

Leadership for sustainability: fostering organizational learning to achieve radical innovations

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Abstract

Purpose – While concerns about the social and environmental impact that result from business activity continue to grow, a stream of research consolidates to understand the mechanisms that can favor more sustainable companies. The present study tries to expand the knowledge of the antecedents of radical innovation by analyzing the effects of alternative and understudied constructs. Grounded on stewardship and organizational learning theories, this paper analyzes how leaders that are concerned with sustainability and the social impact of their companies may boost this type of innovation by facilitating an organizational context that promotes experimentation, dialog, participative decision-making, risk-taking and interaction with the external environment.

Design/methodology/approach – Through structural equation modeling, the study provides empirical evidence of the positive effect of stewardship leader behavior on radical innovation, using organizational learning capability as an explanatory variable.

Findings – Results suggest that organizational learning capability fully mediates the relationship between stewardship leader behavior and radical innovation.

Research limitations/implications – This research focuses on a sample frame of Spanish companies with recognized excellence in human resources management.

Practical implications – In the context of a growing interest in sustainable development, and concern for the consequences of economic and business activities, this study highlights the role played by stewardship leader behavior to foster radical innovation and organizational learning capability which, in turn, represent essential tools to compete in a globalized and turbulent context.

Originality/value – To the authors' knowledge, this is the first empirical study that analyzes the mediating effect of organizational learning capability in the relationship between stewardship leader behavior and radical innovation. This paper contributes to the understanding of how stewardship leader behavior affects radical innovation and the key role played by organizational learning capability.

Keywords Leadership, Stewardship, Organizational learning, Radical innovation, Radicalness, Sustainability
Paper type Research paper

1. Introduction

Sustainability, ethical and social issues are becoming a matter of high concern for firms and society (Nihof *et al.*, 2019). Climate change, economic and social inequalities, resource scarcity, biodiversity loss, pollution, or unsustainable consumption and production practices, are some of the problems associated with industrial or business activities. This has manifested itself in increasing pressure on companies and organizations, which must refine and rethink their current business models. Resolving such challenges, demand major innovation efforts (Bocken *et al.*, 2019).

In this context, it is essential to find out the conditions under which companies can improve their innovation capacity. When studying the antecedents or promoters of innovation, it is important to differentiate between innovation typologies. One of the most well-known classifications distinguishes between incremental and radical innovations. While incremental innovations represent simple improvements, radical innovations involve revolutionary and discontinuous changes (Marvel and Lumpkin, 2007; Pavitt, 1991). Shevchenko *et al.* (2016) noted that true orientation toward sustainability requires profound



changes in the way companies do business today, stressing the importance of radical innovations, which may be the response to become authentically responsible and to overcome social and environmental issues (Cillo *et al.*, 2019).

Leadership is one of the main elements that may promote innovation and a sustainable orientation in the organizational context. Leaders are essential to promote innovation and instill a sense of accountability in their companies (Kevany *et al.*, 2007). As argued by Waite (2014), they seek to promote creativity and innovation but are also faced with the obligation to act responsibly and achieve not only economic but also social and environmental outcomes. Stewardship theory highlights the relevance of stewardship behaviors of leaders and followers to achieve organizational goals while being committed toward sustainability (e.g. Karns, 2011; Dumay *et al.*, 2019).

On the other hand, leadership does not occur in a vacuum, so it is necessary to consider the organizational context in which leadership takes place, and where stewardship behaviors are exhibited (Menyah, 2013). Moser *et al.* (2019) argued that the relationship between leadership and innovation is not straightforward, so additional factors have to be taken into account. Many studies explain the consequences of leadership through mediating variables.

Innovation is an individual and collective learning process that depends on the capacity of an organization to learn and the way new knowledge is created, distributed and used (Chiva *et al.*, 2014; Nonaka and Takeuchi, 1995). For this reason, organizational learning capability may be relevant to analyze the context in which companies with responsible leaders aim to promote innovation. Although previous research studied its mediating role in the relationship between different leadership styles and innovation (e.g. García-Morales *et al.*, 2012), the effects of stewardship leader behavior on organizational learning remain unexplored. In fact, as learning increases awareness and consciousness on the consequences of a company on different stakeholders, the usual focus in previous research has been on how organizational learning fosters concern for sustainability or social responsibility, rather than the other way round.

All in all, the present study tries to answer the following questions: how does stewardship leader behavior affect radical innovation? What is the relationship between stewardship leader behavior and organizational learning capability? What is the effect of organizational learning capability on radical innovation? To the best of our knowledge, this is the first study that empirically analyzes these relationships. In the next sections, a literature review about the variables that make up the study is conducted. Then, we propose the hypotheses, present the results and the methodology of the research. To end with, along with the conclusions, this paper provides suggestions for future research and discusses some of its own limitations.

2. Literature review and hypotheses

2.1 Stewardship leader behavior

Stewardship theory appeared in the 90's, in contrast to agency theory, as an alternative approach to study the behaviors and motivations of managers (Menyah, 2013). Dumay *et al.* (2019, p. 29) argued that stewardship theory “overcomes the simplistic and rational character of human beings founding agency theory and enlarges it to a multitude of traits shaping human behavior”. Academic literature differentiates between both mindsets (Dutta *et al.*, 2012), as they may lead to different organizational outcomes (Bacq *et al.*, 2016).

Stewardship theory has a sociological basis and explains relationships within the organizational context from a non-economic point of view (Keay, 2017). According to this theory, managers are naturally pro-organizational and align their objectives with those of the organization (Cater *et al.*, 2019). They also sacrifice short-term interests to favor the success of the organization in the long-term (e.g. Hiebl, 2015; Zahra *et al.*, 2008).

These managers are also collectivistic and inclined to work in the interest of all stakeholders (Bacq *et al.*, 2016; Menyah, 2013). They prioritize cooperative behaviors

(Cater *et al.*, 2019) and stimulate the idea of following a common goal, enhancing the sense of community (Barbuto and Wheeler, 2006; Kevany *et al.*, 2007). They are also motivated by ideas of growth, achievement, fairness or justice (Keay, 2017; Menhyah, 2013), looking after the resources entrusted to them (Reisberg, 2011), and using their personal power instead of the institutional power related to their position (Dumay *et al.*, 2019).

Focusing on leadership, Barbuto and Wheeler (2006, p. 319) defined stewardship as “the extent that leaders prepare an organization to make a positive contribution to society through community development, programs, and outreach. Organizational stewardship involves an ethic or value for taking responsibility for the well-being of the community and making sure that the strategies and decisions undertaken reflect the commitment to give back and leave things better than found. They also work to develop a community spirit in the workplace, one that is preparing to leave a positive legacy.” Hernandez (2008, p. 121) conceptualized stewardship as “as an outcome of leadership behaviors that promote a sense of personal responsibility in followers for the long-term wellbeing of the organization and society.”

Besides, stewardship theory is related to the idea of sustainability. For instance, Hernandez (2012, p. 188) highlighted that “stewardship theory implies the organizational goal of sustainability, that is, meeting the needs of the present without compromising the ability of future generations to meet their own needs”. Moreover, Dumay *et al.* (2019, p. 29) stated that “stewardship theory and behavior represent the ground of the organizations’ commitment to sustainability”. While Kevany (2007) stressed the idea that stewardship accelerates progress toward sustainable progress.

Stewardship may provide some advantages to organizations. For instance, it is related to employee’s willingness to perform extra-work (Barbuto and Wheeler, 2006), enhances employee satisfaction (Barbuto and Wheeler, 2006), creates a culture of empowerment (Kevany *et al.*, 2007) or facilitates long-term orientation (Cater *et al.*, 2019).

2.2 Organizational learning capability

Crossan *et al.* (1999, p. 522) stated that organizational learning “can be conceived of as a principal means of achieving the strategic renewal of an enterprise”. Although there are different definitions and approaches to study organizational learning, there is a general consensus that it is a multidimensional concept (Barba *et al.*, 2014). Some authors focus on the learning process within organizations, while others do on the factors that facilitate learning in organizations (Goh and Richards, 1997; Jerez-Gomez *et al.*, 2005; Thomas *et al.*, 2017). The present study centers on the particularities that allow an organization to learn. Chiva *et al.* (2007, p. 225) defined organizational learning capability as “the organizational and managerial characteristics that facilitate the organizational learning process or allow an organization to learn”.

Chiva *et al.* (2007) identified five factors of dimensions that facilitate learning within organizations: experimentation, risk-taking, interaction with the external environment, dialog and participative decision-making. Experimentation consists on giving support and encourages employees’ initiative to present new ideas. Risk-taking involves venturing into unknown territories. Interaction with the external environment consists on collecting information about what is happening outside the organization and collaborating with external entities, such as universities, competitors or technological institutes. Dialog is related to communication and teamwork. And participative decision-making indicates that employees are involved in important decisions and organizations’ policies are influenced by workers’ views.

Organizational learning capability is a dynamic capacity that helps organizations to compete in turbulent environments (Camps *et al.*, 2016; Wilkins, 2014), and a source of competitive advantage (Thomas *et al.*, 2017), which is vital for firm’s success (Barba *et al.*, 2014).

2.3 Stewardship leader behavior and organizational learning capability

Leadership is one of the predictors the literature considers essential to foster organizational learning. For instance, [Cooksey \(2003\)](#) stressed out that leaders encourage learning, by serving as role models, and creating supportive environments, shared visions or empowering subordinates. This author considered leadership as an inseparable component of learning.

To the best of our knowledge, there is no empirical evidence of the positive relationship between stewardship leader behavior and organizational learning. Nonetheless, leaders with stewardship behavior involve employees, promote participation, trust, collectivism, low power distance, etc. ([Davis et al., 1997](#)), which are factors that may also facilitate organizational learning (e.g. [Kim and Park, 2019](#); [Martínez-León and Martínez-García, 2011](#)).

In addition, stewardship may boost the different dimensions that make up organizational learning capability. For instance, [Waters et al. \(2013\)](#) suggested that stewardship strengthens relationships, facilitating dialog with stakeholders and inviting employees to share their point of view and to participate in the decision-making process. It also promotes the exchange of information and reduces uncertainties related to risk-taking ([Caldwell et al., 2008](#)). Besides, it creates a supportive environment in which employees cooperate, share knowledge and experiment ([Zahra et al., 2008](#)).

Regarding the interaction with the external environment, [Nihof et al. \(2019\)](#) consider that, as these organizations are focused on society, they are also more influenced and impacted by external organizations. Managers in organizations with a stewardship orientation involve external stakeholders, strengthening ties with them.

These ideas lead to the first hypothesis of the study.

H1. Stewardship leader behavior has a positive effect on organizational learning capability.

2.4 Organizational learning capability and radical innovation

There is a general consensus that organizational learning capability may favor innovation in the organizational context ([Jerez-Gomez et al., 2005](#)). A great deal of research has demonstrated that learning in organizations may promote different innovative outcomes. For instance, organizational learning has been positively related to organizational innovation ([Hsiao and Chang, 2011](#)), product innovation ([Alegre and Chiva, 2008](#)), radical innovation ([Domínguez-Escrig et al., 2016](#)) or open innovation ([Peris-Ortiz et al., 2018](#)).

Organizational learning develops and distributes knowledge within the company ([Chiva et al., 2014](#)), reexamines and questions information, values or norms (e.g. [Calantone et al., 2002](#)), or injects new ideas in the organization ([Hsiao and Chang, 2011](#)), thereby increasing creativity and innovation. [Calantone et al. \(2002\)](#) suggested that learning improves the firm's capability to innovate, as these companies take advantage of a deep understanding of the competitive environment, knowing and anticipating customer needs, interpreting the weakness and strengths of competitors or benefiting from the new advances in technology.

Focusing on radical innovation, it appears that the different dimensions that make up organizational learning capability may boost this type of innovation. [Chang et al. \(2012\)](#) concluded that openness to the external knowledge, experimentation or autonomy to make decisions and tolerance to risky and ambiguous ideas are essential capabilities to promote radical innovation. [Chiva et al. \(2014\)](#) considered that a high degree of organizational learning capability leads to experimentation, risk-taking and participation, which facilitate radical innovation. In addition, organizational cultures that foster risk-taking, support and confidence between employees and team members, multidisciplinary teams, connection with the external environment to harvest new ideas, etc. are likely to develop radical innovation ([McLaughlin et al., 2008](#)). Finally, safe environments promote participation in decision-making, and in turn, radical innovation,

as members of the organization are motivated to share different perspectives (Nijstad *et al.*, 2014).

Besides, organizational learning has been argued to facilitate innovation and an orientation toward sustainability. Organizational learning is essential to implement sustainability in corporations (Siebenhüner and Arnold, 2007), being recognized as an important determinant of sustainability and firm performance (Chou and Ramser, 2019). Organizational learning fosters more sustainable societies, questioning assumptions, challenging the status quo, and institutionalizing and consolidating new and more sustainable mental models (Lozano, 2014). Vos *et al.* (2018) found that organizational learning has a positive impact on sustainable product and process innovation, as it helps companies to integrate ideas to protect the environment. Similarly, Weidner *et al.* (2020, p. 147) empirically demonstrated that organizational learning is positively related to sustainable innovation, arguing that it transforms knowledge, creates new and suitable mental models and facilitates change, so “the firm increases its ability to create inventions addressing a range of social, economic, and environmental concerns”.

Considering these ideas, the second hypothesis of the study is:

H2. Organizational learning capability has a positive effect on radical innovation.

2.5 The mediating effect of organizational learning capability

Hsiao and Chang (2011) stated that leadership style is one of the most significant influences, at the individual level, to promote innovation within organizations, as leaders may introduce new ideas or set specific goals to encourage innovation. These authors also emphasize the role played by organizational learning as a mediator in the relationship between leadership and innovation. That is, leaders promote innovation through learning, open communications, collaboration and cohesive teamworks. In the academic literature, a great deal of research has studied the effect of leadership on innovation through the mediating role of organizational learning (e.g. García-Morales *et al.*, 2012; Hsiao and Chang, 2011).

From the point of view of stewardship, it should be stressed that organizations with a focus on sustainability may be more interested in promoting innovations that overcome ecological problems, social inequalities and so on. Muff *et al.* (2020) argued that responsible leaders initiate change and facilitate innovation toward sustainable development, questioning the status quo, being flexible, involving and inspiring others or fostering out of box thinking. Wilkins (2014, p. 188) stated that “innovation and stewardship are particularly important aspects of values-based leadership in times of uncertainty”, and suggested that no innovation is possible without stewardship of leaders.

Hayes *et al.* (2015, p. 275), stressed out that, due to stewardship, followers are more passionate and committed to the organization’s mission and goals, being more “creative, innovative, hard-working, and dedicated”. Similarly, Lubogoyi *et al.* (2018) stated that stewardship characteristics are important to manage transformation.

Regarding radical innovation, Shu *et al.* (2016) showed that managers concerned about the natural environment foster radical innovation to a greater extent than incremental innovation, and, in an empirical study, Domínguez-Escrig *et al.* (2019) concluded that stewardship leader behavior enhances both radical innovation and innovation success.

On the other hand, stewardship helps managers to reinforce internal ties, and facilitate communication, information sharing or bottom-up initiatives, stimulating “innovation at every level of the organization” (Nihof *et al.*, 2019, p. 156). Zahra (2008) stressed that, in organizations that face environmental changes and uncertainty, stewardship facilitates more creative employees that take risks, cooperate, share knowledge, experiment, and are more committed and flexible, thereby promoting change and innovation.

All these factors, which are related to organizational learning capability, have been previously identified as drivers of innovation in general (Alegre and Chiva, 2008), and radical innovation in particular (Domínguez-Escrig *et al.*, 2016). Consequently, the last hypothesis of the model (Figure 1) is proposed.

H3. Organizational learning capability mediates the positive relationship between stewardship leader behavior and radical innovation.

3. Research methodology

3.1 Data collection

The present study was conducted on the basis of a sample frame of 402 Spanish companies whose main feature is their excellent management of human resources. The characteristics of these firms not only become benchmarks for workers themselves, but also for other firms, which can use them as a starting point in their own continuous improvement processes. As a result, the relationships among the variables arising in these working environments is a subject worthy of in-depth examination. Finally, 150 different companies participated in the research.

Regarding the data collection procedure, a multiple-respondent approach was adopted (Bou-Llugar *et al.*, 2016). Each organization received two different questionnaires. Human resources managers had to answer the questions related to stewardship leader behavior and organizational learning capability, while innovation managers gave their point of view about radical innovation. By innovation manager, we include different professional profiles, depending on who was in charge of innovation projects in each company, such as research and development (R&D) managers or product managers. These job profiles were

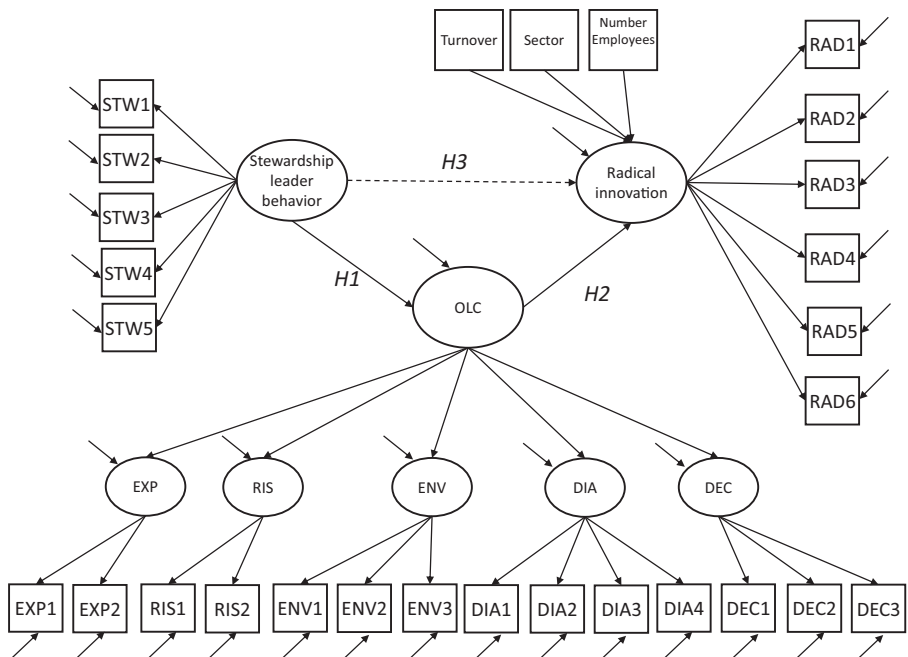


Figure 1. Conceptual model and hypotheses

selected for their knowledge of what is happening within the companies, which makes them a reliable source of information and enables them to assess the variables that make up this study. The only requisite for these managers to participate in the study was that they had at least two years of seniority in the company. Considering the number of the companies, a participation of 37.3% of the firms was obtained. Assuming a 95% confidence interval, sampling error represents $\pm 4.72\%$.

By obtaining responses from different people, it is possible to avoid common method bias (CMV). Nonetheless, other additional recommendations were followed to guarantee that CMV does not represent a problem in this research, such as using different endpoint scales or setting a period of time in the data collection (Chang *et al.*, 2010). Namely, the fieldwork was carried out between 2010 and 2015. In 2010, information about stewardship leader behavior and organizational learning capability was obtained. Five years later, the same companies provided information about radical innovation. Regarding the scales, stewardship leader behavior and organizational learning capability were measured on a seven-point Likert scale, while to measure radical innovation a five-point Likert scale was used.

The survey was completed through telephone interviews. The selection of this method is based on the facility to interview different people in the same company and the ease to interview managers of major companies, who are professionals difficult to reach through other methods.

As the study was conducted in Spain, the questionnaire was administered in Spanish to facilitate understanding among the participants. Given that the original scales used in the study to measure the different constructs were created in English, a double-back translation was utilized. Through this method, the original English scales were translated into Spanish before being translated into English again. Once this process has been completed, both versions were compared.

3.2 Measurement instruments

Stewardship leader behavior was measured using the scale developed by Barbuto and Wheeler (2006), who identified stewardship as a dimension of servant leaders. Cronbach's alpha value of this construct was 0.85.

The measurement of organizational learning capability was based on the work developed by Chiva *et al.* (2007). These authors proposed five dimensions to evaluate how organizations learn: experimentation, dialog, participative decision-making, risk-taking and interaction with the environment. Cronbach's alpha for each dimension of this construct varies from 0.81 to 0.89. Although there are other scales to measure the propensity of an organization to learn, most of them have been based on a single perspective, typically the learning organization literature (e.g. Goh and Richards, 1997; Jerez-Gómez *et al.*, 2005). Chiva *et al.* (2007) determined the dimensions of their scale after a comprehensive theoretical review, which includes, along with the learning organization literature, the individual and social perspectives, and the organizational learning literature. In addition, this scale was originally tested and validated in Spain, so its use with companies in this country seems appropriate.

Finally, the works by Gatignon *et al.* (2002), and Marvel and Lumpkin (2007) were considered to measure the development of radical innovation. This construct obtained a Cronbach's alpha of 0.91.

3.3 Control variables

In consideration of previous studies, firm sector, turnover and number of employees have been used as control variables. These variables may influence innovation, as demonstrated by previous research (e.g. Laforet, 2013), and other studies use them to control this influence (e.g. Domínguez-Escrig *et al.*, 2016).

3.4 Analyses

Structural equation modeling and the statistical software Statistical Product and Service Solutions (SPSS) Analysis of Moment Structures (AMOS)-26 were utilized to empirically validate the hypotheses of the conceptual model (Figure 1), opting for the maximum likelihood estimation method. Additionally, a bootstrapping analysis was conducted to test the significance of the proposed indirect effect.

4. Results

4.1 Descriptive statistics and measurement scales

Table 1 summarizes the information about means, standard deviations and correlations among all the constructs considered in the study.

Accepted practices in literature (Anderson and Gerbing, 1988) were followed to evaluate the psychometric properties of the measurement scales. Namely, their dimensionality, reliability, and content, convergent and discriminant validity were studied (Tippins and Sohi, 2003).

In the case of organizational learning capability, the fit of the second-order factor model was tested to support the proposed multidimensionality of this concept. These were the results: chi square (df) = 94.18 (72); p -value = 0.04; chi-square/df = 1.31; normed fit index (NFI) = 0.92; nonnormed fit index (NNFI) = 0.97; comparative fit index (CFI) = 0.98; root mean square error of approximation (RMSEA) = 0.05.

In addition to confirmatory factor analyses, a full measurement model that includes all the variables (Anderson and Gerbing, 1988) was assessed to establish the structure of the variables in the context of other variables measured in the study. In this way we ensure that the measures used in the study are different from one another. The overall fit of this general model was: chi square (df) = 341.40 (267); p = 0.00; CFI = 0.96; RMSEA = 0.04. The chi square statistic was non-significant and all the standardized estimates were significant and in the expected direction. Therefore, it is confirmed that the constructs are different from one another.

Following the recommendations of Nunnally (1978), it can be said that the results of the reliability analysis were satisfactory. Cronbach's alpha values and those of composite reliability exceeded the minimum accepted value of 0.7. Besides, the average variance extracted exceeded the minimum limit of 0.5 in each construct (Table 2). Moreover, content validity was guaranteed by using measurement scales validated in former studies.

Convergent validity of the constructs was also supported. Average variance extracted was above the recommended threshold of 0.5 for each construct; and the magnitude of

	Mean	s.d.	STW	RI	Exp	Risk	Env	Dia	Dec
STW	4.05	0.47	1.00						
RI	5.50	1.00	0.26**	1.00					
Exp	4.00	0.58	0.34**	0.12	1.00				
Risk	3.32	0.84	0.29**	0.03	0.26**	1.00			
Env	3.65	0.69	0.09	0.02	0.11	0.25**	1.00		
Dia	4.09	0.57	0.30**	0.15	0.42**	0.28**	0.31**	1.00	
Dec	3.48	0.71	0.35**	0.13	0.30**	0.27**	0.32**	0.52**	1.00

Table 1. Factor correlations, means and standard deviations

Note(s): For the standard deviations and factor correlations. We used the mean of the items making up each dimension. **Significant correlation at $p < 0.01$. STW = Stewardship leader behavior; RI = Radical innovation; EXP = Experimentation; RISK = Risk-taking; ENV = Interaction with the external environment; DIA = Dialog; DEC = Participative decision-making

factorial loadings were above 0.4, which is the minimum accepted value (Hair *et al.*, 2006), in all the constructs. On the other hand, the results of Bentler-Bonnet Normed Fit Index (BBNFI) exceeded 0.9 in all the constructs, showing a strong convergent validity (Ahire *et al.*, 1996).

Finally, analyses to test discriminant validity were also satisfactory. Table 3 shows how the square root of average variance extracted is greater than the inter-construct correlations, suggesting that each construct is more strongly related to its own measures than others (Fornell and Larcker, 1981).

Control variables also allow to provide a demographic description of the sample. According to the sector of the company, 30.0% of the firms that participated in the study were manufacturing companies, while the other 70.0% belonged to the service sector.

Regarding firm size, the sample had the following distribution: fewer than 50 employees (13.3%), between 50 and 100 employees (22.0%), between 101 and 250 employees (26.0%), between 251 and 500 employees (25.3%), between 501 and 1,000 employees (10.0%) and firms with more than 1,000 employees (3.3%).

Respecting annual turnover, 10.2% of the companies invoiced less than 2 million euros, 55.7% between 2 and 10 million, 32.7% between more than 10 million and 50 million, and 1.4% earned more than 50 million.

4.2 Hypotheses testing

Although new trends do not require evidence of a total effect to estimate direct and indirect effects (Hayes, 2012), this effect was analyzed as a first step. Result showed that the effect of stewardship leader behavior on radical innovation was statically different from zero ($\alpha = 0.30$, $t = 3.34$, $p < 0.001$). The effect of the control variables on radical innovation was

Construct	Composite reliability	Average variance extracted	Cronbach's alpha
Stewardship leader behavior	0.87	0.57	0.85
Radical innovation	0.93	0.67	0.91
Experimentation	0.83	0.71	0.81
Risk-taking	0.82	0.69	0.81
Interaction with the external environment	0.83	0.62	0.81
Dialog	0.88	0.64	0.87
Participative decision-making	0.90	0.75	0.89

Table 2.
Reliability of the measurement scales

	<i>STW</i>	<i>RI</i>	<i>Exp</i>	<i>Risk</i>	<i>Env</i>	<i>Dia</i>	<i>Dec</i>
<i>STW</i>	(0.75)						
<i>RI</i>	0.26**	(0.82)					
<i>Exp</i>	0.34**	0.12	(0.84)				
<i>Risk</i>	0.29**	0.03	0.26**	(0.83)			
<i>Env</i>	0.09	0.02	0.11	0.25**	(0.79)		
<i>Dia</i>	0.30**	0.15	0.42**	0.28**	0.31**	(0.80)	
<i>Dec</i>	0.35**	0.13	0.30**	0.27**	0.32**	0.52**	(0.87)

Note(s): On the diagonal, data correspond to AVE square root (in brackets). Below the diagonal, data show the correlations between constructs. **Significant correlation at $p < 0.01$. *STW* = Stewardship leader behavior; *RI* = Radical innovation; *EXP* = Experimentation; *RISK* = Risk-taking; *ENV* = Interaction with the external environment; *DIA* = Dialog; *DEC* = Participative decision-making

Table 3.
Discriminant validity

non-significant (turnover: $f1 = -0.00, t = -0.04, p > 0.05$; number of employees: $f2 = 0.00, t = 0.05, p > 0.05$; sector: $f3 = -0.01, t = 0.05, p > 0.05$). The overall fit statistics of the total effect model were satisfactory: chi-square (df) = 72.51 (70); $p = 0.40$; chi-square/df = 1.04; NFI = 0.93; NNFI = 1.00; CFI = 1.00; RMSEA = 0.02 (Figure 2).

To support the mediation, some conditions have to be met. The significant relationship in the total effect model (stewardship leader behavior and radical innovation) must decrease or become non-significant in the mediation model. The mediation model explains more variance in the dependent variable (radical innovation) than the total model effect. Besides, the relationship between stewardship leader behavior and organizational learning capability, and organizational learning capability and radical innovation have to be significant. In addition, bootstrapping analysis is necessary to test the significance of the mediated effect (Hayes, 2013; MacKinnon et al., 2012).

As the conditions mentioned in the former paragraph were met, the mediating role of organizational learning capability in the relationship between stewardship leader behavior and radical innovation was confirmed. First, the significant relationship between stewardship leader behavior and radical innovation decreased when the mediating effect of organizational learning capability was incorporated ($b = 0.15, t = 1.45, p > 0.05$), becoming non-significant. The mediated model explained more variance than the direct effect model (8.8% vs 15.8%). The relationship between stewardship leader behavior and organizational learning capability was significant ($c = 0.49, t = 4.24, p < 0.01$), confirming Hypothesis 1. On the other hand, the relationship between organizational learning capability and radical innovation was also significant ($d = 0.30, t = 2.54, p < 0.01$), which confirmed Hypothesis 2 (Table 4). Given that the relationship between stewardship leader behavior and radical innovation became non-significant when the mediating effect of organizational learning capability was incorporated, the mediation was full. That means that organizational learning capability plays an essential role in explaining how stewardship leader behavior affects radical innovation.

The overall fit statistics of the mediation model were, in general, good: chi-square (df) = 412.568 (336); $p = 0.00$; chi-square/df = 1.23; NFI = 0.83; NNFI = 0.96; CFI = 0.96; RMSEA = 0.04 (Figure 3). The only value that did not achieve the minimum accepted

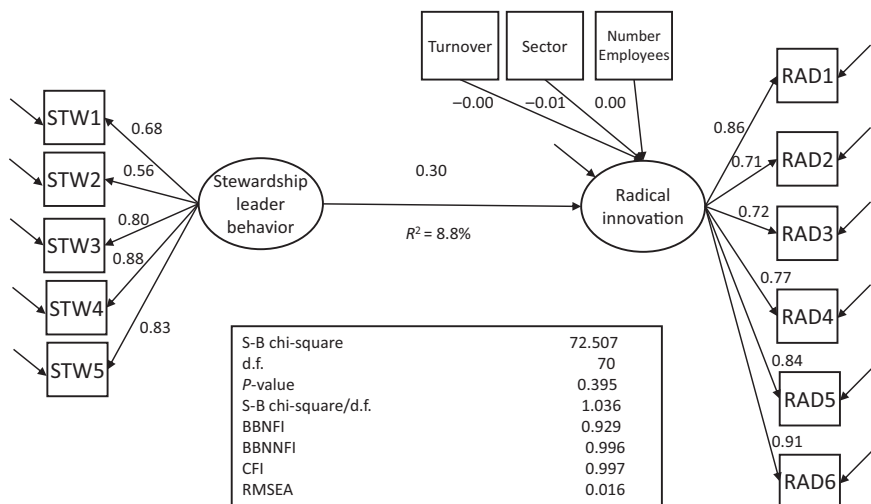


Figure 2. Total effect model

	Total effect model	Mediation model	Sustainable leadership
<i>Hypotheses</i>			
Stewardship leader behavior – Radical innovation	0.30 (3.34)	0.15 (1.45) ¹	
Stewardship leader behavior – OLC	–	0.49 (4.24)	
OLC-Radical innovation	–	0.30 (2.54)	
<i>Control variables</i>			
Turnover	–0.00 (–0.04) ¹	0.00 (0.04) ¹	
Sector	–0.01 (–0.06) ¹	–0.02 (–0.30) ¹	
Number of employees	0.00 (0.05) ¹	0.03 (0.34) ¹	
<i>Measurement model</i>			
Stewardship leader behavior – STW1	0.68 (8.84)	0.67 (8.79)	
Stewardship leader behavior – STW2	0.56 (7.02)	0.56 (7.08)	
Stewardship leader behavior – STW3	0.80 (11.02)	0.80 (11.13)	
Stewardship leader behavior – STW4	0.88 (12.35)	0.87 (12.42)	
Stewardship leader behavior – STW5	0.83 ²	0.84 ²	
Radical innovation – R1	0.86 ²	0.86 ²	
Radical innovation – R2	0.71 (9.98)	0.71 (9.98)	
Radical innovation – R3	0.72 (10.22)	0.72 (10.20)	
Radical innovation – R4	0.77 (11.23)	0.76 (11.22)	
Radical innovation – R5	0.84 (13.14)	0.84 (13.19)	
Radical innovation – R6	0.91 (15.01)	0.91 (15.03)	
OLC – Experimentation	–	0.58 ²	
OLC – Risk-taking	–	0.46 (3.42)	
OLC – Interaction with the external environment	–	0.43 (3.61)	
OLC – Dialog	–	0.82 (5.32)	
OLC – Participative decision-making	–	0.70 (5.32)	
Experimentation – EXP1	–	0.96 ²	
Experimentation – EXP2	–	0.71 (5.99)	
Risk-taking – RIS1	–	0.76 ²	
Risk-taking – RIS2	–	0.90 (4.92)	
Interaction with the external environment – ENV1	–	0.73 ²	
Interaction with the external environment – ENV2	–	0.71 (7.95)	
Interaction with the external environment – ENV3	–	0.90 (8.43)	
Dialog – DIA1	–	0.75 ²	
Dialog – DIA2	–	0.77 (9.32)	
Dialog – DIA3	–	0.83 (10.02)	
Dialog – DIA4	–	0.84 (10.20)	
Participative decision-making – DEC1	–	0.87 ²	
Participative decision-making – DEC2	–	0.76 (11.33)	
Participative decision-making – DEC3	–	0.96 (15.58)	
Note(s): ¹ Non-significant, ² The value of the parameter was set to 1 to fix the scale of the latent variable. In brackets, <i>t</i> -student			

Table 4. Measurement and structural models

threshold was NFI, which was below 0.9. However, given that this indicator is sensible to sample size, some authors suggested to rely on other indicators that are not affected by this issue, recommending indicators such as NNFI and CFI (Kline, 2005; Tucker and Lewis, 1973). As both indicators were above 0.9, they showed an acceptable level fit (Marsh *et al.*, 2004).

Finally, the estimated indirect effect of stewardship leader behavior on radical innovation was 0.14. The 95% bias-corrected confidence interval for the indirect effect based on a 5,000 bootstrap sample was entirely above zero (0.02–0.35). Consequently, the indirect effect of stewardship leader behavior on radical innovation was significantly different from zero, and so the null hypothesis of no mediation can be rejected. Therefore, Hypothesis 3 was confirmed.

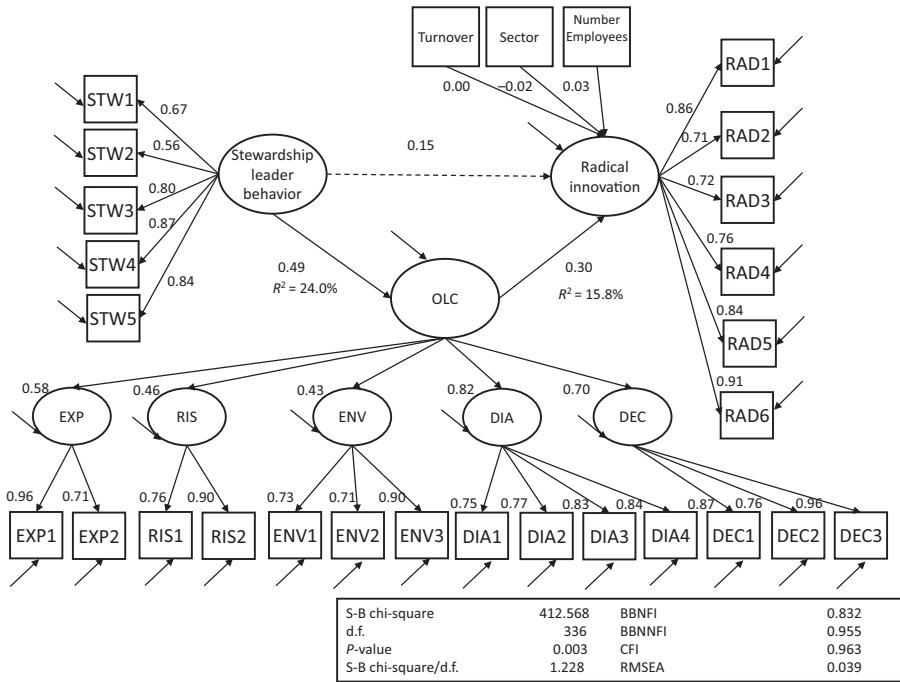


Figure 3.
Mediation model

Regarding the control variables (Table 4), none of them has a significant effect on radical innovation (turnover: $e1 = 0.00$, $t = 0.04$, $p > 0.05$; number of employees: $e2 = 0.03$, $t = 0.54$, $p > 0.05$; sector: $e3 = -0.02$, $t = -0.30$, $p > 0.05$).

5. Discussion

The present study sheds light on how facilitators or promoters of radical innovation work, which is a means to improve organizational performance and guarantee firms' long-term viability. This research also considers the ethical implications of organizational activity. In this sense, analyzing paths to improve both sustainability and company competitiveness is critically important in the current context of climate change and social inequalities (Nihof *et al.*, 2019). Organizations cannot focus on improving their performance at any cost and should be held accountable for the consequences of their activity, which should also include innovation (Domínguez-Escrig *et al.*, 2019).

All the hypotheses proposed in the present study were confirmed. Results provide empirical evidence of the importance of stewardship behavior in leadership to promote radical innovation, thanks to the creation of an organizational context that facilitates learning.

The main contribution of the study is on the mediating role played by organizational learning capability. Previous research had demonstrated how stewardship leader behavior fosters radical innovation and innovation success (Domínguez-Escrig *et al.*, 2019) and suggested how leadership concerned with sustainability may promote this type of innovation (Shu *et al.*, 2016). However, the mediating mechanisms that explain how these leader's behaviors promote these outcomes remained unexplored. This research represents a step

forward to shed light on this issue by unraveling the mechanisms that may clarify this positive effect.

The results in this study showed that organizational learning capability played a full mediation role in the relationship between stewardship leader behavior and radical innovation, meaning that without organizational learning capability, stewardship leader behavior cannot influence radical innovation. To the best of our knowledge, this is the first study that positively relates stewardship leader behavior with organizational learning capability and challenges the usual goal of previous research, that had been analyzing how organizational learning fosters concern for sustainability or social responsibility, rather than the opposite effect (e.g. [Lozano, 2014](#); [Siebenhüner and Arnold, 2007](#); [Vos et al., 2018](#); [Weidner et al., 2020](#)).

Stewardship leader behavior fosters an organizational context that favors experimentation, risk-taking, interaction with the external environment, participative decision-making and dialog. This is congruent with what is pointed out by theory. Stewardship is related to collectivistic cultures, organizations with low power distance, involvement of employees ([Davis et al., 1997](#)), trustful relationships, leader support for risk-taking and followers' engagement on decision-making ([Hernandez, 2008](#)).

Besides, the present study follows recent calls in the academic field that have demanded more research on the effects of leadership on innovation ([Hughes et al., 2018](#)). These authors suggest a major focus on new leadership styles and also demanded more emphasis on specific leader behaviors or traits, given that leadership styles include many different dimensions that difficult the interpretation of the results of the studies, following the same approach of [Yukl \(2012\)](#).

By focusing on a concrete leader behavior, the present study may provide more clear conclusions on the role played by stewardship as an antecedent of radical innovation. Following this approach, results increase the understanding of "the basic building blocks of leader influence" ([Hughes et al., 2018](#), p. 564). Besides, results are also consistent with the stream of research that defends contemporary forms of leadership, related to positive, moral, ethical and virtuous behaviors to promote organizational effectiveness and innovation ([Domínguez-Escrig et al., 2016](#); [Lyubovnikova et al., 2017](#)), expanding the knowledge of this field.

Results also contribute to stewardship theory by demonstrating the positive outcomes that may be achieved by leaders who rely on these behaviors. In recent years, a trend in the academic literature has demanded more research on the consequences of stewardship. This concept has gained interest in the literature about management and responsibility ([Kevany et al., 2007](#)), as it may help to fight against the degradation of the environment and to avoid the mistakes that led to recent financial crashes ([Reisberg, 2011](#)). [Menyah \(2013\)](#) argued that empirical research is needed to refine existing theoretical perspectives on stewardship theory. The results achieved in this study broaden knowledge in this field of research, confirming the positive relationship with radical innovation and disentangling the mediating role of organizational learning capability.

On the other hand, results have also implications for the literature of organizational learning capability, confirming its positive effect on radical innovation. A group of studies have analyzed its importance to boost innovation in a variety of areas, and the conclusions of this study can be added to this stream of research, reinforcing the idea that organizational learning capability is one of the main drivers to foster innovation in the organizational environment (e.g. [Alegre and Chiva, 2008](#); [Jerez-Gómez et al., 2005](#)). The study also consolidates its importance as an essential mediating mechanism in the relationship between leadership and innovation, as demonstrated in previous studies ([Domínguez-Escrig et al., 2016](#); [García-Morales et al., 2012](#)).

Finally, the present study has implications for the literature about the antecedents of radical innovation. Although many studies try to disentangle which are the promoters of this

type of innovation, the influence of leadership (Chang *et al.*, 2012) and other alternative variables are still an area of interest. The present study clarifies the effect of stewardship leader behavior on radical innovation and confirms the positive mediating effect of organizational learning capability.

5.1 Practical implications

The study has also practical implications as it may offer some insights about how to face the growing concern about the consequences of organizations and companies on society, environment and future generations. This is not about minimizing the impact of a company, neither a slogan nor a marketing campaign, this is about taking care of the decisions that firms make, the consequences of their acts and having a positive orientation toward the others. Contrary to a common perception, this orientation does not necessarily involve high costs and losses, and the results of the present research are an example of this.

This study suggests that, by showing a genuine concern for sustainability and considering the impact of the company on the others, it is possible to improve radical innovation, which might guarantee the long-term survival of companies, as they may achieve better results, be more valued and more profitable (Sorescu *et al.*, 2003; Baker *et al.*, 2014). For this reason, it would be important that companies promote stewardship behaviors among their leaders, in order they can be able to create an organizational context that facilitates radical innovation.

The results of this study also highlight the need to change leadership styles in companies. In recent years, news about corporate scandals, often linked to unethical behavior of their leaders, have proliferated. By understanding the consequences of stewardship, virtuous leadership behaviors, which go beyond traditional styles, may be promoted. These leader behaviors create efficient companies that are, in turn, responsible, ethical and moral.

Organizations and companies should bet on leaders that believe that companies have to play a moral role and contribute to society, and have a long-term vision, preparing the organization to make a positive difference in the future. Moreover, these leaders also have to encourage a sense of community in the organization. They might influence subordinates, emphasizing the importance of focusing on the good of the whole and the societal responsibility of their work (Van Dierendonck and Nuijten, 2011).

On the other hand, companies must focus on stewardship as an essential human resource management strategy. Through training, promotion and recruitment, firms should place employees with these characteristics in powerful or leading positions.

Regarding training, Dumay *et al.* (2019) state that “the virtues of stewardship” should be taught in universities rather than teaching students how to serve their own needs. The same idea is found in Kevany (2007), who highlighted that not only corporations contribute to unsustainable production or inequitable social practices, and warned about the type of learning provided by educational institutions, which may deepen unsustainable practices. This author suggested that higher education and faculties of business should play an essential role to instill stewardship and facilitate a transformation toward sustainable progress.

As for recruitment, organizations should seek people who firmly believe that organizations play a moral role and contribute to society and are concerned with the future consequences of their decisions. McCuddy and Pirie (2007) suggested that stewardship values are not something exclusive of the private sphere, so leaders are likely to incorporate their personal values in the company.

In addition, the present research also highlights the importance of organizational contexts that favor learning. Companies have to reinforce environments in which leaders encourage the development of new ideas, support venturing into unknown territories, facilitate

communication within the organization and promote interaction with the external environment (other competitors, customers or universities). Besides, it is important to empower employees, consider their views and involve them in decision-making.

In short, the results stress the idea that organizations may be more competitive developing radical innovations, being more sustainable and boosting organizational environments that facilitate learning. This is especially important in a context in which taking care of future generations and preserving nature is crucial, particularly considering that resources on our planet are limited (McCuddy and Pirie, 2007). Organizations should involve leaders in stewardship behaviors to succeed in the present competitive environment, achieving the organizational goals and creating a better world.

5.2 Limitations and future research

There are some limitations that have to be recognized. The questionnaire was administered only to managers, so they were who estimated their leadership behavior. Future studies should obtain the opinion of the employees and conduct multilevel studies. On the other hand, the study is focused on Spanish companies that manage their human resources in an excellent way. Consequently, the conclusions are limited to these companies and to a specific country. Future research should be conducted differentiating between countries. In addition, the population of the study is also heterogeneous in terms of sector, size and turnover, and for this reason, we have included these variables as controls. However, none of them showed a significant effect on radical innovation. Although other studies provided evidence of a significant relationship between these controls and radical innovation, a great deal of research found that these variables were non-significant. Considering that they may affect innovation in general and radical innovation in particular, it would be interesting to differentiate between large and small and medium-sized enterprise (SME) companies and to conduct studies comparing between sectors.

Another possible weakness of this study may be to overemphasize the importance of stewardship behavior. It is possible that managers and directors of companies do not always act with this behavior. In this sense, Key (2017) suggests that although some people are trustworthy and act reliably most of the time in the work environment, it is very likely that at some point they will act selfishly. This duality in human behavior should be analyzed in future studies.

In a similar vein, future studies should also consider the social context. Key (2017) pointed out that human beings do not act solely on the basis of their character but are often influenced by the social context. The atmosphere within a company, the hierarchical structure of an organization and the culture within it can have an impact on the behavior of managers, and should be studied in the future. Some environments may promote selfish behavior while others may promote respect and concern for others.

As sustainability and future consequences of economic activity are in the spotlight, future research should keep on studying the consequences of stewardship leader behavior along with organizational learning capability. Effects on other types of innovation, such as incremental, green or open innovation; the different stages of the innovation process; measures of innovation success or innovation performance; creativity; etc., would shed light on the potential consequences of these variables for organizations. Future studies should consider alternative mediating variables, such as absorptive capacity, different types of learning or other conceptualizations of organizational learning capability (e.g. Hsu and Fang, 2009). Moreover, additional concepts such as altruism, trust, engagement, extra-role behaviors or motivation, to name some ideas that have been related to stewardship on theoretical models, should be included in upcoming empirical research. Finally, it would be interesting to study how alternative leadership styles, such as transformational and additional leader behaviors promote innovation and an orientation toward sustainability.

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Appendix: Measurement scales and factor loadings**About stewardship leader behavior: [Barbuto and Wheeler \(2006\)](#)**

STW1. The leaders of this organization believe that the organization needs to play a moral role in society	0.67
STW2. The leaders of this organization believe that our organization needs to function as a community	0.56
STW3. The leaders of this organization see the organization for its potential to contribute to society	0.80
STW4. The leaders of this organization encourage me to have a community spirit in the workplace	0.87
STW5. The leaders of this organization are preparing the organization to make a positive difference in the future	0.84

Organizational learning capability: [Chiva et al. \(2007\)](#)*About experimentation*

EXP1. People here receive support and encouragement when presenting new ideas	0.96
EXP 2. Initiative often receives a favorable response here, so people feel encouraged to generate new ideas	0.71

About risk-taking

R1. People are encouraged to take risks in this organization	0.76
R2. People here often venture into unknown territory	0.90

About interaction with the external environment

ENV1. It is part of the work of all staff to collect, bring back, and report information about what is going on outside the company	0.73
ENV2. There are systems and procedures for receiving, collating and sharing information from outside the company	0.71
ENV3. People are encouraged to interact with the environment	0.90

About dialog

DIA1. Employees are encouraged to communicate	0.75
DIA2. There is a free and open communication within my work group	0.77
DIA3. Managers facilitate communication	0.83
DIA4. Cross-functional teamwork is a common practice here	0.84

DEC1. Managers in this organization frequently involve employees in important decisions	0.87
DEC2. Policies are significantly influenced by the employees' views	0.76
DEC3. People feel involved in main company decisions	0.96

About radical innovation: [Marvel and Lumpkin \(2007\)](#), and [Gatignon et al. \(2002\)](#)

RI1. These innovations represent an entirely new type of product/service	0.86
RI2. These innovations can be described as totally new innovations	0.71
RI3. These innovations meet a want or a need that has not been addressed by other products/services	0.72
RI4. These innovations involve a revolutionary change from the latest generation of these products	0.76
RI5. These innovations could be described as a new product line	0.84
RI6. These innovations are significant or leading innovations	0.91

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