FROM SOCIAL CAPITAL TO FIRMS NETWORKS: SOME EVIDENCE FOR EUROPE

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The concept of development is not only referred to the level or to the growth rate of GDP of a country, but it concerns different aspects of individual and social life. Development leads to a changing of values, culture, behaviours and attitudes of people interested in it. That is to say that not only quantitative dimensions, but also qualitative ones became relevant in fostering development trajectories. Reasoning in these general terms a long and rich intellectual debate grow up in social sciences within which we focused the social capital and firm network debate. Social capital is a multidimensional determinant at base of the industrial district framework as the "network capital" represent a driver of firm's network framework.
By moving from social capital, as a local development driver, to network capital, as a global development driver, the present paper analyzes the firms networks determinants by identifying the conditions for some European countries. The methodology through which the results are obtained is the multidimensional scaling method which allows to define relations between countries in terms of proximity/distance with respect to the considered determinants providing a spatial representation of them.

Keywords: social capital, network capital, firms networks, multidimensional scaling.

JEL code: D71, R23 Z1, Z13

1. Introduction

From a theoretical point of view, modern political economy has developed by depriving economic interactions of their social content. Despite that a stream of research programs grow up in order to replace social interactions within the development issue. Among them the social capital concept became more and more a debated argument, by moving from the belief that the economic activity is deeply embedded in the social structure, and agents' decisions are always influenced by a wide range of social and cultural factors. Firstly discussed within the sociological boundaries (Bourdieu, 1986; Putnam, 1993; Granovetter, 1985) the concept of social capital affected also economy (among other Becker, 1974 and North, 1990; for a critical overview see Sabatini, 2005). As a matter of fact the several perspectives on social capital derive from heterogeneous academic backgrounds and frameworks, but they all agree on the ability of certain aspects of the social structure to generate positive externalities fostering competitive advantage for members of a group (Sabatini, 2005). An exhaustive review of the different approaches on social capital falls behind our aims; what we stress in this paper are the positive outcomes that a social structure and the following interactions exert on firms productive capabilities. It's widely acknowledge about these outcomes. A social structure fuels the agents interaction and consequently increases the better diffusion of trust and information. That is to say that an increase in trust-based relations reduces the average cost of transactions, just as an increase in physical capital reduces the average cost of production. Moreover the

circulation of information reduce uncertainty and the free-riding effect on the market. These mechanisms were at the base of local economic development patterns, providing a credible explanation for growth differentials among regions with similar endowments in terms of the other forms of capital. We are talking about the industrial district framework that characterized the Third Italy's development model (Bagnasco 1977; Becattini 2000). About economic outcomes of social capital we argue that they strictly depend on social and historical circumstances in which social interactions are located, that's why many marshalliani scholars talk about social capital and local development. What about a wider context? As Simpson (2005) argues in a globalised context grow up a new type of social capital, known as "network capital". It is formed from collaborative practices in a human network. Network capital is the expression of social capital in the Information Age. It exists making use of ICTs, because it is a result of cooperation via electronic networks. That's why by moving from social capital, as a local development driver, to network capital, as a global development driver, the present paper analyzes the firm's networks determinants identifying the conditions for some European countries. The paper starts with a brief overview of the topic of firms network (see par. 2). In the second section, a data analysis using a multidimensional scaling methodology is provided, in order to identify groups of countries that show similar characteristics in relation to the chosen indicators (see par. 3). At the end, some brief concluding remarks, that summarize the results achieved by the analysis, are given (see par. 4).

2. Firms networks

Globalisation has brought undisputed changes on competitive field and the way of communicating. It has increased the importance to cooperative networks and business in international markets. In this context a new type of social capital, known as "network capital", arises. Network capital is the expression of social capital in the Information Age. It exists making use of ICTs, since it is a result of cooperation via electronic networks (Simpson L. 2005). Firms can also create collaborative relationships even if these are located far from each other.

The networks' roles are multiple, since they may accelerate the innovative process, increase the capability for continuous learning, combine some specific functions shared with others, stimulate scale economies, help to anticipate trends and changes within the society for new market opportunities.

The efficiency of a network enterprises depends on its stability and its survival is facilitate by three factors: degree of trust among partners, information and knowledge sharing, presence of a planning system.

There are different ways for classifying firms networks, since they constitute a phenomenon with heterogeneous characteristics and aims. There are the "natural networks" characterized by the absence of legal identity and structurally flexible. The "governed networks", on the other hand, have a high coordination degree. According to the strategic cohesion degree, there are the "diverged networks", the " mutual influence networks" and the "converged networks". The first ones usually reach efficiency and effectiveness advantages in the short-term. The second ones are mutually determining to pursue competitive strategies. The third ones represent the most appropriate organizational solution to achieve a common strategic plan. Depending on the integration degree, there are the "complementary networks", in which the technical-productive and economic ties among firms are very strong, and the "independent networks", which ignore the processes in the companies but create shared common interests.

Firms network relationships may increase the level of development since they allow to replicate information and knowledge, and overcome the physical distance problem. The

network expansion is based on important pre-conditions, fundamental for creating stable and global relationship: opening capability, security and above all ICTs diffusion.

3. Data, methodology and results

To reach our purpose, which consists in identifying conditions for network capital development in the European countries, we use a multidimensional scaling analysis.
Multidimensional scaling is a useful tool through which it is possible to produce a graphical representation of a pattern of objects, in this case the 27 European countries, based on the degree of similarity/dissimilarity between them.
The goal is to provide a representative map that best approximates the distances observed between countries, concerning the conditions for network capital development.
This statistical method attempts to build a configuration of the various entities, merged in a small number of dimensions. This is done by defining relations between countries in terms of proximity/distance with respect to the considered indicators. The resulting positioning map has the property to partition the countries into homogeneous groups, so as that the degree of association between two countries is maximal if they belong to the same group and minimal otherwise.
We considered a matrix of 27 Eastern European countries and indicators, representing 4 sets of variables: development background, national security, ICT diffusion both at firm and individual level (see Table 3).
In particular, we have selected the following indicators (source Eurostat):

1) Opening capability
- Persons with tertiary education attainment by age and sex (% of 15-64 years old), 2010
- Number of airports (with more than 15,000 passenger movements per year) (per million of people), 2009
- External trade of EU (export/import ratio), 2010
- Total intramural R&D expenditure (Euro per inhabitant), 2010

2) National security
- Police officers (per 1000 people), 2009
- Crimes recorded by the police (per 1000 people), 2009
- Prison population (per 1000 people), 2009

3) ICT diffusion at firm level
- Enterprises using automated data exchange with other ICT systems outside the own enterprise, 2011
- Enterprises using Internet for interaction with public authorities (demand side), 2010
- E-government availability (supply side), 2010

4) ICT diffusion at individual level
- Broadband penetration rate (%), 2011
- Frequency of Internet access: once a week (including every day), 2011
- Internet use: interaction with public authorities (last 12 months), 2011

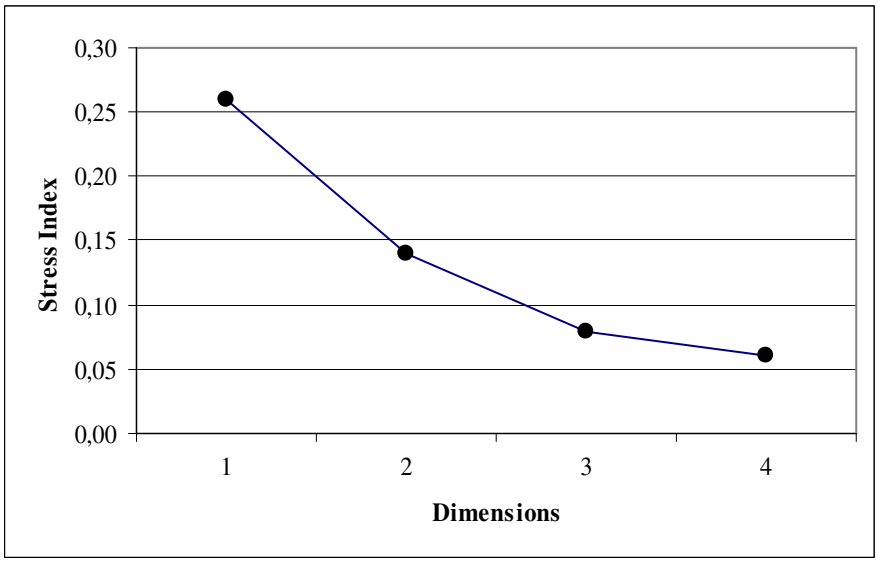
Data refer to the most recent year basing on their availability.
The model's goodness of fit was assessed via the RSQ (0.91), that indicates the proportion of variability explained by the corresponding dissimilarity distances, and the Stress Index (0.14). As a general rule, results are found to be robust when the size k achieves an Stress Index value lower than 0,15. A two-dimensional model was judged to be acceptable according to the values of the Stress Index, reported in Table 1. Further investigation provided additional basis for choosing the two-dimensional solution: the "elbow" rule

suggests to choose the number of dimensions in correspondence to where the diagram yields an "elbow", beyond which the broken line flattens (see Figure 2).

Table 1. Stress Index and map configuration

Dimensions	Stress Index
1	0,26
2	0,14
3	0,08
4	0,06

Figure 1. Scree plot



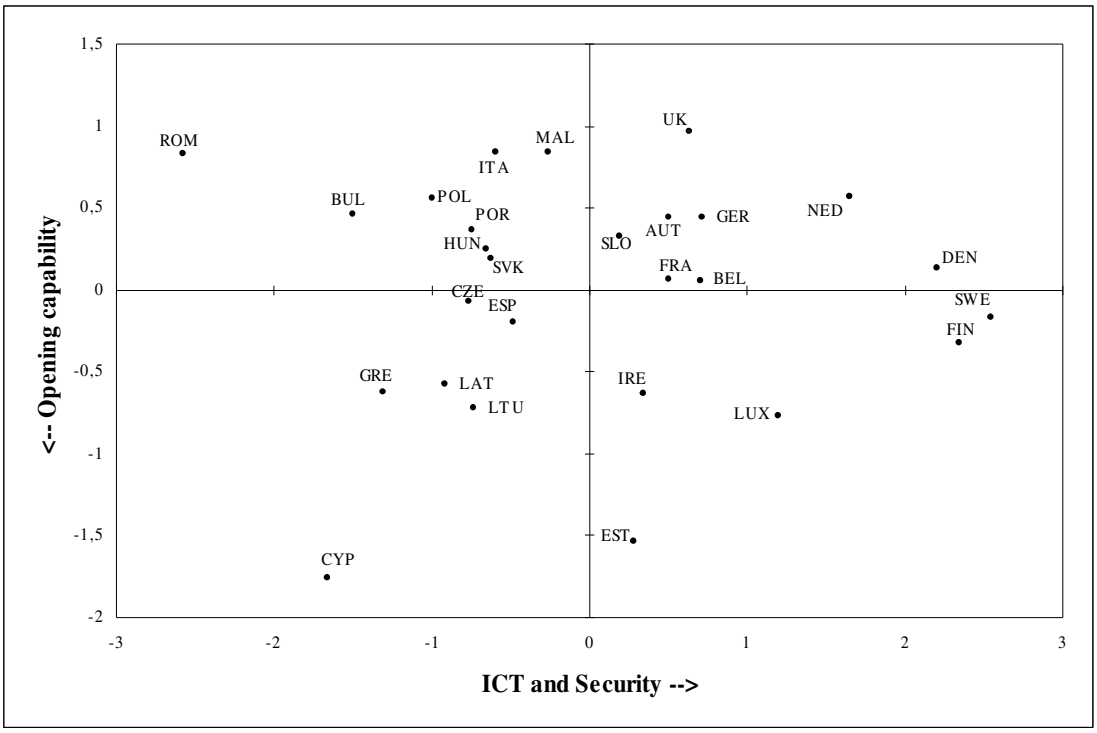
The correlations between dimensions and variables (see Table 2) were useful for naming the axes. The resulting two-dimensional image is shown in Figure 3. The horizontal axis represents the variables concerning ICT diffusion (both at firm and individual level) and national security; the vertical one is related to the opening capability.

Table 2. Correlations between variables and dimensions (r > |0,5|)

Variables	Dimension 1	Dimension 2
Persons with tertiary education attainment	0,54	-0,57
Total intramural R&D expenditure	0,89	
External trade of EU		-0,68
Number of airports		-0,58
Police officers	-0,53	
Crimes recorded by the police	0,83	
Prison population		
Enterprises using automated data exchange with other ICT systems		0,57

Enterprises using Internet for interaction with public authorities	0,59
E-government availability	0,59
Broadband penetration rate	0,84
Frequency of Internet access	0,93
Internet use: interaction with public authorities	0,93

Figure 2. Cluster of countries in a two-dimensional space



On the right of the chart is the northern cluster, which shows the highest ICT performances and efficiency in security; the group of central European countries, with levels of technology closes to the average values of the sample, lies on the centre; on the left is the cluster of Eastern and Southern European Countries, with its lower level of ICTs diffusion and safety efficiency. On the lower area of the chart there are some countries which show an higher opening capability with respect to the others.

4. Conclusions

In a globalised context, fuelled by ICTs, collaborative relationship among firms could happen, even if these are located far from each other. These stylized fact generated the so called "network capital". So by moving from social capital, as a local development driver to network capital, as a global development driver, we provided a preliminary analysis on some European countries, adopting the multidimensional scaling method that allows us to point out where conditions are more appropriate for firms network diffusion. It is worth to underline that this analysis is only a first step in such an investigation and shall not be

considered as exhaustive in order to thoroughly understand the reference dynamics, it can simply be useful for further and more detailed investigation.

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