Chair Management of Network Industries
Research Project

Innovative Governance of Large Urban Systems (IGLUS)
Innovative Governance of Large Urban Systems (IGLUS)

Background
More than 50% of the world’s population is now living in urban areas, consuming about 75% of natural resources and producing 80% of global GDP.

Cities are also perceived as one of the major actors for solving global challenges such as Green House Gas emissions. However, there is still little focus on effective governance of urban infrastructures to achieve such goals.

Currently, urban governance is addressed by both academics and practitioners; however, there is generally a lack of multidisciplinary perspective on Urban Systems which combine social, technological, economic and political characteristics.

The research on Innovative Governance of Large Urban Systems (IGLUS) at the Chair MIR is aimed at providing both the academic community and practitioners with a comprehensive, multidisciplinary understanding of the relationship between governance of Large Urban Systems and city performance.

To that effect, this PhD project aims at developing innovative strategies to train urban practitioners about the complex relationship between governance of urban infrastructures and performance of cities.

Objectives & Research question
The main objectives of this PhD project are:

- To improve the quality of IGLUS Executive Master by conducting an Action Research inquiry on the first edition of the program.
- To develop a roadmap for the design and implementation of professional training programs which are aimed at training practitioners about the management and the governance of complex socio-technical systems.

The main research questions driving this PhD are:

- What are the main challenges to train urban practitioners about complex-multidisciplinary concepts?
- How can professional training programs effectively deal with these challenges and overcome them in practice?

Methodology and expected results
In this project, an Action Research methodology is being used. The research design includes four cycles of reflexive inquiry (plan, action and critical reflection).

The results of this research will help the target audience to better understand the challenges of training urban practitioners about the multidisciplinary nature of governance of urban infrastructure systems and its complex relationship with Efficiency, Resilience and Sustainability of cities.

Target audience
The target audience of the IGLUS project in general, and this PhD project in particular, is:
1. City officials
2. International organizations concerned with the performance of cities
3. National governments
4. Infrastructure providing companies
5. NGOs and other citizen-focused groups concerned with the city as their place of living
6. Professionals and practitioners
7. Academics

Client: EPFL
Applied methods: Action Research

Author: Mohamad Razaghi
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State-Owned Enterprises’ Nonmarket Strategies towards the State

[Einsatz von Nichtmarkt-Strategien durch öffentliche Unternehmen gegenüber dem Staat: Untersuchung am Beispiel der Schweizerischen Post AG]
State-Owned Enterprises’ Nonmarket Strategies towards the State

Context
State-Owned Enterprises (SOEs) are – to some extent – governed by the State. The State does not only own them, it also selects their board members, sets objectives, regulates their markets and introduces legislation for SOEs. In the academic discipline of public management, SOEs have thus traditionally been viewed from a top-down perspective: The State is seen as principal who governs its agents, the SOEs. In other words, the SOEs execute the public mandate given by the government.

In real life, however, it can be observed that modern SOEs are no longer passive implementers of governments’ assignments. In fact, they have – in the process of liberalization and corporatization – become active enterprises pursuing market and nonmarket strategies. In order to achieve their objectives, or, in other words, to optimize their business, they take influence on the decisions made by the State. The scientific literature has not seriously addressed SOE-State relations from the perspective of the SOEs so far. In my PhD, I therefore aimed at answering the following research question: Which nonmarket strategies do public enterprises employ vis-à-vis State actors in order to apply or change the framework requirements in line with their business models?

Objectives
The result of my research is a model that, for five different contexts, displays the nonmarket strategies that SOEs apply towards the State (see figure below).

Methodology
A qualitative, grounded research approach was chosen. Five indepth cases were elaborated, the analysis of which resulting in an initial model of a SOE’s nonmarket activities towards the State. In order to validate the model, its accuracy and generalizability were discussed with various SOE-experts. The final model includes modifications based on expert knowledge.

Unit of Analysis
The unit of analysis (the so-called cases) are based on critical incidents, in which the SOE’s objectives clashed with the applicable framework requirements. These cases were chosen from within Swiss Post, which is the most diversified and – in terms of employees – the biggest SOE in Switzerland. For the validation and refinement of the model, possible nonmarket strategies of other SOEs were also included – however, discussed in a more general way.

User group
The model of SOEs’ nonmarket strategies towards the State makes, before all, a contribution to the academic literature. From a practical point of view, this research is particularly useful for managers of SOEs, who are offered a clear mapping of possible nonmarket strategies that may be applied towards the State and which have already been tested in real-life settings.

Client: Swiss Post / EPFL
Applied methods: Case study methods & expert interviews
Contact: Dr. Carole Rentsch, <carole.rentsch@gmx.ch>
Digital business models for the postal mail industry
Digital business models for the postal mail industry

Context
Many of the historical postal operators are currently facing major challenges to their core mail business. They are experiencing substantial mail volume declines, along with serious competition from digital substitutes, such as electronic mail. Some operators, as a reaction to this, have started to diversify into digital mail services, such as hybrid mail, secure mail, etc. However, many of the postal operators are uncertain about the possible business opportunities in digital mail services. This research looks into business models as a solution to address business opportunities in digital mail services. Current research pays little attention on the taxonomy of business models for digital mail services. In addition, there is scarce research on the determinants to the performance of digital mail services using the business model approach. Hence, the fundamental research question that will be addressed in this research is “What is the taxonomy of business models for digital mail services and what are the determinants to their performance?”

Objectives
The research aims to fill an important research gap in business model development for postal operators in digital mail services. The goal of the research is to identify business models that are rigorously tested against theoretical approaches and practical experiences and are specific to historical postal operators. The research aims at answering the following questions:
1. What constitutes a business model for digital mail services?
2. What is the existing taxonomy of business models for digital mail services?
3. What are the determinants to the performance of these business models for digital mail services?

Methodology
Qualitative and quantitative are the two approaches used in this research. Case studies on the digital mail services of six historical postal operators were conducted in order to discover their business models. Subsequently, a survey from the Universal Postal Union on 88 historical postal operators was analyzed through the theoretical perspective in order to investigate the determinants to the performance of the business models for digital services.

Unit of Analysis
The unit of analysis is the digital mail services unit within the historical postal operator organisation. This includes the organisation structure, the investments, the resources as well as related digital service activities.

User group
The thesis makes an important theoretical contribution on the determinants to the performance of business models for digital mail services. Furthermore, the taxonomy of business models for digital mail services will contribute valuable insight for practitioners. As, it will assist them in creating new business models or in re-evaluating their existing business models for digital mail services.

Client: Swiss Post/EPFL

Applied methods: Theory application and comparative case study methods

Contact: Nandkumar Kollara,
Regulatory Institutions in the Postal Sector:

How Does the Behavior of Regulatory Authorities Affect the Evolution of Regulatory Institutions and Governance Costs in Regulatory Regimes?
Regulatory Institutions in the Postal Sector: How Does the Behavior of Regulatory Authorities Affect the Evolution of Regulatory Institutions and Governance Costs in Regulatory Regimes?

Context

The liberalization process in the postal sector (and in other network industries) is accompanied by new institutional policies resulting in the creation of new actors, notably sector-specific regulators. Even though there is a strong trend toward independent sector-specific regulatory authorities across sectors and countries, liberalization has not led to a general European regulatory model.

The various actors in regulated industries relate to each other within a broader institutional framework, i.e., within formal and informal rules. The operation of such an institutional framework as well as its impact on all actors has a cost, which we describe as “costs of regulatory governance”. Theorists as well as practitioners have not paid enough attention to these particular costs of a regulatory arrangement so far.

Objectives

The first theoretical contribution of the research project is to come up with a clear definition of regulatory governance costs. The second contribution is the description of criteria to assess regulatory governance costs and their drivers in regulatory regimes and provide evidence in the postal sector. The overall aim of the research project will be to better integrate different regulatory authorities in the institutional framework of regulation and finally to explain how different regulatory approaches affect the regulatory institutions and consequently the governance costs within a regulatory framework.

Framework

In the framework we assume that regulatory governance has a significant cost which we define as governance costs of a regulatory system. These costs are inherently present in regulatory arrangements and influenced (1) by the behavior of the various actors, (2) by their institutional design and (3) the choice of regulatory instruments within a regulatory framework in unequal ways. We define regulatory governance costs as the costs of establishing, maintaining and coordinating a regulatory arrangement.

We distinguish between direct and indirect costs of regulatory governance. Direct costs are rather related to the institutional design, the behavior of the different actors and therefore to certain principal-agent type problems. The different types are monitoring costs, compliance costs and coordination costs. The indirect costs occur when regulation generates more economic costs than benefits. We call them efficiency costs which have negative impact on markets and prices, technologies and investments and on the level of regulatory dynamics in the regulated industry.

Unit of analysis

The Unit of analysis are the institutional frameworks (rules and actors) of regulation in different postal markets (GB, NL, CH). In European countries the implementation of new regulatory arrangements in the postal sector is in a relatively early phases and currently affected by processes of liberalization. The postal sector offers a stimulating empirical field to analyse regulatory arrangements because the sector was in the recent past - and is still in some countries - in a transformation from national monopolies to national and international competition. This circumstance provides an excellent opportunity to observe how institutions evolve over time and how the involved actors – especially regulators - behave and try to shape the institutional arrangement within which they operate.

Methodology

In terms of methodology, taking a comparative case study approach allows to show the variance in regulatory authorities and traditions of regulatory practice, and the political and economic legacies. Considering the lack of experience in the relatively young field of regulation in network industries in general and in the postal sector in particular, case study research is useful to understand how governance costs are affected by the behaviour of regulators, the institutional design and the chosen regulatory instruments in regulated industries.

User groups

A deeper insight in what the costs of regulatory governance are and how they are influenced by the behavior and decisions of actors (especially regulators) is useful for theorists as well as for practitioners dealing with regulatory issues in the industry. A better understanding of regulatory institutions and possible negative outcomes of regulation will hopefully lead to better institutional policies and improved allocation of rights and duties among different regulators in (re-) regulated network industries.

Client: Swiss Post/ EPFL
Applied methods: Theory building and comparative case study methods
Author: Dr. Martin Maegli, Swiss Post
<martin.maegli@post.ch>
Next-generation capacity allocation for a sustainable European electricity market
Next-generation capacity allocation for a sustainable European electricity market

Context

How to effectively allocate transmission capacity is one of the most crucial questions in any restructured electricity market design. With the gradual emergence of a European electricity market since the early 1990s, this topic receives an ever increasing attention on the political and regulatory agenda.

To achieve a sustainable energy and electricity market, the EU adopted the 20/20/20 agenda, which stipulates a 20% reduction in CO2 emissions compared to 1990, 20% savings in primary energy, and a 20% share of renewable energy, to be implemented until 2020. Among other things, this implies an increasing amount of renewable energies, such as wind power, connected to the electricity grid.

However, the transmission capacity allocation mechanisms in place today face inherent limitations in coping with volatile power sources such as wind and will therefore not be able to provide a long-term solution to achieving the envisaged sustainable European electricity market.

Objectives

This thesis therefore aims at defining core elements of a next-generation capacity allocation scheme that masters this challenge. In doing this, the thesis will elaborate improvements to three key aspects of capacity allocation: A technical one (i.e., the grid model requirements), an economic one (i.e., the impact on macro-economic efficiency and micro-economic incentives), and an institutional one (i.e., the institutional prerequisites and regulatory governance structure).

Framework

The thesis is based on the framework of co-evolution and coherence in network industries. According to this framework, network industries need a certain coherence between institutions and technology to perform well in technical, economic, and social terms. The general observation in many network industries is that deregulation and market opening tend to decrease the coherence between institutions and technology. Indeed, in the context of the European electricity market, the alignment of different institutions such as network operators and market operators is far from optimal and requires many compromises to be made, not the least with regards to transmission capacity allocation.

Unit of analysis

The unit of analysis is the operation of the European electricity grid and its impact on the electricity market. More precisely, the research focuses on the procedures applied to allocate transmission capacity to the market. These procedures are examined and improves from a technical, economic and institutional perspective.

Methodology

On the technical side, an accurate AC load-flow analysis is applied to determine the sensitivity factors of the UCTE electricity grid. This will allow to examine the feasibility and efficiency of a simplified zonal capacity allocation scheme. On the economic side, a social welfare analysis relying on generation cost data is applied in order to predict the estimated net benefit of a capacity allocation based on a full network model. Finally, on the institutional side, the insights of the co-evolution and coherence framework are applied to derive the requirements of a layered regulatory governance structure that will better correspond to a new capacity allocation scheme in a European multi-country electricity market. This analysis will draw on at least one case study, namely the case of European air traffic control (i.e., Eurocontrol).

User groups

The insights expected from this research are of fundamental interest to European electricity system operators (such as swissgrid ag, the industry partner and sponsor of this thesis), as well as to European power exchanges. Moreover, as capacity allocation is a core element of the overall electricity market design, several regulatory bodies have already signaled their interest in the outcome of this thesis.

Client: Swissgrid AG

Applied methods: AC load flow analysis, social welfare analysis, case study

Author: Dr. Christof Duthaler
Management of Network Industries
Research project

Transformation of Governance in the Water Sector:
An Assessment of Performance in Switzerland, Germany and Great Britain
Transformation of Governance in the Water Sector: An Assessment of Performance in Switzerland, Germany and Great Britain

Background

The transformation from state-centered policies to new, non-hierarchical forms of coordination between political, economic and civil societal actors has led to new modes of governing in utility sectors in Europe since the 1980s. Such restructuring under the umbrella of liberalization has led to critical questions regarding the definition, control and organization of a public service (e.g. water supply). The term “governance” is used in the social sciences to refer to an interactive process where public and private actors coordinate and cooperate in developing, adopting and implementing policies. Furthermore, the governance concept provides a means to research such new modes of coordination between diverse actors as well as problems induced by complex political, economic and societal challenges (see figure 1 for a depiction of governance and organizational forms).

Objectives

This research seeks to explain and evaluate the performance of different governance and organizational modes in the water supply and wastewater treatment sectors. To conduct a comparative assessment of the diverging forms of governance in the European context, three countries that have taken varying approaches to restructuring their water sectors are selected for analysis: Switzerland, Germany and Great Britain. Additionally, in order to evaluate the performance of the governance modes, three criteria related to policy evaluation are employed: effectiveness, efficiency and legitimacy. Hence, the main objective is to answer the following question: Which governance and organizational forms in the water supply and wastewater treatment sectors in Switzerland, Germany and Great Britain are politically legitimate, accomplish effective problem-solving capabilities and efficiently achieve objectives?

Framework

To make the normative requirements linked to legitimacy, effectiveness and efficiency analytically manageable, a multi-dimensional framework (with the dimensions of input, throughput, output, out-come and impact) is developed. By operationalizing the test criteria in this framework, governance and organizational forms’ performance can be examined (see figure 2 for an initial approach).

Unit of analysis

The unit of analysis is the governance and corresponding organizational form. Through preliminary research governance types (i.e. from state-centric to regional governance forms) will be identified in each of the three countries. Next the correlating organizational form (i.e. from a constituent state department to a private water company) will be assessed via the test criteria explained in the analytical framework.

Methodology

The research involves three main phases (see figure 3): phase one includes the theoretical, analytical and methodological approach; phase two is comprised of the empirical approach; and phase three includes recapitulation, reflection and the drawing of conclusions.

Research Design

User groups

Insights about the performance of the different governance and organizational modes in the water supply and wastewater sectors are useful for both public and private actors in terms of restructuring the water sector. Furthermore, theoretical understandings of the governance perspective and related theories will provide valuable knowledge for researchers. Finally, the project should shed light on how the shift in control over the water sector affects the allocation of a public service.

Client: Swiss National Foundation
Applied methods: Comparative case studies
Author: Dr. Eva Lieberherr, ETH Zürich <eva.lieberherr@ethz.ch>
The facilitation of mini and small hydropower in Switzerland through institutional mechanisms
The facilitation of mini and small hydropower in Switzerland through institutional mechanisms

Context

Sustainable development is a top priority worldwide today. Firstly, given the forecasted electricity gap between domestic production and demand, Switzerland aims to increase by 50% the amount of electricity produced by renewable energy sources (RES) between 2010 and 2020. One of the seven measures taken is the facilitation of hydropower, including mini (0.1-1 MW) and small (1-10 MW) hydropower.

Secondly, the liberalisation process of the electricity sector (e.g. unbundling) is currently pointing in the direction of the development of decentralised and small-scale power production. Mini and small hydropower are technologies to assure such production.

And thirdly, future energy policies have to be in line with post-Kyoto regulation.

Technology

Mini and small hydropower (MHP and SHP) plants combine the advantages of hydropower with those of distributed power generation. It is a clean, efficient and renewable source. MHP and SHP received a lot of technical R&D during the past decades through government facilitation programs and research laboratories. According to ISKB, MHP represented 2.2% of the Swiss hydropower production and 1.2% of the total electricity production in 2008; SHP 7.7% and 4.2%. Compared to other RES hydropower has a much higher energy payback ratio (up to 200) and generally lower production costs (including financing costs). MHP and SHP can be combined with other infrastructures such as potable and waste water networks with low additional investment costs and no additional ecological damages. MHP and SHP still have considerable unused technical and ecological potential. In November 2008 the Swiss Federal Office of Energy mandated a study on the evaluation of the remaining technical potential of MHP and SHP. The final results will be available end of 2011. Other research is currently being conducted on the ecological potential, including spatial planning issues, at the University of Bern.

Objectives

The MHP and SHP technologies are mature and require adequate frameworks (e.g. regulation, reducing transaction costs, financial incentives) to maximize their potential under sustainable and economically viable conditions. One approach to this problem is to develop institutional mechanisms within the above context and based on the coherence framework. Multipurpose schemes and rehabilitation of existing plants will be taken into account as well. Four perspectives have been indentified, whilst considering the recent introduction of feed-in tariffs: 1) small-scale hydropower needs a technical quality label to guarantee proper implementation; 2) small-scale pump-storage schemes should be explored as distributed options for energy storage; 3) the Swiss design of CO2-compensationshould include hydropower; and 4) transaction costs for small-scale projects should be reduced. The potential for small-scale pump-storage will be evaluated qualitatively.

The aim of the PhD is to develop institutional mechanisms to facilitate MHP and SHP in Switzerland – mechanisms that could be adapted to other countries.

Framework and methodology

The academic research will be grounded in the literature of co-evolution between institutions and technologies in the case of network industries, and the coherence framework. The literature describes the general process of changes within institutions and technologies and highlights the necessity to align these changes. The framework aims to measure the degree of coherence between institutions and technologies, thus leading to a measure of the performance of the network industry infrastructure (Fig. 1). This research will contribute to substantiate the framework.

The methodology will be based on qualitative research, mainly the academic analysis of concrete case studies. Method and data triangulation will guarantee the validity and reliability of the research.

Unit of analysis

The unit of analysis is Switzerland. In a later stage, the research will focus on specific mountain cantons.

User groups

The PhD is mainly written for public and private sector decision-makers – for the former to contribute to policy-making and shaping the institutional framework and for the latter to develop private sector mechanisms.

Funding: Energy Center (EPFL) and EOS Holding

Applied methods: Comparative case study methods, institutional theory

Author: Dr. Nicolas Crettenand, BG <nicolas.crettenand@bg-21.com>
Coopetition in Standard Setting Organizations:

Incentives and Strategies for Firms to Collaborate in a Network of Rivals
Coopetition in Standard Setting Organizations: Incentives and Strategies for Firms to Collaborate in a Network of Rivals

Context
The hybrid behavior comprising collaboration to create value and competition to appropriate value has been named Coopetition in the strategy literature. Coopetition can be witnessed in a number of cases in the electronic business economy. For instance, the last decade was marked by the rise of industry consortia groups - so called Standards Setting Organizations (SSOs) - where competitors jointly develop and adopt uniform technical standards for goods and services. Competitors find substantial strategic benefits when collaborating in SSOs. On the one hand competing firms jointly coordinate their resources and capabilities to develop new products and create new common markets. On the other firms defend their private interests by lobbying for technological options that better support their business model. The goal is to maximize the value appropriated from the jointly created market.

Objectives
Despite copious research on standards and coopetition, there is little work on why do firms coopete in SSOs or on how rival firms can improve their performance when being engaged in a coopetitive network. The first theoretical contribution of the research is to identify the factors that affect the firms coopetitive strategy in a SSO. The second contribution is to determine the sources of coopetitive performance of firms. The strategy literature has essentially been developed around two paradoxical perspectives — the competitive perspective versus the coopetitive perspective. However, in today’s strategic networks most relationships are neither strictly competitive nor strictly coopetitive; they involve mixed motives in which members have private and common interests. The overall aim of the research will thus be to integrate different theoretical perspectives in strategy to better explain coopetitive relationships, where collaboration and competition happen simultaneously.

Methodology
Based on a literature review on standard, coopetition and open innovation we identify the institutional, technological and economical incentives for rival firms to collaborate through SSOs. We analyze the impact of these factors on the firms’ coopetitive strategies (passive, follower or leader). Then, we define the firm’s coopetitive performance as a function maximizing its collaborative and coopetitive performance. We define the firm’s collaborative performance as the share of the value added by the firm to the total value created jointly by the network of rivals of which the firm is a part. We define the firm’s coopetitive performance as the ratio of the value appropriated by the firm and the value added by it. A source of coopetitive performance is thus a set of resources and capabilities affecting simultaneously the collaborative and coopetitive performance of a firm. We suggest that the sources of coopetitive performance can only be understood by using a combination of arguments from different theoretical perspectives: relational and network theory, resource-based view, and transaction cost. Our model identifies three potential sources of coopetitive performance: network resources, absorptive capacity and relationship governance. Taking each source we identify the aspects that (a) affect the firm’s collaborative performance and enable it to cooperate with its rivals in creating value and (b) improve the firm’s coopetitive performance by helping the firm control rent distribution when it comes to appropriate value.

We justify our theoretical findings through a case analysis of the Universal Postal Union’s International Postal System (IPS). Over the years, rival postal operators have collaborated through the Postal Technology Center (PTC), or the SSO, to develop the IPS standard. IPS is an IT application to manage the international mail from the origin to the destination country. It was developed in 1995 by PTC as a “gentlemen’s agreement” between the postal operators of Australia, France, the United States and Japan. In 1996, the first adopter of the technology was Argentina Post followed by Australia Post. Today, 123 postal operators use IPS. We test our theoretical hypothesis by gathering data through a survey that we address to these postal operators.

User groups
Success in today's business world requires from firms to develop manage and assess complex coopetitive relationships. This research proposes a model which helps managers in deciding the appropriate coopetitive strategy, detecting the firms which are deficiently coopeting in their network, and identifying the proper capabilities that should be developed within the firm in order to enhance its coopetitive performance.

Client: EPFL
Applied methods: Theory building, case study and econometrics methods

Author: Dr. Farah Abdallah
Managing electricity sourcing in Europe’s energy intensive industry: A methodology to develop an electricity sourcing strategy
Managing electricity sourcing in Europe’s energy intensive industry: A methodology to develop an electricity sourcing strategy

Background
Several regulatory changes in Europe’s electricity sector have stimulated competition in the market. National power companies, with monopolistic structures, have evolved into competitive entities, creating increased choices for consumers.

Objectives
The objective of this dissertation is to develop a methodology that will assist large electricity consumers to formulate their power sourcing strategies. The methodology provides a range of sourcing options and an assessment to select the best strategy. As a result, this research will answer the following question: The electricity sourcing complexity represents an important challenge for large electricity consumers.

Framework
The liberalization of the electricity sector in Europe has increased the complexity of sourcing and procurement of electricity. First of all, there are regulatory changes in the sector promoted by the liberalization reforms, adaptation of the industry and micro-strategic management at the firm level. Secondly, there is a new wave of environmental regulation incorporated in the new European emission trading scheme – regulation that introduced a new market for emission rights and which has directly affected electricity consumers since the cost is passed on to the end-user in various contracting schemes and conditions. This research provides a framework to deepen knowledge about the electricity sector in Europe as was described in the case studies in three countries with different supply structures. The methodology can be utilized by energy suppliers and energy consumers to test scenarios and identify new electricity sourcing options.

Methodology
In order to empirically define present and proposed methodologies for sourcing energy in Europe’s changing and transitional environment, direct observation on how market and regulatory conditions, and how decision makers embrace decisions on power allocation and efficiency attainment, moved the present research project to prepare a survey of companies in various European countries, so that it could set a framework for a proposed strategic methodology of electricity sourcing.

User groups
The complexity of sourcing electricity in the new liberalized market requires a solution to create an electricity sourcing strategy through a systematic approach. The research in the electricity market, strategy formulation techniques, and decision making process provides all the elements for the development of the methodology tool. This research can be extended and adapted to other regions with similarities in the liberalization of the electricity sector.

Client: CEMEX
Applied methods: Theory building and comparative case study methods
Author: Dr. Luis Treviño

Context
The Middle East and North Africa region (MENA) is associated with countries endowed with oil and gas reserves. Saudi Arabia and Iran, the region’s economic power houses, are the world’s largest oil/gas exporters, but many of the other MENA countries are also significant players. The MENA region is thus an unlikely place for an energy crisis. Yet, the region’s legacy and existing energy policies are at the heart of a number of significant economic, environmental, and technical problems that endanger these countries’ future growth, the health of its residents, as well as the region’s environmental sustainability.

Obviously, business-as-usual energy policies need to be questioned, as it was then that brought about the challenges to begin with. A decisive change of course in the region’s energy policy is required so as to tackle these challenges. Policy makers have started to take note and initial steps have been made, but the recent policy interventions are characterized by ad-hocism and a lack of a coordinated overarching strategy. As a consequence, current policies are largely insufficient given the magnitude of the challenges.

Objectives
This research project pursued two objectives, a conceptual and a practical one.

Conceptual contribution: the development of a methodology in support of the formulation of novel energy policies. The methodology consists of a normative framework for the formulation of an integrated energy policy. An analytical, multi-stakeholder strategic planning process and related implementation procedures underlie and substantiate the framework. The impact assessment of the deployment of novel technologies and their implications for energy policy are focused by the framework.

As the project’s practical contribution, concrete policy recommendations have been developed in an application of the proposed methodology.

Approach
The energy policy making methodology was developed based on a review of the relevant literature, in particular the strategy literature emerging since the mid-60s in the tradition of Chandler (1962), Ansoff (1965), and Andrews (1965). Regional energy planning and energy policy making idiosyncrasies were identified by means of a socio-economic review of past trends as well as an analysis of MENA’s institutional and energy-related characteristics. They were subsequently incorporated in the proposed strategic planning process combining qualitative methods and quantitative energy modeling techniques. The proposed methodology was then applied in a practical study in the Emirate of Ras Al Khaimah.

Eventually, the methodology was validated and the proposed policy recommendations evaluated in a series of expert interviews. This review process provided input so as to improve the methodology and assess its usefulness for policy making support.

Unit of analysis
The geographic unit of analysis of the research project was the MENA region. For lack of a widely accepted definition of the study region, the International Energy Agency’s definition of MENA was adopted for the purpose of the research. In accordance with the IEA, MENA is composed of 17 countries ranging from Morocco to Iran, including the Maghreb and Mashreq countries, as well as the countries on the Arabian Peninsula (excluding Israel).

The technical unit of analysis was the entirety of the energy system in order to represent the various interlinkages and substitution possibilities between the various energy carriers. For the country of study, however, the focus was narrowed down to the electricity and water system. This was done to manage the researcher’s resources.

User group
The proposed methodology aims at helping policy makers in the region to address the energy-related challenges through the implementation of an objective-oriented energy policy framework. The use of this methodology will also help build capacities and reinforce the institutional endowment of MENA countries.

Client: EPFL Middle East

Applied methods: techno-economic analysis, energy modeling and scenario analysis, expert interviews

Contact: Dr. Ralf M. Dyllick-Brenzinger, <ralf.dyllick-brenzinger@alumni.epfl.ch>
Financing rail infrastructure by multi-annual performance contracts – a case-based evaluation
Financing rail infrastructure by multi-annual performance contracts – a case-based evaluation

Context
The regulatory and organizational structure of the rail sector in Europe is evolving. The separation of accounts, the introduction of open access to the rail infrastructure and corresponding infrastructure charges, along with the introduction of competition in the rail freight market and, more recently, competition for the market for passenger services, have led to an ongoing restructuring of the rail sector. As the access charges normally do not cover all the costs of the infrastructure manager (IM), the deficit is paid by the public authorities. Such funding can take the form of multi-annual contractual agreements. Such contracts generally aim at incentivizing the infrastructure manager to reduce the costs of infrastructure service provision and the level of access charges with due regard to safety and to maintaining and improving the quality of the infrastructure service. Article 30 of the European Directive 2012/34/EU (Recast) directly refers to such agreements which may also be termed as Performance Contracts (PC).

Objectives
This research focused on the performance contracts between a competent authority (CA), such as a Ministry, and infrastructure managers (IMs) for ordering rail infrastructure services and financing the deficit of the IM’s not covered by the incomes of infrastructure access charges and other commercial incomes. The research encompasses the process of negotiation and the content of such a contract, as well as the implementation by the infrastructure manager which is monitored by the competent authority. The aim of this research was to understand how such performance contracts set incentives to a rail infrastructure manager so as to improve its performance and whether IMs improved performance after the introduction of performance contracting. Thanks to this understanding, policy recommendations and suggestions for improvements of multi-annual performance contracts, as well as recommendations for further railway reforms, were derived.

Approach
The content, the implementation and effectiveness of already existing PCs is analyzed, and, hence, this research is categorized as evaluation research. This research is structured as an embedded multiple case-study with four cases studies: Schweizerische Bundesbahnen AG (Switzerland), Deutsche Bahn AG (Germany), Infrabel (Belgium) and ProRail (the Netherlands). The cases have multiple units of analysis or rather subunits of analysis. Two subgroups within different contexts with each two individual cases were be distinguished, i.e., vertical integration and vertical separation. This distinction was made because of the prior hypothesis that there will be different incentives with different organizational models of the infrastructure manager or the (national) railway respectively.

Unit of analysis
The unit of analysis was the performance contract negotiated between the Competent Authority and the Infrastructure Manager. The unit of analysis may also be described as a Principal-Agent Relationship. The principle (CA) mandates the agent (IM) to offer the agreed performance with regard to infrastructure management and the agent obtains a defined payment, in addition to the income of track access charges.

User group
The research results are relevant for the competent authorities, in particular for the Swiss Federal Office of Transport (FOT) as well as infrastructure managers. The results will also be reported to an academic audience in order to contribute more sound performance contracting.

Client: partly financially supported by the Federal Office of Transport (FOT)

Applied methods: embedded multiple case studies

Contact: Dagny Anne Greinus, anne.greinus@gmail.com
Crime, Security and the Postal Service: the Case of Swiss Post
Crime, Security and the Postal Service: the case of Swiss Post

Context
There have been increasing concerns about crime and security risks involved in the international postal service over the past few years. In October 2010, al-Qaeda terrorists dispatched two parcel bombs from Yemen to the US via the express couriers UPS and FedEx. Each explosive parcel contained 300 to 400 grams military grade plastic explosive and a detonator hidden inside a printer’s toner cartridge. Before the authorities managed to intercept the parcel bombs at transshipment points in the UK and Dubai, the bombs had travelled on board two air freighters and three passenger planes. Cross-border e-commerce is growing, and so is the fulfillment of the online orders by Posts and express couriers. The dark side of the e-commerce, characterised by rogue online pharmaceuticals, replicas, and black markets, drive contraband trafficking through the postal network.

Theft, whether perpetrated by insiders or external thieves, undermines the credibility, brand value and customer satisfaction of postal operators. Given the modern liberalized postal markets with fierce competition, postal operators cannot afford to have unreliable services. Thus, countering theft is still an important challenge for postal managers.

Objectives
A stream of new regulations, standards, initiatives and projects imply that interest in postal security is mounting among policy makers, authorities, managers and academics. This study contributes to the on-going security discussion by consolidating the theoretical underpinnings of supply chain security and proposes, in the light of case study evidence, means for more effective and efficient security management and governance in the postal sector.

In particular, the study complements our current knowledge on supply chain crime by developing and validating a taxonomy for supply chain crime types (see fig.1). The research aims also at identifying promising streams for future inquiries that would address the most urgent academic and managerial challenges in the field of supply chain security.

![Taxonomy of supply chain crime types](image)

Crime facilitation

Methodology
The research design comprises three phases. First, a supply chain crime taxonomy is developed on the basis of secondary qualitative data and validated with primary case study data. Second, the extant academic literature on supply chain security is reviewed following a systematic literature review approach. Lastly, the case study of Swiss Post provides a contemporary account of postal security management in the Swiss context by incorporating perspectives from Swiss Post, the Swiss customs, cantonal police forces, security service providers, as well as supranational organizations such as the Universal Postal Union and the World Customs Organization. Case study data is collected mainly by means of expert interviews, archival analyses and on-site visits. Qualitative interview notes are analysed with a content analysis method.

Unit of Analysis
The case study research focuses on two business units of Swiss Post: PostMail and PostLogistics. The research addresses crime and security issues related to domestic and international letter and parcel delivery by road, rail and air. Freight and express mail services remain out-of-scope.

User group
Academics benefit from theory development and the suggestions made. Managers and authorities can make use of the proposed methods for cost-efficient security management and governance in the postal sector. The research concludes by proposing recommendations specifically targeted at authorities (customs and police), managers working for posts, and policy makers at the regional (EU) and global levels.

Client: Swiss Post

Applied methods: Theory building, case study research, and systematic literature review

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