

Dimensions and antecedents of the Absorptive Capacity, how are they related?

In a dynamic and turbulent environment, knowledge represents an essential resource for value creation and for keeping competitive advantages (Teece *et al.*, 1997). Since a strategy based only in the internal R&D is limited in scope, the organizations need to search outside the knowledge that will help them to reach competitive advantages. It is recognized that absorptive capacity (AC) can help firms to develop this strategy, as it provides the firms with the ability to “identify, assimilate and apply external knowledge to commercial ends” (Cohen and Levinthal, 1990).

The importance of the concept has been remarkable in fields such as strategic management (Lane *et al.*, 2006) technology management (Schilling, 1998), international business (Kedia and Bhagat, 1988), organizational economics (Glass and Saggi, 1998) and open innovation (Lichtenthaler, 2009; Spithoven *et al.*, 2010). However despite the huge increase in the absorptive capacity literature, a lack of consensus exists in its definition, dimensions and the measurement scales (Zahra and George, 2002; Lane *et al.*, 2006; Todorova and Durisin, 2007; Easterby-Smith *et al.*, 2008; Camisón and Forés, 2010; Sun and Anderson, 2010; Volberda *et al.*, 2010).

In an important contribution, Lane *et al.* (2006) assessed 289 articles about the concept of AC and found that most of the scholars have used this concept in a reified manner. In respond, they propose a new definition and model, helping to reconnect the concept to its roots and also including the relevant contributions made to the definition and dimension of the concept. Likewise, in a recent contribution, Volberda *et al.* (2010) performed a bibliometric study with which they identified which elements of AC have been used through the organization literature and the main researches gaps which need to be covered by future studies. However, none of the previews studies make a systematic assessment of the empirical support of the concept. They merely describe the way the concept has been measured, without any selection or evaluation criteria, and without explaining which of the different approaches and relations evaluated have received more empirical support.

The aim of the current study is to fill in the aforementioned gap by means of assessing the empirical support present in the AC literature to date. For doing this, we use an adapted version of the model employed by David and Han (2004) in the article “*A Systematic Assessment of the empirical support for transaction cost economics*” and the later used and modified by Newbert (2007) in the article “*Empirical research on the*

resource-based view of the firm: an assessment and suggestions for future research". This methodology in contradistinction to the theoretical review is more systematic and explicit in the selection of the studies (David and Han, 2004). Moreover, it allows for "the mitigation of the partiality resulting from subjectivism" (Newbert, 2007). The sample search and definition was done in 6 steps: (1) Searching for relevant articles (2) ensuring the substantive relevance (3) ensuring the empirical content of the articles (4) selecting articles published in multiple journals, (5) reading abstracts (6) exploring the whole articles.

From this methodology we obtained a final quantity of 78 remaining articles. From these articles, 76% (56) evaluate AC as an independent variable and assess its effect on organizational processes, including their inputs and output. The next 22% (17) consider AC as a dependent variable and examine the main internal and external antecedents that influence the dimensions and processes of AC. The last 4% analyze the elements that moderate the relationship between the antecedents and firm's AC.

By analyzing the 59 articles studying AC as an independent variable, we point out the number of individual test carried out for each variable, the number of tests supporting and the number of test contradicting to the theory. The articles classified in this category presented 464 individual test from which 293 (52%) were statistically significant. Similarly to David y Han (2004), we used a cut-off of $p < 0.05$ for statistically support to homogenize the results since some academics considered significance at $p < 0.10$ and others not considered it to values over $p < 0.05$.

In our analysis we identified different methods used to measure AC, which depended on the way it was defined and the nature of the antecedent considered as determinant of the term. We classified them into six groups: (1) *capability*, (2) *knowledge base*, (3) *human capital characteristic*, (4) *knowledge management activities*, (5) *inter organizational relationship* and (6) *organizational characteristic*.

In spite of the widespread use of the concept in the literature, it has just received a marginal support. Among the 59 articles evaluating the effect of AC on firm's inputs, outputs and processes, only less than half of the individual tests (51%) were empirically supported. Although the level of support seems to be low, these results are not fare from the ones obtained in others studies on the management strategic theories. For instance, David and Han (2004) and Newbert (2007), who used a similar methodology, found an empirical support of 47% and 53% for the empirical tests about the Transaction Cost

Economic theory (TCE) and the Resource Based View theory (RBV) respectively. Although the level of support achieved in a theory and another are not comparable, the above shows that our results are not atypical.

Another aspect to be underlined is that the level of empirical support changes substantially depending on the approach employed and the relationship assessed. For instances, the studies evaluating the effect of AC (measured as a capacity) on exploration processes and performance obtained an empirical support of 44% and 45% respectively. On the other hand, the studies using the knowledge based approach to analyze the above relationships, obtained an empirical support of 69% and 64%.

The previous knowledge has been considered as one of the main determinants of firm's AC. However AC not only represents the result R&D investment or manager experience, instead exists other elements related to the environment, the process and the organizational structures which play an important role (Lane and Lubatkin, 1998; Van den Bosch *et al.*, 1999; Lane *et al.*, 2001; Park, D Minbaeva and T Pedersen and I Bjorkman and C F Fey and H J., 2003; Jansen *et al.*, 2005; Lichtenthaler, 2009). According to these studies AC represents a multidimensional concept, therefore analyzing AC by considering previous knowledge as the only measure may provide a skewed view of the term.

Taking into account all of the above, it is not surprising that more frequently scholars combine different models to assess the multidimensional nature of AC. As a result, the empirical support obtained by each component will differ depending on the level of analysis (individual, intra or inter organizational) and on the variable used. For instance, the capacity approach has obtained in the last 4 years a considerable increase on the number of publications and the empirical support, which reached a minimum value of 75% for the total test examined. Likewise, there is a greater tendency to measure AC considering, apart from knowledge base, aspects like motivation, personal abilities and management mechanisms. This new guidelines have helped to confirm the multidimensional nature of AC and to show that R&D, patents and inter-organizational relationship are not enough to explain a firm's AC.

Finally, a last aspect to underline is the high variability on the constructs used to measure AC. In the 59 articles analyzed, we identified different measures and approaches used in order to evaluate the main components and dimensions of the term. All these represent a sample of the level of flexibility that the theory admits in its

applications and the lack of consensus still present in the literature. Moreover, the definition of AC developed by Cohen and Levinthal (1990), leaves term limits unclear, this resulting in scholars making use of the term according to their needs (Zahra and George, 2002, Lichtenthaler, 2009, Volberda et al., 2010).

In many reviews and papers it has been proposed a new re-conceptualization of the term. However, up to date there is no consensus about the dimensions and which element of a firm may have a deeper impact on the development of its AC. Future studies may try to integrate the measurements identified in the present study. These show a higher level of validity while capturing the multidimensional nature of the term.

References

- Camisón C, Forés B. 2010. Knowledge absorptive capacity: New insights for its conceptualization and measurement. *Journal of Business Research* **63** (7): 707.
- Cohen WM, Levinthal DA. 1990. Absorptive Capacity: A New Perspective On Learning And Inno. *Administrative Science Quarterly* **35** (1): 128.
- David RJ, Han S. 2004. A Systematic Assessment of the Empirical Support for Transaction Cost Economics. *Strategic Management Journal* **25** (1): 39.
- Easterby-Smith M, Graça M, Antonacopoulou E, Ferdinand J. 2008. Absorptive Capacity: A Process Perspective. *Management Learning* **39** (5): 483.
- Glass AJ, Saggi K. 1998. International technology transfer and the technology gap. *Journal of Development Economics* **55** (2): 369.
- Jansen JJP, Van Den Bosch,Frans A J., Volberda HW. 2005. Managing Potential and Realized Absorptive Capacity: How Do Organizational Antecedents Matter? *Academy of Management Journal* **48** (6): 999.
- Kedia BL, Bhagat RS. 1988. Cultural Constraints On Transfer Of Technology Across Natio. *Academy of Management Review* **13** (4): 559.
- Lane PJ, Koka BR, Pathak S. 2006. The Reification of Absorptive Capacity: a Critical Review and Rejuvenation of the Construct. *Academy of Management Review* **31** (4): 833.
- Lane PJ, Lubatkin M. 1998. Relative absorptive capacity and interorganizational learning. *Strategic Management Journal* **19** (5): 461.
- Lane P, Salk JE, Lyles MA. 2001. Absorptive capacity, learning, and performance in international joint ventures. *Strategic Management Journal* **22** (12): 1139.
- Lichtenthaler U. 2009. Absorptive Capacity, Environmental Turbulence, and the Complementarity of Organizational Learning Processes. *Academy of Management Journal* **52** (4): 822.

- Newbert SL. 2007. Empirical research on the resource-based view of the firm: an assessment and suggestions for future research. *Strategic Management Journal* **28** (2): 121.
- Park, D Minbaeva and T Pedersen and I Bjorkman and C F Fey and H J. 2003. MNC knowledge transfer, subsidiary absorptive capacity, and HRM. *Journal of International Business Studies* **34** (6): 586.
- Schilling MA. 1998. Technological lockout: An integrative model of the economic and strategic factors driving technology success and failure. *Academy of Management Review* **23** (2): 267.
- Spithoven A, Clarysse B, Knockaert M. 2010. Building absorptive capacity to organise inbound open innovation in traditional industries. *Technovation* **30** (2): 130.
- Sun P, Anderson M. 2010. An Examination of the Relationship Between Absorptive Capacity and Organizational Learning, and a Proposed Integration. *International Journal of Management Reviews* **12** (2): 130.
- Teece DJ, Pisano G, Shuen A. 1997. Dynamic Capabilities and Strategic Management. *Strategic Management Journal (1986-1998)* **18** (7): 509.
- Todorova G, Durisin B. 2007. Absorptive Capacity: Valuing a Reconceptualization. *Academy of Management Review* **32** (3): 774.
- Van den Bosch FA, Volberda HW, de Boer M. 1999. Coevolution of firm absorptive capacity and knowledge environment: Organizational forms and combinative capabilities. *Organization Science* **10** (5): 551.
- Volberda H, Foss N, Lyles M. 2010. Absorbing the Concept of Absorptive Capacity: How to Realize Its Potential in the Organization Field. *Organization Science* **21** (4): 931.
- Zahra SA, George G. 2002. Absorptive capacity: A review, reconceptualization, and extension. *Academy of Management Review* **27** (2): 185.