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***Resumen*—** La relación entre la innovación organizacional y tecnológica y su efecto en el desempeño empresarial ha recibido atención por la literatura con perspectivas divididas. Ambos modos de innovación se consideran fuentes importantes de ventaja competitiva. La evidencia empírica hasta ahora indica dos direcciones con respecto a la relación entre la innovación organizacional y tecnológica: aquellos que indican que la innovación organizacional posibilita la innovación tecnológica, y aquellos con una perspectiva opuesta. La evidencia reciente sugiere mantener un enfoque holístico para comprender la relación intrínseca entre las actividades innovadoras de una empresa. Este estudio utiliza la visión de capacidades dinámicas de las organizaciones e implementa un análisis fuzzy-set comparativo cualitativo (fsQCA) para una muestra de empresas en América Latina, con el objetivo de observar interacciones causales complejas entre los atributos de una empresa y diferentes formas de innovación que conducen a un alto desempeño. Los resultados muestran varias soluciones equifinales que conducen al éxito empresarial. Además, los resultados identifican tres arquetipos diferentes de empresas basados en comportamientos de innovación.

Palabras claves*—innovación tecnológica, innovación organizacional, fuzzy-set QCA, desempeño empresarial.*

***Abstract*—**The relationship between organizational and technological innovation and its effect on firm performance have received attention for the literature with divided perspectives. Both modes of innovation are considered as important sources of competitive advantage. Empirical evidence so far indicates two directions regarding the relationship between organizational and technological innovation: those supporting that organizational innovation enables technological innovation, and those with the opposite perspective. Recent evidence suggests a holistic approach to understand the intrinsic relationship between the firm's innovative activities. This study uses the dynamic capabilities view of the firm and implements a fuzzy-set qualitative comparative analysis (fsQCA) for a sample of enterprises in Latin America, to clarify complex causal interactions of the firm's attributes and different forms of innovation leading to high performance. The results show several equifinal solutions leading to business success. Additionally, the results identify three different archetypes of firms based on innovative behavior.

Keywords*—technological innovation, organizational innovation, fuzzy-set QCA, firm performance.*

I. Introduction

Innovative behavior of firms entails an arrangement of activities, comprised by the development of new products, improving processes and complement such activities with organizational innovations. Research exploring the relationship between non-technological and technological innovation recognizes that competitive advantage is attributed to both types of innovation [1].

Organizational innovation involves the adoption of new methods for organizing routines, new methods for distributing and structuring responsibilities and new ways for organizing external relations [2]. These activities convey an iterative process within an organization with an impact on its operating routines and therefore contributing to firm performance [3], this distinctive nature categorizes organizational innovation as a non-technological process.

Several authors have addressed the bias towards technological innovation [4], indicating the limited attention received by organizational innovation in the literature [5]. This mode of innovation is relevant in the business context since it offers a long-lasting source of competitive advantage [6], and allows the creation of tacit knowledge [7]. Common business practices perceived as organizational innovations are varied and includes knowledge sharing and learning within the

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firm, organization restructuring, distribution of activities and collaboration with external entities [2].

Empirical evidence so far indicates two directions regarding the relationship between organizational and technological innovation: those supporting that organizational innovation enables technological innovation [8, 9], and those with an opposite perspective [10, 11]. These studies are qualitative and even though they offer detailed insights about this topic, they are constrained to its specific context and analytical techniques, limiting the possibility to observe complex interactions of variables influencing innovative behavior [4].

Recently, Černe et al. [12] conducted a profound analysis of the field of non-technological innovation, suggesting the necessity to understand the complementarities between non- and technological innovation under an integrated perspective. Additionally, most of the studies of organizational innovation are merely descriptive and only a handful invoke a specific theory [1].

This study addresses this problem recalling the dynamic capabilities view of the firm and by using a fuzzy set qualitative comparative analysis (fsQCA) to explore the relationship between organizational and technological innovation under a holistic perspective.

Dynamic capabilities are defined as "the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments" [13], and it provides the theoretical framework to understand how organizations achieve competitive advantage. Superior performance is obtained through the creation of difficult to replicate tangible and intangible assets.

By using fsQCA is possible to discover different configurations of multiple interrelated variables leading to the same desired output [14], and enables wider interpretations of intrinsic relationship in comparison with traditional regression techniques. This particular technique has not received wider attention in the field of innovation with minor exceptions [4, 15, 16, 17]. Moreover, fsQCA is suitable to explore and pragmatically organize multiple complementarities among the variables of interest explaining a desirable outcome.

This study aims to provide a holistic perspective of the firm's innovation behavior by answering the following questions. First, what is the relationship between organizational and technological innovation? Second, what are the complementarities of these types of innovation on explaining firm performance?

Section 2 of this study presents the theoretical background of dynamic capabilities and innovation complementarities. Section 3 describes the research model and the data. Section 4 provides the research findings and Section 5 concludes this article.

II. Theoretical Background

A. Dynamic Capabilities view of the organization

The theoretical framework provided by the dynamic capabilities view of organizations allows understanding the firms' capacity to obtain competitive advantage in changing environments. The dynamic capabilities view of the firm discusses the key role of strategic management in appropriately adapting and reconfiguring internal and external resources to address environmental uncertainty [13]. The main premise argues that firm performance is increased by relying on valuable, rare, inimitable, and non-substitutable tangible and intangible resources [13, 18]. The nature of dynamic capabilities is recognized as the firm's capacity to modify its resource base [3] and also to develop new routines [19, 20].

Most recent evidence shows that dynamic capabilities facilitate a firm's innovative behavior, it is an important determinant of organizational innovation [5] and influence firm performance through technological innovation [21].

B. Organizational innovation

Organizational innovation literature has evolved from previous conceptualization of the topic to become one main focal point in management research, receiving equal consideration as technological innovation to become a fundamental source of competitive advantage. Early studies aimed to investigate the adoption of organizational innovation. Daft [22] presented a dual model of innovation, mentioning that innovations take part in the administrative and technical system of an organization. The emergence of organizational innovation arises from new ideas that can flow within a firm from top to bottom (administrative innovation) or from bottom to top (technical innovation). This conceptualization influenced organizational innovation research. Kimberly & Evanisko [23] and Damanpour & Evan [24] explored the impact of administrative and technological innovations on performance, under the concept that 'innovations at the organizational level may involve the implementation of a new technical idea or a new administrative idea" [24]. Later, Damanpour´s [25] influential work explained organizational innovation pertaining also technological innovation. These perspectives on the topic brought confusion to the field, suggesting that organizational innovation also includes the development of new products or processes [12].

Consequently, organizational innovation is divided by the emergence of managerial innovation or non-technological innovation. Birkinshaw et al. [26] defined management innovation as the "invention and implementation of a management practice, process, structure, or technique that is new to the state of the art and is intended to further organizational goals". This concept entails all new business practices that are implemented as the result of managerial decisions and wide is the literature under this umbrella [6, 7, 27]. Damanpour & Aravind [7] mentioned that the concept of organizational, administrative and managerial innovation overlaps significantly, since previous research aimed to differentiate the term from technological innovation.

The OECD provides the most accepted and used definition of organizational innovation as the "implementation of a new organizational method in the firm's business practices, workplace organization or external relations" [28, 29, 30, 31, 32, 33]. This approach differs from previous definitions [32] and it is used by this study. This concept of organizational innovation considers not only new managerial and working concepts and practices within the organization, but also contemplates new business practices aiming to pursue external relations [28]. In contrast, technological innovation refers to the introduction of new products and processes within the firm [2].

C. Organizational and technological innovation complementarities

The antecedents that enable organizational innovation are typically attributed to factors related to leadership capabilities, managerial levers and business processes [1], in contrast R&D intensity and technological assets are important preconditions for technological innovation [12]. However, prior research exploring the combined effect of these two modes of innovation on firm performance is divided.

The first perspective indicates that organizational innovation is an antecedent of technological innovation [8, 9, 30, 31, 32, 34, 35]. The implementation of new business practices, external relations and workplace organization improve processes and manufacturing efficiency [32]. Mothe et al. [9] found that new methods for organizing routines and external relations affect product innovation. Organizational innovation allows structural flexibility and knowledge articulation within a firm, promoting the generation of new ideas in the technical domain of an organization.

The second perspective considers that technological innovation promotes organizational innovation [10, 11, 27, 28, 36, 37]. Ganter & Hecker [36] explained that in highly competitive markets product and process innovation triggers the adoption of organizational innovation to overcome environmental rigidities. Mol & Birkinshaw [27] mentioned that the quality of organizational innovation adoption is potentially more important than performance based on R&D investment for product development. The implementation of organizational innovation often entails unobserved R&D processes shared with external entities through cooperation or technology transfer, therefore the relationship among technological innovation (i.e. product and process innovation) and new organizational methods are highly correlated [4].

The aforementioned studies properly explain that competitive advantage arises from a combination of different modes of innovation, explaining that superior firm performance is the result of both organizational and technological innovation. However, most studies are limited to the country-specific context and the cross-sectional nature of the data, suggesting the discrepancies of the findings and inconclusive results. Černe et al. [12] suggested the necessity to investigate different interactions and effects between organizational and technological innovation. This study addresses this issue and contributes with further evidence using fuzzy QCA analysis to evaluate different complex combinations of innovation types and its effect on firm performance.

D. Fuzzy-set QCA and innovation

The number of scientific articles applying fuzzy set qualitative comparative analysis (fsQCA) to business and management research has been on the rise in the last few years [14]. Research generally focus to investigate the internal environment of an organization, entrepreneurship activities, processes and organizational structure on specific organizational outcomes. However, almost 10% of the fsQCA research strictly accounts for the field of innovation [38].

Even though it is outside the scope of this study to provide a complete literature review, most recent evidence regarding innovation is presented. Ganter & Hecker [4] explored the configurational paths explaining the adoption of organizational innovation, demonstrating the complex complementarities among organizational context and technological innovation variables on predicting high organizational innovation adoption. Hervas et al. [39] explained the different combination of firm attributes, R&D investment and technological innovation on explaining four possible organizational innovation effects on firm performance. Ali et al. [15] showed the causal effect of absorptive capacity in combination with technological and management innovation on high-performance firms. Ordanini et al. [17] studied new service innovation based on organizational adoption drivers. Reichert et al. [40] found that different configurations of firm-level capabilities lead to high innovation performance. Other articles study country-level innovation behavior, for example, Coduras et al. [41] studied social and individual attributes in countries associated with high entrepreneurial activity, and Crespo & Crespo [16] discussed several causal conditions considering macro innovation drivers leading to innovation performance in high and low-income countries.

III. Data and Methods

A. Model description

The selection of the variables in the model described in Figure 1 builds upon the foundations of the previous research conducted by [4]. However, we expand that model considering different forms of innovations and contextual factors in constructing configurations of performance. This study uses fsQCA to identify configurational paths of organizational and technological innovation and other conditions leading to firm performance.

The conditions considered as firm attributes are size and education [27, 36], while innovation types include organizational, product and process innovation [2]. The model also considers business inhibitors to capture the firm's barrier to innovation activities. The outcome of the model is represented as firm performance.

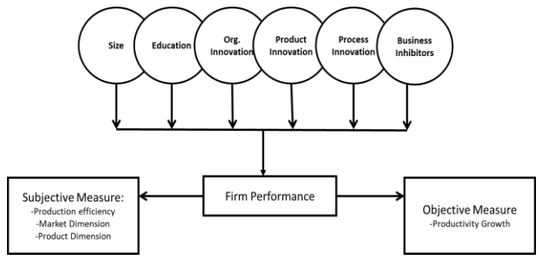

Fig. 1. Research model

B. Data and measurements

This study uses data from the Enterprise Survey conducted by the World Bank in the Latin American region [42]. The survey methodology considers the enterprise as the unit of analysis and conveys two types of questionnaires that depend on whether an establishment belongs to the manufacturing or service sectors. Sample data from the manufacturing module that covers a period from 2007 and 2009 is used. The countries included in the sample are Argentina, Bolivia, Colombia, Mexico, Panama, Peru, Paraguay, Uruguay, Venezuela, Chile, Ecuador, Salvador, Honduras, Guatemala, Nicaragua, Costa Rica, Dominican Republic, Jamaica and Trinidad and Tobago, resulting in a pool data of 9.336 observations. For the purpose of this study, firms that were stablished after 2007 are

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eliminated and following [4] and [27] the data is cleansed by dropping fully unobserved cases; this measure leaves a sample of n=3.997 observations.

The operationalization of the variables of interest are presented below.

1) Condition variables

Firm size: this study uses the number of full-time employees during the last fiscal year (2009).

Education: this variable measures the education level of labor as a percentage of workers who have at least a bachelor's degree in the total workforce.

Business inhibitors: is a variable that captures the effect of environmental conditions on firm behavior. Business inhibitors in this study are those that limit the firms' flexibility and independence to pursue effective business functioning. The operationalization of this variable refers to the degree of perceived obstacles in different aspects gathered from the survey. The possible answers are 'No obstacle', 'Minor obstacle', 'Moderate obstacle', 'Major obstacle' and 'Very severe obstacle.' Inhibitors factors considered for this variable are 'Practices of competitors in the informal sector, 'Access to finance', 'Tax rate', 'Economic/Political instability', 'Customs and trade regulations', 'Labor regulations', and 'Inadequate labor force'. In each case, we coded any degree of an obstacle as '1' and no obstacle as '0'. The number of cases results in a measure between '0' and '7' [36].

Product innovation: is a dummy variable that represents whether a firm has introduced any new or significantly improved products.

Process innovation: is a dummy variable that represents whether a firm has introduced new or significantly improved process for producing or supplying products.

Organizational innovation: the operationalization of this variable measures the extent of adoption of new organizational practices [27], and extracted from the "Business Development Services" section of the survey. Establishments were asked whether over the last three years have implemented any of the following four activities. The first response is in regards to improving quality control or training to obtain quality certification. This indicator captures the implementation of practices to prepare the firm for obtaining certifications to improve the quality of products. Examples include local or regional standards, ISO certification, safety and sanitary certifications or verifying quality management systems. The second response is in regards to developing business alliances with other suppliers or clients. Alliances refer to promoting interactions with other firms to improve business functioning and opportunities. Examples include participation in competitiveness programs, cluster promotion programs or supplier development programs or others seeking business partnerships. The third response is in regards to promoting exports. In this case, activities designed specifically to support exporting are considered. Examples include market identification, participation in trade fairs, coordination with trade offices overseas, or human resource development to enhance export capacity. The fourth response is concerning the use of any programs, technical assistance or training on information technology, management, accounting or other functions such as marketing and logistics. This category considers back-office operation to run the establishment properly, relying on information technologies and other types of technical implementations. Examples include software for exports, accounting, human resources, and inventory or management control systems [42]. Each item from the four responses is coded as '1' for implemented and '0' for otherwise. Therefore, a categorical variable is created by counting the number of activities introduced by the firm on a scale from '0' to '4'.

2) Outcome variables

The outcome variable on which configurational paths are going to be examined is firm performance. This study uses an objective and subjective measure of performance.

Firm performance: this subjective measure captures the effect of the introduction of organizational innovation in three dimensions [39]. The market dimension is whether the firm reports benefits on 'increase sales in the domestic market' and 'opened new foreign market'. The product dimension is whether the firm reports benefits on 'increase number of goods offered by the establishment', 'improved quality of goods and services' and 'obtained quality or export certification'. The production efficiency dimension is whether the firm reports benefits on 'reduced unit production costs' and 'reduced energy consumption'. The number of cases where respondents gave positive answers are coded as 1, resulting in a measuring scale from 0 to 7.

Productivity: this objective variable is based on [27] and measures productivity growth between 2007 and 2009, to include a time lag to the model. Therefore, productivity growth is computed as (2009 sales/employees 2009) / (2007 sales/employees 2007) – 1.

C. Qualitative comparative analysis fsQCA

Fuzzy-set QCA allows with Boolean algebra and set-theoretic method for the assessment of multiple causal conditions or their combination that lead to an outcome. Fuzzy set QCA is an approach as well as a useful technique for cross-case analysis [38]. Rather than investigating the net effect of independent variables, fsQCA identify the relationship between an outcome and all possible combination of the variables of interest. Therefore, it is possible to observe the equifinality of different combinations of independent variables in reaching the same outcome [43, 44].

This method allows us to differentiate between necessary and sufficient causal condition of the firm´s innovative behavior and performance [4, 43], necessary causal conditions are firm-specific attributes, while sufficient causal conditions indicate a possible alternative combination of those attributes.

The literature has discussed the potential benefits of fsQCA in contrast to its counterpart traditional statistical techniques. First, it allows us to investigate causal conditions and establish analytical research in a middle ground between quantitative and qualitative techniques [14]. Second, most correlation-based research analyzes the effect of variables in isolation, while regression analysis estimates the fitness of a single path to an outcome [45, 46]. Third, fsQCA seems an appropriate technique to supplement regression analysis when the relationships between conditions and outcomes are asymmetric [14].

D. Data calibration

This study used fsQCA and data calibration relies on the package fuzzy for Stata 13.0. Data calibration consists of two

TABLE I. MEAN, STANDARD DEVIATION AND CORRELATION AMONG VARIABLES. N = 3997

	Variables	Mean	SD	1	2	3	4	5	6	7	8
1	Firm performance	2.79	2.14	1.00							
2	Productivity growth	0.16	0.45	0.01	1.00						
3	Organizational innovation	1.71	1.32	0.73	0.00	1.00					
4	Product innovation	0.59	0.49	0.28	0.02	0.28	1.00				
5	Process innovation	0.49	0.50	0.32	0.00	0.31	0.39	1.00			
6	Size	158.85	623.74	0.18	-0.02	0.17	0.08	0.07	1.00		
7	Education	14.38	17.88	0.22	0.01	0.27	0.08	0.09	0.06	1.00	
8	Business inhibitors	5.36	1.62	0.17	0.00	0.17	0.16	0.11	0.06	0.05	1.00

steps, identify the target set and data transformation. The independent variables are calibrated using the transformation rule (stdrank), which rank orders the variables and then standardizes this ranking to range from 0 to 1 [47]. The standardization consists of subtracting the rank value with the minimum rank and dividing the outcome by the difference between the maximum and minimum rank.

The focus of this study is the set of firms with high performance as the result of implementing different types of innovations, and the objective is to use performance indicators to rate the degree of membership in this set. Two individual analyses are implemented for both, the subjective and objective measure of firm performance.

To calibrate the dependent variables, the direct method is utilized [see 44]. The direct method uses three qualitative anchors to structure calibration: the threshold for full membership, the threshold for full non-membership, and the cross-over point [48]. The data is calibrated in terms of the deviation from the cross over point, and once these values have been properly identified, it is possible to allocate the degree of membership to the target set. The anchors of the dependent variables are based on the following: productivity growth and firm performance are variables that have been transformed into fuzzy set following [45], using the 25th, 50th and 75th quantiles for the threshold of full non-membership, crossover point and threshold of full membership respectively. In other words, the target set (high performers) are firms that have reported at least four performance improvements for the subjective measure, and firms with productivity growth greater than 18% for the objective measure (see third quantile in Table II).

Data calibration generates a truth table used by the fuzzy algorithm to observe all possible combination (cases) of independent variables (conditions) explaining a particular outcome consistent with a cut-off value of 0.8 [48]. The algorithm shows optimal reduction sets leading to the outcome. Consistency is comparable to a correlation; it expresses the number of cases consistent with the outcome [39]. Coverage is comparable to a coefficient of determination, it asses the empirical relevance of the condition in view [4].

IV. RESEARCH FINDINGS

The analysis consists of two parts; first, it evaluates all possible solutions explaining firm performance improvement and a subsequent analysis to understand the productivity growth.

Table I and Table II contain descriptive statistics of relevant variables. In average, firms report to have adopted at least two out of four new organizational methods, 60% introduced new improved products, 50% new improved processes and the perception of business inhibitors are highly distributed among firms.

A. Configurational paths explaining firm performance

Table III shows the results of the fsQCA considering the subjective measure explaining high firm performance. The solution table presents three optimal solutions, black circles

TABLE II. UNCALIBRATED DATA AND TRANSFORMATION FOR FUZZY-SET QCA ANALYSIS

Variable	Statistics									
	Min		First quantile		Median		Third quantile		Max	
	Un-calibrated	Calibrated	Un-calibrated	Calibrated	Un-calibrated	Calibrated	Un-calibrated	Calibrated	Un-calibrated	Calibrated
Productivity Growth	-0.5938	0.0013	-0.2669	0.0851	-0.0083	0.4990	0.18	0.9296	2.5855	1
Firm performance	0	0	0	0	2.2561	0.3378	4	0.6247	7	1
Firm size	2	0	9.220	0.1363	25.670	0.3873	74.62	0.6270	21955	1
Education	0	0	0.2728	0.0379	6.8174	0.3755	17.22	0.6800	100	1
Business Inhibitors	0	0	0	0	3.84	0.2444	6	0.6654	7	1
Product Innovation	0	0	0	0	1	1	1	1	1	1
Process Innovation	0	0	0	0	1	1	1	1	1	1
Organizational Innovation	0	0	0.4610	0.1285	2	0.5527	3	0.8156	4	1

N= 3997

TABLE III. CONFIGURATIONS EXPLAINING HIGH FIRM PERFORMANCE

	Solution		
Configuration	**1**	**2a**	**2b**
Size			●
Education		●	
Organizational Innovation	●		
Product Innovation		●	●
Process Innovation		●	●
Business Inhibitors		●	
Raw Coverage	0.692	0.218	0.317
Unique Coverage	0.396	0.01	0.033
Consistency	0.896	0.883	0.882
Overall solution coverage	0.746		
Overall solution consistency	0.866		

Black circles indicate high presence of the antecedent condition predicting the outcome in a particular configuration. White circles indicate low presence of the antecedent condition predicting the outcome in a particular configuration. Absence indicate that the antecedent condition is not figured in a particular configuration. N=3997

indicate a high presence of a condition, while a white circle indicates the low presence of a condition, and empty spaces indicate the absence of a particular condition. Additionally, the solutions are grouped following [43] by identifying the firm's innovation behavior. The three configurations show the combinations of conditions that explain high firm performance in 86.6% of the cases (overall solution consistency) and cover 74.6% of the observations (overall solution coverage).

Considering the innovative behavior of firms, solution 1 shows that firms achieve high performance with the presence of the condition of organizational innovation, while solution 2 are firms that rely on technological innovation (i.e., product and process innovation) to achieve high performance.

Solution 1 indicates that 89% of firms pursuing organizational innovation achieve high firm performance. This result is not surprising given the high correlation between organizational innovation and performance as seen in Table I. Solution 1 implies that firms observe business function improvement through the adoption of new organizational practices. Solution 2a and solution 2b indicate that firms pursuing the development of new products and introducing new processes similarly achieve high performance.

According to solution 2a, 88% of firms with a combination of highly educated workforce, engaging in product and process innovation facing greater business inhibitors obtain high performance. Another configuration (solution 2b with consistency 0.882) states that larger firms with high product and process innovation also achieve high performance.

These two solutions share product and process innovation as core conditions. However, it is possible to observe a substitution between the relation of firm size, education and business inhibitors in solution 2a and solution 2b. Organizational size has been positively associated with performance [23, 24], as the firm grows in complexity, new organizational methods and innovations are required to overcome challenges derived from such complexities. Larger firms are equipped with more capabilities, accumulated knowledge and resources to face environmental barriers [7-9].

Higher skilled workers are more growth-oriented and more likely to engage on organizational goals. Moreover, an educated workforce improves a firm's capacity to retain knowledge from external sources, generates new capabilities and serves a source for innovations [4, 32, 36].

This indicates that employees´ creativity and their involvement in the organization's goals to increase their innovation capabilities to achieve high performance have a positive effect on smaller firms facing greater business inhibitors, as seen in solution 2a.

Table III provides three configurational paths of predictors leading to the same outcome, in other words, all these combinations of firm attributes and innovation activities are equifinal and organizations with such conditions achieve high performance. The coverage among these solutions ranges between 21% and 69%, indicating the share of the outcome explained by a particular configuration.

B. Configurational paths explaining productivity growth

Table IV shows the results of the second analysis, considering the objective measure of performance as productivity growth to provide a more adequate evidence about the effect of innovation complementarities in firm performance. The solution table contains four configurational paths and explains the combination of conditions of firms that belongs to the set of high productivity growth in 81.5% of the cases (overall solution consistency) and cover 23% of the observations (overall solution coverage). Following the previous analysis, the solutions are grouped to identify innovative behavior. The results show multifaceted configurational paths and it is possible to determine three typologies.

Solution 1 is typified as 'technological innovators'. This solution explains that for 80.7% of firms with larger size, product innovation is a core activity, supported by process innovation and facing low business inhibitors achieve high productivity growth. Solution 2 is described as 'complex innovators', this characteristic explains that 83.4% of firms with smaller size, with a highly educated workforce that relies on product and process innovation as core conditions and supported by organizational innovation with low business inhibitors also achieve high productivity growth. The third typology is 'hybrid innovators' represented in solution 3. The configuration 3a explains that for 83.6% of firms with larger size product innovation is a core condition, supported with organizational innovation, with lower education and fewer

TABLE IV. CONFIGURATIONS EXPLAINING HIGH PRODUCTIVITY GROWTH

	Solution			
Configuration	**1**	**2**	**3a**	**3b**
Size	●	○	●	○
Education		●	○	○
Organizational Innovation		○	○	●
Product Innovation	●	●	●	●
Process Innovation	○	●		
Business Inhibitors	○	○	○	●
Raw Coverage	0.066	0.061	0.113	0.144
Unique Coverage	0.018	0.015	0.017	0.078
Consistency	0.807	0.834	0.836	0.836
Overall solution coverage	0.229			
Overall solution consistency	0.815			

Black circles indicate high presence of the antecedent condition predicting the outcome in a particular configuration. White circles indicate low presence of the antecedent condition predicting the outcome in a particular configuration. Absence indicate that the antecedent condition is not figured in a particular configuration. N=3997

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business inhibitors is a combination that leads to a higher productivity. Finally, solution 3b states that 83.6% of firms obtain a high productivity growth with smaller size, high organizational innovation, high product innovation and facing greater business inhibitors.

Product innovation is a core condition present in all solutions, indicating that the development of new products is an important antecedent to achieve high productivity growth, supporting the evidence that firms increase sales as a direct response to competitive factors by improving its products offered to the market [12, 30, 34]. Other solutions do incorporate a high presence of organizational and process innovation as an important antecedent for achieving high productivity growth, this corroborates the discrepancies found in previous literature applying econometric techniques.

A trade-off between size, organizational innovation and business inhibitors is observed in solution 3a and solution 3b. This implies that smaller firms facing stronger business inhibitors complement the development of products with the adoption of new organizational practices. This support the notion that the implementation of organizational innovation enables the creation or modification of operating routines [49, 50] and increase the likelihood to engage in technological innovations [30, 31, 32]. In contrast, larger firms are closer to the productivity frontier with fewer opportunities for improvements, while smaller firms are more flexible for introducing new business practices or organizational innovations [27]. Additionally, the results also corroborate the evidence that business inhibitors trigger the implementation of organizational innovation to overcome environmental rigidities [36], as seen in solution 3b.

Another important finding is in regards the strong complementarities between organizational and technological innovation. It is possible to determine which configuration is the most relevant by analyzing the unique coverage (empirical relevance of each solution) of the four solutions in Table IV, overall the unique coverage range between 1.8% and 7.8%. This study found that hybrid innovators (solution 3b) represent 7.8% of the cases (out of 22.9% of total coverage) explaining the outcome. Showing that organizational and product innovation are core conditions that characterize the innovative behavior of the majority of firms in the Latin American region.

Organizational innovation requires the adoption of new practices within and outside the firm's boundaries (e.g. explore and acquire knowledge, decentralized the workforce, promote training, improve processes with information systems, establish alliances and cooperation, among others) that triggers the capabilities to foster the creation of new products and production processes [2, 5, 6, 7, 9, 10]. For this reason, firms pursuing product and process innovation are likely to also engage in organizational innovations [4].

V. Discussion

The dynamic capabilities view of the firms provides the proper framework to understand innovation complementarities. Organizations achieve competitive advantage with difficult to replicate assets and dynamic capabilities allow the modification, integration and reconfiguration of the firm's resource base [13]. In this regard, the degree in which firms increases their innovative capabilities serves as a mediator between dynamic capabilities and competitive advantage [21]. The firm's resource base is comprised of tangible and intangible assets [3] and organizations pursuing innovative behavior are more likely to modify its resource base [5].

The relationship between dynamic capabilities and innovative behavior recalls the concepts of routines. Adopting new business practices for both organizational and technological innovation produces fundamental changes in the routines of an enterprise [26]. Innovation adoption requires changes in the functioning and activities of a firm and represents a clear variation of existing routines [25], with a direct impact on the knowledge base of an organization. Organizational innovation allows the generation of tacit knowledge or intangible assets, while technological innovation the creation of explicit knowledge or tangible resources [26. 49, 50]. Consequently, sustainable competitive advantage is attributed to the exploitation and reconfiguration of the firm's resources to dynamically modify its capabilities in order to face environmental uncertainties, and innovative activities promotes the emergence of such capabilities [19, 20, 21].

The findings of this study showed several configurations of conditions that provide interesting insights to understand the innovative behavior of firms in Latin America, by observing the differences and commonalities found in the combination of firm attributes and types of innovation.

Productivity growth is associated to four possible combination of conditions and represents the heterogeneous nature of business functioning to obtain competitive advantage. The results offer a broader perspective about the 'receipts' for business success. Moreover, the finding contributes to understanding complementarities between technological and organizational innovation and their effect on performance.

VI. Conclusion

Evidence regarding the complementarities of organizational and technological innovation have advanced in the management science, however several discrepancies are found and arguments are divided into the field. This study aims to overcome this problem by approaching that intrinsic relationship from an integrative perspective using fsQCA analysis in a large sample of manufacturing firms of Latin America, to find complex causal interdependencies between different types of innovation and their effect contributing to high firm performance. The results show several equifinal combinations of antecedents leading to firm performance, providing evidence about the complex interaction between firm attributes and innovation. Moreover, three typologies of firms based on its innovative behavior are identified. The importance of the methodological approach and the evidence provided by this study aim to avoid the tendency to analyze the effect of organizational or technological innovation in isolation. Additionally, this study contributes to the literature of innovation under the lens of fsQCA analysis, complementing previous quantitative and qualitative evidence in the field of innovation management.

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