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eCustoms Innovation and Transformation: A Research Approach

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Abstract

A major challenge for European governments is solving the dilemma of increasing security and control of international trade, while at the same time reducing the administrative overhead carried by commercial and public administration organisations. Electronic Customs, the transformation of paper-based trade documents to electronic ones, and the corresponding redesign of customs procedures, seems to be very promising approach to deal with this dilemma. However, while ICT is widely perceived as a key component of a solution, we argue in this paper that the complexity of the redesign of these electronic documents and procedures for international trade is far more problematic than traditional business process and network innovations. We identify key challenges facing the development and introduction of innovative eCustoms solutions and we outline conceptual and methodological approaches to address these challenges. In such a way, we outline a research approach for eCustoms innovation and transformation.

Keywords: *eCustoms, innovation, research approach*

1. Introduction

A major challenge for European governments is solving the dilemma of increasing security and control of international trade, while at the same time reducing the administrative overhead carried by commercial and public administration organisations. Two stated long-term goals of eCustoms development in Europe are crucial to solving this paradox (e.g. see policy reports of the European Commission including: the Draft eCustoms Vision State and Multi-Annual Strategic Plan, TAXUD/477/2004 and The Role

of eGovernment for Europe's Future, COM(2003) 567[1]). The first one is the provisioning of online Single-Window Access Point services, where businesses can do all their interactions with public administration offices with one online access point, preferably in their own country. The second one is the enabling of Authorised Economic Operators (AEO), businesses that are permitted by a public administration office to operate throughout the Community. For these AEO companies, simplified customs procedures apply, which leads to significant reductions in the administrative load and hence a reduction of costs.

ICT is widely perceived as a key component of a solution to this dilemma: by creating a sufficiently granular and reliable representation of the physical, financial and information flows it will increase the transparency of the underlying processes and hence potentially increase both, control and efficiency (for a critical view on the representational view of information systems see Lilley et al (2004)). However, this outcome is not automatic or inevitable, as the development, introduction and maintenance of such a complex IS creates its own control needs, uncertainties and inefficiencies.

Currently, several technological solutions for eCustoms are under development. Examples are the Excise Movement Control System (EMCS[2]) and the Tamper-Resistant Embedded Controller (TREC[3]). EMCS is an EU-wide system for monitoring of the transport of excise goods. The TREC device is a mobile device which can be used to detect unauthorised opening of a container and thus is intended to reduce fraud.

Technological solutions like EMCS and TREC have the potential to allow for timely information and to increase control and security. However, as argued in the business process redesign literature, technology can bring little value, if it is simply introduced to replace the paper-based communication without reorganising current practices. Moreover, while the development of IS in organisations and to a lesser degree in inter-organisational settings is relatively well understood, the challenge of eCustoms solutions is that they have to work in an international setting, align interests of commercial companies and public institutions, e.g. customs and taxation authorities, companies and supply chain service providers.

How to specify, develop, demonstrate and validate acceptable scenarios for eCustoms solutions is the key focus of the ITAIDE[4] project. Given the technical, organisational and political complexities of potential eCustoms solutions, we claim that an extensive exploration, deliberation and discussion about the problem itself and alternative conceptual and methodological approaches to address it are mandatory. In that respect, the goal of this paper is first of all to reflect and to reveal the types of complexities and challenges that make part of the problem space of eCustoms innovation and transformation; and second to outline conceptual and methodological approaches to address this problem. As such, this paper should be primarily seen as a research agenda.

The remainder of this paper is organised as follows. We review the challenges of eCustoms innovation and then consider a conceptual underpinning for analysing this setting. We then discuss the theoretical grounding followed by a sketch of the research process and methodology proposed to address these challenges. The paper ends with conclusions.

[1] The Role of eGovernment for Europe's Future, Communication from the Commission to The Council, The European Parliament, The European Economic and Social Committee and The Committee of The Regions

[2] Further information on EMCS available under Taxation and Customs of the European Commission: http://europa.eu.int/comm/taxation_customs/taxation/excise_duties/circulation_control/index_en.htm

[3] Further information on TREC available at http://domino.research.ibm.com/odis/odis.nsf/pages/board.06.html

[4] ITAIDE is an integrated project of the 6th Framework for Information Society Technology of the European Union and stands for "Information Technology for Adoption and Intelligent Design for E-Government". The time span of the project is January 2006- June 2010. For further information see www.itaide.org

2. eCustoms Innovation Challenges

To clarify the challenges of eCustoms innovation and transformation, we start with an illustration of the procedures for export of beer from one EU country to another. Even this simple example encompasses various different parties in addition to the citizens in the role of consumers.

2.1 The Beer Example

When goods like beer and cigarettes (also called excise goods) are sold, the producer needs to pay a special tax called excise. However, the general principle is that excise only has to be paid in the country where the beer is actually consumed. Hence, if a beer producer in the Netherlands exports beer to a retailer in the UK, who sells the beer to English consumers, the excise has to be paid by the English retailer to the UK Tax office. In this case the beer producer in the Netherlands can export this beer excise-free to the UK and does not have to pay excise to the Dutch Tax office. Clearly, this is only acceptable for the Dutch Tax office, if the beer producer in the Netherlands can prove that it shipped the goods outside the Netherlands. This information exchange and the related procedures currently revolve around the exchange of paper-based documents. The core document for this excise-free export procedure is the Administrative Accompanying Document (AAD). This document is signed by the warehouse in UK and then sent to UK Tax. UK Tax then signs the AAD confirming that the goods have arrived in the UK. Finally, the AAD is returned to the Dutch beer producer as proof that the goods have arrived in UK and will be presented to Dutch Tax upon request.

The European Commission has initiated the development of a new information system to replace the paper AAD, the so-called Excise Movement Control System (EMCS). EMCS is based on the principles of Single Window Access (SWA) and Authorised Economic Operator (AEO), and can be considered as a typical eCustoms example. EMCS is intended to satisfy two goals: first, to be a high-level specification of a national database for excise data in each European country, and second, to be an international message standard for exchanging data between all the EMCS compliant systems in member states. The development and implementation EMCS systems present a typical case of a technology solution intended to work as an interorganisational information system (IOIS) thereby indicating the need for Business Process Redesign (BPR) or inter-organisational Business Process Redesign (ioBPR) within and between the organisations impacted by these developments.

In a preliminary case study with a large Dutch beer producer it was discovered that in the current functional specification of EMCS a reference-number for the AAD is still needed on a paper trade document. Hence, the current EMCS is not a complete paper-less solution. We illustrate however that the EMCS solution can be made completely paperless if it is combined with the TREC technology. Achieving such a paperless solution is not as straightforward as it first appears, it requires that the ERP systems of the companies, the EMCS and TREC are integrated and interoperable. Ideally the integration of heterogeneous systems should be based on the use of agreed standards, which brings challenges of standard development, implementation, and translation between standards. Furthermore, granting tax offices direct access to the ERP system of a company to retrieve the relevant excise data directly from the source data base raises big issues. Clearly, the Dutch beer producer will only allow this direct access to their company ERP system if they can completely control the access that Dutch Tax has to the data in their ERP system. Secure access technology is now available but are businesses prepared to simply grant tax authorities continuous access to sensitive corporate data?

Further opportunities to introduce efficiencies, better controls and security through redesign or restructuring of systems and procedures for excise-free export of beer are available. A system called VIES (VAT Information Exchange System) is already in place in Europe for the exchange of VAT (value added tax) data between the European Tax agencies for exporting companies. One possibility is to look at the VIES system, which is already available and see whether it contains the information that is needed for the operation of an EMCS. We must ask the question, 'why introduce a whole new system for excise when it might be possible to adapt the existing VIES system?' Another opportunity is presented when we contemplate the use of electronic invoicing (e-invoice) between companies, their suppliers and customers. The e-invoice contains all the data required for the EMCS. Is it possible to adapt EMCS to utilise e-invoices instead of having special systems for the exchange of tax data?

In this preliminary study the Dutch beer producer indicated a desire to avoid the tremendous costs required to adjust their ERP systems to generate data in a special formats that are required by the VIES and/or EMCS systems. They preferred the first option, TREC integration with their ERP and granting Dutch Tax direct access to the system. However they also argued that in order to adopt this redesign certain legislative changes are first needed at national, EU and international level; a complex and uncertain task involving a large network of actors and political interests. This shows that even if the redesign is initially concerned with introducing innovations desired by the businesses and governments directly involved, a broader political process and negotiation of a network of actors may need to take place to successfully reconfigure these systems and processes.

2.2 Challenges of eCustoms Solutions

This example illustrates that innovations like EMCS and TREC (among others) have the potential to transform eGovernment processes related to international trade. However, we claim that reaching the desired outcome is neither simple nor straightforward and that there are significant challenges, complexities and issues which can lead to the implementation failing.

Our example provides a flavour of the difficulties related to the diversity and the scale of the actors involved or implicated in the process of innovation. We can distinguish between a number of major types of actors who are involved in the development and adoption of eCustoms solutions including: the citizens; the commercial companies and supply chains; public administration (e.g. the different national customs offices); harmonisation and standardisation bodies; ICT companies. Each stakeholder has its own interests and characteristics, implying different and even contradicting perceptions and expectations. Such diverse networks of stakeholders are difficult to manage and maintain (Latour 1987). In the next section, we propose and discuss a conceptual underpinning employed to better order and inform our analysis of the problem area.

3. Conceptual Underpinning

As it is clear that we are dealing with a complex problem, how then do we deal with such complexity in approaching the field, what areas of analysis can we employ to delineate and structure the scope and extent of our interaction with the actors in the research setting? Our conceptual approach to divide the problem space of the project is to define levels of analysis[5] (e.g. Zachmann, (1987)). Following the idea that levelling can facilitate the problem analysis, to conceptualise the dynamics of change we introduce

[5] The layered approach is typically employed in technological/engineering representations of software architectures, in particular the Open Distributed Processing Reference Model (RM-ODP)

three levels: technology, process and network. Although these levels are inter-related, for analytical purposes we will discuss them separately in order to highlight the specifics.

- *Technology level: Challenges related to the integration of technology and the development and use of standards*

In the context of eGovernment and cross-border trade, what we are facing is a complex network of organisations (both public and private) with cross national borders and legislations. These organisations often have existing technological solutions and it is unrealistic to expect that they will adopt one integrated system. Instead, a multitude of different, loosely-coupled systems in each of the European countries which adhere to a set of principles for interoperability is the most realistic scenario. These systems need not only to connect and exchange data, but they also need to act upon the exchanged information in a meaningful way. Conducting such a meaningful communication and achieving interoperability between the different systems is a key challenge due to the inherent differences between the systems in terms of syntactic structures, embedded semantics, and embedded logic of interchange agreements, business rules and even to the level of acceptable and viable work practices by employees. In such a diverse and distributed environment, it is impossible to achieve interoperability without establishing a degree of shared understanding for the design, deployment and use of these systems, which inevitably leads us to the second challenge related to the integration of technology, mainly standards.

The challenges related to standards relate both to standard development, as well as standard implementation and usage. The complexity in defining and using standards in local and national setting is huge. The problem however extrapolates magnificently when we talk about cross border trade. In such cases we are not talking about local or national standards, but standards at EU and even global level. For example, the EMCS standard is an EU wide standard and may be used when the trading parties belong to one of the EU member states, however additional standards may need to be developed to meet the global trade requirements, leading to another complex process of standard development. This may mandate the adjustment of legislation of different countries, initiatives to avoid the proliferation of competing standards or to facilitate their harmonisation and alignment, and the involvement of international standardisation bodies like the World Customs Organisation (WCO) and the United Nations Centre for Trade Facilitation and Electronic Business, (UN/CEFACT).

- *Process level: Challenges related to redesign*

Even if the challenges for integration of technology are overcome, as argued in the BPR literature, it is not sufficient to introduce a technology while keeping the old processes. BPR requires a broader view on activities and IT and that IT should be viewed not only as a means for automation but also as a mechanism to fundamentally reshape the way of doing business (Davenport et al. 1990; Hammer 1990). In the redesign process, conceptual modelling plays a key role to visualise the current situation and develop scenarios for redesign. In the traditional redesign literature, the actors in the redesign are usually commercial parties which strive for efficiency gain and the available modelling methodologies are tailored for supporting these demands. As we have outlined earlier, the involvement of the government as a party in the redesign introduces additional requirements for control and security, which will need to be considered in the redesign. This adds the demand for a new methodology of how such eCustoms processes can be conceptualised and redesigned, taking into account the commercial interests of the parties and at the same time ensuring that the control and security requirements of the public organisations are taken into consideration in the proposed redesign.

- *Network level: Challenges related to the adoption of innovative eCustoms solutions*

The need for a new methodology for eCustoms procedure redesign approaches the issue of redesign from a modelling perspective. This perspective is important to provide a clear view of the current situation and possible redesign scenarios. However, in a redesign project, the socio-political perspective plays an equal if not more important role than the modelling perspective. If we look at past research on Electronic Data Interchange (EDI) and BPR we see that inter-organisational information systems development efforts and the accompanying process redesign are often doomed to fail. Research on Inter-Organisational Business Process Redesign (ioBPR) and EDI has identified a number of BPR project failures (Malhotra 1998) and obstacles to the introduction and diffusion of EDI (Iacovou et al. 1995; Tschanz et al. 1997). These obstacles crossing the different semiotic layers of an inter-organisational solution (Kubicek 1992) still need to be considered. In addition, reasons for failure include; a lack of sustained management commitment and leadership, unrealistic scope and expectations, and resistance to change (Malhotra 1998). These issues relate to the social processes present in the background of redesign projects and are tremendously important to the course of these projects. In eCustoms redesign projects however the challenges related to the social perspective appear much harder than in traditional projects due to the diversity and scale of stakeholders involved. It is therefore important to understand the social processes that may lead to the alignment of interests and expectations in order to achieve an acceptable redesign. Furthermore, due to the specifics of the eCustoms context, there is a legislative and political dimension which makes this collaboration extremely challenging.

From the discussion above it becomes clear that the introduction of novel technological 'solutions' and redesign of eCustoms processes is a complex problem and requires a sophisticated approach to address it. In the next section, we review the theoretical grounding proposed for application in this problem area.

4. Theoretical Grounding

We have determined that the notions of BPR and accompanying IOIS development in the literature are particularly relevant to the goals and settings of innovative eCustoms developments (e.g. leading to reduced administrative burden and increased control and security across states and organisations) but how do they inform the context of eGovernment and eCustoms developments in particular? We problematise differences identified between the context of eGovernment and this literature.

1. Strong divergence of interests between the commercial companies that have profit-oriented interests, whereas the Tax and Customs institutions have primarily a controlling interest. Hence, complicated trade-offs have to be made between efficiency gains and control requirements.

2. Traditional BPR has a strong focus on improving the efficiency of business processes. However, in the case of customs procedures the control aspect is the most important one. So, the procedure redesign in eCustoms is different from traditional process redesign in that it should always preserve control properties of a procedure, in addition to creating efficiency gains.

3. Traditional BPR typically does not explicitly address the issue of compliance with legal aspects at the national and/or international level. However, in the case of eCustoms legal compliance of the redesign, and even introducing complete new legislation to allow for use of the new procedure is essential. Hence, the legal environment is an integral part of BPR for eCustoms.

This critique implies that in the complex context of eCustoms development, traditional BPR methods are not directly applicable and it is necessary to adapt or develop new approaches for the study of and interaction within the particular setting of these projects.

4.1 The Scope: Delineating and Structuring the Area of Analysis

The conceptual underpinning presents clear distinctions between technology, process and network levels to better characterise the domains and dynamics of the fluid and contested environment for innovative eCustoms development. The challenges related to the technology layer are tackled from a pragmatic perspective by development of demonstrators and proofs of concepts. The process level focuses mostly on modelling and representing the business processes; to further understand the process level, we consider modelling theories. The network level focuses on the social and political interactions between the actors in a network; deep understanding of the network level requires a thorough grounding in social and organisational theory.

In representing these levels as distinct structure (technology, process, network) we are drawn then to also analyse relationships and interaction between these levels of analysis. The technology supports the business processes, and processes are embedded in a larger network of actors supporting (or impeding) the activities and the intentions of these actors. The conceptual and resultant methodological considerations need to be well grounded theoretically if research and development in the field is to be useful, productive and represent an advance in our knowledge of the area.

4.2 Theoretical Building Blocks

Accounting for the relationships and interaction between our levels of analysis is often incorporated into a theoretical domain, for example Malhotra (1998) argues that the social aspect is as important as the process redesign and modelling. This means that to be able to understand the complexities related to eCustoms transformation, it is important to look at the levels separately, but also consider the interfaces between them. It is important to clarify that we do not aim to build a grand unified theory that synthesises both the modelling perspective and the social perspective. We argue rather that they are independent theoretical domains that are both needed to enable innovative eGovernment transformation. This innovative transformation requires both an adequate redesign methodology as well as theories relevant to social interactions and structures like governments and organisations. Below we present theoretical building blocks, which will help to shape our approach.

4.3 Business Network Redesign (BNR)

The framework adapted from Klein and Schad (1997) provides an example of how relationships may be drawn between the process level (which includes modelling) and network layer (which includes social interactions) analysis. This network transformation framework distinguishes between the scope and perspective employed. The scope can be characterised as social, political and organisational scope or technical scope. The perspective includes context analysis, consultation and scenario development. Context analysis incorporates contingencies and evaluation of the system of interactions; consultation includes participatory analysis and requirements solicitation; scenario development deals with the identification and assessment of alternative scenarios.

From a thorough analysis of the network transformation framework we conclude that it brings the social and the modelling levels together to address the issue of network transformation. For example, in the consultation perspective, which deals with

participatory requirements and requirements solicitation, modelling plays a clear role. The social level is more dominant in the context analysis and the scenario development.

Table 1: *Scope and perspectives of network transformation (adapted from Klein and Schad (1997))*

Scope / Perspectives	Social, political and organisational scope	Technical scope
Context Analysis: Contingencies and evaluation of the system of interaction		
Regulatory and economic environment	Network of regulation, fragmentation and competition; Stakeholder analysis	Governance of standardisation Existing technology
Inter-organisational relationships	Roles & linkages, interdependence, power, trust	Governance of IOIS
Process networks	Complexity, efficiency and security of process networks (end-to-end)	Modelling of transactions
Consultation: Participatory analysis and requirements solicitation		
Actor level analysis	Identification of processes and their relevant contexts, process modelling and analysis	External interfaces, links to internal systems
Network level analysis a) business b) customs c) customs & business	Inter-organisational process modelling and analysis (e^3-value and control), identification of bottlenecks and key benefit areas	Specification of technical requirements
Scenario Development: Identification and assessment of alternative scenarios		
First order changes: ioBPR	Interchange agreements within existing set of roles & linkages, evaluation of the systemic and individual process improvements, incentive compatibility	Improved informational representation of supply chain, e.g. RFID
Second order changes: BNR	Scenarios related to coordination strategy: structural changes along the supply chain, models of horizontal cooperation	Standardisation issues

It is essential to emphasise that, although in this framework modelling and social interaction aspects are both included, they play different roles in the process. This stems from the differing research traditions they derive from, having different objects and methods of analysis. Merging them in a single theory is not the intention, it is rather to juxtapose, relate and demonstrate that each has a place and plays a role in the process of network transformation.

We need now to elaborate further on the theoretical building blocks that relate primarily to the modelling and the social level respectively.

4.4 Modelling

Models as representation are used to identify differences in the interests of the parties involved in the description and redesign of these interorganisational systems. Models can be used to represent different levels of granularity and can capture different aspects of the process. Apart from modelling operational processes, modelling tools may be usefully (and skilfully) employed to analyse and illuminate whether for example a desired 'win-win' situation is achievable. In the business context one such modelling method is the e^3-value business model design method (Gordijn et al. 2001), which is an instrument to represent the economic exchanges between the actors in a business network. It is used to make explicit how different actors collaborate in doing business: who (*which* actor)

provides *which* values (e.g., money, goods, or anything for which some actor is willing to pay) to whom. Subsequently, profitability can be calculated for all actors involved in the model. e^3-value however presupposes a perfect world where all the actors behave honestly. It ignores the control aspect, or what if a party in the transaction acts opportunistically and does not fulfil its obligations. Hence, e^3-value was extended in Kartseva et al (2005) to e^3-control, which can be used to model control mechanisms to prevent fraudulent and opportunistic behaviour. These control mechanisms are based on well-known principles from internal control theory (for example Romney and Steinbart (2003)).

Currently e^3-control enables modelling of the above, but control flaws and mechanisms must still be identified by domain experts rather than programmatically through the software. The e^3-control is in the early stages of its development and does not capture the specifics of eCustoms. Identifying control flaws in the proposed redesigns is of key importance for eCustoms processes and the further development of the e^3-control methodology seem to be of key importance for supporting the eCustoms innovation and transformation.

4.5 Structuration and Sociological Enquiry

Sophisticated and relevant understanding of the dynamics of social processes and issues surrounding the achievement of the alignment of actors' interests is the domain of sociology and organisational studies. The structuration theory of Giddens (1984), had and still has a major influence on social science research. Giddens' structuration, in his own words "an ontology of social life", provides a conceptual framework which allows us to overcome the traditional dualism of social and institutional structure on the one side and individual behaviour (and decision making) on the other. The "duality of structure" opens the view on how individual actors draw on social structures in their behaviour and are constrained by them, while at the same time they are producing and reproducing these social structures. Social systems are conceptualised as regulated systems of interaction and relations. Uncertainty is seen an essential part of modernity: "But so long as the institutions of modernity endure, we shall never be able to control completely either the path or the pace of the journey. In turn, we shall never be able to feel entirely secure, because the terrain across which it runs is fraught with risks of high consequence" (Giddens 1990, p139). Employing structuration theory as a way of representing and sensitising studies of networks and organisations facilitates a ricer analysis and understanding of the social interactions that inevitably take place in processes of eCustoms transformation. We are also drawn to consider past experiences of eCustoms transformation projects which we expect to provide fruitful grounds for reasoning about the implementation of future innovations.

5. Research Process and Methodology

In order to substantiate and ground our analysis, we have identified a tentative set of conceptual and theoretical approaches, which have and will inform our analysis. We need next to propose a systematic research process and methodology adequate to the problem domain so that informed researchers in the field may draw on these approaches in a meaningful way. Such a system for action must relate and interlink these approaches as a process for 'research to development to research'(Hughes et al. 1999). The process is represented in the figure below as a suite of activities taking place in the field and orchestrated by the researcher acting as both observer and consultant to the other a actors. It draws upon the perspectives discussed in the framework for network transformation but also indicates the importance of reflexivity and iteration.

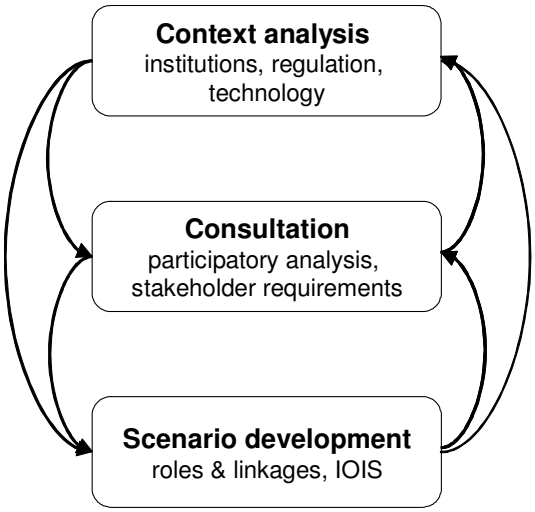

Figure 1: *A process of analysis*

5.1 Context Analysis

The context analysis will take primarily an institutional perspective and consider the influence (and dynamics) of regulation, collective actors, such as standardisation bodies or TAXUD, as well as market structures. It will identify relevant stakeholders as well as their roles and relationships. Moreover it will develop a first cut of the primary trade processes.

5.2 Consultation and Participatory Analysis

In the language of BPR, this step tries to identify process bottlenecks and key benefit areas, if change is enacted. It will switch from an individual economic actor perspective, to existing relationships within supply chains and with customs and tax authorities and consider alternative models of division of tasks or process flows. A main purpose of a consultative and participatory approach is to not only broaden the scope of the analysis but also facilitate a situation of active engagement of the parties. By making the different perspectives, preferences and incentives more transparent, negotiation can be become more substantial and productive.

5.3 Scenario Development

Closely linked and indeed embedded in the consultation process is the development and assessment of alternative scenarios. These scenarios can ideally function as kernels or catalyst of consensus building.

5.4 Research Setting

How do we develop (in time) this deep understanding of the relationship between innovation, technology and organisation in the circumstances of eGovernment innovation and transformation? Building on the process of ‘research to development to research’ described above we propose here to use living labs as an approach to constructing the

research setting. The use of the Living Lab[6] concept has previously been applied to multidisciplinary research sites for the development of ICT in open societal settings e.g. to test and develop advanced telecommunications products in urban environments. The living lab builds on the idea of open-ended multi-sited ethnographic methods (Marcus 1995)[7] and action research thereby offering the potential to weave differing research perspectives and epistemological positions into sophisticated understanding of complex social and technical processes, for example information systems design (ISD), software engineering, business process (re-) engineering and sociological enquiry. Even the distance between research, developers and users will be partly transformed into a situation of mutual learning, understanding and sense making. (Argyris et al. 1985, p237).

In designing the living lab as the research case of a real-life setting we hope to make transparent the logic of the construction of the setting and the decisions made jointly by the researchers and other stakeholders which identify and give shape to the research environment. We present it as the real-life locations (temporally and spatially related) of a network of stakeholders in which prototypes and demonstrations are developed, applied, refined, employed, appropriated, or rejected. The living lab is constructed for the purpose of both research and development and as with the performance of enquiries of social phenomenon. "The actual and intended logical structures are essentially vague; and are modified, elaborated, extended if not indeed created, by the fact and manner of being addressed" (Garfinkel 1967, p96). Configuration of which is conceived as a kind of research development life cycle consisting of: initiation and survey; development and demonstration; validation and review and iterative feedback. This approach compares favourably with cyclic development models and with research cycles described in similar settings (Pierson et al. 2005, p117).

6. Conclusions

This paper focuses on the first stage of the research process, the exploration of the problem domain, identification of analytical perspectives and proposing a research approach. By describing and problematising a scenario developed from initial exploratory field work we argue for a new analysis for understanding and intervening in these intrinsically complex settings related to eCustoms innovation and transformation. The initiative between Dutch Tax and the Dutch beer producer to develop and introduce novel technologies into industry facing cross-border eGovernment systems presents a complex domain, a complex problem and equally challenging solution.

We then discuss challenges of eCustoms solutions by elaborating the diversity of the actors involved and by conceptualising the complexities related to the dynamics of change. Having done that we identify key theoretical building blocks which can provide guidance for understanding the complexities related to eCustoms innovation and transformation. We then reflect on the research process as 'research to development to research' and we propose to use living labs as an appropriate research setting to develop and apply models, tools and methodologies to address eCustoms innovation and transformation challenges.

[6] For example: Jarmo Suominen amongst others has used the term living lab to cover a range of situated research methodologies involving new technologies and people (end users). This has been applied to research involving whole cities and regions as well as communities of practice and small groups being monitored in buildings." http://www.kingston.ac.uk/~ku07009/livinglabs.html

[7] Multi-sited ethnographic research, described by Marcus where "research is designed around chains, paths, threads, conjunctions, or juxtapositions of locations in which the ethnographer establishers some form of literal, physical presence, with an explicit, posited logic of association or connection among sites that in fact defines the argument of ethnography"

In this selective reflection on the challenges of eCustoms innovation and transformation we postulate that research and intervention in these large, on-going, multiparty work systems is not an issue of just selecting and applying an appropriate method, but of a careful configuration, shaping and indeed development of methods and conceptual tools.

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