



ORIGINAL

Social capital in small industrial firms and its link with innovation

Capital social en pequeñas empresas industriales y su vinculación con la innovación

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ABSTRACT

Introduction: social Capital in organizations is an intangible asset that represents the favourable relationships that exist between work teams, within an organization and externally, to different interest groups.

Objective: this study examined the link between internal relational social capital (RSC) and external RSC with innovation in small industrial firms in Tabasco, Mexico. There was also an inquiry into how much internal RSC and external RSC explain innovation.

Methods: the design was nonexperimental, cross-sectional, descriptive, correlational, and explanatory. Linear regression analysis was used.

Results: significant positive relationships was identified between internal RSC and external RSC and innovation. The internal RSC and external RSC contributed significantly to the explaining of innovation. Areas of opportunity were identified for these firms in process design and formal research activities for new raw materials, production procedures and patent generation. **Conclusion:** to promote innovation, managers of small industrial companies must continue to establish strategies and practices to strengthen RSC.

Keywords: Internal Relational Social Capital; External Relational Social Capital; Innovation; Small Industrial Firms; Linear regression.

RESUMEN

Este estudio examinó el vínculo entre el capital social relacional (CSR) interno y el CSR externo con la innovación en pequeñas empresas industriales en Tabasco, México. También se investigó en qué medida el CSR interno y externo explican la innovación. El diseño fue no experimental, transversal, descriptivo, correlacional y explicativo. Se utilizó análisis de regresión lineal. Los resultados indicaron relaciones positivas significativas entre el CSR interno y externo con la innovación. El CSR interno y el CSR externo contribuyeron significativamente a la explicación de la innovación. Se identificaron áreas de oportunidad para estas empresas en el diseño de procesos y actividades formales de investigación de nuevas materias primas, procedimientos de producción y generación de patentes. En conclusión, para favorecer la innovación los gerentes de las pequeñas empresas industriales deben continuar estableciendo estrategias y prácticas de fortalecimiento al CSR

Palabras clave: Capital Social Relacional Interno; Capital Social Relacional Externo; Innovación; Pequeñas Empresas Industriales; Regresión Lineal.

INTRODUCTION

Social capital (SC) is built by the strength of interpersonal cooperation within groups and organizations to realize common interests and create value.⁽¹⁾ SC in organizations is an intangible asset that represents the favourable relationships that exist between work teams within an organization (internal social capital) and externally to different interest groups, such as clients, suppliers, investors, and support organizations, among others (external social capital). As an organizational asset, it can increase through the interest that the leaders of organizations invest in it but also weaken if there are no strategies to strengthen it.

SC in organizations has been studied through various dimensions: the structural dimension, which includes the number and diversity of contacts that an organization has; the relational dimension, which refers to the norms, expectations, commitment and trust between individuals who collaborate, developing and strengthening throughout continuous interactions; and the cognitive dimension, which represents language and similar and shared narratives.^(2,3) In this work, the relational dimension of SC is analysed, as background in a previous study is the dimension that has best explained innovation.⁽⁴⁾ coupled with the fact that aspects of the structural and cognitive dimensions are achieved by robust quality in the relationships between individuals or organizations. Weisz & Vassolo⁽⁵⁾ argue that the density of a social network decreases if the relationships are not predominant and increases when the members of the groups are linked frequently in consolidated relationships, Levin et al.⁽⁶⁾ demonstrate that trust, as an element of relational social capital (RSC), unites networks and Westerlund and Svahn⁽⁷⁾ argue that the most productive assets of an organization are its relationships.

In small industrial firms, research has identified that SC leads to strong links for collaborations in science and technology and in relationships with financial institutions that facilitate obtaining risk capital, in addition to having a positive effect on the financial results of these firms.^(3,8) However, small industrial firms still lack sufficient knowledge about the opportunities that SC can provide them to innovate, grow and enter international markets.⁽⁹⁾ The innovation capacity of businesses is significantly related to their long-term growth.⁽¹⁰⁾ In various studies, the results indicate that innovation positively influences the performance of small businesses.^(11,12,13)

Therefore, studies that empirically and rigorously identify factors that contribute to the creation of or improvements in processes, goods and services in organizations and that facilitate or solve problems in human activities are merited. In this sense, researchers have looked at and studied SC as an element for innovation; however, a review of the literature revealed that almost all studies address the relationship of SC with innovation considering only one type of SC, either internal social capital.^(14,15) or external social capital.⁽¹⁶⁾ Given the scarcity of knowledge about organizational innovation considered comprehensively with the building of internal and external relationships by a company, the objective of the research is twofold: first, to verify the empirical possibility of a link existing between internal and external RSC with innovation in small firms in the industrial sector and, second, to assess internal RSC and external RSC as factors in innovation.

Internal RSC in organizations and innovation

The internal SC in organizations is an exclusive and private asset that is built internally through human resources. It represents an organization's network of internal relationships; therefore, it lies at the micro level of institutions; it allows the use of synergies between groups and individuals and increases the efficiency and effectiveness of internal collective management.^(17,18) Internal SC enables firms to respond to uncertainty not only due to the changes around them but also due to the complexity of internal relationships.⁽²⁾ Internal RSC represents the relationships that the members of a firm are able to establish as a result of ongoing interactions and has been associated with radical product innovation.⁽⁴⁾ and Madhavaram and Hunt argue that internal SC has a positive effect on creativity in organizations. In the literature, creativity has been considered the foundation of innovation.⁽¹⁹⁾ These ideas support the following hypothesis:

H₁ There is a significant positive correlation between internal RSC and innovation.

External RSC in organizations and innovation

In the literature, external SC is also called bridging social⁽¹⁶⁾ bonding social capital.⁽²⁰⁾ It is conceived as a network of external actors made up of indispensable agents for the company, for example, clients and suppliers, and participants who offer similar products and services, that is, competitors and social actors, such as government institutions.⁽¹⁷⁾

External SC involves being clear about the achievements and advantages of having relationships with external stakeholders, systematically investing time and resources to strengthen trust to maintain long-term relationships and generate reciprocal benefits⁽²¹⁾

Empirical studies on external SC have reported important contributions of this asset for innovation in organizations, among which we can mention the significant positive effect of external SC on entrepreneurs' generation of business ideas.⁽⁴⁾ and its contribution towards integrating into international markets and adopting an approach towards technological innovation⁽²²⁾ in the agile and effective transmission of innovative knowledge.⁽¹⁶⁾ Similarly, Pérez Luño et al.⁽²³⁾ argue that external RSC consisting of trust and agreements between

firms integrated in innovative projects facilitates the exchange of knowledge. However, small businesses find it difficult to create and maintain contacts with individuals and organizations that are not part of their social network composed of friends and family,^(24,25) and it is hoped that by disseminating these studies that demonstrate the relationship between external RSC and innovation in these firms, importance will be given to strengthening external RSC. Following this line of thought and considering the previous studies, the following hypothesis was formulated:

H₂ There is a significant positive correlation between external RSC and innovation.

Explaining innovation from internal RSC and external RSC

Most studies focus on a single SC type when they relate it to innovation in organizations, just as Fernández et al.⁽¹⁶⁾, who provide empirical evidence that strengthens the theoretical position about the significance of innovation and binding capital that refers to relationships with entrepreneurs in the same line of business in a region. Ramírez-Solis et al.⁽¹²⁾ found an indirect relationship between external RSC and innovation through the following measures: market orientation and entrepreneurial orientation. Another study reports a positive correlation between SC capital due to the interactions between people in an organization and innovation; therefore, its purpose is the measurement of internal social capital.⁽¹⁴⁾ However, the perspective of commitment, which focuses on the internal relationships of a team, as well as the perspective of interconnection, which focuses on the external relationships of a team, are not opposed to each other but complementary.⁽⁵⁾ Along these lines, Cuevas-Rodríguez et al.⁽⁴⁾ argue that businesses should equally address the construction of internal RSC and external RSC considering their relative contributions and the benefits of their complementation. Based on these previous contributions, the following hypothesis is developed.

H₃ Innovation can be explained by internal RSC and external RSC.

METHODS

The present investigation's approach is quantitative. The design is nonexperimental, cross-sectional, descriptive, correlational and explanatory. Linear regression analysis was used. This study focused on small firms in the industrial sector in southern Mexico, specifically in the state of Tabasco, where 125 manufacturers were identified through the National Statistical Directory of Economic Units (Directorio Estadístico Nacional de Unidades Económicas, DENUE) of the National Institute of Statistics and Geography.⁽²⁶⁾ The random sample size was 94 units. Sixty-four establishments agreed to participate. In the analysis of the information, one questionnaire was eliminated for being an atypical case. The 63 cases are considered sufficient for the validity procedures by factorial analysis according to Lawley and Maxwell cited in Beavers et al.⁽²⁷⁾, whose criterion is 51 cases more than the number of variables in the study.

In the study, two variables were determined with the aim of achieving the objective of the research: Relational Social Capital (RSC) and innovation.

For the variable Relational Social Capital (RSC) a multidimensional scale was used, an adaptation of the questionnaire developed by Román et al.⁽²¹⁾ the dimensions were:

Internal RSC y External RSC.

The compendium of the Internal RSC dimension is described as:

- The work team (partners and/or employees) are people you can trust.
- The work team (partners and/or employees) are people who trust you.
- The work team (partners and/or employees) are a work team in which everyone trusts each other.
- The work team (partners and/or employees) are people who increasingly value their work in the company.
- The work team (partners and/or employees) are people who comply with the rules and/or agreements.
- The work team are people who have influenced the image of the company.

The compendium of the External RSC dimension is described as:

- In relationships with the stakeholders (customers, suppliers, allies, and support organizations) we have managed to gain the trust of our agents.
- In relationships with the stakeholders (customers, suppliers, allies, and support organizations) the majority of companies and people in the sector are trustworthy.
- In relationships with the stakeholders (customers, suppliers, allies and support organizations) we make systematic investments of time and resources to gain the trust of others.
- I belong to business networks that generate benefits for me.
- There are explicit or tacit rules that all businessmen follow.
- In relationships with the stakeholders (customers, suppliers, allies and support organizations), the

search for long-term relationships prevails

The innovation variable was constructed from the study by Espinoza-López et al. ⁽³⁰⁾ on a one-dimensional scale. The compendium of the Innovation variable is described as:

- In the time that the company has been around, it has incorporated new products different from those it started with.
- The company has made changes or improvements in forms of production.
- The company has acquired new goods, new equipment or new furniture.
- There is a formal research process for new raw materials and production processes.
- Research and development activities are developed that lead to patents or copyrights of the products, processes, or services of the company.

The research instrument to measure relational SC in organizations is measured using a Likert-type scale of four points, from 1 = totally disagree to 4 = totally agree, for internal RSC and external RSC factors. It was established that these points, in the results, would be valued as 1 = Very unfavourable, 2 = Unfavourable, 3 = Favourable, 4 = Very favourable. After verifying the normality of the data and performing reliability and validity tests, the final version was composed of six items for internal RSC and six items for external RSC.

The reliability test was performed with Cronbach's alpha coefficient; the alpha value for the instrument was 0,87, which is considered acceptable. ⁽²⁸⁾ The internal structure validity test of the scale was performed through exploratory factor analysis. In the first analysis, one item did not load in the factor previously considered, and according to the theoretical interpretation, it was not appropriate to change it to another factor. Therefore, it was eliminated, and the analysis was performed again, obtaining a good model fit, which was evidenced in the Bartlett's sphericity test ($X^2=395,69$, $p<000$) and Kaiser-Meyer-Olkin (KMO) test (0,85) results. ⁽²⁷⁾

The factorial weights for all items were 0,40 or greater in each of the factors, which reflects theoretical acceptability for factor analysis. ⁽²⁹⁾ The twelve items of the scale were grouped into two factors that jointly explained 50,5 % of the variance in the scale scores, which is considered acceptable. ⁽²⁷⁾

It was decided that the research instrument to measure the innovation variable would be a four-point Likert scale, going from 1 = totally disagree to 4 = totally agree, considering five items. It was established that these points, in the results, would be valued as 1 = Very unfavourable, 2 = Unfavourable, 3 = Favourable, 4 = Very favourable. Regarding reliability, the Cronbach's alpha value was 0,73, which is considered acceptable. ⁽²⁸⁾ The internal structure validity test of the scale was performed through exploratory factor analysis; in the first analysis, one item did not reach a factorial load of 0,30, i.e., the minimum acceptable value; therefore, it was eliminated. The analysis was performed again, obtaining the following acceptable values: Bartlett's sphericity test ($X^2=80,60$, $p<000$) and the KMO value of 0,71. ⁽²⁷⁾ The factorial weights of all the items were 0.30 or greater, which reflects the theoretical acceptability for factor analysis. ⁽²⁹⁾ The five items of the scale explained 40 % of the variance in the scale scores, a result that is considered acceptable.

RESULTS

Table 1 provides descriptive results for the study variables, and Table 3 shows the Pearson correlation coefficients to contrast Hypotheses H1 and H2.

	N	Minimum	Maximum	Mean	Standard deviation
Relational SC	63	2,33	4,00	3,24	0,44
Internal RSC	63	2,00	4,00	3,35	0,54
External RSC	63	2,00	4,00	3,12	0,47
Innovation	63	2,00	4,00	3,17	0,55

The means of the factors that make up relational SC are considered favourable, with a mean above 3, with external RSC being slightly less favourable. Regarding the level of innovation, the mean is also 3; therefore, it can be considered favourable. However, in the analysis of the responses to the items that measure the innovation-driven research activities carried out by these organizations, the means are unfavourable (2,84 and 2,52), as shown in table 2.

As observed, internal RSC is significantly positively correlated with innovation; therefore, Hypothesis H1 cannot be rejected. Likewise, external RSC is significantly positively correlated with innovation; therefore, H2 cannot be rejected.

Table 2. Descriptive statistics of innovation

	N	Minimum	Maximum	Mean	Standard deviation
In the time that the company has been around, it has incorporated new products different from those it started with.	63	1	4	3,56	0,81
The company has made changes or improvements in forms of production.	63	2	4	3,59	0,61
The company has acquired new goods, new equipment or new furniture.	63	1	4	3,38	0,77
There is a formal research process for new raw materials and production processes.	63	1	4	2,84	0,74
Research and development activities are developed that lead to patents or copyrights of the products, processes, or services of the company.	63	1	4	2,52	0,99

Table 3. Correlations of the variables

Variable	1	2	3
1. Internal RSC	---	.534**	.526**
2. External RSC	.534**	---	.588**
3. Innovation	.526**	.588**	---

Note: The correlation is significant at the 0.01 level.

In the multiple hierarchical linear regression, in the model with a single variable, external RSC, 34 % of the variance in the dependent variable is explained, and by adding the variable internal RSC, 40 % is explained. Therefore, H_3 cannot be accepted because innovation in the studied sample cannot be fully explained by the independent variables of external RSC and internal RSC. However, the ANOVA of the hierarchical regression model with two variables (external RSC and internal RSC) significantly improved the prediction of the dependent variable innovation ($F = 20,751$; $p < 0,001$). Likewise, for the regression model coefficients, the t-scores indicate that the variables considered contribute significantly to the prediction model ($t = 3,36$; $2,52$ $p = 0,001, 0,014$), as shown in Table 4.

Compliance with the assumptions for multiple linear regression was assessed: normality was verified through asymmetry and kurtosis measures (values between -1 and 1); linearity was verified with a regression graph of the standardized residuals; in a scatter plot, the absence of a systematic relationship between the standardized residuals and the predicted values of the dependent variable of innovation was verified, meeting the assumption of homoscedasticity; the Durbin-Watson test score (2,09) indicated that there was independence of errors because the criterion “if the value is between 1 and 3 and is close to 2” was observed. The variance inflation factor (VIF) value (1,398) for both variables indicated that the criterion of noncollinearity was met, considering the criterion “no value above ten and together all values close to 1”.

Table 4. Regression coefficients of external relational social capital

Variable	B	SE	t	p	B	F	R ²	R ² adjusted
Step 1						32,30	0,34	0,33
Constant	1,01**	0,38						
External RSC	0,69**	0,12	5,68	0,000	0,58**			
Step 2						20,75	0,40	0,38
Constant	0,58	0,40						
External RSC	0,50**	0,13	3,36	0,001	0,43**			
Internal RSC	0,30**	0,11	2,52	0,014	0,29**			

Note ** $p < 0,001$

DISCUSSION AND CONCLUSION

This empirical study shows the existence of a link between the relational SC built by small firms in the industrial sector and the innovations they achieve, demonstrated by the positive and significant relationship between internal RSC and external RSC with innovation as reported in the statistical analysis. It is interpreted that *the more* trust, meeting commitments and appreciation for the organization in work teams, as well as relationships in which reliability and clarity prevail in the negotiations with external stakeholders, the *greater* innovation there is in products, processes, acquisition of technologies and patent registrations. This finding coincides with the results reported by Cuevas-Rodríguez et al.⁽⁴⁾ on the influence of high levels of internal RSC and environments of trust with external partners in radical product innovation. Additionally, results by Fernández et al.⁽¹⁶⁾, who in their study on external SC demonstrate a relationship between innovation and bridging social capital represented by the relationships with agents in an organization's environment, similar to the results reported by Madwa, et al.⁽²²⁾, points out the importance of external SC in strengthening innovation approaches and actions.

The results indicate that the study sample has strengthened internal RSC more than external RSC, as in the study by Román et al.⁽²¹⁾, who also focused their research on measuring the relational dimension. These authors affirm that the firms in their study are more confident about the quality of their internal relationships than external ones. This result may be influenced by the situation of small firms, where hiring managers employ friends and family with whom they maintain solid ties; in contrast, in their relationships with external agents, the ties are weak.⁽²⁰⁾ This situation should be addressed, considering the results of this study, where external RSC is a better predictor of innovation than is internal RSC; consequently, small businesses should increase their relational skills externally, make changes and open themselves to opportunities for association, and government institutions should establish policies and strategies to strengthen their external RSC and facilitate their penetration into collaborative networks.

However, the results of the multiple hierarchical linear regression indicate that when external RSC is complemented with internal RSC, the contribution to innovation is greater; therefore, small firms in the industrial sector should strengthen both types of relational RSC.

Regarding the descriptive results, none of the means of the relational SC variables reach the maximum score (4 on the Likert scale), which suggests that there are areas of opportunity to increase the relational components, such as shared values and trust, inside the work teams themselves and outwards to agents outside the environment of small industrial firms. For innovation, the results showed unfavourable values (2 on the Likert scale) in terms of systematic research of current materials and processes for the production and development of patents. The results suggest that if small industrial firms want to be innovative, one alternative that contributes to innovation is strengthening and complementing external and internal RSC.

This study contributes to theory and practice. Progress was made in explaining the innovation phenomenon because the variance in the dependent variable innovation was better explained from external RSC and internal RSC in this study than in previous studies⁽⁴⁾, representing a significant advance in arriving at an adjusted prediction model of innovation. The research instruments were adapted to achieve reliability and validity; therefore, they can be references for other studies. Likewise, knowledge about the positive and significant relationship of internal and external RSC with innovation was reinforced.^(4,16,22)

In terms of practical contributions, this work suggests to the leaders of small firms in the industrial sector actions to strengthen relational elements such as trust and shared values.⁽³¹⁻³³⁾ Additionally, agencies representing the industrial sector and government institutions can look at the binding relationship between relational SC and innovation and incorporate it in their support programmes for networks or clusters in this sector.

In future lines of research, it is suggested to include other variables that, together with external RSC and internal RSC, contribute to increasing the percentage of explained variance, such as knowledge management and innovative culture, which are topics that have been related to innovation but not together with SC. Future lines of innovation research are also suggested, that is, the effects it has on other organizational interests, such as competitiveness and sustainable development.

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CONFLICT OF INTERESTS

None

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