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Using fuzzy-set qualitative comparative analysis to develop an absorptive capacity-based view of training☆

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ABSTRACT

Numerous studies examine the importance of training on organizational performance, albeit without resolving how the transformation process occurs. This study bridges this research gap. The study presents a model that shows that absorptive capacity, particularly exploitation capability, mediates the relationship between training and organizational performance. Three analysis methods converge with the findings: case studies (6 cases), PLS-SEM (112 cases), and fsQCA (25 cases). Using these three data analysis methods in a single piece of research represents a considerable methodological contribution and enables the confirmation of the model's validity and robustness. Another of the contributions is that the use of fsQCA overcomes other methods' deficiencies.

1. Introduction

Training is a relevant factor for firms to gain competitive advantage because of training's positive effect on organizational performance (Alavi & Leidner, 2001; Bassi, Ludwig, McMurrer, & Buren, 2002). Nevertheless, although training receives considerable conceptual and empirical attention in the business literature, the process that transforms such training into organizational performance improvements remains unclear.

In response to the scarcity of research on this subject matter, this study builds on arguments from research by Hernández-Perlines and Yáñez-Araque (2015), adopting a dynamic capability focus as a conceptual basis to determine the linkages between training, absorptive capacity, and organizational performance.

Another strength of the study is combining different research methods—qualitative and quantitative, exploratory and confirmatory—to complement one another and validate a theory through hypothesis testing (Paulus, Woodside, & Ziegler, 2008; Symon & Cassell, 1998). The three methods are the case-study method, which is suitable for exploratory research (Woodside, 2010), partial least squares structural equation modeling (PLS-SEM), and fuzzy-set qualitative comparative analysis (fsQCA). This triple analysis is the first of the study's major contributions. The study demonstrates the value of fsQCA versus the case-study method and PLS-SEM. Using these three methods together mitigates the limitations of each individual method.

The second major contribution of this research is an important finding for firms. Training does not yield benefits in organizational performance unless absorptive capacity mediates the relationship between training and organizational performance. Furthermore, the exploitation capability is a necessary condition for this mediating effect to occur. The application of fsQCA leads to this conclusion.

Section 2 reviews the literature on training, absorptive capacity, and organizational performance. Section 3 describes the three analysis methods. Section 4 sets forth the results of the analysis. Finally, section 5 presents conclusions and a discussion of key findings.

2. Training, absorptive capacity, and organizational performance

The literature offers extensive analysis of training's effect on organizational performance. Some studies relate training to profit, productivity, and competitive advantage, whereas other studies relate training to other aspects of business revenue (Hernández-Perlines & Yáñez-Araque, 2015). Nonetheless, despite overwhelming evidence that training is important, neither scholars nor practitioners devote sufficient attention to the link between training and organizational performance.

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In part, this lack of attention owes to the scarcity of formal training models capable of explaining and predicting the training process and its effects (Barrutia, Landeta, Araujo, & Hoyos, 2014). Some authors argue that absorptive capacity (ACAP), acting as a mediating variable, can explain how firms transform training into organizational performance (Taubman & Wales, 1973).

Zahra and George (2002) present a fresh conceptualization of ACAP as a multidimensional construct representing the firm's dynamic capability to create and use knowledge relating to the firm's ability to compete. According to this conceptualization, ACAP comprises' four dimensions split into two capacities: potential ACAP (acquisition and assimilation) and realized ACAP (transformation and exploitation).

The link between training and ACAP lies in the very origins of the concept. Cohen and Levinthal (1990, p. 129) report that "the concept of absorptive capacity can best be developed through an examination of the cognitive structures that underlie learning". Hernández-Perlines and Yáñez-Araque (2015) provide a theoretical overview of the interlinking relationships between complementary concepts. These relationships help to show how training affects performance through the process of ACAP, thereby strengthening the linkages between training and ACAP.

Mediation hypothesis: ACAP positively mediates the relationship between the training of human resources and organizational performance.

Mathieu and Taylor (2006) define mediation in terms of understanding how some antecedent variable (X = training) affects a criterion variable (Y = organizational performance) through a mediating variable (M = ACAP). Accordingly, the mediation hypothesis must appear as two separate sub-hypotheses—which receive the name of propositions in the case study method—to allow the application of the case study and fsQCA methods in two stages (X - > M; M - > Y).

Acquiring new external knowledge is the antecedent of ACAP (Van den Bosch, Volberda, & de Boer, 1999; Zahra & George, 2002), whereas training is the input of ACAP (Cohen & Levinthal, 1990).

Proposition 1. (*H1*): *Training positively affects ACAP.*

Several studies focus on how organizational performance results from ACAP. In fact, empirical findings reveal a significant positive relationship between ACAP and organizational performance (Bergh & Lim, 2008; Jansen, Van den Bosch, & Volberda, 2005; Lane, Koka, & Pathak, 2006; Todorova & Durisin, 2007; Tsai, 2001; Yeoh, 2009; Zahra & George, 2002).

Proposition 2. (*H2*): *ACAP exerts a positive influence on organizational performance.*

3. Method

3.1. Selection and measurement of variables

This study analyzes a small number of variables from a broader research project. Specifically, the study investigates the following variables:

Training (*CONDF*). The study measured training (reflective first-order latent variable in PLS-SEM) using a seven-item scale that draws upon a valid five-item scale. The study used seven-point Likert scales for all indicators to collect data on whether the firm fosters the necessary training conditions to trigger ACAP (Castañeda & Fernández, 2007).

Organizational performance (*DORG*). The study measured this criterion variable using the scale of Camisón and Villar-López (2010). The scale has two dimensions: financial performance (five items) and satisfaction performance (four items). The measurement of all items took place using a seven-point Likert-type scale. In the PLS-SEM analysis, organizational performance is a molecular second-order latent construct whose two first-order dimensions are reflective. The measurement of these first-order dimensions used reflective indicators.

Absorptive capacity (*ACAP*). The study operationalizes ACAP as a multidimensional variable consistent with the proposal by Cohen and Levinthal (1990) and Lane et al. (2006). The measurement of ACAP used a four-dimension scale validated by Flatten, Engelen, Zahra, and Brettel (2011), who evaluate the extent to which the firm engages in knowledge-acquisition activities (acquisition, three items), assimilates acquired information with existing knowledge (assimilation, four items), transforms recently adapted knowledge (transformation, four items), and commercially exploits knowledge transformed into competitive advantage (exploitation, three items). All items used seven-point Likert response scales. For PLS-SEM, ACAP is a reflective second-order construct with four reflective first-order dimensions. Thus, although each dimension comprises different facets, the assumption is that all four dimensions should be present for the firm to possess genuine absorptive capacity.

Control variables. The control variables relate directly to criteria variables. Control variables are sector (dummy variable), firm size, and firm age.

3.2. Sampling and data collection

In Hernández-Perlines and Yáñez-Araque (2015), the gathering of information from different primary and secondary data sources fulfills the principle of triangulation to guarantee the research's internal validity. In the current study, data comes from the following sources. Firstly, the data-collection instrument; a self-report questionnaire comprising Likert-type items and open questions—similar to those in a semi-structured interview—acted as a pre-test for the definitive instrument STraDyCaF © (www.stradycaf.org). Secondly, the documentation that the firms provided upon request (annual reports, social-balance sheets, manuals and procedures, etc.). Finally, the consultation of other published documents: interviews with key informants and data retrieved from different business databases, principally Axesor and SABI (Sistema de Análisis de Balances Ibéricos).

The case studies correspond to six Spanish family businesses. This theoretical sample meets the selection criterion that required each firm in the sample to have a training department. Key informants were the Managing Director and/or Head of Training. Data collection took place between June and December 2012.

For the PLS-SEM, the sample comprises 112 valid cases. These cases contain no missing values for the variables under study. Managers received and responded online to the final questionnaire, entitled "Spanish Survey of Firm Training and Dynamic Capabilities" (STraDyCaF), between May and December 2014 via LimeSurvey Version 2.05 +—an open-source web application that specializes in creating and distributing questionnaires and managing target populations. All participants (Managing Director and/or Head of Training) received personalized emails, together with a cover letter introducing the research project. To encourage responses and improve the response rate, the questionnaire followed a responsive web design, whereby managers could respond using mobile devices, including a text-to-speech assistant similar to CATI (computer-assisted telephone interviewing) systems. Sample selection used simple random sampling to ensure representativeness. The sample consists of Spanish firms from the entire country, having more than 50 workers, and operating in any sector except public administration.

The sample consisted of 112 cases until the PLS-SEM analysis was complete. To test the propositions using fsQCA, the calibration of relevant data took place for an illustrative random group of 25 firms from the dataset (Ragin, 2000).

3.3. Data analysis: combination of methods

This study employs three analysis methods. The first is the case study. Case studies allow a thorough examination of complex processes