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Effects of informal competition on innovation performance: the case of Pacific Alliance

Jorge Heredia^{1*}, Alejandro Flores¹, Cristian Geldes² y Walter Heredia¹

Abstract: This study evaluates the impact of informal competition on the innovation performance of formal firms in emerging economies. A theoretical model under the strategy tripod framework is proposed. It analyzes the effects of Institutional factors as the quality of governance and market labor rigidities on innovation performance, and the mediating effect of informal competition. It is used the Causal Mediation Analysis with data from 3,268 companies from the World Bank Enterprise Survey from countries of the Pacific Alliance (Chile, Colombia, Mexico, and Peru). The results state that informal competition has a negative effect on the innovation performance of formal companies. Based on these findings, It is suggested some promising avenues for future research and managerial implications.

Keywords: Informal competition; innovation performance; emerging economies; Pacific Alliance.

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1. Introduction

The informal economy is defined as economic activities related to the production and trade of goods and services that are not registered or are conducted by unregistered entities; such activities operate outside of government regulation and tax systems (Webb *et al.*, 2013). According to Schneider (2002), more than 50% of the gross domestic product of emerging economies is connected to the informal economy. Becoming an important area of study. Indeed, researchers who study informality in Latin American countries and Eastern Europe and Central Asia agree that companies must now address two types of competitors, both formal and informal (McCann & Bahl, 2016, Mendi & Costamagna, 2017). Because they avoid the costs associated with regulatory compliance and tax payments, informal competitors enjoy relative cost advantages that allow them to undervalue their products. As a result, they may remain in the market despite their low productivity (Farrell, 2004; Perry *et al.*, 2007).

However, the influence of the informal economy on strategic management within the formal economy remains unexplored (Webb, Ireland, & Ketchen, 2014). Different studies consider informal competition as a relevant factor in the competitive dynamics of industries in emerging economies and on formal enterprises. In this sense, Iriyama, Kishore & Talukdar (2016) found in IT industry in India, that informal competition increases the non-market competitive corruption activities of formal enterprises, which aim to reduce the benefits that informal enterprises derive from their lower costs in terms of money and time. Additionally, Mendi & Costamagna (2017) found that informal competition has a negative effect on innovation types (process and product). These relationships were tested with data from the World Bank taken from a sample of African and Latin American countries. These results are relevant because the study of informal activity can yield important insights in areas such as the boundaries of the firm, diversification, dynamic capabilities, the resource-based view, property rights, disruptive technology, and innovation (McGahan, 2012).

Given the importance of informal competition, it is essential to explore the effects of this phenomenon on the innovation capacity of Latin American companies and analyze how informal competition's interaction with institutional factors affects innovation, and which strategies companies can use to mitigate the effects of informal competition on innovation performance (Grazzi & Pitrobelli, 2016; Webb *et al.*, 2014). For both the theory and the practice of strategic processes, it is important to analyze how Latin America's particular conditions interrelate and influence the enterprises' innovation performance (Mendi & Costamagna, 2017). In the same vein, other arguments highlighting the need to analyze the relationship between informal competition and innovative performance are that no theory has attempted to explain the effect of quality of governance on the informal competition among, and the innovation performance of companies in emerging economies. In particular, the effect of quality of governance on strategic processes such as innovation has been ignored (Becheikh, Landry & Amara, 2006). Moreover, the factors behind innovation performance in emerging economies are underexplored, as most studies have been conducted in developed countries, where conditions are different from those of emerging economies (Grazzi & Pitrobelli, 2016).

The purpose of this study is to analyze the effects of informal competition on innovation performance, taking the case of the countries belonging to the Pacific Alliance (Chile, Colombia, Mexico, and Peru) as representative of Latin American and emerging economies. These relationships are evaluated with Casual Mediation Analysis (Hicks & Tingley, 2011), and previous evaluations of the proposed theoretical model with Structural Equation Modelling (SEM) (Hair *et al.*, 2010; Hoyle, 2012). The data are from 3,268 manufacturing firms from the "World Bank Enterprise Survey" (2010). To build the theoretical model between informal competition and innovation performance, we draw from the strategy tripod which argues that the management of innovation might be based not only on the firm's ability to enhance

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its internal resources and capabilities, as in the resource-based view, but also on industry (informal competition) and institutional effect (Peng *et al.*, 2008). Thus, the impact of informal competition on key issues such as innovation is an unexplored field, the study of which may lead to promising new conceptual frameworks, thus furthering our understanding of how Latin America's specific environment influences the sustainability of its companies' competitive advantages. Against this backdrop, we propose the following research questions: a) Does informal competition affect the innovativeness of companies in the Pacific Alliance? If so, how does it affect them? And b) How do the quality of governance, market labor rigidities and informal competition interact? In sum, this study presents a theoretical model for empirical validation that explains how the quality of governance, market labor rigidities and informal competition simultaneously, and directly or indirectly, influence the innovation performance of companies in emerging economies, generating theoretical and managerial implications.

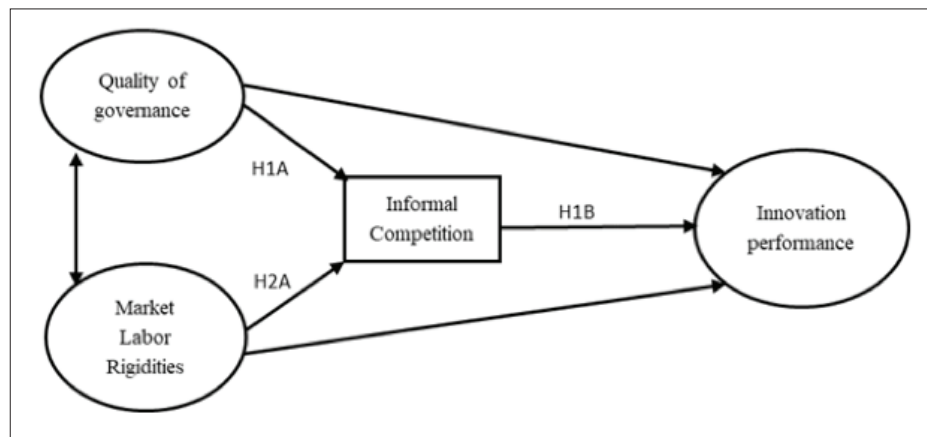
In the next sections, we discuss the literature including the strategy tripod approach as the theoretical approach, the effects of quality of governance and market labor rigidities on innovation performance through informal competition and the influence of informal competition on innovation performance. Next, the method is explained and

data. Then, the results are discussed in the context of emerging economies. We conclude with our findings, implications for managers and policymakers.

2. Conceptual background, theoretical model and hypothesis

In emerging economies, the strategy tripod proposed by Peng *et al.*, (2008) refers to institutional, industry and firm factors (resources and strategic capabilities) that are complementary and relevant to explaining strategic behavior and business performance. In this study, the strategy tripod approach is applied to the study of factors affecting the innovation performance of firms in emerging economies. Specifically, the strategy tripod approach gives the theoretical framework to identify and analyze external factors (institutional) affecting innovation performance of the firm. In this case, it is selected two categories following the Borrmann, Busse & Neuhaus (2006) division of institutional factors: the quality of governance and labor rigidities. In the following sections, it is argued and stated the effect of the selected external factors in innovation performance and their hypothesis. These assumptions are shown in the theoretical proposed model (Figure 1). Basically, the model explains how external factors affect the innovation performance and the mediating role of informal competition.

Figure 1. Theoretical model.



2.1. The influence of informal competition on innovation performance

Most studies of innovation performance have been conducted in developed economies, where the external and internal factors that influence innovation performance have been previously identified (Becheikh *et al.*, 2006; Geldes & Felzensztein, 2013; Geldes *et al.*, 2017). In particular, Latin America and many developing countries are characterized by a unique environment that experiences sudden changes in economic volatility and significant increases in informal competition (unregistered firms) (Vassolo *et al.*, 2011) but it also faces serious challenges that severely underscore these opportunities. We apply a simple framework of analysis to describe the Latin American business environment and detect research opportunities. For that, we focus on four aspects of the region: (1. However, no study has inves-

tigated the impact of informal competition (unregistered firms) on innovative performance in Latin America (Webb *et al.*, 2014). Our aim in this article is to better understand the conditions under which informal competition (unregistered firms) affect innovation performance through the indirect effect of quality of governance. Current measures of innovation performance can be roughly divided into two categories: input measures and output measures. Input measures evaluate how innovation activities have been arranged and how resources are allocated to them. Output measures evaluate the effects of successful innovations (Becheikh *et al.*, 2006). We define the innovative performance construct according to Becheikh *et al.*, (2006) and consider the following as inputs: research and development, and purchases of licenses to use intellectual property. As outputs, we consider sales of new/significantly improved products.

2.2. The indirect effect of the quality of governance on innovation performance mediated by informal competition

In relation to the quality of governance, formal innovative industries find their performance negatively impacted by regulation, i.e., taxes or bribery, when interacting with the government (Grazzi & Pitrobelli, 2016). Moreover, excessive regulations are the main reason for the existence of a large informal sector, which chooses to operate informally to avoid the costs, time demands, and procedures imposed by the formal regulatory environment (De Soto, 2000). In addition, studies have shown that when government regulations were effectively enforced, the percentage of firms affected by informal competition increased (Tokman, 1978).

To measure the quality of governance, Kaufmann, Kraay & Mastruzzi (2009) propose six dimensions: political instability, voice and accountability, corruption control, the rule of law, government effectiveness and regulatory quality. Low institutional quality, represented by increases in corruption and insecurity and by excessive regulation informal competition in emerging economies (Tokman, 2001). The interconnection between institutions and the informal sector may be partially explained by the country's institutional setting, and, conversely, the presence of an informal sector may affect institutional efficiency (Mendi & Costamagna, 2017). This informal competition negatively influences formal companies' ability to innovate in sluggish emerging economies, which have low barriers to entry and plentiful opportunities for imitation due to the lack of protection of intellectual property, as well as the lower competitive advantage (Allred & Park, 2007; Godfrey, 2011). Additionally, if the Intellectual Property Right (IPR) are weak and ineffective (Allred & Park, 2007) discourages manufacturing firms from filing for new patents related to their innovations (Allred & Park, 2007). Given the weakness of Latin America's IPR system, this factor is especially relevant in our Latin American context (Barros, 2015; Grazi & Pietroboli, 2016). With these backgrounds, it is proposed the following hypothesis:

H1: The quality of governance indirectly influences companies' abilities to innovate when there is informal competition in emerging economies.

H1A: The quality of governance is positively related to informal competition in emerging economies.

H1B: The informal competition is negatively related to innovation performance in emerging economies.

2.2. The indirect effect of market labor rigidities on innovation performance mediated by informal competition

The second category of institutional factors that are considered in this study is that of labor rigidities (regulations). Labor rigidities, according to Borrmann *et al.*, (2006), including paying taxes, obtaining credits and managing licenses. In addition, Thai & Turkina, (2014) enrich the category of labor rigidities by including supply factors (resources and abilities) as a category that contains both labor regulations and human development. Excessive use of the regulations (e.g.,

labor market rigidities) and procedures for business development provided by institutions influence the increase in the number of informal businesses (Webb *et al.*, 2014) in emerging economies. A poor support system, represented by a high level of labor rigidity and lack of qualified personnel, increases informal competition in companies in emerging economies (Ketchen, Ireland & Webb, 2014). Furthermore, formal and informal firms compete for the same customers and resources (McGahan, 2012). The resulting informal competition reduces firms' innovation performance by means of imitation.

H2: Market labor rigidities indirectly influence the innovation performance of formal enterprises through informal competition.

H2A: Market labor rigidities increases informal competition in emerging economies.

3. Data and Method

In the following section, it is described the data, the case of study and the method.

3.1. Data and case of study

To test the hypotheses, it is employed the 2010 "World Bank Enterprise Survey". The surveys provide information on the companies' characteristics, strategies, and economic performance, as well as their perceptions of the institutional, policy, and economic environment and the degree of competition in which they operate. The Enterprise Survey data have been featured in a number of previously published studies in the field of informal competition (Iriyama *et al.*, 2016; McCann & Bahl, 2016; Mendi & Costamagna, 2017).

The case of study are the countries of the Pacific Alliance a trade initiative, namely Chile, Colombia, Mexico, and Peru. This selection is a response to a diverse range of issues. The group of countries hosts 38% of the population of Latin America and 34% of its GDP. Moreover, the group already accounts for half of intraregional trade, 50% of regional trade with Asia and 42% of foreign direct investment in Latin America. Chile and México have shown strong economic growth over the past ten years, with growth rates between 6% and 8% (Illescas & Jaramillo, 2011), high export volumes and the implementation of trade liberalization policies that foster international trade. Although Peru has not been considered in the previous studies we examined, it was included in our sample because, in recent years, Peru has also experienced a rapid increase in its exports of goods and services as a percentage of GDP. During the period 2005–2010, Peru had a median growth rate of 5.5% of its GDP (Illescas & Jaramillo, 2011; Peña-Vinces *et al.*, 2017). According to with World Bank Enterprise Survey (2010), the economy percent of firms competing against unregistered or informal firms for each country are Chile (55.8), Colombia (70.9), Mexico (70.3), and Peru (68.6).

The data, corrected for outliers and missing values, included interviews at 3,268 manufacturing firms in the year 2010. The Enterprise Surveys collect data from key manufacturing and service sectors and employ a standardized format and uniform sampling methodology to

minimize measurement error and make the data comparable across countries. We focus on manufacturing industries because they have the imperative to continually invest in innovation and are more consistent in their reporting procedures for innovation investment compared with other industrial categories such as services or non-profits (Allred & Park, 2007). Moreover, innovation is relatively more important in manufacturing and services industries, where value added originates and knowledge and skills are more valued (Crespi & Zuniga, 2012) Chile, Colombia, Costa Rica, Panama, and Uruguay. Additionally, the determinants of innovations and the effects of the different types of innovation are specific to each economic sector (Geldes *et al.*, 2017).

3.2 Method

The method follows the guidelines of Structural Equation Modelling (SEM). The latent variables and the theoretical model are built with Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA), with SEM the hypotheses are tested (Hoyle, 2012). Table 1 provides a detailed summary of indicators for each latent variable: (i) Labor Support, (ii) Quality of governance and (iii) Innovation performance. The remaining variable, the mediator Informal Competition, is considered observable (continuous).

Table 1: Summary of variables and constructs.

	Construct	Scale variable	Description/measure	References
Explanatory variable	Market labor rigidities	Ordinal (0-4)	How much of an obstacle: tax administrations	Borrmann, Busse, & Neuhaus (2006); Kaufman, Kraay, & Mastruzzi (2009); Thai & Turkina (2014); Zhu, Wittmann, & Peng, (2012).
		Ordinal (0-4)	How much of an obstacle: tax rates	
	Quality of governance	Ordinal (0-4)	How much of an obstacle: corruption	
		Ordinal (0-4)	How much of an obstacle: political instability	
Dependent variable	Innovation performance	Continuous	In the fiscal year 2009: how much was spent on purchases of licenses to use intellectual property?	(Becheikh <i>et al.</i> , 2006)
		Continuous	In the fiscal year 2009: how much was spent on R&D activities performed within this establishment?	
		Continuous	In the fiscal year 2009: how much was earned through sales of new/significantly improved products (introduced in the past 3 years)?	
Mediator variable	Informal Competition	Ordinal (1-5)	How big the obstacle is: business practices of competitors in the informal sector?	Mendi & Costamagna (2017) Iriyama <i>et al.</i> , (2016) (McCann & Bahl, 2016)

Additionally, in Table 2 are the tests of latent variables for i) reliability (Cronbach's alpha > 0.7; Construct reliability - CR > 0.7), ii) Convergent validity (Standardized factor loading - FL > 0.5; Average variance extracted - AVE > 0.5) and iii) Discriminant validity (AVE > MSV - Maximum shared variance squared; AVE > ASV - Average variance shared square) (Hair *et al.*, 2010).

Table 2: Test of latent variables.

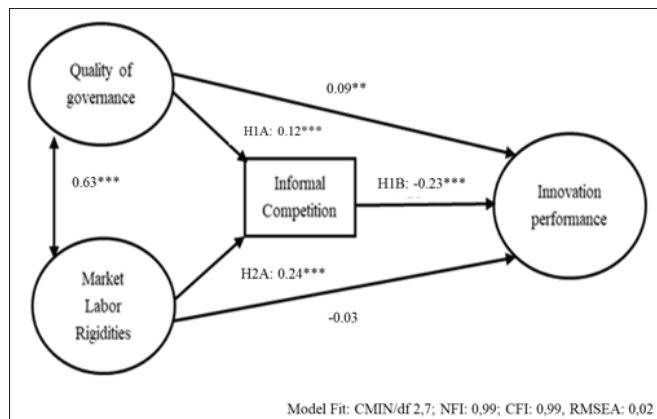
Constructs and items	Reliability			Convergent validity	Discriminant validity	
	FL	Cronbach's alpha	CR	AVE	ASV	MSV
Quality of governance		0.84	0.80	0.67	0.12	0.64
How much of an obstacle: crime, theft, and disorder?	0.82					
How much of an obstacle: political instability?	0.88					
Market Labor rigidity and regulations		0.81	0.70	0.54	0.11	0.64
How much of an obstacle: tax administrations?	0.85					
How much of an obstacle: tax rates	0.80					
Informal competition						
Innovation capabilities		0.83	0.54	0.28	0.01	0.01
In 2009 fiscal year: how much was spent on purchases of licenses to use intellectual property?	0.78					
In 2009 fiscal year: how much was spent on R&D activities performed within this establishment?	0.81					
performed within this establishment?						
In 2009 fiscal year: sales new/significantly improved products (introduced last 3 years)?	0.78					

To evaluate the theoretical model and SEM are used indicators for "minimum" and "good" fit of the model accordingly to CMIN/df ($2 < x < 3$; $x < 2$); NFI ($x > 0.90$; $x > 0.95$); CFI ($x > 0.95$; $x > 0.99$); RMSEA ($2 < x < 3$; $x < 2$) (Hair *et al.*, 2010). Moreover, with the purpose of analysis, the possible mediation of informal competition in the relationship between a dynamic environment and Innovation performance, it is estimated the total effects and its decomposition indirect effect and indirect effect. It involves two steps. First, two regression models are fitted, one in which the mediator is regressed on the exposure variable, adjusted for covariates, and a second in which the outcome is regressed on the exposure and mediator variable, adjusted for covariates. Predictions from these models are then used within a Monte-Carlo framework to calculate estimates for total, indirect and direct effects (Hicks & Tingley, 2011; Cheong & MacKinnon, 2012).

4. Results and Discussion

The Figure 2 shows that all the correlation between the variables in SEM model is statistically significant, with the exception on the relation between market labor rigidities and innovative performance. Moreover, the SEM has a good level of fit and the latent variables accomplish with all requirements, with the exception of market labor rigidities with low levels of convergent validity. This last point can be explained due to nature of secondary data. Additionally, in relation to the hypotheses, it is stated the H1A is no rejected meaning that the quality of governance is positively related to informal competition in emerging economies with a correlation of 0.12. In the second term, the H1B is no rejected too. It is mean that the informal competition is negatively related to innovation performance in emerging economies (-0.24). In the case of H2A, it is no rejected, then market labor rigidities are related to informal competition (0.24). Moreover, there is a significant and positive relationship between the quality of governance and the market labor rigidities (0.63).

Figure 2. SEM.



(***99%, **95% statistical significance)

In relation to H1 "The quality of governance indirectly influences companies' abilities to innovate when there is informal competition in emerging economies" and H2 "Market labor rigidities indirectly influence the innovation performance of formal enterprises through informal competition", both hypotheses are not rejected, demonstrating the mediation role of informal competition. Table 3 shows the indirect effect in both cases and they represent 45% and 67% of effect mediated. These results are relevant for the competitive strategy of firms in emerging economies. The governments of emerging countries, such as those of the Pacific Alliance, have initiated national programs to support innovation and increase spending on innovation, with the goal of helping companies improve their competitive advantage in the global environment (Ketelhöhn & Ogliastri, 2013). However, the innovative performance of Latin American countries is still low (Olavarrieta & Villena, 2014). Our empirical analyses first demonstrated that informal competition has a negative effect on the innovation performance of formal firms. Formal firms change their behavior due to informal competition (unregistered firms), which capture returns from the formal firms' innovative efforts by copying. Therefore, formal firms invest less in innovation. Our findings reinforce a quantitative study by Mendi & Costamagna, (2017) which

used data from the World Bank of African and Latin American countries and found that informal competition has a negative effect on innovation types (process and product). In addition, similar evidence is found in the Chinese market, in which informal competition affects firm investment in R&D (Su, Xie, & Peng, 2010).

Table 3: Mediation analysis. Total Effect and Indirect Effect.

Variables	Total effect	Direct effect	Indirect effect	% effect mediated
Quality of governance	0,07	0,10	-0,03	45%
Market labor rigidities	-0,09	-0,03	-0,06	67%

5. Conclusions, implications and limitations

The governments of emerging countries intend to support innovation with the goal of helping firms to improve their competitive advantage in the global environment. However, our empirical analyses demonstrated that informal competition has a negative effect on the innovation performance of formal firms. These firms change their behavior due to informal competition (unregistered firms), which capture returns from the formal firms' innovative efforts by copying. Therefore, formal firms invest less in innovation and governments' goals are not achieved. It is clear that firms do not progress on their foundations of competitive behavior. However, the negative effect of informal competition is not uniform across companies in different industries, for example, high barriers to entry and high fixed costs act as natural barriers to informal competition. More research on competitive actions to reduce the impact of informal competition is necessary to identify the right approach to help formal firms to thrive in unfriendly competitive landscapes.

5.1. Implications

These results have theoretical and practical implications. From a theoretical point of view, informal competition is a new variable that should be included in the study of innovative performance and strategic behavior in emerging economies, along with quality of governance and labor market rigidities.

From a practical point of view, managers in charge should not overlook the influence of informal competition. Our work confirms that informal competition negatively affects the innovative performance of formal firms. Such competition requires companies to implement activities that allow the configuration of their innovation capabilities. These activities may include investing in technology to differentiate themselves and to maintain competitive advantage in environments of informal competition.

5.2.- Limitations

There are some limitations of our study. First, the secondary sources of information we have used shed light on only one construct of innovation performance. Therefore, future research should consider the development and validation of new quantitative scales to assess model robustness (Becheikh *et al.*, 2006).

Second, this study is context-specific, as it focuses solely on Pacific Alliance (i.e., Chile, Colombia, Mexico, and Peru) firms. Owing to the great differences between the Pacific Alliance and other emerging economies, the generalizability of our conclusions may be limited. Therefore, applicability to other emerging economies must be validated. However, this limitation leads to a series of new research opportunities to investigate our model in other countries and contexts, such as China or other Latin American countries.

Finally, the cross-sectional nature of research into a dynamic concept enables analysis of the organizations' situations at only one specific point in time rather than their overall conduct over a period of time. Future research should consider performing evaluations using panel data analysis.

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