

DOI: 10.22306/al.v3i4.74

Received: 02 Dec. 2016

Accepted: 12 Dec. 2016

HOW TO MEASURE THE SOCIAL CAPITAL IN A SUPPLY CHAIN?

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Keywords: social capital, supply chain, the measurement of social capital in a supply chain

Abstract: The purpose of this article is to characterize the concept of a social capital of supply chain and identify ways to measure this capital for the needs of supply chain management. In addition to traditional methods author brings new proposals to assess the social capital of the supply chain. The author also presents the results of scientific research obtained in two research projects which examined the relationships of social capital and supply chain management.

1 Introduction

In the majority of publications referring to supply chain management the growing importance of the nature of mutual relations between their participants is emphasized which, to a great extent, plays the decisive role in their lasting, effective and efficient functioning. It is most frequently suggested as best for the cooperation between supply network actors to be based on partnership relations as opposed to transaction or confrontation type of interdependencies [1]. Partnership cooperation should be long lasting, result in close mutual bonds and ties of the parties involved, based on trust, openness, common sharing of both risks and profits.

Trust in supply network relationships represents the key for an extensive reduction of transaction costs or at least the guarantee for economic profitability in a network. It mainly results from the fact that in these relations in which trust is present the need for securing the division of future outcomes and activating due mechanisms for the prevention or reduction of opportunistic behaviour is limited.

While discussing the issue of trust between parties involved in network transactions, its internal sources are mainly indicated, i.e. partner's trustworthiness and the tradition of cooperation. However, as many researchers specializing in the study of network organizations confirm, trust, as the fundamental component of network establishment (Among others: Putnam, Coleman, Jarillo, Matysiak), does have its external dimension represented by social capital [2].

2 The perspectives of social capital

Social capital is a concept that has long been discussed in scientific discourse for economic, sociological and management perspective. Although the subject of discussion in this article is the social capital of the supply chain it is worth to introduce the most popular perspectives of social capital, i.e.: macroeconomic and microeconomic.

The macroeconomic theory of social capital says that preserving regular contacts with other people and

undertaking activities in order to obtain common objectives results in lasting and positive effects for the functioning units and communities, since this is how their needs are met as well as mutual relations and trust between people become strengthened [3].

The leading objective of social capital is to limit uncertainty occurring in social life and economic life. At the absence of social capital uncertainty would become a major obstacle in undertaking economic activity and cooperation between people and organizations. Social capital substitutes individual outlays indispensable for decreasing uncertainty present in economic performance and cooperation, e.g.: expenditure on protecting one's own resources and goods, costs of collecting information about economic environment (including information about partners), outlays spent on signalling individual attributes enhancing trust of the environment. Therefore social capital cuts individual the costs of property laws, transactional expenses and signalling outlays (market directed information). Social capital increases economic activity, frequently limited by the absence of financial capital, it also modifies directions and improves investments' efficiency [4].

As compared to social capital macroeconomic perspective, which refers to it as an external category in corporate activities, the microeconomic perspective, i.e. its dedication to individual economic entities still persists in the phase of scientific development.

I. Grzanka, who has been analyzing the influence of social capital on client relations defines the term of corporate social capital as: "the category resulting from participation in relations networks which, based on shared standards, principles, values and later trust, enable parties to access resources, especially knowledge and competencies. All the above is focused on obtaining adequate advantages for an enterprise, such as: improved functioning efficiency, development, obtaining competitive advantage". The definition which the author

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accepts is that social capital in an enterprise facilitates accomplishing substantial targets and strategic plans [5].

Microeconomic perspective, poorer in research results and scientific discussions, still does not have its own set of indicators dedicated to measuring social capital in enterprises. Therefore, professional literature most often suggests to transfer macroeconomic solutions into this particular area. “According to The Word Bank there are six sources of social capital” which represent the popular set of indicators listed below [6]:

- organizational participation and its diversification,
- trust and solidarity level,
- cooperation scale and the level of readiness for it,
- information and communication (e.g. number of information sources used),
- social integration and inclusion (stratification scale, integration range of minority groups),
- the sense of an entity – exerting influence on environment and especially its key institutions.

The quoted sources are supposed to constitute the background for performing both measurement and evaluation of social capital in an enterprise. Unfortunately, among the listed indicators, it is only trust which received the research tool possible for the implementation at corporate level exactly [7].

3 Social capital in supply chains

Despite the outstandingly rich scientific output in supply chain management (SCM) and many schools, definitions, classifications and approaches resulting from it, supply chain in this concept is almost always defined as “extended enterprise”. According to The Global Supply Chain Forum members a supply chain is understood at the network of transfers from the initial suppliers to final recipients. This network covers transfers in the sphere of deliveries, production, distribution, related. to customer service, research and development activities, marketing, etc. The objects of such transfers are goods (raw materials, stuffs, ready-made goods, etc.), information and money. Managing supply chain understood in this way means the integration of all key processes from the final user to suppliers in order to add value to products, services and information.. Such approach authorizes both theorists and practitioners to apply numerous, traditional and modern, solutions typical for an enterprise management to supply chains or delivery networks improvement. It also refers to output accomplished by enterprises in the sphere of social capital which, so far, did not attract enough attention on the part of supply chain researchers. It is even more surprising that in spite of all sorts of differences in SCM concept interpretation, usually there is an agreement in opinions that changing relations between supply chain participants, from confrontation oriented relations and competition power application into long-term partnership oriented relations, based on trust and mutual advantages, does constitute the

essence of this concept. Socially justified division of risks and advantages between chain links becomes particularly emphasized within the framework of synchronized context for SCM concept definition. With regard to this particular concept, the supply chain essence comes down to strategic partnership which should be understood as significant and lasting cooperation of its participants based on trust, risk sharing and advantages resulting from undertaking common investment and organization oriented projects aimed at accomplishing different individual goals subject to common targets focused on winning competitive advantage and creating value [4].

As opposed to social capital, constituting a part of supply chain environment, the capital of supply chain itself represents its internal resource and therefore does influence its competitiveness and ultimately also its development. Additionally, as it has already been mentioned, supply chain capital may be managed and planned, organized and controlled by the supply chain participants[4].

Contrary to other types of capital, e.g. financial, real or even human, the supply chain social capital is not the sum of individual social capitals represented by entities which altogether create it. Capital components, such as: certain values, trust, cohesion, involvement or loyalty level, have to be planned and organized specifically for the needs of an overall supply chain [4].

Therefore an internal **social capital in supply chain** may be defined as the set of relations characterized by a certain quality specified by principles and values common for all its participants, such as trust, involvement or cohesion, which aim at accomplishing common goals and common advantages resulting from them [4].

Differently from social capital microeconomic classification, however, in line with the quoted above Putnam’s classification of social capital, the authors suggest for the set of supply chain relations (and their properties) to reflect an internal type of social capital, together with participants of its environment which includes e.g. competitive supply chains, independent organizations, society or regional governments. This means that internal social capital may be of bridging or bonding nature [4].

Such internal social capital interpretation allows for its quicker identification and measurement. Supply chains internal social capital may be defined on the basis of analysis the scale, direction and quality of relations with the environment (e.g. by means of supply chain integration models implementation (The review of supply chain integration models according to Poirier, AT Karney, Manugistics is presented, e.g. in [13]) and measured by applying indicators dedicated to corporate social capital.

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At macro-social level social capital represents an element of supply chain environment. It is the category which cannot be influenced by an individual supply chain, however, the one which strongly determines this chain functional efficiency.

Social capital performs universal functions, both in a society, an enterprise and also in a supply chain. Therefore at this stage there is no need to indicate any analogies of an influence exerted by social capital on a supply chain. However, the fact which has to be emphasized, since it is of great importance for a group of enterprises involved in a supply chain construction, is an opportunity to take advantage of internal supply chain capital in order to overcome negative effects of environmental social capital influence in which this particular chain functions, as well as negative social capitals of individual enterprises responsible for such a chain construction. Internal social capital of an enterprise does not have this power since it is limited by an external dimension of relations (with business partners) [4].

It has to be emphasized that cooperation for the benefit of meeting a common objective and advantages, constituting the leading characteristics of supply chain management concept, all by itself strengthens relations between enterprises, which is already the initial stage in creating the need for establishing adequate quality relations. Partnership nature, i.e., among others, voluntary common activities, keeping them up and increasing efficiency are influenced by the planned supply chain internal capital development, i.e. its management [4].

According to A. Baraniecka social capital management as part of supply chain will consist in [4]:

1. Identifying both, the level and properties, characteristic for social capital of the supply chain environment and applying this information in planning supply chain development (internationalization in particular).

The identification of social capital level in supply chains environment may determine the choice of such chain configuration, the expected expenditure and effects of its functioning. Social capital, at this stage of aggregation, represents an important background for supply chain management.

2. Supply chain internal capital planning, based on this chain objectives and in relation to data about social capital in the environment;

If capital in the environment does not facilitate the implementation of supply chain strategy, proper strategic decisions should be undertaken and tasks for internal capital, the properties of which may overcome negative effects of environmental influence, should be explicitly specified.

3. Internal social capital organization by means of the set of activities associated with change management in a given area.

The awareness of needs within internal capital allows for the construction, following patterns of organizational culture, its ideal profile and for preparing the process of its creation and implementation in a supply chain. An identified dissonance between the desired and actual condition of this capital (real profile) should become the background for the selection of speed, procedure and tools necessary in social capital construction process.

4. The control of internal social capital level and properties in the context of its influence on supply chain development.

At this stage an ongoing measurement of social capital is performed based on initially prepared profile and indicators dedicated to it [4].

4 The measurement of social capital of supply chain

The social capital measurement represents the key component at all listed above stages. In the situation of benchmarking deficiencies this element may turn out the most difficult and the weakest functioning one within the framework of social capital management in a supply chain. The output of supply chain management concept itself may provide a solution and within its spectrum also supply chain excellence models [9]. They cover groups of phenomena, also including social capital components, deciding about the level of supply chain advancement which, in turn, determines its competitiveness. Following selected supply chains excellence models and considering the research output in the domain of social capital, A. Baraniecka includes the following in the group of indicators of social capital in supply chains: [4] and [8].

- the cohesion of companies operating in the supply chain understood as an implementation of the shared strategy,
- the number of actual vs. declared relationships,
- the average of trust levels for individual relationships,
- the amount of information available vs. the amount of shared information,
- the number of participants carrying out projects dedicated to the development of the supply chain vs. the total number of participants,
- the number of complaints recorded by the customers vs. the number of complaints recorded by suppliers in the supply chain,
- the number of contracts vs. the number of network participants over a specific time (t),
- the growth rate of the number of contracts between network participants,
- the number of pro-development visits against the total number of visits, etc.

These indicators require description that is more detailed, along with a validation and practical application;

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however, even as they are, they prove that the social capital in a supply chain may be easily measured [8].

During her studies of social capital, the author was looking for alternative ways of measuring, more reliable and at the same time more simple. Below the author briefly describe some of them. They are as follows:

- surveys and qualitative and quantitative evaluation models ,
- methods based on the idea of rating.

In research of social capital in supply chain there are two types of results: the level of declared social capital and the level of real social capital.

The declared capital is the result of the declaration of the supply chain’s participants, which often differs from the real social capital, which we estimate on the basis of actual data. If the declared social capital differs significantly from the actual social capital that means that there is a basis for active efforts to take action in this regard. The declared social capital is the basis for future engagement and real capital is a prerequisite for selection of a concept of cooperation.

Declared level of social capital we determine through surveys, or through models based on declarations. One of the model is original (A. Baraniecka) **AVIT** (acronym) model, which in its design resembles DICE model. The DICE framework is a tool originally developed by Perry Keenan, Kathleen Conlon, and Alan Jackson (all current or former Partners at The Boston Consulting Group. A DICE score is a leading indicator of the likely success of a project based on objective measures. [10].

The components of the AVIT model evaluation declared level of social capital are:

- Awareness of the presence of participants (A)
- Common vision (V)
- Joint initiatives (I)
- Trust (T)

To determine the level of social capital in the supply chain, we ask each participant in the supply chain of the individual elements. A respondent may receive for each answer in one of the categories from 1 to 4 points. The category and questions are listed below:

Awareness of the presence of participants – A (1-4 points)

Do you know the links forming the supply chain which you are involved in?

1. I know very well all participants in my supply chain (1 point)
2. I know very well chosen companies (2 points)
3. I know quite well only directly cooperating companies (3 points)
4. I don’t know well the other companies in my supply chain (4 points)

Common vision – V (1-4 points)

Do you have a common vision with other companies in supply chain?

1. We have jointly developed a vision with all participants in the supply chain, and together we implement it (1 point)
2. We have jointly worked out a vision with the selected companies and together we implement it (2 points)
3. We have jointly developed a vision with the first tier partner only and we realize it together (3 points)
4. Each company carries out its own vision of development (4 points)

Joint initiatives – I (1-4 points)

Do you undertake joint initiatives with companies in the supply chain?

1. Most of our initiatives base on cooperation with all other actors in the supply chain (1 point)
2. Most of our initiatives base on cooperation with selected actors in the supply chain (2 points)
3. Most of our initiatives base on cooperation with the closest cooperators in the supply chain (3 points)
4. Most of the initiatives we realize alone without the active participation of others (4 points)

Trust – T (1-4 points)

Do you trust the partners in the supply chain and whether they trust you?

1. We trust absolutely for all actors in the supply chain, and we know that we are trustworthy (1 point)
2. We trust absolutely selected companies in the supply chain, and we know that we are trustworthy (2 points)
3. We trust only the closest co-operators and we are confident that they trust us. (3 points)
4. We have limited trust for companies in the supply chain, and we think that they not trust us. (4 points)

The answers to these questions allow to determine the level of social capital (1). Along the lines of the model DICE we summarize the individual parameters, and to these, which we consider important, we assign a higher value (eg. double value have: trust and joint initiatives). Finally, we obtain the following formula:

$$LSC = A+V+ (2xI) + (2xT) \tag{1}$$

LSC - the level of social capital

The level of social capital reaches a level of from 6 to 24, and it allows to set ranges for the values of social capital. A small number of points indicates a higher level of social capital supply chain in the area. Of course, these levels can be different in different areas of supply chain (Figure 1).

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Calculations:		
Min. $1+1+(2 \times 1)+(2 \times 1) = 6$		
Max. $4+4+(2 \times 4)+(2 \times 4) = 24$		
The range of results [6-24]		
The assessment of the level of social capital:		
6-11	a high	LSC
12-17	a medium	LSC
18-24	a low	LSC

Figure 1 The interpretation of the results of the assessment by the AVIT model

Measuring the real social capital is much more difficult than the measurement of the capital declared. The level of real social capital can be calculated on the basis of the identification of selected indicators, eg. the level of trust or/and commitment. The data is obtained from the companies in a supply chain.

The method of calculating the level of real social capital (2) refers to the idea of level of customer service. It is determined by identifying the share of well executed supply for all deliveries. In the case of social capital it is a fixed share of relationships covered by the trust to the amount of all relationships in the supply chain. A value close to 1 indicates that the level of social capital is high. An example of pattern is shown below:

$$LRSC = \frac{\text{the number of relationships covered by the trust}}{\text{total relations}} \quad (2)$$

LRSC - the level of real social capital

Another method of determining the level of social capital (real and declared) refers to the idea of rating.

The rating assignment consists of three parameters: the social capital of the region where the company comes from, the social capital of the company, the type of social capital of supply chain. Due to the diversity of enterprises in the supply chain rating shall be made for the areas of the supply chain, not for the entire supply chain. This allows you to determine the scope and scale of the differences in the level and quality of social capital throughout the supply chain.

Such an assessment can determine the nature of a social capital in the area of the supply chain, which type dominates and where there the greatest disparities are.

With reference to the evaluation areas there are three criteria:

1. The level of social capital of the region where the company originates:

I – high level

II – medium level

III – low level

2. The level of social capital of the company:

A – high level

B – medium level

C – low level

3. The type of social capital of supply chain

Br – bridging (open to others)

Bd – bonding (focused on the inside of supply chain)

Distinguishing two forms of this capital: bonding capital (uniting, excluding) and bridging capital (including) becomes Putnam’s significant input in the theory of social capital. Bonding capital is present in groups directed inwards and strengthens their cohesion, identity and also homogeneity. This capital means relations between entities (individuals) similar to one another. Strong bonds between community participants, characteristic for this type of capital, are accompanied by: inclination towards establishing barriers protecting a group from its environment and excluding “individuals who disturb homogeneity”. Bridging capital is, on the other hand, directed outwards – it bonds people originating from different environments, constructs relations between heterogeneous groups. Even though relations established by this type of capital are weaker, still they are of inclusive (joining) nature and, in this way, cut the distance between different social categories.

For example, social capital of supply chain can have 3 assessment:

1) Suppliers: IICBr – a low level of social capital of region, a low level of social capital of company, bridging social capital in relationship with others (outside the supply chain)

2) Leader: IABd – a high level of social capital of region, a high level of social capital of company, bonding social capital in relationship with others

3) Customer: IABr – a high level of social capital of region, a high level of social capital of company, bridging social capital in relationship with others.

Figure 2 shows an example of the supply chain including the rating of social capital.

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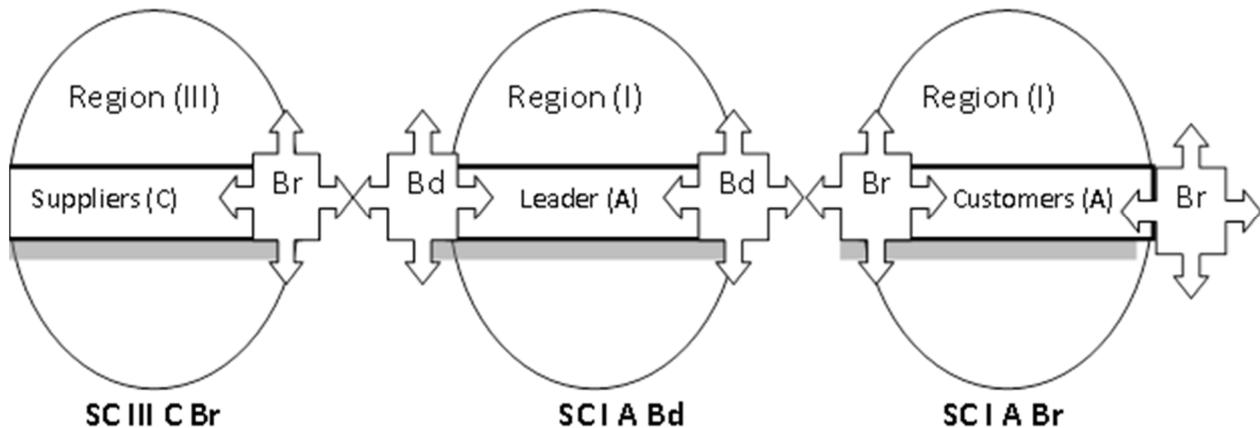


Figure 2 The example of rating of social capital in supply chain

Such an assessment can determine the nature of a social capital in the area of the supply chain, which type dominates and where there the greatest disparities are. This descriptive assessment allows to estimate transaction costs and choose the ways of cooperation in the supply chain (including strategies, concepts and methods) too.

Regardless of the method of evaluation of social capital, there are a few rules for the measurement of social capital:

- To describe the social capital of the supply chain all ties must be considered and conclude on the basis of the principle of domination.
- If there is a clear leader in the supply chain, the tests may be carried out on its level. If the partnership is implemented the way supply chain management survey applies to all companies.
- Social capital can not be added together in the supply chain.

The author wishes to emphasize, that the presented methods are new but very general propositions of measuring social capital in supply chain. The author will verify its in the course of further studies on the subject.

5 Results of research of a supply chain's social capital [8], [12]

The author has conducted over the past 5 years, the three studies related to social capital in the supply chain. The two of them were related to the grants, the third is own research. In the first project (*project no. 4232/B/H03/2011/40 financed by the National Science Center, Poland*), the author examined the perception of social capital at the level of supply chains in Poland (426 companies), in the second (*project no. DEC-2013/09 /B/ HS4/01260, financed by the National Science Center, Poland*) examined the significance of differences in the level of social capital in the Japanese supply chains (6 companies).

The experience of the author as well as the opinions of other researchers [11], suggest that researching a supply chain's social capital is not an easy task. The major obstacles in the research included [8]:

- a lack of knowledge or understanding of social capital among respondents;
- too little awareness of benefits resulting from the understanding of the social capital category;
- too complicated research tools, which discourage collaboration;
- a general unwillingness on the part of modern organisations to participate in scientific research (at least in Poland).

“Despite the said limitations, the authors managed to establish short and modest dialogue with Polish companies regarding the social capital of their supply chains (Hence, 1,820 companies were contacted and 426 were researched at the preliminary stage of study). The screening tests during indirect reasoning showed the considerable importance of social capital in undertaking initiatives in supply chain management. The companies researched indicated that the lack of trust and commitment of collaborators in the supply chain and ensuing restrictions in access to data, as well as the growing uncertainty of business operations were a major barrier to implementing actions towards improvement [8].

What seems reassuring, in particular given the fears presented herein that the practitioners ignore the issue of social capital, is that the majority of researched companies (74%) see the considerable influence of the supply chain's social capital (trust, commitment, loyalty of collaborators in supply chains) on their market success. Almost 10% of respondents recognised social capital as the most important factor influencing the effectiveness of market actions [8].

The companies see many benefits from high social capital in the supply chain, the most important benefit (indicated by 32% of respondents) being the increase in the competitiveness of the supply chain (and individual

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companies). Other areas influenced by the supply chain's social capital are: product quality (25%), collaborations costs (16%), comfort and satisfaction with work (15%) and product price (12%) [8].

In the context of the demonstrated awareness of the significance of the supply chain's social capital, it seems paradoxical that a considerable percentage of researched companies (49%) do not analyse the level of this capital. Only 27% declare they analyse the social capital of their own supply chain, and 22% plan to undertake such research. [8]

As the deliberations presented herein show, a supply chain's social capital is not much discussed in theory or applied in business practice. It seems that tradition and the effective promotion of the macro-economic approach to social capital have dominated the application of any relevant theories in practice in the public sector. This is probably why social capital is regarded by business environments as an unknown and uncontrollable external factor of company and supply chain operation. A similar situation is found with respect to the social capital of companies. It was concluded, too quickly and easily, that this "invisible" resource of individual organisations could not be accurately measured, and that one could therefore not interfere with its structure or level in order to adjust it to the needs of supply chain management "[8].

Other studies conducted by the author indicate different perceptions of the social capital of the region from which the partner in the supply chain comes from. According to research results that low social capital Polish is not considered by the Japanese as a barrier to implementation of solutions typical for Japanese companies in Poland. The reason for this is probably a systemic change in the investment strategy group keiretsu, manifested in this case, balancing the negative effects of low levels of social capital, a high level of human capital with its relatively low price (low labor costs). It seems that the Japanese agree with Polish workers introduced by the amendments, if these do not impair the economic efficiency of enterprises. [12]

Conclusions from the previous considerations regarding the potential differences in the functioning of the Japanese supply chains in terms of Polish culture and social capital, supplement the preliminary results of research conducted by the staff of the *Department of Strategic Management and Logistics* at the University of Economics in Wrocław, a research project funded by the National Science Center granted based on a decision the number of DEC-2013/09 / B / HS4 / 01260, *Management methods in the Japanese supply chains in Poland and the UK* [12].

Conclusion

According to the study of literature, as well as research results, social capital supply chain is not a category generally known. As mentioned in the article as the main source of trust, social capital influences the

effects of co-operation of enterprises in the supply chain. It is therefore important to promote this category on the basis of the theory and practice of business, as well as ways to improve the measurement and management skills. The observations of the author shows that if now the social capital is not widely recognized as a source of competitive advantage, it soon so it will be (unification of other bases of competition) and then will succeed those companies that now consciously manage the social capital of their supply chain.

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Review process

Single-blind peer reviewed process by two reviewers.