

How transformational leadership facilitates e-business adoption

Lirios Alos-Simo, Antonio J. Verdu-Jover and
Jose-Maria Gomez-Gras
*Department of Economic and Financial Studies,
Universidad Miguel Hernandez de Elche, Elche, Spain*

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Received 29 January 2016
Revised 21 May 2016
Accepted 12 June 2016

Abstract

Purpose – The purpose of this paper is to examine theoretically and empirically what type of leadership facilitates e-business adoption in large manufacturing firms. The digital transformation of firms requires leadership that can promote the adaptive quality of organizational culture.

Design/methodology/approach – The authors conducted an empirical study using two key informants from a sample of 181 incumbent firms.

Findings – The authors find significant evidence that adaptive culture is the vehicle by which transformational leaders positively influence e-business adoption.

Originality/value – Given the digital economy's external pressures, many e-business adoption processes fail due to organizational factors originating in leadership and its capability to change followers' values, norms, and motivations. To solve this problem, the authors propose a model that explains how transformational leadership first plays a key role in changing characteristics of culture and then facilitates e-business adoption.

Keywords Transformational leadership, E-business adoption, Innovation processes, Adaptive culture

Paper type Research paper

Introduction

The digital economy's continuous growth causes firms to accelerate adoption of e-business processes (Kotler, 2014). Based on a European study in telecommunications and tourism, Oliveira and Martins (2010) find that external pressures are among the most relevant drivers of e-business adoption. Some studies show concerns, however, about the success of organization's e-business adoption. Dubelaar *et al.* (2005) identify impediments and suggest the need to address issues of leadership, employee trust, and monitoring of internal processes. Ashurst *et al.* (2012) suggest that successful e-business adoption requires IT competences that can be achieved by IT leadership. People in organizations naturally resist change that makes implementation of IT systems difficult (Seah *et al.*, 2010). E-business adoption is especially difficult for incumbents (Verdu *et al.*, 2014) because of the associated learning processes and costs.

E-business adoption decisions begin with the leaders (Chen *et al.*, 2014; Phillips and Wright, 2009), since firms' strategic orientation plays a key role in implementing e-business capabilities (Raymond and Bergeron, 2008). Top management first decides to invest in e-business and must then implement the processes with employees' help and commitment. Thus, e-business adoption requires managerial action and training programs (Oliveira and Martins, 2010), as in implementing any innovative process (McElheran, 2015). Research confirms the relationship between leadership and innovation processes (e.g. Boerner *et al.*, 2007; Jung *et al.*, 2008; Gumusluoglu and Ilsev, 2009), recognizing the leader's stimulus in managing innovation. Although these studies propose direct relationships between leadership and innovation processes, the literature also considers leadership as primarily oriented to changing people's behavior and indirectly to implementing processes. For

The authors thank the Spanish Ministry of Science and Innovation for partial financing of this research through projects ECO2010-21276 and ECO2013-45885-R.



example, Strese *et al.* (2016) propose that leadership affects employees' internal values and can foster cross-functional cooperation. Even the leader's language can modify attitudes of followers and the group (Fan *et al.*, 2014). Thus, organizations' innovation processes emerge not only because top management wills them, but also through collaborative practices (Buschgens *et al.*, 2013), corporate entrepreneurship (Chen *et al.*, 2014) and cultural context (Lai *et al.*, 2007; Chang and Lin, 2007). Studies of culture typologies abound (Buschgens *et al.*, 2013; Senarathna *et al.*, 2014; Shao *et al.*, 2015), but environmental pressure (Phillips and Wright, 2009; Oliveira and Martins, 2010) and leaders' action (Strese *et al.*, 2016; Fan *et al.*, 2014) make cultures evolve and change. This study thus focuses on the adaptive attribute of cultures (Kotter and Heskett, 1992), which is paramount to understanding adoption of change processes, especially in incumbent manufacturing (Verdu *et al.*, 2014) and large firms (Vaccaro *et al.*, 2012).

Our literature review shows few studies on how leadership influences innovation processes (Chen *et al.*, 2014), specifically e-business adoption. Given the growing relevance of e-business in a growing digital economy, incumbents must understand the behavioral processes facilitating e-business adoption. This paper aims to determine how organizations should manage e-business adoption. As leadership processes are oriented to people's behavior toward change, leaders are responsible for shaping cultures (Afsar *et al.*, 2014; Strese *et al.*, 2016), especially for constructing attributes that make cultures evolve and embrace change (Kotter and Heskett, 1992) and then channeling leadership efforts toward e-business adoption.

To explain these goals, the paper is structured as follows. We identify the type of leadership affecting followers' values of change in order to generate a culture of change in the organization. We then review the literature on culture to identify its quality of adaptation and change. Subsequently, we propose hypotheses to test empirically whether the leader modifies values in the culture, facilitating organizations' adoption of e-business.

Theoretical framework

Leadership

Leaders influence firms and shape organizational behavior (Hambrick and Mason, 1984). Leaders' many values – religious, political, theoretical, social (Guth and Tagiuri, 1965) – are key to the strategic orientations the leader proposes (Geletkanycz, 1997), and values are forces motivating behavior (Schwartz and Bilsky, 1987). Thus, leaders influence organizational practices, behaviors (House *et al.*, 2002) and performance (Hernandez *et al.*, 2011).

The literature has paid great attention to leadership and proposed many theories. Traits theory differentiates leaders' characteristics from those of nonleaders (Gibb, 1947; Jenkins, 1947; Costa and McCrae, 1980, 1988). The managerial grid model of leadership analyses leaders' behavior (Bales, 1954; Blake and Mouton, 1964). Another research line focuses on the environment surrounding leaders and offers a contingent perspective (Fiedler, 1967; Vroom and Yetton, 1973; Hersey and Blanchard, 1982). At the end of 1980s, due to environmental turbulence and its impact on the firm, charismatic theories of leadership emerged to identify exceptional characteristics of leaders attributed to individuals and organizations (Conger and Kanungo, 1987; Bass and Avolio, 1995, 2000). Bass (1985) proposed charismatic leadership as a framework for two types of leadership studied today to relate to new situations that organizations face: transformational and transactional leadership. Transactional leadership centers on rewards, the consequences of not reaching goals (Avolio *et al.*, 1999), and efficiency-oriented practices (Chang *et al.*, 2015). Transformational leadership involves transformation of followers' aspirations, attitudes, and values (MacKenzie *et al.*, 2001), considered as a process established between leader and

follower, and characterized by persuasion through followers' understanding of and identification with the leader (Bass and Avolio, 1994).

Although some researchers suggest that both transformational and transactional leadership are suitable in motivating followers to innovate (Gumusluoglu and Ilsev, 2009; Jung, 2001), evidence suggests that the styles differ. For example, Chang *et al.* (2015) analyze the effects of both leadership styles on innovation and find that transformational leadership has a greater effect on product innovation, and transactional leadership a greater effect on process innovation, even though transactional leadership attempts to preserve existing production methods, routines, and practices (Vera and Crossan, 2004). In comparing these leadership styles, other studies find that the most suitable style for top and middle managers in exploration processes is transformational leadership, whereas transactional leadership works better for exploitative processes (Sun and Anderson, 2012; Flatten *et al.*, 2015). Others propose that transactional leadership is appropriate in relatively stable environments, whereas transformational leadership achieves deeper organizational changes and thus better performance in changing environments (Van der Voet, 2014; Jansen *et al.*, 2009). Further, larger organizations must use transformational leaders to compensate for their complexity and develop management innovation, while transactional leadership is sufficient in small organizations (Vaccaro *et al.*, 2012).

Based on past studies, we thus focus on transformational leadership as more suitable for e-business adoption, as it implies exploration (Sun and Anderson, 2012; Flatten *et al.*, 2015) in a fast-changing business environment (Van der Voet, 2014; Jansen *et al.*, 2009) and is thus better suited to the complexity of large firms (Vaccaro *et al.*, 2012).

Culture

Transformational leaders drive followers' values, attitudes, and emotions (Bass, 1985), creating a cultural context in the organization that embodies its mission statement and guides employee behavior (Babnik *et al.*, 2014). Organizational culture is defined as a "complex set of values, beliefs, assumptions and symbols that define the way in which a firm conducts its business" (Barney, 1986).

The organizational culture literature proposes different types of culture, the three most influential being (Scholz, 1987): cultures that fit different strategic views, such as reactive, proactive, exploratory, and creative (Ansoff, 1984); cultures induced internally depending on production system characteristics, such as productive, bureaucratic and professional (Jones, 1983); and cultures induced externally, for example, as the result of environmental pressures (Deal and Kennedy, 1982). From the third perspective, Cameron and Quinn (1999) propose one of the most influential typologies (hierarchy, clan, adhocracy, and market), based on the dimensions of internal-external orientation and control-flexibility orientation. In line with externally induced cultures, Kotter and Heskett (1992) trace the roots of both healthy and unhealthy cultures to organizational core values and their effects on performance. They highlight cultures' adaptive quality (attribute) to reverse the effects of unhealthy cultures. Adaptive culture is not primarily about fit with environment but goes further, incorporating a proactive, anticipatory perspective.

As business environments change continuously, organizational culture evolves to face new situations. Organizations learn and develop new knowledge and capabilities shared by their members, such as the right way of thinking, feeling, and perceiving new situations (Schein, 1985). Adaptive culture adjusts continually to changes by promoting values of risk adoption and proactive focus (Kilmann, 1985) to renew members' behavior over time (Jaw and Liu, 2003; Collins and Porras, 1994).

Organizations' beliefs, norms, and values have been thought to be unchanging, stable, and enduring (e.g. Hofstede, 1980; Davis, 1984). We now recognize that managerial action

can cause cultures to change faster than previously argued (Clarke, 2003; Inglehart and Welzel, 2005). Leaders intentionally induce these beliefs and values (Schein, 1985), leading us to define adaptive culture based on these characteristics (Kotter and Heskett, 1992) and propose adaptive culture as required for effective innovation processes in organizations (Senarathna *et al.*, 2014). Adaptive culture centers attention on the evolutionary quality of culture (Kotter and Heskett, 1992) to align proactively with its environment, an attribute independent of the typologies the literature proposes. Further, effective leadership manages this attribute (Kotter and Heskett, 1992), by reversing followers' change of values, attitudes, and behaviors (Kuo *et al.*, 2010).

Hypotheses

Through intellectual stimulation and individualized consideration, transformational leaders cause followers to generate and share knowledge, orienting the organization to acquisition of common goals (Bass *et al.*, 2003); inspire followers' intellects; and foster new perspectives on problems (Keller, 2006), while promoting communication and organizational learning (Bass and Avolio, 2000). Transformational leaders influence their followers' values, attitudes, and emotions (Bass, 1985; Kuo *et al.*, 2010). The culture can consolidate the values learned or transform them into new values to adapt to environmental and social factors (Bosche, 1984). Adaptive cultures are grounded in core values, values of change and transformation (Collins and Porras, 1994).

For Wu *et al.* (2010), transformational leadership encourages group identification and collective efficacy. Among the characteristics of transformational leadership, we highlight delegation of autonomy and of followers' development, promotion, and experience (Avolio and Gibbons, 1988; Bass, 1985; Dvir *et al.*, 2002), which enable transformational leaders to foster development of the organization's members for better adaptation to the environment and to stimulate the organization's implementation of adaptive culture, with values of risk taking and promotion of change (Kotter and Heskett, 1992).

Following these arguments, we formulate the following hypothesis:

H1. Transformational leadership is positively related to adaptive culture.

Lai *et al.* (2007) show that cultural contexts significantly moderate the interrelationships among network externalities and e-business adoption. As to direct effects, however, some studies relate typologies of culture to different types of e-business adoption. Shao *et al.* (2015) examine the impact of organizational culture on enterprise resource planning by distinguishing between hierarchical, group, and rational culture. Senarathna *et al.* (2014) analyze the influence of two types of organizational culture (hierarchy and adhocracy) on e-commerce adoption maturity in SME's. Thus, organizational culture plays a key role in facilitating or impeding e-business adoption (Senarathna *et al.*, 2014) as internal/external capabilities and costs are strategic when facing incumbents' technological change (McElheran, 2015). Given the digital economy's external pressures on firms, however, we focus here on the quality of adaptation that all cultures have, without discussing typologies.

Organizational processes change in a social environment, influenced by individuals' relationships and behavior in the social context within which they develop (Boglund *et al.*, 2011). Rapid change in environments, as in the digital economy, leads to a gap between knowledge required and organizations' capabilities, making constant internal adaptation necessary. To facilitate innovation, cultures should be open to change, encourage and value free communication, and nurture a motivated staff (Auernhammer and Hall, 2014). New organizational processes require a culture that fosters change, risk taking, and empowerment. The latter are characteristics of adaptive cultures (Kotter and Heskett, 1992),

in which the values of change and transformation have been learned by the organization's members as they face their environments (Schein, 1985).

Based on the foregoing, we formulate the following hypothesis:

H2. Adaptive culture is positively related to e-business adoption.

Transformational leadership has four dimensions (Bass and Avolio, 1995): idealized influence (Bass and Avolio, 1995), or admiration and respect for followers, who identify with and imitate the leader (Bass and Avolio, 1994); inspirational motivation, through which the leader promotes expectations of performance through symbols and images to unify efforts (Bass, 1995); individualized consideration, which promotes socio-emotional support and development of followers (Antonakis and House, 2002); and intellectual stimulation, through which the leader encourages viewing problem situations from new perspectives (Bass, 1995) and fosters innovation and problem-solving (Antonakis and House, 2002). Transformational leaders improve followers' capabilities and competence and foster development of new ideas and renovation of obsolete norms (Bass, 1995). They also promote orientation to learning, whether individual or group, in which members attempt to understand and practice new competence development (Dweck, 1986, 2000; Dweck and Leggett, 1988), leading to innovative action in the organization. Such leadership action contributes directly to building a culture sensitive to change.

Transformational leadership is proactive, oriented to change, innovative, and inspirational (Hogg, 2001). It fosters application of innovative processes and creation of innovative teams (Keller, 2006). Leadership channels its efforts, however, through stimulation of new behavior in the people who compose its team (Campbell, 2000; Frese and Fay, 2001), transforming the organization's beliefs, norms, and values to consolidate an adaptive culture. Transformational leadership creates a context for new initiatives of followers (Sun and Anderson, 2012) and fosters group identification in mediating team innovation (Paulsen *et al.*, 2013). Transformational leadership thus does not affect directly innovation processes, but seeks to influence employee behavior (Afsar *et al.*, 2014), thereby facilitating innovation. For Lin and McDonough (2011), a knowledge-sharing culture mediates the relationship between strategic leadership and innovation ambidexterity. Adaptive culture's mediation enables the organization to learn to find the best solution, based on each firm's situation (Tidd *et al.*, 2005). In fostering beliefs, norms, and values of change and renovation of adaptive culture, the transformational leader permits subordinates to develop new knowledge and experience (Avolio and Gibbons, 1988; Bass, 1985; Dvir *et al.*, 2002), stimulating proactive and creative behavior (Tierney *et al.*, 1999) and enabling establishment of innovative processes.

Following the foregoing arguments, we expect that:

H3. The relationship between transformational leadership and e-business adoption is mediated by adaptive culture.

Method

Data

The study population is taken from the SABI-Bureau Van Dijk database (2015) for its comprehensive information on two a half million Spanish and Portuguese firms and very large number of search criteria. The population of firms was determined by the classification criterion that the organizations have at least 250 workers, since study of both transformational leadership and organizational culture requires a minimum number of members to observe leadership and culture without being intimately related (Schein, 1985). To avoid firms emerging in the boom of the digital era, we selected firms at least 10 years old. The sampling frame was composed of 1,535 manufacturing firms

(40 percent of total firms with over 250 workers in 2015, according to the Spanish Ministry of Industry, Energy, and Tourism).

For each firm, we divided the questionnaire in two parts. For the items on transformational leadership and adaptive culture, we choose the human resources manager as informant, since this manager is in contact with his/her immediate superior (the leader) and can thus evaluate the leader as a member of the TMT (Papadakis *et al.*, 1998), while also identifying the culture's adaptive characteristics. Items related to the criterion variable (e-business adoption) were addressed to the operations manager, who controls the organization's operational activities. We mailed questionnaires in two separate envelopes (one addressed to the human resources manager and the other to the operations manager) to the firm's address, requesting that they be forwarded to the corresponding respondent. After the first mailing, we sent two rounds of reminders. We received 210 questionnaires from human resource managers and 195 from operations managers. We processed only 181 firms with the two completed questionnaires from the firm's key respondents, resulting in a response rate of 11.79 percent from our sampling frame.

Respondents' average age was 40.69 and average years of experience in managerial positions 9.46; 55.8 percent of respondents were men. These leaders' average age was 47.0, and 82.4 percent had a university education. Only 5.5 percent of the leaders evaluated were women. The average age of the organization was 22.6 and the average number of employees 506.05.

To reduce the risk of common method bias (Podsakoff *et al.*, 2003), the cover letter explained our commitment to absolute confidentiality of responses. Confidentiality increased because the responses were returned electronically, so the organization could not control them (Lechner *et al.*, 2010; Tsai and Ghoshal, 1998). Chang *et al.* (2010) indicate that alerting respondents to confidentiality and anonymity reduces bias. The questionnaire responses were classified by point values. According to Chang *et al.* (2010), questionnaires that use point values are less susceptible to common method bias. Further, our study forms part of a broader project that measured other variables, preventing a relationship between these variables and thus reducing the possibility of hypothesis guessing.

Measurements used

Transformational leadership. We used the MLQ (5X form) scale developed by Bass and Avolio (1995) in its "evaluative form." This scale takes into account the theoretical dimensions of transformational leadership and has been validated sufficiently. Other relevant and recent studies on transformational leadership also use this scale (Balthazard, *et al.*, 2012; Froehlich *et al.*, 2014), which includes 20 items with questions on intellectual stimulation, behavioral idealized influence, attributed idealized influence, inspirational motivation, and individualized consideration. We asked that responses be given on a Likert-type scale from 1 (= absolutely not) to 7 (= quite often), with items such as: "The leader reviews everyday actions and asks whether they are still valid" and "The leader talks about his/her most important values and beliefs." We validated the scale using confirmatory factor analysis, which showed the scale's one-dimensionality and high level of reliability ($\alpha = 0.96$).

Adaptive culture. To measure adaptive culture, we combined the scale used by Denison and Mishra (1995) to test the basic traits of culture with the proposal by Kotter and Heskett (1992). We applied four items to identify capability to encourage change and flexibility in response to external pressures (Denison and Mishra, 1995). The scale included questions such as, "In your organization, most of the managers value people and processes that are capable of generating changes" and "In your organization, leadership on all levels of hierarchy causes changes in values according to external pressures." We requested replies from 1 (= totally disagree) to 7 (= totally agree) and validated the scale with confirmatory factor analysis, showing its one-dimensionality and high reliability ($\alpha = 0.76$).

E-business adoption. We adapted the scale for e-business adoption used by McElheran (2015) because of the explosion of new business processes enabled by diffusion of the commercial internet over the past years, as roughly one half of all annual equipment investment by US businesses is in information-processing equipment and software. Respondents answered different questions using a Likert-type scale from 1 (= 0 percent) to 7 (= more than 25 percent). We asked questions such as, “Plants report selling over internet” and “Plants report buying over internet.” We validated the scale using confirmatory factor analysis, demonstrating the scale’s one-dimensionality and very good reliability ($\alpha = 0.70$).

Model and analysis

Table I shows the descriptive analysis and correlation matrix of the model variables.

The study analyzed the model data using structural equations modeling to establish causal relationships between the latent variables, and the program EQS 6.2. The model described was transformed into mathematical models for study and evaluation (Jöreskog and Sörbom, 1996). Structural equations modeling considers measurement errors, variables with multiple indicators, and multiple groups for comparison (Koufteros *et al.*, 2009).

Table II indicates that the model constructs show satisfactory levels of reliability, composite reliability, and average extracted variance. These values should be above 0.5 (Hair *et al.*, 1992). Since none of our constructs shows numbers below this value, the goodness of fit indexes from the confirmatory factor analysis indicate that the model fits the data well.

To evaluate discriminant validity, we determined whether the average variance extracted from each factor is higher than the squared correlations between constructs (Fornell and Larcker, 1981), with significant correlations below 0.90. We performed a more

Table I.
Means, standard deviations, and correlations

Variable	Mean	SD	1	2	3
1. Adaptive culture	4.53	1.21	1	0.56***	0.59***
2. Transformational leadership	4.91	1.39		1	0.41***
3. e-Business adoption	4.68	1.19			1

Notes: $n = 181$. *** $p < 0.001$

Table II.
Validity, reliability, and internal consistency

Variable	Indicator	Factor loading	t-value	CA	CR	AVE
Transformational leadership	EI	0.91***	15.92	0.96	0.96	0.84
	IIC	0.93***	16.38			
	IIA	0.94***	16.74			
	MI	0.89***	15.21			
	CI	0.93***	16.62			
Adaptive culture	ADACU1	0.77***	11.52	0.78	0.79	0.50
	ADACU2	0.73***	10.59			
	ADACU3	0.52***	6.97			
	ADACU4	0.74***	11.57			
e-Business adoption	EBA1	0.74***	10.58	0.80	0.80	0.50
	EBA2	0.72***	10.12			
	EBA3	0.66***	9.12			
	EBA4	0.72***	10.11			

Notes: CA, Cronbach’s α ; CR, composite reliability; AVE, average variance extracted and convergent validity. $SB \chi^2(60 \text{ df}) = 156.27 (p < 0.001)$; NFI = 0.92; NNFI = 0.93; CFI = 0.94; IFI = 0.96; RMSEA (90 percent CI) = 0.09(0.07, 0.11); SRMR = 0.06. *** $p < 0.001$

demanding test, analyzing the confidence interval for each pair of variables in which the value 1 did not appear, and conclude that there is no problem of discriminant validity (Anderson and Gerbing, 1988). Table III shows these results. We conclude that our scales fulfill the requirements for discriminant and convergent validity.

To control for the effect of common method variance on the data, we performed Harman’s one-factor test (Podsakoff and Organ, 1986). The results of the confirmatory factor analysis for all variables loaded on a single factor: $\chi^2(65) = 464.01; p < 0.001$; RMSEA (90 percent CI) = 0.19(0.17, 0.20); SRMR = 0.15; NFI = 0.75; NNFI = 0.73; CFI = 0.77; IFI = 0.77. This result shows poor fit, suggesting that common method variance is not a concern, as variance is not maintained throughout the data. Another way of controlling for common method bias is to obtain measures of the innovation variable from the operations managers and predictor variables from the human resource managers (Podsakoff *et al.*, 2003).

Results

We analyzed the mediating effect of adaptive culture on transformational leadership and e-business adoption, using the procedure from Tippins and Sohi (2003). These authors develop two consecutive models, the first evaluating the direct effect of transformational leadership and e-business adoption, and the second evaluating the mediating effect including adaptive culture.

To analyze mediation, we developed the direct relationship model for the relation between transformational leadership and e-business adoption. The results indicate good fit for the direct model and a significant relationship, shown in Table IV and Figure 1, in which the relation between transformational leadership and e-business adoption is positive and significant ($\beta = 0.44, p < 0.001$).

We then configured our model, including adaptive culture as mediating variable. The estimation results for this second model are shown in Table V, where we see that transformational leadership is positively and significantly related to adaptive culture ($\beta = 0.65, p < 0.001$). We thus confirm the positive and significant relationship between adaptive culture and e-business adoption ($\beta = 0.73, p < 0.001$). The relationship between transformational

Variable	1	2	3
1. Adaptive culture	0.50	0.31***	0.34***
2. Transformational leadership	(0.54; 0.75)	0.84	0.17***
3. e-Business adoption	(0.61; 0.83)	(0.31; 0.59)	0.50

Notes: Diagonal represents the AVE. Upper part of diagonal represents the square correlations. Lower part of the diagonal shows the confidence intervals for estimation of the factors. *** $p < 0.001$

Table III. Discriminant validity

Relationship	Standardized β -value	t-value
Transformational leadership → e-business adoption	0.44***	5.32

Note: *** $p < 0.001$

Table IV. Results of direct effect model

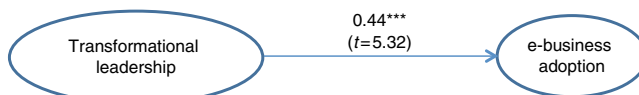


Figure 1. Causal relationship – direct effect

Note: *** $p < 0.001$

leadership and e-business adoption is positive and non-significant ($\beta = 0.09$). Figure 2 illustrates the results of the model's causal relationships.

Tippins and Sohi (2003) establish that certain conditions must be fulfilled to obtain solid mediation: First, the mediation model must explain the variance in innovation better than the direct effect model (0.52 vs 0.19). Table VI presents the details of R^2 for both models. Second, there must be a significant relationship between transformational leadership and e-business adoption ($\beta = 0.44, p < 0.001$). Third, there must be a significant relationship between adaptive culture and e-business adoption ($\beta = 0.65, p < 0.001$). Fourth and finally, the relationship between transformational leadership and e-business adoption must either substantially weaken or cease to be significant. In this causal model, transformational leadership and e-business adoption cease to be significant ($\beta = 0.73$).

Our results thus confirm that adaptive culture mediates the relationship between transformational leadership and e-business adoption. The model confirms our hypotheses and shows total mediation. Thus, where adaptive culture exists, the effect of transformational leadership reaches the variable e-business adoption entirely through adaptive culture.

Relationships	Standardized β -value	t-value
Transformational leadership → adaptive culture	0.65***	8.04
Adaptive culture → e-business adoption	0.73***	5.73
Transformational leadership → e-business adoption	-0.02	-0.24

Table V.
Results

Notes: $\chi^2(60) = 156.24; p < 0.001$; RMSEA (90 percent CI) = 0.09(0.07, 0.11); SRMR = 0.06; NFI = 0.92; NNFI = 0.93; CFI = 0.95; IFI = 0.95. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

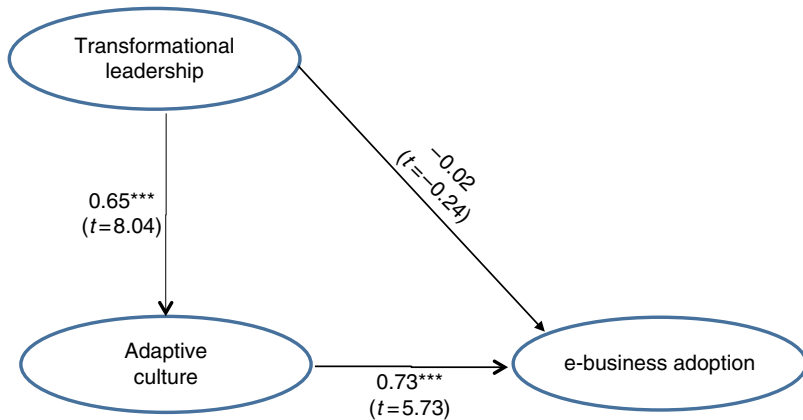


Figure 2.
Causal relationship
mediation model

Note: *** $p < 0.001$

	R^2
<i>Direct effect</i>	
Transformational leadership → e-business adoption	0.19
<i>Mediated effect</i>	
Transformational leadership → adaptive culture	0.41
Transformational leadership → adaptive culture → e-business adoption	0.52

Table VI.
Variance explained by
the two models

Conclusions and discussion

Recent literature recognizes the difficulties of e-business adoption in incumbent firms (Dubelaar *et al.*, 2005; Ashurst *et al.*, 2012; Seah *et al.*, 2010; Verdu *et al.*, 2014). These studies indicate that most impediments arise from organizational behavior issues, not technical problems. We propose that obstacles arise from leadership style and its direct effects on organizational culture. We thus theoretically identified two paramount antecedents of e-business adoption for incumbents and large firms that help to understand the social scope of the digital economy when firms adopt it: transformational leadership and adaptive culture. Although various studies show the connection between transformational leadership and innovation (Howell and Avolio, 1993; Jung *et al.*, 2003, 2008; Gumusluoglu and Ilsev, 2009), the literature has hardly empirically analyzed the means by which transformational leadership can influence e-business adoption. Thus, the theoretical model proposed is tested empirically in large manufacturers' e-business adapters. The results confirm the mediation model and indicate a significant contribution to the theory – that leadership plays a key role in internal transformation of the culture (Strese *et al.*, 2016; Fan *et al.*, 2014) – which translates into implications for e-business adoption. More specifically, our study proposes total mediation, in which adaptive culture is the main vehicle by which leadership influences e-business adoption. Leaders must thus create a cultural context that leads to accepting the change required by the digital economy and then facilitate its adoption in the firm. Although other studies propose mediation models between leadership and innovation processes in the organization (Lin and McDonough, 2011), no one has connected the relevance of leadership to e-business adoption by its direct effects on the organization's cultural context.

This study supports the argument that e-business requires certain prior organizational conditioners (Chesbrough, 2010). Among different types of leadership and their characteristics (Sun and Anderson, 2012; Vaccaro *et al.*, 2012; Flatten *et al.*, 2015; Van der Voet, 2014), transformational leadership is proposed as a significant antecedent of e-business adoption. The antecedents' view of e-business adoption is established based on the theory of transformational leadership (Bass, 1985, 1995; Bass and Avolio, 1994, 1995), in which the leader's stimulus generates a culture committed to changing and improving innovation processes. Transformational leaders implement e-business through adaptive culture, which fosters values of change, risk taking, and empowerment (Kotter and Heskett, 1992).

This study orients the view of e-business adoption to the socio-political perspective (Yuan and Woodman, 2010), in which the organization's members generate relationships after necessarily reaching prior consensus on internal cohesion and integration (Schein, 1985). E-business adoption requires a human group and socio-political equilibrium that demands involvement of the whole group. E-business adoption is immersed in a socio-political environment of the organization that depends fundamentally on the group's involvement and acceptance of the change required by the digital economy. The leader influences the organizational culture (Miller and Droge, 1986), intervening in creating values of change and revision of established norms. The impulse the leader can give to e-business adoption is thus achieved through transformation cemented in the organization's system of beliefs, norms, and values, configured as adaptive culture. Our model thus contributes to understanding technical implementation processes in the firm from the socio-political perspective (Yuan and Woodman, 2010).

Examples of leaders whose implementation of innovation processes in technology sector organizations does not seem to focus on internal changes, despite constant effort to introduce new products and services, and whose innovation outcomes have been quite moderate are John Sculley as CEO of Apple 1983-1992 and Steve Balmer, who succeeded Bill Gates at Microsoft in 2008. Other leaders strive for constant internal transformation of the organization, as such transformation consolidates the innovation strategy and thus competitive advantage (e.g. return of Steve Jobs to Apple in 1997 and his priority of

generating a new culture according to his vision). Our study provides theoretical grounding for the role that culture plays as a channel by which leadership introduces successful innovation processes (Lin and McDonough, 2011).

Among the study's practical implications, we urge managers to implement changes in the organizational culture to make it more sensitive to the digital economy and environmental demands before deciding on e-business adoption. Managers are responsible for handling organizational culture by focusing on its adaptive quality. We argue that e-business adoption requires the impulse of transformational leadership grounded in adaptive culture, which assumes risks and is receptive to change. All types of cultures consolidate their ways of doing from the experiences of the organization's members and can evolve and adapt, or remain steady. We thus underscore culture's adaptive quality to align the firm with the demands of the environment. If managers must facilitate e-business adoption to achieve competitive advantage, the surest path to this objective is to focus on the organization's members and the transformation of beliefs, norms, and values that prioritize flexibility and adaptation to environmental demands.

Among this study's limitations, we indicate its cross-sectional nature. This limitation is not relevant, however, because the results obtained are analyzed based on their relationship of multiple dependence, not temporal causality (Hair *et al.*, 1992). Another limitation stems from the survey respondents, as responses are based on interpretations and thus somewhat subjective. We believe, however, that the members of the managerial team influence decision making (Papadakis *et al.*, 1998) and thus know how the dynamics of strategy evolve, reducing subjectivity due to the quality of the information received.

Future research on the antecedents of e-business adoption is needed. We identify the type of leadership that best facilitates e-business implementation, but leadership theory is evolving and the digital economy is generating new types of leadership, such as IT leadership (Ashurst *et al.*, 2012). These new types of leadership modify people's values and beliefs, generating new organizational cultures. Studies on this issue are thus highly valuable for academia. Further, although we focus on cultures' adaptive quality (Kotter and Heskett, 1992), combining this quality with types of culture (Ansoff, 1984; Jones, 1983; Cameron and Quinn, 1999) is also relevant to better understanding the nature of organizational culture and the influence of different leadership styles on its changeability.

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Corresponding author

Antonio J. Verdu-Jover can be contacted at: ajverdu@umh.es

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