

## Defining Business Network

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### Abstract

The purpose of the present scientific contribution is to investigate from the business economics standpoint the emerging phenomenon of company networks. In particular, through the analysis of the theory of networks will be proposed the principal categories of business networks, and even before this the concept of the network will be defined. The proposed research, qualitatively, represents the point of departure for the study of the network phenomenon in light of the current economic phase termed "economy of knowledge". Moreover, the research questions are the following: From where does the theory of networks arise? Do company networks consider themselves equal to knowledge networks?

**Keywords** : Network, Business Network, Knowledge.

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### 1. INTRODUCTION

With the birth of reticular capitalism (Schiavone, 2008), the postford companies create collective value through the effect of group action and group interests of the productive multi-business system: the processes of creating value realized by single companies appear always more dependent on those of other companies.

In this sense, the concept of company networks has made progress: a group of companies with free access to cooperative relations modify, on the one hand, the mechanisms of administration of businesses and economic sectors; and on the other, the mechanisms of the functioning of the market.

Although the network derives from centralizing phenomena or of productive decentralization (Powell, 2001) there are no constraints in its formation in terms of size: company networks are formed both by small business realities, as well as by large companies (Grandori, 1999).

From this point, the phenomenon of company networks represents an opportunity for encounter and growth.

In light of what has been laid out, the present article proposes to investigate the phenomenon of networks starting from the analysis of the scientific research that currently exists for interpreting the paradigm.

To continue on this theme, the definition of network, according to the literature, and the reconstruction of the historic evolution of the theory of networks, appear to be indicated in order to identify reticular typologies. Furthermore, the research question is the following: In what areas does the theory of networks originate? What is a company network? What are the network typologies? From the economic-business point of view do company networks consider themselves the equal of networks of knowledge?

### 2. THE THEORY OF NETWORKS

Among the first contributions useful in explaining the phenomenon of company networks is the theory of graphs (Barabasi, 2002): it investigates the structure of networks, on the one hand, identifying the laws governing the expansion of networks, and on the other, recognizing

certain physical, mathematical and innovative theories; in this regard the use of *social network analysis* has assumed particular importance (Wasserman, 1994) as a set of instruments and techniques for investigating social relationships.

The theory of graphs originated in 1736 with the mathematical demonstration of Eulero. He introduced the geometric solution to the problem of the position of the seven Bridges of Königsberg in Prussia, built on the Pregel river: find a way to cross each bridge only once in order to visit the entire city.

Eulero substituted the land areas of the city, divided by the bridges, with annular junctions and every bridge with a *link* or connection. In this way the first graph with four junctions and seven *links* originated. The solution to the problem is shown by the non-existence of a path that crosses all the sides of the city only once: networks are distinguished by many properties which can limit or favour solutions to problems. This means that small structural changes can provide new opportunities for *problem solving*.

The theory of graphs has undergone changes introduced by Cauchy, Hamilton, Cayley, Kirchhoff e Polya. Only recently, around the 1950's, have academics concentrated on the how and why of the origin of graphs and, therefore, networks: such questions were the theme of the research of two Hungarian scholars, Paul Erdős e Alfréd Rény, who layed the foundation for the theory of networks or random graphs.

The main difference between the theory of graphs and the theory of random graphs lie in the fact that the first analyzes the regular graphs: the junctions of the networks have all the same number of connections. The second theory holds, instead that if the links are randomly located in the network, every single junction can have the same probability of acquiring the connections. Moreover, the random network, even if there is a fixed number of junctions, is marked by the presence of equivalent junctions, connected among themselves among themselves.

The theory of graphs or of random networks is similar to social relationships which it discusses as the concept of social capital: it represents the set of relational resources which a group can use, together with other relational resources to achieve its goals. Currently, the economic *performance* generated by company networks seems to be influenced by the social context in which it operates.

The changes undergone by the theory of random networks have also affected the distance between junctions.

On this subject, the principal analysis has been carried out by Milgram (1967), who tired to understand the distance between tow cities in the United States through the sending of letters of specific towns. From this perspective the networks comprise a small world (Buchanan, 2002). Only a few connections are need to reach people, companies and the web.

Only at the end of the 1960's are interpersonal networks begun to be spoken of according to the sociologist Granovetter (1973): his studies attempt to analyse relationships integrated in social networks in terms of intensity.

In this regard, the investigation of the strength of bonds, whether weak, or strong, confirms the influence of social networks in the search for work. He demonstrates that weak bonds, consisting of mild friendships, have greater chances of obtaining access to work information compared to those who depend on family ties or intimate friendships.

Granovetter diverges from the idea of Erdős and Rény: he thinks of a company as if it were a *cluster* of friends in which everyone knows everyone else; weak bonds are few and represent a link to the outside world even in terms of information. The measure of a *cluster*, inside social networks, was introduced by Watts and Strogatz to determine the strength of the circle of friends.

The authors maintain that such a phenomenon applies both to social networks and all other types of networks. *Clustering* can be created in any area (Johnson, 2009).

Assuming the analysis of a circular network in which every junction is connected to the next, it becomes a small world adding only internally a few networks at random. With the connections discover the shortcuts between the more distant junctions, effectively bringing them closer together.

If it is assumed that a company, represented by a circular form, identifies a big world, not a small one; few *links* are needed to reduce the average separation between the junctions of the network.

Moreover, the *test* of the degree of sociability of the junctions, used by Gladwell in "The tipping point" (2000), has demonstrated how each person or junction possess the extraordinary ability to make friends and, furthermore, have a higher number of connections. Connectors recognizable as hubs dominate the reticular structure of which they form a part.

They reduce the distance between the junctions creating a small world within the company. From this point forward, the existence of the connectors guarantees the missing fragmentation of the network.

The networks of the real world, from which originate the invariability of scale, are regulated by the laws of power. In virtue of this, the degree of distribution of a random network follows a bell curve and the junctions have the same number of *links*; in networks of invariable scale, instead, almost all the junctions have a few connections managed by presence of some *hubs* connecting them.

Understanding this shows the limits of the theories of both Erdős e Rény, and Watts and Strogatz: These ignored the existence of reticular connections.

Only with the introduction of networks of invariable scale, of the real world, has the function of connectors in terms of invariability of scale, dynamism, durability, and resistance to damage from the network itself, come to be understood.

The networks of the real world are based on growth, which justifies the presence of the *hubs*, and on the preferential connection to more junctions more popular because of their attractiveness.

The changes in the theory of invariability of scale permits world networks to be defined as follows;

- they are formed by junctions and arches: social units (individuals, groups, companies) and relationships;
- new network junctions emerge spontaneously, depending on the real world network typology considered;
- the networks, the junctions and their connections can disappear depending on events affecting the network, such as attacks targeting the network, or viruses, which make the reticular system vulnerable;
- the network junctions can be rewired and so replaced with other preferred junctions.
- the network junctions age and, furthermore, lose their ability to create new connections.

### 3. WHAT IS A COMPANY NETWORK

The company network is a free business association, able to create structures and processes capable of joint decision making and of integrating the efforts of members to design and produce goods and services, to develop new processes, to reduce times needed for innovation or for entry into the market, to exchange information and other resources.

There are multiple opportunities available to businesses in the network: relationship investment encourages interdependence between different systems and reinforces their complementarity; every cooperative process affects every company of the network.

The most common graphic representation of a network contains a certain number of junctions (people, groups of companies) and arches, which indicate the relationships between various network individuals.

Depending on how they are defined, connections or *links* are expressions of the inter-business communication process.

The transfer of knowledge in the field of networks must take into account the analysis of certain elements which distinguish the relationship:

- the context. The relationship begins when certain events take place: the parties involved are subjected to informational asymmetry;
- reciprocity. The bond between the involved parties is characterized by bi-directionality and, furthermore, by a certain level of correspondence between the junctions;
- interpretation. This comes from the suggested meaning associated with the symbols expressed in the relationship;
- the content. This comes from the meaning denoted by the symbols expressed in the course of an interaction;
- the strength of the connection. The frequency or the strength of the bonds are often determined by their duration.
- the susceptibility of a junction to a virus. This factor represents the possibility of contagion of the reticular nodes with respect to the acquisition of new information and ideas.

The combination of such elements determines the analytical power and the depth of the analysis of the network. The study of the intensity of the connections, according to Granovetter, shows that the more useful information, in the area of work, come from individuals who belong to extensive, and not restricted networks: acquaintances or friends of friends. The strong bonds within a group allow network junctions to share the same information. In this light, information coming from outside offers unique perspectives and

strategic advantages to those who obtain it. It should not be forgotten, however that weak connections supply a fundamental informational support system, overcoming the limits of the strong connections: on the one hand, it is possible to form relationships to discuss matters that one does not want closer collaborators to become aware of; on the other they promote social interaction and a sense of community.

#### 4. TYPOLOGIES OF COMPANY NETWORKS

According to economic theory both a macro and a micro perspective exist which summarizes the concept under examination: the macro perspective compares the network to an instrument which coordinates companies; according to the micro perspective the network is investigated in terms of strategy and operations as a function of the changing dynamic of the company.

In the first case, the network, as an instrument of coordination represents a hybrid form of the market and hierarchy (Williamson, 1991), an alternative form of market and hierarchy (Powell, 1990), coordination which uses mechanisms of *governance* that go beyond the market and the hierarchy (Grandori, 1999).

The predominant theory identifies an intermediate organizational model between the market and the hierarchy since it is based on cooperation between companies and on procedures of interaction specific to the *partners*.

In order to explain the procedures which regulate relationships between economic agents, according to transactional cost theory, a set of management mechanisms are identified in the market based on the meeting of supply and demand; while in the hierarchy a set of mechanisms based on the hierarchical authority of *management*.

According to Williamson the transaction cost represents the instrument useful for deciding whether to carry out a production activity internally or to delegate its production to the market. At this point, *management* chooses one of the two procedures as a function of transaction variables: uncertainty, time frequency and the specificity of available resources for exchange: the aforementioned theory identifies the basis for economic exchange in the transaction: "*The transfer of a good or service through a technologically separable interface.*" (Williamson, 1985).

At this point, the market and the hierarchy are not the sole, unique options available to the company to conduct its business. Since the competitive business context is characterized by uncertainty, transactions have to be controlled by suitable instruments: contracts are replaced by hybrid *governance* agreements between the market and the hierarchy to combat environmental change. In other words, they look to the network.

In the second approach, the micro type, the network takes on the following characteristics:

- the external network unit identifies a set of organizationally distinct companies, but united from a strategic point of view in order to reach objective;
- the internal network unit identifies a large company with a central *core* and possessing more strategic business units or fewer individual objectives;
- at the interpersonal level the network is seen in relationships, even social ones, between diverse individuals within an organization.

Among these, the external network unit is the more researched model in business economics. In this regard, it is possible to distinguish different types of company of company networks.

The external company network sets up a further network which is viewed in business economics in terms of three reticular choices:

- the configuration of the company. Such a network is formed by a set of businesses guided by a company *leader*. The business systems are compatible thanks to the complementarity of knowledge in a position to develop synergistic relationships and determine common objectives.
- the *hollow corporation*: The company network *leader* initiates a policy of decentralization limiting itself to tasks of industrial organisation. The typical example is the fashion sector: the brand holding companies farm delegate manufacturing to outside firms, concentrating on the creation, design and commercialization of the product.
- the industrial zone: the postford network model represents "*a social territorial entity characterized by the active coexistence in a circumscribed area, naturalistically and historically determined, of a community of people of a population of industrial companies*" (Becattini, 1991). In other words, it represents an organization unique due to the presence of many companies with common structural characteristics.

An additional classification of external company networks is the following:

- the social network is made up of a group of companies which share values and linked informally;
  - the bureaucratic network is comprised of a group of companies whose relations are regulated by formal institutional mechanisms such as, for example, *franchising* or supplier contracts, or authoritative power structures;
  - the ownership network is made up of a group of companies which pool their resources, regulated by mechanisms based on property rights, in order to benefit from the advantages derived from activities carried out together. An example is the *joint venture*;
- The network of companies is different from the company network: the latter is comprised of many companies which are legally autonomous, but joined in the productive process and by a vertical control hierarchy, especially during phases of a strategic character.

From the operational point of view, in the case of a network decentralization of production is initiated.

Moreover, depending on the distribution of power and the presence of central company, the company network can be (Lorenzoni, 1992):

- balanced. The balanced company network specifies a configuration of companies. There exists a group of companies coordinated by the leader company: the aim is the pursuit of a common goal;
- acentric. The acentric company network is formed by many companies that have the same power to determine the reticular dynamic evolution and that, also, pursue a common objective;
- governed. The governed company network is endowed with an operating system for determining strategy, both of the *mission* and of relationships;
- natural. The natural company network is distinguished by the lack of a legal *leader*, by a flexible structure, and by common strategy among the junctions of the network.

In the last analysis, if the investigative approach concentrates on the business system, the company network can be found in a single company which decentralizes its productive processes.

## 5. REFLECTIONS ON FUTURE RESEARCH

The phenomenon of company networks investigated in the present study represents the starting point for our further research. In particular, the avenues to be pursued concentrate on the analysis of innovative reticular models and on the study of networks of companies as networks of knowledge.

In the first hypothesis, the phenomenon is investigated in the existing literature on innovation: the network would appear functional in reaching a competitive advantage to the extent that a union of many companies promotes the development and improvement of innovations. From this point, the function of the network of companies as catalysts of business knowledge will be studied

Even if it is not possible to study in greater depth the theme of the current state of the economy of knowledge, we propose a first reflection on the concept of networks of knowledge. In fact a group of companies brings its own knowledge to the productive process or the supply of services; it integrates knowledge transforming it into new forms of knowledge. The creation of a team of companies promotes the forming of relationships based on trust, increases the possibility of innovating, and increases human capital. Such elements, synthesized through intangible business assets actually appear to be strategies for the creation of value over the long term.

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