

Corporate Programming and Control: the Business Network Scorecard for Company Networks

Vincenzo Formisano, Giuseppe Russo, Rosa Lombardi
Department of Economics and Law
University of Cassino and Southern Lazio

Abstract

Purpose. The objective is to propose an analysis of the subject of programming and control in corporate management, with special reference to the organizational network model, introducing a useful instrument to measure and summarise the *performance* achieved from aggregation in its uniqueness as well as to undertake strategic decisions, with a view to establishing the competitive advantage and the creation of value on the long term. Specifically, according to the logic of the Balanced Scorecard, the objective is to propose the use of a modern management control system for company networks, the Business Network Scorecard, aimed at pointing out *performance* of an economic-financial nature and of an intangible nature referred to the network in its entirety and to intersection of the activities carried out jointly by the companies participating in the aggregation.

Methodology. The research methodology used is of a quality related type. The research topic is developed according to the study of national and international literature.

Findings. The contribution proposes theoretical proof to support the new management control instrument for company networks: the Business Network Scorecard.

Originality/value. The approach adopted for the development of the network management control instrument (Business Network Scorecard) refers to the principles of the Balanced Scorecard of Norton and Kaplan, including, apart from the traditional corporate perspectives (economic-financial, customers, internal processes, learning and growth), another strategic profile of analysis: the *value creation*. In this sense, the *reporting* system of network *performance* aims at highlighting the joint results of an economic-financial nature as well as those of an intangible nature. Through a logic of interception of large aggregates, the results achieved by the network are proposed through the matrix of network objectives (MNO), the multidimensional network *model* (MNM), including perspective indicators, 4 indicators of synergy and the comparison *report* of joint and individual *performance* of companies.

Keyword: management control, company networks, performance, bsc, business network scorecard.

1. Introduction and research question

Throughout the years the programming and control activities carried out by companies (Zanda, 1974; Zanda, 2009) have guided the management of company systems towards

the achievement of differential *performance*, towards the creation of long term value (Turco, 2004).

On the one hand, corporate decision making processes, with a view to strategic planning, are based on the use of information technology instruments of an obligatory nature (Dezzani, Pisoni, Puddu, 2001; Giunta, Pisani, 2008; Lacchini, 1994; Onida, 1974; Superti Furga, 1991; Zanda, 2007) and of a voluntary nature (Hinna, 2002; Zambon, 2002), including the consolidated *best practices* on an organisational level.

On the other hand, the complexity (Benevolo, 1995; Dagnino, 2004, Fontana, Ballati, 1999; Onida, 1971) of company facts and of the environment in which the operating companies have requested more and more the use of instruments and mechanisms suitable to identify, represent and interpret the economic and non economic results achieved in the execution of various activities.

The programming and control systems (Baraldi, Devecchi, 1995; Bocchino, 2001, Brusa, Zamprogna, 1991; Grant, 1994; Lizza, 2004; Ranalli, 1994; Tangen, 2004; Terzani, 1999; Vergara, 2004) find, among other aspects, their utility in the joint decisions undertaken by several companies organised in the form of corporate groups and/or company networks.

The decision making meanings of the groups, in a broad sense, are the result of the collaborative processes between several actors who share values, knowledge, traditions and conflicts (Bastia, 2001).

In the era of knowledge (Thurow, 2000), the Anthony model (1967), founded on strategic planning and on management and operative control, is revisited according to the demand of planning and controlling activities carried out by deverticalised organizational structures, born from relational economy (Quagli, 1995; Trequattrini, 2008).

In these terms, having placed emphasis on the reticular model (Bastia, 1989; D'Alessio, 2008; Thorelli, 1986), the need emerges to handle and control the organizational complexity of the company networks and to highlight aggregated management, measuring and summarizing the results achieved by the same.

In Italy, company networks have found *ad hoc* regulations and incentives for their diffusion on the territory, especially through forecasts according to the methods of constitution and *governance* established by the law 122/2010; furthermore, the opportunity of implementing a sustainable *business* model of a reticular nature, innovating in terms of products and processes (Chesbrough, 2003; Gollin, 2008; Nambisan, Sawhney, 2008; Von Hippel, 1988) and creating joint value (Vicari, 1992), supports the launch of expansion courses of the networks on an international level.

Among other aspects, this scenario refers to the need to plan and control, on the one hand, the activities of each single company participating in the network; on the other hand, the general activities of the network, measuring the action of the latter through instruments aimed at highlighting the results that derive from the intersection of activities of the companies involved in the *cluster*.

Furthermore, with a view to cultural change and collaboration between companies, through the use of *ad hoc* companies for management control (Brusa, Dezzani, 1983; Lizza, 2004) it is possible to interpret the results of company network activities, by

highlighting the economic *performance* as well as performance of an immaterial nature, achieved by each aggregate company and by the network in its uniqueness.

This aspect originates from the logic of interception of the network accounts, through which the company networks can register the mutual activities carried out individually, summarizing economic-financial elements as well as intangible elements (Beretta Zanoni, 2005; Lev, 2001; Marchi, Marasca, 2010).

In light of these representations, the objective of this contribution is to outline a management control instrument capable of assessing, controlling and guiding network activities through the achievement of satisfactory long term *performance*.

Through a quality related research method, the proposal of using an assessment form of network *performance*, the Business Network Scorecard, revisiting the instrument of the Balanced Scorecard of Norton and Kaplan (Kaplan, Norton, 1992; Kaplan, Norton, 1996), without changing the construction logic.

Therefore the *research question* is the following: What is the Business Network Scorecard and what importance does it have?

2. Literature Review

To build a company programming and control system (Bastia, 1989; Terzani, 1999) means, on the one hand, identifying the actors involved in this kind of activity, including the definition of their roles and the objectives to be pursued; on the other hand, to share the action to be undertaken as well as the knowledge available on each organizational level, drastically reducing the informative asymmetries.

The main characteristics of the measuring systems of *performance* (Brusa, Zamprognà, 1991; Brusa, 2000; Marchi, 1993) descending from a definition of the objectives, understood as the *performance* to be pursued; measuring of the *performance* achieved and correlation between objectives, *performance* and instruments of company guidelines (Austin, Hoffer Jittel, 2002).

In this regard, the function of programming and control undertake the following configurations (Vergara, 2004; Zamprognà, 1988): in the first case, programming or planning activities represent the phase in which strategic decisions are undertaken (Trequattrini, 2004; Zanda, 2006), also on the basis of results achieved during the previous year, registered through various kinds of computer instruments (Lizza, 2004); in the second case, control activities (Lizza, 2007) consist of when the results and variations are established compared with forecasts.

Assessment of the cause-effect relations of management events, in light of the strategic objectives (Coda, 1988), identifies the definition phase of the instrument panel of findings of company results efficient in the long term.

The principles of programming and control are applicable to the *modus operandi* of company networks (D'Alessio, 2008; Cafferata, 2000), characterised by organisational structures that base their essence on relations of a horizontal nature.

Despite the fact that on the current scenario of teaching, the topic of company *performance* measuring has been widely discussed (Busco, Riccaboni, Saviotti, 2008; Lynch, Cross, 1991; Marasca, Marchi, Riccaboni, 2009), also through classification of

company computerised instruments (Garrison, Noreen, 2003), with assertion of the economy of knowledge (Foray, 2006) and of company networks (Golinelli, Dezi, 1997; Johnson, 2009; Lai, 1991; Lomi, 1991; Lorenzoni, 1992; Rogers, Kincaid, 1981; Rullani, 1989; Thorelli, 1986), the need to identify joint management control instruments and systems has been born.

The complexity (Benevolo, 1995) that is generated from the network model lays its roots into several aspects, related to single company systems and also to the network in its unique nature. Among these, it is possible to refer, for example, to the numerous company systems participating in the network, the different industrial policies and the various *governance* systems adopted by each company, the numerous relations to be handled internally and externally compared with the joint companies, the complexity of the environment (Azzone, 1993; Cafferata, 1995; Cavalieri, 1990; Donna, Zamprogna, 1983).

Furthermore, if on the one hand, regulation of the phenomenon of the company networks intervenes, as in the case of Italy, regulated by the law 122/2010 and subsequent modifications; on the other hand, some aspects of management and accounting are left to the independence of the internal organizational processes of the networks, all voluntary and finalized at increase their competitiveness on the market in question, with regards to the objective to be achieved.

This norm recalls to a theoretical *framework* for the creation of networks, continuing with indications related to the subject of the activity, the network programme, including the creating of a (possible) financial fund, the formation of a (possible) common body and withdrawal from the aggregation. Furthermore, reference is made to some regulations related to legal subjectivity of the network (law 134/2012) and participation of the networks to tenders (law 221/2012). It is also important to remember the regulations of the law 224/2012 with regards to tax credit recognized to the networks that are invested directly in research and development or who entrust such activities to universities, public research authorities and research organizations.

In 2013, according to the financial statements of Unindustria, there are more than 600 company networks with more than 3,000 companies involved, with a growth rate, from 2010, that was very high. The most important problem generated from their operation (Retimpresa, 2013) was highlighted in the difficulty in modifying the management model and the instruments used for company activities, with a view to collaboration between the aggregates.

Even though on an economic-corporate level, different aggregation models exist between companies (industrial districts, local production systems, technological districts, industrial consortiums, temporary associations of companies, *joint ventures* and so on), the norm regulations affect the management methods of the networks. In the case of examination, the networks of *ex* law 122/2010 may, for example, undertake legal subjectivity, adopting a *governance* model guided by a common body, to form a financial fund.

These aspects intervene in the management of networks, highlighting a *framework* useful for the construction of a programming and control system: in fact, it is important not to forget the importance of defining the aggregation as a systemic entity; of identifying an economic individual (Zanda, 2006) for undertaking strategic decisions and for planning

of activities; defining of long term objectives, of defining a network programme, allowing for a certain level of financial independence through the creation of a network fund. Once again the operative nature of the company network is highlighted, with the need to measure its action through computer instruments (Garrison, Noreen, 2003), with the objective of increasing competitiveness with regards to all of the *stakeholders* (Donaldson, Preston, 1995; Freeman, 1984) and to implement the transfer of knowledge between companies and towards the external environment, with the objective of creating value.

Therefore the need to plan, assess and measure the activities carried out by the network of companies in full compatibility with the individual action of each company participating in it, requires the use of adequate management control instruments (Sannino, 2002).

In general, the literature panorama classifies the control instruments as follows (Baraldi, Devecchi, 1995; Bocchino, 1994; Mella, 1997; Brusa, Dezzani, 1983):

- the obligatory instruments of a financial and economic-financial nature deriving from accounts and from balance sheets, including the indexes and flows of balance sheets;
- the instruments of preventive control such as *budgets* used to represent the economic-financial objectives to be achieved on the short term;
- the control instruments of final balance as *reports* understood as control documents that communicate *performance* of the system.

These instruments can be used by each single company included in the network. However, the same need emerges in the network as the unitary organisational system.

In this way the traditional conception of the Anthony model (Bastia, 2001) needs to be reviewed in light of the reticular model, assigning new roles to the actors of the network, modifying the organizational levels of strategic planning, of management control and of operative control.

In company networks these functions are aligned in a horizontal manner: all of the aggregate companies take part in the strategic decisions, if not for the ones undertaken by the mutual authority, if it exists; the forecast of a network *manager* acts as a connecting element and intermediary in terms of the information, activities and operative technicalities of the system; operative controls are based on common network activities.

By emphasizing the *reporting* systems, a modern measuring and control instrument of *performance* is represented by the Balanced Scorecard (or BSC) of Norton and Kaplan (Kaplan, Norton, 2000; Kaplan, Norton, 2006; Lucianetti, 2004), which allows for the definition of our strategic company dimensions, through a balanced assessment chart and a *set* of indicators (Kaplan, Norton, 2005). These dimensions comply with the definition of company objectives.

The objective of the BSC is to become a strategic company instrument (Various Authors, 2002; Kaplan, Norton, 2002) capable of integrating the economic-financial indicators with the intangible *drivers*, with a view to achieving future company *performance* of a traditional and immaterial nature. The Balanced Scorecard (Brusa, 2007; Norreklit, 2000) can translate the company *mission* (Porter, 1996) into a communication model of company strategy.

According to the BSC, the balancing of company perspectives (Kaplan, Norton, 1996) includes explanation of the economic-financial profile, customer, internal processes and

learning and growth. For every perspective the strategic objectives that the organization intends to achieve are considered: performance assessment parameters; objective values; strategic initiatives.

The financial perspective identifies the company strategy with regards to the economic results predefined by the company. Therefore some economic-financial indicators are defined. The customers perspective identifies the strategies referred to company customers, with a view to creating trust and measuring, for example, the duration, the quality and the volume of relations. The perspective of the internal processes defined, through specific indicators, the objectives related to new management processes necessary for company competitiveness. The perspective of learning and of growth measures the resources used and the improvement processes finalized at achieving the objectives.

Basically, the Balanced Scorecard examines the cause-effect relations (Coda, 1983) between the objectives and the measures identified in the strategic analysis perspective. Every measure chosen belongs to a chain of cause-effect relations that allow for communication to the organization of the meaning of company strategy.

Compared with other computer related instruments, for control of company management, BSC introduces an element of innovation: the assessment of intangible aspects related to company management. In fact, the BSC report assesses, among other aspects, the strategic elements of an intangible nature (Roos Roos, Dragonetti, Edvinsson, 1997) held by the company and important for the achievement of differential *performance*.

3. Methodology and Findings

The need to carry out management control (Caldarelli, 1992; Merchant, Riccaboni, 2001) in the company networks is generated by the diffusion of the aggregative phenomenon (AA.VV. 1999; Broglia Giuggi, 2001; D'Amico, 2006; Giaccari, 2003; Lai, 1991) between companies (Ackoff, 1961; Amaduzzi, 1965; Bertini, 1990; Eminente, 1972; Ferrero, 1980; Sciarelli, 1985; Zanda, 1974), whose objective is to achieve differential results that *stand alone* are not capable of reaching.

In consideration of this, small and medium sized enterprises, as well as large companies participating in a network project (Bastia, 1989; D'Alessio, 2008; Thorelli, 1986), may launch an improvement process of company culture and of joint *performance*, through the adoption of a management control system that is common to the entire network, suitable to identifying the general results of the entity and useful to compare joint *performance* with that of the individual companies involved in the common project.

Economic-corporate literature (Bianchi, 2005; Bastia, 2001) interprets the demands of developing adequate monitoring systems of economic and non economic *performance* achieved by the companies (Kang, Fredin, 2012), proposing representation of the cause-effect relations (Coda, 1983) between management and the results achieved (Lebas, Euske, 2002), including those of an intangible nature.

In this regard, a modern *reporting* model is the Balanced Scorecard (BSC), that is based essentially on a balanced assessment form containing four company perspectives as previously indicated: economic-financial, customers, processes and learning and growth. In the case of company networks, the BSC model (Shutibhinyo, 2013; Carr, Gratton, 2013) represents the theoretical support that is used to build a modern control instrument of joint management, with a view to measuring traditional and intangible

performance (Petty, Guthrie, 2000) born from the intersection of activities carried out jointly by the *participant* companies of the network (Johnson, 2009).

Specifically, by maintaining the logic of the BSC model, its review (Buhk, Malmi, 2005; Mouritsen, Thorsgaard, HandBukh 2005) complies the four original perspectives according to the characteristics of the networks, as well as expanding them, inserting a fifth profile, *value creation* (Marr, Schiuma, Neely, 2004; Turco, 2004), that welcomes sustainable elements of aggregate action, understood as intellectual capital (Carlucci, Schiuma, 2007; Lipparini, 2002; Trequattrini, 2008; Stewart, 1999), social responsibility (Manni, 1994; Terzani, 1984) and environmental responsibility (Cisi, 2003; Paris, 2003).

Structuring of the new five perspective *report* allows for the study of economic-financial and intangible network *performance*, highlighting the objectives and measures and including a *set* of indicators that are useful to assess the general multidimensional activities, without removing attention from the aggregate objectives and from the unitary nature of the network system.

The introduction of a network assessment form, the Business Network Scorecard (BNS) allows, according to the interception logic of the dimensions of analysis, an assessment of general management of the company network, balancing on the one hand the objectives with the indicators and with results; on the other hand, the traditional perspectives with the modern ones, of an intangible nature. Furthermore, comparison chart of network *performance* is provided for as well as individual *performance* of each aggregate company.

The BNS *reporting* is made up of three parts (figure 1):

- Matrix of network objectives (MNO);
- Multi-dimensional *report* (economic-financial, *stakeholder*, internal processes, development and creation of value), containing a *set* of network indicators and 4 indicators of network synergy;
- Comparison chart of *performance* of the network/aggregate companies.

Figure 1 – Structure of the Business Network Scorecard

BUSINESS NETWORK SCORECARD		
Matrix of network objectives (MNO)	Multi-dimensional Report, with Network Indicators (I)	Comparison chart of <i>Performance</i> of Network/Aggregate Companies

Source: our elaboration

The matrix of network objectives (MNO) is a strategic guideline document (Brusa, 2007; Kaplan, Norton, 2005; Meyer, 2004) of the management control system of company networks. Through its preparation, the guidelines for organization of the objectives-measures system are defined, the management control system principles of the reticular system are defined and the common objectives that the *cluster* of companies must pursue are identified, with regards to each analysis perspective (figure 2).

Figure 2 – Matrix of the network objectives (MNO)

<u>Economic-financial perspective</u>	<u>Customer Perspective</u>	<u>Internal Process Perspective</u>	<u>Development and growth perspective</u>	<u>Value Creation Perspective</u>
1. Objectives	1. Objectives	1. Objectives	1. Objectives	1. Objectives
2. Measures	2. Measures	2. Measures	2. Measures	2. Measures

Source: our elaboration

According to the profile in question in the matrix, it is possible to presume some general network objectives, to which it is possible to add special objectives deriving from the activities carried out by the network.

In the economic-financial perspective, the general objectives of the network of companies can be found, for example, in the reference market of competitiveness and in economic-financial returns deriving from joint activities. The customer perspective is connected with the creation of added value for customers (Freeman, 1984) from the network. The general objectives, for the perspective of internal processes can be attributed to the creation of products and/or to the supply of services appreciated by the market. Therefore, the management processes of production cycles of the network are extremely important. The perspective of development and growth implies the desire to adopt innovative processes (Chesbrough, 2003), as well as to make investments in intangible capital, both useful in achieving the whole series of objectives defined by the network.

The *value creation* perspective is placed in close collaboration with definition of the added value generated by network action, its intellectual capital and the environmental impact of its activities.

In this regard, a review of the BSC has been proposed through the construction of a *scorecard* integrated with the principles of voluntary reporting, of a sustainable nature (Mancini, Quagli, Marchi, 2003; Quagli, 2005), attributed mainly to the *value creation* profile, which is functional to the explanation of the aggregate strategic variables of an intangible nature.

Therefore, the multidimensional network *report* (MNR) is identified by means of a network assessment with five perspectives, containing a *set* of basic indicators for management control of company networks, considering that the main inspiration of measuring and representation of results can be found in the dimensions deriving from intersection of the activities carried out in common by the companies participating in the network and not from the total of each single company profile.

The following chart (figure 3) summarises, for the multidimensional network *report*, through the five analysis perspectives and a *set* of indicators. The latter are characterized by an alphanumeric code, in order to make the interpretation of aggregated data much easier.

Figure 3 – Multidimensional Network Report (MNR)

ECONOMIC-FINANCIAL NETWORK PERSPECTIVE	CUSTOMERS	INTERNAL PROCESSES	NETWORK DEVELOPMENT	VALUE CREATION
<i>1EFN.</i> NETWORK SHARE CAPITAL (OR FINANCIAL FUND)	<i>1C.</i> NUMBER OF CUSTOMERS INCLUDED IN THE NETWORK (OR NUMBER OF CONTRACTS)	<i>1IP.</i> NUMBER (AND/OR VALUE) OF THE RESEARCH PROJECTS LAUNCHED BY THE NETWORK	<i>1ND.</i> VALUE OF INVESTMENTS IN NETWORK HUMAN CAPITAL TRAINING	<i>1VC.</i> ADDED VALUE OF THE NETWORK (<i>1VC.1</i>) AND SOCIAL INITIATIVES (<i>1VC.2</i>)
<i>2EFN.</i> PROFIT OR LESS OF THE NETWORK	<i>2C.</i> CUSTOMER SATISFACTION RATE	<i>2IP.</i> PRODUCTION COST OF GOODS AND/OR SUPPLY OF SERVICES	<i>2ND.</i> NUMBER (AND/OR VALUE) OF PROCESS AND PRODUCT INNOVATION	<i>2VC.</i> ENVIRONMENTAL IMPACT (<i>2VC.1</i>) AND CERTIFICATION (<i>2VC.2</i>)
<i>3EFN.</i> NETWORK PROCEEDS	<i>3C.</i> NUMBER OF COMPLAINTS	<i>3IP.</i> NUMBER OF EMPLOYEES OF THE NETWORK	<i>3ND.</i> NUMBER (VALUE) OF NETWORK PATENTS	<i>3VC.</i> STAKEHOLDERS
<i>4EFN.</i> VALUE OF NETWORK ACTIVITIES	<i>4C.</i> REPUTATION OF THE NETWORK	<i>4IP.</i> EQUAL OPPORTUNITIES	<i>4ND.</i> COSTS FOR R&D	<i>4VC.</i> TRANSFER OF KNOWLEDGE
<i>(5, 6, 7,...N.)EFN.</i> OTHER NETWORK INDICATORS	<i>(5, 6, 7,...N.)C.</i> OTHER NETWORK INDICATORS	<i>(5, 6, 7,...N.)IP.</i> OTHER NETWORK INDICATORS	<i>(5, 6, 7,...N.)ND.</i> OTHER NETWORK INDICATORS	<i>(5, 6, 7,...N.)VC.</i> OTHER NETWORK INDICATORS

Source: our elaboration

In the economic-financial perspective (EFN) of the multidimensional network *report* (MNR), the indicators for network management control are identified as follows:

- *1EFN. Share capital or financial fund.* It identifies the value of share capital of the network, or the value of the financial fund, formed by the aggregate companies;
- *2EFN. Profit or loss of the network.* It identifies the end of year results deriving from the activities carried out in common by the aggregate companies;
- *3EFN. Proceeds.* It represents the general turnover of the network with regards to the execution of activities;
- *4EFN. Value of activities.* This indicator derives from the total sum of the values of the *assets* acquired by the network;

- (5, 6, 7, ...n) *EFN. Others.* They are all of the indicators that can qualify the economic-financial perspective of the network.

In the customer perspective (C), the management control indicators of the network are identified as follows:

- *1C. Number of customers involved in the network (or number of contracts).* It identifies the number of customers of the network, characterised alternatively by the number of contracts undersigned by the network in its entirety;
- *2C. Customer satisfaction rate.* The satisfaction rate of customers from the network can be measured using the percentage of increase/decrease of turnover related to each customer of the network, or the general turnover of the network, during one given year, compared with the turnover achieved during the previous year;
- *3C. Number of complaints.* It represents the number of complaints received from customers from the network;
- *4C. Network reputation.* The reputation of the network is interpreted through the difference between the number of general relations with customers (to be measured according to the number of invoices issued) and the number of complaints received (4C);
- (5, 6, 7,...n) *C. Others.* They are all of the indicators used to qualify the customer perspective with regards to the network.

In the internal processes perspective (IP) the following indicators can be identified:

- *1IP. Number (and value) of the projects launched by the network.* It represents the number (and/or value) of the research projects undertaken by the network in a given year;
- *2IP. Cost of products of goods and/or supply of services.* It identifies the total amount of costs borne by the network to produce its goods and/or to supply its services;
- *3IP. Number of employees of the network.* It identifies the number of employees of the company network;
- *4IP. Equal opportunities.* It identifies the number of female and male employees of the network;
- (5, 6, 7, ...n) *IP. Others.* They are the other indicators used to qualify the perspective of internal network processes.

The network development perspective (ND) includes the following network indicators:

- *1ND. Value of investments in human capital training of the network.* This indicator identifies the value of investments made by the network for training of its employees;
- *2ND. Number (value) of process and product innovations.* It identifies the number (and/or value) of innovation introduced in the production processes and/or in the supply of products;
- *3ND. Number (value) of network patents.* This indicator measures the number and/or value of the patents belonging to the network;
- *4ND. Investments in R&D.* This is the value of investments made by the network in research and development;
- (5, 6, 7,...n) *ND. Other.* These are the indicators used to define the perspective of the network development.

The *value creation* perspective (VC) includes the indicators illustrated below:

- *1VC. Added value of the network and social initiatives.* It measures the added value generated by the company network (1VC.1), through the general value of wages and salaries given to the employees of the network, including elements of the management authority (if available) and the network *manager*, as well as the social initiatives (1VC.2), undertaken by the aggregation, through the number and the value of investments undertaken for the organization of events with a social impact;
- *2VC. Environmental impact and certification.* It identifies the impact of the activities carried out by the network through (alternatively or jointly) measures related to raw materials, energy, water and emissions related to the activities of the aggregation (2VC.1). Furthermore, this indicator includes all of the initiatives undertaken by the network to mitigate the environmental impacts generated by its action, available in the environmental certifications of the processes and in investments, in general of an environmental nature (2VC.2);
- *3VC. Stakeholder.* This indicator identifies the number and the categories of network *stakeholders*;
- *4VC. Transfer of knowledge.* It qualifies the transfer of knowledge activated between the companies of the network due to the effect of their collaborative alliance. Expression of this indicator can be found in the knowledge assessment models. The ones proposed include economic-company literature (De Toni, Fornasier, 2012), the Cross, Borgatti and Parker model (2001), using the Social Network Analysis, through four key elements (the actors, the attributions, the relations and the networks) to analyse relations and, therefore, knowledge (Foray, 2006) within the social networks. The actors are the individuals involved in the network. The movement to company networks corresponds to companies participating in the network. The attributes identify the properties of the network actors, such as the role of each aggregate company. The relations identify the contacts that intervene between the network participants and towards the outside world. The networks identify the graphic representation of the indications provided above. The aggregate details are structured in a matrix related form, through the use of some specific forms of *software*, such as Ucinet. The elaboration of details requested by the model gives back the graphic representation of the network together with a *set* of indicators such as density, the level of centrality, mutuality, closeness, frequency and so on (Johnson, 2009). Interpretation of the indicators of analysis allows for the expression of a judgment on network relations;
- *(5, 6, 7,...n) VC. Others.* They are the other indicators used to qualify the perspective of analysis with regards to the characteristics of the network.

The aggregate multidimensional *report* is supported, in the new management control system, by a *set* of indicators of synergy. They allow the company network to understand the effect of collaborative action, throughout time, comparing some dimensions referred to the single aggregate companies (A, B, C) with those of the network (R), understood individually and defining the threshold for definition of the relational synergy of equality between the total of the dimensions related to each single company and to the aggregate companies deriving from intersection (1). The variation in terms of

synergy is determined, in the same way, through comparison of the aggregate dimensions that may take on higher or lower values compared with the total of each single dimension investigated. It is presumed that the differential represents the network synergy effect. The formula is the following:

$$\text{Company A} + \text{Company B} + \text{Company C} = \text{Network (intersection)} \quad (1)$$

from which

$$A + B + C > R \quad (2)$$

and

$$A + B + C < R \quad (3)$$

The hypothesis in which the total amount of the dimensions of each single company (A+B+C) is greater (2) than the dimensions referred to the aggregation (R), may occur in the *start-up* phase of the network and, subsequently due to the effect of the trend in aggregate management throughout time. In this example, the effect of relational synergy generated by the network is presumably on the decrease. On the contrary (3) we can presume the hypothesis of an increase in relational network synergy.

By applying the logic indicated above, the indicators proposed to highlight the synergies generated by intercompany relations, or by the network, are the following:

- Synergy indicator 1. It compares the total amount of share capital of each aggregate company with the network share capital (indicator 1EFN);
- Synergy indicator 2. It compares the total number of customers of each aggregate company with the number of customers from the network (indicator 1C);
- Synergy indicator 3. It compares the total number of research projects launched by each single aggregate company with the number of research projects launched by the network (indicator 1IP);
- Synergy indicator 4. It compares the total number of investments in terms of wages and training of human capital of each single aggregate company with the value of investments in wages and training of human capital of the network (indicator 1ND).

For example reference can be made to the calculation of the synergy indicator 2, to time 0, in the hypothesis of constitution of the company network by three companies (A, B, C) with a portfolio of customers, respectively, equivalent to 10. The customers of the network initially are 0. The formula is the following:

$$A_0(10) + B_0(10) + C_0(10) = R_0(0)$$

from which

$$30 = 0$$

In time 1, due to the effect of the operative nature of the network and of the management operations, the customer portfolio of each single aggregate company remains the same, while the network customers have increase by 40. Therefore we will find:

$$30 < 40$$

Even if this result requires adequate training in terms of network management and with regards to each single company (Mancini, 2011; Quagli, Teodori, 2010; Zanda, 2009), an increase in the customer portfolio of the network generated by the operative nature of the network itself should not be excluded, also by virtue of its competitive nature and of the goods and services offered to the market, compared with those of the single aggregate companies.

Lastly, the system of the Network Scorecard is based on the preparation of a comparison form of *performance* of an economic and non economic nature of each single company participating in the network with the ones achieved by the network. This *report* is based on the hypothesis that each company involved in the *cluster* adopts a similar management control system to the one proposed for the network. From here, the individual and aggregate planning and control activities (Marchi, 2009) move towards an alignment, even though we should not forget the limits of the modern network management control system, organized by simplifying the complexity of the network and of the surrounding environment.

4. Conclusion, limitations and proposal for the future research

This contribution has proposed the organisation of a management control system for company networks through the modern instrument of the Business Network Scorecard, inspired by the logic of the BSC of Norton and Kaplan.

This instrument finds its utility in the principles of planning and control of company activities, which are born from the strategic decisions (Invernizzi, 2008) that the networks must make and from the assessment, measuring and control of economic-financial *performance* as well as performance of an intangible nature generated by aggregation, with the objective of establishing a certain level of aggregate competitive advantage and generating differential value on the long term.

On the other hand, the three-party nature of the BNS system allows for the definition of the guidelines to be followed for implementation of the strategies and objectives of the network (matrix of network objectives) to create a multidimensional *report* containing a *set* of indicators for the five network perspectives, as well as identifying the synergy effect generated by the network through 4 indicators and comparing the results achieved by the network with the ones achieved individually by the companies participating in aggregation.

If on the one hand it is possible to consider the BNS as an integrated management control instrument, capable of measuring the traditional and intangible results generated by the company networks according to an intersection logic, on the other hand, some critical aspects of an operative nature should not be neglected.

Precisely, the *framework* proposed for network *reporting* is based on simplified hypotheses of the aggregate reality, that require further definition with structuring of the system according to the characteristics of each company network.

This aspect also refers to completion of the *set* of indicators necessary to assess aggregate management with regards to the 5 profiles defined in representation of the strategic areas of the network.

Of the same capacity we can find the observation of moving to all of the indicators proposed in the BNS *report* as they may not come up with homogeneous measures among them, resulting in the need for *ad hoc* interpretations, also by virtue of facts that may have occurred in several years that characterize reticular management and/or management of other computer documents that summarise the joint action of the companies involved in the aggregation.

In this direction, the proposal for empirical controls aims at proving the importance of the management control instrument in the networks proposed, testifying the possibility of application of *reporting* and the meaning of the dimensions returned, especially by the indicators of perspective and of synergy.

This passage will therefore be necessary to enhance the *framework* of the Business Network Scorecard.

Acknowledgment

This paper is the joint work of the three Authors: paragraph 1 is by Vincenzo Formisano; paragraphs 2 and 4 are by Giuseppe Russo and paragraph 3 is by Rosa Lombardi.

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