

# ORGANIZATIONAL ISSUES ON COOPETITIVE FEDERATED INFORMATION SYSTEMS

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**Keywords:** Federated Information Systems, Coopetition, Data Quality.

**Abstract:** In this paper we point out the organizational issues related to the set-up of a coopetitive federated information system. The joint exploitation of information owned by different, independent, even competing companies and public administrations may be carried out according to a “coopetitive model”. The term coopetition is used in management literature to refer to a hybrid behavior comprising competition and cooperation. We will show in this paper that the set-up of a coopetitive scenario raises organizational issues, which can be addressed by the creation of inter-firm personal relationships as well as by the firms decision makers active engagement.

## 1 INTRODUCTION

More and more dynamic markets and higher expectations from the stakeholders have pushed firms and Public Administrations to continuously improve their service provision models. In this perspective, an important role is played by the information management processes within enterprises and Public Administrations. Thus, managers and stakeholders need accurate and up-to-date information about the market trends, the customer satisfaction level, and other topics of interest. Furthermore, information management is the core business of many sectors (e.g. job market place intermediation, real estate activities). The increasing information requests obliges the decision makers to better exploit the information assets which are available within companies and Public Administrations. The data assets, used singularly, do not provide enough information, but their joint exploitation may provide significant answers to the information requests. However, companies and PAs may compete with each other, therefore, boycotting data exchange. We claim that the joint exploitation of information owned by different and independent entities may be carried out according to a “coopetitive model” (Cesarini and Mezzanzanica, 2006). The term coopetition is used in management literature to refer to a hybrid behavior comprising both competition and co-

operation. Coopetition takes place when some actors cooperate in some areas while competing in others. Some authors (Brandenburger and Nalebuff, 1995) (Gnyawali and Madhavan, 2001) (Lado et al., 1997) have recently emphasized the increasing importance of coopetition for today’s inter-firm dynamics, however, (Dagnino and Padula, 2002) acknowledge the weaknesses of conventional approaches and underline that coopetition is an under-researched theme.

According to (Cesarini and Mezzanzanica, 2006), three different types of coopetitive scenarios can be identified in the domain of the information systems federation: *Reciprocal advantages*, in such a case the involved partners benefit by integrating their information systems using a coopetitive model (e.g. Roaming in different Mobile phone GSM networks, autoroute automatic toll paying systems for different companies); *Stakeholders that have the power to enforce a coopetitive scenario* e.g., a company or a Public Administration may enforce a coopetitive scenario respectively within its suppliers or within its partners; *Statistical Information Systems*, some Public Administrations (or even large companies) may share the content of their information systems in order to build a system able to provide information about the population for decision support and for statistical analysis. In the sequel of this paper we will analyze the most critical organizational issues related to coopetitive

scenarios where the involved coepetitors share their information systems contents. The set-up of a coepetitive scenario requires changes within the companies or public administrations involved. The changes affect both the ICT internal infrastructure, and the internal organization. Firstly, the cost of modifying the information systems in order to provide data to a federation is very low compared to the annual incomes of many companies and public administrations, therefore, this topic can be neglected (Mezzanzanica and Fugini, 2003). Nowadays web service technologies allows the creation of federated information systems with minimal invasiveness in the legacy systems. Secondly, a partner joining a coepetitive setting has several possibilities concerning internal organization, the two antithetical are: effort can be spared where cooperation takes place, therefore, the partner may simply shift some internal resources from the cooperative fields to the competitive ones; the opposite approach is to enact a business process reengineering may be enacted to fully exploit the opportunities provided by the coepetitive scenario.

The paper is organized as follows: in Sec. 2 the data quality topic will be investigated in the frame of coepetitive scenarios; in Sec. 3 the organizational issues will be outlined and the main actors affecting the coepetitive processes will be identified; in Sec. 4 the strategies to get the actors actively supporting the coepetition will be outlined; In Sec. 5 we will point out the similarities among the set-up of a network of independent and loosely coupled nodes and the set-up of a coepetitive scenario; in Sec. 6 the time and incentive issues will be investigated; in Sec. 7 a case study will be explored and finally in Sec. 8 some conclusions will be drawn and the future works will be outlined.

## 2 DATA QUALITY ISSUE

In a coepetitive information system federation, the aim of the federation is to share information among the involved firms and public administrations (entities hereafter). It is important to check low data quality issues, since they may frustrate the coepetitors and thereby cause the failure of a federation. Low data quality may be related to several reasons:

- The data managed within a local information system is structured and managed according to different goals. We can identify operative goals (e.g. to book passengers data by airlines, to store customer addresses by e-commerce companies), and management/control goals. Many information systems are conceived or strongly influenced by

the management expressed control goals, which may conflict with the users aptitudes, namely the final users (not the managers) who perceive the information system as a bureaucratic system considered useless from their point of view. Such a perception, which might lead people not to use the system, is usually balanced by the hierarchical relationships with management. However, in a federated scenario no (direct) hierarchical relationship exists among the coepetition board committee and the final users. In this case, it is up both to the coepetition board committee and to the local managers to motivate their staff adequately.

- Data quality is strictly related to the processes used to manage the data within each local entity. Given that there is extensive literature that covers this issue, we need no longer focus on it. We would like to point out, that, existing local processes have not been designed with coepetitive goals in mind. Should any data subset considered unimportant for the local business processes, such data subset is likely to be of low quality although, it may be important for different coepetitors.
- If there is low expectation from coepetition, little care will be taken about the quality of the data provided to the federation, or the data acquisition processes will not be managed appropriately.

In both cases, the common underlying problem is the need to modify the internal organization and business processes to support the coepetition.

## 3 MAIN ACTOR ROLES AFFECTING COOPETITION

The entities entering a coepetitive scenario set-up should carry out various changes. The impact of ICT changes are few compared with the required organizational changes, both in terms of budget, time and complexity. Organizational issues can be addressed in different ways, the two extreme and antithetical approaches are: 1) to shift resources from the fields of cooperation to the fields of coepetition, 2) to undergo a Business Process Reengineering to better fit the company/public administration internal organization with the modified scenario. The first approach has minimal impact, the entities exploit that sectors where cooperation occurs needs less resources. Concerning the second approach, the involved entities may decide to undergo a business process reengineering, which can require high investments. Extensive literature on Business Process Reengineering (or even Business Process Improvement) (Hammer and Champy, 2001;

Harrington, 1991) is available, thus we will not explore these topics further. In this section we are going to point out some human related issues that should be addressed when some organizational changes are enacted to join a coopetitive scenario. Should an entity decide to join a coopetition, two actor types mainly affect the subsequent decisional processes: the decision makers (e.g. the company board, the Chief Executive Officer, ...) which affect directly the decisional processes, and some internal actors that we refer to as "coopetitive processes key roles" (CPKR hereafter) who usually have operative roles (they have a lower position in the hierarchical scale with respect to the previous actors) can strongly affect the inter entities coopetitive processes. In a coopetitive scenario aimed at exchanging registry data, the staff who is in charge of inputting data can be classified as the CPKRs. We are going to study the two internal actor categories separately.

### 3.1 The Decision Makers

The board committee managing the coopetitive scenario should carefully consider the decision makers beliefs and expectations. An entity may join a coopetitive setting either because obliged (e.g. law enforcement or stakeholder commitment) or because the entity committee feels that the coopetition may provide benefits. The contribution of the single entity to the coopetition depends strongly on how the decision makers are self committed to the goal of the coopetition. In case of forced joining, the coopetition board committee must spend a lot of effort in convincing the decision makers to effectively collaborate. Effective coopetitive inter-organization process execution requires reshaping of the entity internal organizations (the more the impact of the coopetition, the more the changes required to the internal organizations). However the decision makers can be reluctant to carry out such activities, due to the high investments required. The coopetition board committee can encourage the decision makers involvement using policy making and moral suasion. Policies that are able to fit the coopetition goals with both the single entities and decision makers goals are more likely to succeed. The impact of policy making activities in coopetitive scenarios have been studied in (Cesarini and Mezzanzanica, 2006). Policy making affect the decision makers behavior directly, while having an indirect effect of the CPKRs.

### 3.2 The Coopetitive Processes Key Roles

The inter-organization coopetitive processes involve different actors within the entities being part of the coopetition. Some of these actors may strongly affect the coopetition results, although they may have little influence on the single firm or public administration itself. We already referred to those roles as CPKRs. We can try to explain the topic with an example. Most of the coopetitive scenarios focus on information sharing, the information is primarily managed by the firms or public administration's information systems. Sometimes, the information system is conceived for supporting the management control activities rather than the operational ones (e.g. data entry operators may be asked to collect a lot of information, more than that necessary for the operational tasks). For this reason, the people in charge of data input, feel the information system more like an assignment than like a useful instrument, thus they make use of the information system only to accomplish the bureaucratic requirements and no more. Furthermore, a coopetitive setting makes use of information in a different way to that originally planned. Therefore it is likely that the people will perceive the tasks related to the coopetition as new bureaucratic ones. Among the coopetition board committee and the CPKRs there are no direct hierarchical relationships, so whether the internal decision makers have no strong commitment to the coopetition goals, it is likely that the CPKRs will have a very small engagement within the coopetition related tasks.

## 4 FOSTER ACTORS ACTIVE IMPLICATION

In this section we are exploring how to address the organizational issues outlined in the previous section. We will face the problems from the point of view of the coopetition board committee, namely the entity who is committed to foster the coopetition. There may be different form of coopetition (as outlined in Sec. 1). From now on we will abstract from the differences and we will consider a generic coopetition board committee. The first step that the coopetition board committee has to carry out is to actively involve the decision makers within the coopetitive settings. The goal is that the decision makers involved should perceive the coopetition as feasible and as a source of opportunities. People of different entities should overcome reciprocal suspicious, reciprocal knowledge among the decision makers will help to carry out this step. In this streamline it would be

useful the creation of a discussion table, where the decision makers can provide feedbacks to the cooperation board committee and may deeper their reciprocal acquaintance. In a cooperative scenario fostered by a stakeholder the “forced” competitors are inclined to assume a passive behavior, (namely a “waiting” behavior): they participate to the cooperative scenario, but they spend as less effort as possible and they observe the results obtained by the competitors that actively engage the cooperation. A cooperative scenario is likely to succeed if and only if all (or most of) the competitors will change the internal organization to exploit the cooperative scenario. Organization changes requires a lot of resources, thus the waiting competitors will not carry out such changes, unless forced by the situations (e.g. when most of the competitors would have done it). For this reason, the cooperation board committee should adequately motivate the reluctant decision makers, should smooth away the suspicious, and should present the cooperation as feasible and as a source of opportunities. An

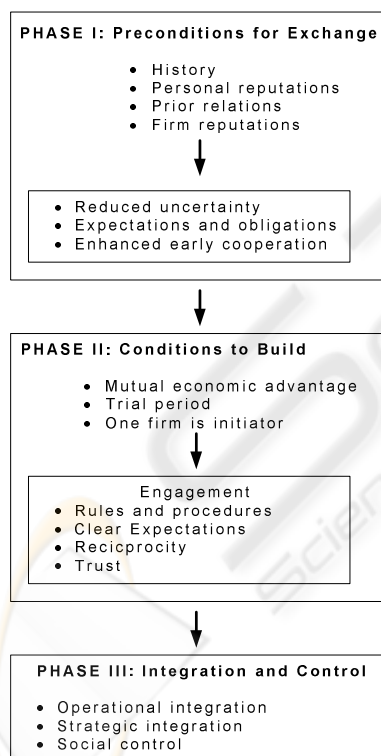


Figure 1: The three phases through which a network form is established.

optimal plan may be outlined next, it goes through different subsequent steps: the cooperative scenario is set-up, sensitization of the decision makers is carried out, stimulated entities as well as long-sighted en-

ties will try to effectively exploit the opportunities of the cooperative scenario. In the steps just outlined it is very important the time variable. If it takes too much time, the decision makers could have a kind of negative feeling about the cooperation success possibilities, therefore they will never shift from a passive approach to a proactive one. The decision makers active engagement is the first step in building an effectively working cooperative scenario, however the CPKRs role should be considered as well. Also these people should be actively involved within the cooperation processes, since their contribution is very important, as explained in previous section. The CPKRs may perceive the cooperation related tasks as additional bureaucratic effort, in addition the CPKRs may be required to get in touch with people of different entities to participate in inter-entity processes, and this can increase the CPKRs reluctance to collaborate. The committee management board most probably has no direct relationships with these people, so they have to be reached and sensitized through the decision makers collaboration.

## 5 SIMILARITIES WITH THE NETWORK FORMS OF ORGANIZATION

The process of building a federated information system on a cooperative basis is strongly affected by the establishment of mutual relationships with the involved actors. In these processes similarities with the building of “network forms of organization” are present. The expression “network forms of organization” refers to two or more organizations involved in long-term relationships (Thorelli, 1986) and the first study in this field has been carried out by (Powell, 1990). An interesting evolution process of network forms of organization (hereafter network forms) articulated in several phases has been described by (Larson, 1992). According to this model, a network form develops in three phases (summarized in Fig. 1), each with particular and important social aspects.

1. The first phase is a preparatory one, during which personal relationships are established and good reputations of the involved people are established.
2. During the second phase the involved actors start exploiting mutual economic advantages from their relationship. During a trial period, the actors taste in an incremental way their competences and their availability to cooperate. A positive ending is the result of the incremental growth

of trust and the evolution of reciprocity norms during that period.

3. In the third phase, the organizations became operationally and strategically more tightly integrated. But in lieu of cost considerations or legal contracts, effective control and coordination were achieved, and opportunism avoided, through the regulatory presence of moral obligations, trust, and concern for preserving reputations.

A federated information system may be considered a network form of organization, therefore the issues concerning trust and relationships may be applied to the set-up of a federated information system as well. The trial period just introduced is an important topic that should be accurately cared during the set-up of a cooperative federated information system. Especially when there are no prior strong relationships within the involved entities (e.g. in the case when the cooperative scenario is enforced by a stakeholder).

## 6 TIME AND INCENTIVES

A competitor may choose to have either a proactive or a passive (waiting) approach. The decision is related to the decision maker's personal beliefs, expectations, and propensity to invest. Every competitive scenario should reach a specific "critical size" so that the cooperative processes can provide significant reward to the competitors. Otherwise the reward will be insignificant. In the latter situation a competitor has no advantage to modify its business processes and internal organization to exploit the cooperative scenario, thus the competition is going to starvation. This is likely to happen during the initial transient time or when the competitors are too pessimistic, thus, the competition would never start on its own, unless being stimulated by offering incentives to the players. Basing on the above considerations, we stress that in order to set up successfully a cooperative scenario, an important role is played by the incentives used to shorten the time it takes the actor involved to have positive expectations about the cooperative scenario and about the cooperative processes.

## 7 STUDY CASE

The Italian private job agencies and public employment services, according to a law commitment, have created a virtual job market place, whose name is "Borsa Continua Nazionale del Lavoro" (BCNL hereafter). A virtual network, whose nodes can be ac-

cessed online from a Portal (Fugini et al., 2006), federates the information systems of the just introduced entities. The job seekers can access matching vacancy descriptions without being limited to the boundaries of a local job agency. The federation has been conceived in order to build such a global market place, while preserving the possibility to do business by some partners (e.g. private job agencies). An ad hoc data management model allows to reach both the goals. Every agency participant to the network collects curriculum from job seekers and vacancy descriptions from enterprises. The data contained in a curriculum is split in two subsets: the "public" and the "private" profile. The public profile can be considered an anonymous version of the original curriculum, while the private profile contains the contact details only. Vacancy data is similarly split in public and private profiles. The public data profiles (regarding both vacancies and curriculum descriptions) are shared among the network and are used to match each other. If a vacancy public profile matches a curriculum public profile, the job agencies (or public employment service offices) are notified. Contact details are eventually shared between the involved intermediaries according to business rules. The BCNL service model is deeper described in (Fugini et al., 2005). In the resulting scenario, the competitors cooperate in creating a global virtual market place of curricula and vacancy descriptions available for matches, while they compete in looking for job seekers and vacancy offers (to add to the virtual market place), in fostering matches among job demands and job offers as well as in selling the contact details to the enterprises once a match occurs. A similar approach is being evaluated in the SEEMP (Single European Employment Market Place) project (SEEMP, 2006), whose goal is to connect the national public employment offices and private job agencies through a European federated information system. In the BCNL scenario, the boards of the private job agencies and the directorate of the public employment services represent the decision makers within the different entities, while the front-office operators that welcome the job-seekers and the companies representatives represent the CP-KRs within the scenario. The front-office operators interview the job seekers, help them to write the CV and upload the data within the local agency information system. The more time they spend to qualify the job seekers descriptive data that is entered within the local information system, the higher is the data quality that flows within the BCNL. Conversely, the front-office operators may insert into the information system low quality data, because the operators rely more on local knowledge and relationships rather than data

sharing to match CVs with job offers. The coopetition board committee should enact policies that help avoiding the latter behavior, because it goes against the coopetitive scenario goals, i.e. the circulation of information among the entities being part of the federation.

## 8 CONCLUSIONS AND FUTURE WORK

In this paper we have presented the organizational issues arising when trying to establish a coopetitive scenario, especially when the coopetition focuses on information sharing. The term coopetition is used in management literature to refer to a hybrid behavior comprising competition and cooperation. A coopetitive model is getting more and more popular in today's inter-firm and Public Administration dynamics. The set-up of a coopetitive scenario is not an easy task, it requires times, resources and changes in the internal organization of the involved entities. The committee fostering the coopetition has to take care of the behaviors of the public administrations and companies internal actors who can affect the coopetition success. From this point of view, we have identified that the most relevant actors within an entity are the decision makers (e.g. the boards of the companies or the directorates of the public administrations) and the CPKR's "coopetitive processes key roles" who are people that can strongly affect the inter-entity coopetitive processes. These actors should be adequately motivated to join and to actively support the coopetition, mutual relationships should be established paying attention to build effective collaboration relationships and avoiding opportunistic behaviors. A study case has been presented, with the goal to point out some of the topics introduced in this paper. The study case describe a federated information system of private job agencies and public employment centers, that has been created with the aim of creating a virtual country wide job market place. Concerning the future works, we are investigating coopetitive scenarios where the set-up transient time length is a critical success factor. We are investigating the usage of game theory to model the coopetitive scenarios and to find out appropriate incentives and policies.

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