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*Trust matters in cooperative agreements but does the nature of the partner also matter?**

La confianza es importante en los acuerdos de cooperación en I+D. Pero, ¿es también importante la naturaleza del socio?

ABSTRACT

The purpose of this paper is to analyze the role of trust in cooperative agreements. Trust affects a firm's agreements in different ways, depending on the nature of the partner (firm or research organization) and according to the stage in the evolution of the agreement. An in-depth look at different components of trust (initial or ongoing) and at different contexts (at the beginning or during the implementation process) suggests that trust has a different influence on alliance success. Results show the influence of trust on the success achieved in the relationship. However, when considering the nature of the partner, the average levels of trust and success are different, as is the influence of trust on success.

Key words: R&D cooperative agreements, inter-organizational relationships, trust, satisfaction, evolution of the relationship.

RESUMEN

El objetivo de este trabajo consiste en analizar el papel que la confianza tiene en los acuerdos de cooperación entre empresas. En él se pone de manifiesto que

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la confianza afecta a los acuerdos entre empresas de manera distinta, dependiendo de la naturaleza del socio (empresa u organismo de investigación) y en función de la etapa de evolución del acuerdo. Una observación detallada de los diferentes componentes de la confianza (inicial o durante la vida del acuerdo) y de los diferentes contextos (al principio del acuerdo o durante el proceso de implantación) sugiere que la confianza tiene una influencia distinta en el éxito de la alianza. Los resultados empíricos muestran que la confianza influye en el éxito de la relación, como en otros estudios previos. Sin embargo, cuando tenemos en cuenta la naturaleza del socio, los niveles medios de confianza y de éxito varían, al igual que varía el grado de influencia de la confianza en el éxito.

Palabras clave: acuerdos de cooperación en I+D, relaciones interorganizativas, confianza, satisfacción, evaluación de la relación.

1. INTRODUCTION

Inter-organizational relationships are an important economic phenomenon in today's world and, increasingly, organizations of different kinds are choosing to establish such relationships (García-Canal, López-Duarte, Rialp-Criado & Valdés, 2002). Cooperative relationships have proved to be vital to the development of technological breakthroughs in recent years and are now generally considered necessary for industrial development in all countries (Jiang & Li, 2008).

For the creation and development of inter-organizational relationships, trust among partners is very important (Cullen, Johnson & Sakano, 2000; Hosmer, 1995; Mayer, Davis & Schoorman, 1995) and can be founded both in interpersonal or institutional relationships (Gulati, 1995; Zaheer, Mcevily & Perrone, 1998). Trust can be considered a complex and multi-dimensional concept in the study of organizations. In this paper, we focus on trust in inter-organizational relationships, which has had contributions in literature coming from different disciplines such as management, strategy, marketing, organizational behaviour, etc.

Many theoretical and empirical studies show the relationship between the level of trust among partners and the success of collaboration (Andaleeb, 1996; Smith, 1997). However, trust among partners can grow as the partnership develops. The difficulty to define and measure trust has led scholars to use scales encompassing trust's various dimensions or to examine previous links among partners at the beginning of the relationship. These two different approaches have generated a lack of consensus with respect to the results. In this paper we believe that both approaches represent two types of trust among partners in an agreement. Thus, initial trust is defined as the existence of prior ties among partners and ongoing trust, is the trust that arises over the course of the cooperation agreement. Nevertheless, the majority of previous literature has focused on one type or another of trust without establishing this difference. The differentiation that is proposed in this paper makes it possible to better observe the role of trust in success and offers new insights about this relationship.

On the other hand, technological agreements can differ depending on the nature of the partners involved: those that take place between partners of a similar nature (firm-firm) and those established between partners of a different nature (firm-research organization - RO from now - including universities, state research centres, research associations and innovation and technology centres). While most studies on how the level of trust between partners influences the success of relationship have focused on agreements between firms (Cullen *et al.*, 2000; Das & Teng, 1998; Gulati, 1998; Zaheer *et al.*, 1998) or on agreements between firms and ROs (Davenport, Davies & Grimes, 1999; Garret-Jones, Turpin, Burns & Diment, 2005; Mora-Valentin, Montoro-Sanchez & Guerras-Martin, 2004; Mora-Valentin & Montoro-Sanchez, 2009; Rama & Ramakrishna, 2005), no previous studies compare this relationship based on the nature of a firm's partner, if the partner is another firm or a RO.

Nevertheless, given relationships firm-firm or firm-RO have different characteristics in terms of function and behavior (activities involved, competitive relationship, and symmetries in the relationship) both the level of each kind of trust and their impact on success can vary. This makes it necessary to have a better understanding of the role of trust and how to manage it in each type of relationship, depending on the nature of the partner. Providing empirical evidence in this regard constitutes an outstanding and novel contribution. The purpose of this paper is to compare the role of initial and ongoing trust in two different samples, in which the nature of the cooperating partners is different. The paper has four sections. In the first section, a theoretical model and subsequent hypotheses are developed. The second section describes the methodology. This is followed by an analysis of findings in section three. The final section presents the main conclusions and implications, as well as guidelines for future research.

2. MODEL AND HYPOTHESES

The success of a cooperative agreement refers to the fulfillment of the targets pursued. Among the different factors affecting, trust plays an important role in the success of relationships between firms (Das & Teng, 1998; Gulati, 1998; Zaheer *et al.*, 1998) and between firms and ROs (Gopalakrishnan & Santoro, 2004; Santoro & Saparito, 2003). Trust is related to the existence of risk and uncertainty about the future behavior of the parties involved in the exchange (Doney, Cannon & Mullen, 1998; Madhok, 1995), as well as beliefs and expectations about the behavior of the parties involved (Aulakh, Kotabe & Sahay, 1996; Mayer *et al.*, 1995; Santoro & Chakrabarti, 1999). Therefore, trust can be divided into intention, which means that one wants to depend on the other in a given situation, and belief, where a partner believes the other is benevolent, competent and honest (Cullen *et al.*, 2000; McKnight, Cummings & Chervany, 1998). Trust can be defined as the expectation that one part will promise to fulfill its obligations, behave in a predictable way and negotiate and act fairly if the possibility of opportunistic action presents itself (Zaheer *et al.*, 1998).

But during the development of an inter-organizational relationship, trust can evolve in different ways. Some authors assume that relationships usually start at a low level of trust, which gradually increases as time goes by (McKnight *et al.*, 1998). However, when contrasting

their theories empirically, they have run across an important paradox: contrary to expectations, some relationships begin with a high level of trust between the parties involved. In this paper, we distinguish two stages of trust in cooperative relationships. The first is so-called initial trust, or trust existing at the time of the formation of an agreement, which mainly results from the existence of previous relationships between the parties. The second stage is the trust generated during the developing of a relationship itself, what we call ongoing trust. This kind of trust is, according to most authors, the result of the level of credibility, honesty and benevolence of a partner.

Initial trust is related to relationships that partners may have had in the past – meaning that partners know each other or have had professional relationships prior to the constitution of the agreement. When cooperation is in its initial stages, it is difficult to find a level of trust between parties, except if the partners have previously worked together. Some studies relate trust and previous experiences of collaborating partners to a time variable. In other words, the level of trust increases as a result of the consecutive interaction between parties (Gulati, 1995; Mora-Valentin & Montoro-Sanchez, 2009; Parkhe, 1993, 1998; Sampson, 2005). This means that experience may generate trust, which limits the cost of future partnerships from the point of view of the transaction cost theory (Glaister & Buckley, 1999; Pangarkar, 2003). Hence, two firms with previous relationships are more likely to trust each other than other organizations with no prior links whatsoever (Gulati, 1995).

Some studies support the existence of a positive relationship between the success of cooperative relationships and prior cooperative experiences. In fact, collaboration with known partners decreases the likelihood of opportunistic behaviors and, then, the risk of failure, thus contributing to the improvement of outcomes, and has a positive influence on the success of cooperation, both between firms (Hakanson, 1993; Levinthal & Fichman, 1988) and between firms and ROs (Cyert & Goodman, 1997; Davenport *et al.*, 1999; Mora-Valentin *et al.*, 2004; Mora-Valentin & Montoro-Sanchez, 2009). This leads to the following prediction:

Hypothesis 1. The level of initial trust between partners at the formation of a cooperative agreement has a positive influence on its success.

Nonetheless, trust amongst partners at the start of a relationship is as important as the level that trust may achieve while the cooperative agreement develops. Therefore, ongoing trust is the result of the level of integrity and benevolence in an inter-organizational relationship and is based on the degree to which one party believes its partner possesses competence, that is, experienced enough to carry out its work in an effective and reliable way (Geyskens, Steenkamp, Scheer & Kumar, 1996; Kumar, Scheer & Steenkamp, 1995). Benevolence refers to the extent to which a firm believes its partner will have beneficial intentions and motives when new conditions arise, conditions for which no previous agreement has been reached. It is the belief that a partner is interested in the well being of the firm and that no action that might affect it negatively will be taken (Anderson & Narus, 1990; Cullen *et al.*, 2000). For the purposes of this study, ongoing trust is defined as the belief that the action taken by the other organization will bring positive results, and these organizations will not take unexpected action that may generate negative or harmful results.

In this respect, several studies have found that ongoing trust has a direct and positive influence on success (Mohr & Spekman, 1994; Morgan & Hunt, 1994). The belief that the other party will try to achieve the best results for the relationship can attenuate the fear of opportunistic behavior (Parkhe, 1998). So, trust leads to the perception of a higher degree of satisfaction with a partnership and to a belief in its importance for the survival and stability of the cooperative relationship (De Laat, 1997). Then, this kind of trust influences the outcome of a cooperative relationship in a positive way (Cullen *et al.*, 2000; Zaheer *et al.*, 1998).

In the case of cooperative relationships between firms and ROs, a high level of trust guarantees that both parties will fulfill their targets through collaboration (Mora-Valentin *et al.*, 2004; Santoro & Chakrabarti, 1999). In fact, survival of this kind of cooperation will be better assured if there are high levels of trust between the parties (Geisler, 1995). Mutual respect and trust between parties emerges as one of the most highly valued factors by the staff of firms and ROs taking part in R&D cooperative agreements (Davenport *et al.*, 1999). Similarly, the studies carried out by Dodgson (1993), Mora-Valentin *et al.* (2004) and Mora-Valentin and Montoro-Sanchez (2009) also show that high levels of trust between partners are of vital importance to the development of firm-RO relationships.

Hypothesis 2. The level of ongoing trust between partners during the implementation of a cooperative agreement has a positive influence on its success.

Upon reviewing the literature, we find many theoretical arguments and empirical evidence on the influence of trust on success. If we classify this literature (Table 1), there are certain studies that consider initial trust as a determining factor and others that emphasize ongoing trust. In addition, there are some studies focusing on relationships among firms and others dealing with agreements between firms and ROs. But there is a lack of theoretical and empirical evidence comparing the level and role of both kinds of trust in both kinds of agreements. This comparison is important and necessary because inter-organizational relationships can have different features and targets depending on the nature of the partners. These differences stand out in the activities to be carried out, in the relationship between partners, in the type of assets supplied and the non-profit nature of some of the partners. Thus, we assert that it is highly likely that the influence of trust on success varies depending on the nature of the partners. There are four reasons for this.

Firstly, if we take into account the activities involved in a cooperative agreement, a distinction is clear between focused and complex agreements (Bowman & Faulkner, 1997). Whereas companies collaborate with other companies for the joint performance of one or more different business activities (marketing, production, technology), cooperation between firms and ROs are more frequently focused towards technological agreements. Then a more focused agreement would facilitate the generation of trust among partners because a less complex agreement has less uncertainty (Das & Teng, 1998; Doney *et al.*, 1998).

Secondly, as far as the type of competitive relationship existing between partners is concerned, we can distinguish between vertical and horizontal agreements (Yasuda & Iijima, 2005). Cooperative relationships between companies are either vertical or horizontal. In the particular case of firm-RO cooperation, they are vertical agreements, establishing a similar relationship to that of supplier-client: the firm (client) demands services (training, graduates

and research) that the RO (supplier) can offer. Horizontal agreements have demonstrated greater instability due to the increased probability of opportunistic behavior on the part of partners and the damaging consequences derived from them. As a result of the competition that exists among the partners, the difficulty of generating trust between both parties increases (Das & Teng, 1998; De Laat, 1997; Gulati, 1995; Ring, 2000). Therefore, it can be expected that opportunistic behaviour is going to be less likely in agreements between firms and RO than in those between firms.

Table 1
Time dimension of trust and kinds of agreements.

		Firm-Firm	Firm-RO
Time dimension of trust	Initial trust	Anand & Khanna, 2000; Barkema, Shenkar, Vermeulen & Bell, 1997; George & Farris, 1999; Hakanson, 1993; Levinthal & Fichman, 1988; Park & Russo, 1996; Saxton, 1997	Cyert & Goodman, 1997; Davenport *et al.*, 1999; Geisler, 1995; Geisler, Furino & Kiresuk, 1990, 1991; Goldhor & Lund, 1983; Hall, Link & Scott, 2000; Häusler, Hohn & Lütz, 1994; McDonald & Gieser, 1987
	Ongoing trust	Achrol, 1997; Andaleeb, 1996; Anderson & Narus, 1990; De Laat, 1997; Gill & Butler, 1996; Mohr & Spekman, 1994; Morgan & Hunt, 1994; Smith, 1997; Sullivan & Peterson, 1982; Yuan & Wang, 1995;	Davenport *et al.*, 1999; Dodgson, 1993; Geisler, 1995; Klofsten & Jones-Evans, 1996; Santoro & Chakrabarti, 1999; Rama & Ramakrishna, 2005; Zaheer *et al.*, 1998
		Kinds of agreements	

Thirdly, regarding the kind of assets supplied, we can distinguish between symmetrical and asymmetrical (or complementary) agreements (Yasuda & Iijima, 2005). In agreements between firms, partners can supply assets of a different or identical nature. Cooperative agreements between firms and ROs are asymmetrical by nature, as firms have direct access to the technological resources of ROs (laboratories, scientific equipment, and technical staff expertise), allowing them to complement their assets and increasing their technological potential. As a result, it is possible to expect that the complementary nature between partners would generate trust as a consequence of the lower probability for the appropriation of the other partner's assets and of the need each partner has for the assets provided by the other party (Faulkner & Senker, 1995).

Furthermore, it is important to point out that, in recent years, a change in the role of firms and ROs has happened. The traditional lineal model (university-push and industry-pull) has been substituted by spiral or circular models (Betz, 1996). Following Etzkowitz (1998), the role of the ROs in the linear model is education and research, the role of the firm is to produce while the government establishes the rules for the relationships. In the circular models, each agent adopts a more active and broad role. That is, the ROs can have entrepreneurship R&D activities, the firms can do internal research and the government adopts a more active role in promoting the R&D and the interrelationships between both kinds of agent (firms and ROs).

The fourth and final reason is that ROs tend to be non-profit organizations (NPO). For this reason, they present a lower tendency for opportunistic behavior than a partner which is another firm. A less likely opportunistic behavior in this kind of organizations can be expected for, at least, three reasons: a) As shown by Montoro-Sanchez *et al.* (2006), firms have different objectives than ROs when cooperating in R&D activities, these objectives being complementary and, then, compatible; b) An NPO does not compete in final markets of goods and services, therefore they have not incentives to appropriate resources from firms for their own interest (Trojan horse effect); c) the public owned character of most of ROs in our study makes the collaboration with firms a small part of the financial resources needed for supporting their activities, as the state funds these organizations mainly with public resources, and d) NPOs are important agents in some markets such as health, education or R&D activities because society trusts that NPOs are not going to demonstrate opportunistic behavior as making profit is not their main goal.

Based on the above four reasons, we suggest that the relationship between trust and success is more intense in relationships between firms and ROs than in the relationship between firms, as depicted in Hypothesis 3. This does not mean trust is not important in relationships between firms, but the level of trust should be greater between firms and ROs, which would lead to a greater impact of trust on the success of the agreement.

Hypothesis 3. The influence of trust (initial trust and ongoing trust) on success is greater in cooperative agreements between firms and ROs than in those only between firms.

3. METHODOLOGY

3.1. Sample

Taking into account that the aim of this paper is to compare the effect that trust between partners has on a firm's success, with regard to different kinds of partners, two samples were necessary to broaden the scope of the research. Both are made up of cooperative relationships between two partners. The first sample includes domestic R&D cooperative projects run by the Centre for Development of Industrial Technology (CDTI), and the second one, international projects on R&D within the European Eureka program, in which Spanish firms took part. Both CDTI and Eureka projects are initiatives aimed at encouraging cooperation not only between firms, but also between firms and ROs (universities, research associations, innovation and technological centers, state research centers, all of which have non-profit aims) in order to increase the competitiveness of Spanish companies.

In Eureka agreements, it is difficult to find dyadic agreements between one firm and one RO because only 10-15% of the partners tend to be ROs. Therefore, only cooperation between firms was considered for the Eureka sample. On the other hand, collaboration between one firm and one RO is common in the CDTI program. In this way, we are able to define the perception a firm has when it collaborates with ROs.

The sample of CDTI collaboration agreements gathers 604 cooperation projects started between 1995 and 2000. With 1208 partners (604 firms and 604 ROs), these collaboration initiatives exceed 493 million euros, of which nearly 45% is financed by funds from CDTI. The sample of collaboration agreements from the European Eureka program consists of 53 cooperation projects started between 1988 and 1997. These projects, which include 106 partners (all of them firms), demand high levels of investment, in excess of 107 million euros, and are financed by the CDTI international program under similar conditions to those of its national program. In order to get the information about the variables we sent a mail survey to all firm partners in both samples. The return rate was 52.83% in the Eureka sample (56 valid responses), and 26.33% (159 valid responses) in the CDTI sample.

3.2. Measures

To measure initial trust we have used a dichotomic variable (initrust), as used by Glaister & Buckley (1999), awarding a value of 1 if prior links exist and 0 if partners had no previous contact, prior to the formation of the cooperative agreement. As regards the ongoing trust, we elaborated a measure based on the proposal put forth by Kumar *et al.* (1995), Geyskens *et al.* (1996) and Cullen *et al.* (2000), by gathering items for both dimensions of honesty/credibility and benevolence (Andaleeb, 1996; Mohr & Spekman, 1994; Morgan & Hunt, 1994; Zaheer & Venkatraman, 1995). So, the four-item scale (ranging from 1 to 7) includes: we trust the partner (ongotrust1), the partner will do the right thing without misleading us (ongotrust2), our relationship will enjoy a high degree of harmony (ongotrust3) and the performances of the partner will be beneficial (ongotrust4). In order to reduce the dimensionality of this variable and avoid correlation problems between the different items, a factorial analysis generated a factor that represented the level of trust during the development of an agreement (see Table 2). We have also done a reliability analysis of this variable. Values reached by Cronbach Alphas proved to be effective in both samples (0.9386 for CDTI agreements and 0.8752 for Eureka agreements).

Table 2
Factorial analysis of ongoing trust.

Variable	CDTI Agreements Factorial Load	Eureka Agreements Factorial Load
Ongotrust 1	0.936	0.926
Ongotrust 2	0.934	0.900
Ongotrust 3	0.928	0.882
Ongotrust 4	0.881	0.697
Variance percentage	84.59%	73.24 %
Kaiser-Meyer-Olkin	0.822	0.786
Bartlett's test of sphericity	597.739	131.662
Significance	0.000	0.000

As with the dependent variable, the success of the cooperative relationship, as we have stated above, the success of a cooperative agreement refers to the fulfillment of the targets

pursued. Amongst the different measures used (Ariño, 2003; Geringer & Hebert, 1991; Glaister & Buckley, 1999) in literature, in this study we focus on partner satisfaction and the evolution of the relationship. Considering the different types of partners – firms and research organizations, it is difficult to find a common measure for success in cooperative agreements for both partners. Firms and research organizations usually have different but complementary reasons for cooperating and the mix of objectives can be different for each of the partners in the agreement (Montoro-Sanchez *et al.*, 2006). With the measure of the degree of satisfaction of the partner, as a global measure of effectiveness, and the evolution of the relationship, as an operational measure related to the survival and stability of the agreement, (Ariño, 2003), we can get more complete information about the global success of the agreement.

Regarding satisfaction, it is probably the most commonly used measure in studies on relationships between firms and is a widely accepted indicator representing the achievement of targets resulting from the partnership (Anderson & Narus, 1990; Glaister & Buckley, 1999; Mohr & Spekman, 1994). In fact, most authors associate the concept of success with overall partner satisfaction. Satisfaction evaluates the accomplishment of common, private, initial and emergent goals together. and the outcome and how the agreement process performs (Ariño, 2003). In our case, we use five items (ranging from 1 to 7) to capture the different aspects of this measure: satisfaction with the relationship and partner performance (sat-partperf), satisfaction with the way the project operates (sat-projop), satisfaction with the outcome of the agreement (sat-outagr), whether the agreement has managed to fulfill the initial partner expectations of the project (sat-fulexp) and whether the agreement has contributed to balanced outcomes for both partners (sat-balout).

The second measure was the evolution of the relationship between partners taking part in the agreement (evolrel). This measure is based on the concept of survival, put forward by Geringer and Hebert (1991) and Glaister and Buckley (1998), and on that of continuity or stability by Shamdasani and Sheth (1995). As Ariño (2003) states, stability is positively related to performance in contractual alliances —as is the case in our samples— and captures the performance of the agreement towards the process performance. The evolution of a partnership can be vital to its continuity and the basis for future partnerships. If a relationship is terminated before completion of the agreement, the level of trust between partners decreases dramatically, as does the chance to form new partnerships. Similarly, the willingness of the parties concerned to keep on collaborating is an indicator of the success of the cooperative agreement. Our measure includes five categories (values 1 to 5) of the evolution of the cooperative agreement which implies growing levels of success: whether it has been terminated before the project ends, whether the agreement has not ended but collaboration will not continue, whether the project has finished and the partners have not continued collaborating, whether the agreement has not concluded but there is the intention to continue collaborating in the future and whether the agreement is over and collaboration has continued with new activities.

As a control variable we have used the duration of a cooperative relationship. In our particular case, both CDTI and Eureka agreements have a fixed and established duration from the time of formation of the agreement. This variable ranges from 6 to 72 months.

Finally, we followed methods of design of the questionnaire as well as statistical proofs such as the Harman test to check for the inexistence or reduced influence of a possible common method bias (Podsakoff, MacKenzie, Lee & Podsakoff, 2003).

4. RESULTS AND DISCUSSION

Tables 3 and 4 show descriptive statistics and correlations of dependent and independent variables. Regarding the existence of prior links between partners in both types of agreements, 34% of the firms show no prior links with partners, while 66% have had some type of previous contact before entering into a cooperative relationship. This is a meaningful result, because the same frequency of previous links gives different trust-generating behavior during the development of the relationship. Thus, as for the level of trust, despite the fact that the different dimensions reach above average values in both types of agreements, firms cooperating with ROs get higher scores than those cooperating with other firms. The same situation is found in relation to the different measures of satisfaction. As for the evolution of the relationship, data shows high values, meaning favorable attitudes towards continuing the relationship and future collaboration, and even higher values when cooperation is with other types of organizations than firms. Finally, the duration of the agreements tends to be longer when firms cooperate jointly rather than when they do so with ROs.

Table 3
Descriptive statistics and correlations for Eureka agreements.

VAR	Mean	Stand dev	1	2	3	4	5	6	7	8
1. Initrust	0.66	0.47								
2. Ongotrust	6.14	0.91	0.136							
3. Durat	23.21	11.42	-0.064	-0.100						
4. Sat-partperf	5.70	1.13	0.209**	0.723**	-0.178*					
5. Sat-projop	5.67	0.94	0.118	0.502**	-0.172*	0.678**				
6. Sat-outagr	5.67	1.03	0.212**	0.484**	-0.190	0.579**	0.789**			
7. Sat-fulexp	5.55	1.15	0.265**	0.430**	-0.209**	0.470**	0.697**	0.887**		
8. Sat-balout	5.51	1.09	0.226**	0.600**	-0.147	0.712**	0.667**	0.726**	0.707**	
9. Evolrel	4.45	1.01	0.267**	0.449**	-0.144	0.549**	0.335**	0.351**	0.332**	0.415**

Level of significance * 0.05 **0.01.

With respect to the relationships between variables, (see Tables 3 and 4) no correlations exist between the explicative variables in the model, or between both variables with the control variable. Regarding the relationships of independent variables with dependent ones, in general, the values reached by the different variables, especially initial trust and satisfaction are higher in firms taking part in CDTI agreements than in those under Eureka agreements. So, correlations show the existence of meaningful relationships between initial trust and all

success measures, except for the levels of satisfaction with the outcomes of the agreement in firms collaborating with ROs. With respect to the relationships of ongoing trust with success measures, the correlations show meaningful values for all relationships between ongoing trust and the different measures of success, for both samples.

Table 4
Descriptive statistics and correlations for Eureka agreements.

VAR	Mean	Stand dev	1	2	3	4	5	6	7	8
1. Initrust	0.66	0.47								
2. Ongotrust	5.26	1.08	0.219							
3. Durat	32.16	14.88	0.056	-0.128						
4. Sat-partperf	4.91	1.24	0.193	0.672**	-0.054					
5. Sat-projop	5.20	1.00	0.180	0.515**	0.087	0.572**				
6. Sat-outagr	5.34	1.18	0.047	0.321*	0.072	0.344**	0.760**			
7. Sat-fulexp	5.07	1.39	0.147	0.356**	-0.110	0.395**	0.620**	0.730**		
8. Sat-balout	4.88	1.44	0.439**	0.585**	-0.070	0.655**	0.536**	0.346**	0.360**	
9. Evolrel	4.07	1.15	0.340*	0.331*	-0.235	0.385**	0.208	0.142	0.178	0.496**

Level of significance * 0.05 **0.01.

Tables 5 and 6 show the results of regression models for every variable representing success. The score of standardized coefficients of regression models allows us to analyze the influence of initial trust and ongoing trust on the degree of partner satisfaction and the evolution of an agreement, enabling us to test Hypotheses 1 and 2. As for Hypothesis 3, due to the fact that correlations and standardized regression coefficients constitute typified values that are free from the effects of sample size, we have opted to contrast the results from both samples in order to compare the behavior of the variables involved in the model and their relationships. Results allow us to confirm the hypotheses proposed.

Table 5
Results from regression models for CDTI Agreements.

Variable	Sat-partperf	Sat-projop	Sat-outagr	Sat-fulexp	Sat-balout	Evolrel
Initrust	0.113*	0.471	0.142*	0.202**	0.147*	0.210**
Ongotrust	0.708**	0.502**	0.451**	0.386**	0.579**	0.421**
Duration	-0.101	-0.123	-0.136*	-0.158*	-0.081	-0.090
R	0.731	0.502	0.524	0.502	0.617	0.4495
R^2	0.535	0.252	0.275	0.252	0.381	0.245
R^2 Adjusted	0.529	0.247	0.260	0.238	0.373	0.235
F (signific)	89.723**	52.834**	19.552**	17.450**	47.967**	25.295**

Level of significance **0.01, *0.05.

Table 6
Results from regression models for Eureka Agreements.

Variable	Sat-partperf	Sat-projop	Sat-outagr	Sat-fulexp	Sat-balout	Evolrel
Initrust	0.049	0.071	-0.025	0.073	0.327**	0.282*
Ongotrust	0.672**	0.515**	0.321*	0.356**	0.513**	0.269*
Duration	0.032	0.156	0.115	-0.065	-0.024	-0.222
R	0.672	0.515	0.321	0.356	0.666	0.430
R 2	0.452	0.265	0.103	0.126	0.444	0.185
R 2 Adjusted	0.442	0.251	0.086	0.110	0.423	0.154
F (signific)	44.483**	19.479**	6.188*	7.816*	21.149**	6.018**

Level of significance **0.01, *0.05.

When analyzing the relationship between initial trust and success (Hypothesis 1), the regression analyses show that initial trust has a positive influence on the level of satisfaction and evolution of the relationship. As shown, for those firms taking part in CDTI projects (Table 5), initial trust is always meaningful except in the second regression model (satisfaction with the outcomes of the agreement), whereas in Table 6 (Eureka agreements), it is only significant for one measure of satisfaction (balanced outcomes) and the evolution of the relationship. These findings support in both samples the relationship between initial trust and success considering both partners' satisfaction and the evolution of the relationship with one exception. In the Eureka sample, this hypothesis can only be partially accepted in the relationship with partners' satisfaction, as it only proves to be significant for the perception of balanced outcomes.

Results from testing Hypothesis 1 allow us to conclude that initial trust, which arises from prior relationships between partners, is a factor that influences the degree of satisfaction of the partners involved. These results are consistent with those obtained by previous studies, both for the case of collaborations among firms (Anand & Khanna, 2000; George & Farris, 1999; Saxton, 1997), as well as for cooperation among firms and ROs (Cyert & Goodman, 1997; Davenport *et al.*, 1999; Geisler *et al.*, 1990, 1991). In particular, in relationships among firms and ROs (CDTI sample), initial trust between partners affects the firm's degree of satisfaction with respect to the performance of the partner, the outcome of the agreement, the achievement of initial expectations, the obtaining of balanced outcomes for both partners, as well as the positive evolution of the cooperation relationship. In cooperation relationships between firms (Eureka sample), initial trust especially affects success measured as to the extent that the firm partner perceives that there has been an equal share of results between the partners and the positive evolution of the cooperation relationship.

In the case of the relationship between ongoing trust and success (Hypothesis 2), results from the regression models show that trust is the variable that best explains both approaches to success for both samples. In the specific case of satisfaction, regression model coefficients show high and meaningful values which are especially relevant for the level of satisfaction with the relationship and partner achievement (0.708** for CDTI agreements and 0.672** for Eureka agreements). As for the evolution of the relationship, outcomes from correlations and regression coefficients again support Hypothesis 2.

Results from testing Hypothesis 2 allow us to confirm the positive effect of trust generated during the cooperation relationship on the success. Again, these results are in line with previous studies of cooperation among firms (Andaleeb, 1996; Cullen *et al.*, 2000; Mohr & Spekman, 1994; Morgan & Hunt, 1994; Yuan & Wang, 1995) or among firms and ROs (Davenport *et al.*, 1999; Santoro & Chakrabarti, 1999; Zaheer *et al.*, 1998). Nevertheless, some differences are observable comparing both samples. When firms collaborate with ROs (CDTI agreements) the higher impact of ongoing trust is on the performance of the partner, followed by the influence on the perception of balanced outcomes between partners, the functioning and results of the project, the evolution of the relationship and the achievement of expectations. Whereas in the case of collaboration between firms (Eureka agreements), trust also affects the degree of satisfaction with respect to the functioning of the agreement, the perception of balanced outcomes and the achievement of expectations, and to a lesser extent the degree of satisfaction with the results of the project and the evolution of the cooperation agreement.

Therefore, in relationships with ROs, trust may impact more aspects of success than are directly or indirectly related with the performance of the partners and the outcomes of the collaboration project. Firms are more concerned about what they obtain from the agreement, about whether they are going to continue to collaborate or whether their initial expectations are completely met. Firms are more interested in the work and research they are provided with by their partners and how these aspects materialize in terms of concrete results. Nevertheless, in agreements among firms, not only is the performance of the partner a concern, but more value is placed on the impact that trust has on the development or functioning of the project and the fair share of results obtained by the partners, as well as how the agreement makes it possible to achieve initial expectations or objectives sought by the firms by means of the collaboration.

Regarding Hypothesis 3, about the comparison of the influence of trust on success depending on the type of partner, the results from multiple regression models (Tables 3, 4, 5 and 6) all show the same trend: values in the relationships between firms and ROs are higher than in relationships between firms only. These outcomes support Hypothesis 3, that is, on the one hand, the influence of trust (both initial and ongoing) on success (both partner's satisfaction and the evolution of the relationship) is far more intense in cooperative agreements between firms and ROs than in those involving firms.

This hypothesis has an exploratory nature not studied in previous literature. Results allow us to confirm the arguments supporting the relationship proposed. Thus, we can conclude that the influence of initial and ongoing trust on partners' satisfaction and the evolution of the relationship are greater when firms cooperate with ROs than when they do so with other firms. Comparing the CDTI sample with the Eureka one, we can observe that in the former: 1) more success measures are positive influenced, and 2) the influence of trust is higher. The reasons could be that CDTI agreements tend to be more focused on a particular activity (due to the nature of the sample, they are activities related with technology, and research and development) (Doney *et al.*, 1998), where the vertical relationship among partners causes agreements to be less unstable (Ring, 2000) and where an asymmetrical relationship among them makes it possible for partners to complement one another and to increase their potential assets (Faulkner y Senker, 1995).

Finally, regarding the control variable, we have only found that duration has a significant effect in two regression models relating to the sample of CDTI agreements. In particular, duration has a negative influence on satisfaction with regard to the outcome of the agreement and the perception of expectations having been met when the firms cooperate with ROs. In the case of the sample of Eureka agreements, we have found no significant regression coefficient for the duration variable.

5. CONCLUSIONS AND IMPLICATIONS

This paper has attempted to provide new evidence on one of the aspects that has aroused the greatest interest in this field: the study of success of cooperative agreements and its determining factors such as trust. But not all cooperative relationships are identical, displaying different features depending on the nature of the partners involved. Previous research has focused on individual types of trust or relationships, without analyzing the possible differences or similarities among them all.

So, given the lack of prior evidence, the purpose of this paper has been to compare the role of two different kinds of trust in two different kinds of agreements where firms cooperate with other firms or with ROs. In order to achieve this goal, we have first divided trust into two different time frames: formation –initial trust - and implementation of the agreement– ongoing trust. Secondly, it has been necessary to study the influence of initial and ongoing trust on the success of cooperative agreements as a first step before comparing results in two different samples, where the nature of the cooperating partners is different, the latter being what we consider the most novel contribution.

The results from the two samples, collaborations at a national level from R&D cooperative projects run by the Center for Development of Industrial Technology (CDTI), and R&D projects at an international level under the European Eureka program, have allowed us to contrast our initial hypotheses. Results enabled us to first make a complete confirmation in both samples of the relationship between the level of ongoing trust and the two indicators for success. Secondly, and only in the case of relationships between firms and ROs, the existence of prior links seems to be an important and meaningful feature which influences the success of agreements, especially in the evolution of the relationship. In the case of agreements between firms, however, although initial trust does not have any influence on the level of satisfaction, it is more important for the evolution of the relationship than the level of ongoing trust between partners.

The comparison of results between two samples has always come to the same conclusion: as shown by the different indicators of success, values obtained in the relationships between firms and ROs are higher than those of relationships between firms, regardless of the initial trust and level of ongoing trust developed during cooperative agreements.

Thus, findings show that in a situation where initial trust is similar, as is the case of relationships between firms and ROs, where the R&D activities involved result in uncertainty about outcomes, but where there are fewer risks concerning loss of autonomy or creation of possible rivals and partner contribution tends to be asymmetrical, not only is the level of ongoing trust

developed during the collaboration agreement higher than in the case of relationships between firms, but the influence of this factor on success is also greater.

Finally, we consider that our study offers new insights into the traditional relationship between initial and ongoing trust and success and its main conclusion could be: "the nature of the partner matters". This means that when a firm's partner is a RO, the level of initial and ongoing trust is greater, the level of success higher and the influence of trust on success is also greater. From a practical standpoint, our study provides guidelines that may be useful both for firms that are involved in technological collaboration agreements as well as for national and the European Union governments to implement policies designed to encourage collaboration among firms as well as among firms and ROs. Understanding that the objectives that partners attempt to reach in their cooperative relationships differ depending on their organizational mission and the role that trust plays in these relations is important to be able to increase the chances for success for these agreements. Countries in the European Union invest large sums of money in promoting these relationships, money that will be more efficiently utilized if the agreements have greater chances of success.

On the other hand, in technology-based industries it is important to maintain a certain level of confidentiality with respect to the exchange of knowledge or information. If the level of trust is high and the partners have a better understanding of their role in the success of the agreement, the number of mechanisms used to maintain a certain level of confidentiality (licences, intellectual property rights, etc.) can be reduced (Vonortas & Spivack, 2006), which would mean a reduction in the costs related to the management of collaboration agreements.

Although contributions and conclusions are of interest and relevance, generalization requires confirmation from other kinds of inter-organizational relationships and in other contexts. Thus, some aspects related to our methodology could be seen as limitations. With respect to the measuring of variables, the use of a single variable to measure initial trust among partners could be a limitation. Future studies could complement the information provided by this variable with aspects related to the degree of intensity, frequency or duration of prior relationships, which would make it possible to carry out an evaluation, ranking and classification of relationships previously maintained with the partners. With respect to the sample, besides comparing two different sub-samples, it would be interesting to confirm results in a single sample of firm partners under the same agreement with other firms and ROs, even differentiating the results depending of the kind of RO involved in the agreement (universities, state research centres, research associations and innovation and technology centres) or adding new characteristics than can explain the differences in the relationships between firms or between firms and ROs. This research would allows us to look at the same firm partner and observe what its level of trust has been like in a relationship with a firm and what it has been like in a relationship with a RO.

Additionally, it would be interesting to complement this study with other empirical tests considering ongoing trust as a variable changing over time during the life of the agreement. This complementary study would imply a longitudinal perspective for this variable. Finally, it would be interesting to investigate the same phenomenon in other geographical contexts such as R&D cooperation between organizations coming from Latin American countries or between these countries and other potential partners in Europe or in North America.

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