University of Economics in Katowice

**Journal of Economics and Management**

ISSN 1732-1948 Vol. 24 (2) • 2016

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# The model of competitiveness assessment of coopetition network systems – competition and cooperation of enterprises in the global economy

DOI: 10.22367/jem.2016.24.01

## Abstract

The paper presents the concept of network systems competitiveness evaluations. The aim of the paper is to draw the attention on the necessity of deepening analysis of new factors which are dedicated to assess competitiveness of modern business systems. The paper presents the concept of the synthetic measure for global business networks – creation of value added in coopetition networks. It is the project of multidimensional assessment of network systems with international multilevel competitiveness structures.

In the paper is presented the own concept of indicator – to take into account the qualitative dimension of building international competitiveness based on available quantitative data.

**Keywords:** competition, cooperation, coopetition, competitiveness, networks enterprises.
**JEL Classification:** D85, F23, L14, L20, M14.

## Introduction

In the modern economy, simultaneous competition and cooperation has become a requirement for businesses to remain competitive, resulting in the formation of coopetitive network systems. For reliable assessment of competitiveness of businesses operating in such a structure it is necessary to have a new view of organisation's capital. It is of key importance to measure all layers of the network system – both the economic and intellectual capital of coopetitive network systems.

The analytical model presented in this paper is based on J. Bain's threefold system: *structure – conduct – performance*[1]. It is assumed that changes in the global economy necessitate concentration of subjects – changing market structures (cooperation). The new structure determines appropriate corporate behaviour – competitive strategy requires the development of networks, including competitors (coopetition). The foundation of effectiveness is the ability to adapt to new requirements, is the creation of added value to the current standard through the use of multi-layer capital coopetitive business networks.

The aim of this paper is to present the concept of the measuring of the creation of added value, using multivariable statistical analysis to take into account the qualitative dimension of building international competitiveness based on available quantitative data. The essence of the presented method is to highlight the impact of all five separate layers of company capital on the effectiveness of coopetitive systems [Rosińska-Bukowska 2012, pp. 104-108]. For this reason, five parameters have been used: profitability index of equity, the cost of research and development per employee, engagement of intangible assets in the value of sales and internationalization indicators of assets and employment. The key is to emphasise the importance of networks[2] and the international nature of these systems [Esser et al. 2008, pp. 21-26], which is intended to draw attention to the necessity to combine cooperation and competition in order to meet today's challenges.

## 1. Coopetition – requirement of the modern development model

Progressive globalisation processes accelerate the liberalization of the movement of production factors. This leads to the rebuilding of organisational businesses systems as a result of the implementation of the modified development strategy. The changes thus promote beings capable of creative cooperation, including the ability to combine cooperation and competition. This favours the formation of various forms of collective bargaining – including coopetitive ones.

The concept of coopetitive global business network is a result of the evolution of company organizational systems. The continuity of interaction between market participants (*Actor Bonds*), their resource dependence (*Resource Ties*) and the relations between them related to their activities (*Activity Links*), i.e. fea-

[1] Structure – Conduct – Performance paradigm (SCP) was developed by J.S. Bain Jr in 1959 [Bain 1968]. The SCP paradigm is used to explain relations between market structure, market conduct, market performance and it is considered a pillar of industrial organisation theory [Bain 1968; Weiss 1979, pp. 1104-1140].

[2] The nature of the system means the integration of all four levels: meta-, macro-, mezzo- and microeconomic.

tures indicated as essential for networks [Håkansson & Snehota 1995, pp. 24-49] are of paramount importance. A kind of novelty, however, is that these relations currently have a coopetitive nature.

Coopetition is a system of simultaneous streams and interdependent relationships of competition and cooperation between the entities that retain their own organisation [Cygler 2009, p. 19]. Coopetition should be defined as a specific mode of action, allowing for building capacity on the basis of close cooperation between participants combined with competitive struggle. It is a business strategy that uses insights gained from game theory to understand when it is better for competitors to work together. By adopting this perspective enterprises may creating added value for still increasing standard. As a result of progressive globalisation and liberalisation, coopetitive relations develop dynamically, due to the fact that the world market has become almost an open area on which the systematic shortening of flow of not only goods and services, but above all, knowledge and information on a global scale increases rapidly. Companies trying to be competitive were somehow forced to build up their position in the global business space. The key was the ability for global action, taking into account existing areas of cultural, social, political and economic diversity – glocalisation [Robertson 1995, pp. 25-44]. In order to meet these challenges, market participants began to string coalition arrangements, including those with competitors.

To conclude, gathering resources, enabling effective competitiveness in a global environment requires the adoption of the idea of the "interaction of resources", that is to develop different types of business relationships with other entities that control specific resources and/or can provide needed information for adaptation models in a given market. What followed was the reorganisation of company structures in such a way that the actual boundaries inside and outside the organisation became blurry [Ciabuschi, Perna & Snehota 2012, pp. 220-229]. As a result, today, companies form business networks, whose distinguishing feature is the ability to combine cooperation and competition; in other words coopetition. The role of organisational links and the creation of creative international teams, composed of direct competitors, is of key importance in the contemporary model of development.

## 2. The stratification of the company's capital and the comprehensive assessment of its competitiveness

The ongoing changes have a significant impact on the principle of creating competitiveness. They should therefore be reflected in models for sources of market advantages. It seems necessary to take into account the analysis of multi-

ple layers of organisation's capital, including those whose value, due to their qualitative nature, is difficult to quantify. For the purpose of analysis of company business systems, the author takes into account the division into five basic subsystems: market, financial, innovation, organisational and institutional[3].

The market subsystem reflects the possible combinations of the most efficient allocation of scarce resources in the production and sale of goods and services – production systems used at any given time. The financial sub-system is used to evaluate the effectiveness through the prism of current profits, market value and the ability to maintain liquidity. These subsystems are the pillars of the economic capital.

Three other subsystems determine the strength of intellectual capital. The innovation subsystem is a source of improving the quality of individual proposals, especially on key competences (e.g. specialising in handling specific segments). It's analysis is based on an examination of expenditures for research and development activities, to provide innovative solutions in terms of products and operations (e.g. the production organisation techniques). The essence of the organisational subsystem is, in turn, transforming their resources into capital by building pathways for company structures to adjust, based on opportunities offered by its surroundings. The choice of organisational forms that are adequate to the place of business, contribute significantly to improving the effectiveness of the system [Claver-Cortés, Pertusa-Ortega, Molina-Azorín 2012, pp. 993-1002]. The result of its performance is to change resource (quantifiable) in capital, generating added value (quality approach). The subsystem is responsible for the systematic modification of the value chain and must be taken into account in the study of competitiveness. It is also responsible for the creation of linkages adequate to the situation, including coopetition. The creative use of multi-institutional potential of the surroundings is the role of the institutional subsystem. "Institutions" create external (with business partners) and internal relations – e.g. good practice in relation to employees that allow for more efficient use of their talents [Kim et al. 2012].

The analysis of five subsystems is multidimensional and allows one to include a number of new factors integrated into the competitive strategies that were previously overlooked. This means analysing architectural relationships established among the various subsystems (internal conditions) and the congruence principles with the surroundings (external conditions). These relationships

[3] Why I take into account exactly these five subsystems was explained in book: [Rosińska-Bukowska 2012]. The division is the result of literature studies. Especially on the components of the intellectual capital of the organisation.

now take multiple cooperation forms – simultaneous cooperation and competition at every level.

To sum up, it seems necessary to try to reinvent the traditional system of evaluation of the competitiveness of enterprises, taking into account all the layers of capital (especially intellectual capital). The distinguishing feature of the proposed approach is focusing attention on the role of knowledge and innovation (the theory of innovation, key competences, behavioural concepts), the capacities of the potential global environment through internationalisation (the theory of international production and direct foreign investments) and the abilities to build adequate relations and structures (aglomeration theories, mergers and acquisitions, organisation and management). Only such a broad approach allows to at least partially meet the challenge of realizing the ideals of modern "complexity economics" [Wojtyna 2008, pp. 9-32].

## 3. Indication of the creation of added value – assumptions of the concept of assessing the competitiveness of network enterprises

In order to meet the challenge of a comprehensive analysis of the competitiveness of network enterprises, reference is made to the methods of Multivariable Statistical Analysis, allowing for the comparison of objects with complex structure description, which requires taking into account a number of diagnostic indicators. The constructed synthetic indicator is designed to reflect the ability of the company to create added value through power connections of all categories of capital held within the network. Organisational relationships play a special role, allowing for the formation of international creative teams, composed of direct competitors.

The construction of the indicator used the idea of linear ordering of objects, taking the overall scheme of the method (linear ordering) [Mikulec 2011, pp. 93-101]. Emphasis is put on the inclusion of diagnostic indicators characterizing different aspects of network companies. For this purpose, the author sought data relating to individual layers of capital of these organisations. For the construction of the indicator a set of five diagnostic indicators were used, as stimulants of equal weight.

Within the proposed concept the element reflecting the state of the economic capital of the company is Return On Equity (ROE), which combines elements describing the area of finance, production and sales. This indicator considers the impact on the profitability of committed capital of three important factors: operational efficiency, expressed by return on sales, efficient use of acquired assets

and leverage, reflecting the impact of the involvement of foreign capital to increase profit per equity unit: equity multiplier.

When selecting elements that represent the intellectual capital, so called direct methods of valuation were used [Sveiby 2015]: *Holistic Value Approach* [Pike & Roos 2000, pp. 11-25], *Intellectual Capital Dynamic Value* [Bounfour 2003, pp. 396-413], *Intellectual Capital Benchmarking System* [Viedma 2001, pp. 148-164] *and Estimated Value Via Intellectual Capital Analysis* [McCutcheon 2008, 79-96]. It was found that the ability for the creation of added value is often connected with the strength of intellectual capital, but emphasising that it is a potential for growth, which requires adequate implementation and support of adequate economic capital. This is of paramount importance, as many times it is necessary to connect multiple parties, including competitors. This does not appear in traditional analysis. The proposed concept attempts to at least partially fill the gap. The indicator incorporates the following: the share of intangible assets in the creation of the value of sales [(MV–SE)/S], the cost of research and development per employee [(R&D)/E] and indicators of the internationalisation of assets [AF/A] and employment [EF/E][4].

It was equally important to introduce a parameter indicator [(MV–SE)/S]. In this way, they tried to "measure" the importance of a business network, entangling the enterprise, for sales volume being carried out by the central subject [MV–SE], that is the difference between the market value and own property valuation was considered as a key part of the intellectual capital – valuation of the network system. The network capital is based on a system built by company relationships and business connections, not necessarily visible in materialised form, which includes owned holdings, joint venture or formal cooperation agreements. The company has possession of these types of assets through a skilful combination of co-operation with competition. Thanks to this, the company acquires experience, increases the professionalism of its personnel, develops certain models of conduct, improves procedures and modifies standards, introduces new brands of products relevant to the specific individual segments, regions, etc.

The indicator is an attempt to assess the impact of potential intangible assets, whose key ingredients, unique skills and competences worked out in the course of the interactions within the system, building the image of the organisation and systematically raising the value of the brands belonging to it. An important element of these assets is a quality management system, based on often unwritten internal codes of conduct, creating the foundations of organisational

[4] MV – Market Value, SE – Shareholder's Equity, S – Sale Value, E – Employment, EF – Employment Abroad, A – Assets, AF – Foreign Assets, R&D – Research and Development Costs.

culture, including a special sense of entrepreneurship and innovation. They include a specific method of reactions of members of the organisation to the challenges of a dynamic and diverse environment, including workflow in emergency situations, rules for adjusting the offer to specific local conditions or sudden challenges (activities of the main competitors, changes in economic and legal situation). Using [(MV–SE)/S] it was sought to take into account the impact on sales of standard factors not measured directly, i.e. soft stimulants of competitiveness, including coopetitive abilities. It is an attempt to quantify the hidden factors increasing the competitive potential of intellectual capital [Marr & Roos 2005, pp. 28-41].

Innovation capital is represented in the indicator through expenditure on research and development per employee. Expenditure on R&D was compared with the level of employment in order to assess the technological advancement of the production system against competitors[5]. Today, subjects that are leaders in sectors competing for primacy in a particular market segment, often work in another area. They observe their actions, utilize best practices and cooperate (including the trade of items). This innovative capital assessment model allows one to capture development trends.

Two further indicators, that is the share of assets abroad in total assets [AF/A] and the participation of employees abroad in total employment [EF/E] were introduced into the synthetic indicator as elements designed to reflect the internationalisation of the organisational system. In this way the ability to derive potential from the multicultural human capital and the ability to arbitrate is highlighted, resulting from the investment of assets outside the home country. Both elements are important in the era of corporate globalisation. The importance of the global spread of assets, that is the skilful following of trends, including the movements of the competition and building creative international teams, was underlined. The increase in the value of indicators shows the development of global network enterprise systems and confirms the system's ability to combine competition and cooperation.

In summary, the parameters taken into account in the design of the synthetic indicator were chosen in such a way, as to reflect the impact of each layer of capital on the competitiveness of modern enterprise. That concept allows for a relatively thorough competitive position of the system with network structures against a selected group of objects, analysis of individual elements of competitive potential of the studied subjects and even attempting to predict their prospects for development. An authorial test study[6] using the structured indicator was conducted

[5] In order for the [(R&D)/E] indicator to properly serve its purpose it must concern properly selected set of companies.

[6] The objects were 252 transnational corporations.

on industry sets that consisted of 10 leaders of the sector[7]. The calculations made use of Excel and numerical taxonomy [Kolenda 2006] based on the indicated diagnostic indicators. The study confirmed the usefulness of the indicator for companies who recognise the importance of combining collaboration with competitors, using a network model of action.

## Conclusions

Changes in the global economy meant that international companies have been forced to build their competitiveness on the basis of multi-layered coopetitive network structures. Their essence is to combine cooperation with competition. This resulted in the need to find a way to take into account new parameters in models for assessing their competitiveness. The article proposes an original approach for assessing the competitiveness of enterprises networks. Its advantage is the use of the available quantitative data to achieve the fullest possible picture of the state of all layers of capital of the organisation (including intangible assets). The indicator is based on quantitative indicators (measurable and comparable), which, as a result of proper configuration, make it possible, at least to some extent, to take into account quality measurement conditions for building competitiveness. The concept is an attempt to present a model for the assessment of the competitiveness of enterprises – as a view combining the properties of positional and resource streams [Gorynia & Dzikowska 2012, pp. 1-30], taking into account the importance of the international context.

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[7] The objects were the most powerful corporations classified in international rankings during a decade. The sectors included in the study: automotive, petrochemical, electronics, telecommunications and media, chemical-pharmaceutical, consumer, industrial goods and services, public services.

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