



LITERATURE OVERVIEW ON THE FIELD OF CO-OPETITION

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Abstract. Co-opetition is a perspective on business relationships which highlights the ambivalence of competition and cooperation. Game theory is regarded as the mathematical tool for solving co-opetition related problems. The major step for introducing “co-opetition” into public discussion and economic research has been made by Brandenburger and Nalebuff in 1996. However they target a non-professional readership. A multitude of publications has followed, where the authors mostly focus on specific aspects of the problem and investigate particular industries. This paper gives a comprehensive literature overview on the field of co-opetition.

Keywords: co-opetition, game theory, Nalebuff and Brandenburger’s book “Co-opetition”, overview and analysis of the literature on the field of co-opetition.

LITERATŪROS APIE BENDRADARBIAVIMU GRĮSTĄ KONKURENCIJĄ APŽVALGA

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Santrauka. Bendradarbiavimu grįsta konkurencija yra verslo santykių perspektyva, kuri pabrėžia konkurencijos ir bendradarbiavimo dvilypumą. Žaidimų teorija laikoma matematinė priemonė spręsti problemas, susijusias su bendradarbiavimu grįsta konkurencija. Viešas diskusijas ir ekonominius tyrimus apie bendradarbiavimu grįstą konkurenciją pradėjo Brandenburger ir Nalebuff 1996 m. Tačiau jų darbai skirti ne specialistams. Daugumoje publikacijų šia tema dėmesys skiriamas konkretiems problemos aspektams ir nagrinėjamos atskiros pramonės šakos. Šiame straipsnyje pateikiama išsami literatūros apie bendradarbiavimu grįstą konkurenciją apžvalga.

Reikšminiai žodžiai: bendradarbiavimu grįsta konkurencija, žaidimų teorija, Nalebuff ir Brandenburger knyga „Bendradarbiavimu grįsta konkurencija“, apžvalga ir literatūros apie bendradarbiavimu grįstą konkurenciją analizė.

1. Introduction

“Co-opetition” is a neologism that represents the ambivalence of competition and cooperation in business relationships. According to Dagnino and Padula (2002), “coopetition is a matter of incomplete congruence of interests and goals concerning firms’ interdependence”. According to the European institute for advanced studies in management (EIASM), “Coopetition highlights the need to overcome the oversimplified framework at the base of conventional approaches and proposes a description of more complex market structures where cooperation and competition merge together to form a new perspective. By widening the conventional boundaries of the two more familiar categories of competition and cooperation, coopetition challenges the traditional framework addressing the surge of complexity of actors’ roles, strategies, objectives, processes and rent seeking behaviours” (EIASM 2009).

Though co-opetition has been mentioned in literature for the first time in 1913 by Cherington, just in 1996 Brandenburger and Nalebuff (B/N) introduced co-opetition into public discussion and research with their book “Co-opetition” (Brandenburger and Nalebuff 1996). They understand co-opetition as an applied business theory in the spirit of game theory. However the level of their publication is oriented at a non-professional readership. Till today, though a variety of scientific publications has appeared on the field of co-opetition, which covers many specific aspects of the problem, the problem of a non-existing theoretical foundation and structure is not solved yet. The only publication which treats this problem so far is that of Dagnino and Padula (2002).

The paper gives a comprehensive overview over B/N’s book “Co-opetition”. A critical analysis about the proposed “PARTS model” is given. Additionally, a general overview over the literature referring to the co-opetition approach is given. General and specific theoretical contributions are presented. It is shown how the co-opetition idea has been used to describe problems in particular industries.

The aim is a deeper comprehension of the scope of co-opetition as a problem of research (Ginevičius and Krivka 2008; Liaudanskiene *et al.* 2009; Zavadskas *et al.* 2008a).

2. Brandenburger and Nalebuff’s book “Co-opetition” (1996)

B/N explain “co-opetition” as an approach that intends to explain competition and cooperation in business networks in the spirit of game theory. The idea is to apply game theory to solve problems that are connected with business relationships and supply chains. However game theory is not introduced explicitly.

B/N focus on the ambivalence of competition and cooperation in “value nets”. “Value nets” are an extended notion

of supply chains where competitors and agents with complementary offers are considered. It must not be confused with the “value chain” inside of enterprises that was introduced by Porter (1985). Even if two enterprises act as competitors at a market, there can be various possibilities for them to cooperate, either by not attacking each other, or by tacit price collusions, etc. On the other hand, cooperation partners generally compete in the question of profit sharing.

B/N define five elements of a game as basic:

- Players (The paper uses the word “agent” to describe an independent economic decider. “Player” is only used when the original term is important. However, “player” is regarded as a rather informal term.).
- Added value.
- Rules.
- Tactics.
- Scope.

The initial letters yield the catchy word “PARTS”. It rather shows the wish to get a slogan for the “co-opetition” approach than a profound structuring. Nevertheless, B/N use the “PARTS” elements as crucial criteria.

2.1. Players (agents)

Classically, a competitor is a participant on the same market who decreases the price/demand for the other’ products by increasing the value of the own products in the eyes of the customers. As the interests are in general antagonistic, the relationships can be characterized by a “win-lose” situation.

“Complementor” is a neologism by B/N that means an agent that has offers that are complementary to the own ones. Complementors offer products/services that increase the value to the product/service of the own enterprise, but they do not compete at the same market. Customers appreciate a product more if they already possess or can get a complementary one. Roughly said, the relationship among complementors is in general “win-win” (the interests go into the same direction).

Suppliers and customers are part of the same supply chain. However, in the co-opetition approach they are similar with the complementors in the sense of “win-win”-relationships.

B/N argue that the distinction between “win-win” relationships and “win-lose” relationships is not as clear as it may look on the first sight. An enterprise competes with suppliers, demander and complementors concerning the distribution of the commonly achieved utility (i.e. profit). Thus, negotiations are a competitive situation. On the other hand, there are many possibilities of profiting by coordinating one’s behavior with that of the competitors. Even if the explicit agreements are restricted by law, tacit collusions about prices, products, conditions, etc. (Besanko 2009) are

thinkable. Even if there is no direct communication, it can be wise for competitors not to attack each other, and to avoid price wars, etc.: B/N argue that “a satisfied competitor is less dangerous than a distressed one.”

An agent changes the “cast of agent” as soon as it is advantageous, by quitting cooperative relationships or finding new cooperation partners. Auctions are an important procedure to select new cooperation partners. In this paper, the agents that have the possibility to enter the game are termed “potential agents”.

2.2. Added value

An agent thinks about the maximization of his own profit. However in order to achieve this, he has to think not only about the effect of his own participation in the game but also about the effect of the other agents’ participation. Additionally, he has to understand whether it is advantageous to bring added value to other agents, e.g. in order to increase suppliers’ or customers’ loyalty, etc. (“win-win”).

It is dangerous to try to increase one’s own profit at the cost of another agent (opposite of added value), due to the possibility of retaliation (“win-lose”). The scheme coincides with the classical prisoner’s dilemma:

“win-lose”, “lose-win” → “lose-lose”.

Added Value refers to the value difference between the participation (or existence) and the non-participation (or non-existence) of an agent, product, etc. in the game.

2.3. Rules

B/N distinguish between

- governmental or official rules,
- cultural rules and
- rules in the relationships between business agents.

In the relationship between business agents, B/N distinguish between

- mass markets and
- individual relationships

and explain, how rules can be influenced advantageously. Thus an agent has to recognize which rules are advantageous, which ones are of disadvantage and what are the possibilities to change them.

Rules are principles that govern social behavior and restrictions. They define the way a game or sport, etc. has to be conducted, or how to behave in business, traffic, etc. B/N explain rules as follows: “most of the rules businesspeople play by are well-established laws and customs. They have evolved to help ensure that trading practices are fair, that markets keep operating, and that contracts are honored. To

step outside these rules would be to risk legal penalties or exclusion from the markets.”

It is the question which rules will rule. In individual relationships negotiations are usually the prerequisite for cooperation. In the relationship towards a mass market, negotiations are often not possible. The supplier usually determines the rules unilaterally and customers usually do not have many possibilities to influence them. The governmental and cultural rules are termed by Nalebuff and Brandenburger “meta-rules”. They can be regarded as externally given. Nevertheless there is the possibility of influencing laws by lobbying, etc.

2.4. “Tactics”

The agents have to decide in general whether the game should be played transparently or opaquely. Each agent should recognize which perceptions by other agents should be preserved and which should be changed. However it is difficult to achieve such an “information control” over other agents where uncertainty is built up (e.g. by bluffing), preserved or reduced.

Negotiations typically take place in a fog. Negotiators try to show and hide information deliberately in order to improve their position. However this is challenging because basically everything sends signals. Without sufficient reliance among the agents, negotiations are likely to fail. This can be solved by a negotiator that is accepted by both sides.

The word tactics is presumably misleading because it refers to how to control the perceptions by other agents in negotiations. B/N say: “Games in business are played in a fog.” This means that the agents usually are confronted with the problem of incomplete information. “The job of managing and shaping competitors’ perceptions is an essential part of business strategy. Perceptions play a central role in negotiations. The domain of perceptions is universal.”

2.5. Scope, boundaries

The agent should ask himself, whether to link/delink one game with/from another one e.g. by entering new markets or making longer-term contracts. If a new agent wants to enter a market, he should try to avoid competition. This can be done by occupying a price segment that is not that interesting for the incumbent(s), or bringing new products with the chance of failing. Particularly in businesses, where technology advances quickly, market superiority is deceptive. New agents may emerge with superior technology and the core competency of the incumbent in one technology may turn out as rigidity in another technology.

The scope or the boundaries of a game are defined artificially. All games are connected with each other. Even if the separation of games is convenient for analysis, it must not be neglected that decisions might have unexpected impacts

on any other issues. The complete game comprehends the whole world, but a model can only depict a small excerpt limited by region, time, technology, etc.

Time is a crucial determinant for the scope of the game. Longer-term contracts assure the links between games of different periods and therefore can be a prerequisite to protect added value. On the other hand, longer-term contracts can be difficult to assert due to changing agents, changing added value, external rules and perceptions (Ginevičius *et al.* 2006, 2007; Peldschus 2008).

2.6. Analysis of B/N’s “Co-opetition”

B/N’s “co-opetition” approach is an important step towards a practice oriented business theory in the spirit of game theory. It is a comprehensive attempt to make highly abstract or mathematic concepts in economics applicable. There is no other comparable concept yet that focuses on the ambivalence of competition and cooperation in each business relationship. Nevertheless, B/N’s co-opetition has some fundamental flaws, like that the foundation in the economic sciences is not explained, the internal structure that is disputable (Ginevičius and Podvezko 2008a, 2008b; Zavadskas *et al.* 2008b) and as it is targeted to a non-professional readership.

The only economic theory that is mentioned is the game theory. However it is not clear in which way game theory is used and whether there are other theories that are in connection with the co-opetition approach.

The “elements” “players” (agents), “added value”, “rules”, “tactics”, “scope” (PARTS) are not in a logical structure. The short-cut “PARTS” seems to be based on the intention of being memorable and easily accessible for a large readership. It is misguided from the point of view of priorities and the kind of chosen criteria. In order to show the structural problem, table 1 lists some important aspects that refer to two or more “elements” of “PARTS”, so that the “elements” overlap:

Table 1. Overlaps of elements, **x** marks the reference in B/N’s book “Co-opetition”

Aspects by B/N	Overlap of elements:	P	A	R	T	S
1 Value net: determination of agents		x			x	x
2 Value net: distinction between mass markets and individual agents		x		x	x	x
3 Value net: “potential agents” and their impact		x	x		x	x
4 Value net: “win-win” vs. “win-lose” relationships		x	x			
5 Negotiations: restricted to relationships with individual agents		x	x	x	x	x

1. The determination of agents concerns also the “scope” of the game. By each additional agent, the complexity of the game increases tremendously (Pin 2005). Furthermore the cast of agents is the result of negotiations, so that the determination of agents also refers to “tactics”.

2. The distinction between customers that are
 - individual agents and those that are,
 - mass markets (aggregated agents)

is introduced at the element “rules”. However, the distinction between individual and aggregated agents could also be covered by the element “players” (agents), and therefore also by “scope”.

3. Agents who have the potential to enter the game (“potential agents”) can be regarded as strategically very important. If an enterprise has a supplier and obtains an alternative, this has crucial impact on negotiation power as it decreases the actual supplier’s “added value”.

4. “Win-lose” relationships are among competitors and “win-win” among the others relationships in the value net. They are introduced in “agents”. However, both “win” and “lose” refer to the “added value”.

5. Negotiations (chapter “tactics”) can have impact on each element, as “you can negotiate anything” (Cohen 1982). However B/N omit to mention that negotiations are restricted to individual agents and it is not possible to “negotiate” with mass markets. The distinction between mass markets and individual agents is introduced in the chapter “rules”, but is ignored in the chapter “tactics”.

Hence, though B/N’s proposal of the co-opetition theory can be regarded as a good starting point for research, it is not implementable in the given form.

3. An overview of the literature contributions to the “co-opetition” theory

The term “co-opetition” has been coined long time before B/N’s book without receiving public attention. Already in 1911, Kirk S. Pickett of the oyster manufacturer “Sealshipt” coined the word “co-opetition” in order to describe the relationships among his 35,000 oyster dealer by stating: “You are only one of several dealers selling our oysters in your city. But you are not in competition with one another. You are co-operating with one another to develop more business for each of you. You are in co-opetition, not in competition.” T. Cherington referred in his book “Advertising as a business force” from 1913 (Cherington 1976) to this first mention. The Californian historian R. Hunt reintroduced “co-opetition” in the Los Angeles Times (1937). However, none of these early introductions received any public attention. For more than half a century there has not been any approved publication that uses this word. Ray Noorda, the long-time CEO of Novell Corporation, is regarded as

the person who reintroduced the term co-opetition into public debate in 1992 (Fisher 1992).

However the major impulse has been given by B/N (1996), though it is written in a non-scientific style. Afterwards, a multitude of literature contributions has followed and refers to both highly theoretical questions and to certain industries.

Dagnino and Padula (2002) give a comprehensive introduction into the theoretical research on the field of co-opetition. They argue that co-opetition is a field that has not been researched sufficiently due to limited or non-existing theoretical foundations. In order to propose a foundation, they compare it on the one side with the mainly competitive perspective and the mainly cooperative perspective. The competitive perspective is represented by Porter and particularly his seminal book "Competitive Strategy" (1980) and by Williamson and his major contributions on the field of "transaction cost economics" (1975, 1985). On the other side, the cooperative perspective is shown by Contractor and Lorange (1988), who emphasize strongly on the benefits of cooperation and regard them as sufficient incentive to be not seduced by possible benefits of opportunism.

Co-opetition is described by Dagnino and Padula as a new perspective that emphasizes on the "partial or incomplete congruence" of interests and goals of enterprises if they are interdependent. It is regarded as an integrative theoretical bridge between the competitive and the cooperative perspective that intends to "rebalance" the respective biases, in order to generate an enhanced understanding of sustained business performance. Dagnino and Padula propose a "theoretical framework (that is) underlying the co-opetitive perspective":

1. "Firms' interdependence is both a source of economic value creation and a place for economic value sharing".

2. "Firms' interdependence is based on a variable-positive-sum game which may bring to mutual but not necessarily fair benefits to the partners because of several competitive pressures of different nature that may undermine their co-opetitive structure".

3. In a variable-sum game structure, firm interdependence is based on "partially convergent interfirm interests".

Song (2003) explains the significance of co-opetition in the port industry with the rationalization efforts of the preceding decade. Many port operators who previously ran only their local business now extend their business to the regional or global scale. This becomes possible by cooperating with competitors in order to reach the critical mass. Song presents as example the ports of Hong Kong and South China. As the ports remain independent, they are competitors despite of cooperation.

Zineldin (2004) recommends to strategy and marketing planners in organizations to consider potential benefits

of collaboration and coordination with the competitors. He claims that "co-opetitive partnerships" are an effective response to environmental threats and opportunities. He shows possible preconditions for the survival of a "co-opetitive partnership" and compares it with a marriage. The participants get to know each other and make a "ceremony", the signing of the business contract. Conflicts that can arise must be coped with clear and agreed mechanisms. However, divorce is always possible.

Luo presents in his book "Coopetition in international business" (2004) various issues of business relationships between different countries. He regards co-opetition is a "loosely coupled system in which agents maintain certain interdependence without losing their organizational separateness". Luo's typology of co-opetition is shown in table 2.

Table 2. Luo's typology of co-opetition in dependence of the intensity of competition and cooperation

		Cooperation	
		Low	High
Competition	High	Contender: Bargain, challenge, appeasement	Co-opetitor: compromise, influence
	Low	Alienator: compliance, circumvention	Partner: accommodation, co- optation, adaptation

He investigates:

- co-opetition with global rivals,
- co-opetition with foreign governments or the
- co-opetition within one multinational enterprise.

He recognizes a simultaneous increase of competitive pressure and desire for cooperation between multinational enterprises (MNE). Cooperation with a given rival can facilitate knowledge acquirement, technological progress. In the context of product innovation or the product introduction in foreign countries it can reduce costs, risks and uncertainties. In many cases it is too costly or not possible because of laws for an enterprise to enter a foreign market. In these cases, cooperation even with a competitor might be inevitable. Luo recommends "co-opetition groups", where the collective power of the "global players" (globally active agents) is solidified towards "outside stakeholders" like home and host governments. Concurrently the "competition" helps to dilute anti-trust regulations or anti-monopoly demands.

Luo delves into the relationship between MNEs and foreign governments and the interdependence in many aspects like resource sharing, market expansion and economic growth. It is the interest of the MNEs to succeed in the market while government institutions are "controllers,

regulators, clients or adjudicators of private-sector activities. On the other side, governments are (should be) interested in “maximizing social welfare, which is contingent on efficiency, equity and social considerations”.

Luo develops ideas referring to co-opetition of dispersed subunits within a multinational enterprise. He argues that these subunits in different countries are interdependent in the sharing of resources and knowledge and in the rationalization of the value chains. Concurrently they compete for the support by the corporation, resources, etc. He classifies enterprise subunits “aggressive demander”, “silent implementor”, “ardent contributor” and “network captain”.

Ren and Shi (2005) expressed the idea that reliance among cooperating agents determines the degree of cooperation and depends on long period mutual benefit. That is a comprehensible approach in the modelling of reliance development.

Gurnani (Gurnani *et al.* 2006) focuses on supply chain management. In a supply chain one enterprise refines or markets a product that another enterprise has produced. In order to increase the customers’ demands, an enterprise has to make investments into quality or the reduction of prices. This can be exploited by the cooperation partner that sees the possibility of suspending own investments and therefore acts as a free-rider. The authors propose buy-back agreements, quantity and quality commitments and information sharing as counter-measures.

Gnywali (Gnywali *et al.* 2006) delves into the advantages and disadvantages of certain positions in networks. Networks are regarded as aggregations of bilateral links. Enterprises that have more links tend to be more influential and autonomous. These links can also refer only to particular issues. -For instance, enterprises that cooperate in research & development possibly compete in marketing. 3 types of flows in supply chains are recognized: information, assets and status. “3 primary levels of analysis” are determined:

- the industry level, where “patterns” of competitive and cooperative activities across different industries are analysed,
- the group level that refers to “competitive groups” and
- the firm level where an individual firm’s competitive and cooperative behaviour is regarded.

Chen and Fan (2006) analyse the stability of strategic alliances. They try to find stable solutions by employing game theory in an attempt to develop a theoretical basis for strategic alliances. They argue that unplanned changes from the perspective of one or more partners lead to alliance instabilities, as soon as the bargaining power shifts. Furthermore, unrealistic goal planning, imperfect implementation or goal dissimilarities of the partners make

strategic alliances in general not stable. However, alliances can bring an advantageous strategic competitive position against the competitors (Porter 1985). Chen and Fan also refer to the transaction costs economics (Williamson 1985) that emphasizes the negative effect of opportunistic behaviour in the relationships between business partners.

López-Gómez and Molina-Meyer (2007) build a bridge to population dynamics. They claim that “partial cooperation” or an interaction with competitive and cooperative aspects can lead to an explosive increment of productivity, creativity, diversity and efficiency after an appropriate time span. On the other hand, the attempt to evade competition can lead to segregation mechanisms where enterprises adapt to specific markets with their properties and regulations and use spatial heterogeneities, i.e. market boundaries that are caused by distance. Thus, business networks are described as analogous to ecological systems.

Sierra and Debenham (2007) develop a negotiation model by defining the five dimensions legitimacy, options, goals, independence and commitment and combining it to the catchy word “LOGIC”. They give the advice to negotiators to prepare by analysing their positions regarding these dimensions. Additionally they introduce two “primitive concepts”: intimacy as degree of closeness and balance as degree of fairness.

Cheng (Cheng *et al.* 2008) takes a look at “trust and knowledge sharing in green supply chains”. The inter-organizational knowledge sharing is investigated on 288 major “green” manufacturing firms in Taiwan. “Green” symbolizes strong effort to consider environment protection in the production. The majority of the firms is in the industries of electronic components, machinery and chemistry. They recognize “shared values”, “participation”, “communication”, “learning capacity”, “opportunistic behaviour” and “resource fitness” as the determinants for trust and in consequence for inter-organizational knowledge sharing.

Bojar and Drelichowski (2008) investigate the development of enterprises in the agricultural industry in many EU member countries, there under Lithuania, Poland and Czech Republic. Despite of the fact that agricultural companies are competitors, they have various common interests like building up the infrastructure for production on high quantitative scale, general development of their rural areas and therefore the obtainment of financial support by the EU. The attempt to increase the common market power compared with other competitors or in front of customers is a characteristic of the co-opetition approach. Thus, this paper is thematically close to that of Song (2003).

Another contribution to supply chain management comes from Bakshi and Kleindorfer (2008). They develop the special case where two agents are connected by a common threat, for instance terrorist attacks or natural hazards. They try to form contracts to share the risks and losses or

to share relevant information. A bargaining model is proposed where a demander and a supplier intend to make a contract. However the demander suspects the potential supplier of exploiting the situation of insecurity and waiting for a possibility to cheat. This refers to the concept of “moral hazard” in the new institutional economics (Göbel 2002). Therefore the demander plans to give an incentive to the potential supplier to refrain from committing fraud (Ginevičius *et al.* 2008).

Ngo and Okura (2008) investigate privatization and its impact on the level of competition and cooperation in a mixed duopoly market, where a semi-public and a private firm meet at a market. They show that the semi-public company is more concerned about public welfare. The private company exploits that as a free-rider. The existence of public or semi-public enterprises has positive effects on the surrounding business networks.

Hu (Hu *et al.* 2008) proposes an evolutionary model of supply chains (similar to López-Gómez’ and Molina-Meyer’s model of population dynamics of 2007). They compare business networks with many agents, where strictly competitive and strictly cooperative strategies prevail concurrently. They show that out of the competitive environment rather a situation evolves that is in the middle between competition and cooperation and provides the best profit perspectives in the whole system. Hence, in the long run a competitive outset is recognized as advantageous for the whole system in comparison with a totally cooperative outset.

Eriksson (2008) recognizes the problem in the Swedish construction industry that contract partners do not have sufficient reliance to behave cooperatively. In a survey of 87 Swedish construction companies he claims to have recognized that mistrust prevents cooperation in the way how the transaction cost theory would predict it. His aim is to demonstrate the companies how to make unbiased and systematic procurement decisions.

Baumard (2008) gives a comprehensive overview over “learning strategies in cooperative environments”. “Correct or cooperative behaviour is listed like generosity, contrition, signalling of good faith, signalling of conventions, etc. These determine the “ambiguities and tensions of paradoxical simultaneous cooperation and competition”. Baumard proposes a typology of “learning strategies”. For instance he understands the TIT-FOR-TAT principle (Axelrod 1984) as “reciprocal symmetric transparent learning” or the adverse selection (Akerlof 1970; Spence 1973) as “asymmetric open adverse learning”.

Guan (Guan *et al.* 2009) investigates wireless multimedia transmissions for many users and the optimal and fair resource allocation.

They build a formal model where they understand the numerical results as evidence that co-opetition strategies are a good way to adapt to the changes of network conditions

or participating users and help to achieve better quality of service (QoS), etc.

Sun (Sun *et al.* 2009) delves into evolutionary game theory as well, in order to find an “effective co-opetition mechanism of partners within high quality pork supply chain”. They claim that their model provides 8 factors that influence co-opetition: cooperation costs, cooperation income, “coefficient of income distribution”, decrease of cooperative risk, “coefficient of risk compensation”, probability of risk, management scale and “coefficients of either encouragement or punishment”.

Gueguen (2009) studies cooperative behavior of companies in the information technology industry. He shows the importance of establishing technological standards and therefore the necessity for competitors to cooperate. As example, the five “major business ecosystems” of mobile operating systems are compared: Palm, Microsoft, Symbian, Research in Motion (RIM) and Linux. Gueguen highlights the relationships between and within the “business ecosystems”. The possibilities are shown of how key agents of rivaling “business ecosystems” can cooperate.

Schoo (2009) describes the “Ambient Networks Project” that has been implemented 2004–2007 by a consortium of more than 40 companies, among them industrial enterprises, network operators and academic institutions like the Fraunhofer Institute Munich, Vodafone, Nokia-Siemens, Ericsson, the Technical University Berlin, etc. The project addressed the future generation of mobile communication systems for voice and data transmission, 4G (4th generation). A framework has been developed that might allow companies to enter the market with low structural barriers.

This is planned to be achieved by the development and provision of a comprehensive technological platform that regards authorization, availability and security aspects, and is therefore the basis for the provision of access (availability), applications, contents, etc. Companies that enter this industry and do not have explicit bilateral agreements can collaborate through the utilization of “pre-shared keys”, etc.

4. Conclusions

The co-opetition perspective on business relationships

“Co-opetition” is a neologism representing the ambivalence of competition and cooperation in business relationships. It highlights the incomplete congruence of interests and goals of enterprises if their decisions are interdependent. It is an applied business theory in the spirit of game theory and an integrative theoretical bridge between

- the competitive business perspectives and
- the cooperative perspective.

Table 3. An overview of publications related to co-opetition with estimation of their importance

Year	Author	Issue
Competitive perspective:		
1960	Schelling	Game theory: strategy of conflict
1976	Jensen	Institutions: principal-agent theory
1980	Porter	Competitive Strategy: neoclassical competition and profit maximization
1985	Williamson	Institutions: transaction cost economics
Cooperative perspective:		
1988	Contractor, Lorange	Advantages of cooperation
Co-opetition perspective:		
1913	Cherington	Advertising, distrib. and case studies (book)
1937	Hunt	Claim to unify competition and cooperation
1992	Fischer	IT company Novel's business philosophy
1996	Brandenburger, Nalebuff	"PARTS" model, value net, small case studies (book)
2002	Dagnino, Padula	Incomplete "interest congruence", change of perspectives: co-opetitive instead of purely competitive or cooperative
2003	Song	Sea port industry
2004	Zineldin	Co-opetitive partnerships
2004	Luo	Multinational enterprises and co-opetition (Book)
2005	Ren, Shi	Reliance determining cooperation level
2006	Gurnani, Erkoc, Luo	Free riders at supply chain investments
2006	Gnywali, He	Properties of certain network positions
2006	Chen, Fan	Stability of strategic alliances, repeat. games
2007	López-Gómez	Partial cooperation with population dynamics*
2007	Sierra, Debenham	Negotiation model "LOGIC"
2008	Cheng, Yeh, Tu	Knowledge sharing in Taiwanese industries
2008	Baumard	Learning strategies
2008	Bojar	Agriculture in Lithuania, Poland, Czech Rep.
2008	Bakshi, Kleindorfer	Bargaining with incomplete information in supply chains
2008	De Ngo, Okura	Duopoly: private and semi-public enterprise
2008	Hu, Houdet	"Evolutionary" supply chain, many agents*
2008	Eriksson	Swedish construction industry
2009	Guan, Yuan	Wireless multimedia transmissions
2009	Sun, Zhang, Lin	Evolutionary game, pork supply chain*
2009	Gueguen	Mobile operating systems
2009	Schoo	"Ambient networks", mobile communication

Game theory is used as the mathematical instrument for the co-opetition theory in order to describe questions related to business relationships.

Brandenburger and Nalebuff's contribution to coope-tion research

B/N understand co-opetition as an applied business theory in the spirit of game theory. They regard "players", "added value", "rules", "tactics" and "scope" as the basic elements of co-opetition. However, the "PARTS" model is arbitrary and presumably in accordance to marketing considerations. B/N target a non-professional readership. Nevertheless B/N made a first step towards a theoretical foundation. They present many important distinctions in a non-structured way like:

- Win-win vs. win-lose relationships in "value nets",
- Individual customers vs. mass markets and
- Potentially vs. actually participating agents.

Co-opetition: relevant publications

As the most important publications are identified:

1. Dagnino and Padula (2002).
2. Nalebuff and Brandenburger (1996).
3. Bakshi and Kleindorfer (2008).
4. Luo (2004).

Dagnino and Padula claim there should be a switch from the competitive and the cooperative perspectives to a co-opetition perspective. Dagnino and Padula criticize the neglecting of the foundation and structure of the co-opetition theory. Bakshi and Kleindorfer introduce a bargaining model with incomplete information in accordance to the principal-agent theory. Luo delves into co-opetition in international business.

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