Social Capital as Knowledge Facilitator: Evidence from Latvia

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Abstract

The aim of the paper is to investigate the relationships existing between cognitive resources and the existence of diverse social connections among individuals in territorial contexts, by adopting a theoretical framework and model based on a complex conception of shareable knowledge and a quantitative approach to empirical analysis.

The adopted framework draws on different literature threads such as knowledge management, regional economics, planning strategy and organizational science, and is based on the conception of knowledge as a 'club good' of a complex nature, and on a cognitive-oriented definition and classification of social capital, partly based on Nahapiet and Ghoshal's work (1998). Social capital - in its various forms - is seen as an (individual, organizational or institutional) asset which can allow the access to different forms of useful knowledge, bypassing the barriers (secrecy, tacitness, codification) which constitute obstacles to knowledge exchange and absorption. Four main dimensions of social capital (structural-proactive, attitudinal identity, attitudinal openness, and cognitive tools) and three main dimensions of knowledge (declarative, procedural, and conceptual) are defined, and relationships (causal effects and correlations) among them are hypothesized. In order to test the model, an evolved approach for empirical analysis has been chosen, consisting of a structural analysis for observed variables, applied to psychometric data collected among over 800 individuals in the Republic of Latvia.

The results allow to accept most hypotheses but point out some unexpected results as well. Whereas structural, attitudinal identity and cognitive social capital are found to have an impact on declarative knowledge, and cognitive social capital is found to influence procedural knowledge, no significant effect of attitudinal identity social capital on procedural knowledge, and cognitive social capital on conceptual knowledge, is found. The results are meant to be further investigated in detail against spatial, socio-economic and demographic control variables.

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Key words: social capital, knowledge sharing, multivariate analysis, EU-10 countries

JEL classification: O20

1. Introduction

The progressive trends which became popular in strategic planning theory and practice since the 80's are characterized by a critique (in same cases rejection) of traditional planning methods, of a deterministic and positivistic kind, based on a top-down approach and more or less complex problem solving methodologies. These critiques are of two main kinds:

- The opposition towards top-down planning as a non-democratic, elitist approach, and the plead for participative and collaborative planning, able to pay attention to the interests and ideas of all stakeholders;
- The opposition towards views of planning assessment based on too narrow criteria (such as economic cost-benefit analysis) and the plead for a shift towards a holistic approach, able to encompass different dimensions of sustainability (social, environmental).

Such progressive trends presents many differences, in particular between reformist – gradualist and radical approaches to change. However, it can be said that a common feature among them is the trend towards an inclusion of cognitive issue in planning theory and methodology. The role of knowledge is important in progressive strategic planning since:

- An attention towards participative and collaborative forms of planning involve the exchange of ideas between practitioners and stakeholders, in a perspective in which, aside from ethical considerations, the practitioner can gain from such an exchange useful information and knowledge related to specific planning problems ([1], [2]);
- An attention towards sustainability implies, next to the use of more sophisticated assessment methods, the attention towards the mechanisms of awareness spreading in the civic society ([3]).

A consequence of such a trend is a growing attention towards learning dynamics in territories, that is, towards the study of how ideas can be shared and transmitted between people ([4]). Such issues have been investigated in the last decades in different scientific areas, such as territorial and development economics, and organisational management. One of the key concepts for the issue is *social capital*, an umbrella term by which sociologists and economists have come to define the set of social ties which allow individuals and organisations to gain external benefits. Introduced by Jacobs [5] and made popular by authors such as Bourdieu[6], Coleman [7], Putnam [8], and Fukuyama [9] in the scientific debate, the concept has been investigated by several authors ([10]; [11]) with regard to its cognitive benefits, that is, its contribution to the sharing and building of knowledge, and has been recently pointed out as a knowledge facilitating asset in planning studies. Sandercock [12] emphasizes the need for planners to find access to the experiential knowledge of benefiting communities, and the role of social learning as an empowerment tools for communities themselves. Guth [13] sees social capital at the individual and institutional level as a powerful tool for socially inclusive learning and innovation processes.

However, the several theoretical contributions in the field:

- on one hand, have been somehow flawed by a low attention towards defining the complex nature of exchangeable knowledge ([14]);
- on the other hand, have rarely been tested by means of consistent empirical analyses.

The present paper is a pilot attempt at fulfilling such a gap. Chapters 2 and 3 are dedicated to literature review. Chapter 2 focuses on the issue of social capital and transferable knowledge classification. In chapter 3, relevant theoretical hypotheses and empirical findings concerning the cognitive benefits of social capital are summarized. In chapter 4, a theoretical framework based on a complex definition of social capital and transferable knowledge is proposed, and theoretical hypotheses on causal effects and correlations among variables are formulated. Chapter 5 presents the results of the model testing, carried out by means of evolved statistical techniques, on the basis of data collected among individuals in the Republic of Latvia. Chapter 6 summarizes strengths, weaknesses, possible evolution and applications of the carried out research.

2. Social Capital And Transferable Knowledge: Classification Issues

The first issue to be taken into account is the definition of the dimensions under exam. Both social capital and knowledge are broad concepts, which have been classified by the scientific literature on the basis of different criteria and for different purposes. More, given the immaterial nature of such dimensions, their measurement is a complex issue in itself. The following paragraphs are an attempt at rationalizing such classifications and related criteria as a starting point for the definition of a sound theoretical framework, as well as a review of measurement criteria.

2.1 Social capital: taxonomic criteria

Unit of analysis

A first issue with regard to social capital consists in the definition of the level of aggregation at which the analysis is meant to be carried out. Chou ([15]) summarizes the three levels which have been investigated in literature:

- Micro level (individual, household). J. Coleman defines social capital as some aspect of social structure, which facilitates certain actions of individuals who are within the structure.
- Meso level (organisation, group of individuals, community). This is, for instance, the chosen focus in Putnam [16], who defines social capital as features of social organization such as networks, norms, and social trust that facilitate coordination and cooperation for mutual benefit. In intellectual capital studies, which investigate the assessment of organisational intangible assets, the concept of social capital is expressed in terms of partnerships and good relationships with external actors, such as clients (e.g. [17]).
- Macro level (territorial entity, complex of institutions). This is the level of interest in several assessment studies in the field of territorial sustainable development (e.g. [18])

Embeddedness

Another widely used taxonomic criterion relates to the nature of social capital as a set of cohesive resources within a community, or as a set of ties connecting the actor with external actors. According to this criterion, social capital can be either *bonding* or *bridg*ing. ([19]). Adler and Kwon [11] define bonding social capital as a collective resource for a community, while bridging social capital is a private good, which allows the owner to gain external goods. Chou [15] hypothesizes that bonding social capital plays a key role in human capital accumulation, whereas bridging social capital builds collective trust.

Intensity

Another thread focuses on the intensity of social ties, and distinguishes between *strong* (frequent) and *weak* (rare) ties. Such a thread derives from social network analysis and dates back to Granovetter [20], who defines weak ties as those which can help to gain resources which are external to the actor's community. Lorenzen [21] defines weak ties as transitive relations, giving rise to casual, short-lasting and flexible interactions, able to span the borders between the stable and closed relations constituted by strong ties, enriching agents with information that strong ties do not provide them with. Lechner and Dowling [22] stress that strong ties are often characterized by a high similarity between the players. A strong tie offers a great depth of knowledge but little diversity of knowledge. Hansen [23] shows that project teams having strong ties with other units often took longer to complete their tasks than those with weaker ties, since they are too costly to maintain. Weak ties provide access to non-redundant information, and are less costly to maintain than strong ones.

The intensity – based classification is often overlapped with the embeddedness - based one, by considering weak ties of a bridging kind and strong ties of a bonding kind, but some scholars ([24]) state that this correlation is not necessarily justified.

Nature of relationships

The fourth and last issue consists in the different nature of the dimensions which constitute social capital. With regard to this, scholars have identified different typologies of 'relationships' between entities, which can include attitudes, values, and formal cooperation bonds. The most used classification distinguishes between a *structural* and a *cognitive* component ([25]; [26]), that is, between a set of regulated networks, based on the formal acknowledgement of established roles, and a set of informal linkages based on the sharing of values and norms, and on mutual trust. This approach stems directly from the most popular definitions of the concept itself, in particular Putnam's [9].

An alternative taxonomic classification was proposed by Nahapiet and Ghoshal [10], who redefine the dimensions of social capital with regard to its cognitive benefits, that is, its capability to enable the exchange of knowledge - related resources (intellectual capital). The approach defines three categories of social capital: a *structural* dimension, which includes formal networks and their features (configuration and degree of appropriability); a *cognitive* dimension, which relates to common, culture-related, decoding tools between actors (shared language, codes, narratives, goals); a *relational* one, which relates to common values (norms, trust, identification).

Levin and Cross [27], also investigating the issue in a cognitive perspective, take into account both works influenced by the structural-cognitive dichotomy and Nahapiet and Ghoshal's model: here the 'relational' dimension is divided into two components – a 'benevolent trust' one and a 'cognitive trust' one.

2.2 The forms of transferable knowledge: taxonomic criteria

Explicitness degree

The most popular and influencing conceptual distinction is the one between tacit and explicit knowledge, as defined by Polanyi [28] and developed by Nonaka [29] and Nonaka and Takeuchi [30] in the context of organizational learning studies, that is, between an internalized, non codified, often subconscious, and therefore hard to transfer, form, and a codified, conscious, and therefore transmittable one. In order to be made shareable by the whole organisation, tacit knowledge must be made explicit by means of a process of socialization and externalization. [31] use this taxonomy in order to point out the different approaches to knowledge in Eastern and Western knowledge management studies and point out their main difference: whereas the latter find their scope in making tacit forms of knowledge explicit, the former gives a high value to tacit knowledge itself.

Embeddedness

Many knowledge management studies, in particular in the context of regional economics, with regard to territorial innovation dynamics, emphasize the distinction between two forms of inter-organisational shareable knowledge which are crucial for innovation-based competitiveness: a local kind of knowledge, basically procedural and experience-based, created and shared by the interaction of local engineers and workers ('communities of practice'), and a global knowledge, of a scientific kind, which is created by means of global networking between scientific communities ('epistemic communities') ([32]). Bathelt et al. ([33]) describe local knowledge as being based on a set of local connections and information exchange called 'local buzz', and global knowledge as being based on 'network pipelines' which are extended beyond the boundaries of the local area, pointing out how the interaction between the two phenomena can be both positive and negative.

Lundvall [34] stresses the link between local knowledge and tacitness, and global knowledge and explicitness.

Elaboration degree

Other works define different types of knowledge with regard to its degree of elaboration. Kogut and Zander [35], in the context of inter-firm transfer, distinguish between information and know – how, that is, between declarative knowledge, which can be learnt by description (knowing what something means) and procedural knowledge, which can be learnt through direct experience (knowing how to do something). Nonaka [29] points out the distinction between information (flow of messages) and knowledge (information – sustained belief). Lundvall [36] proposes a taxonomy based on four types of knowledge which can be learned: know-what (knowledge about *facts*); know-why (knowledge about *principles* and *laws of nature*); know-how (skills, capabilities to do something), and know-who (information about sources of knowledge). Lane and Lubatkin ([37]) identify a distinction of three forms of inter-organisational transferable knowledge: know-what (scientific knowledge), know-how (knowledge – processing systems), and know-why (dominant logics).

A combination and enrichment of these classifications can be found in Gorman [38], who identifies four types of transferable knowledge: Declarative (what); Procedural (how); Judgement (when); Wisdom (why). The first two forms correspond, basically, to information and know-how as defined by Kogut and Zander and others. The last two are *conceptual* forms of knowledge. In Gorman's framework, the components of knowledge are identified along two dimensions: the distinction between tacit and explicit knowledge is transversal with regard to the degree of data elaboration.

3. The Cognitive Benefits Of Social Capital: Theoretical Hypotheses And Empirical Findings

The cognitive benefits of social exchange have entered the planning and economics debate in the last century. Zander and Kogut ([39]) stress that knowledge exists in the social relations among cooperating members in a community. Lundvall ([36]) stresses the great role of social ties in the knowledge transfer process, and singles out two categories of shareable knowledge (know-how and know-who) which are mainly rooted in social interaction.

In social sciences, innovation and planning studies, theoretical hypotheses have been formulated in order to define the cognitive benefits of different forms of social capital.

Capello [40], on the basis of Camagni's work on *innovative milieux* and collective learning, stresses, in a regional economics perspective, the role of relational capital (a 'proactive' redefinition of social capital) as the main factor enabling territorial collective learning and innovation. Hansen ([23], [41]) links forms of social capital with knowledge transfer by associating weak (formal) ties with high search benefits and strong (relational) ties with high transfer effectiveness. Strong ties enable the transfer of very complex knowledge, whereas weak ties help searching for useful knowledge in other subunits but impede the transfer of complex knowledge.

Empirical analysis has been performed especially in the context of organisational and territorial innovation studies. Tsai and Ghoshal [42] test Nahapiet and Ghoshal's framework by measuring the impact of social capital on inter-firm resource exchange, and firms' innovative production. The structural dimension of social capital is measured by interaction time spent and close contact, the relational one by reliability and promise keeping, the cognitive one by shared vision across units and shared organisational vision. Multiple regression analysis is performed at the dyadic level and both quantitative and psychometric measures are used, leading to results which allow to accept the hypothesis of social capital

facilitating knowledge exchange. Levin and Cross [27] empirically identify a positive correlation between strong ties and acquisition of useful knowledge, as well as between competence - based trust (cognitive social capital) and the transfer of tacit knowledge. Capello and Faggian [43] investigate the correlation between proactive social capital (defined 'relational capital') and knowledge enrichment in territorial industrial systems. In this work, relational capital is evaluated by means of measures of cooperation and workforce mobility between firms; knowledge enrichment is measured by its effects (innovative performance). The regression analysis results support the hypothesis of the importance of relational capital in fostering the innovative performance of a firm. Weber and Weber [44] analyze the effect of social capital on knowledge transfer among venture capital firms. They adopt the traditional distinction between structural and relational social capital. Results show a positive influence of willingness to cooperate, affective fit and trust on knowledge transfer.

4. Theoretical Framework And Model

4.1 Barriers to knowledge access

Borrowing from economics terminology, it is likely that knowledge can be defined, to use Buchanan [45]'s definition, as a *club good*, that is, a kind of good which is:

- *non-rivalrous*: as every immaterial good, knowledge is not consumed with use;
- *excludable*: it can be accessed according to some conditions; in other words, there are 'barriers' that can prevent the access to knowledge. Those who are able to overcome such barriers become part of the 'club' of users.

Some of these 'barriers' have been pointed out in knowledge management literature. Argote [46] identifies, among the main obstacles to knowledge transfer among people and organisations, low absorptive capacity, poor relationships, low motivation, knowledge complexity. Antonelli [47], reflecting on the governance forms which can enhance territorial knowledge combination, defines four features of knowledge which can be obstacles for the efficiency of its transmission: tacitness, indivisibility (interdependence of knowledge modules), complementarity of learning agents, and appropriability.

In the context under exam in the present work, and on the basis of knowledge forms as defined in knowledge management literature, some barriers to access can be pointed out:

Secrecy. Actors outside the club do not know the location of information, since it is secret or non-accessible (copyright, etc.)

Tacitness. Actors outside the club do not have access to knowledge since it is embedded-in-action and hard to be communicated.

Codification. Actors outside the club have no access to knowledge since they cannot understand the codes in which it is expressed.

4.2 Knowledge taxonomy

Inkpen and Tseng [14] identify a drawback of conceptual and empirical contributions in the quantitative studies on the cognitive benefits of social capital, consisting in a monolithic approach to knowledge, rarely taken into account as a complex entity. In the present work, an attempt is made as measuring knowledge on the basis of a complex taxonomy, mainly based on the above mentioned classifications proposed by Lundvall [36] in the context of territorial innovation studies, and Gorman [38], in the context of technology transfer studies. Three main dimensions were singled out:

Declarative knowledge, or know-what (KW1). Knowledge about facts. Consists of organised data (information) and knowledge about sources of information. Organized data are explicit,

but can be secret. Sources can be both secret and tacit. Declarative knowledge is (usually) expressed in forms which present a not very high degree of codification.
Procedural knowledge, or know-how (KW2). Knowledge about procedures, practical skills. It is usually tacit; can be coded or uncoded. Organisational learning studies investigate the ways through which it can be made explicit. Can be linked to Nonaka[29] and Nonaka and Takeuchi[30]'s tacit knowledge, and to Schon[1]'s knowledge-in-action.
Conceptual knowledge, or know-why (KW3). Knowledge about laws, principles. It is usually expressed in coded forms and languages, not understandable for everyone. Scientific laws are an example of conceptual knowledge.

4.3 Social capital taxonomy
The chosen taxonomy for social capital is mainly based on Nahapiet and Ghoshal[10]'s framework for the classification of *meso* (organisational) social capital as an intellectual capital exchange and growth facilitator.
Four main dimensions were singled out:
Structural social capital (SC1). Social ties as networking, cooperation links. It coincides with Ghoshal and Putnam's definitions of social capital. In the context of the present analysis (focus on individual social consciousness), it can be measured by the extent of socio-political engagement. May be tentatively linked to access to declarative forms of knowledge.
Attitudinal identity (bonding) social capital (SC2). Social ties as attitudes towards cooperation in the community (e.g. trust towards community members). May be linked to the access to tacit forms of knowledge. It is very close to Putnam's definition of cognitive capital.
Attitudinal openness (bridging) social capital (SC3). It falls halfway between Ghoshal's relational capital and cognitive capital categories. Can be defined as the possession of attitudes for the absorption of knowledge from external sources. Can be measured by attitudes of tolerance and respect towards different people. May be linked to tacit forms of knowledge.
Cognitive absorptive tools (SC4). Possession of tools for the absorption of external knowledge. Knowledge of codes, languages. May be linked with all kinds of knowledge as a 'decoding' tool.

4.4 The model: theoretical hypotheses
The direct causal effects and correlations that could be hypothesized, on the basis of the theoretical framework and existing literature are listed in the following.
Hypothesis 1. A higher level of structural social capital (i.e. the engagement of the individual in social activities) implies the possession of a higher amount of declarative knowledge. In other words, socio-political engagement is supposed to have a positive effect on the amount of available channels for information exchange.
Hypothesis 2. Attitudinal identity social capital has a positive effect on the possession of declarative knowledge. Trust is supposed to have a positive impact on the access to secret or hidden information..
Hypothesis 3 a,b. Attitudinal identity and openness social capital have a positive effect on the possession of procedural knowledge. Social attitudes (trust and openness) should facilitate the exchange of tacit knowledge, based on *vis-a-vis* contacts.
Hypothesis 4. Attitudinal openness social capital is correlated with a higher amount of structural social capital. Openness towards other people and socio-political engagement should be connected.
Hypothesis 5. Attitudinal openness social capital and cognitive tools are correlated, being different dimensions of absorptive capacity.

Hypothesis 6 a,b,c. Cognitive tools has a positive effect on the possession of declarative, procedural and conceptual knowledge. Cognitive tools should imply a higher absorptive capacity of different kinds of external knowledge.
Hypothesis 7 a,b. The possession of conceptual knowledge is affected by the possession of declarative and procedural knowledge, since complex knowledge is supposed to be based on a broad information and experiential base.

5. Quantitative Analysis

5.1 Data and territorial context

The used data consist of a subset of ordinal (mainly psychometric) variables collected among 809 citizens of the Republic of Latvia in 2007. Such a survey was carried out in 2007 and managed by the Laboratory of Analytic and Strategic Studies, a research and consulting company in the field of regional development based in the capital city of Riga.
In line with a general trend in European post - communist countries, Latvia is characterized by low levels of social capital. According to Eurobarometer[48], the level of trust and cooperation attitude among Latvian people is considerably lower than the EU average. The engagement in socially conscious activities is low as well. These figures may be explained by generalized distrust towards state governance and public institutions, as well as by the fragmented structure of society, characterized by division along ethnic (mainly, between ethnic Latvians and Russian-speaking minorities), as well as cultural - historical lines (between 'Soviet-trained' older generations and 'Westernized' youth). Such features of society, together with a general lack of confidence in the future, a diffused sense of precariousness, and media-driven excessive consumption trends, account for a difficulty regarding the diffusion of sustainability oriented and long term-conscious attitudes among citizens[49]. The survey on which the present paper is based is meant as an assessment of individual resources and attitudes, useful in a sustainable development perspective, among the citizenship. In particular, the submitted questions dealt with the issues of sustainability awareness, and the assessment of individual and collective intangible assets such as creativity, community trust, and social engagement.

5.2 Analysis

The chosen statistical analysis consisted of model testing through structural equations. The model was based on theoretical hypotheses and support statistics (cross-tabulation and factor analysis). The structural analysis was carried out by means of package Amos 7.0, combined with SPSS 15.0 (which was used for support statistics).
The measurable variables for latent factors were chosen with regard to a context of individual assets and social consciousness. The traditional distinction between 'structural' and 'cognitive' capital has led, in social and planning studies, to analyses where structural capital is measured in terms of membership of organisations and cognitive capital in terms of trust (e.g. [26]). Putnam ([8]) examines social capital in terms of the degree of civic involvement. Scholars who use the concept in sustainable development contexts add to this scheme measurements of proactive relational parameters like goodwill and attitude towards cooperation (e.g. [50]).
As for knowledge enrichment, at the individual level it is usually measured as evaluation, or self-evaluation, of cognitive capabilities (e.g. education) and practical skills, as in organisational studies dealing with human resource management, ranging from intellectual capital ([51]) to competence evaluation (e.g. [52]).
On the basis of literature and preliminary factor analysis, the following variables were chosen as proxies for the seven factors included in the model:

Intensity of political engagement in NGOs, for structural social capital (SC1).
Trust towards neighbours, for attitudinal identity social capital (SC2).
Importance of respect towards other people's ideas and feelings, for attitudinal openness social capital (SC3).
Education, for cognitive absorptive tools (SC4).
Intensity of political discussion with close people, for declarative knowledge (KW1).
Manual creativity, for procedural knowledge (KW2).
Attitude towards future-conscious actions, for conceptual knowledge (KW3).
All of the chosen variables are ordinal, and most of them are psychometric. The analysis was performed by means of Amos 7.0, using both maximum likelihood and Bayesian estimation (the latter being the most suitable for ordinal variables).

5.3 The results

The resulting theoretical model is a causal model for observed variables. It is recursive and based on 4 exogenous variables (the social capital dimensions) and 3 endogenous variables (the shareable knowledge dimensions). The assumption for errors are mean = 0 and regression weight = 1. The model was first tested by means of standard maximum likelihood estimation for metric variables; later the results were tested by means of Bayesian estimation, more reliable for ordinal data. In this case, the necessity to use listwise selection led to about 20% of observations not taken into account. The model was adjusted according to the analysis of residual covariances and modification indexes, which led to the following results, corresponding to an excellent adaptation to data (P=.580 for Bayesian estimation, P=.673 for maximum likelihood estimation).

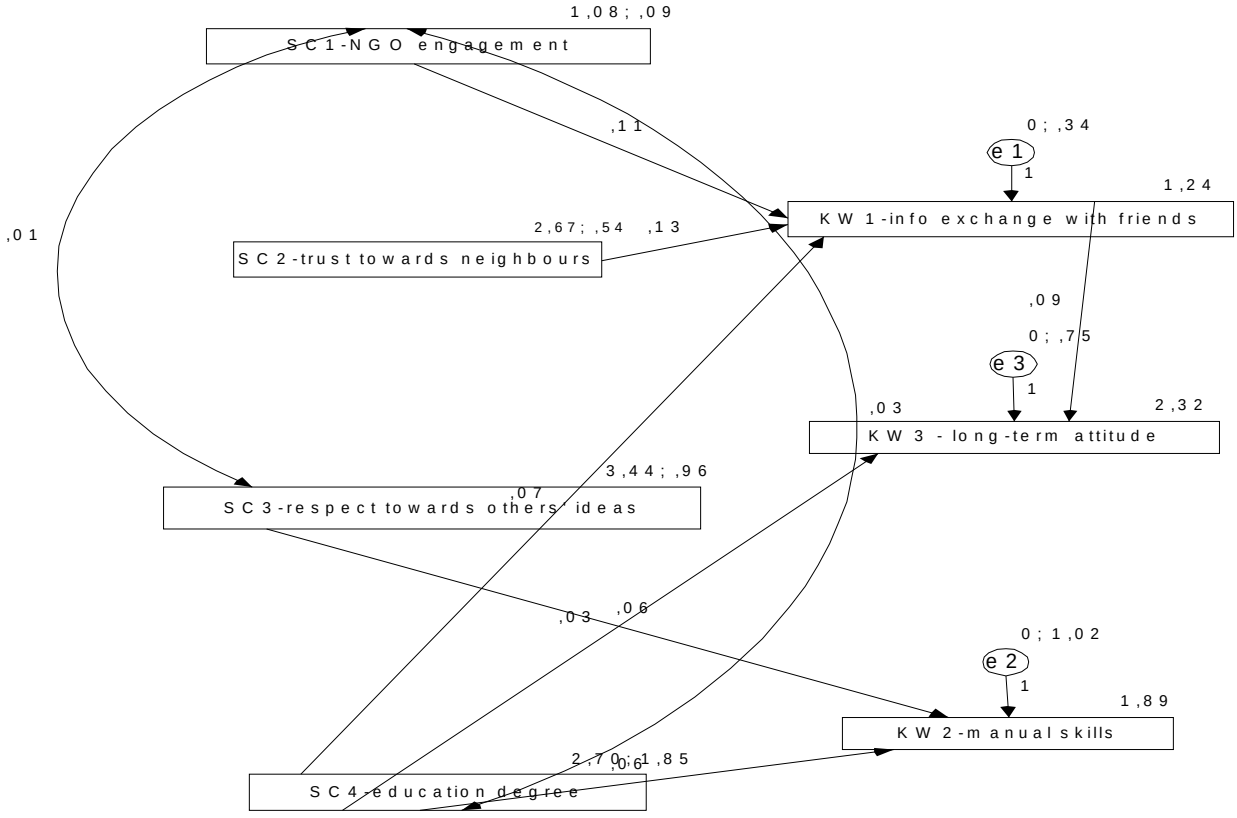

Figure 1: General Adjusted Model (Maximum Likelihood Estimation)

Table 1: Correlation Matrix (Bayesian Estimation)

	SC1	SC2	SC3	SC4	KW1	KW2	KW3
SC1	1,000	0,000	0,047	0,091	0,079	0,006	0,007
SC2	0,000	1,000	0,000	0,000	0,163	0,000	0,005
SC3	0,047	0,000	1,000	0,000	0,003	-0,002	0,000
SC4	0,091	0,000	0,000	1,000	0,130	0,066	0,060
KW1	0,079	0,163	0,003	0,130	1,000	0,009	0,037
KW2	0,006	0,000	-0,002	0,066	0,009	1,000	0,004
KW3	0,007	0,005	0,000	0,060	0,037	0,004	1,000

Table 2: Standardized Direct Effects (Bayesian Estimation)

	SC1	SC2	SC3	SC4	KW1
KW1	0,068	0,163	0,000	0,124	0,000
KW2	0,000	0,000	-0,002	0,067	0,000
KW3	0,000	0,000	0,000	0,056	0,029

With regard to hypothesized effects and correlations, the adjusted model showed the following results, according to maximum likelihood estimation:

- Acceptation of hypotheses 1, 2, 3b, 6a, 6b, 7a.
- Rejection of hypothesis 5 (no direct correlation between SC3 and SC4)..
- Rejection of hypothesis 3a (no direct effect of SC2 on KW2)
- Rejection of hypothesis 7b (no direct effect of KW2 on KW3)
- Rejection of hypothesis 4 (non significant correlation between SC1 and SC3)
- Rejection of hypothesis 6c (non significant direct effect of SC4 on KW3)
- Unexpected significant correlation found between SC1 and SC4.

The Bayesian estimation results are basically consistent with the maximum likelihood estimation, with the significant exception of hypothesis 3b (negligible and negative correlation between SC3 and KW2) being rejected.

5.4 Interpretation of discrepancies

Unexpected results related to SC4 may depend on the used proxy (education degree). For instance, a higher degree of education can be connected with stronger socio - political engagement (SC4 - SC1 correlation). On the other hand, SC3 (attitudinal openness) should be connected with the possession of cognitive absorption tools, but not automatically with the education title. This may raise questions on the adequacy of the SC4 proxy.

The absence of correlation between SC2 and KW2 is a very interesting hint of reflection, since it points out the absence of a relation between community trust and procedural knowledge, in contrast with previous findings (e.g. [27]).

The negligible effect of KW2 on KW3 seems to underline the absence of a real impact of procedural skills on conceptual knowledge. This result is somehow consistent with mainstream results in innovation studies carried out at the *meso* level, claiming a strong

dichotomy between incremental innovation, based on everyday adjustments, and breakthrough innovation based on global knowledge.

6. Conclusions

The carried out research has a few strengths:

- It is based on a theoretical framework which is the result of a cross-fertilization analysis able to put together contributions from different fields, which have rarely interacted despite dealing with similar issues;
- It proposes a globally original (albeit indebted to several previous works) model based on a complex vision of shareable knowledge, and on a broad definition of social capital;
- It is based on an empirical analysis able to identify unexpected causal effects and correlations.

On the other hand, it is affected by some drawbacks. One of these depends on the impossibility of performing a consistent factor analysis, because of the limited amount of available data. Confirmatory factor analysis was, however, used as a supporting tool in the choice process of observed variables.

Some critiques that can be moved to chosen variables are the following:

- Education degree is probably a too raw proxy for cognitive absorptive tools. Better proxies could be related to more precise measures of cognitive features which can make the individual more open to the absorption of external knowledge. A more suitable proxy could be the amount of spoken languages and understood technical codes.
- Respect towards others' ideas may be a too generic and unfocused proxy for SC3. More objective proxies such as behavioural measures of tolerance towards other people may be more suitable.

A particularly problematic issue is the measurement of knowledge. In studies carrying out quantitative analysis, knowledge is usually measured by means of its supposed effects of a tangible nature (e.g. innovation output, such as patents, in territorial innovation studies). This way to proceed has the advantage to use objective, quantitative proxies, but it postulates a high causal effect of knowledge on the measurement variable, which is a strong and unverifiable hypothesis. In this case, dealing with individual knowledge, the chosen way for KW2 and KW3 has been the psychometric measurement of self-described attitudes which can be related to knowledge possession. Such variables are relatively direct measures, but can be criticized as being too subjective. KW1 was measured by means of the intensity of information exchange, which can be criticized as not showing the quality of such exchange. In general, the trade-off between precision and objectivity is a common problem with regard to intangible assets measurement. It is likely that it could be partially solved by means of a structural and consistent factor analysis.

Some words must be spent with regard to the possible validity of the results for other contexts. First of all, it is likely that the results are strongly dependent on the context and purpose of the analysis, that is, the investigation at the *individual* level of the cognitive benefits of social capital with regard to generic knowledge concerning socio - environmental issues. Therefore, the presented results must be taken with strong caution. The choice of different units of analysis (*macro* or *meso* level), as well as the focus on specific cognitive benefits (e.g. economic innovation) may probably lead to different results. It would probably be more interesting to focus on the sensitivity of the results with regard to the demographic,

socio-economic and spatial context. In order to check the sensitivity within the chosen sample, follow-up papers will analyze the results against control variables such as ethnic group, residence place dimensions and region of residence.
The framework proposed in the present paper and the findings of such a broad analysis would constitute an important scientific support basis for:

- *A cognitive approach to territorial development analysis and assessment*. Development analysis could be enriched by a social - cognitive interpretation of strengths and shortcomings.
- *Innovative planning support strategies*. Territorial social knowledge is exchanged and shared through strong channels that could be relied upon, and weak channels that could be improved, in order to foster citizenship involvement, cooperation, and sustainability awareness.

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