



## WHAT ARE THE ORGANIZATIONAL CONDITIONS FOR LEARNING AND KNOWLEDGE MANAGEMENT? EVIDENCE FROM LARGE SPANISH FIRMS

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### Abstract

The phenomena of globalization and the intensification of change mean that firms increasingly require an internal climate that fosters the genesis and application of new knowledge. If the firm's objective is to achieve continuous learning, organizational variables and managerial purpose are essential for access to superior knowledge assets. This study takes an in-depth look at the relationship between a political phenomenon (knowledge management) and a natural one (organizational learning) within a particular organizational framework. The aim is to obtain evidence of the effect of organizational variables on learning and knowledge from the perspective of large Spanish firms.

**Keywords:** Organizational Learning, Knowledge Creation, Knowledge Management, Organizational Design.

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### 1. INTRODUCTION

The globalization of markets, the complexity of business problems and the acceleration of the phenomena of change have led to new and original proposals in the area of *organizational design*. Traditional sources of competitive advantage (protected markets, physical, financial, or even technological assets) have taken a back seat to knowledge-based assets. Under these circumstances, knowledge has become the most valuable asset that any organization can generate. However,

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it is only a source of sustainable competitive advantage over time if it is continually developed: survival and achieving and maintaining advantage require firms to be able to create, innovate and assimilate new knowledge in order to do things differently.

*Knowledge creation* (through research), its *diffusion* (through formative actions) and *application* (during an appropriate of innovation) form the basis of competitiveness for firms. Given the importance of knowledge creation for firms and for society to progress, a good deal of research has focused on the analysis of the factors that affect this process. In the case of Spanish firms, few studies have analyzed the process of knowledge creation and its contextual factors. The relevant literature stresses the importance of the organizational framework (*design variables*) and their dynamic interaction with *knowledge creation*, as well as *organizational learning*: the organization is the context that should favour the emergence, development and application of knowledge. Studies such as those by Hedlund (1994), Nonaka and Takeuchi (1995), Grant (1996), Nonaka and Konno (1998), von Krogh (1998) and Nonaka, Toyama and Konno (2001) have made important contributions to this line of research.

The aim of this study is to analyze the relationship between knowledge management and learning in the organization. The study delves empirically into this question using a sample of large Spanish firms. The main contribution of the study is empirical, although certain theoretical implications can be drawn from the results. The research is split into two sections. First, a literature-based model for the creation and management of organizational knowledge is proposed. This model is subsequently tested using a sample of 167 large Spanish firms in order to establish whether the policies for the creation and management of organizational knowledge and its development under particular organizational conditions have an active effect on the creation of knowledge assets in Spanish firms.

## 2. THE PROCESS OF KNOWLEDGE CREATION AND MANAGEMENT

For decades, research on *Organizational Learning* and *Knowledge Management* has significantly contributed to the development of the *Theory of Organization* and *Strategic Management* and it has experienced rapid growth in the 21<sup>st</sup> century. Contributions from the *Knowledge-based view* rely on the *Resource-based view* and *Evolutionary Economics*. They suggest that competitive advantage comes from the skills and capabilities of the firm, recognizing knowledge and learning as primordial strategic aspects. Technological means are in fact knowledge that lies both in a material form in products and in people as well as in organizations that participate in its conception, development, and application. From this perspective, the capacity to innovate is conceived as a learning process de-

rived from knowledge, which, when it passes through a variety of organizational mechanisms, becomes new knowledge. Innovation takes place when that knowledge has been capitalized upon via commercial applications that work to the firm's benefit by applying this knowledge to products and productive processes. An essential characteristic of the process of knowledge creation and subsequent innovation should be its continuous nature; an accumulative flow of the genesis of new knowledge.

The literature review on *organizational learning* carried out by Miner and Mezias (1996) reveals the existence of three key questions concerning learning and organizational knowledge creation: a) who learns? b) What are the key learning processes? And c) What is the value of learning? The widely argued viewpoint in the literature is that organizational learning is not the simple sum of individual learning (Argyris & Schön (1978); Hedberg (1981); Fiol & Lyles (1985); Nicolini & Mezner (1995); Marquandt (1996) and Crossan, Lane & White (1999), among others). Individuals are agents through which the organization learns, but individual knowledge must be publicly shared and integrated into routines in order to be considered organizational. However, in the analysis of the process of organizational knowledge creation, it is important to bear in mind the knowledge created by business groups and communities, as well as that at an individual level.

A social perspective assumes that knowledge is mainly generated through conversations and interaction between members of the organization (Brown & Duguid (1991); Lave & Wenger (1991); Cook & Yanow (1993); Nicolini & Mezner (1995); Wenger (1998); Fox (2000) and Gherardi & Nicolini (2002), among others). Individuals learn from social interaction, which occurs within a specific socio-cultural framework (Cook and Brown, 1999; Edmonton, 1999). Thus, the group emerges as a fundamental element in the interpretation and integration of knowledge. Perceptions on one or several topics converge in groups due to the desire to share what one knows. Here organizational conditioning factors act as catalysts for this relationship.

The key to the development of organizational knowledge lies in the exchange of mental models and their subsequent institutionalization into the structure of the firm's operations, thereby transforming the rules of decision that have held sway in the firm up until that point, thus enabling it to carry out actions more effectively. Several authors have studied the process of organizational learning, laying down the dimensions, stages or flows that it consists of (Huber (1991); Day (1994); Nevis, DiBella & Gould (1995); Crossan, Lane & White (1999) and Winter (2000), among others). In these and other studies, although the terminology may differ, the processes defined are similar. A review of the different proposals allows us to identify four dimensions or stages (Huber, 1991): the *acquisition of knowledge* (through external sources or internal development); the *distribution of knowledge* (which links individual and group learning and allows individuals to

develop cognitive maps, through language, of the areas in which they operate); the *interpretation of knowledge* (the development of shared decisions and coordinated decision-making, acting as a nexus between the group and organizational levels); and *organizational memory*, the result of decisions on institutionalization (referring to the integration of new knowledge and capabilities into organizational routines).

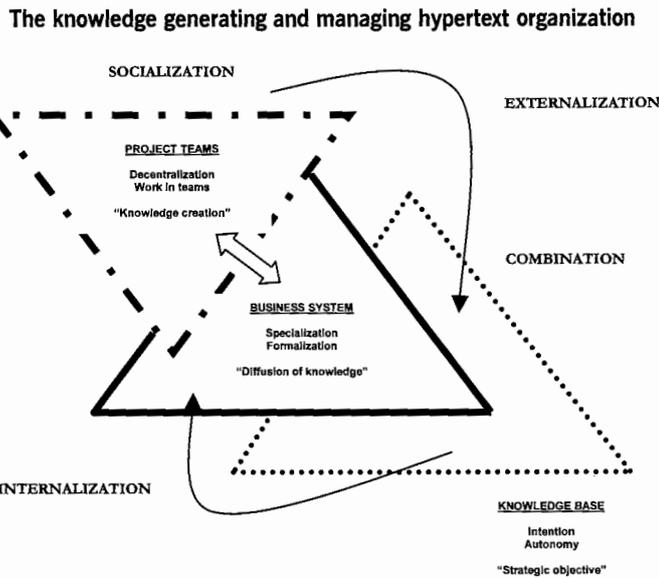
Consequently, in order for the capability to learn to become a source of heterogeneity among firms, it is not enough merely to adapt to changes within the established framework (Slater & Narver, 1995). The firm must go further and develop a type of generative learning that is capable of questioning the current organizational system and, where possible, search for and explore alternative routines, regulations, technologies, goals and aims (Fiol & Lyles, 1985; Senge, 1990; Lant & Mezias, 1992).

The *Knowledge-based view* regards one of the essential functions of the firm as being the creation and application of knowledge that comes about as a result of collective learning (Nonaka, 1991, 1994; Grant, 1996; Spender, 1996). Knowledge management is thus considered to be one of the most important dynamic capabilities of the firm and an essential requisite for the development of any other capability or internal process (Lei, 2003; Lei, Hitt & Bettis, 1996). Knowledge is present in numerous aspects of the firm such as organizational culture, routines, policies, systems and procedures, documents, and, of course, employees (Alavi & Leidner, 2001). Different types of knowledge can therefore be distinguished. Nelson and Winter (1982) introduced into strategic literature the distinction made by Polanyi (1966), which differentiates between explicit and tacit knowledge. Another relevant classification is that based on the ontological dimension of knowledge via which Nonaka and Takeuchi (1995) identify and describe four levels of knowledge: *individual*, *group*, *organizational* and *interorganizational*.

In short, we are describing a process that integrates organizational characteristics and managerial factors aimed at the creation and management of knowledge. Nonaka and Takeuchi (1995) and Crossan, Lane and White (1999), amongst others describe some of the basic conditions necessary in the organization for generating knowledge that also allow the organization to obtain the necessary capabilities for its management. The central requisite is the adoption of an *organizational form* that is capable of providing the firm's management with a vehicle for putting into practice its *strategic aim* (Nonaka & Takeuchi, 1995; Nonaka, Toyama & Konno, 2001) to cyclically acquire, create, exploit and accumulate new knowledge. It requires an organizational form that considers bureaucracy and the organic or adhocratic form as being complementary and not mutually exclusive. The hypertext organization is made up of layers in which the organization specializes in its predominantly productive activities (bureaucratic layers or product divisions) or innovative activities (a parallel structure of inno-

vation teams). These layers are endowed with autonomy, whilst being interconnected, as shown in figure 1, and they make the organization hypertext for this organizational model.

FIGURE 1



### 3. RESEARCH OBJECTIVE, CONCEPTUAL MODEL AND HYPOTHESES FOR CONTRAST

Ever since the first appearance of studies that dealt with organizational learning and knowledge creation, it has been claimed that those organizations capable of developing this capability obtain better results. They state that in dynamic, unpredictable environments a firm's ability to learn more quickly than its competitors may be the sole source of sustainable competitive advantage (Stata, 1989; McGill & Slocum, 1993; Nevis, DiBella & Gould, 1995; Lei, Slocum & Pitts, 1999).

The literature offers sufficient empirical support to propose a positive relation between the application of knowledge management practices and learning. The work of Nonaka and Takeuchi on the creation of organizational knowledge establishes knowledge as the chief requisite for innovation and competitiveness in the firm (Nonaka, 1994; Nonaka and Takeuchi, 1995).

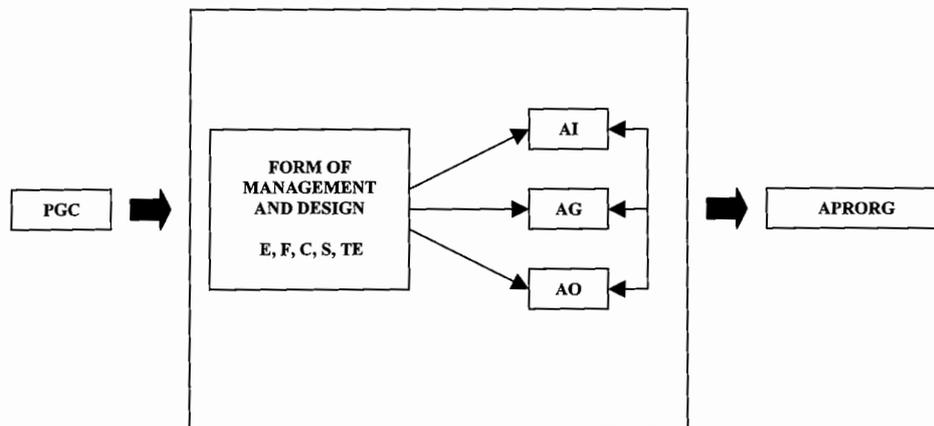
The aim here is to verify whether through knowledge management policies certain managerial and organizational design conditioning factors stimulate and develop learning processes within the organization. We compare and contrast

the elements that make up organizational design and the learning that occurs at each organizational level (individual, group and organizational). Figure 2 explains which variables are studied and the estimated relation between them.

In our proposal (Figure 2), the dependent variable is APRORG (the amount of learning and knowledge creation that occurs in the organization). This construct integrates the three ontological processes of learning and knowledge creation in firms: AI (individual learning, AG (group learning) and AO (organizational or institutional learning). The variable APRORG is influenced by an independent variable, PGC (knowledge management policy).

FIGURE 2

Relations between the variables of the theoretical proposal



The variable PGC indirectly affects the processes of organizational learning. These knowledge management actions and policies are made up of a series of organizational variables: managerial factors and the organizational design possessed by the firm, which are determined by the variables E (degree of specialization in assigned tasks), F (degree of formalization of tasks, procedures and skills), S (degree of diffusion of common values), C (degree of decentralization) and TE (degree of the use of work team techniques).

Therefore, based on the ideas given above, we can now formulate the following hypotheses:

*H1: A positive relation exists between knowledge creation at each organizational level and the other organizational levels.*

*H2: A positive relation exists between the organization's design variables and knowledge creation at all organizational levels.*

#### 4. METHODOLOGY AND DESIGN OF THE EMPIRICAL STUDY

##### 4.1 Data gathering

The population used for this study was taken from the 'Dun and Brandstreet' database and the information therein provided on the population of large firms located in Spain. This criterion allows for an adequate sample size in statistical terms. From among the different quantitative criteria that can be considered in order to classify firms according to size, that of the fourth directive 78/660/CEE was chosen, in line with European Commission recommendations.

TABLE 1

**Basic research data**

1.465 large firms
Firms not contacted: 8
Erroneous data: 8
Firms contacted: 1.283 (100%)
Firms that were not willing to collaborate: 96 (7.5%)
Questionnaires sent: 1.187 (92.5%)
Firms that answered: 167 (14.1%)

Following these criteria, all the firms belonging to the population of analysis were considered to be large. Following the criterion for large firms on the number of employees (according to the database used), 2842 firms in Spain had 250 or more employees. As a second criterion was necessary, yearly turnover was chosen (greater than 40 million euros per year). An overall figure of 1465 firms met both these criteria, and constituted the population of the study.

The basic data from the study are shown in table 1 and the technical datasheet in table 2. The total number of large firms located in Spanish territory (according to the chosen criteria) came to 1465 organizations. We were not able to or not allowed to make contact with someone able to adequately answer the survey in 182 cases. 1283 contacts were eventually established (via e-mail or by telephone) of which 96 (7.5%) declared that they were unwilling to collaborate. Therefore, 1187 questionnaires were sent, 1078 via e-mail, which included a link to a webpage created for this purpose, and 109 by fax. By the end of the data gathering stage, 167 valid questionnaires had been received (134 firms gave their responses via the webpage and another 33 in *Word* format sent by fax), which implies a reasonable response rate, in this case 14.1% of the questionnaires sent out.

TABLE 2

**Technical datasheet of the empirical study**

POPULATION AND FIELD OF THE RESEARCH	1.465 Spanish firms with more than 250 employees and a yearly turnover of more than 40 million euros
SAMPLE SIZE	167 firms
CONFIDENCE LEVEL	95,5%
SAMPLE ERROR	+/- 7%
SAMPLING PROCEDURE	Convenience sampling <sup>1</sup>
GEOGRAPHICAL FIELD	The entire state territory
SAMPLE UNIT	Firm
DATES OF FIELD WORK	September-December2005
TYPE OF INTERVIEW	Structured questionnaire in optional web or Word format, depending on the respondent's preference. The survey was sent to the CEO, or in their absence the Quality Control Manger or someone of a similar position in the firm <sup>2</sup> .

**4.2 Measurement of the variables and data analysis**

In this study, several multivariate statistical techniques were applied. An exploratory *factorial analysis* was used to study the dimension of the measurement scales, with regard to both learning and the variables of organizational design; a *cluster analysis* was applied in order to segment firms from the sample according to the level of learning; and a *logistical regression model* was used to analyze the influence of organizational design on the processes of knowledge creation (Hair, Anderson, Tatham and Black, 1998).

The nature of the variables and the aim of the research led to the use of this dependent multivariate technique. This is a common technique in cases where the objective is to find out which factors influence the likelihood of belonging to a particular group, in this case, of belonging to a group of firms with a greater or lesser capacity for knowledge creation.

A *cluster analysis* was applied for the segmentation of the sample. Prior to this analysis, an exploratory factorial analysis was carried out on the measurement scales with a view to establishing the classification variables.

<sup>1</sup> In this case, the simple is made up of units that were both accessible and (Miquel et al., 1997: 146).

<sup>2</sup> The replacement of the CEO with the Quality Control Manger or someone of a similar position is not due to any request on the part of the researchers but a deliberate choice on the part of the firms responding to the questionnaire in each case, despite the indications appearing on the questionnaire.

*Measurement of the variables: Learning and Knowledge Creation*

The questionnaire included a group of items to evaluate the process of knowledge creation of the firms in the sample. This block was made up of 19 items using a 7-point Likert scale (1 = totally disagree... 7 = totally agree). The items are shown in Table 3.

TABLE 3

**Measurement and assessment factors of learning in the organization**

Item 1	People in our firm are capable of breaking with old conceptions in order to see things in a new, different Light.
Item 2	People in our firm attempt to understand the way other colleagues think and act.
Item 3	New ideas and approaches to work are continually being tried out.
Item 4	Information systems enable individuals to share information.
Item 5	The firm's files and databases provide the necessary information for carrying out tasks.
Item 6	Employees tend to hoard knowledge as a source of power and are unwilling to share it with colleagues.
Item 7	Groups have a common understanding of the aspects related to the unit they work with.
Item 8	Everyone's point of view is asked for in meetings.
Item 9	Both successes and failures are shared within the group.
Item 10	In group meetings, ideas arise that would be unlikely to appear if employees worked on their own.
Item 11	Groups provide innovative solutions to questions that affect the whole organization.
Item 12	The outcomes of work in groups are used to implement increasing improvements in products, services and processes.
Item 13	In the firm, there are procedures for gathering proposals from employees, assessing them, adding them and internally distributing them.
Item 14	The organization adopts recommendations from groups.
Item 15	The management encourages experimentation and innovation.
Item 16	The firm is capable of discarding obsolete knowledge and looking for new alternatives.
Item 17	Organizational processes are documented in manuals, guidelines or quality regulations, among others.
Item 18	The firm has databases that allow experiences and knowledge to be stored so that they can be used at a later date.
Item 19	Staff turnover does not imply a loss of important knowledge or skills for the firm.

The study of the dimensions that make up the scale for knowledge creation was carried out through an exploratory factorial analysis. The factors, or dimensions, necessary for representing the original data were drawn from a technical analysis of the main components. Those whose associated value was greater than 1 were chosen. Different rotations were carried out in order to clarify the meaning of the dimensions. The process ended with a *Varimax orthogonal rotation*. As can be seen in Table 4, this resulted in a considerable reduction of factors, with a loss of an acceptable amount of information. The 19 factors were reduced to just two, which explained 61.5% of the variability of the information.

During the process of refining the model, the decision was made to eliminate items with similar factorial loadings as this fact can interfere with the identification of the dimensions.

TABLE 4

Factorial loadings	Dimension	
	1	2
Item 1	<b>.682</b>	.239
Item 2	<b>.652</b>	.329
Item 6	<b>.785</b>	.132
Item 7	<b>.753</b>	.140
Item 8	<b>.778</b>	.198
Item 9	<b>.663</b>	.192
Item 11	<b>.680</b>	.450
Item 15	<b>.761</b>	.353
Item 3	.157	<b>.870</b>
Item 12	.279	<b>.823</b>
Item 19	.225	<b>.643</b>

Once the number of factors was established, the composition of the loading factors was studied in order to interpret their meaning. According to these analyses, a name was given to each dimension. The name and specific contents of the dimension are as follows:

- Dimension 1 (39.2% of the total variance): *individual-group knowledge creation*. This includes the aspects that correspond to learning acquired by employees, as individuals and as groups.
- Dimension 2 (22.3% of the total variance): *institutional (organizational) knowledge creation*. This factor covers all the aspects related to learning in the organization as such.

The examination of the matrix of correlations between all the items allowed for the verification of their correlation. Table 5 shows other indicators of association among variables. The application of a factorial analysis is also justified. This analysis provides partial confirmation of hypothesis 1: it confirms a positive significant relation between individual knowledge creation and knowledge creation in groups (both included in Dimension 1). With regard to Dimension 2, which deals with knowledge creation of an organizational or institutional nature, the statistical analysis hitherto carried out does not confirm a significant and positive relation with the other two organizational levels, without taking into account the

analysis of the influence of the organizational variables, which appears in section 4.3 of this study.

TABLE 5

**Degree of association among variables. Validity of the factorial analysis**

Determinant of the matrix of correlations	0.003
Bartlett's sphericity test	904.045 (p-value=0,000)
Kaiser-Meyer-Olkin Test	0.878

*Segmentation of the sample*

Values given for firms in the sample for each dimension were measured via the average value from the items that make it up. Table 6 contains the description of these two new variables.

The segmentation of firms was carried out using these two variables. This grouping was done using a cluster analysis. The algorithm used for formulating the groups was the non-hierarchical K-average. This technique requires a pre-ordained number of clusters or segments. In this case, we opted for two groups.

TABLE 6

**Descriptive statistics of the dimensions of the measurement of learning in the organization**

	<b>INDIVIDUAL-GROUP LEARNING</b>	<b>INSTITUTIONAL LEARNING</b>
Average	4.4898	5.1708
Typical deviation	1.07391	1.23512
Minimum	2.00	1.33
Maximum	7.00	7.00
25% of firms did not exceed...	3.7500	4.3333
50% of firms did not exceed ...	4.5000	5.3333
75% of firms did not exceed ...	5.3750	6.0000

Table 7 shows details of the typologies found. It can be seen how the first cluster, or segment, composed of 47% of the firms analyzed, is defined by less effective knowledge creation , i.e. those that make up segment 1 are firms where less learning occurs than those in segment 2. 53% of the firms analyzed make up segment 2.

TABLE 7

Description of segments with regard to learning averages

	Segment	
	1	2
INDIVIDUAL-GROUP LEARNING (Average)	3.71	5.17
INSTITUTIONAL LEARNING (Average)	4.21	5.99

Measurement of the variables: organizational design

The questionnaire also included the possibility of measuring the organizational design of the firms analyzed. This block was made up of items that attempt to measure the degree of specialization, centralization, formalization, socialization and the capacity for work in teams in organizations. They were all designed using a 7-point Likert scale (1 = totally disagree...7 = totally agree). Table 8 shows the items for this block.

The study of the dimensions that make up the scale for organizational design was also undertaken using an exploratory factorial analysis. Different rotations were carried out in order to characterize the meaning of the dimensions. The process ended with a Varimax orthogonal rotation.

As can be observed in Table 9, the items assigned to each dimension were calculated as having an explained variance of 67.4% in the variability of the information. During the refining process of the model, the decision was made to eliminate the items with similar factorial loadings as this can cause interference in the identification of the dimensions.

The specific contents of each dimension are as follows:

- Dimension 1 (16.3% of the total variance): *Specialization*. This factor combines the elements that refer to the degree of specialization in posts and the tasks involved.
- Dimension 2 (14.1% of the total variance): *Formalization*. This dimension includes aspects related to regulations, procedures and instructions in the workplace.
- Dimension 3 (13.8% of the total variance): *Socialization*. This component is related to the presence of the firm's values.
- Dimension 4 (13.2% of the total variance): *Centralization*. This dimension considers the degree of participation of non-managerial employees.
- Dimension 5 (9.8% of the total variance): *Work in teams*. This element considers the organization's capacity for working in teams.

TABLE 8

**Block II of the questionnaire**

<b>Specialization</b>	
Item 1	The post involves a small number of tasks.
Item 2	The tasks involved in this post are largely unvaried.
Item 3	The tasks involved in this post form a small part of the overall process
<b>Formalization</b>	
Item 4	The post has few written norms, procedures and instructions.
Item 5	Employee qualification makes direct supervision unnecessary.
Item 6	There are planning and control systems that establish objectives for the unit.
Item 7	There are performance control methods that allow autonomy in the workplace.
<b>Socialization</b>	
Item 8	The values and regulations of the organizations are considered when hiring staff.
Item 9	In training programs there are activities aimed at making staff aware of the organization's values.
<b>Centralization</b>	
Item 10	Non-managerial employees participate in strategic decisions.
Item 11	Non-managerial employees participate in decisions at an intermediate level.
Item 12	Non-managerial employees participate in decisions of an operative nature
<b>Work in teams</b>	
Item 13	Project teams are made up of staff from different specialities.
Item 14	Project teams possess their own collective objectives.
Item 15	Project teams are self-organizing.
Item 16	Project teams are a source of learning.
Item 17	There is a great flow of knowledge between members of project teams.
Item 18	Project teams do not base their work on established procedures.
Item 19	The work of project teams is controlled indirectly so that they do not lose effectiveness.
Item 20	The collective outcomes of work teams are rewarded.
Item 21	Project teams have defined objectives that are not altered by the normal functioning of the firm.

An examination of the matrix of correlations between all the items allowed correlations to be verified. Table 10 shows other indicators of the degree of association of the variables. In addition, the application of factorial analysis is shown to be justified in this case.

#### 4.3 Organizational design and learning. Influential factors

We analyzed the effect of the organization's design variables using a logistical regression model on the process of the creation and management of knowledge.

TABLE 9

**Factorial analysis**

Factorial loadings	Dimension				
	1	2	3	4	5
Item 1	.068	<b>.838</b>	-.120	.101	.185
Item 2	-.012	<b>.878</b>	.069	-.010	-.141
Item 3	-.174	<b>.532</b>	.411	-.216	.137
Item 4	-.019	-.010	-.036	-.287	<b>.785</b>
Item 5	.135	.101	-.001	.322	<b>.709</b>
Item 8	.086	.073	.053	<b>.818</b>	.099
Item 9	.212	-.161	.254	<b>.662</b>	-.160
Item 10	<b>.831</b>	.042	.164	-.140	.036
Item 11	<b>.843</b>	-.053	.170	.187	-.092
Item 12	<b>.734</b>	-.020	.019	.253	.182
Item 15	.144	.118	<b>.798</b>	.153	1.748E-05
Item 17	.117	.012	<b>.729</b>	.252	-.087
Item 18	.213	-.167	<b>.558</b>	-.415	.035

TABLE 10

**Degree of association of the variables. Validity of the factorial analysis**

Determinant of the matrix of Correlations	0.042
Bartlett's sphericity test	338.457 (p-value=0.000)
Kaiser-Meyer-Olkin Test	0.615

*Variables of the model*

The dependent variable of the model 'Y' is the level of learning in firms, which is drawn from the characterization resulting from the cluster analysis. It is a binary variable with a level of 1 associated with greater levels of learning and 0 for lower levels. The explanatory variables are the five dimensions that describe organizational design. These dimensions are quantified by finding the average value given by the items that make up each of these dimensions.

*Description of the model*

In order to classify the firms in each of the levels of learning, we specify a logistical regression model thus:

$$\Pr (Y=1) = \Pr (\text{Higher level of learning}) = \frac{\exp(\sum_k \beta_k x_k)}{1 + \exp(\sum_k \beta_k x_k)}$$

The explanatory variables that are shown as  $x_k \beta$  in the model are the vector of the parameters to be estimated (Greene, 2000). As can be observed in table 11, *socialization* is a predictive factor of learning of an organizational or institutional nature. The p-value associated with the Wald contrast is less than 0.05<sup>3</sup>. The value of the associated coefficient is positive, i.e. it has a positive effect on learning. It can thus be stated that the greater the intensity of the variable *socialization*, the more capable the firm will be of creating knowledge. The other dimensions or variables of organizational design do not predict the creation of organizational knowledge. Their associated p-values are greater than 0.05 and thus their effect on the variable *knowledge creation* is not significant. This outcome also leads to the partial acceptance of the proposal expressed in hypothesis 2 in the sense that it is the organizational variable *socialization* that enables the existence of a positive correlation between *individual-group knowledge creation* and *organizational (or institutional) knowledge creation*. The greater the intensity or effort on the part of the firm or its management to intensify socialization and shared values, beliefs, practices, and procedures, the greater the organization's capacity to globally institutionalize, consolidate and diffuse the learning that occurs (and the knowledge developed) both among its individuals and groups or communities.

The predictive capacity of the model is defined by the optimal classification of 63.4% of the cases. Table 12 shows this classification.

The plausibility test, which measures the overall significance of the coefficients, gave a p-value of 0.00 and was therefore less than 0.05. Therefore we can reject the hypothesis that the value of all the parameters is equal to zero. Moreover, the Hosmer and Lemeshaw tests also allow us to state that the estimated model fits the observed data, i.e. the proposed model with the significance of centralization acceptably describes the dependent variable *degree of learning*. The associated p-value is greater than 0.05, giving a value of 0.88.

<sup>3</sup> The level of significance used was 5% (p-value=0.05). Therefore, any p-value of less than 0.05 indicates a statistically significant relation between variables. Conversely, a p-value greater than 0.05 indicates the absence of such a relation.

TABLE 11

Estimation of the parameters of the logistic model

	$\beta$	Wald statistic	Degrees of freedom	p-value	Exp( $\beta$ )
SPECIALIZATION	-.098	.450	1	.502	.906
CENTRALIZATION	.284	2.130	1	.144	1.329
WORK IN TEAMS	.257	1.687	1	.194	1.293
<b>SOCIALIZATION</b>	<b>.355</b>	6.015	1	<b>.014</b>	1.427
FORMALIZATION	.057	.146	1	.702	1.059
Constant	-3.558	6.969	1	.008	.028

TABLE 12

Table of classifications of the logistic model

Observed		Prediction		
		LEVEL OF LEARNING		% correct
		Average level of learning	High level of learning	
LEVEL OF LEARNING	Average level of learning	27	24	52.9
	High level of learning	17	44	72.1
Overall %				63.4

## 5. DISCUSSION AND CONCLUSIONS

In this study, we looked into the relationship that links a phenomenon of an *artificial* or *political* nature (knowledge management) with another of a *natural* sort (learning in the organization). The deliberate adoption of actions linked to knowledge management led us to pose the question, 'Does management have a positive influence on the knowledge creation process in firms? Fiol and Lyles (1985) identified contextual factors that affect learning in the organization as, among others, the existence of an organizational structure that is conducive to innovation and enables prevailing rules and values in an organization to influence learning. The explicit use of organizational variables or tools (design variables) provides an adequate framework for knowledge creation.

If management encourages continuous learning and the acquisition of new skills and knowledge, the organizational configuration and form of management

will be essential in endowing the organization with more valuable knowledge assets—in both quality and quantity— than those possessed by its competitors. In order to do this, firms must be efficient in developing an organizational environment, guidelines and processes aimed at securing, developing and retaining knowledge (Dickenson & Blundell, 2000; Lord & Ranft, 2000). Organizational conditions characterized by specialization, formalization, socialization, and decentralization and the use of techniques that involve work teams, together with a definite managerial attitude aimed at favouring the processes of creating and managing knowledge beg the question: 'Do they provide an adequate context for learning in the organization?' The conclusion to be drawn from our sample of large Spanish firms confirms the greater impact of the variable *socialization* in those organizations in which concrete plans and actions are explicitly developed for organizational knowledge management. This partially confirms the basic ideas behind the hypotheses of the model and identifies this variable as a contextual factor of an internal nature that leads to a favourable organizational environment for knowledge management policies and the stimulus of organizational learning.

As we have pointed out, this study presents relevant outcomes as an initial stage. We will continue this line of research with the incorporation of more sophisticated methodology and procedures that will allow us to overcome present limitations in our statistical analysis in the near future (with regard to the use of exploratory factorial analysis, the number of items and the volume of responses obtained) with a view to strengthening the results and thus enabling us to produce more generalized conclusions on the outcomes obtained up to this point.

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## Resumo

O fenómeno da globalização e a intensificação da mudança requer que a empresas desenvolvam um clima interno que promova a criação e aplicação de conhecimentos novos. Se a empresa tiver por objectivo implementar uma aprendizagem contínua, as variáveis organizacionais e o propósito da gestão revelar-se-ão essenciais para a empresa aceder a activos de conhecimento superiores. Este estudo analisa em profundidade a relação entre um fenómeno político (gestão do conhecimento) e um fenómeno natural (aprendizagem organizacional), o seu objectivo é o de encontrar evidência sobre o efeito das variáveis organizacionais sobre a aprendizagem e o conhecimento em grandes empresas espanholas.

**Palavras-chave:** Aprendizagem organizacional, criação de conhecimento, gestão de conhecimento, desenho organizacional.

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