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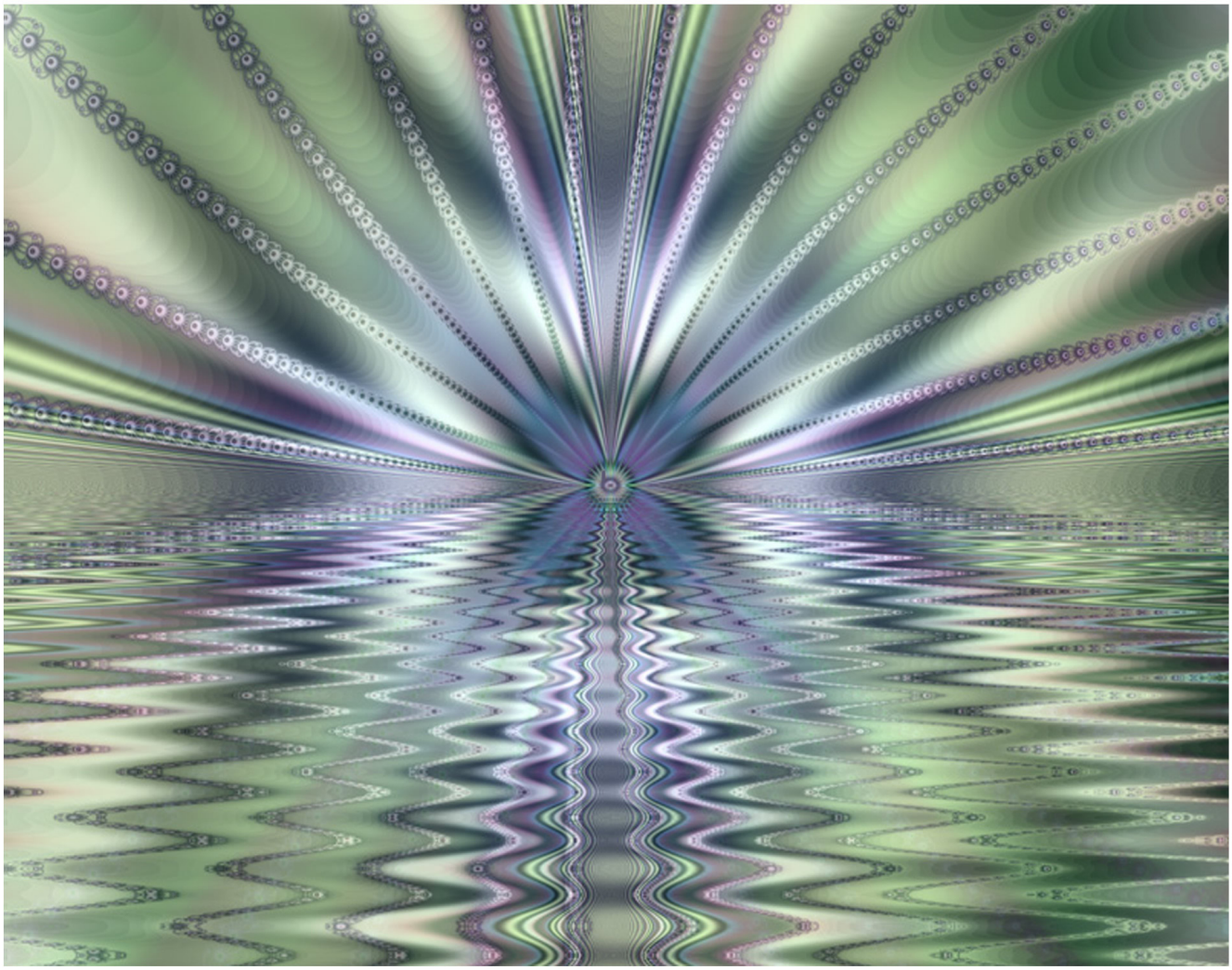

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COGNITIVE AND BEHAVIORAL DIMENSIONS IN ORGANIZATIONAL LEARNING: INFLUENCE ON ORGANIZATIONAL PERFORMANCE

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ABSTRACT

Problem Statement: *This research analyzes the relationship between cognitive and behavioral change that comes with organizational learning and performance, understanding how these changes afect performance. Very little is known about how cognitive and behavioral changes afect improvements efectively in organizational performance.*

Method: *Based on the literature, we develop a theoretical model that shows interrelations between cognitive change, behavioral change and organizational performance. The hypotheses are tested using data collected from 408 CEOs in Spanish organizations. The study analyzes the data using structural equations modeling (LISREL 8.71 program).*

Results: *this research reflects the positive efects of cognitive change on behavioral change and it also show how these variables positively afect organizational performance.*

Conclusions: *Learning occurs when it produces a change in conduct as a result of a change in the level of knowledge. The results support the importance of both changes in generating improvements in organizational performance*

KEYWORDS:

Cognitive change; behavioral change; organizational learning; organizational performance.

INTRODUCTION

Environmental circumstances are changing rapidly and profoundly, and new rules, limits, and modes of behavior are emerging. As organizations are faced with one of the most dramatic changes in the history of humanity, one of the new values emerging is adaptation to "learning," and one response is the "learning organization." Today more than ever, "continuous learning" is a necessity, not a choice. Learning is not a separate activity that occurs before being incorporated into the workplace or that is taught in lecture halls; today, it is the essence of productive activity (Peters, 1993). Further, learning is the work of everyone in the organization (Dixon, 1994) and occurs through all of the firm's activities at different speeds and levels (Dodgson, 1993). The concept of the learning organization is definitely not new. It is the fruit of a series of steps that are not radical or revolutionary but progressive and evolutionary in the world of organizations (Ulrich et al., 1993). But what *is*

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new is the recent interest in how the concept of "organizational learning" helps managers to construct competitive companies, since there is a strong link between learning capacity and corporate competitiveness (Easterby-Smith, 1998; Ulrich et al., 1993). The topic of learning is integrated into studies in very different areas and topics and grounds all current approaches that attempt to achieve success in business (Wick & León, 1995).

Today, a firm's strategic activity does not lie in its products and services, but in the continuous learning of its human resources. Such learning helps the firm to achieve continuous improvement of the competencies, knowledge, and abilities of its workers, who are the foundation of competitive advantage. We find ourselves in a knowledge society in which old, mechanical modes of thinking from the industrial era are no longer adequate. We must create contexts in which members can learn and experience systemic thinking, question their assumptions and mental models, encourage dialogue, create a vision, and impel actions (Barrett, 1995). Although learning and the need to convert the organization into an entity that learns (intelligent organization) is increasingly popular among technicians and researchers, achieving learning is not easy and how to do so continues to be a question to which many answers have been proposed. It is not enough to show executives what an "organization that learns" is. We must also give them the declarative and procedural knowledge to reach this goal and to foster the corresponding cognitive and behavioral change (Miner & Mezias, 1996). Organizations that learn possess an architecture that satisfies the requirements of competitive advantage, converting the firm into a center for permanent learning in which people possess internal motivation to develop personally and professionally in ways that are unlikely to be imitated (Slater & Narver, 1995).

Given the foregoing, many authors see the ability to learn as the strategic source of competitive advantage that is sustainable over time. Maintaining this advantage is a constant challenge (Senge, 1990). And the first step in generating this ability properly is to understand it properly.

Osigweh (1989) argues that developing clear definitions of concepts is important to improving organizational research and the construction of theory. We can thus grasp the importance of defining the concept of "organizational learning" clearly, although this is

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difficult, as the concept is a complex and multidimensional. From the beginning, a number of the main researchers (e.g., Cyert & March, 1963; Miller & Friesen, 1980) have attempted to provide the initial foundations to create a clear concept, and numerous literature reviews have attempted to launch a definition in a universal language (e.g., Argyris & Schön, 1978; Dodgson, 1993; Easterby-Smith, 1997; Fiol & Lyles, 1985; Huber, 1991). A common language does not yet exist, as there is little consensus in terms of definition, perspective, conceptualization, and methodology, and confusion reigns among students and practitioners of the material (e.g., Edmondson & Moingeon, 1998; Fiol & Lyles, 1985; Garvin, 1993; Slater & Narver, 1995). To help clarify the situation, Table 1 presents some of the main definitions of organizational learning that have been appearing in the literature, ordered chronologically.

Author	Definition
Cyert & March (1963)	The process by which the organization as a collective learns through interaction with its environment.
Argyris & Schön (1978)	The process by which the members of an organization detect errors or anomalies and correct them through restructuring of the action theory upheld by the organization, integrating the results of their inquiries in organizational maps and images.
Fiol & Lyles (1985)	The process of perfecting actions through better knowledge and understanding (of reality). The development of abilities, knowledge and association between past actions, their effectiveness, and future actions.
Levitt & March (1988)	Organizations are seen as learning by codifying inferences from history in routines that guide behavior.
Huber (1991)	Occurs in the entity through the entity's processing of information; its range of potential behaviors changes. Information processing can involve the acquisition, distribution, or interpretation of the information… an organization learns if any of its units acquires knowledge that is observed as potentially useful for the organization. Therefore, organizational learning refers to the process by which organizations acquire and develop knowledge.
Kim (1993).	An increase in the capacity of an organization to perform effective actions.
Swieringa & Wierdsma (1992)	A term with which we refer to change in organizational behavior, which is a process of collective learning.
Senge et al. (1994)	To submit oneself to the continual test of experience and to transform that experience into knowledge that is accessible to the entire organization and that belongs to its central purpose.
Slater & Narver (1995)	The development of new knowledge or perceptions that have the capacity to influence behavior. Presumably, learning facilitates change in behavior that leads to an improvement in performance.
Real et al. (2006)	A source of heterogeneity and of potentially sustainable competitive advantages as a result of the different capacities of the company to learn and absorb knowledge. The study of organizational learning attempts to respond to challenges that increase in a constantly changing environment and can help firms to face the difficulties of survival in the long term.
García-Morales et al. (2006)	A process that extends over time, enabling new abilities and permitting knowledge to be developed, increasing the organization's capacity to perform actions that improve the business result.
Simsek et al. (2009)	A central mechanism in the firm, a mechanism that probably guarantees an adaptive advantage through the corporate entrepreneurial spirit.

Table 1. Main definitions of organizational learning

On examining the concepts of organizational learning that have emerged in the course of the literature, we can see that there is much confusion on the meaning of the concept.

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Learning is applied to processes as disparate as dissemination of information in the organization (e.g., Huber, 1991), codification of organizational routines (e.g., Cyert & March, 1963; Levitt & March, 1988), interpersonal communication barriers that block the possibility of detecting and correcting errors (e.g., Argyris & Schön, 1978), barriers of limited rationality (e.g., March & Olsen, 1975), cognitive changes (e.g., Argyris & Schön, 1978; Huber, 1991), behavioral changes (e.g., Cyert & March, 1963; Swieringa & Wierdsma, 1992), etc.

To clarify this confusing mix of concepts, we can conclude by affirming that organizational learning is viewed by most to be a process that extends over time and is linked to knowledge acquisition and improvement of performance. We can analyze organizational learning as the process through which we detect dysfunctions by studying existing relationships between action and result (experience is transformed into knowledge), between the organization and its environment, or between the organization and memory, restructuring mental models and action theory and sharing the organizational knowledge base. These actions permit the development of new abilities and knowledge, increasing the organization's capacity to perform effective actions and improving organizational performance. This activity includes the acquisition (cognitive development), dissemination, and utilization of this knowledge (behavioral development). The organization that learns should thus facilitate the transformation and continuous learning of all of its members and of the organization itself. It must be an organization that "learns how to learn." This orientation to learning has also been conceptualized as a critical cultural variable that emphasizes the development of models for revision and general knowledge (García Morales et al., 2006). When organizational learning is used strategically, information systems and flows in the company (Leonard-Barton, 1992) promote entrepreneurial actions, filtering, ordering, and contextualizing the relevant information for the main managers (Simsek et al., 2009).

COGNITIVE AND BEHAVIORAL CHANGE IN ORGANIZATIONAL LEARNING

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As mentioned above, organizational learning is an organizational capacity that enables effective performance of action and improvement of performance by facilitating transformation and continuous learning for all members. This process includes the acquisition (cognitive development), dissemination, and utilization of this knowledge (behavioral development) (García et al., 2006). It thus leads to cognitive and behavioral change.

Behaviorism argues that it is impossible to understand existing mental models and that psychology should focus on observing behavior to discover general laws that relate behavioral responses to the stimuli that the individual receives (Leroy & Ramanantsoa, 1997). Learning is thus a response to a stimulus. In the case of the individual, this response causes a change in behavior, whereas in the case of the organization, the behavioral change is the fruit of existing changes in the environment (Kazdin, 1975).

We can see learning as a response to a stimulus (Cyert & March, 1963; Daft & Weick, 1984), but this response could be seen as blind or automatic, failing to produce any new knowledge (Miller & Friesen, 1980). Behavioral learning may but need not be based on the existence of cognitive change (Dodgson, 1993; Fiol & Lyles, 1985; Kim, 1993). Prescriptive scholars tend to adopt definitions of learning that incorporate changes in behavior due to the fact that professionals are oriented to action (Tsang, 1997).

Organizational cognition, in turn, is a topic of recent interest in the study of organizations. It spans an extensive rubric of diverse topics. Cognitivism is concerned with what happens in the black box; that is, it takes into account the internal complexity of the subject of learning, observing human conduct in terms of mental models. For authors like Ford & Kraiger (1995), a behaviorist stimulus-response orientation would not capture the complexity of this learning process. It suggests that learning requires some conscious acquisition of knowledge or perspicacity on the part of the members of the organization (Argyris & Schön, 1978; Huber, 1991). In this case, knowledge is not necessarily be related to organizational action; it would be individual and not organizational learning. Or it could happen that learning is not related to change in behavior. Descriptive studies do not usually incorporate real behavioral change, as this would create various problems (Tsang, 1997). However, they can incorporate

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potential changes in behavior.

There are clearly differences between cognition and behavior, and one is not a reflection of the other, Further, it is difficult to move from cognitive learning, which is based in the individual, to behavioral learning, which is more collective (Doz, 1996). As Figure 1 shows, cognitive changes can occur without behavioral changes, and vice versa (Fiol & Lyles, 1985)

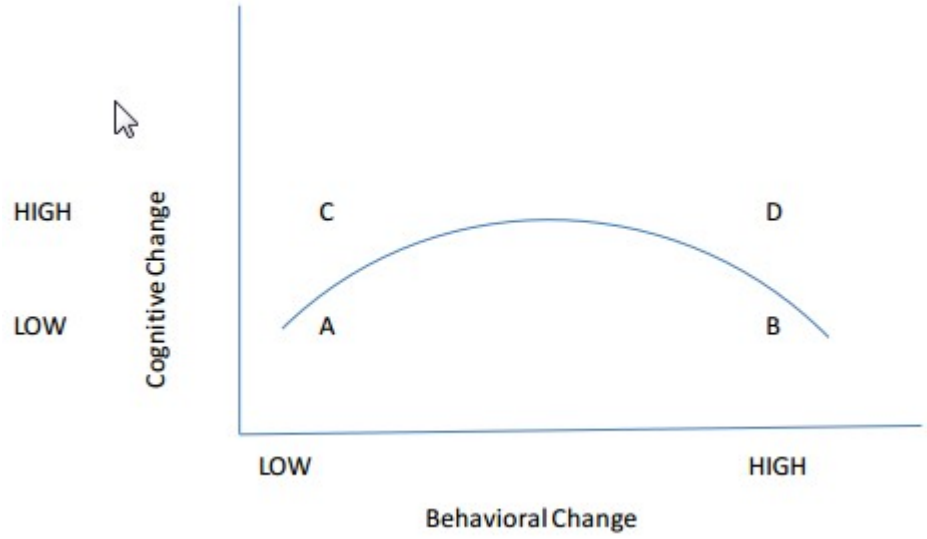

Figure 1. Cognitive and behavioral change

Source: Fiol, C. M., & Lyles, M.A. (1985, 807).

Position "A" would be typical in bureaucratic firms, in which there are successful programs firmly in place; in such a case, there are no attempts at cognitive or behavioral learning. This position is acceptable in a stable environment, in which change and learning are not that impor important. This may be a good position for maintaining existing strategies with little change as, for example, in a mature industry with a dominant market share. A second position, "B," is characterized by great behavioral change but little or no cognitive change. Firms perform actions, changing strategies and restructuring themselves, but with little cognitive change and learning. This is typical of firms in situations of crisis,

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in which actions are carried out in the hope that something will happen to mitigate the crisis. These actions do not involve any cognitive change, however. They create shocks in the organization with little resulting direction from management. A third position, "C," involves little behavioral change but great cognitive change, developing new beliefs and interpretive schemas. Finally, position "D" involves cognitive and behavioral change, in which full learning emerges. This is highly appropriate for turbulent environments.

There may be changes in behavior without changes in cognition, or vice versa, producing transitional states, creating tension between the interpretation of behavior and beliefs, tension that is synonymous with cognitive dissonance. In these cases, there is no learning. This tension can be seen as *transitional,* and one can argue that reducing this dissonance is normal in human beings. When changes occur on both sides, this is called "integrated learning" (Inkpen & Crossan, 1995).

If there is behavioral change without cognitive change, this change might come from the "forced learning." This conflict is resolved without changing beliefs, creating a lack of learning. That is, one would end up in the "no learning" quadrant (e.g., someone can feel obligated to do something and perform the appropriate behavior but do it in a way that reinforces the idea that this external obligation should not exist, as may be the case with state law). If this behavioral change occurs in the semi-square of "experimental learning," individuals could try out new behaviors that give rise to cognitive change because they want to suspend beliefs, thereby achieving "integrated learning." In this case, learning would indeed occur. Examples of forced and experimental learning would be cases of organizations in crisis that undergo rapid restructuring (e.g., mergers), in which there is behavioral change but a low level of cognitive learning. Man-dated political changes would also be examples of "forced learning."

There may be a third and fourth transitional situation, in which there would be cognitive but no behavioral change. On the one hand, this would be the semi-square "anticipatory learning," which would occur due to the transitional gap between change in cognition and behavioral change (e.g. a doctor requires many years of cognitive change before his/her new knowledge is reflected in behavioral change; or, one can exercise, or one needs, a great deal

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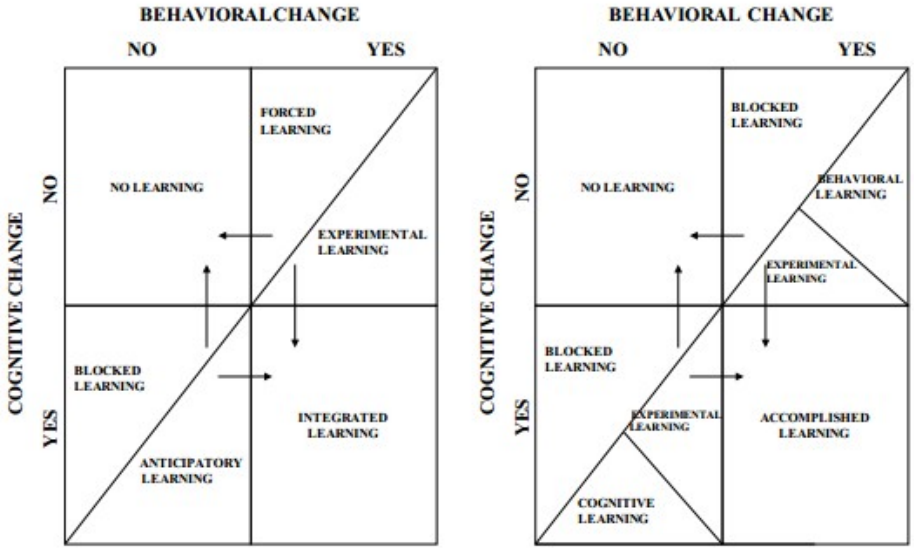
of theoretical knowledge to play golf before one can play masterfully). If handled well, anticipatory learning can lead to "integrated learning." One may not be able, however, to transform "knowing" into action because one does not possess sufficient physical resources. On the other hand, there is "blocked learning," in which some factor prevents learning, that is, blocks the possibility of convertin change in cognition into behavioral change. Blocked learning usually ends in "no learning" (Inkpen & Crossan, 1995). Figure 2 shows this kind of learning based on these cognitive and behavioral changes.

Figure 2. Relationship between cognitive and behavioral change



Source: Inkpen, A. C., & Crossan, M. M. (1995, 599) & Leroy, F., & Ramanantsoa, B. (1997, 875).

We can see in the figure above that, for Leroy & Ramanantsoa (1997), the presence of learning ("accomplished learning")—what Inkpen & Crossan (1995) call "integrated learning"—depends on achieving the right fit between cognitive and behavioral change. A strong tension between cognitive and behavioral changes may, however, produce what is called "blocked learning." This tension can be resolved either favorably through "experimental learning," which overcomes resistance and enables cognitive and behavioral changes to adjust to each other gradually; or unfavorably, producing lack of learning. "Experimental learning" produces gradual adjustments between behavioral and cognitive learning that can lead to the learning phase. The ties between behavioral and cognitive learning are so tight in experimental learning that it is difficult to deter-mine whether its

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origins are behavioral or cognitive.

Blockages occur in different kinds of situations. One such situation occurs with what Inkpen & Crossan (1995) call "forced learning," in which new procedures are only adopted superficially, creating a gap between declared theory and theory in use (Argyris & Schön, 1978). In this case, there is only "behavioral learning" (Leroy & Ramanantsoa, 1997). There should be a least minimal adhesion if we wish to achieve proper learning. If this does not occur, members will be

tempted not to use the new measures, which is ineffective. Another situation occurs when there is organizational resistance, power struggle, or a lack of sufficient resources for learning to take place. Here, we are speaking of cognitive change without behavioral, which makes it hard to institutionalize learning (March & Olsen, 1975). This is the case of "anticipatory learning" defined by Inkpen & Crossan (1995), the "cognitive learning" of Leroy & Ramanantsoa (1997), and the "fragmented learning" of Kim (1993).

Further, we must take into account that learning can also depend on the environment. Stable environments exert little pressure to learn new abilities and capacities, whereas turbulent environments with high levels of change can lead us to lose the path and produce a low level of behavioral and a high level of cognitive change. Finally, if the environment is moderately turbulent, "integrated learning" could occur. This would be the ideal environment (Fiol & Lyles, 1985).

To summarize, many authors view real organizational learning as cognitive change (e.g., Argyris & Schön, 1978; Huber, 1991; March & Olsen, 1975) or behavioral change (e.g., Cyert & March, 1963; Daft & Weick, 1984; Miller & Friesen, 1980; Swieringa & Wierdsma, 1992). A great deal of energy has been expended in debating the point of cognition vs. behavior, which prevents us from using this energy to see the connection between the two points (Inkpen & Crossan, 1995).

Currently, both perspectives are connected and considered to be complementary, such that there is no strict separation between the cognitive and behavioral dimensions. This is already be-ginning to be seen in theory itself, as behaviorists and cognitivists reflect that one cannot consider cognitive and behavioral change in isolation from each other. If there is only

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cognitive change, learning runs the risk of being incomplete and ineffective unless accompanied by organizational change. On the other hand, achieving only behavioral change risks making learning superficial and short-lived. An increasing number of authors are deciding to integrate the cognitive and behavioral dimensions (e.g., Dodgson, 1993; Fiol & Lyles, 1985; Garvin, 1993; Inkpen & Crossan, 1995; Leroy & Ramanantsoa, 1997; Senge, 1990), adopting a "utilitarian view," according to which learning exists and improves business results if there is a change in conduct caused by a change in the level of knowledge; that is, acquisition of knowledge must be accompanied by utilization of this knowledge.

In analyzing the relationship between cognitive and behavioral change that comes with organizational learning and performance, understanding how these changes affect performance is a complex task, as we know very little about how cognitive and behavioral changes affect improvements effectively in organizational performance (Snyder & Cummings, 1998). Ambiguity or time lag between learning and performance (today's change will affect tomorrow's performance) and the possibility that the results of the changes needed in learning are masked by external factors make it even more difficult (if this is possible) to research this connection (Inkpen & Crossan, 1995). Finally, processes of cognitive and behavioral change in learning and organizational performance are interrelated, but there is little understanding of the mechanisms through which the changes needed in organizational learning are translated into performance (Snyder & Cummings, 1998).

Many authors relate these cognitive and behavioral changes in learning to improvements in organizational performance (Argyris & Schön, 1978; Dodgson, 1993; Fiol & Lyles, 1985) or change in behavior to improvements in performance (Fiol & Lyles, 1985; Garvin, 1993; Senge, 1990). In general, cognitive and behavioral changes are a major component in any effort to improve organizational performance and to strengthen competitive advantage. But for these changes to bring about improved performance, they must also be put into practice properly (Huber, 1991). Change (cognitive and behavioral) from learning does not actually involve an improvement in performance (Huber, 1991), since learning will bring about better performance only if the knowledge obtained is exact and there are many reasons that can make learning incorrect (Tsang, 1997). Thus, the real connection between cognitive and behavioral changes from learning and performance is a point that must be determined

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empirically, not assumed in the definition, as often occurs (Tsang, 1997). Based on the foregoing, we establish the following hypothesis for empirical verification:

H1: Cognitive change is positively related to behavioral change in organizational learning.

H2: The cognitive change in organizational learning is positively related to organizational performance.

H3: The behavioral change in organizational learning is positively related to organizational learning.

METHODOLOGY

Sample and procedures

The population for this study consists of companies in Spain belonging to the Duns and Bradstreet Spain database and to the four sectors we sought to examine (food-farming, manufacturing, construction, and services). We randomly drew a sample of 900 organizations from this source. The study uses CEOs as the key informants, since they receive information from a wide range of departments and are therefore a very valuable source for evaluating the different variables of the organization. CEOs also play a major role in informing and molding the variables under study by determining the types of behavior that are expected and supported (Baer & Frese, 2003). Although numerous actors may be involved in the management process, the CEO is ultimately responsible for plotting the organization's direction and plans, as well as for guiding the actions carried out to achieve them (Westphal & Fredickson, 2001).

The authors mailed surveys to the CEOs of the 900 randomly selected organizations with a cover letter. The cover letter explained the goal of the study, offered recipients the option of receiving the results on completion of the study, indicated the basic ethical principles of the re-search, and reiterated the necessity that the person chosen answer the questionnaire, even at the cost of receiving fewer responses. To reduce possible desirability bias, the cover letter promised to keep all individual responses completely confidential and confirmed that the analysis would be restricted to an aggregate level for the publications to prevent the identification of any individual or organization. 408 CEOs finally answered the questionnaire. The response rate is 45% (Table 2).

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Table 2. Technical details of research

Sector	Food-farming, manufacturing, construction, services
Geographical location	Spain
Methodology	Structured questionnaire
Procedure	Stratified sample with proportional allocation (sectors and size)
Universe of population	50,000 companies
Sample (response) size	408 (45.3%) companies
Sample error	4.8%
Confidence level	95 %, p-q=0.50; Z=1.96

To eliminate the possibility of non-response bias, the authors compared the characteristics of the respondents and of early and late respondents in the sample (Armstrong & Overton, 1977). No significant differences exist based on the size or type of business. Since the same survey instrument collected all measures, the study tested for the possibility of common method bias using Harman's one-factor test (see Konrad & Linnehan, 1995). A principal components factor analysis of the questionnaire measurement items yielded three factors with eigenvalues greater than 1.0, which account for 72% of the total variance, identifying several factors, as opposed to one single factor. Since the first factor does not account for the majority of the variance, a substantial amount of common method variance does not appear to be present (Podsakoff & Organ, 1986).

Measures

Based on an analysis of different authors who have analyzed the cognitive and behavioral dimensions and stages in organizational learning (e.g., Huber, 1991; Garvin, 1993; Inkpen & Crossan, 1995; Leroy & Ramantsoa, 1997; Swienga & Wierdsma, 1995), we measure cognitive changes using a two-item scale that measures whether the stages of organizational learning—acquisition, dissemination, and utilization—have changed existing knowledge in the organization and whether the knowledge acquired has involved a cognitive change in the organization. The authors used a confirmatory factor analysis to validate a Likert-type 7-point scale (1 *"totally disagree,"* 7 *"totally agree").* The scale is unidimensional and has adequate validity and reliability (α=. 872).

The study also uses a scale of two items to measure behavioral change, determining

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whether in the stages of organizational learning (acquisition, dissemination and utilization) have existed a change in the behavior of the organization and whether the new knowledge has involved behavioral change in the organization. The scale is unidimensional and has adequate validity and reliability (α=.785). Finally, to measure organizational performance, after reviewing how performance is measured in different strategic research studies (e.g. Homburg et al., 1999), we drew up an eight-item scale to measure organizational performance. The first four items analyze return on assets, return on equity, return on sales, and sales growth in the organization's main products or services and markets. The second four analyze the same concept in relation to the competitors. We developed a confirmatory factor analysis to validate our scales ($\div^2_{20}$=328.61, NFI=.96, NNFI=.95, CFI=.97, GFI=.97) and showed that the scale was unidimensional and had high reliability (α=. 887). The use of scales to evaluate performance relative to the main competitors is one of the most widely-accepted practices in recent studies. Many researchers use managers' subjective perceptions to measure beneficial outcomes for firms. Others prefer objective data, such as return on assets. A wide range of literature establishes a high correlation and concurrent validity between objective and subjective data on performance, implying that both are valid when calculating a firm's performance (Homburg et al., 1999). This study includes questions involving both types of assessment in the interviews, but the CEOs were more open to offering general views than precise quantitative data. When possible, the authors calculated the correlation between objective and subjective data, and these are high and significant.

Model and analysis

Given the existence of an exogenous latent variable (cognitive change [ξ_1]), a first-grade endogenous latent variable (behavior change [η_1]), and second-grade endogenous latent variables (organizational performance [η_2]), the study analyzes the data using structural equations modeling (LISREL 8.71 program) to establish causal relationships between these variables. This procedure translates the theoretical construction into mathematical models in order subsequently to estimate and evaluate them empirically (Jöreskog and Sorbom, 1996). The theoretical model presented in Figure 1 represents the hypotheses in concrete form. The study uses a recursive non-saturated model. Structural equation modeling takes into account

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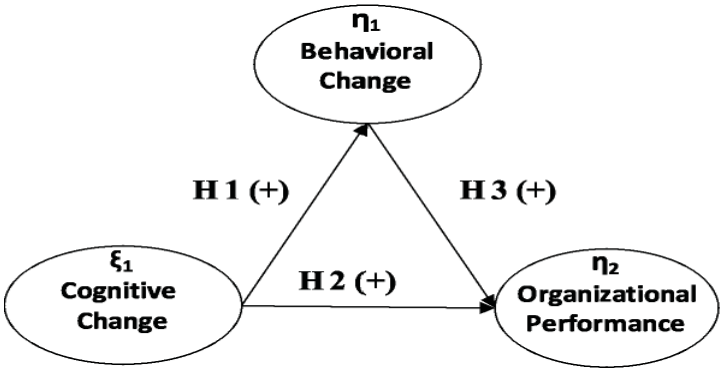
errors in measurement, variables with multiple indicators, and multiple-group comparisons.

Figure 3. Hypothesized model



Results

This section presents the main research results. First, Table 3 shows the means and standard deviations, as well as the inter-factor correlation matrix for the study variables. Significant and positive correlations exist among cognitive change, behavior change, and organizational performance. Second, the study performs structural equations modeling to estimate direct and indirect effects using LISREL with the correlation matrix and asymptotic variance matrix as inputs. This type of analysis has the advantage of correcting for unreliability of measures and also provides information on the direct and indirect paths between multiple constructs after controlling for potentially confounding variables. Figure 4 shows the standardized structural coefficients. The magnitude of the coefficients reflects the relative importance of the variables.

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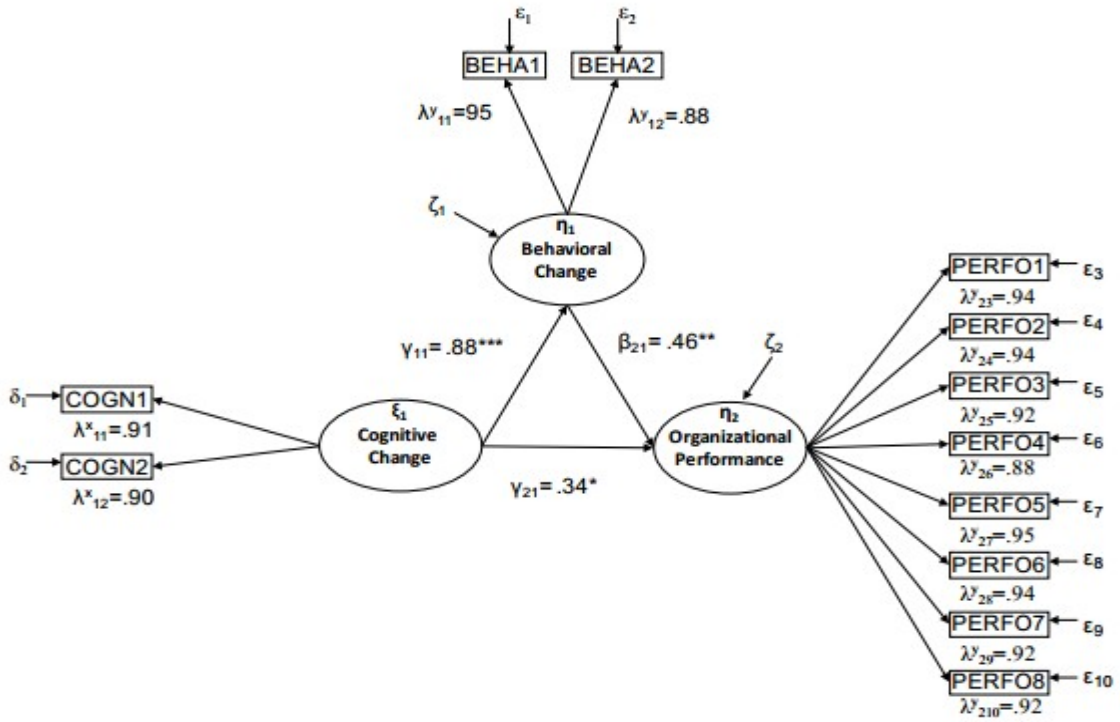
Table 3. Means, standard deviations and correlations

Variables	Mean	S.D.	1	2	3
1. Cognitive Change	5.265	1.231	1.000		
2. Behavioral Change	5.438	1.051	0.643***	1.000	
3. Organizational Performance	4.846	1.014	0.474***	0.439***	1.000

Notes: † p < 0.1; * p < 0.05; ** p < 0.01; *** p < 0.001 (two-tailed)

Figure 4. Results of structural equation model



If we examine the quality of the measurement model for the sample, the constructs display satisfactory levels of reliability; the composite reliabilities range from 0.88 to 0.98, and the shared variance coefficients from 0.79 to 0.86 (Table 4). The authors conclude convergent validity from examination of both the significance of the factor loadings and the shared variance. The amount of variance shared or captured by a construct should be greater than the amount of measurement error (shared variance >0.50). All multi-item constructs meet this criterion; each loading (l) is significantly related to its underlying factor (t-values

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>12.29) in support of convergent validity. To assess discriminate validity, the authors perform a series of chi-square difference tests on the factor correlations among all of the constructs (Anderson and Gerbing, 1988). The study follows this procedure for each pair of latent variables, constraining the estimated correlation parameter between them to 1.0 and then performing a chi-square difference test on the values obtained for the constrained and unconstrained models (Anderson and Gerbing, 1988). The resulting significant differences in chi-square indicate absence of perfect correlation between the constructs and thus discriminant validity.

Table 4. Validity, reliability, and internal consistency

Variable	Item	Parameter	Validity, reliability, and internal consistency			Goodness of Fit Statistics
			λ*	R^2	A. M.	
Cognitive Change	COGN1	λ^x_{11}	0.91(f.p.)	0.83	C.R.=.898	χ^2_{51}=381.09
	COGN2	λ^x_{12}	0.90***(40.83)	0.80	S.V.=815	GFI=0.98
Behavioral Change	BEHA1	λ^y_{11}	0.95(f.p.)	0.93	C.R.=.883	
	BEHA2	λ^y_{12}	0.88***(12.29)	0.63	S.V.=.792	AGFI=0.96
Organizational Performance	PERFO1	λ^y_{23}	0.94(f.p.)	0.89		NFI=0.97
	PERFO2	λ^y_{24}	0.94***(53.52)	0.89		
	PERFO3	λ^y_{25}	0.92***(53.71)	0.85		NNFI=0.96
	PERFO4	λ^y_{26}	0.88***(46.42)	0.78	C.R.=.980	
	PERFO5	λ^y_{27}	0.95***(55.53)	0.90		IFI=0.97
	PERFO6	λ^y_{28}	0.94***(56.49)	0.88	S.V.=.860	
	PERFO7	λ^y_{29}	0.92***(51.12)	0.85		NCP=330.09
	INNO3	λ^y_{210}	0.92***(52.40)	0.85		CFI=0.97

Note: λ* = Standardized Structural Coefficient (t-students are shown in parentheses); R_2 = Reliability; C.R. = Composite Reliability; S.V. = Shared Variance; f.p. = fixed parameter; A.M. = Adjustment Measurement; *p < .05; ** p < .01; *** p < .001(two-tailed).The overall fit measures, multiple squared correlation coefficients of the variables (R^2s), and signs and significance levels of the path coefficients indicate that the model fits the data well (χ^2_{51}=381.09, p>.001; NFI=.97; NNFI=.96; GFI=.98, CFI=.97, IFI=.97). Findings from the standardized parameter estimates (Table 5) show that cognitive change is

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closely related to and affects behavioral change ($\tilde{a}_{11}$=.88, p<.001, R^2=.77), as predicted in Hypothesis 1. Further, the results show that organizational performance is influenced by cognitive change ($\tilde{a}_{21}$=.34, p<.05) and behavioral change (β_{21}=.46, p<.01), as predicted in Hypotheses 2 and 3, respectively. The research also shows an indirect effect (.40, p<.01) of cognitive change on organizational performance by behavioral change (.88x.46; see, e.g., Bollen, 1989 for calculation rules). The global influence of cognitive change on organizational performance is thus 0.74 (p<.001). Comparing the magnitudes of these effects indicates that the total effect of cognitive change on organizational performance is larger than the effect of behavioral change on organizational performance. Globally, the model explains organizational innovation well (R^2=.59).

Table 5. Structural model results (direct, indirect, and total effects)

Effect from		To	Direct Effects	*t*	Indirect Effects	*t*	Total Effects	*t*
Cognitive Change	→	Behavioral Change	0.88***	34.64			0.88***	34.64
Cognitive Change	→	Organiz. Performance	0.34*	2.42	0.40**	3.07	0.74***	24.35
Behavioral Change	→	Organiz. Performance	0.46**	3.06			0.46**	3.06

Notes: Standardized Structural Coefficients; $^{\dagger}p<.10$, $^{*}p<.05$, $^{**}p<.01$, $^{***}p<.001$.

CONCLUSIONS AND FUTURE RESEARCH

The word learning usually has positive connotations, and learning is therefore usually associated with improvements in performance through cognitive and behavioral changes (Argyris & Schön, 1978; Dodgson, 1993; Fiol & Lyles, 1985; Garvin, 1993; Senge, 1990). We must take into account, however, that learning not only leads to intelligent or improved behavior but is also necessary to obtain the right knowledge for this learning (cognitive change) and must be put into practice properly through behavioral change. If this does not occur, we will not manage to improve organizational performance (Huber, 1991). We cannot fall into the error of learning incorrectly or learning the wrong thing correctly (Huber, 1991).

In any case, it is crucial to analyze empirically whether cognitive and behavioral learning changes affect the organization's performance (Snyder & Cummings, 1998). In this sense, our

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research shows first a positive relation between cognitive and behavioral change. It shows an integration of the cognitive and behavioral dimensions of learning; learning occurs when it produces a change in conduct as a result of a change in the level of knowledge (e.g., Dogson, 1993; Fiol & Lyles, 1985; Garvin, 1993; Senge, 1990).

The study also verifies a positive relation between cognitive change and organizational performance directly and indirectly through the behavioral change. The results support the importance of both changes in generating improvements in organizational performance (Inkpen & Crossan, 1995; Leroy & Ramanantsoa, 1997). Although both developments are necessary in organizations, additional problems make it difficult to achieve them correctly, such as lag or delay in the time between cognitive and behavioral change and performance. Today's learning affects tomorrow's performance, preventing us from observing the relationships and from investing in cognitive and behavioral change in the members of the organization (Inkpen & Crossan, 1995).

At other times, the benefits (performance) caused by the cognitive and behavioral change may be masked for different external reasons, decreasing leaders' interest in generating these developments (Inkpen & Crossan, 1995; Senge et al., 1994).

This investigation has several limitations. First, the study measures the variables based on the CEOs' managerial perceptions (single respondents), which involve a certain degree of subjectivity. However, the authors contrasted some variables with objective data (e.g., organizational performance) and find no significant mean differences between the two types of measures. A second limitation of this study concerns the measures of cognitive and behavioral change. One could also use more extensive scales to measure these variables.

Third, although Harman's one-factor test and other method tests do not identify common method variance as a problem, this bias may still be present (Podsakoff & Organ, 1986; Konrad & Linnehan, 1995). Fourth, the study data are cross-sectional, hindering examination of the evolution of the variables in this study. This aspect is of particular interest given the dynamic nature of some variables. Although the authors test the most plausible directions for the pathways in the study model, only longitudinal research can assess the direction of causality of the relationship and detect possible reciprocal processes. The authors have tried to temper this limitation through attention to theoretical arguments by

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rationalizing the relationships analyzed and integrating temporal considerations into measurement of the variables (Hair et al., 1999). Fifth, future studies should analyze a larger sample, preferably in more than one country and in other sectors.

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