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The effectiveness of regional co-operation

Managing regional transport networks

1.   Introduction

This paper aims at contributing to a wider dispersion of the use of the theory of collective action. Besides, it aims to contribute to the development of the theory by modelling variables which are of influence with respect to co-operation and by quantitatively testing the model.

The paper deals with regional transport networks and their management as a common pool resource. Problems with respect to this man-made common pool resource is, with regard to the theory of collective action, a new area of interest.
In the paper the effectiveness of co-operation is analysed; describing and explaining effectiveness in terms of relevant factors and their interrelationships, both in a qualitative and quantitative way. Important contributions are the presentation of an integral model for the effectiveness of co-operation using a dynamic systems approach, the operationalisation of model variables and the empirical validation of the model.

First, the paper explains the rationale for governmental provision of transport policy by arguing that a transport network may be considered to be a common pool good. Then (paragraph 3) the role administrative organisation plays with respect to transport policy is described, concluding that co-operation may be the panacea in case of a lack of administrative organisational fit to the problems. In paragraph 4, the mobility problems in the Netherlands and the governmental reaction to these problems is described, summarizing that co-operation is necessary to solve such problems. In paragraph 5 the paper returns to theory. Co-operation is not easy to accomplish and several variables seem to influence it. These variables are presented in an integral, dynamic model. Next, the model is validated. The paper explains how variables are operationalised and how the model has been tested. Conclusions with respect to co-operation in the Dutch regions are drawn in paragraph 7. In paragraph 8 theoretical conclusions are drawn. In paragraph 9, the epilogue, some concluding remarks are made.

2.   The transport network : a common pool good

A first question to be answered is : "Why has it to be the government who deals with transport problems?"

To answer this question, the difference between private and public goods may be essential. The difference between these two kinds of goods may be explained by the characteristics "exclusion" and "rivalry". Using these characteristics and supposing a dichotomy, four possibilities do exist (figure 1) (Ostrom, E. et al, 1994; Hess, 1995). Exclusion may be easy or difficult (impossible), and rivalry may be small (absent) or large. With respect to pure private goods exclusion is easy and rivalry is large. In that case, the prize mechanism does function. Theoretically, it can be stated that in cases where public goods are at stake, the market will fail due to the absence of rivalry and the difficulty of exclusion. Prize mechanism does not function when public goods are

at stake (Ostrom, V. et al, 1994a; Doel, van den, 1978). A public good can be produced only by collective action (Schmidtz, 1991).

In case of public goods individuals can not be withheld from consumption, because exclusion is difficult or impossible to realise. Besides, consumption is not rivalring. When some individual consumes the good, it does not limit the potential consumption of the good by another individual. The two other possibilities are common pool goods (or common pool resources) and toll goods. A common pool resource may be defined as a natural or man-made resource system that is sufficiently large as to make it costly (but not impossible) to exclude potential beneficiaries form obtaining benefits from its use (Ostrom, E., 1990) With respect to common pool goods, exclusion is difficult to achieve and rivalry is large. With respect to toll goods, exclusion is easy to achieve and rivalry is small. A good may move from one category to another, since its characteristics may change.

rivalry exclusion	small	large
difficult	public goods *(defense)*	common pool resources/goods common property resources/goods commons *(infrastructure)*
easy	toll goods *(cable television)*	private goods *(bread)*

Figure 1 : *types of goods*

In case of both public goods and common pool goods, several problems may be recognised as a results of the characteristics of non-exclusion and absence of rivalry. If a good is nonexclusive, an individual may decide not to contribute, because he can enjoy the good for free (free rider behaviour) (Olson, 1971). Besides, a reason not to contribute arises if an individual believes it would be futile to contribute because the good will not be provided anyway. Finally, individuals may contribute suboptimally not because they are free riders, but because they are averse to being taken for a free ride (Doel, van den, 1978; Schmidtz, 1991). In fact, it is the character of the goods which impairs a production by the market. Therein lies a role for government (Schmidtz, 1991).

In the case where the management of regional transport networks (infrastructure) is at stake, the transport network is the "good" to be managed (or to be produced). Exclusion of individuals of the use of the transport network is difficult to achieve. It will be very precious to keep individuals from using the roads.

The second characteristic, rivalry, is more dubious. In fact, when no one (or very few individuals) is using the transport network, rivalry is absent. In this case, the transport network may be classified as a pure public good. However, when many individuals use the network, crowding may appear. Congestion may be the result (Button, 1993; Ostrom, V. et al, 1994). In that case, the transport network may be classified as a common pool good. From this, it may be concluded that the transport network may

be a public good at first, but when more individuals use the transport network, the good will shift from the category of pure public goods towards the category of common pool goods. The good is lying somewhere at the continuum between pure public good and common pool good (Oakerson, 1981; Oakerson, 1992).

Therefore, to deal with the mobility problems, it is the government who has to take action. And many countries did change their transport policy in order to reduce car mobility growth and to increase attractiveness of alternative transport modes (like public transport, bicycle) (Louw et al, 1997). But apart from the change in transport policy, governments recognised that tasks and competencies with regard to transport policy were distributed among various administrative levels. This fact was impeding an effective and coherent policy formulation and implementation. Consequently, in many countries (like the Netherlands, France and Germany) (Witbreuk et al, 1998; Jong, de et al, 1994) discussions were held about the appropriate level of formulating and implementing transport policy, the role of various organisations with respect to the policy and the way in which tasks and competencies were distributed and the way they should be distributed.

3.   Restructuring the administrative organisation : a fiscal federalist argument

Since the transport network may be considered to be a common pool good or a public good, Oates' theory of fiscal federalism (Oates, 1991) may be used to consider the appropriate administrative organisation. According to fiscal federalism, every public good has its own optimal level of provision and production (Oates, 1991; Ostrom, V. et al, 1994b). The level of costs and benefits differ between public goods. Consequently, a single administrative level providing (and producing) all public goods is not an optimal situation. Fiscal federalism argues that every public good should be provided (and produced) at the level coinciding with the needs and preferences present at that level. Needs and preferences may differ between locations or regions and therefore a decentral provision may meet the local preferences better than a central provision. Tuning the administrative provision level at the spatial area of the users will result in an optimal allocation of provisions. This is the principle of fiscal equivalence, meaning hat individuals (households or firms) and groups (neighbourhoods or communities) get what they pay for and pay for what they get (Oakerson, 1987; Denters et al, 1996). A lack of fiscal equivalence undermines the local community of interest. This argument does have a decentralising influence.

However, realising an administrative organisation for the provision of every public good would result in a multiple layer of administrative organisations. This might lead to high costs of organisation and decision-making. Limiting the number of organisations and combining them may yield economies of scale (Oates, 1991; Toonen, 1990; Oakerson et al, 1989).
Secondly, it will almost be impossible to limit the costs and benefits of public goods to the spatial area of the providing authority. This is the problem of spatial external effects. These effects may bring individuals or groups to show free rider behaviour.

Consuming the benefits and not paying for it. To internalise spatial external effects, the provision should be at a higher level.

These two influences, the possibility to realise economies of scale and the internalisation of external effects, do have a centralising influence.

However, these economic arguments are not the only ones influencing the structure of an administrative organisation. The political opinion is important as well. It is the politicians who decide and therefore their opinion is important. And their opinions may differ considerably from the economic (fiscal federalist) arguments. It is because of these facts that administrative organisations of states differ from one another.

The resulting administrative organisation does not have to be immobile (Oates, 1991). It can be stated that to maintain an efficient public economy structural flexibility and continued availability of alternative arrangements for provision and production is required (Oakerson, 1987). Changing societal or technological circumstances may result in a centralising or decentralising pressure at the organisation. In case of changes, an administrative authority can react by (Ostrom, V. et al, 1994b):
1. reorganising itself;
2. co-operating voluntarily (with other administrative organisations);
3. asking other (higher) administrative organisations for an appropriate fit between interests and organisation.

Hence, changes may bring about a formal change in the administrative structure. When, in case of a centralising pressure, politicians choose not to change or adapt the administrative structure formally, co-operation between administrative providers may be an option to overcome changing circumstances and lead to a more optimal provision of the public goods. Consequently, it can be concluded that in case with respect to the management of a transport network the administrative scale is not attuned to the scale at which transport problems appear, theory of collective action may be useful to study co-operation.

4. Mobility problems : institutional change versus co-operation

Since the beginning of the sixties, car mobility and car ownership have increased considerably in the Netherlands (as in many other western countries). The growing welfare was used by people to buy a car, the welfare symbol. The number of cars increased from 30000 in 1945 to 5,6 million cars in 1995 (Kleef, van, 1996) and car mobility increased between 1980 and 1992 by 17 %. Between 1986 and 2010 car mobility is expected to increase by 72 % (Vervoerregio Twente, 1994).

Governments built new infrastructure, but generally withheld investments in public transport infrastructure. These developments, together with growing commuter travel distances and a growing population, led to a considerable growth in (car)mobility. Transport policy in the sixties and seventies was demand following. The supply of infrastructure was adapted to the demand for it. The aim was more or less to certify an efficient flow of transport. Unfortunately, new infrastructure resulted in new demand (and more mobility) (Maarseveen, van, 1996).

Transport flows are still increasing rapidly, and even on the long run for instance for the Netherlands annual growth figures of 3 % or more are envisaged (Ministerie van Verkeer en Waterstaat et al, 1990). Estimates of growth seem to be outdated quickly (Hofstra, 1990). Transport flows will increase rapidly, but to what extent cannot be told by certainty.

Unfortunately, the growth of mobility is not without problems. Congestion increases. Mobility and especially car mobility deteriorates the accessibility of economic centres and inner cities. Secondly, transport does influence environment and liveability negatively.

The problems did result in a change of transport policy in many countries. Managing this mobility boom has become a challenge for most European governments, especially in urban areas (Witbreuk et al, 1998).

Because mobility led to problems in the Netherlands, the Dutch government concluded that the transport policy should be changed to reduce the (growth) of car mobility. Government realised that times had changed. Commuter travel distances had increased (Rijksplanologische Dienst, 1991), car ownership had increased resulting in individuals being more mobile and the spatial profit level of central (or municipal) provisions had increased. This had resulted in environmental problems and accessibility problems (like congestion). The costs in 1995 of measures taken to deal with environmental pollution by traffic are estimated at US$ 700 million, in 1980 the costs where approximately US$ 40 million (Centraal Bureau voor de Statistiek, 1996).

To maintain or even improve the environment and accessibility (of the main ports and inner cities) several measures were proposed by the government. A distinction can be made between "push-measures" (like prize policy and parking policy) and "pull-measures" (like the improvement of public transport and bicycle facilities). Pull measures are intended to decrease the attractiveness of car use. Pull measures on the other hand are intended to increase the attractiveness of alternative transport modes like public transport (Witbreuk, 1997).

However, the government realised that not all regions were alike. Problems differed in kind and degree between regions and therefore, transport policy should differ between regions (although the main aims were alike) (Ministerie van Verkeer en Waterstaat et al, 1990). And, most important, the regional scale was according to the government the scale at which transport flows showed a functional coherence (Schuring, 1994). To tune the transport policy to the region-specific situations, it therefore seemed appropriate to formulate and implement the transport policy on a regional level. Regional transport networks could be defined to be common pool resources.

However, the problem was that in the Netherlands a regional authority did not exist. The administrative structure in the Netherlands consisted of three levels, but not a regional one. The three levels were state, provinces and municipalities. Although in some cases it could be stated that the area of a province was equal to the area of a defined region, in most cases the area of a region did not conform to the area of the province. Consequently, it could be stated that a regional level, a level between provinces and municipalities, did not exist. This problem was recognised and a

discussion was initiated about the Dutch administrative structure. The government concluded that the tasks and competencies with regard to transport policy were dispersed among the administrative levels. This was impairing an effective and coherent policy. To attain the aims a more coherent approach and a more integral policy were nevertheless necessary. A reorganisation of the administrative structure therefore seemed essential.

In 1990/1991 the government launched incentives to create new (public) regional transport authorities (transport regions). These transport regions should facilitate the implementation of a more integral policy and a more collective approach of the problems. A transport region was a geographical area. It was a functional coherent area and potentially administrative coherent (Ministerie van Verkeer en Waterstaat, 1991). A transport region was defined as a form of (regional) co-operation between municipalities, tuning their policy with other administrative levels and with public transport firms (and other private parties). Co-operation was both vertically and horizontally. This co-operation should develop into a new administrative level, the regional authority with its own tasks, competencies and financial means. These regional authorities should manage the (regional) transport systems (Witbreuk, 1997). From 1992/1993, in all parts of the Netherlands municipalities started to co-operate at a regional level, although regions differed considerably in the development of their co-operation (Runhaar et al, 1995). In 1994, 30 transport regions had been created (Ploeg et al, 1994). The central government stimulated these developments by rewarding successful co-operation.

The elections of 1994 caused a political change. This political change changed the process, although the motives for a restructuring of the administrative organisation did not change. The new government stopped the process of regionalisation in the more peripheral regions and allowed only 7 (of the former 30) regions to continue development. According to this government, a simple reshuffling of the financial means, competencies and tasks should suffice. During time, however, even these 7 (more urban) regions became increasingly uncertain about their future. The government nowadays is considering if a change of municipal borders does not suffice to meet the changed circumstances. The 7 regions will lose their juridical status.

Nevertheless, even in the system where the present administrative structure remains unchanged and the problem "of the inadequate administrative structure" will be solved by a reshuffling of competencies, tasks and financial means, co-operation will remain an essential condition for the attainment of the aims of the policy. Without co-operation, the accessibility and the environmental condition will not be maintained or improved. This has been concluded by the government itself as well (Ministerie van Verkeer en Waterstaat, 1996). On the other hand, however, rewards for successful co-operation were in the meantime (beginning 1996) abandoned. The central government changed its policy of rewarding successful co-operation and distributed financial means to the lower administrative levels more or less independent of their successes.

From a fiscal federalist point of view some remarkable developments may be mentioned. At first, in the Netherlands the changing circumstances were notified. It

was notified that transport flows were changing (growing) and that mobility did not stick to the borders of a municipality or a province. Government concluded that transport flows did have a functional coherence at a regional level, a level at which an administrative organisation did not exist. To deal with the transport problems, from a fiscal federalist point of view a regional approach seemed appropriate. A local approach would not succeed. This could be illustrated by the fact that local authorities do have competencies with respect to a parking policy, a potentially effective tool. A reduction of the parking space or an increase of the parking fee may decrease the number of people using their car in visiting an inner city. However, many local authorities are very reluctant in using parking policy measures because of a fear of losing customers at the benefit of other inner cities that might not take these "car-unfriendly" measures (spatial external effects of a measure). In this case a regional policy may be an attractive and effective option. Parking policy would be more effective if it would be formulated and implemented at a regional level (Witbreuk et al, 1994).

From a fiscal federalist point of view the Dutch intent to realise regions was a justified one. To internalise the spatial external effects and to meet regional needs tasks and competencies should be at a regional level. To realise this the intent of the government to decentralise some tasks and competencies to the region and to have some local tasks and competencies be centralised can be justified.

The following developments in the Netherlands make clear that although economic arguments may be used to defend some choices, political opinion is more important. Although transport flows and problems kept increasing and transport problems kept having a regional character, political opinion changed. It became clear that a real change of the administrative structure in the Netherlands will not be attainable the next few years. A regionalisation was more or less abandoned. From a fiscal federalist point of view the conclusion may be drawn that, the other two options not been chosen in the Netherlands, voluntary co-operation between the Dutch municipalities has to be the panacea. Voluntary co-operation between administrative providers may be an option to overcome the changing circumstances.

Concluding that (voluntary) co-operation may be an option, it would be interesting to know whether co-operation will lead to a more effective co-operation with respect to transport policy, and to study the key factors within the process of co-operation. This may be a contribution to the theory of collective action. The main research question is formulated as :

How can the effectiveness of co-operation with regard to the management of regional transport networks be described and predicted? Which key variables do influence the success of the process of co-operation?

5. Modelling variables influencing co-operation

To answer the question posed in the preceding paragraph, first a theory has to be built. Then, this theory has to be tested.

The proposition that every actor does prefer the realisation of the common good does not imply that the achievement of co-operation is obvious. Co-operation to pursue common interests is not self-evident as a result of the temptation to free ride (Olson,

1971; Udehn, 1996). This phenomenon is known as the commons dilemma and is illustrated in box 1 (Hardin, 1982; Witbreuk, 1997; Gardner et al, 1990; Colman, 1982).

Nevertheless, co-operation does occur quite often without an external actor forcing it. So, other variables appear to be relevant as well and common pool resources are not necessarily destroyed (Blomquist, 1987; Gardner et al, 1990). The theory of collective action considers the probability and sustainability of co-operation and presents several variables that are of relevance with respect to co-operation.

However, to enable co-operation, several conditions have to be met and some assumptions have to be made.
In the first place, to enable co-operation several conditions have to be met. Actors do have to perceive the situation as an interdependent one in which they have to co-operate to attain a (common) goal, the public good (Glasbergen, 1996; Alter et al, 1993). No actor has to be able and willing to attain the goal by itself independent of the behaviour of the other actors (Olson, 1971). Furthermore, the actors have to be able to bear the costs of co-operation (Eggertsson, 1990) and have to estimate the benefits of co-operation to be higher that the costs (Oakerson, 1981; Alter et al, 1993; Argyle, 1991). Finally, the environment of the actors have to be sufficiently stable (Ostrom, E, 1992; Alter et al, 1993).
In the second place, several assumptions have been made. Actors have to be subjective rational actors (Simon, 1976; Koppenjan et al, 1993; Bressers et al, 1989). Besides it has been assumed that personal features of representatives of co-operating organisations have no significant influence at (the effectiveness of) co-operation. Representatives are considered to act in conformity with the goals of their organisation. Finally, it has been assumed that the theory of collective action may be used to describe and explain co-operation between organisations. This assumption is in accordance with Simons view that individuals representing an organisation may be considered to pursue the goals of that organisation (Simon, 1995). Then, co-operation between individuals is comparable with co-operation between organisations.

If the described conditions are met and if the assumptions are taken into account, a systematic framework that can be used to study co-operation may be defined. A systems approach has been used to define the key variables and their interrelationships, and to set up a modelling framework.
The environment is considered to be an external variable. It offers both opportunities and limitations (Chisholm, 1989; Krogt, van der et al, 1991) and has to be stable to a certain degree (Witbreuk, 1997). Otherwise, actors will not co-operate (Alter et al, 1993, Ostrom, E., 1992).

Box 1 : Tragedy of the transport network

Consider a transport network with a predominantly regional function. The region consists of 6 communities. Every community generates an amount X of car mobility. As long as the total amount of car mobility does not exceed 6X, the transport network functions efficiently. Suppose that in the present situation every X of car mobility corresponds to 10B of benefits; consequently, the amount of benefits to the population of every community equals 10B and to the population of the entire region 60B.
What happens in case of an increase of car mobility? A minor increase may result in a considerable congestion resulting in a decrease of benefits per unit of car mobility. Suppose for instance that every increase of car mobility of X results in a decrease of the benefits per X of 1B. Hence, as a result of an increase of car mobility in the region from 6X to 7X travel time losses will result in a decrease of benefits per X of car mobility from 10B to 9B. An increase of car

The effort that has been put in setting up the co-operation depends on the size and severity of the problem (Tang, 1991; Gardner et al, 1990; Ostrom, E., 1990). The more urgent the problem, the more likely the occurrence and effectiveness of co-operation (Glasbergen et al, 1993). Necessary conditions are that actors perceive the problem as solvable and that co-operation is considered to be a useful tool in solving the problem (Chisholm, 1989; Hargreaves Heap et al, 1995; Glasbergen et al, 1993).

If co-operation is developing, an organisation will develop too. Therefore, several rules are needed to structure the co-operation in order to increase the chances for effectiveness (Ostrom, E., 1990 ; Udehn, 1996; Glasbergen, 1994; Tang, 1991; Ringeling, 1990).

Co-operating actors can have different (common and secondary) interests and usually will have different capabilities and resources (Hardin, 1982; Olson, 1971) . The larger the differences, the more difficult it will be to achieve effective co-

operation (Blomquist, 1987; Chisholm, 1989; Krogt, van der, 1984; Alter et al, 1993; Denters et al, 1996).

In co-operative games every actor has to interact with the other ones. Interaction does influence co-operation (Argyle, 1991; Gardner et al, 1990; Gächter et al, 1996; Udehn, 1996; Axelrod, 1990). When interaction is progressing, reputations will be formed or changed (Chisholm, 1989; Alter et al, 1993; Hargreaves Heap et al, 1995). Behaviour in the past of one actor will be used by the others to predict its behaviour in the future. Reliable actors will seek one another and find it more easy to co-operate (Hardin, 1982).

When the composition of the group is unstable and frequently changing, reputations will not be built up easily and the interaction might decrease. It will hamper the continuity and effectiveness of co-operation. Or, as Blomquist states, "the more stable the group of users, ceteris paribus, the more likely they are to act successfully to preserve and manage the resource" (Blomquist, 1987).

The number of co-operating actors is important as well (Udehn, 1996). A small group has some advantages, since it requires less co-ordination and organisation, and hence is less expensive (Taylor, 1987; Denters et al, 1996; Blomquist, 1987). Besides, in a large group free ridership can be more attractive (Olson, 1971; North, 1994; Hardin, 1982; Argyle, 1991; Ostrom, V. et al, 1994a).

The resulting theoretical model consists of a systematic and structural set of hypotheses and is presented in figure 1.
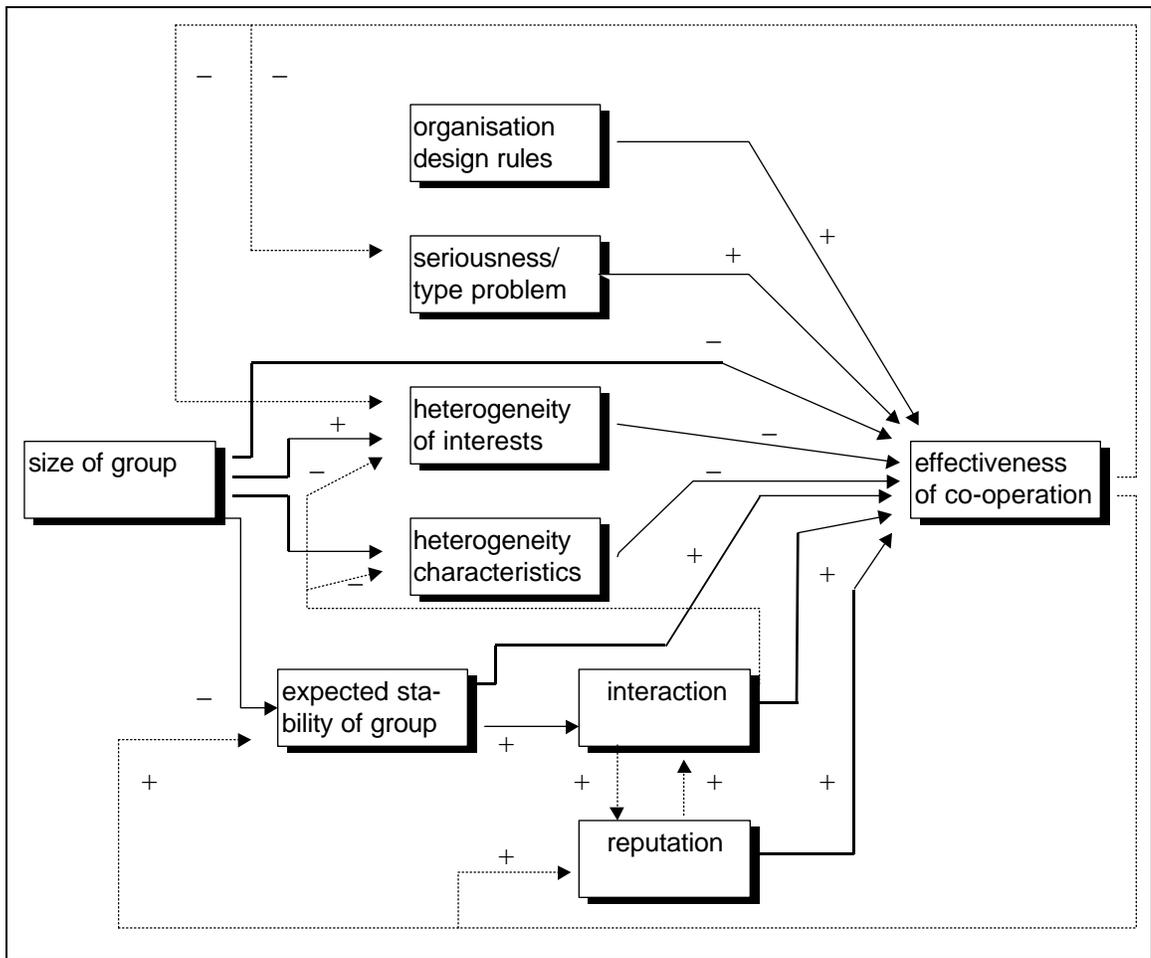
organisation
design rules

seriousness/
type problem

−   −

size of group

heterogeneity
of interests

heterogeneity
characteristics

+

−

−

+

−

−

+

+

effectiveness
of co-operation

−

expected sta-
bility of group

+

interaction

reputation

+

+

+

+

+

+

+

Figure 1 : *Theoretical model of co-operation influenced*

6.   Research design and operationalisation

In order to validate the model, a research design has been developed and all variables in the model have been operationalised. Generally attention paid to the operationalisation of variables is limited. Nevertheless, with regard to the theoretical development of the theory of collective action operationalisation of variables is very important. Defining variables enables comparative research and testing of theory.

Firstly, the model presented in figure 1 is a probabilistic model. However, it has to be possible to reject hypotheses. If hypotheses cannot be rejected, theoretical development is not possible (Lieshout, 1988; Becker, 1977). Because theoretically it is not possible to reject the probabilistic hypotheses presented in figure 1 and therefore testing the hypotheses would not contribute to theoretical development, the hypotheses are determined. This is an empirical-analytical approach. In case of interpreting the research results this should be borne in mind.

Then, to test the hypotheses, a survey has been conducted. The survey has been conducted in three regions (cases). Several criteria have been used to select these

regions (the regions of Twente, Arnhem-Nijmegen and Eindhoven). These regions seemed to experience comparable problems, were of comparable size and structure and had a comparable juridical context (Kaderwet). Influence of environment as an external variable and organisation as an internal variable could be considered equal for the three regions. Hence, a minimum variation of cases has been chosen. The cases were comparable and belonged to the domain of the theoretical model.

After selecting the cases, in each region a variety of research methods has been used. Firstly, literature and documents with respect to transport policy and the organisation in the three regions have been studied. Secondly, a survey has been conducted. The participating actors in these regions a questionnaire has been sent. The questionnaire counted approximately 100 questions and items. All of these questions and items had a closed character. Thirdly, in all regions interviews have been carried out, on the one hand to introduce the research and to gain co-operation with respect to the completion of the questionnaires and on the other hand to gain more insight into the situation in the particular regions.

From this it can be concluded that the research method used is a combination of survey and case study.

As stated before, environment and organisation have been excluded from the validation study upon the assumption of indifference. Accordingly, these variables have not been operationalised. As an example of the way variables have been operationalised, the operationalisation of the variable "reputation" will be explained.

The variable "reputation" has to do with the reliability and predictability of (behaviour of) (representatives of) actors. Reputation can not just be found in written sources. To gain insight into the reputation of actors interviews or surveys are useful. With respect to this survey items/theses have been constructed. Respondents had to indicate to what extent (0% -100%) they could agree with it. Items/theses were :

- The other organisations are reliable (will not trick us).(1)
- In negotiations and discussions the other organisations are honest, frank and sincere.(2)
- The other organisations fulfil given promises properly.(3)
- The other organisations do not trust us nor each other and demand every agreement and promise to be put down in black and white.(4)
- The other organisations seem to forget certain verbal agreements wittingly.(5)
- Mutual confidence between the co-operating organisations is present.(6)
- Information the other organisations give is reliable.(7)
- The other organisations withhold information.(8)
- In case they will profit more, the other organisations deviate from made agreements and the common plan without consultation.(9)

The degree to which respondent agree with the items has been used to determine the value of reputation. The weight of all items is equal.

$$R_i = 1 - \sum_{k=1}^{9} w_k X_{ik}$$

$R_i =$ mean reputation as perceived by respondent i, and

$X_{ik} =$ the in quantitative units converted score of respondent I at item k ; the index k refers to the numbers between brackets (see the items above).

The parameters w_k represent weights, chosen in such a way that the domain of R is equal to the interval [0,1]. The smaller the found value (the closer to 0), the better the mean reputation of the concerned participants. The higher the value, the worse the reputation.

The other variables have been operationalised likewise. In accordance with findings in the literature (Harrison, 1994; Rieken et al, 1982; Alter et al, 1993; Bressers, 1984; Teisman, 1992; Honigh, 1985), the dependent variable effectiveness of co-operation has been defined in a number of ways. Four indicators are used : satisfaction of actors, performance gap, expected implementation of proposed measures, and a weighted combination of all these.

7. Validation of the model

The model and its underlying hypotheses have been tested using multiple regression analysis on the available data. The more the theoretical model fits the empirical data, the better the model-fit. To value the model-fit a distinction has been made between the global fit and internal fit. Global fit concerns a valuation of the model as a whole. To value the global fit X^2 (chi square), the adjusted goodness of fit index, R^2 (rho square), the global behaviour of residues and stability were used. Internal fit concerns a valuation of the internal (causal) structure. To test the internal fit of the model, the hypotheses were tested (one-sided).
After having studied the respons, in the first place spread diagrams have been viewed. Then, correlation analysis and regressions analysis have been carried out. Analysis of the residuals and analysis to study if the presumption of linearity was a legitimate presumption completed the study. The results were used to draw conclusions with respect to the hypotheses.
To gain more insight into the strength of the model and the sensitiveness to the way of operationalisation complementary analyses have been carried out. In these analyses variables have been adapted by changing the weight of parts of indicators/items and the above described procedure was repeated.

The survey was conducted among 83 municipalities. 69 of them responded (respons of 83 %). The non-respons was spread proportional and no reasons were found to assume that the non-respons could influence the results considerably.

Table 1 shows some results of a multivariate regression stepwise. In this table only variables are presented which have a statistically significant influence at the effectiveness of co-operation.

dependent variable	variables and intercept	B	Bèta	T	SigT (one-sided)	R^2	adjR^2	F	SigF

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E	R	.38	.51	4.94	.00				
	P	.16	.26	2.35	.01				
	I	.10	.25	2.31	.01				
	dummyc1	.07	.32	3.04	.00				
	(intercept)	.10		2.91	.00				
						.54	.50	12.69	.00

E = effectiveness of co-operation
R = reputation
P = seriousness/type problem
I = interaction
dummyc1 = influence group-variables per case

Table 1 : *multivariate regression stepwise*

A significant positive correlation was obtained between the effectiveness of the co-operation (E) on the one hand and the urgency of the problem (P), the (regularity and predictability of the) interaction (I) and the reputation (R) on the other hand. Moreover, the size of the group appears to influence the stability of the group: the larger the group is, the less stability.
Some hypotheses had to be rejected. No statistically significant relation was found between stability of the group on the one hand and effectiveness or interaction on the other hand.
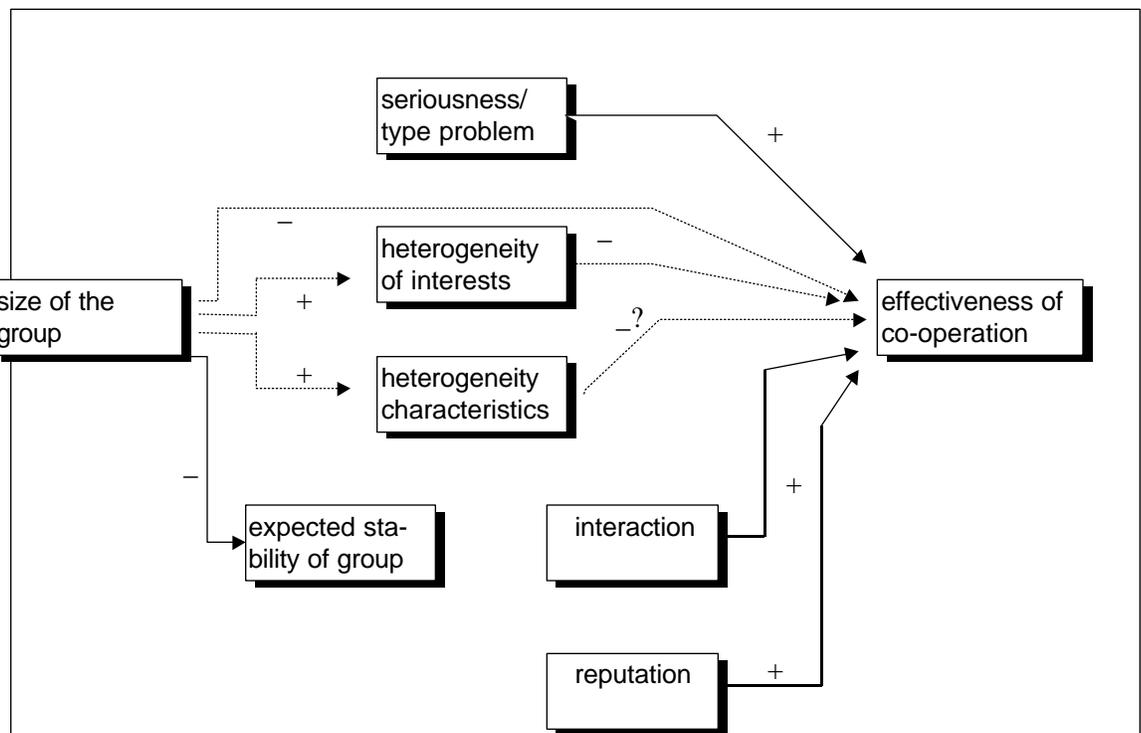

Figure 2 : *Testing of the model : conclusions*

Unfortunately, a number of hypotheses could not be tested thoroughly due to the experimental design. Because some variables are "group-variables" (heterogeneity and size), with respect to these variables only three data were present. Therefore, conclusions with respect to the relations among these variables themselves and between these variables and other variables are purely indicative.
As far as conclusions may be drawn, group size seems to influence heterogeneity of interests and characteristics positively (as expected) : the larger the group, the more heterogeneous. And surprisingly, heterogeneity of interests apparently seems not to have any impact on effectiveness at all.

Bearing the above mentioned notions in mind, figure 2 presents the conclusions which could be drawn with regard to the theoretical model.

With regard to the global fit of the model it could be concluded that most criteria which can be used to value the global fit produced satisfactory results (see table 2). The theoretical model and the empirical data fit each other quite well.

Indicator	Results	Judgement
X^2	1.88 met P = 0.13	meets requirements (limits are 3 respectively 0.01)
AGFI (adjusted goodness of fit index)	0.79	does not meet requirements (has to be $\geq 0,85$)
global behaviour of residues	linear	meets requirements
R^2 for E*	0.56	quite acceptable
stability	ratio 1 : 11	meets requirements (has to be at least 1 : 5)

* = one of the indicators of effectiveness

Table 2 : *Global fit*

From the findings it can be concluded that a "tragedy of the commons" can be prevented. A number of variables can be pointed out that have a positive impact on the effectiveness of co-operation. Consequently, there are opportunities for increasing the probability of an effective co-operation in regional transport policy formulation and implementation.

8.   Co-operation in the Dutch transport regions

In the more urban Dutch regions, the municipalities do have a common goal with respect to transport policy. This is the improvement of accessibility and liveability (and safety). Their transport networks are congested and their environment is affected. However, within regions differences are present. Although their transport flows are related and their situation is an interdependent one, municipalities located in the more peripheral areas of the studied regions do not identify their situation as problematic, and consequently are not really motivated to take measures which should help the more central and urban municipalities. And as long as municipalities do not identify their situation as problematic or do not expect problems on the short

term, they will not co-operate the way other municipalities would like to. It may be expected that in the Netherlands problems will continue to grow and that in the regions not yet confronted with serious problems prevention of the problems which may be expected will not succeed. Besides, in the regions where problems are already at stake, the intentions of the central municipalities will be impaired by the reluctant behaviour of more peripheral municipalities.

9. Conclusion

From the study it may be concluded that fiscal federalism may be used to study the administrative structure of a country and developments in this structure. Besides, it may be used to recommend changes in the administrative structure. On the other hand, other forces (politicians) do influence the administrative structure of a country as well. This does result in a structure that may not be appropriate to overcome changing circumstances. Fiscal federalism offers a way out : co-operation.
Unfortunately, co-operation is not that easy to realise as the presented model suggests. Research results show that several variables do influence co-operation and its chances for success.
On the other hand, several hypotheses had to be rejected and with respect to some hypotheses only indicative conclusions could be drawn. These two groups of hypotheses should be subject to more research.
Besides, the presented model suggests some indirect relationships relevant with regard to the effectiveness of co-operation. These indirect relationships have not been tested in the presented research. Nevertheless, a (longitudinal) testing of these relationships may contribute to the gaining of insight into the strength of the presented, integral model, including the supposed indirect, time-dependent relationships.
Furthermore, another subject for complementary research concerns the operationalisation. It has been indicated that the way (theoretical) concepts have been operationalised in measurable concepts may be of influence on the research results. A first analysis after the influence of the operationalisations has been conducted and as a result several concepts have been adapted. Nevertheless, complementary research may be elucidative and give more insight into the influence of operationalisation.

10. Epilogue

Taking into account the assumptions and conditions, with respect to mobility problems it may be concluded that if the regional transport network is considered to be a common pool resource, then the theory of collective action and the presented model may offer a guide-line in the management of it. Increasing the chances for effective co-operation between administrative organisations (municipalities/communities) offers opportunities to reduce the (growth of) car mobility and the negative effects of it.

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