied this concept to economics subsequently in his *The Logic of Collective Action: Public Goods and the Theory of Groups*. To an extent Ronald Coase (1937) should be mentioned in this context as well as he provided in his classic *The Nature of the Firm* the concept of transaction costs making possible the measurement of the size of firms as well as the problem of social cost (1960). Accordingly, transaction costs, especially those pertaining to the cost of organizing of such *collective action*, for a majority attempting to achieve the utility of the goal (typically a public good) are disproportionately higher than the transaction costs for a small minority. Such a minority would benefit disproportionately more from such collective action. Sometimes this is referred to as a social dilemma and is explained by the utility yield being distributed via many individuals in the first case, but in the latter only very few individuals would benefit. An additional problem of collective action is the benefit gained by those who do not participate in its achievement. This is generally referred to as the *free rider problem*. The concept of collective action has been used extensively by several scholars in the standards evolution, standards diffusion as well as standards adoption literature (see also next section) and in this paper we will utilize the concept to explore collective action initiatives that took place in the context of SN IOS.

2.2 IOS studies

2.2.1 *From a focus on IOS to support a limited number of business-to-business interactions to an industry focus*

Early on IOS was defined as “an automated information system shared by two or more companies” (Cash & Konsynski, 1985, p. 134). This definition is further extended by Johnston and Vitale (1988, 154) as follows: “An IOS is built around information technology, that is, around computer and communication technology that facilitates the creation, storage, transformation and transmission of information. An IOS differs from an internal distributed information system by allowing information to be sent across organizational boundaries”. These definitions of IOS clearly indicate a focus on the use of IS to support business-to-business interactions between and among companies and the role of government is seldom the focus of the analysis.

Fifteen years later, looking at the IOS literature retrospectively, Johnston and Gregor (2000) observe that inter-organizational systems research has dealt mainly with micro-level business-to-business interactions. The focus has been on issues arising when systems cross corporate boundaries and the difficulties of partnership in development and adoption of IOS, but has tended to focus on the more limited scope of inter-organizational interactions, often in pair-wise fashion.

In their criticism of the then-available IOS literature, Johnston and Gregor (2000) point out that the work has tended to a large extent to ignore the relationships between analysis at a level of the individual firm and analysis at a broader industry level. Similarly, Steinfield et al. (2005) observe that less common are studies that examine the implications of IT for large aggregations of firms and especially investigation of IOS influence on entire industries. To overcome the above-mentioned limitations, a number of researchers have tried to shift the analysis of IOS and to move beyond the micro-level business-to-business interactions towards an industry focus (Johnston & Gregor, 2000; Steinfield et al., 2005; Wigand et al., 2005; Markus et al., 2006). The *Journal of Information Technology* devoted an entire issue to this topic (Iacono & Wigand, 2005).

Johnston and Gregor (2000) propose a multi-level analysis consisting of three levels: individual industry units; the industry group itself, and the remote environment. The individual industry units are “the firms and organizations that contribute to the operation of the industry” (p. 244). These include firms associated with the value chain (e.g., distributors, retailers) but also actors such as transport providers, standardization bodies, and industry-related research organizations. The industry group “consists of the individual industry units plus the systems of relationships between them” (p. 244). The remote environment “consists of all firms, organizations, institutions and other factors at a larger scale than industry that affect the firms and organizations of the industry and the relationships between them” (p. 244) (e.g., government policies, foreign competition).

Although the remote environment is not well elaborated on in Johnston and Gregor’s work, the importance of the environment, however, has been in general a subject of

broad discussion in the context of inter-organizational relationships with early research starting in the late 1950ies (Dill, 1958; Emery and Trist, 1965; Lawrence and Lorsch, 1967; Terreberry, 1968).

Most research in this setting demonstrates that overall businesses are the drivers for the development of IOS. Moreover, Steinfield et al. (2005) argue that one needs to explore industry level consequences. They show how IOS can have influences extending beyond the immediate organization or the immediate pair of organizations implementing them. Steinfield et al. (2005) identify three types of industry level phenomena when examining the use of inter-organizational IT-driven coordination systems: performance effects, structural effects and collective actions.

Standards are key to any IOS but they become even more important when multiple players are involved, which is the case with industry. Markus et al. (2006) provide further investigation of industry-wide information systems standardization as collective action and they point out the importance to study both cycles of standards development and standards diffusion as they are interrelated. Regarding Johnston and Gregor (2000), standardization bodies are seen as industry units and part of an industry group. Steinfield et al. (2005) also argue that in the context of IOS, industry level consequences are qualitatively different from what is observed at an organizational level. Similarly, a number of other studies also focusing on industry-level analysis explore the effect that information technology could have on industry change (e.g., Sawyer et al., 2005; Allen & Kim, 2005; Howard, 2005). As Iacono and Wigand (2005) point out, these studies address diverse and unique industries “yet they all rely on ICT and have been fundamentally changed by ICT” (p. 212).

When looking at both the traditional IOS studies and those advocating an industry view, we can assert that these IOS developments are initiated by businesses and business drivers such as competitiveness and efficiency. When reflecting on the role of government in the above-mentioned studies, government is either not discussed at all or is seen as part of the remote environment (Johnston & Gregor, 2000). For the purpose of the present study, however, government is at the focal core of our investigation.

2.2.2 IOS driven by national government

It has already been acknowledged that the issue of IOS in the public sector and its interaction with private businesses has received limited attention (Schooley & Horan, 2007). Nevertheless the literature reveals studies where in the context of cross-border trade IOS developments are initiated and driven by national governments (e.g., Singapore’s TradeNet (Teo et al., 1997) and the ‘e-export’ system in Denmark (Bjørn-Andersen et al., 2007)). When government introduces a system to communicate with trade entities, the goal of the systems is to support government-to-business (G2B) interactions such as launching an import or an export declaration. This differs when compared to traditional IOS, where the purpose for developing a system is to be used by companies (see the definition by Cash & Konsynski, 1985 above) in support of their business-to-business interactions. In IOS developments driven by national governments, regulation and political agenda drive these

developments (Andersen, Henriksen & Rasmussen 2007). And while in B2B contexts the adoption of IOS is driven by business drivers, in B2G settings governments have the power to impose an IOS by making the system obligatory by law (Bjørn-Andersen et al., 2007; Henriksen et al., 2008). While such studies explicitly acknowledge the role of government, they remain limited to the national context.

eGovernment systems to support such activities (such as an eExport system), which are the focus of our study, are developed centrally on a national level. There are, however, eGovernment systems for providing services to citizens which are usually developed at the municipality level. While these systems will remain out of the focus of our analysis, there are some findings which may provide interesting insights for our study of supranational IOS. More specifically Sorrentino and Ferro (2008) studied the interactions taking place between the central government, the local municipalities and intermediate level for inter-municipal collaboration. They examined the paradoxical nature of inter-municipality collaboration, which combines competition and cooperation, autonomy and interdependence. The authors suggest that in that process, local municipalities may lose some of their independence and power. They bring the attention to the difficult political processes taking place when the control of IS is spread over several levels. It is exactly this type of issue that we see present when we refer to supranational IOS as well. In the case of SN IOS, however, the complexity is increasing even further due to multiple member-states involved and their differences in terms of culture, legislation and practices.

2.2.3 *Transnational IOS*

With the increasing complexity in areas where IOS is applied, we recognize studies focusing on transnational information systems (Cavaye, 1997; Cavaye et al., 1998; Cavaye, 1998; Mantelaers & van den Berg, 2002). Transnational information systems (TIS) are defined as “information systems that transcend both national and organizational boundaries” (Cavaye, 1998, p.17). These studies emphasize specifically the crossing of national boundaries. Cavaye (1997, p. 100) reflects on the IOS literature stating that “little attention had been paid to the confrontation between different national cultures, judicial systems and political priorities”. Cavaye (1997) and Cavaye et al. (1998) analyse a number of cases of transnational IOS and based on these they describe problems which were encountered during the development and management of such systems and discuss solutions found for these problems. These problems and solutions are further categorized according to domain (technical, organizational and institutional) and according to development phases (identification, building, implementation and maintenance). Noteworthy organizational problems mentioned are unequal sharing of costs and benefits; fear of loss of autonomy and differences in legal requirements. According to the characterization of Mantelaers and van den Berg (2002), the transnational systems that are explored in the different case studies differ in terms of users: public organizations, both public and private, only private or only public.

This literature on transnational systems provides a very useful addition to and amplification of IOS research, by explicitly acknowledging the need to consider the

cross-national boundaries nature of these IOS. Transnational IOS seem similar to supranational IOS, where also multiple countries are involved. The difference, however, is that while transnational IOS focus on IOS crossing national borders, they do not explicitly handle the issue of supranational IOS, i.e. that there is higher-level government having the power to influence IS decisions on the lower levels while the lower levels are obliged to follow these decisions. In fact, one of the cases discussed in the transnational literature uses exactly the same case which we will also analyse. Their emphasis, however, is more on problems and solutions rather than providing a detailed account on the role and function of supranational bodies and their interactions with national governments and businesses in the decision-making processes. With this study we aim to extend and deepen the current knowledge on IOS, specifically by addressing the supranational dimension explicitly.

In general, there are some important aspects that we can derive from the current IOS literature for our purposes. These include: (1) the need for a multi-level analysis looking beyond the micro level business-to-business interactions into the level of industry and remote environment and the role of supporting organizations in that context; (2) the need to investigate industry level effects of IOS, such as performance, structural effects and collective action, and (3) as standards are of key importance for the development and subsequent adoption of IOS, it is important to consider both the process of standards development and standards diffusion. (4) From the transnational perspective we also identify the need to be attentive to issues that may arise due to differences between countries such as legal and cultural differences. (5) It is further recognized that national governments can have a powerful role when introducing national IOS, as they can make these obligatory by law. These ideas are schematically captured in Figure 1 below.

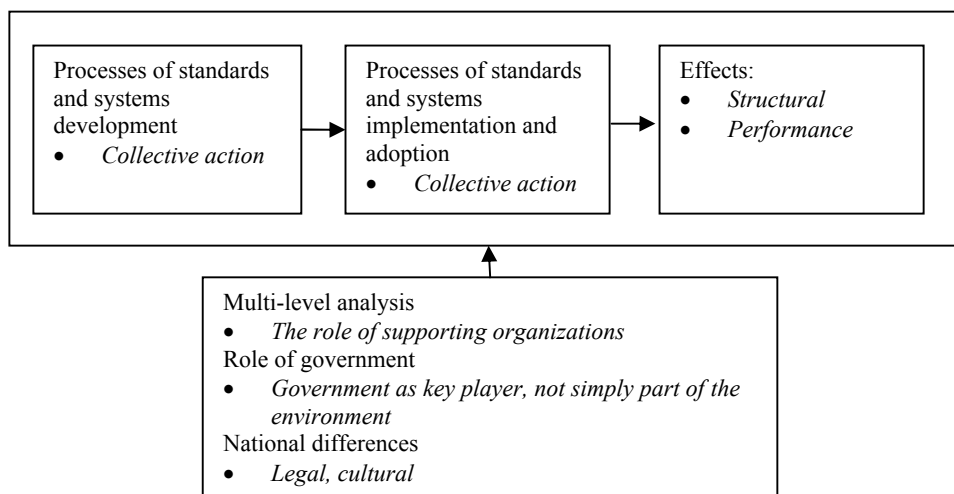


Figure 1 Aspects from earlier IOS studies to be explored in the context of SN IOS

2.3 Typology of IOS

Figure 2 is an attempt to provide a consistent typology of IOS, while building on earlier research reviewed in the section above. The studies discussed in section 2.2 are

often in isolation of one another and this typology aims to propose a systematic way of viewing these efforts thus far. In doing so, we aim to better distinguish SN IOS from other types of IOS. In building this typology we use two dimensions: levels and scope. With respect to levels, we distinguish among businesses, government level 1 (national government) and government level 2 (supranational government). With respect to scope we distinguish between national and transnational, where for transnational we rely on the definition of Cavaye (1997) where IOS cross national boundaries. The resulting typology consists of five blocks and interactions between these blocks (see Figure 2 and Table 1).

Table 1 Key interactions from the IOS typology

Interactions block 2 and 1	Interactions between government and businesses in national context.
Interactions block 5 and 4	Interactions between supranational government and national governments in transnational context.
Interactions block 5,4,and 3	Interactions between supranational government, national government and businesses in transnational context.

- National Scope

Block 1. Block 1 captures the IOS research concerning a limited number of business-to-business (B2B) interactions as well as the industry IOS on a national level. A key building block is that of the national economy, consisting of different industries. The reason to introduce the notion of national economy was to be able to provide a logical link to the industry IOS research as well as to prepare the basis and provide the link to research focusing on IOS driven by national governments. When reviewing the industry-focussed IOS literature a precise definition of what industry actually is and what is the scope of coverage (national or international) could not be found. While we see references in industry studies to cases that refer to industry at a national level, there are certainly industry initiatives that cross national boundaries. We find that distinction important. Thus, for building our typology we needed to define the meaning of industry.

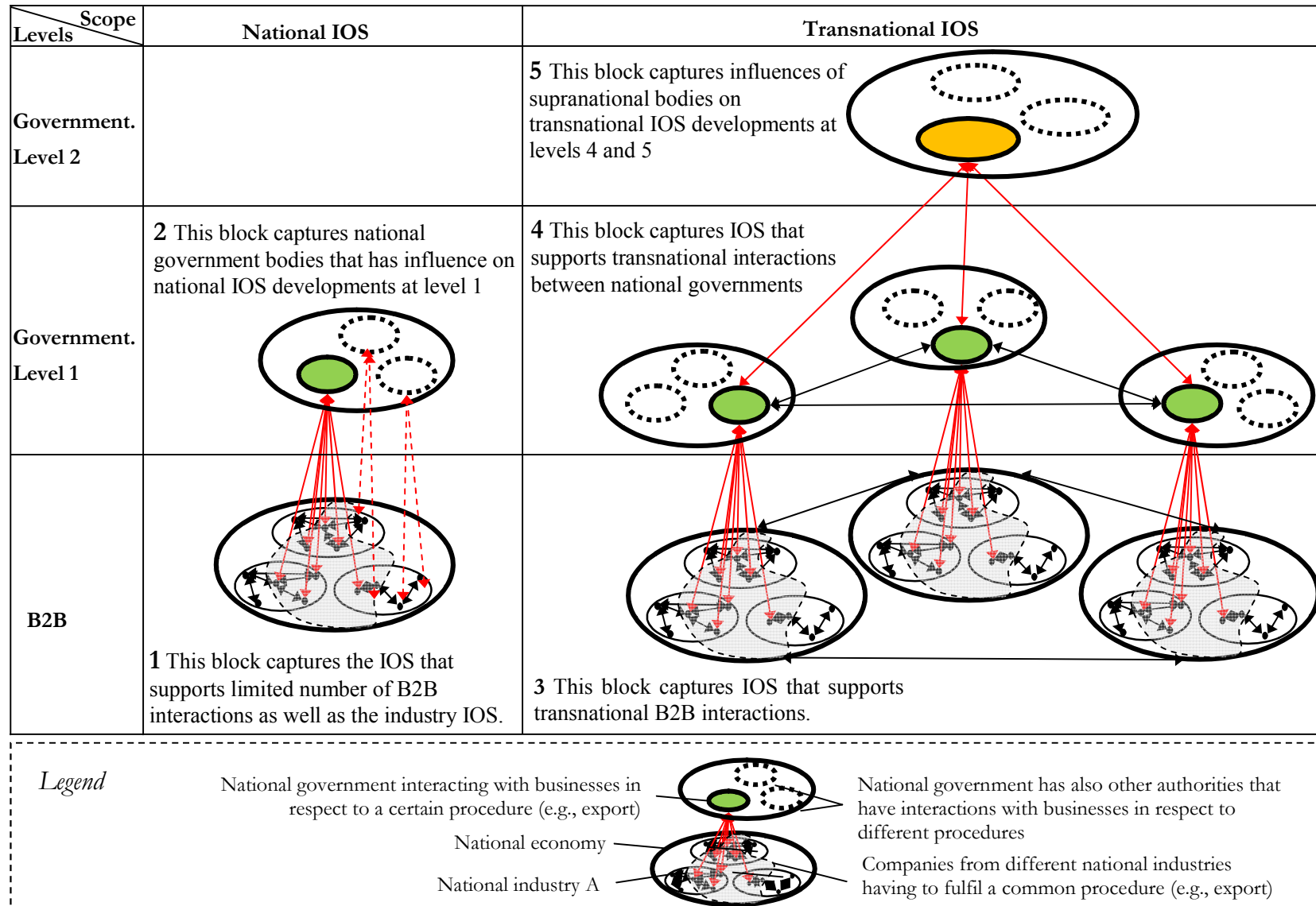


Figure 2 Typology of IOS and the role of government

Surprisingly, in our search for an appropriate definition we came across the work by Nightingale (1978) who 40 years ago also pointed out the problem that while the term “industry” is widely used in practice and the field of economics, conceptually the term remains ambiguous and lacks clear definition. In his essay, “On the definition of Industry and Market”, he points out the conceptual difficulties defining the term. In his work, we find the following definition of industry which builds on earlier work of Andrew and Brunner:

Industry is any grouping of firms which operate similar processes and could produce technically identical products within a given planning horizon. [in Nightingale, 1978, p. 35]

In our search we also came across some definitions available from businesses. In the definition below, we see that industry is seen as a classification of a group of companies according to their activities:

“A sector refers to a large segment of the economy, while the term industry describes a much more specific group of companies or businesses An economy can be broken down into about a dozen sectors, which can describe nearly all of the business activity in that economy. An industry, on the other hand, describes a much more specific grouping of companies with highly similar business activities. Essentially, industries are created by further breaking down sectors into more defined groupings.”¹

In both definitions we see the grouping of firms with similar business activities as essential. In practice, we find many classification systems that try to group firms into industries. Examples are the North American Industry Classification System (NAICS) used by US, Canada and Mexico; the United nations International Standard Industrial Classification System (ICIS). These classification systems are used to capture data about activities of the national economies as well as for international comparability of data.

Based on the above, for conceptualizing industry for the present purposes, we will use as a building block the concept of national economy, which encompasses the economic activities taking place in a specific country. National industry is a group of firms with highly similar business activities within that economy. In that respect, we can say that the national economy can to a large extent be viewed as a collection of industries and an industry level analysis at a national scope will focus on one such industry. This view encompasses also the traditional IOS research focussing on IOS supporting a limited number of B2B interactions taking place on the national level, although in the traditional IOS literature usually a distinction between national or transnational levels is not made.

Block 2. Block 2 captures national government bodies that have influence on national IOS developments that are captured in Block 1 as well as national government-to-

¹ <http://www.investopedia.com/ask/answers/05/industrysector.asp>, last visited 12 January, 2009.

government IOS if such relationships exist. We derived that Block in the following manner: We may assert that in a national economy, we have also a national government issuing rules and regulations. When addressing cross-border trade activities (i.e. our area of our interest) businesses have obligations to report to the national government their import and export activities and pay required duties. One example is the e- export system in Denmark. In this case, all businesses from different industries need to report to the government about their export activities, irrespective of whether they are representatives of automotive, pharmaceutical or any other industry. In addition, there are different government agencies which have different demands to businesses (multiple governments are represented with dotted ovals in Figure 2). Thus when referring to interactions between national governments and businesses an industry focus is not very appropriate; governments, especially in the context of cross-border trade activities, introduce IOS for specific procedures such as import, export, excise and all the businesses that have to comply with that procedure need to use these systems. Thus, when considering the unit of analysis, a national government IOS will concern businesses from the national economy which have to comply to a common procedure and have interactions with the national government with respect to that procedure. It follows then that the common procedure rather than the industry is a more appropriate unit of analysis for understanding IOS development driven or influenced by national governments.

- Transnational Scope

Next we are considering what Cavaye (1997) refers to as transnational IOS or IOS activities that cross the borders of the national economy (see the right side of Figure 2). In both the IOS literature focussing on a limited number of B2B interactions and industry itself the explicit distinction whether the activities take place in one country or cross the borders of that country is not made. Block 3 and Block 4 capture transnational business-to-business (B2B) and government-to-government (G2G) interactions, respectively, and can be seen as an extension of Blocks 1 and 2 to the transnational scope. Block 5 indicates that there is a supranational body above the national governments that may influence IOS decisions at the lower levels.

- Interactions

To understand the typology it is important to understand the interactions between higher levels in the typology with the lower levels, as they capture the government's influence on IOS decisions. Here (see Table 1) we define three such interactions which we consider central for the purpose of our discussion. In cases when we have interactions between blocks 5 and 4 as well as between 5, 4 and 3 we will have cases of supranational IOS or supranational bodies are able to impose decisions about IOS on the lower levels. It is these types of systems and interactions that are of focal interest to our present study.

Before proceeding further we would like to make one observation concerning the concept of environment. In their work on industry-wide IOS, Johnston and Gregor (2000) introduce a separate level which deals with the role of the environment and as we saw earlier, the role of the environment has been an extensive subject of discussion when it comes to inter-organizational relationships. While we definitely

agree that one needs to consider the role of the environment, when looking at our typology we see that it is difficult to provide a clear delineation of what an *environment* is, as this will depend largely on where the focus of the analysis will be and what the perspective of the observer is. For example, one's view of part of the environment when focusing on a limited number of B2B interactions will be largely different when compared to viewing of the environment with which we will need to deal when envisioning the national industry IOS or supranational IOS. This will need to be specified on case by case basis, depending on the type of phenomena under investigation. Consequently, we view the environment as a context that may vary considerably based on the nature of the business as well as the nature of and level of the IOS. The remainder of this article is structured as follows: First we discuss our methodology, then we present our case study and analysis, followed by a discussion and concluding remarks.

3 METHODOLOGY

In the previous section we have provided an overview of the IOS literature and we have discussed aspects of IOS considered important by earlier studies. We also developed a consistent typology of IOS, in which we position SN IOS with respect to other types of IOS studied today. Our intent is now to go more in-depth and gain additional detailed insights of what makes SN IOS a distinct form of IOS and where are similarities and differences compared to other types of IOS. In order to do so we build on the interpretative and contextualist tradition that is well established in IS research (Orlikowski & Baroudi, 1991; Klein & Myers, 1999; Walsham, 1993; Walsham & Sahay, 1999; Walsham & Waema, 1994). Interpretive studies are “aimed at producing an understanding of the context of the information system, and the process whereby the information system influences and is influenced by the context” (Walsham 1993, pp. 4-5). Accordingly, we search for explanations of IOS phenomena, where we do not propose a positivistic test of our conceptual framework, nor use our framework as a predictive model. In her taxonomy of theory types in information systems research, Gregor (2006) distinguished between five theory types, i.e. theory type for (1) analysis, (2) explanation, (3) prediction, (4) explanation and prediction and (5) design and action. Here our goal is to analyse and explain the SN IOS phenomena which we observe in the area of eCustoms; this, in terms of Gregor (2006), refers to her theory type for (1) analysis and (2) explanation.

The study presented here is part of the EU-funded ITAIDE research project (www.itaide.org), which aims to propose innovative solutions for cross-border trade. Four European Living Labs provide the real-life settings in which eCustoms solutions are developed. The Dutch “Beer Living Lab” (BLL) focuses on the export of excise goods and the key players are a large beer producer based in the Netherlands, two large technology providers, a Dutch university and the Dutch Tax and Customs Administration. Dutch Tax and Customs is an example of a specific local actor in the EU's eCustoms developments. The BeerLL focused on the analysis of the procedures for export of excise goods and we analysed the current EU initiatives which aim to introduce a supranational, EU-wide system (called Excise Movement and Control

System (EMCS)) for information exchange concerning excise goods (such as cigarettes and alcohol). This system is still in the early stages of development and is not yet operational, however, during interviews with experts involved in the BeerLL we learned about another system, The New Computerized Transit System (NCTS), which was introduced in 2005 for transit goods. It was considered by the experts of Dutch Tax that the development and implementation of the EMCS will be quite similar to those of NCTS, even though the content of the messages exchanged will be different. Furthermore, NCTS was the first EU-wide system introduced in Customs. In that way, we conducted the study concerning the implementation and development of NCTS as a contextual study, which we can use to better understand the developments with EMCS that we observe in the BeerLL.

Data collection was conducted during the period of January 2006 to December 2007 consisting of two parts. First, we gained contextual knowledge about the Customs domain, the customs procedures and regulation as well as general developments in eCustoms in the Netherlands and the EU via the Beer LL. In total, we attended 19 work meetings, 5 brainstorming sessions, we conducted 23 interviews with BeerLL participants. Second, our contacts with Dutch Tax who participated in the BeerLL arranged access for us to experts from Dutch Tax, who were involved in the development and implementation of the NCTS system (both at national and EU levels). We conducted 11 additional interviews with key people involved in the project. These included specifying the new legal procedure and system requirements at the EU level, the people who were managing the implementation of these systems in the Netherlands, technical people and users. The interviews were semi-structured and exploratory in nature. The majority of the meetings and interviews were recorded with a digital recorder and archived for further analysis. Due to the large volume of recorded material, the interview transcripts were only partially transcribed.

In addition to the meetings and the interviews, we conducted extensive examinations of documents and reports. The documents ranged from EU policy documents for the introduction of EU-wide IOS systems, numerous documents on transit, fraud in the transit regime as well as the results of the parliamentary inquiry, which acknowledged the inefficiency of the old paper-based procedures and the need for a computer system to replace the paper-based procedure. We also reviewed evaluation reports concerning the introduction of NCTS.

During the data analysis we developed rich case descriptions, following the chronology of events and how and why they occurred. We used multiple sources of evidence and compared the findings from the interviews with the information found in the documents to triangulate the findings. The theoretical perspectives presented in section two were used as a conceptual lens to analyse our case findings. To analyse the SN IOS development that we observe in the NCTS case, we will build on the earlier IOS research discussed above and our conceptual framework presented in Figures 1 and 2 of section two. Specifically, we analysed the processes or standards and systems development and adoption in the context of SN IOS. Moreover, we reviewed the consequences these systems have in practice. While doing so, we were attentive to understanding the multiple levels involved (such as supranational and national bodies and businesses). We also explored the interactions taking place within

one level and across levels, where we were cognizant of the diversities between the actors (such as legal, political, cultural) which influence these interactions. In our analysis we discuss the developments of the procedures and system requirements that take place at the EU level and then we focus on one specific Member State (The Netherlands) to get an in-depth understanding of the processes and issues that occur when the system is adopted.

It is important to mention that earlier research on transnational IOS already make use of the NCTS case. We were not aware of these earlier studies when we did our data collection, due to the difference in the use of terminology. Nevertheless, the analysis provided in this paper is different than the earlier research on transnational IOS, as here we aim to focus specifically on the role of supranational government in IOS developments and what distinguishes SN IOS from other IOS studies. It should be note that this had not been examined previously and it is in this is the area in which we see our main contribution.

CASE ANALYSIS

This case study focuses on the transit procedure in Europe and the subsequent introduction of a supranational EU-wide system called New Computerized Transit System (NCTS) to support this very procedure.

3.1 Context

The post World War II era enjoyed an increase in trade of goods and realized a need for cooperation among countries. Traditionally, when goods enter a country/territory, Customs will demand payment of import duties and other charges and this is the case even where the goods are only meant to pass through (to transit) that country/territory on their way to another final destination country. The existing customs procedures that goods were subjected to at every border crossing caused a significant administrative burden on trade. In 1949 the first TIR (International Road Transit or Transports Internationaux Routiers) was introduced as a way to allow for a simplified transit. With respect to Europe, after the founding of the European Economic Community with the Treaty of Rome in 1957, there was the need for a transit system for the European Community and in 1968, a Community Transit System was introduced. It has its legal basis in the Community Customs Code and its implementation provisions. The Community Transit System was subsequently extended to include also European Free Trade Association (EFTA) countries first via agreements (in 1972), which were subsequently replaced by Conventions between the European Community and all EFTA countries. One of the conventions was to establish a common transit procedure, while the other provided simplification of import, export and transit formalities by introducing the Single Administrative Document (SAD). The common transit procedure is used for movement of goods between the EU Member States and the EFTA countries. The transit regime allowed that it is no longer necessary to pay the duties at the border but it was possible to

suspend the payment to a later point in time. In that respect, transit meant suspension of the obligation of payment of duties at the border.

The import duties are used to finance the budgets of government, thus part of the transit procedure includes control mechanisms to ensure that such suspension of payments of duties at the border is granted correctly. The control was enabled by using a paper-based procedure. For transit procedures, a transit declaration (later replaced by the SAD) was used. The document contained a number of different sheets. A company had to send one copy of the transit document to the national authorities to state that it is going to export goods. When the goods reach the national border to exit the country another copy of the transit document was stamped at the border and returned to the national authorities. When the two copies are available to the national authorities, the company exporting the goods was exempted from paying duties. In this situation the return of the stamped copy from the border was completed within one week. If the copy was not returned, the national authorities had a quick procedure to investigate the case.

At the end of the Cold War, the beginning of 1990s, much smuggling started to take place in the transit regime. The situation became yet worse after the disappearance of internal borders between the EU Member States in 1993 to allow for the free movement of goods. While before 1993 Customs officers were physically present at the border of each EU country, after 1993 the role of Customs diminished to control the goods coming in and going out of the EU. As a result, there were no longer Customs controls at the border of each Member State. The consequence for transit was that now, for the goods to be exempt of payment of import duties, the exporting company had to deliver the goods to a Customs warehouse abroad. This Customs warehouse had to send back the signed copy of the transit document which proved that it took over the responsibility for the goods. After receiving this document and presenting it to its respective Customs authorities, the exporting company could claim that it has the right not to pay import duties. An incorrect assumption prevailed that the old transit procedures would work, even though the borders were dissolved. While before 1993 it was taking about one week to get the signed copy of the transit declaration back, after the dissolution of the borders, it was taking six months or even a year for the documents to be returned. In this context, there were many cases, where the not-returning of the copy was simply due to deliberate fraud.

As the import duties are used to finance the EU budget, large scale fraud meant that the EU was loosing enormous amounts of money. The fraud reached such a level that the European Parliament decided to launch an official inquiry to find out the source and the level of fraud. This is the first Parliamentary inquiry in the history of Customs in the EU; the integrity of the EU was at stake and politicians from the different Member States were questioned. As a result of that inquiry, one major recommendation towards the Customs authorities and the European Commission was that the paper-based system for sending documents from the receiving party to the exporting party was considered old-fashioned and had to be modernized and improved. It was recommended that the system should be computerized and no longer be paper-based.

3.2 Collective actions for development of NCTS (standards and systems)

3.2.1 Background

There were already several attempts to use computers for the exchange of transit information. Two such attempts were made in the 1970s and mid 1980s but they were not successful. According to some opinions, these attempts were not high on the agenda and lacked necessary political and governmental support. After the dissolution of the borders between the EU Member States, there was a need for the internal tracing of the movements of transit goods and in 1994 the European Commission started the third project aiming to bring automation for the transit system. The recommendations of the European Parliament created a legal obligation at the EU level, which required that NCTS is implemented in all EU Member States and all the businesses involved in transit in that Member State.

When the recommendations of the European Parliament were published, a working project already existed which aimed to develop a computerized system for transit called the New Computerized Transit System (NCTS). The idea behind the NCTS is as follows: first, new transit procedures and system requirements are defined at the EU level by representatives of the governments of the different Member States. These specifications become the standards to which the Member States were obliged to adhere. Once the specifications are complete, all 27 Member States were obliged to implement a national NCTS system that adheres to the specifications defined at the EU level. These national systems are then connected and are to be used to exchange transit information between EU Member States. Third, all businesses involved in transit are also required by law to develop an interface to communicate with the NCTS system of the national authorities about every transit transaction they undertake. The resulting system is a supranational IOS system for exchange of information about goods in transit (see Figure 3), the development and adoption of which was largely driven and influenced by EU bodies.

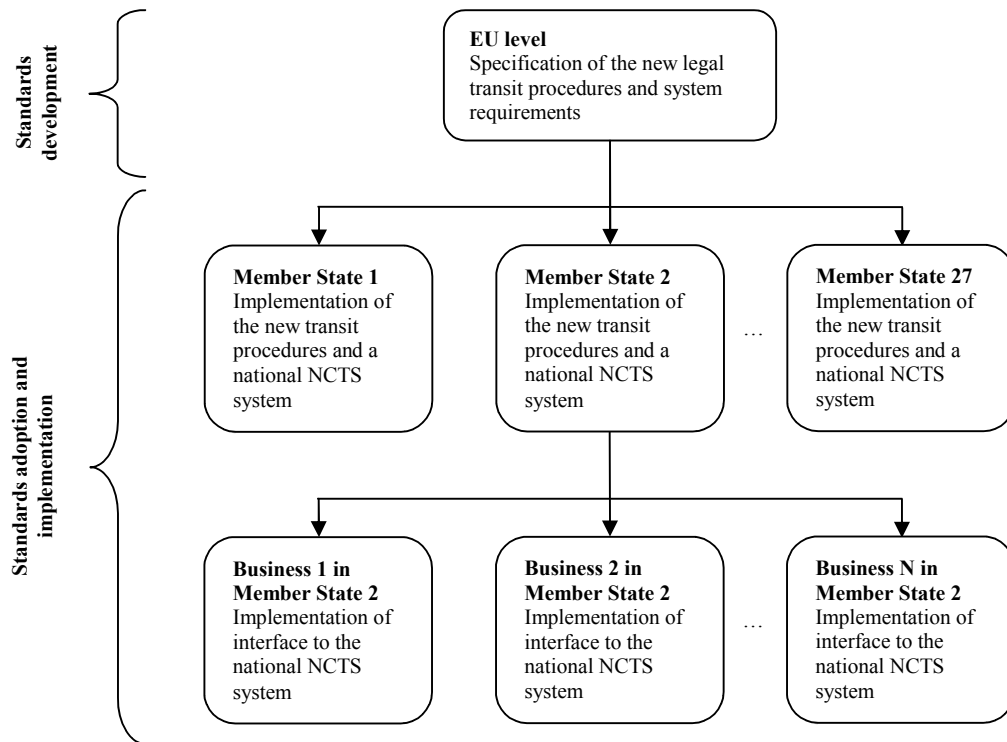


Figure 3 Levels of development and implementation of NCTS

NCTS is the first such supranational system that was developed and implemented within EU Customs. At the time of this writing there are several other projects for the development of such supranational systems (see European Commission, 2007).

3.2.2 Collective action at EU level

We identified three developments at the EU level (see Figure 4 below) with different goals and different sub-sets of participants. These can be seen as separate collective action initiatives.



Figure 4 Collective action initiatives at EU level

- The committee for defining the new legal procedures

The goal of the first initiative was to define new legal procedures for transit. In this development, two separate groups joined forces. The Member States of the EU formed part of the Community Transit Working Group and the work done within this

Working Group was limited to the EU Member States. In addition, EFTA countries (who were not part of the EU but were part of the European Free Trade Association) were also interested in participating in the definition of the new transit procedures and this was accomplished in the Common Transit Working Group. This Working Group had a broader scope of membership, as it included the EU Member States as well as the EFTA countries. The Community Transit and the Common Transit had a different voting structure as well as a different legal basis which made the negotiations difficult. The processes in these committees were driven by different political interests and it was not in the power of one single government to make a decision, the decisions are made collectively. For example, in the Common Transit meeting the European Commission had to come up with one vote on behalf of all the EU Member States. There were examples of situations, however, where one Member State did not fully support the position of the European Commission and was using informal channels to join forces with EFTA countries. In this context Member States were stuck in the middle between the need to cooperate in order to define the new procedures and the need to compete in order to preserve their national interests. While in this process no single player alone can influence the outcome, there is a complex interplay of cooperation, competition and political manoeuvring.

- Collective action for the development of the system specifications

While the Transit committees were busy with specifying the new transit procedures, a separate Working Group was established to develop the standard for the development of the computer system to be used for exchange of transit data. One of the complications for the development of the NCTS was that all EU Member States had to have different experts represented in the discussions, resulting sometimes in three or four representatives per country. Furthermore, EFTA countries were also represented. This meant that a large number of people took part in the meetings. The detailed matters that had to be discussed with larger groups of people made the progress of the discussion very cumbersome. In addition, different countries had different interpretations of the law, which made it difficult to reach an agreement. It was expected that as the documents that needed to be exchanged were already defined (i.e. Single Administrative Document) and used for the paper processes it would be very easy to build a computerized system. It turned out, however, that the different countries had different interpretations of the law. And while it was easy with the paper based system to deviate from the specifications of the fields specified in the paper document and to use one's own interpretations, in the case of computerized systems everything needed to be precisely specified and agreed upon. Accordingly, between 1995 and 1997 much time was spent to agree on common definitions and it was not expected that it would take so long to reach agreements. During the discussions, parties wanted to include different aspects which led to a situation where the scope of the project expanded too much and became very big and difficult to handle. A decision was taken to phase the project. While ultimately the Working Group developed the specifications, the process of reaching agreements was challenging due to the large number of people involved, different national interpretations as well as different views on the project's scope.

The next task was to develop applications conforming to these requirements. This, however, turned out to be again a difficult process driven by differences in opinions of how to approach the applications. Some countries preferred to develop their own applications, while other countries preferred to participate in the development of a joint system. While a joint solution was not found, a compromise was agreed upon, i.e. it was decided that both options will be allowed. That meant that each Member State had a choice, it could either develop its own application based on the common specifications or it could collaborate with the European Commission in developing and implementing a common application.

- Collective action for the development of a common system

The European Commission took the responsibility for the development of the common system and provided the financial resources. The large volumes of smuggling as well as the recommendations from the European Parliament inquiry were putting extra pressure on the Commission to move the development of NCTS further. The Commission wanted to make sure that there is a system available and any country wanting to use it could do so. During this process the Commission needed to select a software company. The software company was selected by the Commission via a tender process, where the Commission was the main contractor. Apart from that, for the development of the common application, a special temporary organization called Minimal Common Core User Group (MUG) was created. The goal of that group was to discuss the development of the common system as well as implementation problems and experiences. From the countries, which were working with the Commission for the development of the common system, some were fore-runners and actively participating in the processes and the decision-making, while others were followers or more passive participants. The fore-runners were usually those countries for which transit was of key importance. One such country is the Netherlands handling large volumes of transit goods. The Netherlands made a political decision to participate actively, in order to ensure that its interests are discussed and taken into account in the development. This also meant, however, that the Netherlands had to invest considerably more time and efforts for the development of the systems, compared to other countries which were not so active in the process. This illustrates how in this case a Member State with significant volume of cross-border trade transactions was ready to take action and gain influence at the EU level in order to protect the interests of its national economy.

3.3 The implementation of NCTS in one Member State (The Netherlands)

Although the common system was developed centrally, each participating country was responsible for the national implementation of the system. Here we will present the experience with the implementation of the common system in only one Member State, i.e. the Netherlands. Although the Netherlands made a political decision to participate in the development of the common system and to put much effort in working with the Commission during the development, it turned out that it is rather difficult to embed the common application in the existing technical infrastructure of Dutch Tax. This initiated a struggle where the politicians advocated the pro-European

view and wanted to be a fore-runner in the developments were confronted with the IT people who saw the technical dangers and limitations of this approach. Nevertheless, the implementation had to continue, as commitments had been made on the political level. It is important to mention that Dutch Tax installed a special function- national transit coordinator, performing a mediating role between the traders and the EU. His role was to communicate to trade the changes that the EU is requiring, but at the same time he was attentive to the concerns of trade and was bringing these concerns into the discussions at the EU level. This mediating role of the Dutch government became also very important during the adoption stage and this illustrates how national government played a mediating role among the IT people, the businesses, the technology providers of the common application and the committees in Brussels.

In the period after the national pilot, the system was available but the companies were reluctant to use it: they were used to work with the old process; the system was not made obligatory yet; there was a need to obtain a licence to be able to use the system. In addition the introduction of the electronic system was considered as restricting to some extent the freedom of the companies and there was a possibility that failure in the system would interfere negatively with the logistics processes. Another big problem was also that there was not a sufficient choice of software products on the market, which companies could buy and install to connect to the national NCTS system.

In 2003 representatives of the Commission visited the Netherlands. It was expected that the Netherlands with large volumes of trade would require many electronic messages but that was not the case, as only few companies had adopted the system. It was recommended by the Commission that the Netherlands had to take actions and ensure adoption. This illustrates a situation where the Member States were willing to take more liberal approaches towards the adoption of the NCTS system from businesses; they were forced, however, by the higher-level authorities to make the system obligatory as there were binding legal obligations established at the EU level to have the system adopted by 2005.

After the recommendations from Brussels, the Netherlands had to take actions to ensure adoption. To be able to carry out trade transactions electronically meant that: every company had to get a license; every company had to install software; and people had to believe in the systems, both the company software and in the common system; the facilities for communication with trade needed to be improved.

Table 2 provides examples of the mediating role the national Dutch government played between businesses and the EU in order to solve some major problems that were encountered and to ensure adoption.

Table 2 National government as a mediator between businesses and EU

Adoption Problem	Role of national government to solve the adoption problems
No trust in the common system (technology, functionality)	National government plays a central role in facilitating intensive cooperation with Brussels and the software provider to solve the problem.
Companies are afraid that the system will interfere with their logistics processes	National government makes agreements with companies that the system will be implemented in such a way so that it does not hinder their logistics processes.
No suitable software for the companies on the market	The national government facilitated co-operations between the companies and software providers to bring better software on the market.
Communication facilitation	National government established helpdesks where companies can call and ask questions.

Table 2 demonstrates the key mediating role that the Dutch government played between the EU and businesses to solve the problems and ensure adoption. During that process, the Dutch government tried to protect its national interests and negotiate terms that were more acceptable for businesses.

3.4 Effects from the implementation of NCTS

3.4.1 Performance effects

On a larger scale, we can see that the NCTS was adopted EU-wide and resulted in a large-scale information infrastructure. This linked the governments of all the 27 Member States as well as all the businesses in each Member State dealing with transit goods. The reform in the transit procedures and the introduction of the NCTS system aimed to make the transit procedure more efficient and effective and to reduce fraud in the transit regime. The NCTS system aimed to replace the old paper-based procedure with electronic document exchange, which would allow governments to exchange information about movements faster and enable them to identify potential risks.

Looking at the introduction of the new transit procedures and systems it is difficult to provide a straightforward answer what their impacts are. For example, in the main conclusions of a ‘Study on the Impact of the Reform of Community/Common Transit’, conducted on behalf of DG/TAXUD (ADE, 2006, p. viii), we read:

“The reform has improved security for individual transit movements and NCTS has - by its nature - created databases that enable NAs [National Administrations] to retrieve data that support more effective and efficient management of the overall systems NCTS is fully used to initiate movements, to follow them up, to initiate enquiries and to tackle possible fraud more rapidly than in the past....The reform and the introduction of NCTS have effectively eliminated some types of fraud, and the reduced timescales for raising queries allow an earlier detection of possible irregularities. More significant advances in fraud prevention and detection will, to a large extent, be dependent upon the present expansion in the use of Risk Management systems within the National Administrations...NCTS facilitates fraud prevention”

Although the main conclusions from the evaluation seem to be quite positive, a closer look at the areas for improvement identified in the same report indicate that many issues need still to be resolved and that actually the benefits are not so clear cut. For example, it is reported that there are still administrative errors and delays in the part of Customs and the economic operators as well as the unavailability of computerized systems. From our interview data we also found evidence that unavailability of Customs systems can cause disruption in the logistics processes of companies. For example in the Netherlands, in case of breakdowns, happening often at the early stages when the system was implemented, this led to delays in the logistic processes of the companies and long queues of trucks in the port of Rotterdam. This is a significant drawback, as failure in the systems can lead to temporary blocking of the imports/exports of a country and disruption of trade.

In the annex of the ‘Study on the Impact of the Reform of Community/Common Transit’ (ADE, 2006) we also find evidence that the benefits of the transit reform and the introduction of NCTS for trade are not clear. When asked whether the reform and the introduction of NCTS served to facilitate trade, 75% of the respondents representing trade answered “Not at all” and furthermore 75% of the respondents reply that the workload by the availability of an electronic procedure is actually increased. When asked whether the reform improved the guarantee management, 100% of the respondents answered with “Not at all”. This indicates that the improvement on the side of trade is not necessarily visible.

In another report of the Court of Auditors (2007) we find a much more moderate view with respect to what NCTS achieved in combating fraud. The report states that “The Commission successfully coordinated implementation of NCTS and has provided efficient back-up” (p. C44/3, III (a)), but at the same time the report also concludes that “information available to the Commission regarding fraud in the transit was neither reliable nor complete enough for it to be possible to determine whether the legal reform and the NCTS project have successfully reduced fraud in transit” (p. C44/3, III (f)). Thus, at this stage it is difficult to make definitive statements about the effects of NCTS on fraud reduction.

Another concern raised during the interviews is that the implementation of NCTS as a large-scale supranational IOS may block further innovation and modernization in the transit regime, due to the cost involved in changing the already installed information infrastructure. As one of the interviewees pointed out:

“Especially when we talk about eCustoms, where more communication between trade and Customs is electronic, automatically means that we have more often discussions which are not led or the outcome is not led by the needs of trade, the need of less administrative burden, the need of the legal side, the need of prevention of fraud; no, very often they will be lead by what does it cost to change, because of the computerization. And I think that will be a big problem....”

This points to what is known in the literature as path dependency, meaning that it is hard to change policy even when it outlives its usefulness (Bomberg et al, 2008)

In that respect, similarly to other IOS studies we found that looking at performance effects in the context of NCTS is definitely meaningful, as it helped us to point our attention in that direction. In our case it is difficult, however, to provide a definitive

answer concerning the achieved performance effect. The time for exchanging information can potentially be seen as a significant improvement, as the information is now exchanged electronically in a fast manner, compared to the paper-based system. The errors and unavailability of the systems on the other hand are a factor that leads to increased processing time. We also see that such unavailability of the system can cause disruptions to the logistics processes and that the installed information infrastructure may hinder further innovation. When all these aspects are taken into account it becomes clear that the net performance effects are quite difficult to estimate and they can vary per stakeholder.

3.4.2 Structural effects

In our case, we found examples where the introduction of the new legal procedures and systems related to transit also lead to changes in the network of actors involved in the transit procedure, actually making some actors disappear. For example, one important role in the transit world is the role of the Customs agent. This agent is an intermediary (Wigand, 1997, p. 4) who can charge a certain fee and arrange all the documents related to transit. If a transport company does not want to arrange all the formalities related to transit, it can pay a fee to the Customs agent for this service. The Customs agent assumes also the responsibility for the transit. Before the establishment of the EU, these Customs agents operated in a very protected environment; they knew their clients. They had a long-running guarantee with the Customs office and this guarantee was most of the time sufficient to cover the risks. After the establishment of the EU, there were transporting companies coming from, e.g., Eastern Europe which also wanted to use the services of the Customs agents. The Customs agent trusted these transport companies but often, after the trucks entered EU territory, the goods did not go to the Customs warehouse but disappeared on the black market. Naturally, the signed paper document (Single Administrative Document (SAD)) for these goods was never returned. In investigations for the missing SADs, the Customs authorities visited many such Customs agents to inquire into what happened with these goods. The Customs agents, however, could not provide answers, as they simply did not know where the goods went. Usually in such cases, the Customs authorities will take as compensation the running guarantee of the Customs agent. As there were many cases, however, when the shipments disappeared, such a guarantee was no longer capable to cover the losses. To give some indicative figures, a Customs agent may work with a guarantee of €5,000 but the value of the shipment is €500,000. This meant that although many of the Customs agents were declared insolvent, the Customs offices were still not able to collect their money owed. After the inquiry of the European Parliament, it was also recommended to make sure that there is better financial coverage of the transactions. As a result, changes were made in the legal procedures which required very high guarantees to be deposited for the goods in transit. This meant that many small and medium-size Customs agents were no longer able to survive in the new situation, as they were not able to maintain the requirements for the high guarantees and only the big players remained active in this market. This indicates that if we look at IOS developments as a combination of systems and procedures, in the case of NCTS we see that this EU-wide initiative for

the changes in the transit regime led to changes in the network operating within this regime. Thus we see a change in one segment of the network of actors involved in the transit procedures, which indicates that the new procedures led to structural effects as well.

4 DISCUSSION

A key question explored here is whether SN IOS are a distinct form of IOS and if so, what makes them different. The NCTS case discussed above presents a detailed account of the development and implementation of one such SN IOS and demonstrates the distinct role that supranational government can play in influencing decisions about IS on the levels of national governments and businesses. Below we reflect on the processes related to the standard and systems development and adoption as well as the effects this has on performance and structure.

4.1 Collective action for standards and systems development

Similarly to what is observed in industry-focussed IOS studies (Markus et al., 2006) in the NCTS case we see that collective action is essential for the development of such supranational IOS. However, while some aspects with respect to collective action are similar in both industry and SN IOS as studied in the case, other aspects are different. In the industry-focussed IOS research, the role of the supporting organizations such as standardization bodies has been identified as very important (Johnston & Gregor, 2000) and they have been identified as key players in the process of mobilizing collective action (Wigand et al., 2005; Markus et al., 2006). Similarly, in the NCTS case we also observe collective activities of representatives of the EU Member States for the development of the legal procedures, the system specifications as well as for the subsequent development of the common application. If we look at the drivers for setting up such supporting organizations in industry IOS and in the case of supranational IOS, we see however some differences. While on an industry level, businesses are the driving force for setting standardization bodies and are actively involved in the process of standards setting, the situation is quite different in our case of SN IOS. As we saw in the NCTS case, the committees were set-up by the government and government representatives of all the EU Member States participated in these committees; businesses have no decision-making power in this process. Thus, we see distinct differences in terms of the parties that drive the process when we talk about industry and SN IOS.

Despite the different driving bodies and when reflecting on the standardization processes, they seem to be quite similar. Industry standardization organizations show a multiplicity of partners with diverse interests (Weiss & Cargill 1992; Markus et al., 2006). We saw similar practices in the NCTS case. While national governments are quite powerful on a national level, on a supranational level they are but only one player in the process and the power gets more dispersed (Henriksen et al., 2008). In the NCTS case representatives of different Member States, pursuing different national interests had to come to an agreement and it was not up to a single government to set

the standards. Yet, the processes were characterised with constant struggle between cooperation and competition, as Member States also try to protect their national interests in negotiations. As the case indicates, it was a difficult process driven by politics, negotiation and compromise. This indicates that although the parties driving the standardization process may differ (business or government), the processes that take place for reaching agreements on standards seem to be similar. This similarity is notable in that it may allow for knowledge transfer about how to manage such processes and balance the interests from one domain to the other.

Two other aspects which we will use to compare the industry IOS research and the SN IOS are focus and approach. The industry standardization efforts focus on a specific industry, whereas in the supranational case discussed here the focus is on a specific procedure (in our case 'transit') rather than on a specific industry. Furthermore, the approaches of these initiatives also differ. While in the industry case, the initiatives often emerge bottom-up, driven by the needs of the businesses, in the NCTS case we see that the initiative for setting up the legal and system specifications were started top-down and it was obligatory for all the Member States to participate (authority decision (Rogers, 1971, p. 36)). There was some freedom, however, in the subsequent development of the applications based on the system specifications, where governments could choose whether to join the collective action for the application development or to proceed alone.

4.2 Standards and systems adoption

Looking at the way standards and systems are adopted, we can see clear differences in the case of industry, compared to supranational IOS. With respect to industry, the adoption of a standard for IOS is defined by business drivers. In an industry setting, the adoption approach is very much bottom-up and companies often wait for other companies to adopt the standard first (Markus et al., 2006). Thus, although a standard may offer considerable advantages to businesses, whether it will ultimately be adopted is unclear. In the literature we see examples of a completely different approach, top-down instead of bottom up, where national government can make systems obligatory by law (Bjørn-Andersen et al., 2007; Henriksen et al., 2008). Similarly, in the NCTS case we also see that the top-down approach is applied, ensuring the adoption of the standards and the systems in all the governments of the EU Member States as well as all the respective businesses involved in trade with transit goods. It is interesting to notice, however, that the role of the national government has changed. In case of supranational systems, the national government is not the powerful actor who can impose systems, as these decisions come from a higher level (in our case the EU). In the NCTS case we see that the national government took actions to reach a compromise and make the system more attractive to businesses. Thus, although the systems were enforced top down, the Dutch government still found some room for negotiation. This discussion clearly indicates differences with respect to adoption in an industry and national contexts. This may make issues of interest to industry level adoption less relevant in the context of supranational IOS and vice versa.

4.3 Effects

Similarly to the industry level IOS (Steinfeld et al., 2005), also with respect to SN IOS it is meaningful to talk about both performance and structural effects. However, in the supranational case the focus is not on an industry but on a specific EU procedure (transit) and the effects can be relatively traced by focussing on that procedure rather than on a specific industry. We found that while the case illustrates that it is meaningful to talk about performance effects, a clear cut and absolute answer on that issue may be difficult to provide. In our case we also found examples of structural effects, noticing that the changes in the transit regime also lead to changes in one segment of actors (the Customs agents), providing services with respect to transit. This analysis, however, is meaningful when we look at a network involved in the context of a specific procedure rather than a specific industry.

4.4 Mapping the Business-to-Business (B2) and Business-to-Supranational (B2S) domains to explore new issues and opportunities

Reflecting on the NCTS case as an example of a supranational government IOS, we arrive at the following observations. First of all, NCTS focuses on only one procedure, i.e. transit. In practice, however, such systems are being introduced for a number of other procedures as well. For example, as observable in EU strategic documents (European Commission, 2007), several supranational systems are developed or are to be developed to deal with specific procedures related to cross-border trade. A system called VAT Information Exchange System (VIES) was introduced for the value added tax (VAT) reporting, a system called Excise Movement and Control System (EMCS) is currently being introduced for tracking the movement of excise goods, and a system called Export Control System (ECS) is introduced to deal with export procedures. As a result, a company involved in cross-border trade may need to implement separate interfaces to the multiplicity of supranational systems that governments introduce.

Second, the supranational government IOS captures B2G interactions (between businesses and national government) and G2G interactions (between national governments), while B2B interactions are of the scope of coverage of NCTS. It is understandable why B2B interactions are not included in the supranational IOS. One possible explanation is that businesses are commercial organizations and for their commercial purposes they are free to choose systems that are best suited for them. However, we consider that if the existing IOS to support the business-to-business interactions are also taken into account, in addition to the supranational systems that are now being introduced, we may gain new insights of where improvements may be possible.

In the case of the EU, there are 27 Member States leading to an extremely complex network of SN IOS systems. Questions that arise are: Why do we need to introduce so many additional layers of SN IOS and isn't it possible to simplify the existing IOS landscape? Why is it necessary to have separate government systems for different procedures? Why is it necessary for a company to develop separate interfaces to these

separate government systems, and why should layers of supranational IOS be developed? Furthermore, as supply chains already have developed a quite complicated network of IOS for business-to-business purposes, can't governments make use of the information that already resides in these business-to-business IOS networks also for their government purposes? There are already pilot results which demonstrate that technically reuse of business-to-business IOS networks for government purposes is possible and the businesses agreed to share their commercial information with government (Baida et. al., 2008). The pilot results demonstrate that the company does no longer need to maintain separate interfaces to separate government systems by actively "pushing" information to the government; instead, the interested government officials were allowed to "pull" the information that they need directly from the commercial systems of that company. While there are still difficulties of implementing this scenario in practice, due to the constraints in existing legislation, the pilot presents a real-life example how potential gains from piggy-backing on commercial IOS can be made. As the legal grounds are not yet established, such scenarios may not be directly implemented here and now. Nevertheless, it is definitely worthwhile exploring this in the future. Even more so, because we already see movements in practice, where governments are discussing possibilities to move away from the traditional hierarchical approach of controlling the companies to a much more equal relationship of shared responsibility and partnership; such ideas are embedded in concepts like "horizontal supervision" (Dutch Tax, 2006). While in the development stage, concepts like "horizontal supervision" will allow for a fundamental rethinking of the IOS landscape in this new setting. In that respect, it may be worth exploring the complete IOS landscape and gain awareness of the level of complexity that resides here in order to initiate discussions of how things can be done simpler, more efficient and cheaper for both government and trade. While it is not our goal in this article to provide answers to these questions, we find it worthwhile to provoke discussion on these issues in both the research as well as the practitioner communities.

5 CONCLUDING REMARKS

We examined SN IOS as a novel IOS phenomenon. We aimed to explore whether SN IOS are a distinct organizational form of IOS and, if so, what makes them different. Our findings suggest that both industry and SN IOS exhibit similarities in terms of the roles that the intermediary organizations play as well as the processes through which standards are negotiated. A practical implication from that is that the two domains can benefit from exchanging experiences and practices concerning the management and negotiations that take place in the standards development processes and learn from each other. Moreover, we also demonstrate that there are inherent differences between industry and SN IOS, which make the latter a distinct form of IOS. These differences are in the form of drivers for setting up the supporting organizations (business vs. government), focus (industry vs. procedure), approach (bottom-up vs. top-down), adoption incentives (business vs. driven by law) as well as the unit of analysis for examining the performance and structural effects (industry vs. the network involved in a specific procedure).

We developed here our insights on supranational IOS using a single case study and by looking only at the implementation in the Netherlands. Following the same approach, further research on supranational IOS may benefit by investigating other supranational systems as well as the implementation of such systems in multiple countries. Such multiple country comparisons will provide insights into contextual differences which may arise when implementing the same system in different countries. Further research can focus on extending our findings on SN IOS by cross-case comparisons and derive more specific practical and theoretical implications.

We have also demonstrated, by looking at one SN IOS only, that the scale and complexities for introducing such a system are enormous costing significant amounts of time and money. We need to realize, however, that there are numerous such SN IOS currently being introduced in the EU which inherently extrapolates in even bigger complexity and costs for both business and government. In this respect we suggest that it may be worth exploring the complete IOS landscape and gain awareness of the level of complexity that resides here in order to initiate discussions of how things can be done simpler, more efficiently and cheaper for both government and trade. While providing answers to such questions is beyond the scope of this contribution, nevertheless, we find it worthwhile to fuel discussions on these issues in both theory and practice.

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