Formation of Advocacy Coalitions in Nascent Subsystems: A Case Study of the European GNSS Project Galileo

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Abstract

The European GNSS project Galileo belongs to the most ambitious programs of the European Community. The European Commission aims at connecting political, economic and technological goals. The several goals of Galileo led to a high number of actors involved from politics, economy, and research. The actors follow several different belief systems relying on scientific or economic interests, respectively. The requirements of satellite technology and the expectations to get direct economic values led to coordination problems within the political subsystem. Additionally there were several groups of actors belonging to different modes of transport, supplemented by the scientific developers of GNSS.
Because of the complexity of the actor constellation and the fluid institutional responsibilities the paper will use the Advocacy Coalition Framework to identify actors, beliefs, and potential causes of policy change. The case study focuses on the question how interests and perceptions of latent actors are transformed into policy belief systems and how actors form Advocacy Coalitions in nascent subsystems.

1. Introduction

Galileo is the European global navigation satellite system (GNSS) which should allow the European breakthrough in the satellite-supported navigation and detection. It started in 1995 with the pilot project EGNOS (European Geostationary Navigation Overlay Service). EGNOS consists of tracking stations and was put into operation in 2009.
Galileo is aimed at enabling the independence of Europe from other GNSS systems like the American GPS (Global Positioning System) and the Russian GLONASS (Globalnaja Nawigazionnaja Sputnikowaja Sistema). It should also lead to far-reaching economic effects for Europe and win considerable shares at the worldwide, lucrative market for GNSS applications. The project dates back to the late 1990s and was planned to be usable in 2008 originally. In the course of the project delays arose though. The original timetable could not be kept. Currently 2013 is planned to be the earliest start.
The project is not only unique because of its technological challenge. It is also the first intensive cooperation of the European Community (EC) and the European Space Agency (ESA). Another peculiarity is the extensive participation of private actors at the funding of Galileo. The public-private partnership (PPP) became an important foundation of the project.
In 2007 the PPP failed and Galileo underwent a fundamental governance change. Even though there have been some descriptions of this change (Smith 2008; European Court of Auditors 2009) it still lacks explanations of this development from the perspective of Policy Analysis.
This paper develops a theoretical perspective, theses, and methodological considerations to explain the governance change of Galileo. It starts with the presentation of the peculiarities of the program and its' consequences for choosing a theoretical lens. The third section presents the structure, problems and conflicts of the program up to and since the major change in 2007. Afterwards it is analyzed how policy-learning might contribute to the explaining and understanding of this change. The conclusion will discuss the contribution of the case study for general understanding of policy learning and formulate a research program to underpin the presented results.

2. Galileo as an ACF Case Study

Technology policy and especially the Galileo program rely on specialist information much more apparently than other issues. Therefore policy-oriented information and learning can be assumed to play an important role for policy change. Any approach to understand and explain changes of the Galileo program should use a theoretical lens that helps to reduce the complexity of the actor constellation and by the same time includes the possibility of policy-oriented learning.
The importance of scientific information might suggest Epistemic Communities as an appropriate theoretical lens (Haas 1992**)**. The idea of Epistemic Communities stresses the possibility that political decision makers might be influenced largely by scientists under certain conditions: Firstly the politicians must lack undisputed information to a large degree that hampers them to find solutions themselves. Secondly there must be a powerful scientific coalition that includes (at least nearly) all leading experts. Appropriate conditions can be found at the field of climate change among others. The Galileo program lacks the existence of a single leading epistemic community though. Therefore we expect to find evidence for policy-oriented learning by scientific information without expecting the dominance of scientists over politicians. With other words: Epistemic Communities might contribute to the understanding of future develop-

ments of the Galileo program. Up to now we need other theories that do not require scientific homogeneity.
The Advocacy Coalition Framework, developed by Paul Sabatier and Hank Jenkins-Smith also stresses the idea of policy oriented learning resulting from technical and scientific information (Sabatier/Jenkins-Smith 1993). The framework has been developed for the conditions of the American presidential system. It has also been proven useful to European democracies (Bandelow 2006). Contrary to other theoretical lenses of policy analysis it does not assume stable and given actor preferences. The ACF relies on three foundations (Sabatier/Weible 2007: 192-198): Firstly it argues that complex societies lead to the development of policy subsystems consisting of specialists to negotiate policies. Secondly the ACF is based on the model of belief systems that includes biased perceptions of actors and the idea of less likeliness to change general beliefs than to modify strategies by new information. Thirdly the framework has developed the eponymous concept of advocacy coalitions. Within policy subsystems the ACF argues – contrary to some rational choice approaches (Schlager 1995) – that actors tend to cooperate within networks to reach common core beliefs and similar policy objectives.
Any application of the ACF has to check these three assumptions in the investigated case. In contrast to traditional internal policies like employment, health, pensions, or taxes, the Galileo program lacks specific institutions to frame the policy process. Therefore it cannot apparently be assumed to be negotiated within a subsystem. The ACF defines subsystems less by institutional criterions than by policy arenas though.
Criterions for subsystems are the existence of specified actors and the relevance of these actors for the formulation of policies. The regular conferences of experts within the Galileo program proof the existence of actors from politics, economy, science and technology to be engaged in this issue. The first peculiarity of the subsystem is that it is neither limited to a single country nor to the region of the European Community (and in some issues even including actors from neighbouring regions). The original ACF does not demand a national limitation of policy processes but requires geographical boundaries. These geographical boundaries are less clear in the Galileo case than in other cases. So the case study will have to deal with the challenge to localize the subsystem.
We will suggest to use social network analyzes (SNA) to localize the subsystem. SNA has been combined with the ACF in several studies recently (Knoepfel/Kissling-Näf 1998; Weible/Sabatier 2005; Ingold 2008; Nohrstedt 2008; Witting 2008; Sager/Varone 2009). Most of these studies focus on established national or regional subsystems and use SNA to identify coalitions and actor relations within a given subsystem. The combination of SNA with the ACF in the field of Galileo might help to enlarge the applicability of the ACF to nascent subsystems and transnational areas by questioning the condition of geographical limited subsystems.
Furthermore, a subsystem needs a long-term perspective. By applying this to Galileo one has to see the program as an enduring issue rather than a single project. Galileo is not limited in time as it is intended to have an enduring operational phase. But the time perspective leads us to the second peculiarity: Galileo only started officially in 1998/99, even though first discussions can be traced back to the program EGNOS in 1995. So our case represents a nascent subsystem that enables us not only to analyze the procedures within a subsystem (like most other ACF applications) but also the formation of a subsystem.
The youth of the issue will not only be relevant for the identification of the subsystem but also for the other ACF foundations. It will present the chance to observe the development of belief systems by actors that might enter the subsystem without stable policy beliefs but only have deep normative core beliefs or material interest. It will also be relevant for the development of the actors' network that can be assumed to change from an unstructured constellation to a limited number of coalitions with similar policy beliefs and enduring cooperation. Therefore it

might be possible to identify new modes of policy-oriented learning that are important for nascent subsystems and are likely to be overlooked in established areas.

3 Governance change in Galileo

The following chapter contrasts the structure, problems and conflicts of the program until and since 2007. It aims at describing the governance change that was unexpected by several actors and observers.

3.1 Development of a Public Private Partnership 1998-2007

The first period of the European satellite navigation program Galileo begun with a Communication of the European Commission in January 1998 (COM(1998)29 final). The formal decision to start the program was made by the Council in July, 1999 (COM(1999)54 final). The Commission received the order to plan the feasibility, efficiency, structure, control, reliability and the costs. The program got a financial frame of 40 million Euro up to the end of 2000. The cost was raised by the ESA with the GalileoSat program, while the EC financed numerous research projects (Hobe et al. 2006). The Commission presented the results in November, 2000. Subsequently the ESA received a service contract with the EU, while the Commission took the political role (COM (2000)750 final).
The negotiations for the further funding of GALILEO started in 2001. The funding culture of the ESA requires that member states receive orders in the same extent as they contribute to the funding of projects ("geographic return"). Therefore the member states had an incentive to contribute as much as possible to the funding of 550 million Euro for the period up to 2005: They could expect to got their money back and could use their financial share to influence the technology in their interest. (Hobe et al. 2006). Germany, France and Italy all wanted to take the industrial leadership and outbid each other with their financial participation. So the project outran the originally agreed sum. The competition also led to open questions about the project leadership and the money backflow. It took enduring negotiations to find a compromise in March 2003 that gave the project the capacity to act back (COM (2006)769 final). So the project lost over one year compared to its original timetable. The Galileo Joint Undertaking (GJU) was founded to develop and test the first model satellites and tracking stations. The European Commission had already started first projects within the 6th Framework Programme (FP) to prepare the market of applications (Benedicto/Ludwig 2001).
The original plan of a public private partnership intended the private side not only to build and install the tracking stations and satellites but also to be involved into the funding and take the user's license. The syndicate should take over 1.6 billion Euro of the whole cost of approximately 2.1 billion Euro for the construction. In return it would get the Galileo's proceeds of 20 years (COM (2000)750 final).
In 2004, the first selection procedure identified three possible concessionaires:

- iNavSat (syndicate of EADS, Inmarsat, Thales),
- Eurely (syndicate of Alcatel, Finmeccania, Vici Concessions) and
- Eutelsat (syndicate of Eutelsat, Hispasat, LogicaCMG, AENA).

The GJU started negotiations with these three syndicates in 2004. Eutelsat withdrew in 2005. The other two syndicates presented similar offers, so the GJU suspended the final negotiations (GJU 2005). Thereon the remaining syndicates merged presented a joint offer in December, 2005. Even though there was no competition left the final negotiations turned out to be full problematic details:

- How to distribute the financial risk between the syndicate and the EU?
- How to distribute the orders for the infrastructure and to organize subcontracts?
- Which should be the role of the public partner for financing safety provisions during the operation period of Galileo?

In the course of the tough negotiations it became evident that, on the one hand, the schedule could not be kept for the completion and that it was impossible to implement the intended PPP.

3.2 Centralization of the Galileo program since 2007

In May, 2007, the negotiations failed finally after the syndicate exceeded the last deadline to sign the concession (COM (2007)261 final). At the same time the timetable had to be changed again. Currently the official plan is to start the use of the system in 2014. This plan hardly seems realizably though. This development marks a significant change from a formal PPP to a purely public financed enterprise. Until the end of 2007 the partners negotiated for a new form of the project. Finally the program was transferred to a central public form. The GJU was dissolved and the competencies were handed over to the new-founded GNSS Supervisory Authority (GSA). With the resolution EC/683/2008 the EU took the whole responsibility for the funding of the program. Thereby Galileo became property of the European Community.
All decisions that have originally been made within a diversified network of public and private actors are now centralized at the European Commission. The Commission has divided the program into working packages like tracking stations, satellites, installation of the system, control etc. to give concrete orders to private enterprises. The advantage of the centralization is that the Commission can control single contractors more efficiently. On the other hand it might become more difficult to coordinate the single working packages. It remains unclear if the hierarchical control will lead to further delays of the time schedule though. The governance change takes into account that decisions regarding technical solutions imply the political aims of the EU. The idea to centralize Galileo was not only developed in 2007 because of the problems to agree on a PPP. One can find this goal in older documents like a Green Paper that dates back to 2003 (COM (2003)17 final). The originally intended governance of Galileo brought together actors with several different background: The European Commission as a supranational organization differs from the ESA. The ESA has an intergovernmental structure that involves not only member states of the EU but also countries like Norway, Canada, and Switzerland. The ESA lacks a clear political mandate and is bound to the interest of the member states. So the development of 2007 changed the governance in three ways:

- The private partners were excluded from the funding.
- The member states were excluded from direct funding by transferring the responsibility directly to the budget of the European Community.
- The program was transformed from a network of supranational, national, intergovernmental and private partners to a supranational hierarchical control.

The described governance change is far from being normal and could not be expected originally. The transformation from PPP to hierarchical control contrasts to other trends of governance. The original governance included several actors with several beliefs. Why have private actors and member states been prepared to give up influence, control and financial chances within the largest project of the EU? The following chapter will discuss these questions from the perspective of the ACF.

4 Advocacy Coalitions and Policy-Oriented Learning

Belief systems and advocacy coalitions are important concepts of the ACF as we have discussed above. The ACF supposes the existence of a policy subsystem that includes specialists responsible for the formulation of policies. These specialists form Advocacy Coalitions and follow belief systems. On the basis of these three foundations the ACF has formulated 12 hypotheses in its latest version (Sabatier/Weible 2007: 220). These hypotheses bear on Advocacy Coalitions, policy change and policy learning. The following chapter starts by applying the foundations and hypotheses on Advocacy Coalitions to the Galileo case. Afterwards we discuss possible explanations for policy and governance change with a special focus on policy learning in this nascent subsystem.

4.1 Development of First Advocacy Coalitions

Contrary to other subsystem the Galileo case does not present stable arenas that would enable an easy identification of relevant actors. The policy network has a transnational structure and the responsibility of forma institutions changed by time. So one cannot rely on formal parliamentarian hearings to identify the subsystem and theAdvocacy Coalitions. Instead the first step is to analyze the amount of written statements to find actors, beliefs and evidence for the existence of Advocacy Coalitions.

Galileo is a transnational project. Important decisions are made by politicians that have fundamental beliefs concerning the aims and rules of intra-European political and economic cooperation. These beliefs have become the decisive conflict line for the formation of first coalitions within the network. The perception of problems and the policy-oriented beliefs depend mainly on the question if actors see Europe as a partner or as a competitor of the USA (Weyer 2005).

On the one hand there are Atlanticists that include actors from Great Britain, Germany, the Netherlands, and Sweden. These actors see European space activities in an international context that has originally been part of the competition between the western world and the Soviet Union. The Atlanticicists therefore want a close cooperation with the USA.

The opponents of the Atlanticists can be called Gaullists as they resemble the belief system of the first chancellor Konrad Adenauer who disagreed with his Atlanticist successor Ludwig Erhard on External issues. Actors from France, Italy, and Spain do not share the anglo-saxon tradition that makes the USA a natural partner. Instead they are based in Roman tradition that sees Europe as a region competing with other regions, nations, and empires. The Roman EU member states were backed by smaller ESA (and not EU) member states like Switzerland and by the European Commission (COM (2000)750 final). The conflict between these two coalitions dates back to conflicting strategies for the project in 1999 (Hobe et al. 2006: 144-147).

As Galileo is a nascent subsystem not every actor that is part of the recent policy subsystem has been included in the early stage of the policy process. New developments that can be seen as policy-internal or policy-external information activated new actors. These actors partly joint the existing coalitions.

4.2 Dual Use and Paths to Belief and Policy Change

Galileo is a civil project under civil control. The cooperation between the EC and the ESA rules out any military rule. The EC is an economic community that does not include the Common Foreign and Security Policy (CFSP) and the European Security and Defence Policy (ESDP). As a consequence_the program lacks any legal basis for military use. Therefore the idea of “dual use” of the program has deliberated at the beginning of the project but it has not been central for the negotiations (Lindström 2002; Logsdon 2002; Geiger 2005: 10).

There were different developments that lead to a revaluation in this case. On the one hand there might have been policy-oriented learning within the logic of the ACF. Even before 9/11 the Bush government strengthened the political pressure to their European partner states to include security matters into Galileo. Within the subsystem it was discussed if Galileo has the theoretical potential for military use. So it is a technical matter if Galileo can be limited to civil use. Especially the problem of potential misuse by terrorists has been discussed within the subsystem. If there is no technical limit, enemies and terrorists can use the public signals for their own purpose. Up to know we do not have empirical evidence if there has been learning by new technical information in this case but it seems quite likely that there has been policy-oriented learning at least in secondary aspects.
On the other hand there is clear evidence for a significant perturbation external to the policy subsystem. The 2001 terrorist attack on America directly became a matter for European policies, not only because the terrorists planed their attacks in Europe (BGH 3 StR 139/06). The attacks strengthened the belief that transnational cooperation in security issues is unavoidable. Only three months after the attacks the American Deputy Defence Secretary Paul Wolfowitz formulated worries that Galileo might overlay the GPS military code and therefore the U.S. could try to stop the program (Divis 2002).
The external event 9/11 catalyzed the existing debate within the policy subsystem. The European Commission expressed its annoyance about the U.S. threat. It included military questions into the program though. In 2002 the Galileo Security Board was established to define technical characteristics regarding security, assisting the Commission in its negotiations with third countries and contributing to the future security structure of the program (IP/02/1358; Lindström/Gasparini 2003: 27). In 2007 the GSA established the Commission System Safety and Security Committee (3SC) and the Security Department.
The developments did not directly change the governance or policies but they changed the actor constellation. Security experts entered the subsystem and became more and more influential.

4.3 Developers and Users Joining the Subsystem

Similarly to military experts different groups of possible Galileo users joint the subsystem. While the original network has been dominated by developer interests users originally have been what the ACF names “latent actors” (Sabatier 1987: 659). Users recognize other information than developers to specify their beliefs: Developers depend on the availability of partners and funding of their work. Furthermore they are part of the scientific community and have to get academic recognition. Users need information concerning economic chances of Galileo.
The greatest potential for commercial and public applications has always seen in the areas of transport and telematics. Approximately 90% of the revenues from licences have been expected to be achieved in this segment (Plank-Wiedenbeck 2005). These applications include vehicle navigation, toll systems, driver's assistance systems, traffic data elevations as well as logistic uses.
Possible applications include different transport modes like road, rail, air, and shipping traffic. The demands of the transport systems differ though. The expectations of economic prospects changed over time. According to information given at the Munich Satellite Navigation Summit 2009 the following applications are discussed.
Assistance systems are the most important use of Galileo in road traffic. Galileo is expected to be superior to its American competitor as GPS cannot guarantee area-wide availability. Therefore actors from the road traffic group like car manufacturers became interested in Galileo

originally. In the meantime improvements of Galileo caused some disillusions in this group. GPS systems are able to use other systems like radio and speedometer to bridge disturbances of satellite reception. Even though Galileo might be technically superior it still is an unsolved challenge to design the car applications cheap enough to be interesting for the mass market.
In contrast to road traffic the rail traffic community still expects major potentials of Galileo. Especially the field of train safety is related with precise data that cannot be provided by GPS yet. Rail safety is not only a technical question but also a legal challenge. As there is the risk of major accidents one need contract provisions concerning guarantee and responsibility questions. Galileo only will be able to provide its quality features accuracy, availability and integrity if there are clear guarantee rules. The guarantee problem has not been solved yet despite of several negotiations (Smith 2008).
Related to the guarantee problem the insufficient integration of national railway systems in Europe might lead to safety problems. Therefore it will be necessary to include rail safety applications in decisions about the further harmonization of the European railway systems.
Air traffic delivers possible applications of Galileo comparable to rail traffic. The constantly growing air traffic amount requires improved coordination of flight-routes (pilot-services) and better navigation of the airplanes to ensure safe and efficient use of flight space. GNSS systems can provide important date for starts and landings and automated aviation independent of weather conditions. Galileo also could provide applications to coordinate landing field and flight field traffic. Similarly to rail applications the major problem is the existing safety infrastructure. Air systems are already integrated in a costly global infrastructure in that new Galileo applications have to be included. Because of the complexity and the awareness of safety aspects in air traffic, safety-related actors in aviation take stock of external systems.
The liability problem in the case of accidents is even more complicated as in the rail case as we have global systems that require transnational contracts. Private actors only have limited chances to negotiate on these contracts. Therefore air traffic applications of Galileo require the political responsibility of the European Union (Smith 2008).
The shipping traffic community expects Galileo to deliver gains in economic services. Especially inland navigation and harbour traffic require exact and reliable data. The existing systems have several technical weaknesses. They are confronted with the problem of multipathing and signal disturbances. So there are economic chances. Applications are confronted with problems similar in rail traffic though. They require harmonization of systems and legal rules concerning the liability in the case of accidents.
To sum up, there are several promising applications of Galileo in different areas. The economic chances activated actors from different transport areas. These actors have special interest and belief systems. For example, car manufactures are used to include external technology into their project. They are interested in costs for the customers. On the other hand actors from the air traffic group seem to be much more interested in safety criterions.
The demands of the users have not been taken into account when Galileo has been planned technically even though the European Union has tried to include the interest of users by funding application research. On explanation for the inadequate inclusion of users might be the organizational double structure of EU and ESA. The EU has developed into a political system that does not only have intergovernmental but also supranational institutions. Therefore it could have been able to consider the cross-national views of applicants. The ESA on the other

hand only has an intergovernmental structure that makes it difficult to consider other than political and economic interest of their member states.
There are several promising applications of Galileo. Private actors from different transport communities have entered the subsystem to participate from the gains of the European GNSS system. In the meantime many expectations have been deceived though. The gains of Galileo still are unclear because of open technical developments of the system itself and of the competitors. Legal questions have arisen that have been neglected by the developers of the system. Major applications of Galileo are related to traffic safety and need complicated agreements to avoid problems in the case of large accidents.
Additionally changes of the U.S. policy concerning GPS reduced the economic chances of Galileo. The U.S.A. gave up the selected availability of GPS that included less accuracy of civil signals compared to military signals (Clinton 2000; Bildt/Peyrelevade/Späth 2000).

4.4 Policy-Oriented Learning

Our analysis presents first evidence for the thesis that policy-oriented information has contributed directly and indirectly to the changes of the Galileo problem. Directly it led to policy-oriented learning of actors within the subsystem. Indirectly new information contributed to the activation of former latent actors. Some actors first entered and afterwards left the system and thereby changed the actor constellation.
The findings are now confronted with the hypotheses of the Advocacy Coalition Framework to give some impression how a case study of a nascent transnational subsystem might contribute to the general understanding of policy change and learning from an ACF lens. The ACF presents three hypotheses concerning advocacy coalitions that can be applied to the Galileo case (Sabatier/Weible 2007: 220; contrary to Sabatier and Weible we classify the hypotheses 3 and 10 as concerning learning and not coalitions):

- ACF hypothesis 1: On major controversies within a policy subsystem when policy core beliefs are in dispute, the line-up of allies and opponents tends to be rather stable over periods of a decade or so.
- ACF hypothesis 2: Actors within an advocacy coalition will show substantial consensus on issues pertaining to the policy core. Although less so on secondary aspects. (…)
- ACF hypotheses 11 (new in 1993): Within a coalition, administrative agencies will usually advocate more moderate positions than their interest-group allies.

Galileo is an interesting case to apply the hypotheses 1 and 2 to a nascent subsystem. It will be important to see if even under these special conditions the core beliefs and coalitions are relative stable. Hypotheses 11 is of interest as we have very important administrative agencies in this case that might differ from the assumptions of the ACF. Especially the European Commission seems central within the Gaullist coalition. So our first result indicates that the Commission has radical positions that differ from hypotheses 11.
The ACF presents two hypotheses concerning policy change:

- ACF hypothesis 4 (revised in 1993): The policy core attributes of a governmental program in a specific jurisdiction will not be significantly revised as long as the subsystem advocacy coalition that instituted the program remains in power within that jurisdiction – except when the change is imposed by a hierarchically superior jurisdiction.

- ACF hypothesis 5 (1997): Significant perturbations external to the subsystem (…) are necessary – but not sufficient – cause of change in the policy core attributes of a governmental program.

Hypothesis 4 is not easy to test as the attribute of a coalition to be "in power" only seems to apply to coalitions that include party politicians within single democratic systems. However, the concept of advocacy coalitions takes its theoretical strength not least from its departure from party politics. Advocacy coalitions include actors of different kind like politicians, journalists, scientists etc. These actors have different power resources. The Galileo case does not present any evidence to confirm hypothesis 4. There was no formal shift of power between the coalitions that could have contributed to the policy change.

Hypothesis 5 cannot be confirmed either. The only significant perturbation was 9/11. It can be disputed if the terroristic attacks are external to the subsystem as GNSS systems are directly related to safety measures. Furthermore other policy-related information seem to have contributed to the policy change (scientific, economic and legal information). So one has to focus on ACF hypotheses concerning policy learning:

- ACF hypothesis 3: An actor (or coalition) will give up secondary aspects of his (its) belief system before acknowledging weaknesses in the policy core.
- ACF hypothesis 10 (new in 1993): Elites of purposive groups are more constrained in their expression of beliefs and policy positions than elites from material groups.
- ACF hypothesis 6: Policy-oriented learning across belief systems is most likely when there is an intermediate level of informed conflict between the two coalitions (…).
- ACF hypothesis 7: Problems for which accepted quantitative data and theory exist are more conducive to policy-oriented learning across belief systems than those in which data and theory are generally qualitative, quite subjective, or altogether lacking.
- ACF hypothesis 8: Problems involving natural systems are more conducive to policy-oriented learning across belief systems than those involving purely social or political systems (…).
- ACF hypothesis 9: Policy-oriented learning across belief systems is most likely when there exist a forum that is
  A. Prestigious enough to force professionals from different coalitions to participate: and
  B. Dominated by professional norms.
- ACF hypothesis 12 (new in 1993): Even when the accumulation of technical information does not change the views of the opposing coalition, it can have important effects on policy – least in the short run – by altering the views of policy brokers.

Hypothesis 3 cannot be confirmed or refused without further research. It is very interesting to test this hypothesis in a nascent subsystem as we have several actors that seem to have material interest only and developed a policy belief system after they joined the subsystem.

All other ACF hypotheses seem to be confirmed in the Galileo case. The case is dominated by material groups (hypothesis 10), the coalitions have the prerequisites to engage in an debate with each other (hypothesis 6), there is accepted quantitative data (hypothesis 7), the problems involve natural systems (hypothesis 8), we have regularly meetings of developers and users that can be seen as a forum for learning (hypothesis 9), and it seems likely that technical and legal information has altered the views of potential policy brokers. So all hypotheses let us as-

sume the case to have policy-oriented learning even across coalitions. This expectation complies with the observation that the original framework of the program has changed because of policy-oriented information.

5. Conclusion and Outlook

This paper has applied the ACF lens to the European GNSS project Galileo. The application should have contributed to an understanding and explanation of the governance change of the program. It was shown, that policy-related information contributed to the governance change.
Theoretically the case study aimed at testing the foundations and hypotheses of the ACF in a nascent and transnational subsystem. We have confirmed the applicability of the framework to the case. The hypotheses concerning advocacy coalitions have not been confirmed finally though. Furthermore the findings do not support the ACF hypotheses concerning policy change. Nonetheless the ACF contributes to an explanation of the given case substantially. Like expected by the ACF, policy-oriented information contributes to explain the governance change in Galileo.
Even though the case study confirmed the hypotheses concerning policy-oriented learning the very way learning happens still have to be investigate. The study has presented some evidence for the expectation that not only belief system change by given actors contributed to policy change. Policy-oriented learning seems to occur indirectly by activating latent actors or by motivating actors to leave the subsystem.
Up to now only presented evidence for the existing of two competing belief systems and policy-oriented learning using qualitative methods. We have assumed that the actors with similar core beliefs were part of respective Advocacy Coalitions. Following research will have to investigate the policy subsystem by interviewing large parts of the subsystem and using formal network analysis to build a complete model of belief systems and actor relations.

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