CONTEMPORARY BUSINESS MANAGEMENT MODELS: PROJECT NETWORKS AND NETWORK ORGANIZATIONS

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Abstract: *This article addresses the emergence of networks in practice and the role they play in contemporary business management models. A literature review of approaches towards networks has been done and different authors' perspectives have been revealed. The synergy between processes, structures and governance of a network has been identified as performance factor. Networks are analyzed from the resource-based perspective and are presented as dynamic sets of inter-organizational and inter-personal relationships which sustain beyond particular projects. Uncertainty, interdependence, coordination and network centrality are pointed out as essential for the management of a network. The outline of the article is guided by the following questions: What does a network consist of and what are the different perspectives and dimensions of networks?; What impact do networks have on projects and how do we manage a project network?; What are network organizations and their role for the theory and practice of project management?; What is the effect centrality and coordination have on networks structure?*

Key words: *Project networks, Network organizations, Coordination, Network centrality*

I. Introduction

In a world where projects represent an increasingly important organizational and economic unit, the capability of generating and executing projects becomes critical for company performance and sustainability of firm-level competitiveness. Despite recent contributions to the area of project-capability building, many of the challenges remain largely unexplored areas of research.

When a field or discipline grows and matures this often results in plurality and differentiation, but also in fragmentation. A recent research [1] addresses perspectives underlying the project management literature. Content analysis of selected textbooks and formal articles revealed that this literature is primarily based on a few perspectives, and

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that the perspectives emphasized have changed over time. A surprising fact that was revealed was the modest number of observations related to the stakeholder perspective, in particular underlying theories related to network and relations. This may be an indication that modern authors do not show a particular interest in the stakeholders and the author believes that it should be given more attention in the future.

Regarding networks most early research on permanent organizations was done in order to understand how formal and informal aspects influence organizational behavior. The focus has then gradually shifted towards environmental factors. Research on temporary organizations or project networks as they would be called in the course of the article, seems to follow the same direction. Several scholars have widened their perspectives on projects to include an interest in environmental factors and how these factors influence structures, processes and outcome of different kinds of projects [2].

There seems to be a lack of analytical tools for investigating environmental aspects more specifically, for example, how such aspects cause uncertainty that influences vital aspects of project management.

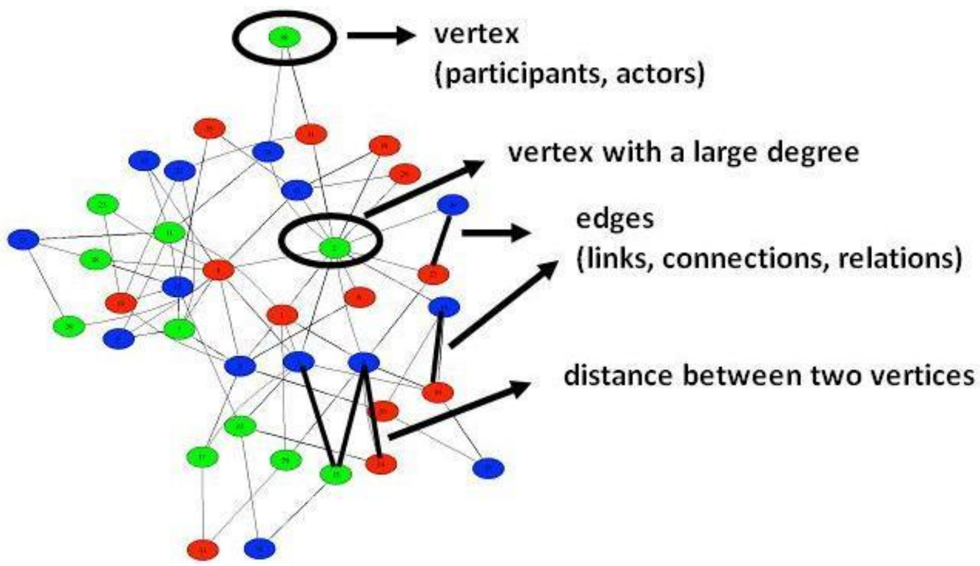
A recent research on innovation networks [3] focuses on three main lines: processes, structures, and governance. The first analyzes how technological processes develop through collaboration. From a network viewpoint, a second line explores how structures operate in terms of partners and resources. Finally, the third line examines how the governance of a network is managed in the development of collaborative R&D. These three lines of research – processes, structures and governance – examine the factors that make the performance of innovation networks efficient, but have done so only partially, or independently of each other, rather than as a whole. Networks and particularly innovation networks are considered an organizational and economic reality, which makes this a promising field for scientific research [4–7]. From an organizational point of view, firms join other partners (companies, research centers, universities, etc.) to organize networks at local, national and international levels, in order to develop technological projects that can positively influence competitiveness [8].

The interactions between these network dimensions will be looked at from different perspectives analyzing the effect they have on network performance.

II. Approaches for exploring networks

A network (simply illustrated as a graph) is an abstract mathematical object that consists of a collection of individuals or entities; each called a vertex or node in the network, and a list of pairs of vertices that are neighbours or directly connected, representing edges or links in the network. Social network users may represent vertices and the connections between them are the edges. It`s common and often helpful to visualize networks with a diagram (Fig. 1) [9]. but it is important to know that the network is the list of edges, not the visualization itself, as the visualization might be altered but the relationship might not have changed. If “N” denotes the number of vertices in a particular network, then the largest number of edges is N (N-1)/2. That means that there might be N choices for a vertex to appear at one end of the edge; N-1 choices for a different vertex to appear at the other end, not allowing self loops in the definition. It is divided by two as each edge is calculated twice. The degree of a vertex in a network is its number of neighbours or direct connections. The distance between two vertices in a network is the length of the shortest path connecting them. That is the minimum number of links. This assumes the network has only a single component. If two vertices are in different components, their distance is undefined or infinite. Another element of a network analysis is a diameter, defined as the average distance taken between all pairs of individuals in a network. It is a measure of how near or far typical individuals are from each other in the network.

Fig.1. Visualization of a network



The visualization allows clear analysis and identification of all actors and links between them in a particular network. It also gives information of how participants are related and which of them play a central role within the network.

Networks are also considered an economic reality. Public institutions promote the development of technological networks as part of their technological policy with the purpose of enhancing the country's competitiveness [10–12]. According to Sakakibara's [13] report, Japan, one of many cases that could be mentioned, is a country in which technological projects developed in networks are encouraged by the Japanese administration. As cited in numerous studies, this policy is also followed by the American administration [14,15]. In Europe, technological policies are included in the R&D Framework Programs, which promote the establishment of innovation networks in the development of technological projects [16,17].

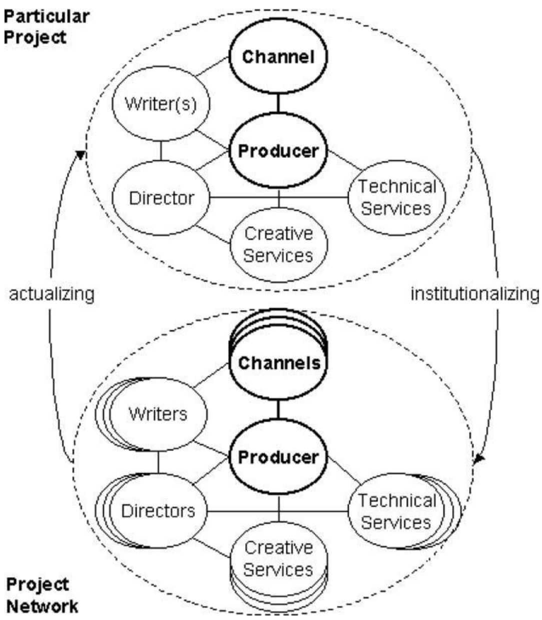
If we look at the network structure from a resource-based perspective, we may argue that the objective of the network involves an incentive to create the network, which is to generate a common profit (joint utility). Moulin [18] and Hagedoorn [6] pointed out that the incentive exists because the whole utility of the network is greater than the sum of individual utilities that partners would have achieved by acting individually. In general, previous studies have suggested that network benefits include cost reduction, risk sharing, access to financial capital, complementary assets, improved capacity for rapid learning and knowledge transfer [6,13]. To accomplish the goal of joint utility, the network requires a structure made up of partners and the resources they contribute. The resource-based perspective affirms that collaboration in the development of a project by a network of partners is one way to access resources or to improve competitive positioning of an organization without the need to acquire or possess them through more traditional paths [19]. Competitive advantage arises not only from resources owned, but also from the possibility of accessing other resources through cooperation [20].

Some researchers have studied project networks as inter-organizational relationships, emphasizing the fact that many ‘‘independent’’ projects are embedded in a large reciprocity-based inter-organizational relationship [21]. Due to imbalances in the distribution of resources, attention and authority, and because of the interdependencies among projects and organizations, the environment in which project networks exist are described as uncertain [22]. As a consequence, project managers must use different kinds of strategies to attract attention, enroll stakeholders, and to mobilize support from more distant but powerful actors [23]. Trust has also been identified as an important factor that shapes and stabilizes inter-organizational relations [24]. Others have described these project networks as highly dependent on supportive social and political institutions in their organizational fields [25]. In a recent research [26] a model for analyzing interactional uncertainty has been designed. The research on inter-organizational relations is extensive and offers determinants and typologies of different kinds of relationships. It has been argued [14] that the main problem for every organization, according to resource dependence theory, is how to manage uncertainty and achieve freedom of action.

III. Networks as dynamic organizational forms

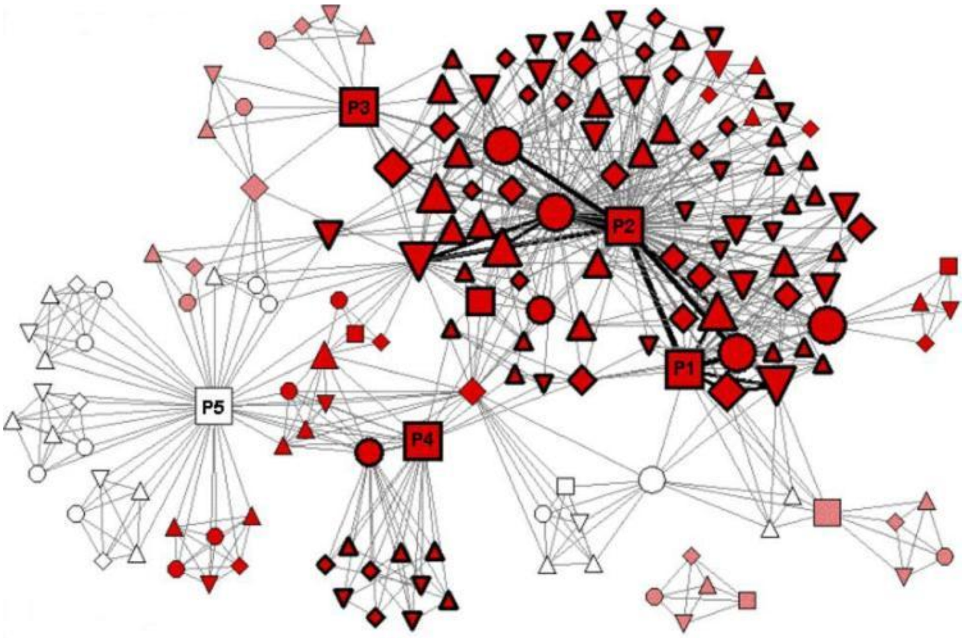
Project networks consist of longer-term relationships of actors that are reproduced by the very projects they collaborate in. That is, through particular projects, network relationships are both actualized and institutionalized, and eventually changed, e.g., when actors change their status in a pool, which makes project networks both a permanent and dynamic organizational form [27] (Fig. 2). In managerial terms, project networks promise to reconcile the needs for stability and flexibility as well as for exploitation and exploration in project business.

Fig. 2. Project networks in TV movie industry as dynamic organizational forms.



Increasingly, project research has become interested in studying projects in their historical and structural contexts. Typically, high-tech projects have been analyzed within the context of matrix organizations. However, by comparison, creative and professional service projects seem to be embedded in project networks which, unlike matrix organizations, stretch beyond the boundaries of the firm, yet do not dissolve fully into the market. Project networks are dynamic sets of project-based inter-organizational and inter-personal relationships which sustain beyond particular projects. They resemble concepts like the virtual corporation or the dynamic network. This has been argued in a recent research [28] in the media industry (Hood Productions – a German TV production company), where a project network have been looked at in more detail in terms of its structure and dynamics as well as its managerial potentials and challenges. This was done by taking a structural network perspective based on the aggregate project affiliations of different actors (marked with a different figure) working in 63 projects from 1997 to 2003. (Fig.3)

Fig.3. Project network of Hood Productions (1997–2003).



Recent management and business research has demonstrated the importance of business models for value creation and company performance. So far, extant research on business models has not investigated the particular requirements, characteristics and combinations of business models in project business. Business models have been considered by many authors to concern firm-level descriptions of business (Hedman and Kalling, 2003; Mahadevan, 2000; Siggelkow, 2001; Tikkanen et al., 2005). However, conceptualizations of business models increasingly suggest that a firm can have several business models. For instance, Zott and Amit (2008) divide business models of a company into two main categories — novelty-centered and efficiency-centered business models. Other authors (Markides and Charitou, 2004) address the challenge of having two business models in the same market at the same time and identify potential conflicts. Most conceptualizations of business models build on value creation for the customer (Chesbrough and Rosenbloom, 2002; Magretta, 2002; Morris et al., 2005; Normann, 2001; Ulaga, 2003; Vargo and Lusch, 2004) and value capture for the contractor in terms of customer relationship functions (Möller and Törrönen, 2003; Walter et al., 2001), relationship value (Baxter, 2009; Diamantopoulos, 2010), types of impact of service offerings on the contractor's business (Artto et al., 2008), entrepreneurial approaches (Zottand Amit, 2008), profit models of various business designs (Slywotsky et al., 1998), and the underlying logic for a contractor's revenue and profit generation (Magretta, 2002; Morris et al., 2005).

In a recent empirical study [29] the existence, relevance and differences of business models in project business have been explored. This is done by identifying business models that might not be explicit but hidden or embedded in the formal or informal practices, activities and approaches in networked organizations among multiple firms and projects. They categorized three types of business models – business models for single projects, project networks and business networks and revealed that corporate executives believed such boundary-spanning business models would become more apparent in the future.

Network organizations or network organizational structures are identified as a contemporary management model [30]. This is determined by the fact that each person or a group of people, anywhere and anytime, have a free access to necessary information, problem solving technology, given the necessary technical means are at his/ their disposal. In some western countries the network model for organizing the company is becoming a leading management trend which is a result of: constantly changing business environment and a necessity of adopting the company to these changes; complicating of company's production and trade activities; focus on time-based competitiveness; globalization of business.

The network model of management is applicable to inter-organizational coordination as well as to interactions between different organizations. Network structures reflect the connections between the components of the internal environment and the factors of the external organizational environment. Formation of networks with specific network links is related with the organizational goals. Furthermore, network structures facilitate inter-organizational cooperation as well as cooperation between separate organizations. These structures are, in most cases, decentralized and very flexible. They can easily adapt to market changes and transform into new structures forming a level of competence that is required by the market. Common characteristics can be identified within network structures: joint mission for all elements of the network structure, common goals and values and as a result joint vision for the outcomes, given a certain level of coordination; fair independence of the members/elements of the network; volunteer interdependence and joint efforts for partnering; lack of hierarchy in the management.

IV. Issues of coordination and centrality in a network

The traditional approaches to coordination were to delegate more authority to a single actor. The idea was to secure coordination by control from the top, a ‘coordination by command’ approach. Contemporary thinkers contend that it may be timely to consider whether an organization should be reconceived as constituting a social network [31]. Coordination can be seen as multilayered, involving the orchestration of relationships not only at headquarters but also at the regional, national and field levels [32]. Hierarchical models of resource allocation and coordination emphasize the power and dependencies, which develop during inter-organizational transactions.

Coordination theorists attempt to analyze and assess interdependencies and levels of coordination by using conceptual modeling in specific domains and contexts [33]. The challenge for studying coordination in a dynamic and complex environment is to create a model that is context driven, and which can be developed based on the problems of a disperse network. A dominant characteristic of coordination in this type of context is the network structure itself. By developing a model that focuses on the relationship between the network and it’s correlation with coordination, an assessment of the current workings of a complex and dynamic network can be analyzed and assessed against its effect on coordination [34]. Although the pre-existing models examined each bring useful perspectives to enhance coordination in specific domains, no one model looks at the network itself to draw conclusion about coordination, but instead focus on achieving coordination by managing either the task [35] or the relationship dependencies as shown by the Coordination Theory Model [34, 35]. These types of structures seem very inwardly focused and impractical where interdependent tasks suffer from conflicting motivations, and relationships are volatile and unpredictable. For applicable use in complex distributed networks, research into the network itself seems necessary in order to understand communication structure and properties of interconnectedness.

Network structures can be either stable, representing long-term partnerships usually around one organization or dynamic which represent temporary alliances of separate firms and emerge as project networks. Coordination within a stable network structure is carried out by a central office called “broker” [30]. Major functions or activities can be allocated to separate departments or organizations. Flexibility allows these organizations to be competitive enough as well as cooperative. Competitive strategies are directed towards other organizations and aimed towards obtaining strategic resources at the expense of their competitors. Some authors reflect on three cooperative strategies: contracting, co-opting and coalescing, all representing different degrees of cooperation and commitment [26]. Contracting refers to the negotiation of an agreement for the exchange of performances in the future. Co-opting refers to the process of absorbing new elements into the leadership or policy-determining structure of an organization as a means of averting threats to its stability or existence. Coalescing goes one step further as it refers to a combination or joint venture with another organization/s in the environment. An increased degree of integration constrains freedom of action. These strategies seem to be applicable to both permanent and temporary organizations.

Studies have shown that vertically hierarchical network structures increase efficiency and reduce coordination costs. This is due to the fact that a hierarchical structure has a chain of command, and thus there is an established medium on which to pass strategic information. A free-forming dynamic network structure in which an actor has many adjacent nodes would result in the actor having to invest more time and effort to build the network in order to maintain its social capital. In reality however, people tend to communicate through these dynamic network structures, thus limiting the effectiveness of the formal hierarchy. It is for this reason that the underlying ‘shadow’ networks must be streamlined. A study of network centrality aims to harness the benefits of these dynamic networks and to improve coordinative activities.

In a purely graph theoretical sense, centrality is the state or quality of being central in a network structure [36] Centrality is a structural attribute of nodes in a network, not an attribute of actors themselves, but of their structural position in the network. Measures of centrality are based such attributes as the closeness, degree or distance between two points. In a social network sense, centrality has been defined by leading social network researchers as a measure of the potential importance, influence, and prominence of an actor in a network [37]. Therefore, it can be argued that the potential importance, influence and prominence of an actor are important indicators for a strong coordinator. It has been argued that centrality measures are an explanatory variable in studies of actor influence and actor control [38] Network structure in an organization form a social network and the participants should be encouraged to build cultures, which promote knowledge sharing and consensus building. This term has been coined ‘collective sense making’ [39] and may exist across successive instances of joint engagement. It is suggested that maintaining social ties between collaborative work is critical for knowledge sharing and improved coordination for the next joint task.

Research within resource dependency has also argued that there is a positive association between organizations’ network centrality and their supposed influence in community affairs [40]. The central and more visible actors in the network are more likely to be potential allies for other powerful actors, and thereby appearing even more powerful. This can be easily observed in Fig.3 where the biggest figures (squares) represent the executive TV producers in the project network. To measure the effect of centrality on these coordination processes, data can be collected on the actors which enact these coordination processes and their relative centralities could potentially be compared to determine if a correlation exists.

V. Conclusions

Within contemporary organization theory an increasing attention has been drawn to the fact that neither permanent nor temporary organizations can be understood without taking their relations to other organizations into consideration. Given the importance of project-based organizations and project management, collaboration and the variety of network models powerfully evolve as dynamic organizational forms.

A literature review has been made and key issues on network management have been discussed. It has been demonstrated how networks. It is revealed that there is a strong correlation between network centrality and coordination and that the performance of networks can be increased through the suitable design of process, structure and governance subsystems. All these network aspects should be taken into consideration when testing these statements in practice in a following research.

Presented as multidimensional phenomenon, networks (being temporary project networks or permanent network organizations) were identified as a contemporary business management model that exploits and explores project opportunities in the long term and builds on the organizations` capacity.

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