Cooperative Business Structures for Green Transport Corridors

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Abstract: *In its White Paper on "A Sustainable Future of Transport", the European Commission promoted the idea of green transport corridors (GTCs) by establishing trans-shipment routes with concentration of freight traffic between major hubs. GTCs reduce environmental and climate impact of the traffic on these relatively long distances of transport while increasing safety and efficiency with the application of sustainable logistics solutions. The Baltic Sea Region (BSR) enjoys a vanguard position in the development and realisation of green transport concepts within Europe.*

Already the GTC definition of the European Commission emphasized the need for a fair and non-discriminatory access to corridors and trans-shipment facilities that enable all customers to participate in the corridor and make use of publicly available benefits. Research results of GTC initiatives revealed that cultural issues, cooperation quality and governance structures play a crucial role in the acceptance and success of the GTC concept.

This paper highlights the current status and discussions on business and ownership models for GTCs and investigates the research

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question if and to which extent can cooperative concepts be used as a base principle for GTC governance. The authors participated in some of the most important GTC projects in the BSR, which provides them in terms of methodology easy access to literature reviews, secondary data analysis, expert interviews and surveys covering the entire BSR.

Keywords: *cooperatives, governance and ownership models, green transport corridors, multi-modal logistics management*

1. Introduction

Climate change and environmental aspects are key issues on the public agenda, and governments around the world are enforcing new regulations in order to reduce the environmental impact of the industry and transport sectors. Companies try to respond by implementing green supply chain management models which are based on the principle of supply chain management with an extra add-on on green impacts, meaning environmental friendly and efficient aspects (Srivastava, 2007; Hunke & Prause, 2014). When it comes to green transportation concepts for large volume cargo solutions, the European Commission promotes the idea of green transport corridors (GTCs), which was first mentioned in the Transport White Paper in 2001 and which aimed at shifting large cargo volumes away from the dominant road traffic to other efficient, more environmentally friendly transport modes (European Commission, 2001). After the revision of the EU Transport White Paper in 2006, the concept of GTC was introduced into the Freight Transport Logistics Action Plan, where the emphasis of GTCs was laid on reflecting "an integrated transport concept where short sea shipping, rail, inland waterways and road complement each other to enable the choice of environmentally friendly transport" (European Commission, 2006; FTLAP, 2007). The GTC concept was further specified and elaborated in the Green Paper on TEN-T from 2009, the TEN-T Policy Review 2011 and, finally, in the EU White Paper on "A Sustainable Future of Transport" from 2011, where the European Commission coined the idea of GTCs by establishing trans-shipment routes with concentration of freight traffic between major hubs and by relatively long distances of transport, now being marked by reduced environmental and climate impact while increasing safety and efficiency with the application of sustainable logistics solutions (European Comission, 2011).

The GTC concept embraces sustainable logistics solutions, inter-modality,

information and communication technology infrastructure, common and open legal regulations and strategically placed trans-shipment nodes. The theoretical foundations of GTCs are related to sustainable aspects, multi-modality, network and supply chain concepts (Hunke & Prause, 2013; Prause & Hunke, 2014a; 2014b). Since the GTC concept has been defined on the political level in a couple of European initiatives, various implementation models of GTCs have been developed and tested. The Baltic Sea Region (BSR) enjoyed a pole position in these initiatives within Europe: Since 2009 several projects have been launched, comprising, for example, the East West Transport Corridor (EWTC) linking Southern Baltic Sea and Black Sea, the Scandria corridor (Scandria) linking Scandinavia and Adria, the Rail Baltica Growth Corridor (RBGC) connecting the Baltic States with the Central European rail system, as well as the North East Cargo Link corridor (NECL), trying to develop a Midnordic Green Transport Corridor as a cost-effective and environmentally friendly transport route between Norway, Sweden, Finland and Russia.

These initiatives represent only a special selection of launched initiatives, which have been flanked by umbrella projects such as TransBaltic and the BSR Transport Cluster Project for sustainable, multi-modal and green transport corridors, which intends to join forces and knowledge of the BSR transport initiatives (BSR Transportcluster, 2012). A special objective of the BSR Transport Cluster was to strive towards a green BSR transport network in order to develop a coherent concept and a common standpoint for sustainable macro-regional transport and regional growth policies for the BSR on a European level.

By analysing the essence of all GTC initiatives in the BSR, the strong impact of the Nordic countries on the Green Corridor Initiative (GCI) strikes out: In this initiative, the government offices of Denmark, Finland, Sweden and Norway cooperated in order to define and implement green corridor concepts for Northern Europe. Since 2008, more than 30 local projects have been launched under the management of the Swedish Logistics Forum (Green Corridor, 2010). Despite the facts that several GTC projects have been started and their interpretations of green transportation vary significantly, there are also common topics which are recognized by all GTC initiatives. Firstly, "co-modality" enables the choice of environmentally friendly transport along the transport route, since reduced emissions is one of the obvious objectives of a greener transportation. Secondly, important success factors for green transport are adequate and high performing trans-shipment facilities, innovative transport units and vehicles, just as advanced ITS applications—which can even be considered as base components of GTCs, as customers expect beyond environmental friendliness also economic advantages in the form of cost and time savings (Hunke & Prause, 2012; 2013; Prause, 2014b).

However, the common characteristics of GTCs even embrace additional topics —namely, entrepreneurial growth and cluster development, representing two other important issues which are attributed to GTCs and which have been in the centre of nearly all GTC projects (Prause & Hunke, 2014b; Prause, 2014b). Other properties which are located at the intersection of all GTC initiatives are linked to fair and non-discriminatory access to corridors and their transshipment facilities. Against this background, it is remarkable how little research has been carried out on cooperative governance and ownership structures of GTCs. This paper intends to fill this gap by analysing the legal format of GTCs when being implemented into practice—first of all by analysing the extent to which cooperative concepts are contained in the GTC concept, and the extent to which cooperative governance and ownership structures are appropriate tools for the management of GTCs. The research is divided into four parts: The first part provides the theoretical background for the frame conditions and governance models of GTCs as well as for cooperatives. In a second step, the research methodology for the empirical part is described. Subsequently, empirical results from secondary data analysis, expert interviews as well as case studies are presented and discussed. Finally, the paper summarizes these results and proposes respective implications.

2. Fundamental structures of GTCs

2.1 Frame conditions

The theoretical foundations of the GTC concept are based on sustainable aspects, multi-modality, network and green supply chain concepts implemented in common and open legal regulations (Hunke & Prause, 2013). As mentioned above, the evolution of the GTC approach in the BSR is closely related to the perception and experiences of green corridor concepts set up by the Swedish Logistics Forum, which defines GCs very simply: "Green corridors aim at reducing environmental and climate impact while increasing safety and efficiency" (Green Corridor, 2010). Based on the experience of their about 30 local GTC projects, the Swedish initiative formulated six concrete and clear characterizations of GTCs, which do not differ significantly from the definition of the European Commission, as it comprises as central criteria (1) sustainable logistics solutions with documented reductions of environmental and climate impact, high safety, high quality and strong efficiency; (2) integrated logistics concepts with optimal utilization of all transport modes (the so-called "co-modality"); (3) a concentration of national and international freight traffic on

relatively long transport routes; (4) efficient and strategically placed transshipment points, as well as an adapted, supportive infrastructure; (5) harmonized regulations with openness for all actors; and (6) a platform for development and demonstration of innovative logistics solutions, including information systems, collaborative models and technology (Green Corridor, 2010).

While points 1 to 4 refer to substantial tasks to be performed by a green corridor, points 5 and 6 impose requirements to its internal structure, that is, to the business model of a GTC. Essential for future developments is especially point 5, which can be specified as a demand for openness and harmonization for the participating stakeholders of GTCs, which includes democratic elements as well. The challenging tasks to realise the organizational and political framework for such green corridor concepts are the creation of a fair and balanced transport spot market within the corridors, enabling market leaders and SMEs to interact at a low cost.

Implementation of point 6 in practice is a task which goes far beyond technical issues, because, first of all, it requires all current logistics players to open their closed ICT systems and to integrate them into an integrated logistics platform, which may involve loss of influence and market power. Based on these results, Prause and Hunke (2014b) investigated requirements that have to be fulfilled by an integrated ICT system of a GTC, taking into account the results of GTC initiatives from the BSR. They came to the conclusion that integrated ICT systems for GTCs have to meet seven requirements, namely (1) open architecture; (2) orientation on standards; (3) focus on inter-operability and co-modality; (4) independence of technology; (5) endorsement and adaptation by major freight ICT systems providers and logistics operators; (6) support of the European transport and logistics system in terms of efficiency and environment-friendliness; and (7) creation of a fair and balanced transport spot market within the corridors enabling market leaders and SMEs to interact at low costs. Point 7 represents a corresponding task to point 6 in the Green Corridor requirement list, since it claims that all logistics players, including the global logistics giants with their dedicated ICT systems, should open their closed ICT systems and integrate themselves into a common logistics platform, which includes the request that the big logistics players in the context of GTCs should cede important parts of their influence and market power which is linked to their ICT systems.

Prause and Hunke (2014b) further pointed out that another strong barrier for the implementation of green corridor ICT systems is related with the fact that creating open databases comprising freight tariffs and contracting conditions in order to be able to build transparent spot markets is, again, a politically

sensitive topic in which more incentives than general arguments have to be developed to increase the will to participate among the main logistics players in a GTC.

Finally, it has to be borne in mind that, beyond all technical issues, the results of those GTCs in BSR which have already been set up revealed that political and cultural topics also play a crucial role in the acceptance and success of the green corridor concept. Important preconditions for the implementation of green corridor ICT systems are related to transparency, cooperation and trust. Consequently, Prause (2014a) highlighted these results by developing a GTC balanced scorecard taking into account especially the cooperation and soft logistics aspects in order to monitor and spur the evolution of the cooperative dimensions.

2.2 EU legal forms

The implementation of GTCs requires solutions for both operational and enabling aspects. Enabling aspects comprise hard and soft infrastructure as well as policies and regulations, whereas operational aspects include location and operation, transport techniques and business models (EWTC, 2012). Additionally, in the BSR all GTC initiatives are also linking different countries, and within these countries a large number of heterogeneous stakeholders comprising political and administrational levels, private sector as well as NGOs. Consequently, GTC business models have to deal with transnationality, multi-modality, public–private partnerships and multi-level stakeholder structures requiring new governance models in order to safeguard an efficient management, a sustainable corridor development and a strong alignment of transport policies at various administrative levels (Nyman-Metcalf *et al*., 2014; Dobrin *et al*., 2016). GTC governance has to consider that not all corridor partners are EU Member States (e.g., in the case of the EWTC initiative, also members from Belarus and Ukraine are corridor members, see Kerikmäe *et al*., 2016), making it recommendable that the administrative regulations and governance structures are at least partly solved by an EU-wide harmonization.

An EU-based corridor management solution enjoys the advantage that the European Union provides a common legal framework of regulations that can be used for facilitating the definition of a business model determining value propositions to the clients of the green transport corridor as well as to the stakeholders to use and support the common assets and solutions of the corridor (Osterwalder *et al*., 2010).

The governance and the management format for a corridor shall reflect the scope of the corridor agenda. The different available legal structures for a corridor should be derived from existing EU standards, since all the considered green corridor projects concern more than one EU Member State.

The possible European legal forms are

- Non-profit organizations (NGO) or associations;
- European Economic Interest Groupings (EEIG);
- European Cooperative Society (SCE);
- European Private Company (SPE); and
- European Society (SE).

NGOs and other non-corporate forms of organization do not provide sufficiently consistent and pan-European recognition; instruments set up by European regulations are preferable. The EEIG, created in 1985 (Council Regulation (EEC) 2137/85), is a partnership with unlimited liability designed to "facilitate or develop the economic activities of its members and to improve or increase the results of those activities" (Art. 3(1) of the Regulation), which may well fit the green corridor's purposes. But as stated in the same article, the EEIG's "purpose is not to make profits for itself"; due to the clear profit purposes of participating companies, the EEIG is not a suitable form.

The European Society (Societas Europaea, SE), founded in 2001 by Council Regulation (EEC) 2157/2001, is the European version of a public company. However, apart from the fact that the tasks listed in points 1–4 are financially not that extensive that a green corridor would have to raise capital by selling shares, the purpose of the green corridor is first of all to support the common objectives of points 1–4, not to invest capital. Besides, the intended tasks are merely adjacent to independent core activities of—apart from green corridor management issues—competing companies, so that a merger to a joint SE would be contrary to the individual company interests. The latter point also conflicts with the purpose of an SPE, the "European limited company", as a form option for the green corridor.

The paper will therefore focus on the cooperative model, that is, the European Cooperative Society (SCE). The SCE has been introduced by Council Regulation 1435/2003/EC in 2003 (hereafter: the Regulation) only after more than 40 years of discussion (see European Commission, 1983, p. 51), as national regulations and purposes of cooperatives differ considerably EU-wide: While "Germanic" (such as Dutch or Austrian) cooperatives focus distinctively on economic purposes, the notion of a "cooperative" in the majority of European countries

(UK, France, Spain, Italy, Denmark, Sweden, Finland, Ireland and Portugal) imply a clearly social purpose in the sense of the French *economie social* (Demoustier *et al*., 2006). The SCE aimed to form a "bridge" between these two traditions, providing a basic framework for European cross-border cooperatives. It did not intend to harmonize or even replace the national cooperative models (Krimphove, 2010), as numerous details will be regulated by the national cooperative law of the country where the SCE will have its place of business (see Art. 8(1c) i) and Art. 10(1) of the Regulation).

Partly due to this, at first sight, the non-transparent amalgam of European and national law, the SCE faced long-term considerable acceptance problems by the envisaged customers; by 25 Jan 2014, only 25 SCE have been registered altogether (Libertas-Institute, 2014). Still, the number has approximately doubled within two years, so that the initial reluctance today seems to have been overcome.

2.3 Special focus: cooperatives

The International Cooperatives Alliance (ICA) defines a cooperative as an autonomous association of persons getting together voluntarily to meet their common economic, social, and cultural needs and aspirations through jointly owned and democratically controlled enterprises (ICA, 2017). In this sense, cooperatives are traditionally member-owned legal entities that create benefits for their members and are managed by their members, which makes them very similar to associations. Each natural or legal person can apply for membership in a cooperative, and the members can buy shares, are involved in decision-making processes and participate in the profit of the cooperative, which is distributed as dividends among the members.

Cooperatives are democratically organized and controlled on a 'one man, one vote' basis, even if the shares of members can differ. A representative from one of the members is typically appointed by the members to manage the business operations according to their business objectives. Cooperatives provide products and services to members for free or at a fee, but also non-members can be served (but usually under more restricted conditions than members).

An important example for a cooperative in the world of logistics is the International Air Transport Association (IATA) with its headquarters in Montreal and with around 260 members, from which 250 members are those airlines representing 94 per cent of all international flights. IATA supports airline activity and helps formulate industry policy and standards as well as the most important offered

services comprising ticketing and baggage services, safety audits, training and consultancy (IATA, 2017).Cooperatives have been an object of continuous discussions, since on the one hand they are integrated into the capitalist market economy where they have to withstand competition and distinguish themselves from capitalist, that is, investor-owned, enterprises. On the other hand, they fulfil social responsibilities and are based on the principle of solidarity, meaning that they are not only group-oriented, but also have to consider the values, norms, traditions, morals, and the ideology of the group (Patera, 1994). Consequently, disputes among scholars have taken place concerning the ranking and the importance of the principle of solidarity as opposed to the other cooperative principles, namely, the principles of self-help and economic efficiency.

Compared to investor-owned firms or hierarchical public organizations, cooperatives reveal additional organizational complexity since they are based on pluralistic ownership and democratic decision-making. Nevertheless, cooperatives require high-level leadership despite the fact that a large number of these organizations are established and led by low-skilled persons, especially in the agricultural sector (Oakeshott, 1978; Marshall, 1971).

A long ongoing discussion focuses on the question whether cooperatives are less efficient than investor-owned companies, as cooperatives are characterized by lower technical efficiency, allocative efficiency and scale efficiency in comparison to investor-owned companies (Nilsson, 2001). The inefficiency of cooperatives is often explained by substantial differences between governance structures.

One of the most important differences between a cooperative and an investor-owned company is the allocation of its residual rights and residual earnings. In an investor-owned firm, investors are directly entitled to residual earnings, whereas in a cooperative these rights are restricted to members. In other words—cooperatives are owned and controlled by their users themselves, whereas companies are owned and controlled merely by investors. Membership in a traditional cooperative is open to everybody, the voting system is democratic on a ‘one man, one vote’ basis, and the equity capital is kept commonly on the base of shares. Payments to members are calculated proportionally, that is, payments are proportional to the turnover of a member, which spurs the use of the products and services of the cooperative by their members.

Jensen and Meckling (1976) highlighted certain “horizon and portfolio problems”, which refer to the lacking motivation of members to invest in a cooperative if returns of investments are expected behind the time’s horizon of

members and thus can influence their incentives to invest. The horizon problem may also concern short-time ventures when members are uncertain about their future membership, which means that they cannot ascertain that they will benefit from returns from invested capital. This may lead to underinvestment or over-indebtedness, and ultimately to transferring of costs to other members. The portfolio problem refers to challenges of determining the optimal level of investments diversification. Investment decisions may be forced by groups of members trying to influence the decision-making process, which may lead to higher risks for cooperatives than in investor-owned companies.

Another important problem can emerge in motivating members to manage the cooperative, as cooperatives have heterogeneous goals, which means that the performance is harder to benchmark than in the case of investor-owned companies (where incentives and management assessments in comparison to stock market actors can enhance management). As cooperatives are self-supporting organizations, the economic promotion of their members is of primary importance in comparison to any other goals (Engelhardt, 1976). However, there is a certain tension with regard to other economic goals, as in general cooperative market activities may be beneficial also to non-members. This special role of cooperatives has several economic effects which are not only advantageous for the cooperative's members, but also influence the entire market via increased competition, eliminating monopolistic tendencies as well as offering new goods and services (Dülfer, 1972; 1995; Fleischmann, 1972; Neumann, 1972).

An additional explanation for a cooperative's inefficiency may be related to the 'free rider' problem, which may appear in cooperatives with open membership models, enabling new members to gain from investments made by others in previous periods. Finally, the quantity control problem, that is, the autonomous choice of members concerning their production levels which may influence own and other members' costs, prices and profits, may cause inefficiency due to the impossibility to fix the optimal production quantity. Consequently, these different reasons may affect members' behaviour and change their willingness to invest (Porter & Scully, 1987; Bogetoft & Olesen, 2007)

Literature on corporate governance identifies a number of mechanisms of governance which endeavour to explain why the internal governance system of a company may impact its overall performance and sustainability. Agency theory takes into account that the owners and managers of a company may have diverging interests and also analyses the extent to which information between management and members of a cooperative are asymmetrically distributed and whether there are incentives for self-serving practices of the management

together with disincentives for members to control their business. The key role of internal governance mechanisms, against this background, is to ensure that self-interested managers act in the best interests of the owners who exert control (Jensen & Meckling, 1976; Grossman & Hart, 1983).

Another important function of a firm's internal governance system is to make sure that the declared objectives of the firm are aligned with day-to-day practices and actions. Bureaucratic control, information systems, incentives to align contracts, a particular business culture and trust and several reputation enhancing mechanisms are believed to reduce the respective costs (Tirole, 2006; Hansmann, 1996).

Several other scholars have focused on the economic patterns as well: Albaek and Schultz (1998) pointed out that due to quantity control problem, cooperatives benefit more from larger market shares than investor-owned companies. The game theory approaches developed by Staatz (1983) and Sexton (1986) revealed that setting the same price for all members may prompt some members to leave the cooperative; for a policy of "price discrimination" among the members may thus even be useful. Bourgon and Chambers (1999) as well as Bogetoft and Olesen (2007) studied different payment schemes in cooperatives, concluding that the design of the payment schemes determines the incentive structure for members and hence influences the performance of cooperative as a whole.

Coming back to point 5 of the Green Corridor requirements—which request "harmonized regulations with openness for all actors"—the creation of minimal structures concerning democratic structures of business models for GTCs, including low-level accession modes for new members, is an ultimate requirement. Whether and the extent to which cooperatives and the legal framework SCE are a suitable model for green corridors shall be examined on the case of the EWTC II Information Broker GTC.

3. Case Study: EWTC II Information Broker

3.1 Information Broker

The East West Transport Corridor (EWTC, 2012) is one of the most important GTCs in the BSR. The EWTC aimed to improve East–West trade routes between the Baltic Sea and the Black Sea Region by enhancing interoperability between different infrastructures, standards and systems, as well as by removing physical and operational bottlenecks, especially on the borders. The participating

countries of this corridor include Sweden, Lithuania, Belarus and Ukraine, and as adjoined countries also Demark and Germany. EWTC can be considered as the northwestern part of the Transport Corridor Europe–Caucasus–Asia (TRACECA), being able to attract new freight flows from Central Asia and China to Europe by paying special attention to rail transport and short sea shipping. The backbone of the corridor consists of the container train *Viking*, which shuttles between Klaipeda and Chornomorsk (former Illichevsk) via Minsk and Kiev. The Viking train is linked to Karlshamn in South Sweden by a ferry line and from Chornomorsk via short sea shipping routes to destinations in the Black Sea.

Prause and Hunke (2014b) pointed out that integrated ICT systems are needed to coordinate and organize the activities in a GTC and that they play a crucial role in the performance of a GTC. Consequently, the different GTC initiatives in the BSR defined and even implemented integrated ICT systems for their GTCs. The ICT system of the East West Transport Corridor is called *Information Broker* and was developed upon the theoretical considerations of Inger Gustafsson and the Swedish Logistics Forum on green corridors (Gustafsson, 2008). Based on expert interviews and surveys which were executed during the EWTC II project, 15 features of the Information Broker were elaborated in order to safeguard an efficient and greener transport in the GTC:

1) improving load factors;
2) using digital waybills;
3) intelligent truck parking for finding safe parking areas;
4) reduced waiting times at transfer nodes;
5) up-to-date traffic information;
6) Automatic Identification System (AIS) data about ship locations and estimated time of arrivals;
7) access to up-to-date local weather data;
8) better matching of broadcasted transport information;
9) facilitation of intermodal transports;
10) easing of small cargo shipments by rail and sea;
11) reduce idle costs by sharing of transport units;
12) more efficient management of transnational oversized cargo transports;
13) intelligent Port Access Control;
14) implementation of data exchange between major transport hubs; and
15) improved cargo tracking. (Information Broker, 2012)

A first examination of these 15 points reveals that the list includes not only the main features of classical ICT systems in logistics and supply chain management,

but also highlights new technical issues such as safe truck parking, sharing transport units, tracking of cargo and ships or managing oversized transports. All in all, the EWTC II ICT concept aims at providing solutions for the surface transport industry for reducing costs as well as accessing and exchanging relevant information by guaranteeing the system functionalities of being open and standardized, secure, multi-purpose, real-time visible, scalable and extendable. Since the implementation and operation of the underlying ICT system of the Information Broker is related to investment needs and operating costs, a suitable business and ownership model has to be found, making the Information Broker contribute in an optimal way to the goals of the East West Transport Corridor.

A business model can be defined as the description of the value an organization offers to various customers and portrays the capabilities and partners required for creating, marketing, and delivering this value and relationship capital with the goal of generating profitable and sustainable revenue streams (Osterwalder *et al*., 2010). In Osterwalder's approach of the business model canvas, nine issues have to be clarified (key partners, key activities, key resources, value proposition, customer relations, channels, customer segments, cost structure and revenue streams). But as the research question here is focussed on the compatibility of cooperative and GTC concepts as well as on related business and ownership structures, not all of the business model canvas issues are relevant to the purpose of this paper.

Already during the project period of EWTC II, the business characteristics of the Information Broker (2012) highlighting the main value propositions, key activities and customer-related aspects were presented, such as (1) providing easy, cost-efficient access to information sources of interest to corridor actors via the Information Broker system, including technical service, data management and further ICT system development; (2) offering support, training and consultancy; and (3) delivering tailor-made, ready-to-use ICT solutions, including hardware, software and IT services.

The corresponding revenue streams were seen in (1) membership fees depending on the underlying legal construction; (2) service level agreements (SLAs) with different support levels for a fee; (3) consulting and implementation services for hourly fees; and (4) package and market niche solutions for a specific customer segment together with ready-for-use services for initial start-up and later subscription fees (Information Broker, 2012).

Although the Information Broker could primarily be regarded as a technical tool for coordinating and operating efficiently GTC activities, the overall goals

of the GTCs have to be respected, especially the requirements for openness and harmonization for the participating stakeholders of GTCs as well as the use of technical platforms embracing collaborative models and technology (Green Corridor, 2010). In addition to that, the Information Broker should also fulfil the requirements for an integrated ICT system of GTCs in the BSR, which have been investigated by Prause and Hunke (2014b) in order to safeguard the compatibility of different technical solutions for GTCs. Openness of architectures and standards are—again—crucial, but also the creation of a fair and balanced transport spot market within these corridors which would enable market leaders and SMEs to interact at low costs (as already discussed among the Green Corridor requirements) is an essential goal.

Another important issue which so far has not been highlighted yet is related to the fact that the GTC concept is part of the EU transport policy schemes, meaning that there is political and public interest to support the implementation and usage of GTCs for transport sectors. Consequently, the underlying business and ownership models have to keep in mind to attract and to be as open as possible for all transport stakeholders, that is, the offered services of an Information Broker system must be open for members as well as for non-members in order to invite and convince also non-members and only part-time users of a GTC to use the corridor and thus to strengthen the fulfilment of political goals of the corridor.

3.2 The cooperative business model

In initializing the EWTC II project, one of the most crucial questions concerned the choice of an appropriate business and ownership models for a GTC and especially for the Information Broker (Information Broker, 2012). The discussed questions centred on funding and ownership, business goals, objectives and strategies, product and service portfolio, relationship between GTC users, that is, clients in the context of the business model canvas, and the Information Broker, as well as on openness and completion. A satisfying answer to all these questions could not be retrieved so far, but the analysis of the Information Broker case provides a good and practice-proven overview of the value propositions, key activities and possible revenue streams.

The political intentions of the GTC concepts are (1) highlighting openness and harmonization, including democratic elements; (2) strengthening of SME sector in comparison to big players; and finally (3) facilitation and awarding of GTC use should be integrated into the business model. These three topics shall be examined in greater depth in the context of cooperatives:

Firstly, openness and harmonization towards all users of the GTCs embrace rather a membership of the GTC clients than an investor-owned structure, as membership concepts include democratic elements with harmonized and fair regulations for members (in contrast to investor-owned structures, see above). Secondly, the strengthening of SMEs, that is smaller units compared to bigger units, directs towards a solution where the decision-making power of units and their financial power have to be separated, which in a membership model means that the decisions have to be realised by 'one unit, one vote', whereas the financial contribution or share has to be equivalent to the financial power of the member. Thirdly, the political intentions of the GTC approach call for openness to use the services and the infrastructure of a GTC model which is not marked by a tentative membership, as a high usage of GTC services will lower fees or lead to price discounts.

Summing up this part of the discussion, a cooperative business model enjoys the advantage that a cooperative is open, fair and democratically organized ('one member, one vote' scheme), that the financial contribution in the form of equity shares can be organized in accordance to the financial power of a member, and, finally, that payments to members are proportional to the turnover of a member which takes into account the level of usage of GTC services. By taking an intermediate sum it seems that the cooperative business model enables the realization of all requirements in this paragraph by turning interested GTC clients into members of a GTC cooperative.

Hunke and Prause (2013) further emphasized the trans-nationality and the tubular cluster aspects of a GTC, which raises the question whether the common legal and organizational frame for a GTC business model can be found independent of national regulations. In the case of a cooperative, the European Cooperative Society (SCE) is able to fulfil precisely this task, as within the European Union the SCE offers a common legal framework in which a cooperative business model for a GTC can be smoothly imbedded. Problems can only arise for corridor parts outside the EU (as in EWTC Belarus and Ukraine). But also, in this case, EU legal structures can be exported in the frame of neighbourhood activities. Thus, also a transnational legal frame for a cooperative business model is provided within the EU by the European Cooperative Society (ECS).

Finally, the governance models of cooperatives shall be analysed in the context of GTC requirements. Prause (2014) pointed out that cooperation intensity as well as cooperation quality represent two crucial success factors for GTC performance, where cooperation quality comprises cooperation "soft factors" such as openness, trust and a low conflict level. These cooperation "soft factors"

gain higher attention within the democratic environment of a cooperative than in an investor-owned company. The weak points of a cooperative business model emerge rather in fields of investments, cooperative management and in the context of production control.

GTCs require considerable investments into strategic infrastructure, but also into operating objects, as in the already discussed problems related to the horizon and the product portfolio as well as to "free riders". Further problems may appear in cooperative management for GTC due to a large number of tentative members from different countries, different company sizes and due to different backgrounds and aims, as GTC stakeholders consist of public and private institutions as well as of NGOs. Finally, the production control problem can lead to problematic situations in the context of a GTC by keeping in mind that different actors from different countries with different economic frame conditions have to be put under a common denominator. By considering the case of EWTC, institutions from inside and outside the EU as well as players from lower and higher income countries cooperate together, bearing the potential of conflicts due to incomparable price levels and quality standards.

3.3 The cooperative ownership model

The Information Broker had to select and organize the owners for the ICT system ensuring a maximum value for the vision of the East West Transport Corridor. But the requirements for the ownership model and the choice of the legal form depend on the type of owner: While small businesses concentrate primarily on taxation, risk management and access to green corridor transport markets, businesses with multiple owners or NGOs may prioritize other commercial and environmental goals.

The choice of a suitable legal business entity might be further complicated by the need for legal, social, competitive and political considerations.

Like national cooperatives, also SCEs are member-owned and member-managed entities that accumulate benefits for its members. A company or an institution that wishes to become a member of a SCE applies for membership and purchases a share in order to return various types of value to the cooperative, not only to benefit from it, but also to participate in the cooperative decision-making process.

As mentioned above, SCEs usually provide some products and services to its members for free. In the Information Broker example, these common (free) services could comprise

- access to the information exchange and the application programing interface (API) of the Information Broker and other information sources;
- (legal) document templates;
- system service and support;
- seminars and newsletters; and
- other products and services such as information brokerage and consulting and implementation services.

The question remains about the extent to which other structural features of the SCE match the demands of the Information Broker.

4. Discussion

When different business and ownership models for the Information Broker were discussed in the EWCT II project phase, investor-owned models as well as the cooperative model were analysed—however, this analysis did not imply a deeper discussion or even an answer to this question (Information Broker, 2012). As pointed out in the previous paragraphs, an answer to the questions of a suitable business and ownership model for the Information Broker or, even more generally, for a GTC must first of all facilitate the achievement of the main objectives of a GTC together with the interests of its stakeholders. Additionally, Priemus and Zonneveld (2003) argue that cross-border corridors require a co-production of policy between municipalities, regional authorities and national governments so that differences in regulation and policy practices between nations must be overcome and multi-level governance, policy co-production and multi-actor systems can offer successful examples and guidance in this regard. Moreover, Romein *et al.* (2003) point out that an increasing number of public–private partnerships, the growing involvement of non-governmental organizations in policy-making, and the increasing guidance of public service sectors by market principles embrace multi-actorness of governance. Consequently, beside the already discussed characteristics and requirements for GTC suitable governance structures for the cross-country, multi-actor and public–private stakeholders of a GTC necessitates a regulatory framework which enables multi-level governance in a democratic environment and is based on transnational regulations.

The European Cooperative Society (SCE) provides the EU-wide legal frame (Council Regulation 1435/2003/EC) for a cooperative despite the fact that national regulations and purposes of cooperatives differ considerably.

Nevertheless, the cooperative together with the EU regulation comply with the democratic and balanced frame conditions of green corridors—especially because the value of member shares can vary among the members, so that economically stronger members can take bigger financial shares than smaller members, and the financial potential of the members can be respected without damaging the democratic balance. This 'one member, one vote' rule applies to SCEs (see pt. 8 of the Preamble and Art. 59(1) of the regulation) which corresponds generally to the structure of the SE (Schulze, 2004).

Furthermore, the cooperative is open and able to accept members of different background regardless of whether they are public or private. Members of the cooperative are able to formulate and establish the mission so that the cooperative can develop the GTC towards a common vision which includes the objectives of all stakeholders. The democratic structure of the cooperative empowers the members to participate in the choice of the management as well as in important business decisions.

The cooperative awards membership because the offered services usually possess different prices for members and non-members, and a higher use of cooperative services can lead to payments to their members which are proportional to the used services. Any profit generated by the Information Broker can be distributed as dividends among the members or reinvested in the financial stability or value of the SCE for its members, as the member capital is the preferred source of financing in a cooperative. Other sources include bank loans, grants from governments and non-profit organizations. These properties stress the intention of the EU to spread the concept of GTC and to convince GTC actors to become a member, to use the GTC services as much as possible and to support the GTC idea with an engagement in the cooperative.

Concerning the case of the Information Broker, members of the tentative SCE can benefit from various advantages of the cooperative which are implemented in the organizational structure, raising considerable synergies and which are in line with the cooperative business objectives and visions for ICT systems in the East West Transport Corridor. This procedure has the effect that the Information Broker's strategy will support to reach the East West Transport Corridor's objectives. Lower integration costs makes the incorporation of new corridor investments and assets quick, and collective actions of the cooperative towards the suppliers create financial advantages in purchasing processes. Incorporating new hardware and integrating ICT/ITS solutions between partners is often costly and time-consuming. By collectively putting pressure on ICT/ITS suppliers, the latter would have incentives for creating interfaces between their hardware and

software solutions and the Information Broker, significantly facilitating such efforts and lowering costs for the SCE members.

The "horizon and portfolio problems" which are linked to the creation of the cooperative, in general, do not influence negatively a cooperative Information Broker construction because both the GTCs as well as the corridor stakeholders have strategical, that is, long-term, interests in their membership so that the returns of investments are not expected to be realised behind the time's horizon of members.

Nevertheless, the horizon problem may concern ventures for members who join the cooperative later, which can be mitigated by linking the use and the related conditions on a financial contribution at the moment of the start of the membership. Regardless of that, the optimal level of investments' diversification may bring about complicated financing procedures as the members have the option of blocking the contribution of equity, which might be needed for start-ups and investments of the cooperative. Access to the capital might prove problematic if members will not contribute the equity needed for the start-up and subsequently needed investments of the cooperative.

Other conflicts may emerge from heterogeneous member sets with different agendas and interests, which require time-consuming and ineffective compromises in the cooperative: for example, larger actors might not be willing to provide to smaller actors the benefits that they themselves already enjoy without involving the Information Broker if they perceive that they do not receive anything in return by doing so. However, the management performance problem of cooperatives is not supposed to impact negatively the tentative Information Broker cooperative, because the membership structure, together with their heterogeneous goals and diverging interests, can be balanced via a strong role of political and public stakeholders in the GTC who will act as a bracket for the members' interests. The political and public institutions are more oriented towards consensus and common good, which stresses the self-supporting dimension in the cooperative. The public and political members receive their special weight and influence in the membership due to the fact that they are financing, to a large extent, GTC-related infrastructural projects of public interest so that management oriented towards a common goal, loosely based on a multi-level governance model, is possible. The high importance of the political and public members in a tentative cooperative signals another problem, well known from public infrastructural projects, which culminates in suboptimal management decisions due to political rather than economically guided decisions which have to be kept in mind in establishing the cooperative management and the supervising bodies.

Finally, the quantity control problem of cooperatives does not harm the intentions of the Information Broker, as it leads to competition inside the cooperative. A sophisticated design of the payment schemes may lead to an advantageous incentive structure for the members and, that way, may positively influence the performance of cooperative.

Summing up the advantages of a cooperative structure for the Information Broker, it can be claimed that considerable parts of the requirements and frame conditions for GTCs can be realised in the legal frame of the European SCE. Some of the critical points which are related to the management of cooperatives, including the management performance, the horizons and portfolio problem as well as the quantity control problem, do not have a negative impact on the situation in GTC.

Anyway, it has to be taken into account that a cooperative structure for the Information Broker, based on a SCE, can also be afflicted with negative aspects, as it is generally in danger of developing slower decision-making processes than in investor-owned companies. A democratic business model and related decision-making procedures require strong communication policies and an active involvement of members, which can be time-consuming and more costly than in other legal forms.

Summing up the arguments of the discussion, it turns out that the cooperative together with its legal frame SCE enjoys more pros than cons in the context of GTCs. The pros lie in its democratic construction which allows an open, fair and balanced membership and decision-making process. Furthermore, the cooperative approach allows the implementation of a multi-level governance structure which is discussed and proposed by several scholars in the context of corridors. The different interests and goals of the stakeholders can be assumed to be balanced due to the important role of public and political members and their orientation to the common good and non-party objectives.

The characteristic weak points of cooperatives can be found in management performance problems—the problem of horizon and portfolio as well as that of the production control were discussed and their impacts were recognized as neutral or only slightly negative. However, taking into account the various incentives it is questionable whether these aspects significantly speak against a cooperative business model in form of a SCE. The discussion was carried out on the basis of the Information Broker which represents a typical part of a GTC and the results can be transferred without any restriction to other parts of a GTC or to the GTC as a whole, because the membership structure, the business

environment, the financial, political and organizational frame conditions in a GTC are the same as in the Information Broker case and are related to cross-country, public–private stakeholder groups with heterogeneous interests and goals which require huge investments and incarnate a strategic political will and programme that shall be open, fair and balanced. All open weak points of the cooperative/SCE construction are not of essential but of purely organizational nature, so that these challenges can be comprehensively met by intelligent and experienced cooperative management, providing a transparent organizational structure, clearly assigned responsibilities, and due diligence in the choice of acceding partners and flexible schedules.

5. Conclusions

The SCE cooperative business and ownership model for Green Transport Corridors represents a promising approach to organize corridors due to its democratic construction and its general openness, which matches the demands of green transport corridors. Further advantages are the easy implementation, low integration costs, its flexibility and the scalability of a cooperative. Some problems of cooperatives and SCEs presented in literature, such as non-transparent relations to national law, slow decision-making processes, possible financing problems and inner conflicts, are having only a neutral or only slightly negative impact on the situation of a GTC and can be avoided by diligent and experienced management. The case study of the Information Broker revealed that a tentative realisation of SCEs must ensure a strong market focus, the delivery of competitive services and economic sustainability.

Consequently, green transport corridor entities in the form of SCEs are capable of guaranteeing financial stability and good governance as well as of underlining the respective strategies and vision of green transport corridor entities. The involvement of the public sector of the involved countries retains the focus on both public good and business benefits for corridor stakeholders at the same time. None of these fields of conflict does essentially tangle a successful implementation of the SCE as a business model for the Information Broker cooperative.

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