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# Examining learning strategies, creativity, and innovation at SMEs using fuzzy set Qualitative Comparative Analysis and PLS path modeling

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## ABSTRACT

Some degree of ambiguity and inconsistency in organizational learning capability and its outcomes still exists, especially among small and medium-sized enterprises (SMEs). This study argues that exploitative learning strategy, explorative learning strategy, improvisational creativity, and compositional creativity are several antecedents (causal conditions) of innovation as an outcome (solution) within SMEs. This study analyzes data from a survey of 206 top managers of SMEs using PLS-structural equation modelling (PLS-SEM) and fuzzy set Qualitative Comparative Analysis (fsQCA) to demonstrate innovation and its dependence on combinations of complex antecedent conditions and various alternative paths. Though the results of the PLS-SEM analysis support the hypothetical paths except explorative learning and compositional creativity; the fsQCA findings indicate conditional support for the proposed antecedents and outcomes except explorative learning and exploitative learning. Furthermore, the complex solutions of the fsQCA analysis indicate that five combinations sufficiently explain innovation.

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## 1. Introduction

This new century is one of economic complexity, change, variety, and a high degree of specialization (Hitt, Ireland, & Lee, 2000), in which hyper competition results from fast technological change and other factors that increase economic uncertainty (D'aveni, 2010). Accordingly, the success factors to cope with this situation are different; few tangible assets withstood the 2008 recession, and many large enterprises filed for bankruptcy. Thus, firms should turn to intangible business and personal assets, such as individuals' ability to learn and practice knowledge creation and assimilation as sources of competitive advantage (Santos-Vijande, López-Sánchez, & Trespalacios, 2012). Hence, organizational learning capability and its potential contribution to creativity and innovativeness is an interesting topic for both academicians and practitioners alike.

Firms today compete in dynamic markets, requiring them to explore new possibilities for adapting to the environmental changes that will occur in the near future while exploiting their abilities to meet current demands (Lavie & Rosenkopf, 2006). Sustained innovation requires firms to explore new capabilities and exploit current capabilities (Wang & Hsu, 2014), which rely on explorative and exploitative learning within the organizational learning domain (Tamayo-Torres, Gutierrez-Gutierrez, & Ruiz-Moreno, 2014).

Firms must learn about their environments because learning is the appropriate response to uncertainty (Lei, Hitt, & Bettis, 1996). While companies strive to become learning organizations (Calantone, Cavusgil, & Zhao, 2002), the current literature does not explain the influence of exploitative and explorative learning strategies on employees' improvisational and compositional creativity. Mbengue and Sané (2013) call for research to operationalize the concept of organizational learning. Using March's (1991) organizational learning theory, this study divides learning capability into exploitative learning strategies and explorative learning strategies, where the former denotes applications of current knowledge from inside the company and the latter refers to the use of external knowledge and technologies. Furthermore, this study categorizes creativity into improvisational and compositional creativity using Sawyer's (1992) definitions. Borrowing from organizational improvisation theory, improvisational creativity is an amalgamation of intuition and spontaneity that results in improvisational knowledge (Vera, Nemanich, Vélez-Castrillón, & Werner, 2014). "Improvisation is not just something individuals do but it is a learned capacity that organizations can manage" (Cunha, Neves, Clegg, & Rego, 2015, p. 511). For organizations to improvise, they need "insight, rapid experimentation and evolutionary learning" (McGrath, 2010, p. 247). Organizations with hypercompetitive characteristics (Wiggins & Ruefli, 2005) value improvisation as a means to devise strategy and react to difficult situations and unpredictable events (Magni & Maruping, 2013) via real-time learning (Cunha et al., 2015). Learning and improvisation are interrelated (Leybourne & Kennedy, 2015), and

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firms can learn and manage improvisation (Cunha et al., 2015). On the other hand, compositional creativity is a lower degree of creativity that leads to variations and enhancements in ideas, processes, products, and services (Fisher & Amabile, 2009). Hence, the difference between improvisational and compositional creativity is in two factors: time and novelty.

Moreover, SMEs contribute to the global economy substantially (Singh, Garg, & Deshmukh, 2009) and compete for market share with big enterprises. SMEs are agile companies and drivers of innovation, representing the basic units of developed countries. In addition, SMEs have a considerable growth effect on developing countries (Singh et al., 2009). Since SMEs show high levels of flexibility and agility, they will likely practice learning strategies more easily. In contrast, large firms tend to show resistance to change and have difficulty changing current business processes given the costs; thus, large firms are unlikely to accept new technology and knowledge as readily as SMEs. Thus, SMEs have opportunities to use their learning capabilities to foster creativity and innovation and remain competitive. Cassidy (2004) points out that the literature on educational learning is plentiful, but few studies consider the role of learning strategies on employee creativity at the organizational level (Gong, Huang, & Farh, 2009; Hirst, Van Knippenberg, & Zhou, 2009), and no research examines the alternative complex combinations (i.e., casual recipes) of the organizational learning strategies that lead to improvisational creativity, compositional creativity, and innovation.

The literature therefore still contains some degree of ambiguity and inconsistency regarding organizational learning capability, and its potential outcomes, especially in the case of SMEs. This study investigates several pathways of complex antecedents by which organizational learning strategies facilitate improvisational creativity, compositional creativity, and innovation (Fig. 1) with organizational learning theory and organizational improvisation theory as the foundation.

The next section provides the theoretical background. Subsequently, this study uses PLS-SEM to provide symmetrical “net effect” explanations (linear relationships among variables) and fsQCA to provide a holistic view of the interrelationships (asymmetrical relationships between variables) that collectively affect innovation. The last section discusses this study’s contributions, managerial implications, limitations, and future research directions.

## 2. Theoretical background

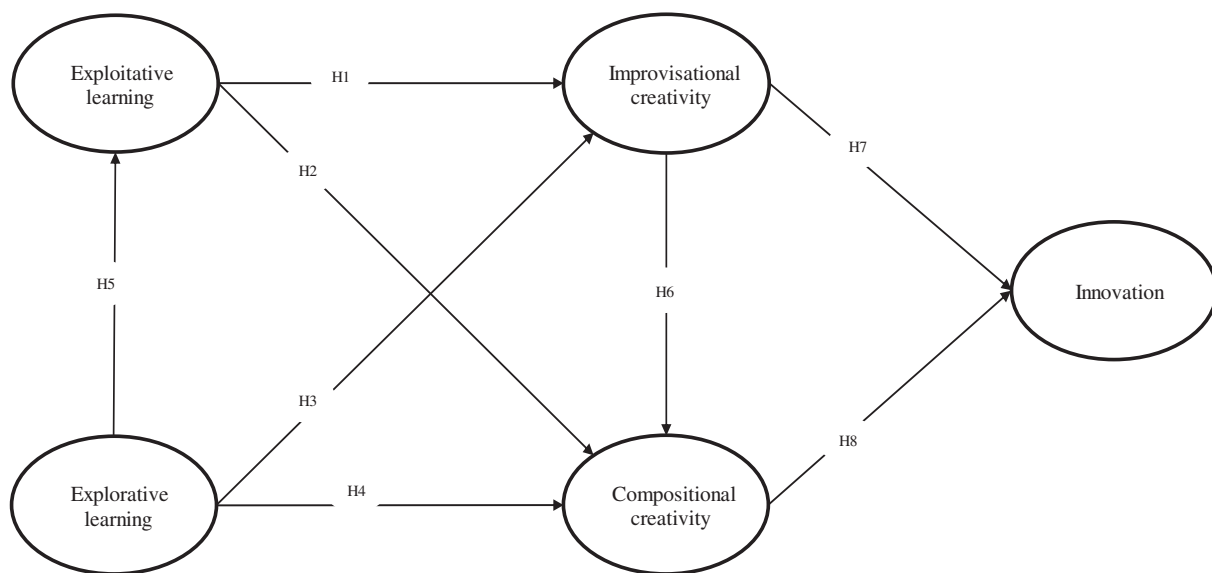
### 2.1. Organizational improvisation theory

Cunha, Kamoche, and Cunha (2003) define organizational improvisation as “the conception of action as it unfolds, by an organization and/or its members, drawing on available material, cognitive, affective, and social resources” (p. 103). They also indicate that organizational improvisation is an obscure concept, and divide improvisation literature into two generations to explain the evolution of improvisation theory in three stages. In the first generation, researchers (Mirvis, 1998; Weick, 1998) investigate improvisation in art and music, especially Jazz. The second generation (Crossan, 1998; Crossan, Lane, White, & Klus, 1996) extends the research to organizational improvisation in business settings using empirical studies. In short, the first generation of authors adapted the features of Jazz music and improvisation theater to an organizational setting to develop the theory (Cunha et al., 2003), while the second generation extends the research into business and personal experiences in organizations (Moorman & Miner, 1998).

Researchers in the third phase of theoretical development revisit studies from the first generation to formally define the concept and features of improvisation (Hatch, 1997; Weick, 1998). Researchers measure improvisation quantitatively at both the individual levels in terms of team leaders (Magni, Proserpio, Hoegl, & Provera, 2009) or relationships between supervisors and individuals (Nisula, 2015) and the organizational level in terms of team improvisation in new product development projects (Magni, Maruping, Hoegl, & Proserpio, 2013) and the improvisational capabilities of R&D teams (Vera et al., 2014).

### 2.2. Organizational learning theory

Fiol and Lyles (1985) define organizational learning as a change in the organization’s knowledge as a function of experience. Dodgson (1993) argues disciplines rarely agree on the concept of organizational learning: the economic literature considers learning as quantifiable improvements in activities while the management and business literature views learning as a comparative competitive advantage. Early studies divide organizational learning into low- and high-level learning in terms of cognition development (Dodgson, 1993). Lichtenthaler (2009) classifies organizational learning into three processes: explorative learning,



**Fig. 1.** Theoretical research model (hypothetical assessment (symmetrical) using PLS-SEM technique\*). Note: \*For fsQCA methodology (asymmetrical), antecedents (causal conditions (exploitative learning strategy, explorative learning strategy, improvisational creativity, compositional creativity) are several subset/s of innovation (outcome condition or solution).

exploitative learning, and transformative learning, all of which have complementary effects on organizational learning and overall performance. Crossan and Sorrenti (1997) indicate that organizational learning requires that organizations to plan, vision, transact, and improvise.

From the knowledge-based view of the firm (Spender, 1996), organizational learning represents refinement (exploitative learning) and renewal (explorative learning) of knowledge. Renewing knowledge assets means the ability to learn and explore novel knowledge while exploiting existing knowledge (Jaw & Liu, 2003). Organizational learning occurs in a context (Glynn, Lant, & Milliken, 1994) that consists of “both the organization and its external environment” (Argote, 2013, p. 33). March (1991) theorizes organizational learning as an exploitation of old certainties and an exploration of new possibilities.

### 2.3. Exploitative learning strategy

March (1991, p. 71) views exploitation in organizational learning as “refinement, choice, production, efficiency, selection, implementation, and execution.” Gupta, Smith, and Shalley (2006) classify exploitation and exploration in terms of the amount of learning. Exploitative learning is low-risk (Vanhaverbeke, Beerkens, Gilsing, & Duysters, 2004), and thus presents only a low degree of uncertainty to the business. An extreme focus on exploitative learning strategies can have negative results in the form of low levels of innovation leading to inertia (Schildt, Maula, & Keil, 2005; Vanhaverbeke et al., 2004). Schildt et al. (2005) argue that an exploitative learning strategy is short-term and meets the needs of a current market and customer requirements. After meeting these needs, a company can follow an explorative learning strategy to extend its business by introducing new technology, novel ideas, and new knowledge from the external environment.

Furthermore, the relationship between exploitative learning strategy, creativity, innovation, and performance at both the organizational and individual level is still ambiguous. Some studies find positive relationships between exploitative learning and outcome dependent variables (Hahn, Lee, & Lee, 2015) such as strategic entrepreneurship, strategic resource management, and competitive advantage (Kyrgidou & Petridou, 2011) and open systems performance (Hernández-Espallardo, Sánchez-Pérez, & Segovia-López, 2011). However, other studies do not find relationships between exploitative learning strategy and performance in terms of profit (Sirén, Kohtamäki, & Kuckertz, 2012), between exploitative product development and new product differentiation (Lisboa, Skarmeas, & Lages, 2011), and between exploitation-based innovation and rational goal performance (Hernández-Espallardo et al., 2011). Despite these contradictory results for exploitative learning strategy and the outcome variables, few studies address the effect of exploitative learning strategy and SMEs' creativity and innovativeness. Therefore:

**H1.** There is a positive relationship between exploitative learning strategy and improvisational creativity.

**H2.** There is a positive relationship between exploitative learning strategy and compositional creativity.

### 2.4. Explorative learning strategy

Exploration in organizational learning refers to “search, variation, risk taking, experimentation, play, flexibility, and discovery” (March, 1991, p. 71), and extends to using knowledge and technologies from the external environment. The new knowledge may be internal or very novel external information. Explorative learning can be a valid choice, though this choice can take firms away from the original goals (Vanhaverbeke et al., 2004) while they use external knowledge to complement internal knowledge and technology, or impose high costs from experimentation, incompetence, or undeveloped ideas. Explorative learning is a long-term goal to achieve after practicing an exploitative

**Table 1**  
Sample characteristics ( $N = 206$ ).

	Characteristics	Frequency	%
Gender	Male	147	71.4
	Female	59	28.6
Age	Between 20 and 29	148	3.4
	Between 30 and 39	51	71.8
	Between 40 and 49	7	24.8
Position in company	CEO	128	62.1
	CFO	12	5.8
	COO	5	2.4
	CIO	4	1.9
	Other executives	13	6.3
	Managers	44	21.4
Number of employees	Between 5 and 20	100	48.5
	Between 21 and 50	61	29.6
	Between 51 and 100	39	18.9
	Between 101 and 150	6	2.9

learning strategy to enter new markets and create new ideas, products, and services. Researchers currently use the terms exploration and exploitation to find a balance between them (Schildt et al., 2005; Vanhaverbeke et al., 2004) and express the challenges the firms currently face (Haanaes, 2016).

Some studies report positive associations between exploration and open system performance (Hernández-Espallardo et al., 2011), competence exploration and entrepreneurial mindset and innovative capabilities (Kyrgidou & Petridou, 2011), and that explorative learning style moderates the relationship between supplier innovativeness and manufacturer performance (Azadegan & Dooley, 2010). However, other studies find negative associations between top management teams' exploratory and exploitative learning and new product performance (Atuahene-Gima & Murray, 2007) and no direct association between exploration strategy and profit performance (Sirén et al., 2012). Both explorative and exploitative learning do not show curvilinear relationships with new product performance (Sirén et al., 2012). In contrast, Li, Chu, and Lin (2010) find that both exploitative and explorative learning have curvilinear effects on new product performance. Lisboa et al. (2011) also find no association between explorative market-related capabilities and new product differentiation in exporting firms. This review shows the inconsistent results in the current literature and that no studies examine the role of explorative learning strategy, improvisational creativity, and compositional creativity at SMEs. Accordingly:

**H3.** There is a positive relationship between explorative learning strategy and improvisational creativity.

**H4.** There is a positive relationship between explorative learning strategy and compositional creativity.

Finally, researcher must determine whether learning strategies are bi-directional or unidirectional given that this relationship is still unknown. For instance, Hahn et al. (2015) find a positive relationship between exploitation and exploration, but other researchers believe that exploitative learning occurs during explorative learning (Atuahene-Gima & Murray, 2007; Schildt et al., 2005) and exploration creates opportunities firms can later exploit (Lavie, Stettner, & Tushman, 2010). Organizational learning is continuous and this study posits that explorative learning can trigger exploitative learning by adding new knowledge to the current knowledge pool. Therefore:

**H5.** There is a positive relationship between explorative and exploitative learning strategy.

### 2.5. Improvisational creativity, compositional creativity, and innovation

Creativity occurs in all aspects of life, from art and music to business and industrial practices that result in novel processes, ideas, services,