Trust and Relational Capital

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Abstract. Trust can be viewed at the same time as an instrument both for an agent selecting the right partners in order to achieve its own goals, and for an agent of being selected from other potential partners in order to establish with them a cooperation/collaboration and to take advantage from the accumulated trust. In this paper we will analyze trust as the agents' *relational capital*. Starting from the classical dependence network with potential partners, we introduce the analysis of what it means for an agent to be trusted and how this condition could be strategically used from it for achieving its own goals, that is, why it represents a form of power. The idea of taking another agent's point of view is especially important if we consider the amount of studies in social science that connect trust with *social capital* related issues. Although there is a big interest in literature about 'social capital' and its powerful effects on the wellbeing of both societies and individuals, often it is not clear enough what is it the object under analysis. Individual trust capital (relational capital) and collective trust capital not only should be disentangled, but their relations are quite complicated and even conflicting. To overcome this gap, we propose a study that first attempts to understand what trust is as *capital of individuals*. In which sense "trust" is a capital. How this capital is built, managed and saved. In particular, how this capital is the result of the others' beliefs and goals. Then we aim to analytically study the cognitive dynamics of this object.

1 INTRODUCTION

In multi-agent systems trust is a growing field of analysis and research and ways to calculate it have already been introduced to enhance studies on commercial partnership, strategic choice, and on coalition formation. In particular, in almost the present approaches the focus is on the trustier and on the ways for evaluating the trustworthiness of other possible trustees. In fact, there are no so many studies and analyses about the model of *being trusted*. Also our socio-cognitive model of trust (1, 2) was about the cognitive ingredients for trusting something or somebody, and how trust affects decision, which are the sources and the basis for trusting, and so on; we never modelled what does it mean to be trusted (with the exception of the work on trust dynamics (3) in which the focus was on the reciprocation and potential influences on the trustworthiness) and why it is important. In this paper we address this point, analyzing what it means that trust represents a strategic resource for agents that are trusted, proposing a model of 'trust as a capital' for individuals and suggesting the implication for strategic action that can be performed. Our thesis is that to be trusted: i) increases the chance to be requested or accepted as a partner for exchange or cooperation; ii) improves the 'price', the contract that the agent can obtain.

The need of this new point of view directly derives from the fact that in multi-agent systems it is strategically important not only to know who is trusted by whom and how much, but also to understand how being trusted can be used by the trustee. It has been already shown that using different levels of trust represents an advantage in performing some task such as allocating task or choosing between partners. Therefore, having "trust" as a cognitive parameter in agents' decision making can lead to better (more efficient, faster etc.) solutions than proceeding driven by other kind of calculation such as probabilistic or statistical one. This study already represented an innovation since usually trust has been studied as an effect rather than a factor that causes the developing of social network and their maintenance or structural changing.

In order to improve this approach and to better understand dynamics of social networks, now we propose a study of what happens on the other side of the two-way trust relationship, focusing on the trustee, in particular on a cognitive trustee. Our aim is an analytical study of what it means to be trusted. The idea of taking the other point of view is particularly important if we consider the judge amount of studies in social science that connect trust with social capital related issues.

Our claims are: (a) to be trusted usually is an advantage for the trustee (agent Ag_i); more precisely received trust is a capital that can be invested, and that requires decision and costs to be cumulated; (b) it is possible to measure this capital, which is relational, that is it depends on a position in a network of relationships; (c) trust has different sources: from personal experience that the other agents have with Ag_i; from circulating reputation of Ag_i; from Ag_i belongingness to certain groups or categories; from the signs and the impressions that Ag_i is able to produce; (d) the value of this capital is context dependent (and market dependent) and dynamic; (e) received trust strongly affects the 'negotiation power' of Ag_i that cannot simply be derived from the "dependence bilateral relationships".

Although there is a big interest in literature about 'social capital' and its powerful effects on the wellbeing of both societies and individuals, often it is not clear enough what is it the object under analysis. To overcome this lack, we propose a study that first attempts to understand what trust is as capital of individuals. How is it possible to say that "trust" is a capital? How is this capital built, managed and saved? Then we aim to analytically study the cognitive dynamics of this object, with a particular focus on how they depend on beliefs and goals .

2 TRUST AND RELATIONAL CAPITAL

Social Capital (4, 5, 6, 7) can be seen as a multidimensional concept and can be studied in its relation both with social norms and shared values and with networks of interpersonal relations. While in the former case studies about conventions and collective attribution of meanings can be useful to study how social capital can be a capital for the society, in the latter, one of the basic issues that need to be studied is how it can happen that networks of relations can be built, which ways they develop, and how they can both influence individual behaviours and be considered as an individual capital.
We also would like underline that social capital is an ambiguous concept. By social a lot of scholars mean in fact 'collective', some richness, advantage of any for the collective; something that favors cooperation, and so on. On the contrary we assume here (as a first step) an individualistic perspective, considering the advantages of the trusted agent, not the advantages for the collectivity, and distinguishing between 'relational capital' (8) and the more ambiguous and extended notion of 'social capital'. The individual (or organization) Ag_i could use its capital of trust, for anti-social purposes. In economic literature the term "capital" refers to a commodity itself used in the production of other goods and services: it is, then, seen as a human-made input created to permit increased production in the future. The adjective "social" is instead used to claim that a particular capital not only exists in social relationships but also consists in some kind of relationships between economical subjects. It is clear that for the capital goods metaphor to be useful, the transformative ability of social relationships to become a capital must be taken seriously. This means that *we need to find out what is the competitive advantage not simply of being part of a network, but more precisely of being trusted in that network.*

The additional value of trusting has been shown as a crucial argument in decision making and in particular in choice of rely on somebody else for achieving specific goals included in the plans of the agents. In these studies trust has been analysed as valuation of the other and expectations on it, and has being shown how these characteristics and mechanisms, being part of the decision process at the cognitive level, represent an advantage for the society in terms of realizing cooperation among its actors and for the trustier in terms of efficiency of choices of delegation and reliance (9).

Changing the point of view, we now want to focus on the trusted agent. What does imply to be trusted for the trustee? The intuitive answer could be that: i) the probability to be chosen for exchange or for partnership will grow; but also that: ii) the *negotiation power* of that agent will increase.

However, to account for this it is necessary to rethink the whole theory of negotiation power based on dependence (10,11,12,13). Try to build a theory of dependence including trust does not mean to base the theory of social capital on dependence, but to admit that the existent theory of dependence network and the consequent theory of social power is not enough without the consideration of trust. What we need, then, is a comprehensive theory of trust from the point of view of the trusted agent, in order to find out the elements that, once added to the theory of dependence, can explain the *individual social power in a network*, on one hand, and, on a second phase, the *social capital meant as a capital for the society*.

Once a quantitative notion of the value of a given agent is formulated calculating on *how much the agent is valued by other agents in a given market for a given task*, we can say that this trust-dependent value is a real capital. It consists of all the relationships that are possible for the agent in a given market and, together with the possible relationships in other markets, it is the so-called *relational capital* of that agent. It differs from simple relationships in given networks, which are a bigger set, since it only consists of relationships the agent has with those who not only need it but have a good attitude toward it and, therefore, who are willing to have it as a partner. How much it is appreciated and requested? How many potential partners depends on Ag_i and would search for Ag_i as partner? How many partners would be at disposal for Ag_i's proposals of partnership, and what "negotiation power" would Ag_i have with them?

These relationships form a capital because (as any other capital) it is the result of investments and is costly cumulated to be spent. In a certain sense it represents a strategic tool to be competitive, and, as well as it happens with other capitals such as the financial one, it is sometimes even more important than the good which is sold (being it either a service or a material good). For example when Ag_i decides of non keeping a promise to Ag_j, it knows that Ag_j's trust in Ag_i will decrease: is this convenient for future relationships with Ag_j? Will Ag_i need counting on Ag_j in future? Or, is this move convenient for reputation and other relationships? For this reason it is very important to study how it is possible for the agent to cumulate this capital without deteriorating or waste it: since the relational capital can make the agent win the competition even when the good it offers is not the best compared with substitutive goods offered in the market, it should be shown quantitatively what this means and what kind of dynamical relationships exist between quality of offered good and relational capital.

3 COGNITIVE MODEL OF BEING TRUSTED

3.1 Objective and Subjective Dependence

The theory of trust and the theory of dependence are not independent from each other. Not only because – as we modelled (1, 2), before deciding to actively trust somebody, to rely on it (Ag_i), one (Ag_j) has to be dependent on Ag_i: Ag_j needs an action or a resource of Ag_i (at least Ag_j has to believe so). But also because *objective* dependence relationships (10) that are the basis of adaptive social interactions, are not enough for predicting them. *Subjective* dependence is needed (that is, the dependence relationships that the agents know or at least believe), but is not sufficient; it is also necessary to add to (i) the belief of being dependent, of needing the other, (ii) the belief of the trustworthiness of the other, of the possibility of counting upon it. If I wouldn't not feel dependent on, I couldn't rely on the other.
The theory of dependence includes in fact two types of dependences: (1) the *objective dependence*, which says who needs whom for what in a given society (although perhaps ignoring this). This dependence has already the power of establishing certain asymmetric relationships in a potential market, and it determines the actual success or failure of the reliance and transaction; (2) the *subjective (believed) dependence*, which says who is believed to be needed by who. This dependence is what determines relationships in a real

market and settles on the negotiation power; but it might be illusory and wrong, and one might rely upon unable agents, while even being autonomously able to do as needed.

More Formally, let $Agt=\{Ag_1,..,Ag_n\}$ a set of *agents*; we can associate to each agent $Ag_i \in Agt$:

- a set of *goals* $G_i=\{g_{i_1},..,g_{i_q}\}$;
- a set of *actions* $Az_i=\{\alpha_{i_1},.., \alpha_{i_z}\}$; these are the elementary actions that Ag_i is able to perform;
- a set of plans $\Pi=\{p_{i_1},..,p_{i_s}\}$; the Ag_i's plan library: the set of rules/prescriptions for aggregating the actions; and
- a set of *resources* $R_i=\{r_{i_1},..,r_{i_m}\}$.

The achievement/maintenance of each goal needs of actions/plans/resources. Then, we can define the *dependence relationship* between two agents (Ag_j and Ag_i) with respect to a goal g_{jk}, as: *Obj-Dependence* (Ag_j, Ag_i, g_{jk}) and say that:

An agent Ag_j has an Objective Dependence Relationship with agent Ag_i with respect to a goal g_{jk} if for achieving g_{jk} are necessary actions, plans and/or resources that are owned by Ag_i and not owned by Ag_j. More in general, Ag_j has an Objective Dependence Relationship with Ag_i if for achieving at least one of its goals $g_{jk} \in G_j$, are necessary actions, plans and/or resources that are owned by Ag_i and not owned by Ag_j.

As in (12) we can introduce the *unilateral*, *reciprocal*, *mutual* and *indirect* dependence (see Figure1). In very short and simplified terms, we can say that the difference between reciprocal and mutual is that the first is on different goals while the second is on the same goal.

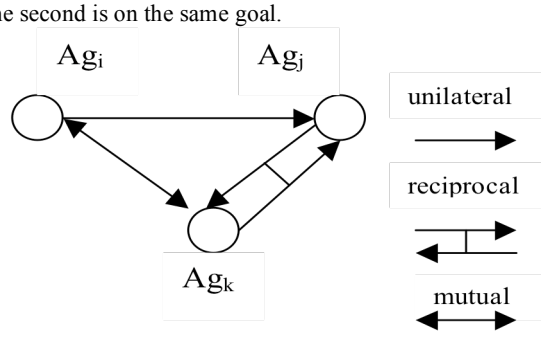

Figure1

If the world knowledge would be perfect for all the agents, the above described objective dependence would be a common belief about the real state of the world. In fact, the important relationship is the network of dependence *believed by each agent*. In other words, we cannot only *associate* to each agent a set of goals, actions, plans and resources, but we have to evaluate these sets as believed by each agent (the subjective point of view), also considering that they would be partial, different each of others, sometime wrong, and so on. In more practical terms, each agent will have a different (subjective) representation of the dependence network as exemplified in Figure1. So, we introduce the Bel_kG_z that means the Goal set of Ag_z believed by Ag_k. The same for Bel_kAz_z, $Bel_k\Pi_z$, and Bel_kR_z. In practice, the dependence relationships should be re-modulated on the basis of the agent subjective interpretation.

We introduce the *Subj-Dependence* (Ag_j, Ag_i, g_{jk}) that represents the Ag_j's point of view with respect to its dependence relationships.

In a first approximation each agent should correctly believe the sets it has, while it could mismatch the sets of other agents.

We define *Dependence-Network(Agt,t)* the set of dependence relationships (both subjective and objective) among the agents included in *Agt* set at the time *t*. Each agent $Ag_j \in Agt$ must have at least one dependence relation with another agent in *Agt*.

3.2 Dependence and Negotiation Power

Given a *Dependence-Network(Agt,t)*, we define

Objective Potential for Negotiation of $Ag_j \in Agt$ about one of its own goals g_{jk} -and call it $OPN(Ag_j, g_{jk})$- the following function:

$$OPN(Ag_j, g_{jk}) = f\left(\sum_{i=1}^{n} \frac{1}{1+p_{ki}}\right)$$

Where:

f is in general a function that preserves monotonicity (we will omit this kind of functions in the next formulas);

n represents the number of agents in *Agt* set that have a dependence relation with Ag_j with respect to g_{jk} (this dependence relation should be either reciprocal or mutual: in other words, there should also be an action, plan, or resource owned by Ag_j that is necessary for Ag_i);

p_{ki} is the number of agents in *Agt* that are competitors with the Ag_i on the same actions/plans/resources (useful for g_{jk}) in a not compatible way (Ag_i is not able to satisfy at the same time all the agents).

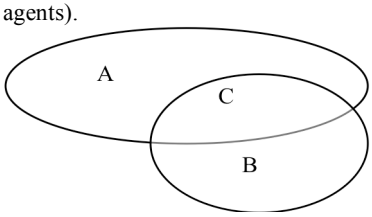

Figure 2

In Figure2 we show the objective dependence of Ag_j: A represents the set of agents who depend from Ag_j for something (actions, plans, resources), B represents the set of agents from which Ag_j depends for achieving an own specific goal g_{jk}. The intersection between A and B (part C) is the set of agents with whom Ag_j could potentially negotiate for achieving g_{jk}. The greater the overlap the greater the *negotiation power* of Ag_j in that context.

However, the negotiation power of Ag_j also depends on the possible alternatives that its potential partners have: the few alternatives to Ag_j they have, the greater its negotiation power (see below).

We can define the *Subjective Potential for Negotiation* of $Ag_j \in Agt$ about one of its own goals g_{jk} -and call it $SPN(Ag_j, g_{jk})$- the following function:

$$SPN(Ag_j, g_{jk}) = \sum_{i=1}^{n} \frac{1}{1+p_{ki}}$$

Where we have the same meanings as for the previous formula but now we make reference to the believed (by Ag_j) dependence relations (not necessarily true in the world): in particular are believed both n (the number of direct dependences) and p (the indirect, competitive dependences).

Analogously, we can interpret Figure2 as the set of believed relationships (by Ag_j) among the agents. In this case we have the subjective point of view. It is also possible to introduce a modulation factor that takes into account the special kind of dependence: reciprocal (x=r), mutual (x=m):

$$SPN(Ag_j, g_{jk}) = \sum_{i=1}^{n} \frac{m_x}{1+p_{ki}} \quad \text{with } 0<m_x<1$$

Usually, we can say that $m_m \geq m_r$. More in general, we can say that the
Subjective Potential for Negotiation of $Ag_j \in Agt$ about the whole set of its own goals (G_j) in the *Dependence-Network(Agt,t)* is:

$$SPN(Ag_j, G_j) = \frac{1}{s}\sum_{k=1}^{s}\sum_{i=1}^{ns}\frac{m_x}{1+p_{ki}}$$

Where s is the number of goals of Ag_j, and ns is the number of other agents in the set Agt, that have a dependence relation with Ag_j with respect to the goal g_{jk}.
p_{ki} is the number of agents in Agt that are competitors with the Ag_i on the same actions/plans/resources (useful for g_{jk}) in a not compatible way.

In words, the global subjective potential for negotiation of an agent in a dependence network with respect to all its own goals is the sum of beliefs above showed[1].

3.3 The Trust Role in Dependence Networks

Before taking into account the trustee's point of view we would like to introduce into the dependence network also the trust relationships. In fact, *although it is important to consider dependence relationship between agents in a society, there will be no exchange in the market if there is not trust to enforce these connections*. Considering the analogy with the Figure2, we will have now a representation as given in Figure3 (where D includes the set of agents that Ag_j considers trustworthy for achieving g_{jk}).

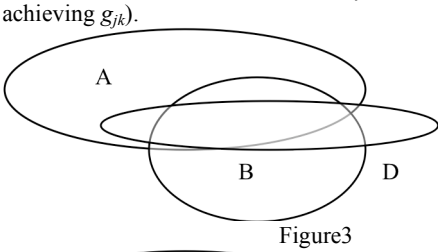

Figure3

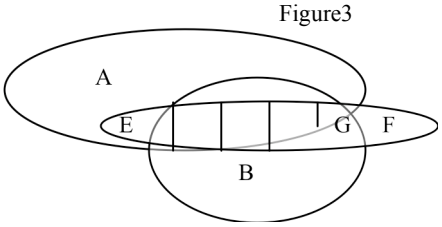

Figure4

We have now a new subset (showed outlined in Figure4) containing the potential agents for negotiation. The analysis of the part E, F and G will result in: part E includes agents who depend form Ag_j, who are trusted but on different tasks; part F includes agents not depending from Ag_j and trusted on different tasks; part G includes agents trusted for achieving the goal g_{jk} but not depending from Ag_j.
Not only the decision to trust presupposes a belief of being dependent, but notice that a dependence belief (*BelDep*) implies on the other side a piece of Trust (as modelled in (1,2)). In fact to believe to be dependent means:

- (*BelDep-1*) to believe not to be able to perform action α and to achieve goal g; and
- (*BelDep-2*) to believe that Ag_i is *able* and in condition to achieve g, to perform α.

Notice that (*BelDep-2*) is precisely one component of Trust in our analysis: the *positive evaluation* of Ag_i as competent, able, skilled, and so on. However, the other fundamental component of trust as evaluation is lacking: reliability, trustworthiness: Ag_i really intends to do, is persistent, is loyal, is benevolent, etc. Thus he will really do what Ag_j needs.
Given the basic role played by "believed networks of dependence", established by a believed relationship of dependence based on a belief of dependence, and given that this latter is one of the basic ingredient of trust as a mental object, we can claim that this overlap between theories is the crucial issue and our aim is namely to study it deeply.
So introducing also in the *Subjective Potential for Negotiation* (of $Ag_j \in Agt$ about one of its own goals g_{jk}) the basic beliefs about trust (1,2) we have:

$$SPN(Ag_j, g_{jk}) = \sum_{i=1}^{n}\frac{Bel_j(DoA_i * DoW_i)}{1+p_{ki}}$$

Where:
$m_m = m_r = 1$;
DoA_i is the degree of ability (with respect to the goal g_k) of the agent Ag_i as believed by Ag_j ($Bel_j(DoA_i)$);
DoW_i is the degree of willingness (with respect to the goal g_k) of the agent Ag_i as believed by Ag_j ($Bel_j(DoW_i)$);
DoA_i and DoW_i respectively represent the Ag_i's ability and willingness of using actions/plans/resources for the goal g_k. We do not consider here the possible relations between the values of DoA_i and DoW_i with the p_{ki} variable. $1 \geq DoA_i, DoW_i \geq 0$.
Let us, now, explicitly recall what are the cognitive ingredients of trust and reformulate them from the point of view of the trusted agent. In order to do this, it is necessary to limit the set of trusted entities. It has in fact been argued that trust is a mental attitude, a decision and a behavior that only a cognitive agent endowed with both goals and beliefs can have, make and perform. But it has been underlined, also, that the entities that is trusted is not necessarily a cognitive agent.
When a cognitive agent trusts another cognitive agent, we talk about social trust. We consider that the set of actions, plans and resources owned/available by an agent can be useful for achieving a set of tasks ($\tau_1, \ldots, \tau_r$).
We take now the point of view of the trustee agent in the dependence network: so we present a cognitive theory of trust as a capital, which is, in our view, a good starting point to include this concept in the issue of negotiation power. That is to say that if somebody is potentially strongly needed by other agents, but it is not trusted, its negotiation power does not improve.
We call the *Subjective Trust Capital* of $Ag_i \in Agt$ about an its own task τ_k the function:

$$STC(Ag_i, \tau_k) = \sum_{j=1}^{n} Bel_i(Bel_j DoA_i * Bel_j DoW_i)$$

Where n is the number of agents need the task τ_k.
$Ag_j, Ag_i \in Agt$.
In words, the cumulated trust capital of an agent Ag_i with respect to a specific task τ_k, is the sum (on all the agents need that specific task in the network dependence) of the corresponding abilities and willingness believed by each dependent agent. The

[1] An interesting problem is that an agent could be a competitor towards itself for achieving its own goals; for example: 1) Ag_j needs action α_r both for g_s and g_t and there is only an agent in Agt that has α_r but is unable to provide two times the action α_r. *2)* Ag_j needs action α_r for g_r and α_s for g_s and for both the actions α_r and α_s it depends only from Ag_i that can provide only an action.

subjectivity consists in the fact that both the network dependence and the believed abilities and willingness are believed by (the point of view of) the agent Ag_i.

As showed in (2) we call Degree of Trust of the Agent Ag_j on the agent Ag_i about the task τ_k (DoT($Ag_j\ Ag_i\ \tau_k$)):

$\mathrm{DoT}(Ag_j\ Ag_i\ \tau_k) = Bel_j DoA_i * Bel_j DoW_i$

At the same way we can also call the self-trust of the agent Ag_i about the task τ_k we can write:

$ST(Ag_i, \tau_k) = Bel_i(DoA_i * DoW_i)$

From the comparison between $STC(Ag_i, \tau_k)$, $DoT(Ag_j\ Ag_i\ \tau_k)$ and $ST(Ag_i, \tau_k)$ a set of interesting actions and decision are taken from the agents (we will see in the next paragraph).

Starting from the Trust Capital we would like evaluate the usable part of this trust capital. In this sense, we introduce the *Subjective Usable Trust Capital* of $Ag_i \in Agt$ about an its own task τ_k as:

$$SUTC(Ag_i, \tau_k) = \sum_{j=1}^{n} \frac{Bel_i(Bel_j DoA_i * Bel_j DoW_i)}{1 + p_{kj}}$$

where p_{kj} is (following the Ag_i's belief about the beliefs of Ag_j) the number of other agents in the dependence network that can achieve the same task with a trust value comparable with the one of Ag_i. We have two *comparable trust values* when the difference between them is in a range under a given threshold that could be considered meaningless with respect to the achievement of the task.

4 DYNAMICS OF RELATIONAL CAPITAL

What has not been considered enough in organization theory is the fact that the *relational capital* is peculiar in its being crucially based on beliefs: again, what makes relationships become a capital is not simply the structure of the networks (who "sees" whom and how clearly) but the levels of trust which characterizes the links in the networks (who trusts whom and how much). Since trust is based on beliefs – including, as we said, also the believed dependence (who needs whom) – it should be clear that relational capital is a form of capital, which can be manipulated by manipulating beliefs.

4.1 Increasing, decreasing and transferring

For what concerns the dynamic aspects of this kind of capital, it is possible to make hypotheses on how it can increase or how it can be wasted, depending on how each of basic beliefs involved in trust are manipulated.

First, let us consider what kind of strategies can be performed to enforce the other's dependence beliefs and his beliefs about agent's competence.

i) Ag_i can make the other agent dependent on him by making the other lacking some resource or skill (or at least inducing the other to *believe* so).

ii) Ag_i can make the other agent dependent on him by activating or inducing in it a given goal (need, desire) on which the other is not autonomous (14) (or believes so).

iii) Since dependence beliefs is strictly related with the possibility of the others to see the agent in the network and to know her ability in performing useful tasks, the goal of the agent who wants to improve her own relational capital will be to *signaling* her presence and her skills (15,16,17). While to show her presence she might have to shift her position (either physically or figuratively like, for instance, changing her field), to communicate her skills she might have to hold and show something that can be used as a signal (such as certificate, social status etc.). This implies, in her plan of actions, several and necessary sub-goals to make a signal. This sub-goals are costly to be reached and the cost the agent has to pay to reach them can be taken has the evidence for the signals to be credible (of course without considering cheating in building signals). It is important to underline that using these signals often implies the participation of a third subject in the process of building trust as a capital: a third part which must be trusted (2). We would say the more the third part is trusted in the society, the more expensive will be for the agent to acquire signals to show, and the more this signals will work in increasing the agent's relational capital. We will see later how this is related with the process of transferring trust from an agent to another (building reputation).

Obviously also Ag_i's *previous performances* are 'signals' of trustworthiness. And this information is also provided by the circulating *reputation* of Ag_i (18, 19).

In formal terms, we can say that Ag_i has to work for increasing: $Bel_j DoA_i$ and consequently $Bel_i Bel_j DoA_i$.

iv) Alternatively, Ag_i could work for reducing the believed (by Ag_j) value of ability of each of the possible competitors of Ag_i (in number of p_{kj}) on that specific task τ_k.

Let us now consider how willingness beliefs can be manipulated. In order to do so, consider the particular strategy performed to gain the other's good attitude through gifts (20). It is true that the expected reaction will be of reciprocation, but this is not enough. While giving a gift the agent knows that the other will be more inclined to reciprocate, but she also knows that her action can be interpreted as a sign of the good willingness she has: since she has given something without being asked, the other is driven to believe that the agent will not cheat on him. Then, the real strategy can be played on trust, sometimes totally and sometimes only partially – this will basically depend on specific roles of agents involved.

Again in formal terms, we can say that Ag_i has to work for increasing: $Bel_j DoW_i$ and as a consequence $Bel_i Bel_j DoW_i$. Alternatively, it could work for reducing the believed (by Ag_j) value of willingness of each of the possible competitors of Ag_i (in number of p_{kj}) on that specific task τ_k.

An important consideration we have to do is that a dependence network is mainly based on the set of actions, plans and resources owned by the agents and necessary for achieving the agents' goals (we considered a set of tasks each agent is able to achieve). The interesting thing is that the dependence network is modified by the dynamics of the agents' goals, from their variations, from the emergency of new ones, from the disappearance of old ones, from the increasing request of a subset of them, and so on (21). On this basis changes the role of each agent in the dependence network, changes in fact the trust capital of the agents.

Relational capital can be also circulated inside a given society. If somebody has a good reputation and is trusted by somebody else, she can be sure this reputation will pass and transfer to other actors – and this is always considered in marketing strategies of making voice circulate. What is not clear yet is how these phenomena work. But when trust on an agent circulates, it is strategically important for the agent to know very well how this happens and which ways (not only figurate) trust takes to expand. In fact, not all the ways are the same: it is possible that

being trusted by a particular agent can mean that she just has one more agent in her relational capital, but gaining the trust of another agent can be very useful to her and exponentially increase her capital thanks to the strategic role or position of this other agent. That said, it should be clear the importance of understanding if and how much an agent is able to manage this potentiality of her capital.

Basically, here also, the role of agents involved play a crucial part: for this reason it is necessary for agent to know the multiplicative factor represented by the recognized and trusted evaluator in the society. It is not necessarily true, in fact, that when somebody trusts somebody else and this trusts a third one, the first one will trust the third one: the crucial question is "which role the first recognize to the second". If the second one is trusted as an evaluator by the first one, than she can trust the third one for specific goals.

Usually how well these transitive process works depends on what kind of broadcasting and how many links the valuator has and how much she is trusted in each of those links, so, basically, it recursively depends on the valuator's relational capital.

4.2 Strategic behavior of the trustee

Until now we did not talk about subjective difference in the way trust is perceived by the two parts of the relationship. We must take into account the fact that there is often a difference between how the others actually trust an agent and what the agent believes about; but also between this and the level of trustworthiness that agent perceive in herself. Since being able is not necessarily the cause of trust: it can be the case of a diffuse atmosphere that makes the others trust the agent although the agent has not all the characteristics to be trusted. These subjective aspects of trust are fundamental for managing this capital, since it can be possible that the capital is there but the agent does not know to have it. Can it be possible to use the relational capital even if who uses it is not aware of having it?

At the base of the possible discrepancy in subjective valuation of trustworthiness there is the perception of how much an agent feels trustworthy in a given task and the valuation that agent does of how much the others trust her for that task.

In addition, this perception can change and become closer to the objective level while the task is performed. These factors must be taken into account and studied together with the different components of trust, in order to build hypotheses on strategic actions the agent will perform to cope with her relational capital. Then, we must consider what can be implied by these discrepancies in terms of strategic actions: how they can be individuated and valued? How the trusted agent will react when aware of them? She can either try to acquire competences in order to reduce the gap between others' valuation and her own one, or exploiting the existence of this discrepancy, taking advantage economically of the reputation over her capability and counting on the others' scarce ability of monitoring and testing her real skills.

5 CONCLUSIONS

As we said, individual trust capital (relational capital) and collective trust capital not only should be disentangled, but their relations are quite complicated and even conflicting. In fact, since the individual is in competition with the other individuals, he has a better position when trust is not uniformly distributed (everybody trusts everybody), but when he enjoys some form of concentration of trust (an oligopoly position in the trust network); while the collective social capital could do better with a generalized trust among the members of the collectivity.

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