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Abstract

In this study, we evaluate how individual virtues and inter-organizational management control systems (IOMCS) influence buyer–supplier performance through relationship quality. Results from a sample of 232 firms confirm that virtues and IOMCS relate positively to relationship quality and performance, respectively. However, IOMCS lose their positive influence on relationship quality when considered along with virtues. That is, when both variables enter the regression model simultaneously, virtues win. This interesting finding has particular resonance at a time when research on ethics still needs to reinforce its positive effects on the practice of management.

Keywords: Buyer–supplier relationships, Inter-organizational management control systems, Quality, Performance, Virtue

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Introduction

Companies increasingly rely on partners to access complementary resources and skills, protect their markets, win new market share, and share risks. Their success and sustainability thus depend largely on their ability to build “good” collaborations, defined as relationships marked by trust and closeness, long-term orientation, and satisfaction for all parties (Crosby et al., 1990). The antecedents that lead to good relationships between buyer and supplier firms and their links with firm performance thus have attracted the attention of researchers in diverse fields, such as marketing, strategy, organizational behavior, management control, and operations management. Such studies on inter-organizational relationships in turn have led to the integration of new variables linked to individual behaviors and virtues. Ethics is an area of study that deals with ideas about what is good and bad behavior, as well as a branch of philosophy dealing with what is morally right or wrong, but philosophers have tried not to limit ethics to merely a theoretical concept. Aristotle for example approached virtues of character as dispositions to act in certain ways in response to similar situations or habits of behavior. Thus, good conduct arises from habits that can be acquired only through repeated action and correction. In this sense, ethics is an intensely practical discipline.

In line with this philosophical tradition, scholars have long been interested in the integration of ethical elements and virtues in supply chain management practices (Blome and Paulraj, 2013; Carter and Jennings, 2004; Drake and Schlachter, 2008). Their findings suggest the need for further research into the components of an ethical climate and their combined effects on relationship quality and performance. To identify additional components, a promising avenue might be to focus on individual levels and personal codes of conduct. To the best of our knowledge, no previous study has examined the link between the individual virtues of collaborators and the quality and performance of inter-organizational relations. Thus, the influence of individual moral virtues on organizational performance has yet to be

explored, even though individuals—namely, boundary spanners—are in charge of inter-organizational relationships (Doney and Cannon, 1997) and part of ethical programs driven by moral virtues. In an organization that emphasizes ethical behaviors, it is important that moral virtues are not confined to top management but embrace the whole organization, especially those members who are in relationships with external partners such as clients or suppliers. We therefore depart from previous studies on general organizational ethical virtues (Cameron et al., 2004, 2011) by focusing on individual virtues.

Performance questions also require consideration of research into management control (Dekker et al., 2013; Ding et al., 3013), which constitutes one of main devices to facilitate coordination and cooperation in inter-organizational relationships. Organizations must select good partners (i.e., those with the required competences and behaviors) and design appropriate management control systems (e.g., planning, feedback, incentives) to foster relationship quality and promote efficient, effective cooperation (Caglio and Ditillo, 2008; Dekker, 2008; Mahama, 2006).

No study has mixed these two approaches in a single model to explicate their respective effects on relationship quality and performance. We try to fill this gap by analyzing two likely antecedents of relationship quality and performance: the individual virtues of boundary spanners and inter-organizational management control systems (IOMCS). Through a quantitative empirical analysis of 232 inter-organizational relationships, focusing on buyer–supplier relationships, we determine that individual ethical behaviors exert a stronger impact than control systems on overall business performance. With these findings, we contribute to literature on both individual virtues and inter-organizational management control systems.

Literature Review and Hypotheses

Virtues and Pertinence of Virtues

The first mentions of virtues were by Greek and Latin philosophers, who asked about moral duties and the best in human beings in their effort to identify the "good life" and happiness. In a philosophical view, virtues are moral dispositions to act deliberately and in positive ways for both the individual and society (MacIntyre, 2007). Virtues are specific properties of a thing or a being; they are not given. Instead, they are acquired by individuals, who then convey and develop them to achieve some accomplishment.

No definitive summary of virtues exists though, because each text, author, and tradition offers its own list. Therefore, there are many—some even potentially competing—sets of virtues (Sison and Ferrero, 2015). However, the ancient philosophical tradition refers to four main virtues that provide great ease, control, and satisfaction. These "cardinal virtues" are the "pivots" of human action (i.e., in Latin *cardo*, meaning hinge or pivot) and determine the other virtues. According to Plato, they are wisdom (IV, 429a-428b), courage (IV, 429a-430c), temperance (IV, 432b-430d), and justice (IV, 444a-432b). These firm attitudes, stable dispositions, and habitual perfections regulate actions, order passions, and guide conduct. In the Aristotelian tradition, Cicero also highlights the status of wisdom and favors courage, temperance, justice, and prudence (XXXIII, 118).[1] The following virtues are the most widely cited in organizational research literature (Gotsis and Grimani, 2015):

- *Justice* [δικαιοσύνη-dikaiosynē], which corresponds to what is legitimate for the good of others and helps ensure the preservation of organized society, by promoting and strengthening it (Small, 2013);

[1] Small (2013) provides a more comprehensive analysis of Cicero's conception of virtues.

- *Courage* [ἀνδρεία-andreia] provides the will to do what is good and to act with determination. It refers to the greatness and strength of a noble and invincible spirit;
- *Prudence* [φρόνησις-phronēsis], in the ancient sense of "practical wisdom,"[2] supports the accurate appreciation of a situation and practical knowledge about how to proceed (Sison and Ferrero, 2015). A prudent person thinks about the best to attain the good. Prudence usually comes with age and experience, which provide more appropriate perceptions of what is salient across various contexts; and
- *Temperance* [σωφροσύνη-temperantia] implies acting in balance and adapting actions to reality. It refers to self-control and moderation in everything said and done (Small, 2013).

Philosophers offer complex justifications of the hierarchical positions of different virtues, and none of these discussions can be considered closed (Small, 2013). However, general agreement exists that even if each virtue always has a particular function, it also is present in the others, because each virtue requires the others (Plato in Protagoras). For example, courage without caution is rashness; without temperance, it is uncontrolled impulse (Aristotle IN, II, 7). It is the combination of virtues that leads to virtuousness and the disposition to act for the best.

Virtues as Antecedents of Relationship Quality and Performance

Saini (2010) proposes a conceptual framework of purchasing ethics and inter-organizational relational determinants that predicts direct influences among inter-organizational power, long-term orientation, personal ties, and ethical—or unethical—purchasing practices. Blome and Paulraj (2013) test and validate both direct and indirect effects of an ethical climate, which includes both employees and the community, on the ethical behavior of procurement managers. However, very few studies analyze virtues in

[2] For many philosophers, prudence is included in the virtue of "wisdom" [σοφία], which implies full perception and intelligent development of what is true (Small, 2013).

inter-organizational relationships. Colwell et al. (2011) analyze ethical behavioral effects, rather than virtues, and show that the enforcement of a supplier's ethical codes enhance buyers' commitment to the relationship, though high switching costs can limit this effect. In line with previous studies (e.g., Mohr and Spekman, 1994; Olk and Young, 1997), Colwell et al. also note the role of dependency in inter-organizational relationships, implying a positive effect of virtues on relationship quality.

In their review of articles pertaining to virtues, published in business ethics and management journals between 1980 and 2011, Ferrero and Sison (2014) note the contributions of Kim Cameron, who has conducted series of empirical studies of virtues and performance since 2004. These studies reflect intra-organizational contexts, but the results suggest their potential applicability to inter-organizational contexts too. For example, Cameron et al. (2004) show that virtuousness (which comprises optimism, trust, compassion, integrity, and forgiveness) favors innovation, customer retention, employee stability, quality, and profitability through both amplifying and buffering effects. The amplifying effect creates self-reinforcing positive spirals, whereas the buffering effect protects the organization from traumas, such as downsizing. Caza et al. (2004) further find that virtuous firms make more money than others. Cameron et al. (2011) consider additional virtuousness practices (caring, gratitude, respect) as antecedents of organizational effectiveness and financial performance. We posit that these organizational performance effects arise in the context of inter-organizational relations as well, such that the individual virtues of boundary spanners should have a positive impact on firm performance. Formally, we hypothesize:

H1: Virtues are positively related to (a) relationship quality and (b) firm performance.

Management Control Systems and Inter-Organizational Relationships

Research in inter-organizational relationships in control management settings is relatively sparse. It follows from Hopwood's (1996) call to investigate control over external collaboration, given that businesses in a global economy transcend organizational boundaries. Inter-organizational relationships are not easy to create, develop, or support; they require considerable time and effort to structure and achieve each organization's goals (Meira et al., 2010). Two main control issues emerge from such relationships: coordination problems related to the interdependence of tasks and cooperation problems due to the divergence of interests (Caglio and Ditillo, 2008). Accordingly, inter-organizational relationships require specific control systems or inter-organizational management control systems (IOMCS). Applying Merchant and van der Stede's (2007, p. 5) definition, we conceive of IOMCS as the totality of devices or systems that members of an organization set up to influence the decision-making process and behavior of members of another organization, such that they seek to increase the chances of achieving business objectives and the required performance.

Usually, IOMCS are complex, comprised of many elements that are designed to encourage coordination and cooperation. Yet the elements often are studied individually or according to a specific subset of mechanisms that are relevant to inter-firm relationships (Caglio and Ditillo, 2008), such as information systems (Tomkins, 2001), outcome controls such as goal setting, incentive systems, performance monitoring or rewards (Dekker, 2004), behavioral controls such as structural specifications and behavior monitoring (Dekker, 2004), performance measurement systems and socialization (Mahama, 2006), target setting and operational reviews (Dekker et al., 2013), partner selection criteria or business contracts (Ding et al., 2013).

IOMCS as Antecedents of Relationship Quality and Performance

Few quantitative studies (Dekker, 2008; Dekker et al., 2013; Ding et al., 2013; Mahama, 2006) address the elements of IOMCS, leaving the field open. However, Mahama (2006) tests the influence of some IOMCS features on relationship quality (cooperation) and performance indicators. He finds that performance measurement systems, which seek to measure and evaluate the financial and non-financial results of cooperation, positively influence information sharing, joint problem solving, and performance (measured as product quality, on-time delivery, and cost savings). These results also indicate that interactional settings such as performance or feedback reviews can foster information sharing but not any other dimension of relationship quality. This author observes no influence between the interactional settings and performance. Despite these major contributions, Mahama (2006) reduces performance to economic and operational results, whereas the performance of an inter-organizational relationship is multidimensional. It includes various sources of competitive advantage, including access to innovations, the development of competencies, and, more generally, partners' global satisfaction (Athanasopoulou, 2009). Moreover, performance management systems are just one formal aspect of IOMCS. We propose an extended consideration of these systems.

Control systems measure and reward performance; they are intended to favor coordination requirements among stakeholders and reduce divergent interests by aligning incentives (Velez et al., 2008). Such systems consist of a structure and a set of mechanisms (Langfield-Smith, 2008). Because IOMCS aim to encourage both internal and external stakeholders to engage in greater coordination, the structure should promote both internal (e.g., matrix structure, transversal projects) and external (e.g., joint seminars with partners) collaboration. This assertion has not been empirically tested. However, it is reasonable to expect that internal and external control structures designed to encourage collaborative

relationships lead to better quality inter-organizational relationships and increased overall performance. The costs of such control structures may be high (White and Lui, 2005) and could negatively affect economic performance. Nevertheless, from a collaborative perspective, the multifaceted benefits of coordination should exceed the costs of the control structure, largely due to actions that favor joint action, delivery, quality, or innovation.

With regard to the second control issue, that is, functional cooperation, control systems can facilitate goal setting and enable regular evaluations of the relationship. The link between control systems and the quality of an inter-organizational relationship continues to be debated in extant literature. That is, controls involve monitoring and thus mistrust, so they could negatively affect relationship quality (Das and Teng, 1998; Ghoshal and Moran, 1996).

Yet controls also provide an opportunity for parties to discuss and get to know each other better, which allows them to refine and better target the mechanisms, such that they enter into a mutual learning process that ultimately is beneficial to their cooperation (Poppo and Zenger, 2002). The outcome may depend on the orientation of the control systems and the underlying corporate strategy. If the strategy aims to develop collaborative relationships—as modern business trends suggest increasingly is the case—control systems might foster trust (Coletti et al., 2005). Therefore, as Langfield-Smith (1997) suggests, organizations should use IOMCS to gain cooperation and focus efforts on the collective. We hypothesize:

H2: IOMCS are positively related to (a) relationship quality and (b) firm performance.

Relationship Quality and Performance

The quality of inter-organizational relationships has been the focus of many studies, especially by researchers in marketing (for reviews, see Athanasopoulou, 2009; Huntley, 2006). Because the notion of relationship quality is multidimensional, its precise meaning shifts, depending on the context. However, it mostly integrates the satisfaction of the partners (Garbarino and Johnson, 1999; Huntley, 2006; Walter et al., 2003), their commitment (Friman

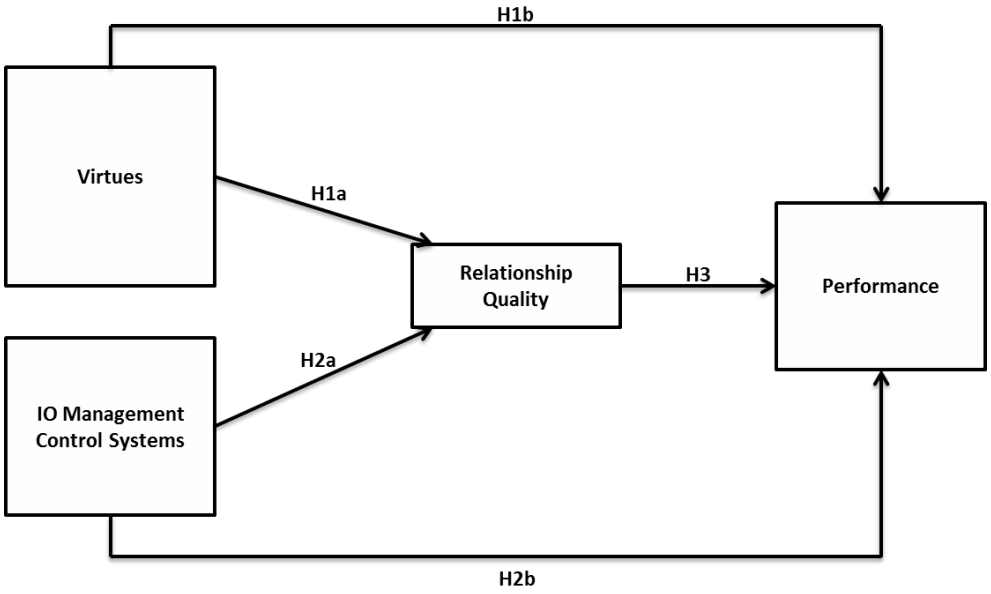
et al., 2002; Goodman and Dion, 2001; Walter et al., 2003), trust (Walter et al., 2003), relational norms (Siguaw et al., 1998), an absence of opportunism (Johnson, 1999), and a lack of conflict (Sanzo et al., 2003). Across these propositions, relational quality is described as generating positive effects, evolving over time, and supporting relationship continuity, while reducing each partner's perceived risks (Athanasopoulou, 2009). For this study, we anchor our definition on these common propositions and definitions, such that we approach inter-organizational relationship quality as a perceptual measure of the level of sustainable, reciprocal cooperation between business partners.

Prior studies indicate that relationship quality improves performance (for a review, see Athanasopoulou, 2009), in terms of profits (Siguaw et al., 1998), market and financial performance (Autry et al., 2008), customer value (Palmatier, 2008), and operations such as cost, quality, delivery, and flexibility (Fynes et al., 2005, 2008). The positive impact of relationship quality on sales effectiveness remains to be validated (Boles et al., 2000; Crosby et al., 1990). Mostly, these studies focus on a few dimensions of relationship quality (trust, commitment, satisfaction, or some combination) and then address one aspect of performance. No empirical study analyzes the impact of relationship quality on performance by combining operational, financial, future, and reciprocal benefits. We aim to fill this gap and hypothesize:

H3: Relationship quality is positively related to firm performance.

Our conceptual model is in Figure 1.

Figure 1. Conceptual Model



Research Method

Data Collection and Sample

We used the Thesame database[3] of collaborative relationships between buyer and supplier firms. It provides information on actors' virtues, relationship quality, and performance. An Internet questionnaire was sent in March 2015 to CEOs of a random selection of 2,000 of the 21,000 manufacturing firms in the French Rhône-Alpes region listed in the Regional Chamber of Commerce database. The Rhône-Alpes region exhibits important research and innovation activities and ranks second in France in terms of research potential (after Paris). Restricting a study's scope to one geographical area is common practice in this field (e.g., Madrid-Guijarro et al., 2009; Niskanen and Niskanen, 2010), in that it not only facilitates the data collection process but also ensures relatively homogeneous environmental conditions. Such homogeneity reduces the impact of extraneous variables. The invitation

[3] Thesame received financial support from F2i (Fund for Innovation in Industry), and the data were collected by an independent consultancy firm specializing in professional ethics (Socrates, http://socratesonline.com/)

email included a cover letter explaining that the study was supported by the Fund for Innovation in Industry (F2I) and various regional public institutions. The CEO was asked to forward the questionnaire to the most qualified people in the firm. At the beginning of the questionnaire, respondents were asked to think of a specific collaboration, using the following prompt: "This investigation concerns your relationship with your main supplier/customer. We will ask you some questions … in order to get your opinion on this relationship."

The data set contained 232 responses, which translate into a final response rate of 11.6%. Compared with standards in the field for this type of study (Bartholomew and Smith, 2006; Baruch and Holtom, 2008), this rate is satisfactory. We dropped 31 questionnaires due to missing data and thus were left with a final sample size of 201 firms. Table A in Appendix 1 presents the sample characteristics.

Measures and Construct Operationalization

Measures

As we detail in Appendix 2, 14 variables represent the virtues construct, four variables measure the IOMCS, three pertain to relationship quality, and eight refer to performance.

Measuring philosophical concepts as broad as *virtues* could entail substantial controversy, because several measurement scales relate to different virtues. We define a set of items linked to the cardinal virtues of justice, courage, prudence, and temperance, all of which had been used in previously validated scales. In particular, we followed Shanahan and Hyman (2003), who developed a virtue ethics scale based on a list of 45 virtues provided by Solomon (1999) and Cameron et al. (2011). Our complete list includes 14 items, measured with a 10-point Likert-type scale ranging from "strongly disagree" to "strongly agree."

Because the concept of IOMCS comes from management control literature, we adopt a common characterization of management control systems in the field, namely, control

structure and mechanisms (Langfield-Smith, 2008). To measure IOMCS, we relied on items that could characterize the control structure and control mechanisms. Control structure refers to the collaborative structure, whether internal (matrix organization, cross-cutting projects favoring lateral collaboration) or external (joint training, seminars combining the suppliers), that has been designed to facilitate joint action, information sharing, and problem solving. To characterize the control mechanisms, we retained one item about the target setting (Dekker et al., 2013; Mahama, 2006) and one for feedback reviews for evaluation. Thus we combined four items and measured them on a 10-point Likert-type scale, ranging from "strongly disagree" to "strongly agree."

Relationship quality is measured by three items that encompass the three dimensions proposed by Walter et al. (2003): trust, satisfaction with the collaboration, and long-term commitment. It also echoes propositions by Jap et al. (1999) to consider relationship quality in the form of attitudes, processes, and future expectations. Trust reflects attitudes, ongoing satisfaction is used to refer to processes, and long-term commitment involves expectations. All items were scored on a 10-point Likert-type scale, ranging from "strongly disagree" to "strongly agree."

Performance has also been measured in multiple ways, and most studies focus on one specific aspect, such as measures of partners' satisfaction or more objective measures of operational efficiency or profitability. Our objective was to assess the overall and global performance of the relationship, so we took into account operational performance (quality and on-time delivery), economic performance (margins), project management performance for long-term relationships, the development of competencies, and innovation (Griffith and Zhao, 2015; Heide et al., 2014; Sjoerdsma and van Weele, 2015). For a global assessment of performance, we also measured satisfaction in terms of mutual benefits and achievement of expectations (Yilmaz et al., 2004). Therefore, we have eight items representing the

performance construct; all of them were scored on a 10-point Likert-type scale, ranging from 1 (“strongly disagree”) to 10 (“strongly agree”).

We controlled for the effects of five variables. Firm size was measured according to the three categories established by the European classification, as small firms[4] (PME, 10–249 employees), medium firms (ETI, 250–4999 employees), and large firms (GE, more than 5000 employees). This variable was coded as a dummy variable, and “large firms” served as the reference category (as in Field et al., 2012). We also controlled for the effect of the firms’ activity sector (0 = industry, 1 = service). Because buyers and suppliers may have different perceptions of their business relationship (Ambrose et al., 2010), we controlled for the firm’s status (0 = supplier, 1 = buyer). Then we took into account the buyer's and the supplier's dependence, in line with studies on the role of dependency in inter-organizational relationships (Colwell et al., 2011). These measures used a Likert scale ranging from 1 (“strongly disagree”) to 10 (“strongly agree”): “It would be difficult to the firm concerned by this evaluation replacing us in similar conditions” and “It would be difficult for us replacing the firm concerned by this evaluation in similar conditions.” Because socially responsible firms are supposed to offer better performance (Bocquet et al., 2015), we controlled for the firm’s adoption of corporate social responsibility practices (0 for firms not engaged in corporate social responsibility [CSR], and 1 for those engaged in CSR).

Construct Operationalization

To test the hypotheses, we applied data reduction for subsequent applications in other statistical techniques. Through principal component analysis, we tested the unidimensionality of our constructs (Hair et al., 2010). Then we created four new variables, representing each construct, and used them in multivariate regression analyses. Table B in Appendix 1 provides the evidence in support of retaining the one-factor solution for all constructs; all KMO

[4] We excluded micro firms (less than 10 employees) from the European Union’s 2003/361/CE recommendation.

statistical values were greater than .5, suggesting an adequate sample size for the principal component analysis. Bartlett's test indicates that all constructs have at least some variables with significant correlations. Thus, the principal component analysis results were satisfactory. After we confirmed the unidimensionality of the constructs, we tested their reliability. All constructs achieved satisfactory Cronbach's alphas between .71 and .95 (Hair et al., 2010). Table 1 presents the descriptive statistics and bivariate correlations between the constructs.

Table 1. Descriptive statistics and bivariate correlations

Variable	Mean	Std. Deviation	1	2	3	4
1. Performance	6.876	1.569	1			
2. IO Management Control Systems	7.148	1.497	0.65**	1		
3. Relationship Quality	7.767	1.572	0.78**	0.55**	1	
4. Virtues	7.120	1.541	0.85**	0.62**	0.81**	1

Notes: Correlations are significant at the 0.01 level (two-tailed).
**$p < .001$.

Results

To analyze the influences of actors' virtues and IOMCS on relationship quality and performance, we conducted a two-step analysis. In the first step, we evaluated the effect of each independent variable individually through ordinary least squares (OLS) regressions (see Tables 2 and 3).

Table 2. Virtues' effects on relationship quality and performance

	Relationship Quality		Performance	
	ß	t	ß	t
Virtues	.819**	19.546	.860**	21.987
Firm status (buyer–supplier)	.097*	2.018	.069	1.516
Supplier dependence	.069	1.589	-.041	-1.020
Buyer dependence	.001	.015	.053	1.221
CSR practices	-.038	-.870	-.040	-.963
Firm size: PME	.014	.297	.011	.236
Firm size: ETI	-.038	-.870	-.034	-.829
Activity sector	.034	.799	.028	.694
R^2 total	.696		.740	

R^2 change control variables	.013	.006
F-value (ANOVA)	56.878**	68.762**
Durbin-Watson	1.986	1.993

*$p < .05$. **$p < .001$.
Notes: ß is the standardized coefficient.

Virtues are positively related to relationship quality and performance (Table 2), in support of H_{1a} and H_{1b}. The same holds true for IOMCS (Table 3), which relates positively to relationship quality and performance, in support of H_{2a} and H_{2b}. With regard to the effects of the control variables, we observe (Table 2) that buyer firms report having higher relationship quality than supplier firms. Firms' activity sector is statistically significant in the relationship of IOMCS with relationship quality and performance (Table 3). Service firms exhibit higher relationship quality and higher performance than manufacturing firms.

Table 3. IOMCS effects on relationship quality and performance

	Relationship Quality		**Performance**	
	ß	**t**	**ß**	**t**
IOMCS	.572**	9.655	.671**	12.152
Firm status (buyer–supplier)	.081	1.196	.046	.709
Supplier dependence	.118	1.919	-.004	.-067
Buyer dependence	.055	.848	.101	1.672
CSR practices	-.024	-.383	-.046	-.776
Firm size: PME	-.004	-.064	-.016	-.240
Firm size: ETI	.050	.807	.060	1.031
Activity sector	.132*	2.203	.145*	2.587
R^2 total	.396		.485	
R^2 change control variables	.044		.035	
F value (ANOVA)	16.249**		22.631**	
Durbin-Watson	1.932		1.928	

*$p < .05$. **$p < .001$.
Notes: ß is the standardized coefficient.

In the second step of our analysis, we accounted for the simultaneous effect of virtues and IOMCS on relationship quality and firm performance (see Table 4). Again, we observed that virtues are positively related to relationship quality and performance, which fully

corroborates H_{1a} and H_{1b}. However, the effect of IOMCS on buyer–supplier relationship quality is not statistically significant. Thus, when virtues are included in the analysis, we do not have evidence to support H_{2a}. However, IOMCS are still positively related to firm performance, which fully supports H_{2b}. Finally, relationship quality is positively related to firm performance, in support of H_3.

Table 4. Virtues and IOMCS effect on relationship quality and performance

	Relationship Quality		**Performance**	
	ß	**t**	**ß**	**t**
Virtues	.758**	14.168	.540**	8.151
IOMCS	.097	1.814	.192**	4.110
Relationship quality	-	-	.243**	3.932
Firm status (buyer–supplier)	.092	1.926	.036	.848
Supplier dependence	.070	1.619	-.052	-1.381
Buyer dependence	-.010	-.217	.041	1.021
CSR practices	-.047	-1.048	-.058	-1.501
Firm size: PME	.018	.381	.007	.166
Firm size: ETI	-.023	-.530	-.002	-.058
Activity sector	.038	.891	.033	.881
R^2 total	.701		.783	
R^2 change control variables	.012		.006	
F value (ANOVA)	51.319**		68.517**	
Durbin- Watson	1.969		2.160	

*$p < .05$. **$p < .001$.
Notes: ß is the standardized coefficient.

Multicollinearity Issues

The fact that IOMCS is not significantly related to relationship quality when virtues are included in the model raises the question of multicollinearity issues. Our independent variables had significant and high positive correlations (see Table B in Appendix 1), so we ran several tests. First, we analyzed the correlation measures (Table 1) and noted any correlation greater than .9, which Hair et al. (2010) call a first indication of multicollinearity. We also examined the values of tolerance and variance inflation factors (VIF) (Table C,

Appendix 1) and found that no variable in our model had values of tolerance below .2 or VIF values above 10 (Field et al., 2012). These results were supported when we employed a two-part process for conducting multicollinearity diagnostics. We first examined the conditional indices regression analysis, then noted the variance proportion coefficients. For the *relationship quality* regression analysis, we found no condition index higher than 30[5] (Table D, Appendix 1). For the *performance* regression analysis, only one condition index (ci_{11}) was greater than 30, and no coefficient loads were higher than .9 (virtues load at .87, and relationship quality loads at .83) (Table E, Appendix 1). Even though our independent variables indicated high correlation levels, we found no evidence of multicollinearity problems in our regression results, as indicated by the values of tolerance and the VIF for both regression analyses. Finally, we examined the value of the Durbin-Watson statistic; in all our regression analyses, it fell between the two critical values of $1.5 < d < 2.5$ (Field et al., 2012). Therefore, we find no concerns with first-order, linear, auto-correlation in our analysis.

Post Hoc Analyses

We did not specifically hypothesize mediating effects of relationship quality, because of the insufficient support from existing theory. In line with Blome and Paulraj (2013), we conducted additional post hoc analyses to test for the mediating effects of relationship quality in our hypothesized model. We thus performed a two-step analysis to test relationship quality as a mediator of the effects of virtues and IOMCS on firm performance.

A common method to test mediation is the casual steps strategy (Baron and Kenny, 1986). Zhao et al. (2010) point out the limitations of Baron and Kenny's (1986) procedure to evaluate mediation though and suggest that the only requirement to demonstrate mediation is a test of the indirect effect (or *ab* term) with a bootstrap method. They suggest the bootstrap

[5] Conditional indices values greater than 30 and correlation values greater than .9 indicate multicollinearity problems (Hair et al., 2010). Even if we were to proceed to the second step using a threshold value of 15 (instead of 30) for the condition index, we would select only one coefficient loading higher than .9 (the intercept).

test implemented by Preacher and Hayes (2004, 2008) is superior for evaluating indirect effects. Unlike the casual steps strategy, it tests the mediation hypothesis not by focusing on the individual paths in the mediation model but instead by analyzing the indirect effect (*ab* term), with the logic that this product is equal to the difference between the total and the direct effects of X on Y (Preacher and Hayes, 2008). Accordingly, we use the approach proposed by Preacher and Hayes (2004, 2008) and Hayes (2013). Controlling for firm status, supplier/buyer dependence, CSR practices, firm size, and activity sector, we first test the indirect effects of IOMCS and virtues individually, and then perform a mediation analysis that includes both variables in the mediation model. The results are in Table 5.

Table 5. Mediation effect of relationship quality

	Effect through Relationship Quality				
Variable	**Direct Effect**	**Indirect Effect (Mediation)**	**Bootstrap Indirect Effect**		**Total Effect**
			LLCI	**ULCI**	
Virtues[a]	.631*	.224*	.1032	.3392	.855*
IOMCS[a]	.325*	.345*	.2580	.4380	.669*
Virtues[b]	.596*	.205*	.0788	.3394	.801*
IOMCS[c]	.212*	.025	-.0093	.0716	.236*

Notes: *a*: Relationship quality as mediator + control variables as covariate; *b*: relationship quality as mediator + IOMCS and control variables included as covariate; *c*: Relationship quality as mediator + virtues and control variables included as covariate. Standardized values.
Based on 5,000 bootstrap samples, 95% confidence level for confidence intervals.

Individual indirect effects

According to the mediation analysis conducted using OLS path analysis, virtues indirectly influence performance through the effects on relationship quality. A bias-corrected bootstrap confidence interval for the indirect effect of virtue (*ab* = .224) based on 5,000 bootstrap samples was entirely above 0 (.1032 to .3392). However, the indirect effect of virtues on performance through relationship quality was less important than its direct effect (what Baron and Kenny [1986] call partial mediation).

Regarding the indirect effect of IOMCS on performance, we observed a mediation effect by relationship quality. A bias-corrected bootstrap confidence interval for the indirect effect of IOMCS (*ab* = .345) based on 5,000 bootstrap samples was entirely above 0 (.2580 to

.4380). The indirect effect of IOMCS on performance through relationship quality also was greater than its direct effect.

Virtues and IOMCS as covariates

When we include IOMCS as a covariate of the indirect effect of virtues on performance through relationship quality, the indirect effect of virtues remained significant. A bias-corrected bootstrap confidence interval for the indirect effect of virtues (*ab* = .205) based on 5,000 bootstrap samples was entirely above 0 (.0788 to .3394). Consequently, we can conclude that relationship quality mediates the effect of virtues on performance. In our sample, two firms whose actors differ by one unit in their reported virtues level (X) are estimated to differ by .205 units in their overall performance (Y) as a result of the tendency of actors with higher virtues (X) to develop greater relationship quality (M), which translates into better firm performance.

When we include virtues as covariates of the indirect effect of IOMCS on performance through relationship quality, we find that relationship quality no longer mediates this effect. A bias-corrected bootstrap confidence interval for the indirect effect (*ab* = .025) of IOMCS based on 5,000 bootstrap samples contained 0 (-.0093 to .0716). Therefore, there is evidence that, if actors' virtues are covariates, relationship quality does not mediate the effect of IOMCS on firm performance. This result offers support for our previous findings.

According to Hayes (2013), including highly correlated multiple independent variables (or covariate variables) in a mediation model can be problematic. When included as the sole independent variable, each variable exerts a direct or indirect effect on Y through M. But, when considered together, neither appears to have any effect. In our study, IOMCS correlated moderately with relationship quality and strongly with performance (Evans, 1996). In contrast, virtues showed a very strong correlation with relationship quality. When virtues were included in the mediation model as a covariate, the importance of IOMCS was decreased

by this very strong correlation (Evans, 1996). However, its direct and total effects on performance were still significant. Similarly, for virtues, the direct, indirect, and total effects on performance were all still significant. Table 6 presents a synthesis of our results.

Table 6. Results' synthesis

Hypothesis and mediation test (MT)	Result	Observation
H1a: Virtues are positively related to relationship quality	Supported	
H1b: Virtues are positively related to firm performance	Supported	
H2a: IOMCS are positively related to relationship quality	Partially supported	The direct effect is only significant if actors' virtues are not considered in the regression model.
H2b: IOMCS are positively related to firm performance	Supported	
H3: Relationship quality is positively related to performance	Supported	
MT1: Relationship quality mediates the link between virtues and performance	Verified	
MT2: Relationship quality mediates the link between inter-organizational management control systems and performance	Not verified	The indirect effect is only significant if actors' virtues are not considered in the mediation model.

Discussion

Consistent with existing buyer–supplier relationship performance research, this study provides evidence that relationship quality generates firm performance (Autry et al., 2008; Fynes et al., 2005, 2008; Palmatier, 2008; Siguaw et al., 1998). However, unlike previous studies (Athanasopoulou, 2009), we adopt a global measure of performance. We focus on operational and economic benefits regarding the margins, delays, and level of product/service quality. We also consider strategic matters, such as competence enhancement, joint project management, ability to innovate, and overall performance of the cooperation, such as mutual benefits and need fulfillment. The reliability of our global performance scale implies its suitability for further research into the performance of buyer–supplier relationships.

Regarding the operationalization of virtues, our results provide both methodological and theoretical contributions. We did not test the effects of a unique virtue, as Argandona (2015) did with humility. We did not choose a huge list of items either, as Shanahan and

Hyman (2003) did with their 45-item virtue ethics scale. Rather, our approach is in line with studies such as Riggio et al.'s (2010) 19-item measure of leadership virtues or Kaynak and Sert's (2012) 9-question scale. No list of virtues can ever be exhaustive though, because

> *Homer, Sophocles, Aristotle, the New Testament and medieval thinkers … offer us different and incompatible lists of the virtues; they give a different rank order of importance to different virtues; and they have different and incompatible theories of the virtues. If we were to consider later Western writers on the virtues, the list of differences and incompatibilities would be enlarged still further; and if we extended our enquiry to Japanese, say, or American Indian cultures, the differences would become greater still* (MacIntyre, 2007, p. 181).

By focusing on justice, prudence, courage and temperance, we cover the cardinal virtues that are keystones of human action and determine other virtues (Riggio et al., 2010). The one-factor solution for the virtues construct highlights that each component depends on the others. Furthermore, it is perfectly in line with Aristotelian theory, which predicts that a separate virtue will become a vice.

The corroboration of our two hypotheses linking individual virtues to relationship quality (H_{1a}) and to performance (H_{1b}) also is an important finding. It contributes to emergent literature on the role of virtues as a vector of firm performance. Whereas previous studies address virtues at an organizational level (Cameron et al., 2004), we insist on individual aspects and demonstrate the importance of virtuous human qualities for organizational outcomes and benefits. This result completes and deepens prior studies highlighting the positive influence of ethical behavior through individual virtues on performance.

The findings on the role of IOMCS can be analyzed at two levels. First, the regression model to test the direct impacts of IOMCS on relationship quality and performance validates

the predicted positive links. In terms of collaborative structure and control mechanisms, IOMCS favors both relationship quality and performance, in line with Mahama (2006). However, our conception of IOMCS is not limited to performance measurement systems; it includes other elements that favor coordination and cooperation, such as the internal and external structure, targeting, and feedback/evaluation processes. We therefore answer Caglio and Ditillo's (2008) call to consider the full complexity of IOMCS, not just one subset of its mechanisms. Moreover, our conception of performance goes beyond operational (costs, on-time delivery, and quality; Mahama 2006). We instead have integrated strategic aspects that are crucial to long-term relationships and need more attention from researchers.

Second, in the post hoc tests of IOMCS's indirect effects, it is interesting to note that, when virtues are not considered in the model, the indirect IOMCS–quality–performance link is stronger than the direct IOMCS–performance link. That is, firms with higher IOMCS levels tend to develop better relationship quality which translates into higher firm performance. This result contributes to the long-standing debate about the influence of control on trust and cooperation. Supporters of the complementarity between formal control mechanisms and the formation of trust and high-quality relationships (Coletti et al., 2005; Poppo and Zenger, 2002) have demonstrated that control has no negative effect on cooperation. We add to this view by showing that control actually encourages cooperation and leads to better overall performance, a proposal that has not been demonstrated previously.

An important contribution of this study is the simultaneous analysis of the roles of virtues and IOMCS on relationship quality and performance. It appears that the effect of IOMCS on relationship quality varies, depending on whether virtues are considered or not. If virtues are not in the model, IOMCS has a positive effect on relationship quality. When virtues are in the model, IOMCS are not significantly related to relationship quality. The global model shows that virtues, linked to individuals and not to organizational systems, have

a much stronger impact on buyer–supplier relationships and firm performance than do control systems, even though those systems are geared to inter-organizational relationships.

This result has two major implications. First, the success of inter-organizational relationships relies on the intrinsic qualities of individuals, whereas prior research has been almost exclusively concerned with the obvious characteristics of organizations (expertise, reputation, costs, commercial efficiency). Very few researchers study organizations and individuals in inter-organizational relationships. For example, Doney and Cannon (1997) demonstrate that the expertise and likability of boundary spanners (i.e., vendors) improved inter-personal trust, whereas Zaheer et al. (1998) could not validate links between the reliability, predictability, and fairness of the boundary spanners and firm performance. Our study advances the field by demonstrating that the virtues of individuals can supplant the organizational control design. This finding is important, especially in a time of economic policies that seek to impose arm's-length controls, a focus on formalized reports of key performance indicators, and processes designed to minimize the impacts of individuals on control systems. But the more individuals intervene, as long as they are virtuous, the better performance the firm achieves.

Second, instead of constraining behaviors by fixing targets or monitoring and evaluating the results to enhance cooperation and coordination, IOMCS should promote individual virtuousness. Authors (2012) stress that developing control structures (e.g., project steering committees, supplier agreements, attendance at fairs) can help create and disseminate good practices or develop institutionalized socialization spaces for the expression of individual qualities. Our results invite managers to design control systems as if they were channels for transmitting virtues.

The finding that virtues have more influence on the quality of relationships and firm performance than IOMCS also implies that special effort must be dedicated to finding and selecting virtuous partners. This result reinforces Dekker's (2004, 2008, 2013) findings about the selection phase. Choosing a corporate partner based on the virtue of its members is a form of control by values, well known in the field of organizational control (Berry et al., 1995) but not yet explored in the field of inter-organizational control.

Our results provide empirical support for an important element in the Aristotelian philosophy on virtues, which holds that a person is not born virtuous but becomes it. Therefore, choosing virtuous people is not enough: the firm should encourage such behaviors by setting up appropriate organizational and managerial procedures.

Conclusion

The objective of this research is to compare the respective roles of individual virtues and management control systems on relationship quality and performance and thereby analyze the mediating role of quality relationships on the link between both virtues and control systems on firm performance. With a sample of 232 French buyer and supplier firms, our study shows that both elements have a positive and very significant impact on quality relationships and performance. However, testing the whole model leads to evidence that the impact of virtues is more crucial and predominant.

The main theoretical contribution of our study is our comparison of the antecedents of relationship quality at individual and organizational levels. We evaluate the impact of virtues and IOMCS on buyer–supplier relationship quality and performance and find that virtues and IOMCS both relate positively to firm performance but that IOMCS relate positively to relationship quality only if the virtues (which have the strongest impact on relationship quality) are not considered in the model. In a series of post hoc analyses, we tested

relationship quality as a mediator of the effects that virtues and IOMCS have on performance. These results confirmed that relationship quality mediates the effect of IOMCS on performance only if virtues are not considered in the mediation model. Specifically, virtues have a greater impact than IOMCS on relationship quality and performance.

We also contribute to literature on virtues and ethical considerations, and on organizational control systems, by showing that the latter should support the individual, not the other way around. This result is reinforced by our finding that organizational engagement in CSR has no impact, which means that the focus should be on individuals first, before organizationally responsible engagements. This important finding related to the respective roles of individuals and organizations in terms of ensuring good collaborations and thus organizational (long-term) performance should be granted greater precedence in research on business ethics. This interesting theoretical contribution also has managerial implications at a time when research ethics still needs to demonstrate that ethical behaviors contribute to business performance.

These results thereby suggest some important managerial implications. As individual virtues outperform IOMCS, they should, from a managerial perspective, be addressed more prominently than IOMCS. This result is particularly notable for modern organizational settings, in which managers usually are incentivized to implement perfect, standardized, and formalized processes that minimize individual impacts on business practices. They highlight the importance of recruiting employees with virtues and further developing them as a way to ensure better buyer–supplier relationship quality and performance. Therefore, to favor inter-organizational collaboration in a buyer–supplier relationship context, managers should pay more attention to hiring virtuous employees instead of focusing on implementing control systems. Managers should attend to this aspect when they recruit people who will engage in buyer–supplier relationships. The management and development of employees' virtues and

implementation of appropriate control systems also is crucial to favor such behaviors, which in turn can strengthen inter-organizational collaboration in buyer–supplier relationships.

This research is not exempt from some limitations, which lead to several avenues for further research. Although representative of the French population, the sample is small, making it difficult to distinguish among different types of manufacturing industries. Further studies with larger samples could reveal that results may vary according to whether the industry is very hierarchical, with strict vertical relationships (e.g., automotive, defense), or not. Another methodological limitation stems from the available measures in our database. Our measure for virtues seems satisfactory, and that for IOMCS is original, taking into account the efforts by the organization to integrate both internal and external collaboration. The measure of quality relationships focuses on three main variables but could integrate more items. Our objective was not to focus on this concept though, which already has been explicated in prior research. Further studies with enriched measures might not lead to a single construct, as in our study, which could enable researchers to distinguish which relationship aspects the virtues affect more. Finally, we concentrated on the roles of virtues and control systems, but other individual or organizational antecedents of quality relationships could be taken into account. A lot remains to be done in the field of ethics and individual virtues.

Appendix 1

Table A. Sample characteristics

Sample Characteristics	Classification	%
Firm size	small (10-249 employees)	20.3%
	medium (250-4,999 employees)	28.0%
	large (>5,000 employees)	51.7%
Firm status	Supplier firms	37.2%
	Buyer firms	62.8%
Focal relationship	0 to 5 years	9.9%
	6 to 10 years	17.6%
	More than 10 years	72.5%
Area	Logistics/procurement service	71.5%
	Marketing/sales	20.0%
	Other areas	8.5%
Buyer–supplier relationship	0 to 5 years	57.5%
	6 to 10 years	21.9%
	More than 10 years	20.6%

Note: Sample size = 201 respondents.

Table B. Principal component analysis and reliability

	Construct			
	Virtues	**IOMSC**	**Relationship quality**	**Performance**
KMO measure of sampling adequacy	.953	.662	.674	.905
Bartlett's test	$\chi^2_{91} = 2501.57$ p-value=.000	$\chi^2_{6} = 187.28$ p-value= .000	$\chi^2_{3} = 337.17$ p-value= .000	$\chi^2_{28} = 1357.69$ p-value= .000
Total variance explained	62.75%	53.34%	76.44%	67.90%
Cronbach's alpha	.95	.71	.84	.93

Table C. Multicollinearity diagnostics

Variables	**Relationship Quality**		**Performance**	
	Tolerance	**VIF**	**Tolerance**	**VIF**
Virtues	.530	1.886	.260	3.841
IOMCS	.530	1.888	.524	1.908
Relationship quality	-	-	.300	3.331
Firm status (buyer–supplier)	.660	1.515	.635	1.575
Supplier dependence	.803	1.245	.809	1.236
Buyer dependence	.708	1.413	.722	1.384
CSR practices	.770	1.300	.762	1.312
Firm size: PME	.646	1.549	.634	1.578
Firm size: ETI	.774	1.291	.772	1.295

Activity sector	.828	1.208	.827	1.209

Table D. Relationship quality: Variance decomposition analysis and condition indices

		Variance Proportions									
	Condition Index	(Constant)	Virtues	IOMCS	Firm status	Supplier dependence	Buyer depencence	CSR practices	Firm size - PME	Firm size - ETI	Activity sector
1	1,000	,00	,00	,00	,00	,00	,00	,00	,00	,00	,00
2	2,522	,00	,00	,00	,03	,00	,00	,00	,31	,05	,07
3	2,714	,00	,00	,00	,01	,00	,00	,00	,02	,20	,40
4	3,642	,00	,00	,00	,04	,00	,01	,04	,09	,44	,39
5	5,525	,00	,00	,00	,55	,02	,05	,00	,42	,16	,00
6	6,245	,00	,00	,00	,18	,02	,02	,87	,06	,09	,03
7	9,085	,02	,05	,05	,02	,52	,03	,05	,03	,00	,01
8	10,780	,01	,01	,01	,10	,40	,88	,02	,00	,00	,08
9	18,202	,94	,21	,05	,07	,03	,01	,00	,08	,02	,00
10	22,228	,03	,72	,88	,00	,01	,00	,00	,00	,03	,01

Table E. Performance: Variance decomposition analysis and condition indices

		Variance Proportions										
	Condition Index	(Constant)	Virtues	IOMCS	Relationship quality	Firm status	Supplier dependence	Buyer dependence	CRS practices	Firm size - PME	Firm size - ETI	Activity sector
1	1,000	,00	,00	,00	,00	,00	,00	,00	,00	,00	,00	,00
2	2,686	,00	,00	,00	,00	,02	,00	,00	,01	,29	,05	,07
3	2,911	,00	,00	,00	,00	,01	,00	,00	,00	,02	,20	,41
4	3,887	,00	,00	,00	,00	,04	,00	,01	,04	,08	,43	,38
5	5,932	,00	,00	,00	,00	,48	,02	,05	,01	,47	,20	,00
6	6,593	,00	,00	,00	,00	,23	,01	,00	,88	,03	,06	,02
7	9,137	,01	,02	,03	,02	,05	,38	,12	,02	,01	,00	,03
8	11,400	,00	,00	,00	,00	,08	,54	,79	,01	,00	,00	,07
9	18,980	,77	,08	,02	,06	,06	,02	,03	,00	,08	,01	,00
10	21,718	,19	,02	,90	,10	,02	,02	,00	,01	,02	,03	,02
11	34,229	,03	,87	,04	,83	,02	,00	,01	,01	,00	,01	,00

Appendix 2

The response scale for the following four constructs items ranged from 1 ("strongly disagree") to 10 ("strongly agree").

1. Virtues

In general, our partners in the enterprise concerned by the relationship

1.1. …pursue their goals while seeking to preserve our interests.
1.2. …respect the rules and principles of a fair competition.
1.3. …respect their commitments.
1.4. …seek to help us move forward.
1.5. …say what they mean and mean what they say.
1.6. …show solidarity with us in case of difficulties.
1.7. …are available when we need.
1.8. …help us to develop our skills.
1.9. …show transparency in our dealings.
1.10. …take the initiative to maintain and improve the relationship.
1.11. …explain, argue and justify their decisions.
1.12. …make decisions that are part of a clear and legible strategy.
1.13. …base their judgments, statements and decisions on facts.
1.14. …react with weighting and when facing difficulties they take a step back.

2. Inter-organizational management control systems.

2.1. The relationship is based on joint targets.
2.2. Is your company organized to foster internal collaboration (e.g. seminars with suppliers, joint training)?
2.3. Is your company organized to foster external collaboration (e.g. between departments, cross-cutting projects, matrix organization)?
2.4. We organize feedback meetings in order to evaluate the satisfaction level of our respective relationship expectations.

3. Relationship quality

3.1. The relation with the partner firm develops in a confidence climate (Trust)
3.2. The relation is part of a long-term perspective (Engagement/commitment in a long-term relationship)
3.3. Give your perception of the relation (Satisfaction/collaboration)

4. Performance

4.1. The relationship with the company fills our needs.
4.2. The relationship with the company is mutually beneficial.

The relationship quality with the company allows

4.3. …better manage our joint projects.
4.4. …improve the quality of products and services.
4.5. …maximize margins.
4.6. …optimize time.
4.7. …innovate.
4.8. …to develop competencies.

5. Control variables

Firm status: 0 (supplier) to 1 (buyer)
5.1. Do you participate in this study as a buyer or a supplier?
Firm size: 1 (PME, 10 to 249 employees), 2 (ETI, 250 to 4,999 employees); 3 (GE, more than 5,000).
5.2. How many employees does your company have?
Firm dependence: 1(strongly disagree) to 10 (strongly agree)
5.3. It would be difficult to the firm concerned by this evaluation replacing us in similar conditions.
5.4. It would be difficult for us replacing the firm concerned by this evaluation in similar conditions.
Firm corporate social responsibility practices: 0 (no) to 1 (yes)
5.5. Is your organization engaged in corporate social responsibility practices?
Firm activity sector: 0 (industry) to 1 (service)
5.6. Which is the activity sector of your company?

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