



Munich Personal RePEc Archive

Structural Equation Model of Successful Territorial Cooperation

Celińska-Janowicz, Dorota and Zawalińska, Katarzyna and Widła-Domaradzki, Łukasz

University of Warsaw, Centre for European Regional and Local Studies (EUROREG), University of Warsaw, Centre for European Regional and Local Studies (EUROREG), Tandem Analityczny

2013

Online at <https://mpra.ub.uni-muenchen.de/52507/>

MPRA Paper No. 52507, posted 27 Dec 2013 12:00 UTC

Structural Equation Model of Successful Territorial Cooperation

Dorota Celińska-Janowicz*, Katarzyna Zawalińska*,
Łukasz Widła-Domaradzki**

**Centre for European Regional and Local Studies (EUROREG), University of Warsaw*

*** Tandem Analityczny*

in: Gorzelak Grzegorz, Zawalińska Katarzyna (eds.) (2013) European Territories: From Cooperation to Integration? Warszawa: Wydawnictwo Naukowe Scholar.

ISBN 978-83-7383-643-3

Please cite as: Celińska-Janowicz Dorota, Zawalińska Katarzyna, Widła-Domaradzki Łukasz (2013) Structural Equation Model of Successful Territorial Cooperation [in:] Gorzelak Grzegorz, Zawalińska Katarzyna (eds.): European Territories: From Cooperation to Integration? Warszawa: Wydawnictwo Naukowe Scholar, pp. 134-154.

*DOROTA CELIŃSKA-JANOWICZ,¹ KATARZYNA ZAWALIŃSKA,¹
ŁUKASZ WIDŁA-DOMARADZKI²*

2.3 STRUCTURAL EQUATION MODEL OF SUCCESSFUL TERRITORIAL COOPERATION

THEORETICAL MODEL OF SUCCESSFUL COOPERATION

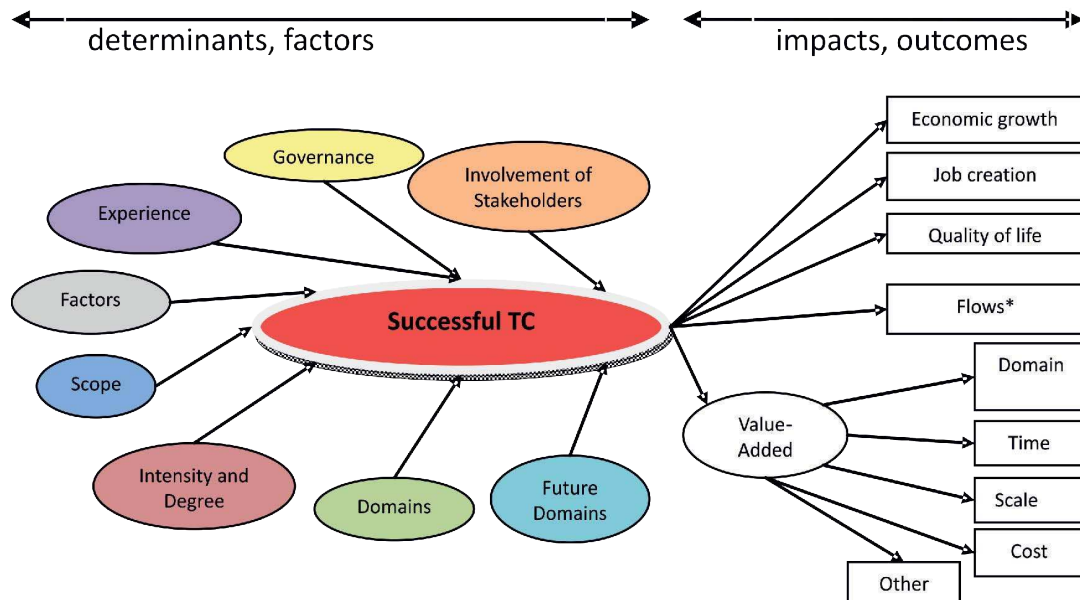
Based on the project's literature review, a conceptual model of territorial cooperation (called TERCO-SEM) was proposed (see Figure 1). Up until this point, there had been no concise model of this type, attempting to put into one framework all the factors shaping territorial cooperation (TC) and assessing their relative importance in terms of producing positive outcomes from cooperation. The model draws on key concepts and findings established by the literature review. For instance, it draws on Colomb's (2007) concept of the scope of cooperation, Barca's (2009) notion of the value added that TC can bring ('by dealing with relevant, over-the-border interdependencies and promoting cooperation networks and collaborative learning involving both public and private actors'), and the expected effectiveness of TC in 'facilitating worker mobility' (Manifesto, 2008), etc. The model was created as an effort to capture and conceptualise the determinants and outcomes of successful territorial cooperation.

Successful territorial cooperation is defined here as bringing the highest joint socio-economic development to the cooperating territorial units. Development comprises economic growth, job creation and increasing quality of life. This definition is consistent with the name of TERCO project (European Territorial Cooperation as a Factor of Growth, Jobs and Quality of Life). In addition to this definition, two other elements were added: transnational flows and value added. With regard to the Conceptual Model, the left-hand side sets out factors influencing territorial cooperation, and the right-hand side sets out indicators that identify successful co-

¹ EUROREG, University of Warsaw.

² Tandem Analityczny.

operation. Causality is depicted by arrows. Hence logically, all the factors/determinants on the left-hand side, such as governance, experience, drivers, scope, etc. have arrows directed towards ‘successful TC’, as they determine whether it takes place. The opposite is the case with constructs such as economic growth, quality of life, jobs, value added, etc.



Determinants, factors:

- Involvement of Stakeholders – various actors involved in TC (five variables: e.g. NGOs, business, local residents, etc.)
- Governance – various stakeholders initiating TC (ten variables: e.g. EU bodies, local government, etc.)
- Experience – length of experience in TC (i.e. when TC was started)
- Factors – facilitators and hindrances of TC (17 variables: e.g. historical links, language, level of development, etc.)
- Scope – extended to six steps in Colomb's (2007) scale of cooperation (e.g. exchange of experience, common actions)
- Intensity and Degree – number of projects and partners, engagement of resources
- Domains – thematic domains of current TC (eight domains: e.g. economy, natural environment, tourism, etc.)
- Future Domains – domains that are most important for future development (eight domains: as above)

Impact, outcomes:

* Flows: International trade, Foreign Direct Investment (FDI), commuting to work, tourism, social commuting (e.g. visits to friends, shopping, etc), educational exchange (students, pupils), migration, etc.

Figure 1 Theoretical model of successful territorial cooperation

Source: Authors' elaboration based on literature review.

This model was developed for two purposes. First, as a comprehensive framework that would visualise expected causalities between TCs and socio-economic development, the model was a base on which the TERCO-CAWI questionnaire was designed. Secondly, the conceptual

model provided the initial form for the Structural Equation Model that was verified empirically.

STRUCTURAL EQUATION MODELLING – FROM THEORY OF COOPERATION TO PRACTICE

Structural Equation Modelling (SEM) is a powerful statistical technique for testing and estimating causal relations between latent (not-directly observable) variables or ‘constructs’. SEM allows most of all confirmatory, but also exploratory, modelling, meaning it is suited to both theory testing and theory development. A hypothesised model (see Figure 1) is tested using the obtained data to determine how well a model fits the data. The causal assumptions embedded in the model often have ‘falsifiable’ implications, which can be tested against the data. Technically, SEM estimates a series of separate, but interdependent, multiple regression equations as specified in the structural model. SEM is distinguished by two characteristics: (i) the scope to estimate multiple and interrelated dependent relationships, and (ii) the ability to represent unobserved concepts in these relationships and account for measurement error in the estimation process (Hair, Anderson, Tatham, Black, 1998). SEM also allows for a graphical presentation of complex models, which makes an analysis more transparent. The arrows show the causal links, which have been specified based on theoretical grounds. On the basis of the existing data, the estimation of model parameters can show which of the assumed causalities are in fact significant and which are not. The statistical information that is compiled during the process of structural model verification allows a researcher to improve the model – to modify the causality structure and to test the hypotheses repeatedly, as long as a satisfactory explanatory power of the model is achieved. The verification of existing theories is a good starting point for constructing a SEM, as the model is improved by ‘falsifying’ some relations and replacing them with new ones, thus improving overall model fit.

TERCO-SEM MODEL

In the TERCO project, SEM analysis was based on the TERCO-SEM conceptual model described in the previous section.

The main reason for using SEM is to deal with important driving forces that, potentially, determine the success of TC but are not directly observable. The TERCO-SEM conceptual model is a theoretical model, that needs to be verified by using SEM analysis. The main assumption underlying the model is the main TERCO hypothesis (transnational

territorial cooperation is one of the factors underpinning the socio-economic development of territorial units). The SEM analysis enabled the empirical verification of the hypothesis and addressed research questions in a robust and consistent way: based on reliable data from the same source (CAWI). Therefore, the SEM results enabled: verification of the main TERCO hypothesis on whether the cooperation has any influence on socio-economic development in terms of (i) economic growth, (ii) jobs, and (iii) quality of life; identification of which determinants listed in the literature are the most important for successful cooperation; and development of a consistent story (theory) addressing the driving forces of TC that are not directly observable.

DATA FOR SEM – CAWI AND DATA MAPPING

The most appropriate type of data for SEM modelling are survey data. Thus, the CAWI questionnaire was designed in a way that allows for the collection of data useful for verification of specific hypotheses. By assigning data from CAWI to the theoretical model, the model could be applied and verified on a step-by-step basis. Each of the seven factors (coloured ellipses on Figure 1) was described by one or more questions in the TERCO-CAWI questionnaire. For example, one driving force is the scope of cooperation, measured by the modified, six-step Colomb's scale (see Figure 2).

However, it has to be remembered that the ability to test the model empirically depends primarily on the quality of data. The following conditions have to be satisfied in order to make the model work:

- Large and homogenous sample. SEM requires a large number of observations to start running and they have to be homogenous, which means that the set of data for each type of TC must be large. In practice, there is no exact threshold under which the software (AMOS[®]) cannot be applied. However, a general rule is that the size of a sample should be 20 times larger than the number of measured variables in the model. For the purposes of this project, the data needed to be gathered for each TC type.
- Normal distribution of variables. In order to have appropriate estimations of relations between the variables and to test hypothesis, a normal distribution of the answers is required, because all the estimators and statistics are asymptotically unbiased.
- No missing data points. The model is sensitive to missing observations. This means that the questionnaires with blanks under some questions have to be deleted from the sample or some special statistical procedures, aimed at handling the missing data, must be applied. These conditions are very

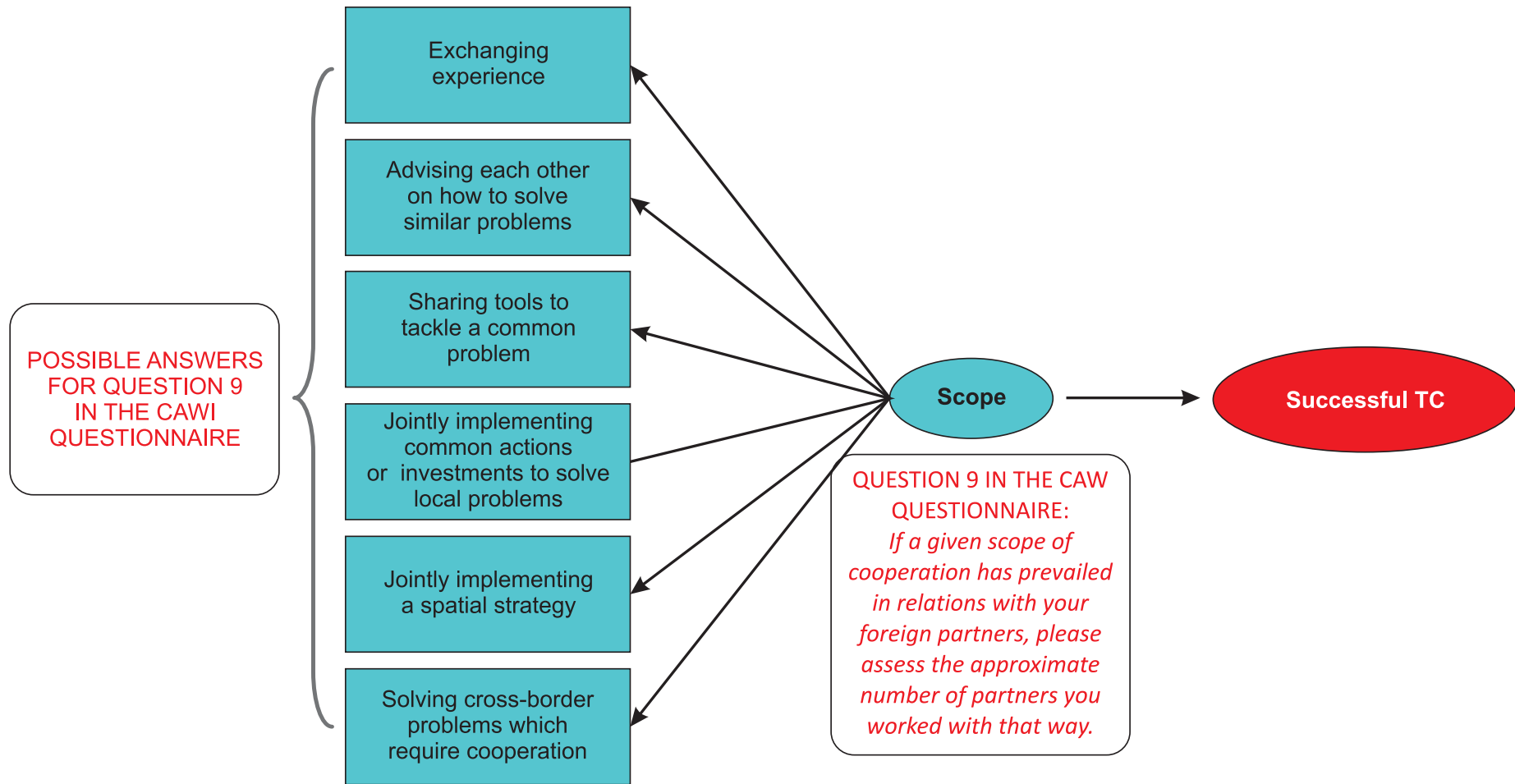


Figure 2 Data mapping in the TERCO-SEM model

Source: Authors' elaboration.

strict and demanding. However, the number of questionnaires obtained during the research was not very high, and for this reason some statistical procedures had to be applied to improve the quality of the model.

STEPS IN MODELLING

SEM modelling was developed in five main stages:

a. Data collection

As already mentioned, data for SEM modelling were provided by the CAWI questionnaires (in electronic and paper versions), completed by respondents in 19 countries³. The questionnaire was sent to all municipalities in the TERCO case study areas. After using many different methods aimed at increasing the rate of return (multiple e-mail requests, phone calls, personal visits etc.), 459 completed questionnaires, usable for the SEM analysis, were obtained.

b. Database preparation and transposition

Of the 459 questionnaires, only 291 were filled in by beneficiaries of territorial cooperation programmes (i.e. persons who actually participated in TC). Those 291 respondents related to five types of cooperation (Twinning Cities, INTERREG A, INTERREG B, INTERREG C, Transcontinental). In SEM, the unit of analysis is a relation (a respondent's opinion on each type of TC is a separate relation), and each respondent had on average 1.72 cooperation relations, hence the final SEM worked on 500 unique records.

Because SEM modelling is very sensitive to missing data points, and because the sample was still relatively small, missing data were supplemented with the arithmetic mean of the values for a particular country or, if this was not possible, of the values for the whole sample. In the TERCO CAWI questionnaire, there were two types of questions – with dichotomous and interval scale answers. To ensure that both types of questions entered the model with the same probability, all the variables were standardised.

c. Preliminary modelling

Preliminary modelling was based on the already described theoretical conceptual TERCO-SEM model (Figure 1). After this first step of modelling,

³ Belgium (BE), Bulgaria (BG), Czech Republic (CZ), Germany (DE), Spain (ES), Finland (FI), France (FR), Greece (GR), Uruguay (UY), Argentina (AR), Morocco (MO), Norway (NO), Poland (PL), Russia (RU), Sweden (SE), Slovakia (SK), Turkey (TR), Ukraine (UA), United Kingdom (UK)

it was obvious that some factors (determinants, colored ellipses) were not consistent. Accordingly, to improve the quality of the model, some factors had to be modified. Firstly, variables with the lowest factor loadings were excluded from the model. These variables were usually related to answers of 'Other, please specify' in the CAWI questionnaires. Secondly, if a particular factor contained more variables with low factor loadings, exploratory factor analysis was conducted. All exploratory factor analyses were conducted using SPSS® instead of AMOS®. Hereby the factor was divided into smaller, more consistent factors. Thirdly, some factors were combined with each other. This procedure was applied, for example, to the factors 'Domains' and 'Future Domains'. Finally, despite the described statistical procedures, some variables had to be excluded from the model. For example, all the variables related to the 'value-added' factor (on the right hand side of the model) had to be excluded due to the very high rate of missing data.

d. Modifications of the model based on its fits

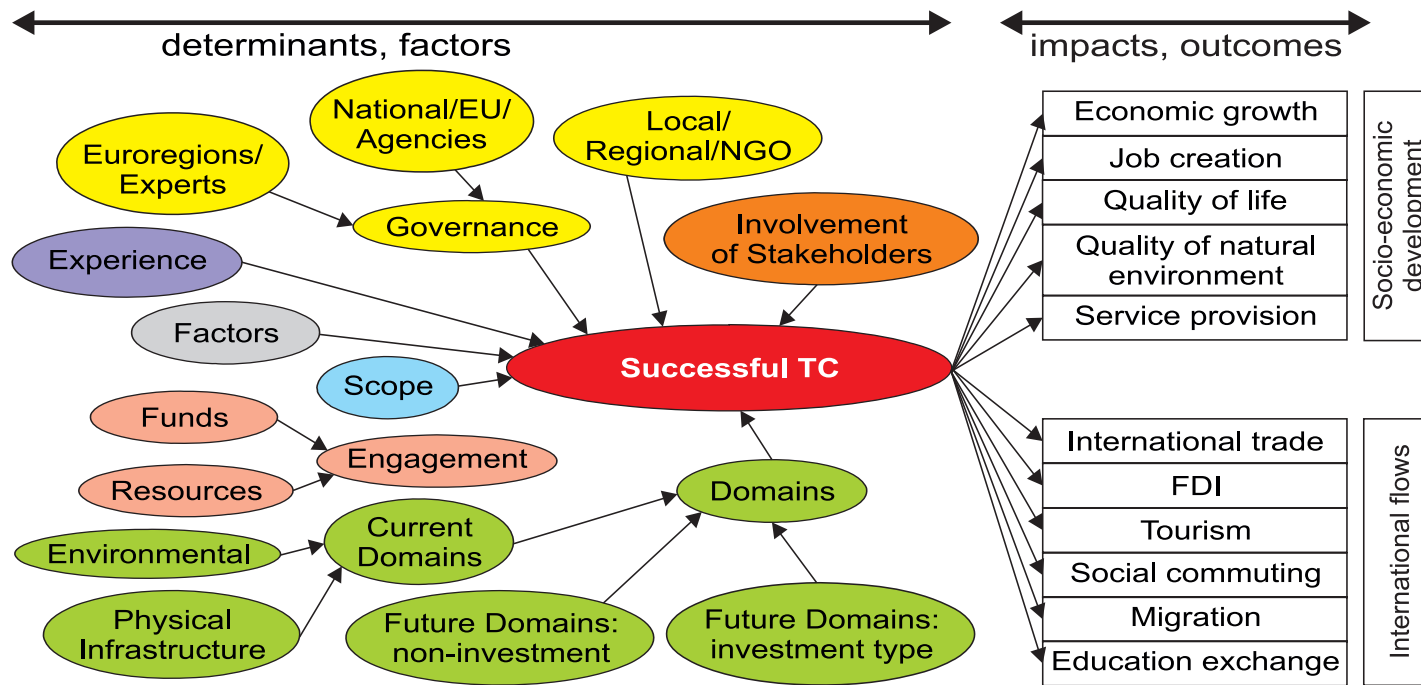
The aim of this stage of modelling was to improve the model's fit rates. The AMOS® software enables wide diagnosis of these rates, and it helps to identify which variables are the weakest and how to improve the quality of the model. Almost all the factors from the preliminary model had to be modified (i.e. the set of variables that build up the different factors had to be changed). During the modification procedure, variables were grouped into factors on the basis of the statistical procedures of factor analysis. Variables of the same factor are strongly correlated to each other and significantly affect the factor. Apart from changes on the left-hand side of the model (factors/determinants of Successful TC), the right-hand part also had to be modified. At the beginning, it was assumed that Successful TC (unobservable, latent variable) consisted of six elements (variables that form Successful TC on the basis of factor analysis). During the modelling process, however, it turned out that all the variables of Successful TC are strongly correlated with each other. This means that respondents described the impact of TC on all elements of socio-economic development and flows similarly – similarly low or similarly high. Consequently, each variable builds Successful TC with a similar factor loading, and differences between the influence of Successful TC on each area (economic growth, quality of life, job creation etc.) are relatively small. This situation leads to the conclusion that the impact of Successful TC on different areas is probably indistinguishable to the respondents. Territorial cooperation influences many areas and its impact is rather comprehensive. Respondents most likely did not see many direct and clear results of TC, but rather an overall small or large influence of TC on the general situation in a specific area.

All these procedures and statistical techniques improved the quality of the model. As a result, the fit rates achieved a satisfactory level. In TERCO-SEM, two basic rates of the model's fitness were chosen: CFI (Comparative Fit Index) and RMSEA (Root Mean Square Error of Approximation). These rates describe fitness of a singular model. According to the literature (e.g. Byrne, 2010) the value of the CFI rate should be ≥ 0.9 and the value of the RMSEA rate ≤ 0.1 . In the TERCO-SEM model, the value of the CFI rate is 0.775 and the RMSEA rate is 0.078. The low value of the CFI rate is a result of small sample size and relatively low differentiation of data (respondents' answers). However, taking into account the small number of questionnaires, the fit rates are relatively high. It should be stressed that a higher number of questionnaires would not necessarily improve the quality of the model. During the collection of the questionnaires, it was very visible that the share of positive questionnaires (from respondents that had any experience in TC), which were the basis of the SEM analysis, was decreasing very rapidly after the first one or two rounds of collection. It can be assumed that respondents that had any experience in TC were also the ones that filled in the questionnaires at the beginning of the survey.

e. Final model

The final TERCO-SEM model, after the modifications described above, is shown in Figure 3 and described in detail in Table 1. It can be seen that the modifications to the model led not only to the exclusion of some elements, but also to renaming some factors and distinguishing sub-factors. Only two factors in the final model are built exactly the same (with the same variables, i.e. the same CAWI questions) as in the preliminary, conceptual TERCO-SEM model: Involvement of stakeholders (level of involvement of key actors in TC projects) and Scope (measured with extended Colomb's scale). Factors (factors that facilitate or hinder TC) was modified only a little bit by removing the variable related to the CAWI answer 'Other, please specify'.

The factor that was changed to the greatest extent was Domains (thematic domains of TC projects) – it was actually combined with another factor – Future Domains (preferred future thematic domains of TC projects which are the most important for future development of the area), and then modified once again. As a result, the model has one large factor Domains and three smaller subfactors: two related to future domains ('soft', which contains variables related to preferred thematic domains of future TC projects: tourism, cultural events, educational exchange; and 'hard': economy, natural environment, physical infrastructure) and Current Domains (from all the variables of the primary factor Domains). In the last factor (Current Domain), two subfactors were distinguished:



- Local/Regional/NGO – stakeholders initiating TC are NGOs, local and regional governments
- Governance: National/EU/Agencies – stakeholders initiating TC are national government, EU bodies, development agencies and chambers of commerce
- Governance: Euroregions/Experts – stakeholders initiating TC are Euroregions and other cross-border institutions, consultants, external experts
- Experience – length of experience in TC and changeability of TC partners
- Engagement: Funds – source of funding (five types of sources)
- Engagement: Resources – availability of funds and staff resources
- Future Domains: 'soft' – tourism, cultural events, educational exchange
- Future Domains: 'hard' – economy, natural environment, physical infrastructure
- Current Domains – economy, cultural events, educational exchange, social infrastructure, tourism, joint spatial (physical) planning
- Current Domains: Environmental – natural environment and risk prevention
- Current Domains: Physical infrastructure – roads and other physical infrastructure

Figure 3 Empirical model of successful cooperation

Source: Authors' elaboration based on literature review and data from TERCO case studies.

Environmental (containing variables related to thematic domains of TC projects: natural environment and risk prevention) and Physical infrastructure (containing variables related to thematic domains of TC projects: roads and other physical infrastructure). Other current domains did not form consistent separate factors and were included directly in the factor Current Domains (economy, cultural events, educational exchange, social infrastructure, tourism, joint spatial planning).

These modifications were made on the basis of the results of the statistical analysis of the first version of the model. As already mentioned, factors and subfactors were distinguished and built on the basis of factor analysis. Variables in the same factor are strongly correlated to each other and significantly affect the factor. This means that if some variables build the factor or subfactor (e.g. Environmental) the answers related to these variables were relatively frequently chosen by the same CAWI respondents.

The described modifications to the factors Domains and Future Domains may lead to the conclusion that the current domains of TC projects are strongly related to the preferable future thematic areas of cooperation that are seen as the most important for the future development of a specific area. This might be a result of two situations: current domains of cooperation are also seen as those that are the most important because they really are very important, or respondents find those domains in which they have some experience in TC to be important. At the same time, it should be remembered that in some cases, especially in new Member States or non-EU countries, involvement in a TC project is a matter of chance, e.g. invitation to the project by a more experienced partner. In these situations, the thematic domain of the project is not always an answer to the real needs and problems of a specific area. Another conclusion from the above-mentioned modifications to the factor Domains is that some domains often coincide with each other (in respondents' answers) and thus form subfactors (Future Domains 'soft': tourism, cultural events, educational exchange; Future Domains 'hard': economy, natural environment, physical infrastructure; Current Domains 'Environmental': natural environment and risk prevention; Current Domains 'Physical infrastructure': roads and other physical infrastructure). This may lead to the conclusion that if current domains of TC projects are taken into consideration, there is a rather clear preference for two thematic areas (natural environment and physical infrastructure), while other domains do not coincide in any meaningful pattern.

On the other hand, with regard to preferred future domains of TC projects (the most important for future development of the area), two types of preferences can be distinguished: one is focused more on culture,

Table 1 Factors and variables of the empirical model of successful cooperation

Factor (<i>question in CAWI questionnaire</i>)	Variable (<i>answers available</i>)
Involvement of stakeholders (<i>If any of the following actors/stakeholders are involved in the TC in your area please assess its level of involvement</i>)	<ul style="list-style-type: none"> • Local authorities • Regional authorities • Local residents • NGOs • Business
Scope (<i>If a given scope of cooperation has prevailed in relations with your foreign partners please assess the approximate number of partners you worked with that way</i>)	<ul style="list-style-type: none"> • Exchanging experience • Advising each other on how to solve similar problems • Sharing tools to tackle a common problem • Jointly implementing common actions or investments to solve local problems • Jointly implementing a spatial strategy • Solving cross-border (transnational or transcontinental) problems which require cooperation
Factors (<i>Please indicate to what extent each of the following factors hindered your organisation/authority from participating in TC</i>)	<ul style="list-style-type: none"> • Level of growth (development) • Presence of minority groups • Physical geography between the regions • Level of infrastructure • Historical relations • Religion • Language • Cultural background • Previous involvement in TC projects • Availability of funding • Geopolitical position of the regions • Institutional background • Civil society

Table 1 Continued

Factor (<i>question in CAWI questionnaire</i>)	Variable (<i>answers available</i>)
	<ul style="list-style-type: none"> • Shared environmental concerns • Business community • EU membership • Political will
<p>Governance (<i>Please indicate 3 key stakeholders initiating TC in your area</i>)</p>	<ul style="list-style-type: none"> • National government • EU bodies • Development agencies • Chambers of commerce
Euroregions/ Experts	<ul style="list-style-type: none"> • National government • EU bodies • Development agencies • Chambers of commerce
National/EU/ Agencies	<ul style="list-style-type: none"> • Euroregions and other cross-border institutions • Consultants, external experts
Local/Regional/NGO	<ul style="list-style-type: none"> • Local government • Regional government • NGOs
<p>Experience <i>(Please indicate to what extent your cooperating partners have changed since 2000)</i> <i>(When did your organisation/authority first become involved in TC?)</i></p>	<ul style="list-style-type: none"> • All the same partners • Mostly the same partners • Similar number of previous and new partners • Mostly new partners • All new partners

Table 1 Continued

Factor (<i>question in CAWI questionnaire</i>)	Variable (answers available)
	<ul style="list-style-type: none"> • before 1994 • 1994-1999 • 2000-2006 • since 2007
<p>Resources (<i>Please assess the extent to which the following resources are available in your organisation/ institution for participation in TC projects</i>)</p>	<ul style="list-style-type: none"> • Funds • Staff
<p>Domains</p> <p>Future Domains (<i>please indicate 3 domains which are the most important for future development of your area</i>)</p> <p>Future Domains: hard</p> <p>Future Domains: soft</p> <p>Current Domains (<i>Please indicate the types of cooperation with which your organisation/authority has been involved</i>)</p>	<ul style="list-style-type: none"> • Economy • Natural environment • Physical infrastructure • Cultural events • Educational exchange • Tourism • Economy • Cultural events • Educational exchange • Social infrastructure • Tourism • Joint spatial (physical) planning

Table 1 Continued

Factor (question in CAWI questionnaire)	Variable (answers available)
Environmental	<ul style="list-style-type: none"> • Natural environment • Risk prevention
Physical infrastructure	<ul style="list-style-type: none"> • Roads • Other physical infrastructure
<p>Successful TC <i>(If there is an impact of TC on your area, please indicate in which theme and at what level)</i> <i>(In relation to the following flows/exchanges, please indicate how you perceive the impact of TC on your area)</i></p>	<ul style="list-style-type: none"> • Economic growth • Job creation • Quality of life • Quality of natural environment • Service provision • International trade • Foreign direct investment • Commuting for work • Tourism • Social commuting • Migration • Educational exchange

Source: Authors' elaboration.

education and tourism, and the other is geared more towards economy, natural environment and physical infrastructure.

Quite distinctive modifications were also made in the factor Experience. In this case, the variable related to the length of experience is strongly correlated with the variable related to the diversification of partners (in the preliminary model, it was a variable of the factor 'Intensity and degree'). This means that the longer the experience, the more stable the set of TC partners. It leads to the conclusion that, as time passes, patterns of co-operation (with regard to choosing partners) are more and more stable and closed. In the final model, the factor Experience consists of only the two mentioned variables. The factor Intensity and degree was also strongly modified, rebuilt and renamed. Variables that remained within that factor (now named Engagement) were grouped into two subfactors: Resources (the extent to which resources of staff and funds are available) and Funds (sources of funding for TC projects: own, public-private, from foreign partners, EU funds, public other than own).

The last factor to be modified was Governance, which described key stakeholders initiating TC. In this case, variables indicating the key stakeholders of local and regional authorities and NGOs were so distinctive from all the others, that they created a separate factor (called Local/Regional/NGO), which can be described as a locally-driven model of TC. In this situation, the factor Governance consists of two distinctive subfactors: National/EU/Agencies and Euroregions/Experts. Distinguishing these three factors indicates, in a very general way, three types of TC in regard to key stakeholders initiating territorial cooperation. The most distinctive is a model with the strong involvement of local and regional governments, supported by NGOs. The distinguishing factor Euroregions/Experts indicates that Euroregions and other cross-border institutions, as well as consultants and external experts, are strongly involved in TC in these areas where public authorities (local, regional and national, as well as EU bodies) and professional organisations (such as NGOs, development agencies and chambers of commerce) are not so active. At the same time, in areas where national government and EU bodies are strongly involved in TC, professional organisations (such as development agencies or chambers of commerce) are also important actors initiating TC. It should be emphasised that from all three types of Governance (described above), only Local/Regional/NGO is consistent enough to be a significant (from statistical point of view) factor of Successful TC. The two other types of governance are also internally consistent, but their factor loadings are much smaller than for those Local/Regional/NGO factor (due to the small number of questionnaires with those answers). In fact, removing them

from the model would be statistically justified, but a decision was taken to leave them in because of their merit and theoretical importance.

DISCUSSION OF THE RESULTS

Based on the TERCO-SEM model, the hypothesis that territorial cooperation underpins socio-economic development was positively verified. This verification was based on the following reasoning. In the theoretical (conceptual) model it was assumed that successful TC is one of the factors that underpins the joint socio-economic development of cooperating territorial units. This assumption was reflected in the structure of the conceptual model where on the right-hand side of the model were placed various indicators of socio-economic development (economic growth, job creation, quality of life) as well as various flows (FDI, migration etc.) and value added. Hence the right hand side indicators were the indicators of potential impact of successful cooperation. On the left hand side the potential determinants and factory of territorial cooperation were depicted – determinants and factors that may lead to success. After modifications and analyses, the final, empirical and statistically significant version of the model was obtained. This model, due to statistically significant relations between Successful TC and elements of socio-economic development positively verifies the main TERCO hypothesis.

Apart from the conclusions mentioned in point 5 (Steps in modelling), SEM allows other, more general conclusions to be drawn. First, the results of the SEM analysis provide information about the role of particular ‘determinants and factors’ in achieving successful TC measured by several ‘impact’ indicators. Second, it is possible to access the extent to which particular ‘determinants and factors’ contributed to the Successful TC as a whole and its particular ‘impacts’.

The empirical TERCO-SEM model showed 12 significant impact variables. Each variable is characterised by its weight, which describes the power with which a variable explains Successful TC (see Table 2). Although the weights of all variables are relatively similar, some differences can be seen: the factors that are manifested to the greatest extent in Successful TC are economic growth, quality of life, quality of natural environment and service provision, while much less are job creation and flows. Thus, it seems that success in TC translates more into overall socio-economic development rather than cross-border flows and functional integration of cooperating areas. In this respect, TC can be seen as an instrument that so far is more oriented on achieving the socio-economic development of cooperating territories rather than a way to reduce the role of barriers related to borders by intensifying various flows. And this is true not only

within the EU and Schengen area, but also for cooperation with non-EU countries.

Table 2 Variables measuring impact of Successful TC

Name of the impact variable	Weight
Impact: Economic growth	9.1%
Impact: Job creation	8.5%
Impact: Quality of life	9.0%
Impact: Quality of natural environment	8.9%
Impact: Service provision	8.9%
Flows: International trade	7.9%
Flows: Foreign direct investment	8.1%
Flows: Tourism	7.7%
Flows: Social commuting	8.4%
Flows: Migration	8.2%
Flows: Educational exchange	7.8%
Flows: Other	7.5%

Source: Authors' elaboration.

With regard to the impact of particular determinants and factors, built by variables (on the left-hand side of the model), on Successful TC, three groups of factors can be distinguished at different level of importance (see Table 3).

The first group consists of *very important determinants and factors of successful TC*, since their weights (Standardised Total Effects) are the highest (> 8.5 percent). This group includes factors related to key stakeholders initiating TC (Local/Regional/NGO and Euroregions/Experts) and Engagement, especially the financial one. This means that for TC, the involvement of organisations and experts and local and regional authorities, as well as the availability of funds, are key determinants of success. Also important, but less so, are factors from the second group – *important determinants and factors of successful TC*. They correspond to Domains (both current and future domains) especially related to hard investments (building border crossings, cross-border transportation connections, etc.) and projects devoted to economy, natural environment and physical infrastructure. *Determinants and factory of moderate importance* can be considered as Engagement of various resources (financial resources and staff), Scope of TC (measured with the Colomb scale), Experience in TC projects, and some current and future domains – related to hard projects (building physical infrastructure) and soft, cultural, educational

and tourism projects. Surprisingly, *the least important determinants and factors* are those related to the stakeholders involved in TC (whereas factors related to the stakeholders that initiate TC play the most important role in determining TC success). Here belong also variables describing factors that hinder and facilitate TC. The main conclusion from this part of the analysis is that, for successful TC, the most important factors are those that initiate cooperation (both people – stakeholders – and resources), while factors that might affect ongoing cooperation (such as stakeholders involved, facilitators of TC, etc.) are less important.

Table 3 Factors determining Successful TC and their importance

Factor	Weight (Standardised Total Effects)	Determinants and Factors
Local/Regional/NGO	9.1%	Very important
Engagement: Funds	8.7%	
Engagement	8.6%	
Governance: Euroregions/Experts	8.6%	
Future Domains: hard	8.2%	Important
Current Domains: Environmental	8.0%	
Current Domains	8.0%	
Engagement: Resources	7.9%	Moderately important
Scope	7.9%	
Experience	7.7%	
Current Domains: Physical Infrastructure	7.5%	
Future Domains: soft	7.3%	
Involvement of stakeholders	1.3%	Of little importance
Factors	1.2%	
Domains	–	Not important
Governance	–	

Source: Authors' elaboration.

The results of the SEM modelling assess the impact not only of all the determinants and factors, but also of particular variables building the factor (see Table 4). For each of the above-mentioned factors, the most important variables can be distinguished. These variables describe types of domains, sources of funding, the scope of TC, etc. that have the greatest positive influence on successful TC (contribute to the successful TC in the greatest extent). Hence:

- In the factor Current Domains, these variables comprise: cultural events, tourism, economy, natural environment and infrastructure;
- In Scope: exchanging experience, sharing tools to tackle a common problem and advising each other on how to solve on similar problems;
- in Funds (sources of funding): own or EU funds;
- in Governance (stakeholders initiating TC): local and regional government.

To this group of the most important variables in creating successful TC, others that should be added include long experience in TC projects, stability of partners, sufficient availability of resources (staff and funds). Analysis of the results at the level of individual variables confirms that the least important for successful TC are those related to the level of involvement of actors and factors that facilitate or hinder ongoing cooperation.

The results of the SEM modelling also allow assessment of the impact of individual variables on particular categories of Successful TC (see Table 4). For economic growth, the most vital determinants leading to success of cooperation are: political will, EU membership (i.e. economic growth is achieved less likely in cooperation with non-EU partners) and the role of the business community, two domains of TC (joint spatial planning and cultural events), and initiating role of regional government, as well as involvement of NGOs and business. Surprisingly, the role of current or future projects in the thematic domain ‘economy’ is minimal. Thus, it seems that the most important factors for TC-driven economic growth are those related to the overall conditions of economic activity and the active role of local and regional actors.

CONCLUSIONS

For job creation, the key determinants seem to be preferred future domains of TC – cultural events, initiating role of local government, Euroregions and cross-border institutions and involvement of local residents in ongoing TC projects. In this area, the involvement of local actors seems to be the most important. Successful TC in terms of quality of life is related mainly to three types of domains – joint spatial planning, risk prevention and economy, and the active role of national government as an initiator of TC. For successful TC in the area of the quality of natural environment, the key factors are the TC domains: natural environment, educational exchange and cultural events. Thus, in this area, it seems that perspective thinking plays a key role not only with regard to environmental investments, but also for ecological education and the promotion of ecological behaviour. When successful TC is considered in terms of service provision, the most important determinants are the involvement of NGOs, EU membership as

Table 4 The most important determinants/factors for the individual impact indicators of successful TC

Economic growth is most likely to be achieved via TC under the following conditions:	Job creation is most likely to be achieved via TC under the following conditions:	Quality of life is most likely to be achieved via TC under the following conditions:	Quality of natural environment is most likely to be achieved via TC under the following conditions:	Service provision is most likely to be achieved via TC under the following conditions:	Economic flows are most likely to be achieved via TC under the following conditions:	People flows are most likely to be achieved via TC under the following conditions:
Good political will, EU membership, active business community	Preferred future domain: cultural events	Current domain: joint spatial planning, risk prevention, economy	Preferred future domains: natural environment, educational exchange, cultural events	Stakeholders involved in on-going TC: NGOs	Stakeholders involved in on-going TC: NGOs	Scope: Solving cross-border problems which require cooperation
Scope of TC is spatial planning and theme are cultural exchanges	Stakeholders initiating TC: Euroregions and other cross-border institutions, local government	Preferred future domain: economy		Preferred future domain: cultural events, tourism	Experience in TC projects	Preferred future domain: cultural events
Stakeholders initiating TC are regional and governmental actors	Stakeholders involved in on-going TC: local residents	Stakeholders initiating TC: national government		Factors* of TC: EU membership	Scope: Solving cross-border problems which require cooperation	Current domain: cultural events Stakeholders involved in on-going TC: NGOs

* Factors facilitating or hindering TC.

Source: Authors' elaboration.

a factor influencing TC, and 2 domains of TC projects – cultural events and tourism. For successful TC in terms of flows, few variables seem to have a crucial role. In creating successful TC in international trade, there is a substantial impact from cooperation based on solving cross-border problems, as well as experience in TC projects and the involvement of NGOs. The two last factors are also very important when successful TC is described as FDI. Successful cooperation in terms of intensive commuting to work is related mainly to the TC domain: cultural events, while successful TC in terms of tourism relates to the domains of tourism and cultural events. The same factors are important for successful TC in terms of social commuting, and, additionally, the involvement of local residents in TC projects. TC based on solving cross-border problems is a key determinant of successful TC in terms of migration, while educational exchange projects are the key to success in terms of educational exchange flows.

BIBLIOGRAPHY

- Barca, F. (2009). *An Agenda for a Reformed Cohesion Policy: A Place-based Approach to Meeting European Union Challenges and Expectations*, Independent Report prepared at the request of Danuta Hübner, Commissioner for Regional Policy, April 2009.
- Byrne, B. (2010). *Structural Equation Modelling with AMOS*, Routledge.
- Colomb, C. (2007). The added value of transnational cooperation – towards a new framework for evaluating learning and policy language. *Planning Practice and Research*, 22 (3), 347-372.
- Hair, J. F. J., Anderson, R. E., Tatham, R. L., and Black, W. C. (1998). *Multivariate data analysis with readings*. Englewood Cliffs, NJ: Prentice-Hall.
- Manifesto (2008). *Manifesto for cross-border cooperation in Europe, Cross-border territories: day-to-day Europe*, European conference – 8 and 9 November 2007 in Lille, EUROMOT.