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Support of Harmonisation of Public Processes

Through Modelling of Legal Constraints

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Abstract

E-Government can transform and improve the entire scope of administrative actions and political processes. Hence, E-Government is both, vision of a future government and the reality we can experience today. E-government is not an objective per se; it has to be seen more as means in organising public governance for better serving citizens and enterprises. The terms on how citizens and enterprises are served is articulated in the public law. Thus, when analysing public processes, the legal framework must be part of the consideration. We use a semi-formal business process modelling methodology to highlight the legal framework that governs different implementations of an E-Government process and use these models as a basis to create a mathematical model. Such models can be used for simulations, to merge processes or as direct input for a workflow management system. We use the formal models to suggest a harmonised process of car registration in the European Union.

1 Introduction

The fast development of ICT and the benefits realised in the private sector from its use put pressure on the public authorities. E-Government seems to be the perfect answer to the demand for better and more efficient services in times of short public budgets. But the ongoing debates in research and in public show that introducing E-Government systems is not that easy. Many of the technologies and techniques that are successfully used in the private sector cannot be transferred one-to-one to the public institutions [WoKr05]. According to a recent survey of top executives in German public institutions the major barriers are the lack of internal know-how, legal restrictions and the missing documentation of public processes [SKH03]. To show the impact of legal constraints, this paper focuses on an area where E-Government is closest to E-Commerce, the service provision.

Online service provision means that external service structures are adequately mapped to the internal process structures of public authorities [BAD03]. Therefore, the addressee's perspectives have to be complemented by a restructuring of the business processes. Process design has to break new ground by taking into account several aspects such as different locations of service production and delivery, organisational front office / back office connection, combining processes according to life situations or including distinct processes from strict workflows to collaborative decision-making. However, we can observe a trade-off in the ongoing process re-design: on the one hand the local structures need to be strengthened in order to efficiently respond to the individual addressee's needs; on the other hand there is a strong effort to harmonise the processes and centralise the data storage – especially if supra-national players such as the European Union come in play.

Moving ahead implies having an integrated view, clear strategies and concepts that are both innovative and feasible. Often, that strategy seems to be missing. In order to articulate new strategies, the concept of Business Process Modelling (BPM) has been widely accepted - in research and in practice. However, there has been little discussion about the organisational consequences of applying this approach.

Process reorganisation in the public sector may often have to stop short of established structures; but finally they will lead to rethinking the institutional structures of Government [SnZu97]. In many respects the legal framework where the public processes and the institutions itself are defined does not fit the current needs anymore. While at a first look this seems to be a problem of public institutions only, we can observe a comparable trend in the private sector, too [KBK06]. Moreover a design has to consider the very different ways of administrative processes. For each of them, IT support will rather be different. Recurrent and well-structured processes are however the base of such an effort [WiTr03].

As an example, we begin our paper with a description of the registration procedure of motor vehicles in Germany and emphasise the process related regulations formulated in the official registration documents. Afterwards, we translate the regulation document step-by-step into a process notation which allows synthesising the entire reference process model from these fragments. We demonstrate how to implement a concrete workflow on the basis of this framework and make it comparable to different implementations of the same task in some of the other EU countries. We close our paper with an outlook on further applications of the presented approach.

2   Regulations of the registration of motor vehicles

2.1   Process description

More than five million cars are registered in Germany every year, which makes the registration process one of the most executed public processes in the German administration. The legal framework for vehicles traffic in Germany is set in federal law code, the so called *Straßenverkehrsgesetz* (StVG) [StVG03]. Additional regulations on the registration of motor vehicles are specified in the *Fahrzeugregisterverordnung* (FRV) [FRV87]. The information collected here is also the base for the taxation of vehicles in the corresponding tax law (*Kraftfahrzeugsteuergesetz*, KrafStG [KraftStG02]). Although specified in federal law, the registration process is executed on the local level (this can be observed on the German licence plates which carry a local identifier). The following description of the registration process also discusses the ongoing debate about a possible reengineering of the process.

In order to register a car in Germany, the car holder must be a German citizen or resident. Consequently, a validation by the authorities in compliance with §33 II StVG and §1 FRV is an important activity within the registration process. According to §33 I StVG and §2 FRV, the vehicle to be registered must be approved by the technical surveillance service (*Technischer Überwachungsverein*, TÜV). Finally, it is obligatory that every motor vehicle must be insured (§34 I and II StVG). Hence, the cover by an insurance company must be presented.

In some cases, the officials may also ask for a proof of financial means from an applicant in order to guarantee that the car tax will be paid. This can be proven by a bank statement. The tax amount is determined by the technical configuration of a motor vehicle (engine, type of fuel, amount of pollutant production, etc.) in accordance with the motor vehicle tax law (KraftStG). Since the tax is reduced for handicapped people (§3 a KraftStG) or farmers (§3 Nr. 7 KraftStG), the belonging to one of this groups must also be documented.

To sum up: in order to register a motor vehicle in Germany one should present his or her personal ID, the approval by the technical surveillance for re-registration or the papers of the vehicle (European Union Licensing Part II) for a new/first registration, the cover of the insurance and – if needed – the proofs of liquidity and any special circumstances.

2.2   Using BPM methods for modelling of the process

The activities of a business process are modelled in extended Event-driven Process Chains (eEPC) as functions (depicted as rectangles with rounded corners). They are triggered by events (depicted as diamonds) and produce events which indicate that the execution of a function is finished. Beginning with a start event, functions and events are mutually connected by control flow arcs. Additional connectors split and join alternatives and concurrency (using the connector types AND, OR, XOR). Moreover, organisational units and information objects are represented by additional symbols. They are connected with function symbols describing the use of these resources when the corresponding function is executed. Figure 1 illustrates the process described above in an eEPC model [Sche94]. Due to their implementation in the SAP R/3 Analyser and the ARIS Toolset, eEPC diagrams are widely spread – especially in Germany. Hence, the method of eEPC is also predominant in (German) E-Government programs

[VBPO05]. Consequently, we start with an eEPC model that later becomes an input for a more formal model.

Paragraphs and legal regulations are the information objects which control the execution of workflows of public authorities. Alpar and Olbrich, therefore, propose the use of the information object metaphor to represent these legal constructs in models of public processes as depicted in the left graph of figure 1 [AlOl05]. Thus, not only the workflow itself is visualised, but also the influence of legal constraints on the workflow. The other way round, laws and legal regulations can be seen as specifications for the workflow as they represent the processes' constraints. Within Figure 1, optional regulations (checking the liquidity and tax reduction) are highlighted with the aid of notes.
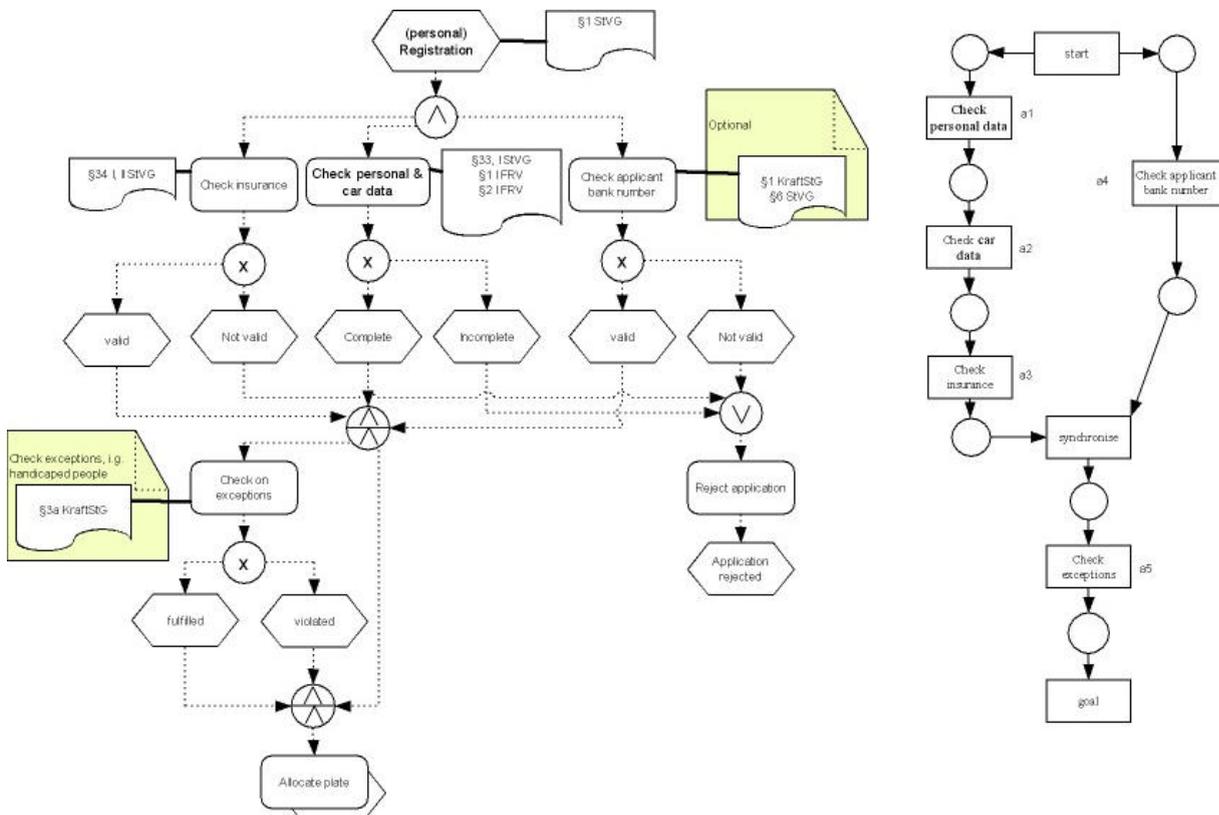

Figure 1: Registration of a motor vehicle according to the current German law

The eEPC model (see Figure 1 – left graph) gives an overview of the application process. Such semi-formal process documentations are increasingly important within the E-Government programs (see *BundOnline 2005* [BuOn05], *E-Government in Österreich* [eÖst03], etc.) because without process documentation there is little chance to successfully introduce E-

Government concepts [SKH03]. Although such semi-formal notations are sufficient for human beings to get an overall comprehension of regulations, they are not, nor were they intended to be, a formal specification against which an actual workflow implementation can be verified. A formal, verifiable model which could be used as a specification of a workflow management system, however, would be a qualitatively higher representation of the process. Moreover, formal methods are prerequisites for analysing processes against specifications and for examining their efficiency [Voss05]. Such a representation is necessary in order to precisely determine the influence of legal constraints. Hence, we take the workflow model of Figure 1 as input and translate it into a formal process specification using the Semantic Process Language [Simo05]. The result is depicted on the right model of figure1.

The Semantic Process Language is an approach for process specification applied to business process modelling based on Petri nets. The meaning of the formulas of this language, called modules, is defined with the aid of *Module nets* – a kind of Petri nets closely related to relaxed sound *Workflow nets* [Aals98] and which are widely known in business process modelling [Dehn03]. *Module nets* are Petri nets with explicit *start* and *goal* transitions (where the preset of *start* and the postset of *goal* are empty). A *process* of a Module net is defined as a firing sequence reproducing the empty initial marking where *start* and *goal* occur exactly once (at the beginning and the end of the process, respectively). The transitions firing in-between are interpreted by actions and their sequence of occurrence indicates the process. This specific definition of processes allows conclusions about non-trivial properties of a Module net from the net's structure without calculating the full state space. The Module net representation on the right side of figure 1 is based on the following module of the Semantic Process Language (we began with the visualisation because it can be understood more intuitively):

$$M1:=\ \ [[a1 < a2 < a3]\ \hat{}\ a4]] < a5$$

The symbol "<" indicates a sequence of (sub-) processes, "^" indicates that processes occur independently.

2.3   Supporting the process under the current legislation

As we said in the beginning of this chapter, the registration of motor vehicles is one of the most executed public processes in Germany. Thus, we can identify a lot of variety in the implementations and a large number of similar process sets; e.g. the cancellation of a

registration of a vehicle, renewal of a registration, temporary registration, registration for transport of goods, and about 40 more. In order to demonstrate the influence of legal constraints and describe the challenges of harmonisation, we focus on the common registration of a car by a private citizen since this is the most common process [ScPe03]. Therefore, all figures in this paper will only describe this single process.

However, the registration process occurs that often because a decree to the StVG dictates that licence plates in Germany are bound to the region the private citizen lives in. Consequently, if a private citizen moves within Germany, she or he must change the licence plate of his/her vehicle, too. Since it was suggested abandoning this decree in June 2006, there is a strong political debate going on about the replacement of the local vehicle plates by individualised plates. Even though this is the most evident way to reduce the number of process occurrences, it does not simplify or change the process itself. The model would consequently represent the same organisational workflow. It is therefore, out of the scope of this paper.

Taking a closer look at figure 1, there is more than one way to reengineer the registration process towards E-Government. Starting with the application itself, some local authorities offer a web form to fill in the personal and vehicle data before actually going to the administration. The quite complex form is verified and the tax calculation can be conduced in advance. Although an applicant still has to appear at the respective office to personally hand over all needed files, the overall process time is reduced. The most obvious goal of E-Government would now be to work on a completely electronic process in order to make the personal appearance obsolete.

Currently, the restrictions on posting documents electronically or on sending the licence plates by post prevent a completely online execution. Yet, by giving someone power of attorney (§167 of German civil law, BGB) the personal appearance can also be taken over by a third party. It is a very common practise that for example car traders or intermediate brokers offer to the actual applicant for a certain fee. Hence, the graphs (we continue with eEPCs and Module Nets) in figure 2 are representing the process with this option.
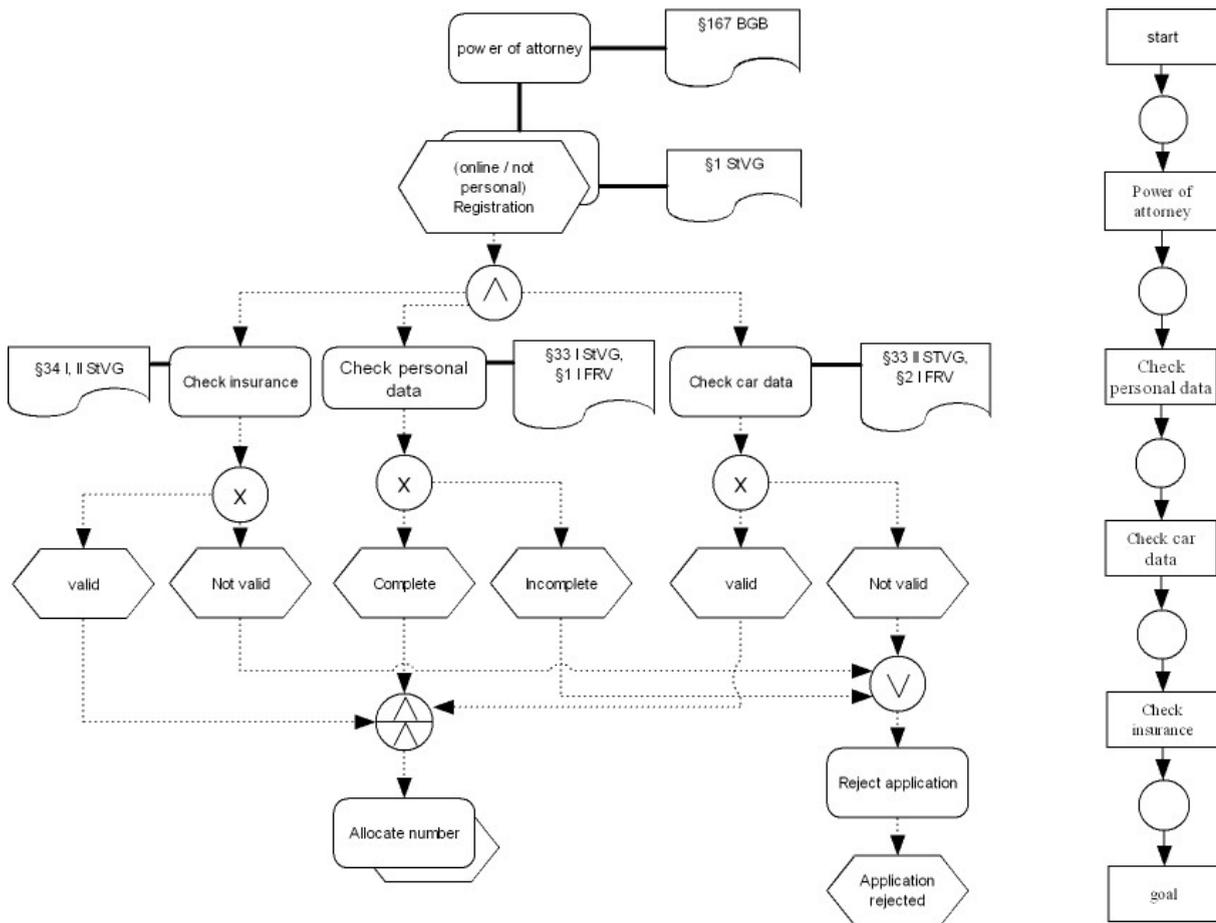
Figure 2: Modified process in compliance with the current German law

In order to harmonise and simplify the process in compliance with the current legislation, all the optional process steps that refer to special circumstances or local variety (special permissions for farmers, checking of foreign cars, etc.) are not represented anymore. Since the information on a tax reduction is actually not bound to the vehicle but based on the individual's tax liability (KraftStG is a tax law), the collection of that information should not be part of the core registration process. Thus, the eEPC of figure 2 knows no check on the exceptions anymore. To offer a common process to the citizens (e.g. in the portal of a metropolitan area or a federal state) there must be an agreement, whether the liquidity (bank statement, etc.) of an applicant needs to be checked or not. Since the current law knows no regulation on that point, the checking is purely optional and therefore ignored in the process depicted in figure 2. Even though figure 2 still represents a legal exceptional process, it is very common process. We will, therefore, use it as (equivalent to figure 1) input for joining different process sets.

2.4   Alternative process sets from European Union countries

When we talk about alternative process sets in the context of E-Government, we basically talk about changing the legal framework in which the processes are defined. Once one reaches that point of a discussion, an even more drastic change to the process can be considered – up to a harmonisation of vehicle registration in the European Union. A recent survey of the University of Potsdam, which analysed the registration procedure of motor vehicles in all European Union member states, came to the result that most of the member states (except France and Germany) already changed the procedure of motor vehicle registration in order to achieve E-Government and more efficient processing [ScPe02].

Within all the changed procedures and changes in the legislation the study found one comparable trend within all the recent efforts: while the storage of the data was centralised (imposing strict conditions), the actual process of registering and distributing licence plates was outsourced by the public administration to private actors. The only option to apply at the authorities directly is mostly via the internet. In Sweden and the Netherlands, for example, these private actors are limited to car traders and insurance companies. Hence, the process could be reduced by one more step: the checking on the state of the car, or the insurance cover respectively. Not even the usual online registration/authentication procedure is needed, since a user can be identified via its contract/insurance number.

In the Netherlands, the process is completely regulated by the centre for vehicle technology and information (Rijksdienst voor Wegverkeer, RDW). The RDW (www.rdw.nl) is – since 1996 - an autonomous institution within the Dutch government which is responsible for all issues relating to the regulation of the traffic in the Netherlands. Their tasks include the surveillance of the motor vehicles (technical and registration issues) and the drivers (driver's licenses, etc.). Hence, the complete data set needed for a vehicle registration (i.e. insurance, personal data and technical surveillance data) is held on the RDWs' servers. If now a car is registered in one of the registration offices (Post office or car dealer), one has to access the RDWs' online service. Figure 3 illustrates this procedure.
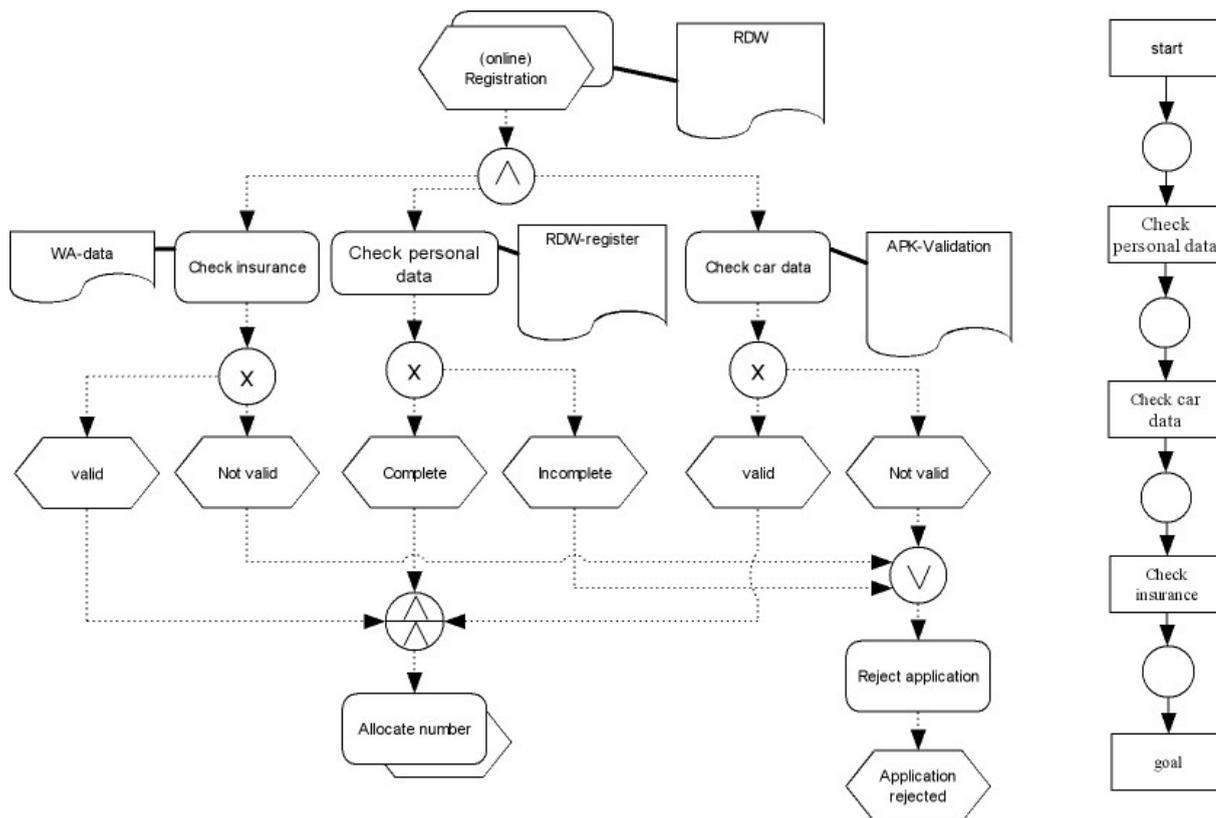
Figure 3: Dutch process of vehicle registration via the RDW

Of course, everything depends on the correctness of the central data on the RDWs' servers. Consequently, one is able to hand in new data (insurance = WA, technical data = APK) during the registration process. During the process, the personal data is cross checked with the data in the registration office.

Although the Dutch procedure is considered quite innovative, and indeed reduces the overall process time (compared to the German procedure), two shortcomings can be identified: first, the RDW holds redundant data which have to be updated frequently - e.g. if a technical surveillance deadline is reached. Second, the holding of too many personal data results in concerns about private data protection. On top of that, from a BPM point of view, one could ask why RDW is executing the registration task if private actors come into play; could those private actors not access the data directly?

In order to reform the Austrian motor vehicle registration process in late 1999 neither a new institution that holds the complete set of data was founded nor was any other organisational change made within the governmental organisation. The only legal change made was to

outsource the registration process to private actors. Unlike in the Netherlands, there were no specific actors picked, but several conditions on who and how to execute the registration task where created (*Zulassungsstellenverordnung* – ZustV [Zust98]). As demonstrated in figure 4, any private actor who fulfils the requirements of the ZustV can technically register cars in Austria.

Figure4: Motor vehicle registration process in Austria

The private actors who execute the registration process in Austria turn out to be mostly insurances who offer the registration as a service to their clients. We can assume the insurance will only register cars that are properly insured with them. Hence, the checking of the insurance coverage can be ignored in the Austrian procedure. Since an insurance will check on the personal data and the correctness of the vehicle data anyway, the collection of information (and hence, the overall process time) is further reduced.

2.5   Harmonising the process across the European Union

Without the integration of legal constraints into the eEPC, the Module Nets of the modified German (figure 2), the Dutch (figure 3) and the Austrian (figure 4) motor vehicle registration

process would be quite similar. In fact the process steps (checking personal data, vehicle data and insurance coverage) must always be the same. Giving the power of attorney to a third party – as modelled in the German common-practise model in figure 2 - actually equals a lot the fully outsourced process as it is done in many European countries.

Nevertheless, the common German process of figure 2 is a legal exemption. The current legislation still describes a far more complex process as it is depicted in figure 1. In order to simplify the procedure in Germany, the (optional) checking must be abandoned. While all the countries that already reformed the registration of motor vehicles towards E-Government implemented centralised data storage and outsourced the front office of the registration process, the required data in Germany are still distributed asymmetrically; partly centralised and partly in local administration. Having built formal models, we can join the diagrams and see how a common process without any change of legislation (figure1, 3 and 4) would look like.

The formal process specification allows the verification of implemented process sets against this specification given that both are described by Module nets. For this, we have built the intersection of specification and implementation nets which is achieved by joining equally interpreted transitions, i.e. transitions that represent the same kind of actions. Afterwards, the join of the nets can be calculated automatically. Figure 5 shows the resulting net. Due to its complexity – resulting from Germany's optional regulations – the resulting net obviously does not represent a desired outcome.
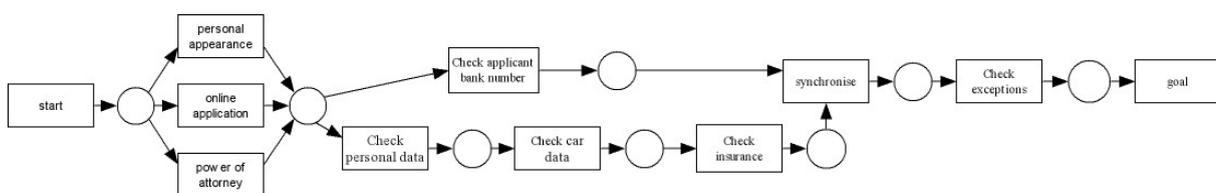

Figure 5: Module Net of joined processes

In Germany, a first step towards harmonisation will be taken in 2008. By then, the Federal Bureau of Motor Vehicles and Drivers will store all personal and vehicle data needed for a registraion. The registration offices will dynamically access the data in order to issue a new registration. By then, the common process of car registration in Germany will already look more like the alternative process set of figure 2. Additionally, assuming the common practice of

third party representation (online applications, third party brokers, etc.), we join the nets of figure 2, 3 and 4 to get figure 6 as the resulting net.
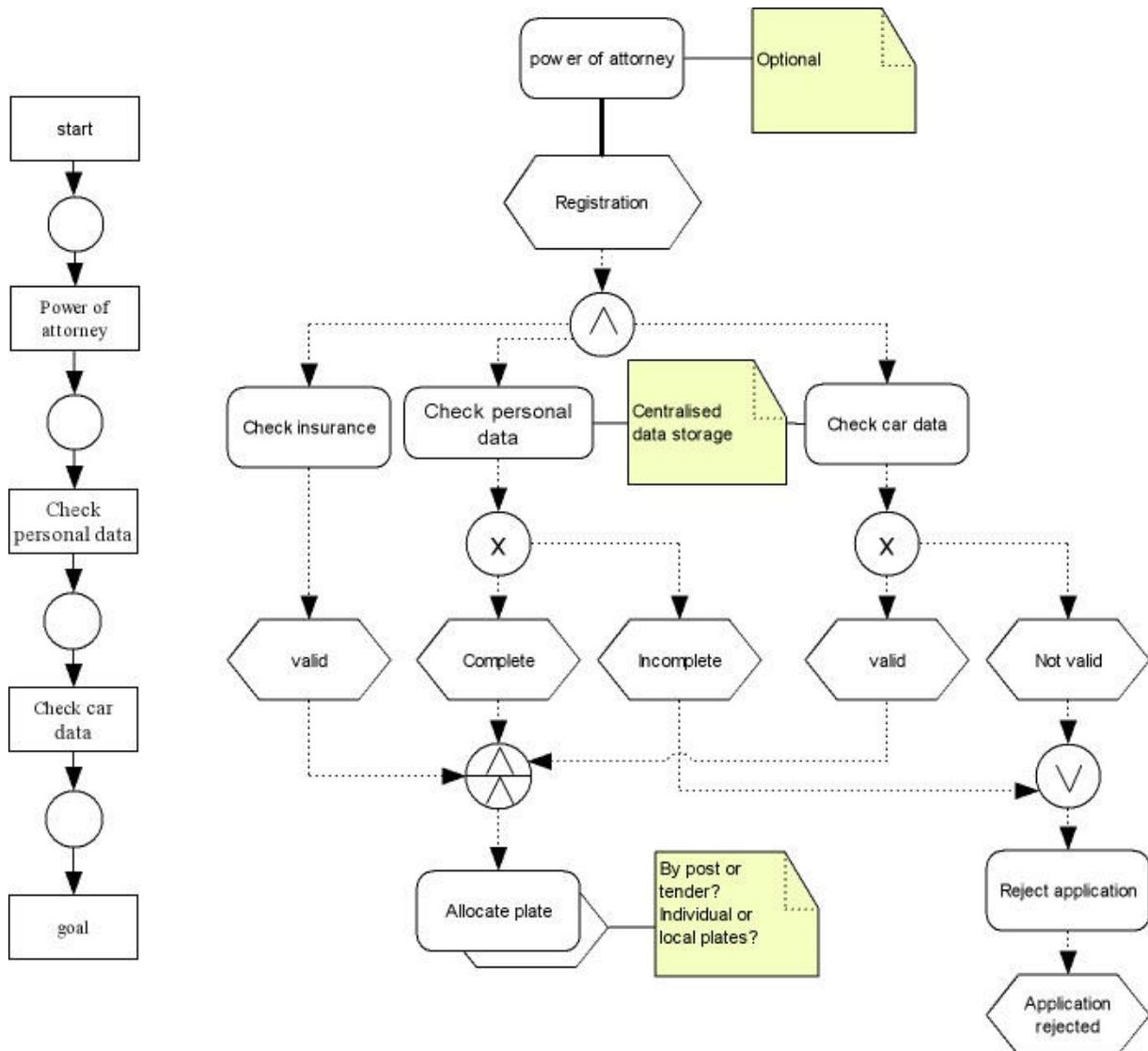

Figure 6: Joined process set of modules 2, 3 and 4

As we can observe in the joint graph of figure 6, the registration is now harmonised within the three examined countries. To make the join work, however, two central assumptions have been made: first, there must be centralised data storage in order to enable a check on the data independently of the location of the front office. Second, as long as the registration process in Germany (and France) remains with the local authorities, the power of attorney must still be given in order to outsource the process to a third party.

Taking further EU member states into the account, it is questionable whether a complete harmonisation will be legally possible. In Sweden, for example, license plates are issued centrally and sent to the applicant by post. In all the other observed countries, licence plates must be received in person. Therefore, Sweden is so far the only country that executes the process completely online.

3 Conclusion

Businesses and private citizens are not only constrained by economic conditions but also by legal regulations formulated at different administrative levels – from cities, states and nations up to international agreements such as in the European Union. Although the legal regulations are of significant importance to the structure of the society, little research on the integration of processes exists.

In this paper, we have showed the influence of legal regulations on the definition of an E-Government process. As a demonstration example, we analysed the process of registering a motor vehicle. We compared the resulting process sets with workflow descriptions of equal tasks in different European countries. Our semi-formal process diagrams already point out that the core processes do not differ much. In order to analyse the complete harmonisation of the process in the European Union, a formal representation is required. Translating the resulted joined Module Net back into an eEPC, one can observe that actually little change in the process and the legal framework is required to achieve harmonisation. In contrast to previous work, which took the position that standard E-Government processes should respect local variety [OlSi06], here it was shown that it is possible to push the German registration process towards a centralised E-Government strategy without loosing functionality.

Using two different modelling approaches helps to address two different issues: eEPC, as one possible option to model business processes in a semi-formal way, allow us to explicitly include the legal framework and the organisational perspective into our considerations. Open workflow nets, as a representation of formal Petri-Nets, permit a mathematical verification of the joined processes. Additionally, inputs for workflow management systems and concepts of automation – such as web services [SFO06] - can be derived.

Our example also shows the paradigmatic approach of specifying a legal framework with a process model. The different processes described above are quite similar – only when adding legal requirements the different constraints become visible. By considering both, the formal and the semi-formal notation including the legal constraints, the verification of the actual workflow implementation against these models becomes possible. The current trend in (German) public administrations to integrate information systems and to restructure administration around government processes [Rein95] increases the necessity of such process modelling approaches.

4   Outlook

Applying Module Nets as a formal description of public workflows in addition to a semi-formal notation that represents laws as information objects appears to be a useful improvement for several ongoing projects. One of these is the E-Justice concept of the European Union which is part of the 6th Research Framework Program funded by the action plan for eEurope 2005 by the European Commission [EuCo05]. Next, we plan to enhance the user-interface management for public services [FrZa06] by our method of integrating the legal constraints. The goal is to improve European markets by deriving process models automatically that already include the legal constraints of each country. This could bring us closer to unified and transparent process sets within the European Union.

Literature

[Aals98]   van der Aalst W. M. P.: The Application of Petri Nets to Workflow Management. In: The Journal of Circuits, Systems and Computers, 1998.

[ALOl05]   Alpar P.; Olbrich S.: Legal Requirements and Modelling of Processes in e-Government. In: Electronic Journal of e-Government Volume 3 Issue 3 2005, www.EJEG.com (2006-07-15), Reading, GB, S.107-116.

[BAD03]   Becker, J.; Algermissen, L.; Niehaves, B.: Prozessmodellierung als Grundlage des E-Government – Ein Vorgehensmodell zur prozessorientierten Organisationsgestaltung am Beispiel des kommunalen Baugenehmigungsverfahrens. In: W. Uhr, W. Esswein and E. Schoop (Hrsg.): Wirtschaftsinformatik 2003 / Band II. Heidelberg 2003, S. 859-878

[BuOn05]   BMI. Umsetzungsplan für die eGovernment-Initiative Bund Online 2005. Bundesministerium des Inneren, Stabsstelle Moderner Staat - Moderne Verwaltung www.bundonline.de (24-03-2006).

[Dehn03]   Dehnert J.: A Methodology for Workflow Modeling - From business process modeling towards sound workflow specification. PhD thesis, TU Berlin 2003.

[eÖst03]   Posch, R. (Ed.): E-Government in Österreich: -Informationen für Wirtschaft und Verwaltung, Bundeskanzleramt Wien, 2003, http://www.cio.gv.at (07-04-2004).

[EuCo05]   European Commission: eEurope 2005 - An information society for all, http://europa.eu.int/information_society/eeurope/2005/index_en.htm (06-07-06).

[FRV87]   Fahrzeugregisterverordnung vom 20. Oktober 1987 (BGBl. I S. 2305).

[FrZa06]   Freiheit J.; Zangl A.: Model-based User-Interface Management for Public Services. In: D. Remenyi (editor): Conference proceedings of the 6th European Conference on Electronic Government (ECEG), Reading, GB 2006, S. 141-151.

[KBK06]   Knackstedt, R.; Brelage, C.; Kaufmann, N.: Entwicklung rechtsicherer Web-Anwendungen – Strukturierungsansatz, State-of-the-Art und ausgewählte Aspekte der fachkonzeptionellen Modellierung. In: WI 48 (2006) 1, S.27-35.

[KraftStG02]   Kraftfahrzeugsteuergesetz i.d.F. vom 26. September 2002 (BGBl. I S. 3818), geändert durch Artikel 30 des Gesetzes vom 21. Juni 2005 (BGBl. I S. 1818).

[LeTr99]   Lenk, K.; Traunmüller, R.: Öffentliche Verwaltung und Informationstechnik – Perspektiven einer radikalen Neugestaltung der öffentlichen Verwaltung mit Informationstechnik, Verwaltungsinformatik Nr. 20, Decker Verlag, 1999.

[OlSi06]   Olbrich S.; Simon C.: Process engineering towards E-Government – modelling process variety and best practice. In: D. Remenyi (editor): Conference proceedings of the 6th European Conference on Electronic Government (ECEG), Reading, GB 2006, S. 339-349.

[Rein95]   Reinermann H.: Perspektiven einer Verwaltungsreform mittels Informationstechnik. In: R. Traunmüller (Hrsg.), Geschäftsprozesse in öffentlichen Verwaltungen - Neugestaltung mit Informationstechnik, Heidelberg 1995, S. 53-69.

[Sche94]   Scheer A. W.: Business Process Engineering, ARIS-Navigator for Reference Models for Industrial Enterprises. Springer, Heidelberg 1994.

[ScPe02]   Schuppan, T.; Penning-Poggenbeck, J.: eGovernment im Kfz-Zulassungswesen Konzeption zur Umsetzung, Kommunalwissenschaftliches Institut (KWI) der Universität Potsdam, KWI-Projektberichte 2, Potsdam 2002, http://www.uni-potsdam.de/u/kwi/publ/kwi-pb.htm (01-06-2006).

[ScPe03]   Schuppan, T.; Penning-Poggenbeck, J.: Kundenanalyse und Evaluierung zu eGovernment im Kfz-Zulassungswesen - Zwei empirische Studien. In: Prof. Dr. Michael Nierhaus (Hrsg.), Kommunalwissenschaftliches Institut (KWI) der Universität Potsdam, KWI-Projektberichte 7, Potsdam 2003.

[SFO06]   Jörn Freiherr, Carlo Simon, Sebastian Olbrich: Usability of Event-driven Process Chains, EPK-Kongress der GI, Wien 2006 (accepted).

[Simo05]   Simon C.: Incremental Development of Business Process Models. In: U. Frank, J. Desel (Hrsg.) EMISA 2005 - Development Methods for Information Systems and their Application, Gesellschaft für Informatik, Lecture Notes in Informatics P-56, Klagenfurt 2005, S. 95-106.

[SKH03]   Scheer, A.-W.; Kruppke, H.; Heib, R.: E-Government – Prozessoptimierung in der öffentlichen Verwaltung, Springer Verlag, Berlin Heidelberg, 2003.

[SnZu97]   Snellen, I.; Zuurmond, A.: From Bureacracy to Infocracy: Management through Information Architecture, in: Tyler, Snellen, Zuurmond (Ed.), Beyond BPR in Public Administration, Amsterdam, IOS Press, 1997, S. 205-224.

[StVG03]   Straßenverkehrsgesetz in der Fassung der Bekanntmachung vom 5. März 2003 (BGBl. I S. 310, 919), zuletzt geändert durch Artikel 2 des Gesetzes vom 14. August 2006 (BGBl. I S. 1958).

[Voss05]   Vossen G.: Was Informatiker und Wirtschaftsinformatiker zu Prozessen beitragen. In: HMD - Praxis der Wirtschaftsinformatik (241) 2005, S. 5-6.

[VBPO05]   Kompetenzzentrum Vorgangsbearbeitung und Organisation: Softwareprodukte zur Geschäftsprozessanalyse und –Optimierung - Bedeutung ihres Einsatzes und eine Übersicht zu ausgewählten Produkten. In: E-Government-Handbuch des Bundesamts für Sicherheit in der Informationstechnik (BSI), Kapitel 6, (online 2005-12-17): http://www.bsi.bund.de/fachthem/egov/download/6_GPA.pdf.

[WiTr03]   Wimmer, M.; Traunmüller, R.: Geschäftsprozessmodellierung in E-Government: eine Zwischenbilanz, eGov days 2003, www.egov.ocg.at (06-02-2004).

[WoKr05]   Wolf, P.; Krcmar, H.: Prozessorientierte Wirtschaftlichkeitsuntersuchung für E-Government. In: Wirtschaftsinformatik 47 (2005) 1, S.337-346.

[Zust98]   Verordnung des österreichischen Bundesministers für Wissenschaft und Verkehr, mit den Bestimmungen über die Einrichtung von Zulassungsstellen (Zulassungsstellenverordnung - ZustV) StF: BGBl. II Nr. 464/1998.