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## **Interlinkages between Coopetition and Organisational Innovation in Europe**

### **ABSTRACT**

#### **Purpose**

The objective of this research is to analyse the relationship between coopetition and organisational innovation in EU countries. As coopetition is usually studied from an inter-company perspective, this work looks in detail at the “ad intra” dynamics of the cooperating companies to understand how they adjust their organisation or implement organisational innovation to successfully adopt this original approach.

#### **Design/methodology/approach**

Using Eurostat data (CIS2014), this research offers a quantitative study on cooperating companies, relating coopetition to organisational innovation. The analysis technique used in this study is logistic regression with maximum likelihood estimation, where the dependent variable is the location of the cooperating companies.

#### **Findings**

The findings highlight specific characteristics and differences according to whether a company competes domestically or in other more complex geographic environments. It also incorporates variables into the analysis such as the use of price marketing, employee training and company size.

#### **Originality/value**

Our study provides insights into the relationship between coopetition and organisational innovation, in a research field that usually focuses on inter-company analysis. Several little-studied factors are included in the analysis, such as the role of employee qualifications and differences in coopetition in different geographic areas. We observe that, in certain locations, coopetition could be related to a “market entry” effect.

**KEY WORDS:** Coopetition, innovation, collaboration, EU, organisational innovation,

## 1. INTRODUCTION

The term “Coopetition” (Brandenburger & Nalebuff, 1996), describing seemingly contradictory collaboration with competitors, has started to become popular with both scholars and practitioners (Chen, 1996; Ritala & Hurmelinna-Laukkanen, 2009) interested in understanding the dynamics of the companies that simultaneously combines cooperation and competition (Luo, 2007; Kylänen & Rusko, 2011). There have been many literature reviews and bibliometric analyses (Minà & Dagnino, 2016; Czachon & Mucha-Kuś, 2014; Gast et al., 2015; Dorn, Schweiger & Albers, 2016; Köseoğlu et al., 2019) which demonstrate the interest in understanding the multifaceted nature of this managerial strategy.

Coopetition has been largely analysed outside the company: as an inter-firm dynamic (Bengtsson & Kock, 2000; Devece, Ribeiro-Soriano & Palacios-Marqués, 2019 for a specific literature review), or at a global or market level, for example involving multinational companies (Luo, 2007). However, little is known about the "ad intra" dynamics in coopeting companies. Our current understanding of precedents for coopetition is fragmented (Bouncken et al., 2015; Czakon, Klimas & Mariani, 2019). The relatively few studies on coopetition inside the company look at organisational units competing with each other ("inter-units") for resources and competences embedded in intra-organisational networks (Tsai, 2002; Chiambaretto, Massé & Mirc, 2019). Even less studies analyse how coopeting companies are organised or should be organised internally. It is interesting to understand how a coopetitive company adjusts its organisation or implements organisational innovation to successfully adopt this original approach. Our research concentrates on the relationships between these practices: coopetition and organisational innovation.

As Luo (2007) indicates, competition takes place without any formal governance, while coopetition is subject to some formal (e.g., contract terms or jointly formalised policies) or informal governance (e.g., norms in socially embedded exchanges). This could provoke tensions in the organisation. Managers face issues like what simultaneously drives cooperation and competition, who it might be worth learning from, how to adjust coopetition in response to new conditions, and where to position the company strategically in terms of market, product, function, and resources in a coopetition network (Luo, 2007). In summary, it places high cognitive demands on managers (Czakon, Klimas & Mariani, 2019), which entails: recognising the importance of coopetition; identifying opportunities for value creation with competitors, and helping other managers to develop a coopetitive mindset, which should be a habitual mental outlook (Gaim & Wählin, 2016). In fact, higher education was found to positively influence the likelihood of coopetition due to skillsets and the stock of knowledge of the employees (Schmiele & Sofka, 2007; van den Broek, Boselie & Paauwe, 2018).

On the other hand, Crick & Crick (2016) presented a framework, depicting local, national, and organisational-level coopetition, which were used to appreciate the multi-dimensionality of the coopetition construct, varying according to the geographical and organisational scope. More recently, Crick & Crick (2019) consider that the variation of

coopetition across different geographical and organisational-level proximities is an alternative perspective to extending existing knowledge related to coopetition, as an under-researched area.

It therefore seems necessary and opportune to study the relationship between coopetition and organisational innovation in cooperating companies. In their extensive literature review, Bouncken, Gast, Kraus & Bogers (2015) insist on the need to enhance our understanding about coopetition and its implications for innovation, especially in its different forms. This refers in particular to organisational innovation that is generally the least studied (Schmidt & Rammer, 2007; Sappasert & Clausen, 2012; Ganter & Hecker, 2014).

Eurostat (2005, p. 17) and the OECD define organisational innovation as: “Organisational innovations refer to the implementation of new organisational methods. These can be changes in business practices, in workplace organisation or in the firm’s external relations”. This definition differentiates it from product, process and marketing innovations. It involves changes to an organisation’s structure and processes through the implementation of new management and working concepts and practices (Damanpour, 1987; Damanpour & Evan, 1984), such as teamwork in production, supply chain management and also cooperation. Crossan & Apaydin, (2010) pointed out in their literature review of innovation publications that only 3% of the articles analysed (in an analysis covering a 27-year period) studied innovation in management practices and business processes. The reality is that other types of innovation, such as product innovation, have been much more attractive to academics (Pippel, 2014; Simao et al., 2016).

This study sets out to answer the question of how coopetition and organisational innovation are related, given that to perform this strategy the company must prepare its organisation appropriately. To do this, the paper presents an analysis based on the Eurostat CIS survey on innovation in the EU, which includes questions about collaboration with competitors, as well as their organisational innovation dynamics.

Our study contributes to knowledge, relating coopetition to innovation, an area that requires more research, as suggested by Bouncken et al. (2015). Prior coopetition-based investigations have predominately been conceptual or qualitative in nature (Crick & Crick, 2019). Therefore, this analysis has made a positive addition to the literature by adopting a quantitative approach and incorporating new variables into the study, and is one of the first works to analyse the role of organisational innovation. In general, studies on coopetition focusing on the cooperating company itself are not very common.

The remainder of this paper is organised as follows. The next section provides a brief overview on the existing research, building on organisational innovation theory and coopetition theory. Then, the methodology and data included in the study is described. Subsequently, the paper presents the empirical analysis and reports the results. Finally, the article closes with some concluding remarks and also sets out some limitations and directions for future research.

## **2. INTERLINKAGES BETWEEN COOPETITION AND ORGANISATIONAL INNOVATION: A BRIEF LITERATURE REVIEW**

The literature examining the link between innovation and cooperation has been growing, especially with the research of Ritala & Hurmelinna-Laukkanen (2009), and we can find many contributions in this area (Ritala & Hurmelinna-Laukkanen, 2013; Granata et al., 2016; Wemmer, Emrich & Koenigstorfer, 2016). There is some consensus about the idea that coopetition can drive innovation because participating companies manage to distribute risks and increase market power (Quintana-Garcia & Benavides-Velasco, 2004; Gnyawali & Park, 2011). However, some research has detected the opposite effect (Nieto & Santamaría, 2007; Fernandez, Le Roy & Chiambaretto, 2017).

Among the points of convergence between innovation and coopetition that can be found in the literature, Ritala et al. (2016) include processes and practices, and particularly the tensions and interaction generated. Some authors (Bengtsson, Eriksson & Wincent, 2010, for example) insist that innovation results could be affected due to the tensions resulting from the contradictions and dichotomies inherent to coopetitive relationships (Gnyawali, Madhavan, He & Bengtsson, 2016). For example, researchers emphasise the struggles and emotional ambivalence experienced by managers who oversee coopetitive relationships (for example, Raza-Ullah et al., 2014). However, these tensions are inherent to the simultaneous search for cooperation and competition (Tidström, 2014). Both trust and distrust are critical for enhancing performance in interfirm relationships (Raza-Ullah & Kostis, 2019) because deep cooperation with a competitor could be potentially dangerous and could conduct to opportunistic reactions, as firms learn about one another. Incompatible goals, role confusion and headhunting represent causes of conflict in intercompetitor cooperation (Tidström, 2009). Over time, companies develop cognitive frameworks that help them reflect on their collaboration experiences, improving their knowledge of the costs and benefits of partnerships, as perceived shared problems and resource constraints stimulate coopetition (van den Broek, Boselie & Paauwe, 2018). The knowledge acquired through this iterative process is gradually incorporated into organisational practices (Estrada & Dong, 2019). The lack of clear coordination among concrete mechanisms through which the outcomes from the application of cooperative strategies can be obtained is a clear challenge for coopeting companies.

A key challenge for management when coopeting is to understand and accept this paradox and keep the resulting tensions down to moderate levels, instead of trying to eliminate them (Estrada & Dong, 2019; Bengtsson et al., 2016; Gnyawali et al., 2016). In this sense, the understanding of the paradox by individuals is a managerial stake that is indispensable to the good management of this tension, as Lacam & Salvetat, (2019) suggest: The managers of the firm must explain and value the advantages to their employees, establish arbitration procedures to resolve possible conflicts between participants and promote separate management of competition and cooperation between functions in the value chain, lines of business and geographic markets. Strese et al. (2016) elaborate on how formal organisational structures might enable a firm to favour coopetition and to cope with the complex task of balancing cooperation and competition alike. Luo (2005) suggests that the

mode of coordination, including factors such as centralisation, formalisation or specialisation, helps companies maximise the benefits of coopetition. As Kim et al. (2013) indicate, coopetition should be employed by managers in an “optimal level”, in which they share the correct amount of resources and capabilities with competing organisations (Crick, 2019).

In any case, going beyond the organisational tensions that coopetition generates and the management problems it causes, and beyond how organisations try to adapt, the combined research on the relationship between coopetition and organisational innovation is very limited. Klimas & Czakon (2018) examine the issue while studying organisational innovativeness. These authors postulate that innovative companies, ones with a high level of organisational innovativeness<sup>1</sup>, cooperate more, but literature clearly distinguishes between innovation and innovativeness (Anderson, De Dreu & Nijstad, 2004; Hult, Hurley & Knight, 2004).

As defined by Eurostat (2005) and the OECD, organisational innovation also includes the implementation of new organisational methods in the firm’s external relations. It is not restricted to processes and activities ‘ad intra’ (Bujidos et al., 2019): openness, collaboration and the establishment of cooperative networks are a fundamental part of the dynamics of organisational innovation. Improving internal innovation through the use of external resources is one of the primary mechanisms identified (Park, 2011; Srivastava, Bruyaka & Gnyawali, 2012) through which companies generate the associated benefits of coopetition. Internal organisational innovation is expected prior to external organisational innovation (Augusto et al., 2014). Czakon, Klimas & Mariani (2019) consider that coopetition is an intentional strategy, driven by a strategic rationale in order to reach clearly defined benefits with fitting partners. The constant effort to identify new partners, together with looking after the current ones, and the tendency to propose routines to manage these relationships, are common in companies with a greater cooperative focus, and could also be beneficial in coopetition.

The search for a competitive advantage has also been analysed from the perspective of the company's position and the characteristics of the exchange network, not only from the perspective of learning but also of knowledge sharing (Powell, Koput & Smith-Doerr, 1996; Gnyawali & Madhavan, 2001). In literature, coopetition also appears to be associated with the dynamics of knowledge transformation (Werner, Dickson & Hyde, 2015) and is one of the key strategies used in the 21st century (Yami et al., 2010). When cooperating, an improvement in the economic performance of the organisation can be expected as a result of the rapid dissemination of new intra-organisational procedures (Caroli & Van Reenen, 2001; Greenan, 2003; Flight & Palmer, 2013).

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<sup>1</sup> Organisational innovativeness is understood as “*an innovation firm’s capacity to engage in innovation*” (Klimas & Czakon, 2018). According to these authors, organisational innovativeness is acknowledged as an enduring organisational trait, clearly appearing as a firm-level antecedent, while innovation represents an organisational outcome.

In small enterprises (SMEs), collaboration through partnerships or collaborative innovation networks are very relevant given that internal innovation is limited due to the use of most of the company's resources and energy on the product and its marketing (de Propris, 2002; Morris, Kocak & Özer, 2007; Lipparini & Sobrero, 1994; Winch & Bianchi, 2006). Nevertheless, SMEs are particularly exposed to cooperative risks (Bouncken & Kraus, 2013) as they lack the advantages of large firms, such as experience and organisational innovation capabilities, which can be used to absorb failure (Rosenbusch, Brinckmann & Bausch, 2011). Cooperation introduces risks such as loss of control over the innovation process or unwanted transfer of knowledge or technology to rivals. In contrast, Chiambaretto et al. (2019) have recently concluded that small firms are generally less reluctant to cooperate than large ones. By comparing small and large firms, these authors show that small firms value the fact that competitors offer more strong risk-sharing and learning opportunities than large firms do.

### 3. EMPIRICAL ANALYSIS

#### 3.1 Methodology and data

This research uses data from the Eurostat Community Innovation Survey (CIS), based on innovation statistics forming part of the EU science and technology statistics. The survey is conducted biannually and EU data from CIS 2014 have been used for this article, covering the 3-year period 2012 to 2014. Some waves of this survey have already been used to study cooperation (i.e. CIS 04 for France, in Le Roy, Robert & Lasch, 2016; CIS 2012 for Germany, in Navío-Marco, Bujidos-Casado & Rodrigo-Moya, 2019).

Eurostat, as the statistical office of the European Union<sup>2</sup>, provides robust and reliable data. Its mission is to provide high quality statistics for Europe. Eurostat's data is collected by the National Statistical Institutes of the different Member States; therefore, the surveys are considered as reliable sources applying high standards with regard to the methodology. The survey provides a representative image of the EU. Over the years, it has evolved to include questions about collaboration in innovation, and especially with competitors, has differentiated in several geographical areas: collaboration with domestic competitors (CO41), with others in EU/EFTA/EU-CC (CO42), in the United States (CO43), in China or India (CO44) and other countries (CO45). The survey also includes internal data about the company (number of employees, qualifications, turnover etc), and its innovative dynamics in the organisational field, both internal and external<sup>3</sup>.

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<sup>2</sup> For further information: <https://ec.europa.eu/eurostat/about/overview>

<sup>3</sup> Regarding organisational innovation, the survey provides responses about: 1. New business practices for organising procedures (i.e. first time use of supply chain management, business re-engineering, knowledge management, lean production, quality management, etc.), 2. New methods of organising work responsibilities and decision making (i.e. first time use of a new system of employee responsibilities, teamwork, decentralisation, integration or de-integration of departments, education/training systems, etc.) 3. New methods of organising external relations with other enterprises or public organisations (i.e. first time use of alliances, partnerships, outsourcing or subcontracting, etc.).

The database provides an initial sample of 98,809 companies located in 11 European countries, from which all companies with some type of cooperative arrangement for product and/or process innovation have been selected. Of all the companies initially observed, n=12,994 companies that have cooperated with other companies or organisations in any of their innovation activities during the 2012-2014 period have been taken into account for this study.

From the n=12,994 companies analysed, 16.2% of companies cooperate with one competitor or other company in their sector, and very few companies do so with more than one (4.9%). It is most common for companies (10, 245) to be involved in other types of collaboration (78%), as presented in table 1.

Table 1. Number of collaborators which whom each company cooperates

No. collaborators (competitors or companies in their sector)	Number of companies	%	Number of collaborations
0	10245	78.8	
1	2104	16.2	2104
2	474	3.6	948
3	90	.7	270
4	39	.3	156
5	42	.3	210
Total	12994	100	3688

A first analysis of the 3688 partnerships with competitors or companies in the same sector by location indicates that companies prefer to cooperate with companies from their own country (59.7%) or from Europe (26.8%). A minority (2.7%) cooperate with companies from China or India (table 2).

Table 2: Location of the companies with whom they cooperate

Competitors or other enterprises	Number of companies	%	Var. Code
National	2202	59.7%	CO41
EU/EFTA/EU-	991	26.8%	CO42

CC			
US	193	5.2%	CO43
China or India	100	2.7%	CO44
Other countries	202	5.4%	CO45

Table 3 contains the variables selected in the study. The variables listed first identify the location of the companies with which European companies compete (CO41, CO42, CO43, CO44, CO45) and these will be the variables explained in the models. Secondly, the explanatory variables are those that identify the companies that have introduced organisational innovations of any type (ORGBUP, ORGWKP, ORGEXR), those that have implemented a new marketing concept or a marketing strategy that differs significantly from that previously used (MKTDGP, MKTPDP, MKTPDL, MKTPRI) and those that have started an innovation activity as part of an agreement for the provision of goods or services to a public sector organisation (PUBDOM, PUBFOR, PBINN). Moreover, the percentage of an enterprise's employees in 2014 with a tertiary degree (EMPUD) and the size of the company in terms of the number of employees (SIZE\_R) were also taken into account.

Table 3: Variables used in the analysis

Cooperation arrangements for product and/or process innovation				
$Y_1$	CO41	Competitors or other enterprises ...: National		
$Y_2$	CO42	Competitors or other enterprises ...: EU/EFTA/EU-CC		
$Y_3$	CO43	Competitors or other enterprises ...: US		
$Y_4$	CO44	Competitors or other enterprises ...: China or India		
$Y_5$	CO45	Competitors or other enterprises ...: Other countries		
Organisational innovation				
$X_1$	ORGBUP	New business practices for organising procedures		
$X_2$	ORGWKP	New methods of organising work responsibilities and decision making		
$X_3$	ORGE XR	New methods of organising external relations		
Marketing innovation				
$X_4$	MKTDGP	Significant changes to the aesthetic design or packaging		
$X_5$	MKTPDP	New media or techniques for product promotion		
$X_6$	MKTPDL	New methods for product placement or sales channels		
$X_7$	MKTPRI	New methods of pricing goods or services		
Public sector procurement				
$X_8$	PUBDOM	Procurement contracts for domestic public sector organisations		
$X_9$	PUBFOR	Procurement contracts for foreign public sector organisations		
$X_{10}$	PBINN	Undertook innovation activities (enterprise with procurement contract)		
Basic information on the enterprise				% companies
$X_{11}$	EMPUD	Percentage of employees with university degree	0: 0%	5,5
			1: 1% to 4%	5,5
			2: 5% to 9%	10,0
			3: 10% to 24%	26,8
			4: 25% to 49%	20,7
			5: 50% to 74%	15,2
$X_{12}$	SIZE_R	Size of the enterprises	6: 75% to 100%	16,3
			0: 0-49 employees	40,4
			1: 50-249 employees	34,8
			2: Over 250 emp.	24,8

NOTE European countries (EU); European Free Trade Association (EFTA); European-Candidate Country (EU-CC); United States (US).

The analysis technique used in this study is logistic regression with maximum likelihood estimation, where the dependent variable is the location of the competing companies. The analysis of the parameter estimates allows us to identify the actions that differentiate competition with companies according to their location.

For the design of the models, it has been verified that the explanatory variables selected are correlated with those explained. The results of the Pearson Chi Square tests carried out all reject cross independence (Appendix 1). The proposed logistic regression models were:

$$P(Y_i) = \frac{e^{\beta_{i,0} + \beta_{i,1}X_{i,1} + \dots + \beta_{i,p}X_{i,p}}}{1 + e^{\beta_{i,0} + \beta_{i,1}X_{i,1} + \dots + \beta_{i,p}X_{i,p}}} \text{ for } i = 1, 2, 3, 4, 5$$

where:

$Y_i$  is the value of the explained variable CO4i with  $i = 1, 2, 3, 4, 5$

$X_{i,j}$  is the value of the explanatory variable  $X_j$  for  $Y_i$  with  $j = 1, 2, \dots, 12$

To guarantee the validity of the models, significance tests of the coefficients in the estimated models are carried out and the standard error associated with each coefficient is incorporated. In addition, the statistical significance of the model is analysed (Likelihood & Chi-Square), the reliability of the models is measured (Hosmer & Lemeshow Test) and the classifying capacity of the model is studied (Receiver Operating Characteristic ROC curve).

### 3.2 Results and discussion

This section includes the results of the statistical analysis that looks at the relationship between competition and the innovative behaviour of the companies analysed, and particularly their organisational innovation. Table 4 shows the coefficients for the independent variables in the five models estimated and the risk associated with each category of variables (odds-ratio). In each case, the variables whose coefficients are significantly different from zero according to the results of the Wald test were selected.

Table 4: Explanatory variables

		CO41		CO42		CO43		CO44		CO45	
		B	Odds Ratio								
	ORGBUP			0,190** (0,095)	1,209	0,966*** (0,193)	2,627				
	ORGWKP			0,204** (0,097)	1,227					0,677*** (0,186)	1,968
	ORGE XR	0,399*** (0,058)	1,490	0,394*** (0,088)	1,483			0,930*** (0,240)	2,533		
	MKTDGP	-0,122* (0,062)	0,885								
	MKTPDP	0,193*** (0,063)	1,213							0,408** (0,181)	1,504
	MKTPDL					0,389** (0,170)	1,475				
	MKTPRI	0,141** (0,068)	1,152	0,234*** (0,086)	1,264			0,575** (0,239)	1,776	0,368** (0,185)	1,445
	PUBDOM					-0,760** (0,301)	0,468				
	PUBFOR			0,506*** (0,153)	1,658	1,205*** (0,300)	3,335	0,925*** (0,324)	2,522	0,776*** (0,251)	2,174
	PBINN	0,470*** (0,093)	1,601	0,227* (0,137)	1,254	0,925*** (0,339)	2,522				
EMPUD	EMPUD(1)	-0,369** (0,161)	0,692	-0,080 (0,307)	0,923	0,175 (0,713)	1,191	-0,608 (1,228)	0,544	0,075 (1,003)	1,078
	EMPUD(2)	-0,126 (0,135)	0,881	0,147 (0,256)	1,159	-0,137 (0,651)	0,872	0,276 (0,841)	1,318	1,221 (0,767)	3,390
	EMPUD(3)	-0,218* (0,119)	0,804	0,368 (0,225)	1,444	0,038 (0,552)	1,038	0,233 (0,763)	1,263	1,127 (0,732)	3,085
	EMPUD(4)	-0,161 (0,121)	0,851	0,513** (0,227)	1,670	0,562 (0,541)	1,755	0,649 (0,754)	1,913	1,250* (0,735)	3,491

SIZE_R	EMPUD(5)	0,165 (0,123)	1,180	1,155*** (0,225)	3,174	1,317** (0,531)	3,733	1,176 (0,748)	3,241	1,899*** (0,730)	6,677
	EMPUD(6)	0,285** (0,121)	1,330	1,458*** (0,224)	4,298	1,848*** (0,526)	6,345	1,563** (0,742)	4,771	2,257*** (0,727)	9,555
	SIZE_R(1)	-0,127** (0,058)	0,881	0,373*** (0,090)	1,452	0,100 (0,214)	1,105	0,609** (0,290)	1,839	0,289 (0,205)	1,335
	SIZE_R(2)	-0,077 (0,070)	0,926	1,024*** (0,095)	2,784	1,231*** (0,200)	3,425	1,345*** (0,289)	3,837	1,127*** (0,201)	3,086
Constant		-1,599*** (0,112)	0,202	-3,996*** (0,222)	0,018	-6,213*** (0,537)	0,002	-6,878*** (0,748)	0,001	-6,811*** (0,731)	0,001
<i>-2Log Likelihood</i>		9976,047		5522,047		1462,435		878,6		1546,884	
<i>Chi-Square</i>		234,433***		466,485***		215,629***		92,813***		147,872***	

NOTES: Coefficient (B), robust standard errors (in parentheses) and Odds ratio of logit regression models (CO41, CO42, CO43, CO44, CO45).

\*\*\*, \*\*, \* indicates significance beyond the 99%, 95%, 90% two-tailed confidence level.

EMPUD is the percentage of employees in the company with university degree. EMPUD (1): 1% to 4% employees with university degree; EMPUD(2): 5% to 9% employees with university degree; EMPUD(3): 10% to 24% employees with university degree; EMPUD(4): 25% to 49% employees with university degree; EMPUD(5): 50% to 74% employees with university degree; EMPUD(6): 75% to 100% employees with university degree.

SIZE\_R is the size of the enterprise. SIZE\_R(1): the size of the enterprise is 50-249 employees; SIZE\_R(2): the size of the enterprise is over 250 employees.

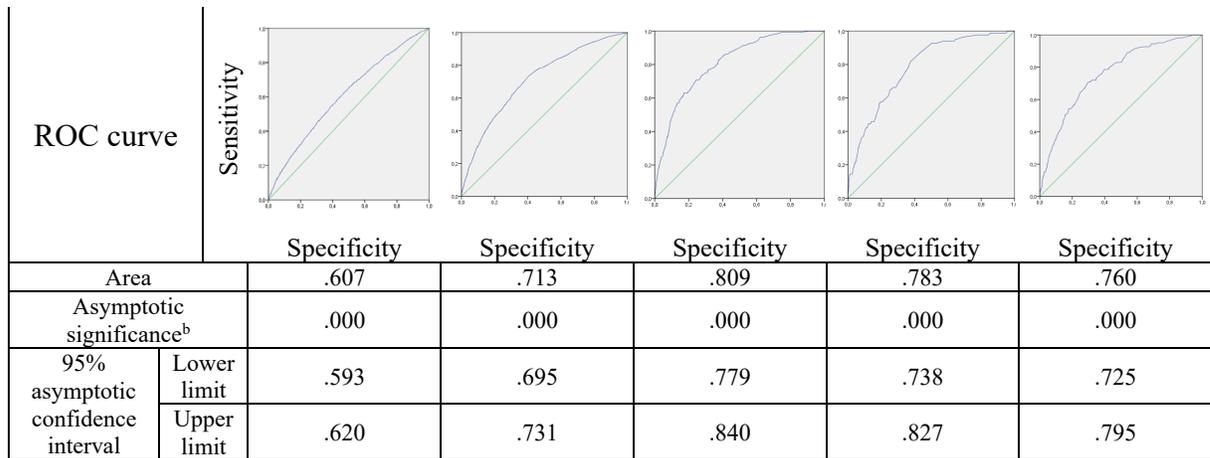
Table 5: Hosmer-Lemeshow test

Variable	Chi square	df	Sig.
CO41	8.172	8	.417
CO42	7.059	8	.530
CO43	4.655	8	.794
CO44	10.362	8	.241
CO45	2.492	8	.962

The results of the Hosmer-Lemeshow tests performed for each model indicate that the fit of the previously estimated models is acceptable (table 5) and, in addition, the study of the ROC curve indicates that, in keeping with Hosmer et al. (2013), the model has an acceptable discriminant capacity (table 6), and in all five models the null hypothesis for the test is rejected.

Table 6: Reliability of the results

	CO41	CO42	CO43	CO44	CO45



The analysis of the estimation results for the five models shown in table 4 provides information on the relationship between the variables studied. The validity of the models is guaranteed by the Chi-Square tests carried out for each of them. Furthermore, the estimated coefficients of the variables included in the models are significant (significance test).

When analysing the results, in all cases coepetition is related to organisational innovation, especially when new methods for organising external relations (ORGEXR) are incorporated, which appears with a better result in practically all cases. Thus, the possibility of collaborating with competitors or other enterprises of the sector is 2.5 times higher when the European companies coepete in China/India (CO44) and organisational innovation exists. In addition to the use of new methods for organising external relations (ORGEXR), the characteristics that largely explain whether a company is prone to collaborating with its domestic competitors involve performing innovation activities for the public sector (PBINN). In Europe, the likelihood of coepetition increases when there is innovation in external relations methods (ORGEXR) and when contracting in the foreign public sector (PUBFOR). Innovation in new business practices (ORGBUP) is mainly present in coepetition with US companies, which is also enhanced by entering into agreements in the foreign public sector (PUBFOR). Coepetition with companies from China and India is greater when innovation in new methods of external relations (ORGEXR) exists and coepetition with companies in other countries is more probable when innovating in work responsibility and decision-making methods (ORGWKP).

Going into detail regarding the results in Table 4, organisational innovation seems to favour companies collaborating with their European competitors. When the coepeting companies are domestic or European, their collaboration is enhanced almost 50% by the use of new methods for organising external relations (ORGEXR) compared to those that do not use them. The likelihood of collaborating with competing companies in other countries is doubled if new methods are implemented (ORGWKP) to organise work responsibilities and decision-making (i.e. first time use of a new system of employee responsibilities, teamwork, decentralisation, integration or de-integration of departments, education/training systems, etc.). However, new organisational business practices (ORGBUP) increase the

probability of a company cooperating with a European company by 20% and with a US company by more than double.

Marketing innovations such as the existence of changes in the design of goods or services (MKTPDP), the use of new techniques to promote products (MKTPDP) and new methods of pricing goods and services (MKTPRI) slightly increase the probability that the companies with which it competes are located in the domestic environment. MKTPRI also positively affects cooperation with companies placed in all location categories except the United States. However, cooperation with US companies is the only one that is enhanced by 50%, by marketing innovation in product placement or sales channels (MKTPDL). Innovation in techniques for product promotion (MKTPDP) is mainly linked to cooperation with companies from the other countries category. New methods of pricing goods or services (MKTPRI) appears repeatedly in the results, indicating that when this type of innovation occurs there is a higher probability of cooperating. This is especially relevant in competition with partners from China or India (CO44), where this type of marketing innovation leads to a 1.8 times greater chance of finding cooperation. This may indicate that collaboration with competitors in these locations has a component related to the desire to innovate on price, based on the cost competitiveness of those markets. This result could be expected, because when the decision of market innovation is taken, organisational innovation goes hand in hand with it. As literature indicates (Bujidos-Casado et al., 2019) there is a strong positive correlation between innovation in marketing and organisational innovation. On the other hand, the search for benefits in marketing, sharing distribution channels or co-marketing, are already linked in the literature to cooperative practices (Ritala, Golnam & Wegmann, 2014).

It is observed that 31.5% of cooperating companies have more than half of their employees with a university degree (groups 5 and 6) and, on the contrary, there are 5.5% of companies that do not have any employee with a university degree. In the intermediate levels, 47.5% of companies are studied, and it is observed that their number of employees with university degrees varies between 10% and 49%. Moreover, the percentage of companies with relatively few employees is slightly higher than the percentage of medium-sized ones, and only a quarter of the sample corresponds to large companies (as detailed in Table 3). A high proportion of employees with a university degree (EMPUD) and a high number of workers in the company (SIZE\_R) increase the probability of cooperation in all cases where competitors are located outside the country. Furthermore, as the scenario becomes more complex (cooperating in remote locations), the percentage of employees with a university degree is increasingly influential. As a result, cooperating in the US (CO43) is 6 times more likely when there is a higher percentage of employees with a university degree. The equivalent figures are 4.3 times higher in the European case (CO42) and over 9.5 times more likely in other countries (CO45). A higher number of employees with a degree could lead to or promote the organising of more elaborated dynamics for innovation, such as cooperation. When knowledge, experience and learning ability accumulate over time, innovative company performance is enhanced through non-imitable skills and innovative idiosyncratic capabilities (Kogut & Zander, 1992) that may benefit the company. Cooperation requires careful management (Klimas, & Czakon, 2018; Fernández et al., 2014), especially to limit the risk of unintended knowledge transfers and spillovers

(Bouncken et al., 2016). Managers should be prepared to nurture the frequency of interactions between partners and teams and the absorptive capacity to promote intra-organisational learning (Luo, Slotegraaf & Pan, 2006). On the other hand, the literature (Yami & Nemeah, 2014) indicates that in markets with short product life cycle, technology convergence and high R&D costs, such as high-tech industries, coopepetition prevails as a strategy for innovation. All these facts definitively require well-prepared and high-skilled managers and have clear implications in companies' talent management.

Procurement contracts for foreign public sector organisations (PUBFOR) explain collaboration in all locations except coopeeting companies in the same country. In particular, the probability of coopepetition in the US is more than tripled when the enterprise has contracts to provide goods or services for foreign public sector organisations (PUBFOR). The performance of innovation activities for the public sector (PBINN) favours coopepetition with domestic, European and, to a greater extent, US companies. Moreover, the association observed between innovation with the public sector (PBINN) and coopepetition at a European and US level, for example, leads us to conclude that it could be a "market entry" effect in those geographic areas, achieving a local presence with innovation commitments with the environment where the company wants to operate. It could also be a requirement associated with reaching agreements to access this type of partner. In line with Klein et al. (2019), the interplay of simultaneous cooperation and competition affects the competitive behaviour of firms in terms of their entry into shared markets. Our results are therefore in line with Ritala, Golnam & Wegmann (2014) regarding the implications of coopepetition on market exploration and competitive positioning. Additionally, cooperation is the prevailing behaviour in channel systems (Rosmimah Mohd and Melewar, 2004): when it comes to opening new clients and markets outside the domestic, cooperation with the necessary partners can take precedence over competitive aspects. These collaborations in markets on other continents, with greater demands on risks and costs, can invite to this collaboration with competitors.

Finally, when the coopepetition scenario becomes more complex in terms of location (from domestic coopepetition CO41 towards more internationalisation), the size of the company becomes more influential, so it is generally three times more likely to find coopepetition with larger companies in the US, China and India, as examples (see table 4). This result can be related to the difficulties of the European SMEs (observed by Wang et al., 2020) to collaborate on the Chinese and other dissimilar markets, in their internationalisation processes.

#### **4. CONCLUSIONS**

Research on coopepetition is neither an extension of academic research on cooperation nor on competition: it has instead evolved as a stand-alone field of research (Yami, Castaldo, Dagnino & Le Roy, 2010). Looking beyond the ongoing debate about its definition (Minà & Dagnino, 2016; Ketchen et al., 2004; Dorn et al., 2016), the new research offers proposals and approaches usually focused on interrelationships between companies and rarely on the organisational aspects of the coopeeting company itself.

Our study contributes to the theory on cooptition and organisational innovation and has practical implications. Its main contribution is to provide insights into the relationship between the two, in a research field that usually focuses on inter-company analysis. Moreover, several little-studied factors are included in the analysis, such as the role of employee qualifications and differences in cooptition in different geographic areas. This study is also one of the first quantitative pan-European works and therefore provides relevant insights using data for the EU as a whole.

Together with the findings relating organisational innovation to cooptition, interesting results have been found related to price marketing and the possible “market entry” effect in collaboration with the public sector. Particularly relevant are the findings regarding the requirement for employees to be more qualified, to manage this type of sophisticated process. The results tend to confirm the complexity of the coopting practice and the need of education to manage such collaboration. As regards company size, the relationship between cooptition and organisational innovation is more evident for large companies.

The analysis differentiates among geographic action areas for the cooptition of European companies. Our results, highlighting the implications of the geographic dimension (location) in line with these findings, provide a better understanding of cooptition strategies for innovation in the multinational environment, and give a greater insight into this field. Our findings highlight the specificities and differences according to whether a company cooptes on a domestic level or in other more complex geographical environments.

This study has its limitations, which are mainly attributable to the limitations of the available data, the dichotomic nature of many of the variables, and the difficulties of handling data for an area as large as Europe. Following the questionnaire, and the variables included in it, has not allowed us to search for relationships or interactions in a totally flexible way. Evolution and time dimension are not considered despite their relevance (Leite, Pahlberg & Aberg, 2018). However, the original results found in the study provide a suggestive input on the cooptitive situation of innovative companies that can be useful, and it has clear managerial implications in highlighting the importance of preparing an organisation to coopte through internal innovation, and of the need to ensure that personnel involved are well qualified.

The search for methodological ideas that will enable us to make better use of the available data and broader approaches on a pan-European level are being considered as future lines of research. The findings themselves open up new avenues for research, partly because they include internal dynamics as a variable for further study, but also because they show the need to better understand the international behaviour of coopting companies.

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## Appendix 1

### Pearson Chi-Square tests

		co41	co42	co43	co44	co45
orgbup	Chi-Square	32,647	104,915	64,796	23,120	43,410
	gl	1	1	1	1	1
	Sig.	,000*	,000*	,000*	,000*	,000*
orgwkp	Chi-Square	50,552	128,876	39,491	29,219	63,973
	gl	1	1	1	1	1
	Sig.	,000*	,000*	,000*	,000*	,000*
orgexr	Chi-Square	130,949	161,942	52,130	43,026	51,398
	gl	1	1	1	1	1
	Sig.	,000*	,000*	,000*	,000*	,000*
mktddp	Chi-Square	9,283	38,723	18,553	5,857	33,311
	gl	1	1	1	1	1
	Sig.	,002*	,000*	,000*	,016*	,000*
mktppd	Chi-Square	49,936	54,170	25,461	19,604	40,891
	gl	1	1	1	1	1
	Sig.	,000*	,000*	,000*	,000*	,000*
mktpld	Chi-Square	59,730	79,091	39,670	21,397	34,836
	gl	1	1	1	1	1
	Sig.	,000*	,000*	,000*	,000*	,000*
mktpri	Chi-Square	56,158	90,852	33,986	28,870	43,250
	gl	1	1	1	1	1
	Sig.	,000*	,000*	,000*	,000*	,000*
pubdom	Chi-Square	40,240	43,241	9,348	3,323	19,290
	gl	1	1	1	1	1
	Sig.	,000*	,000*	,002*	,068	,000*
pubfor	Chi-Square	10,615	99,927	77,923	23,022	50,385
	gl	1	1	1	1	1
	Sig.	,001*	,000*	,000*	,000*.b	,000*
pbinn	Chi-Square	86,011	70,317	50,643	11,657	31,861
	gl	1	1	1	1	1
	Sig.	,000*	,000*	,000*	,001*	,000*
empud	Chi-Square	110,712	189,345	85,409	29,150	51,496
	gl	6	6	6	6	6
	Sig.	,000*	,000*	,000*	,000*	,000*
SIZE_R	Chi-Square	43,766	54,295	26,810	11,260	19,928
	gl	2	2	2	2	2

Sig.	,000*	,000*	,000*	,004*	,000*
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