Faculty Research, Scholarly, and Creative Activity

8-26-2021

Does market digitalization always benefit firms? The Latin American case

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Recommended Citation

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Manuscripts

ABSTRACT:

Prior research has found that firms' adoption of digital technologies (i.e. digitalization) enhances transaction efficiency and improves firm performance. However, this finding is based on the assumption that firms respond to consumers' adoption of digital technology (market digitalization) in a timely fashion. Our study investigates the impact of market digitalization on firm performance in Latin America, where resistance to change is often higher, despite the positive impact on performance when companies respond to the environmental shock of digitalization by restructuring.

Using data from seven Latin American countries from 1997 to 2018 (Argentina, Brazil, Chile, Colombia, Peru, Venezuela, and Mexico), fixed-effects panel regression robustly supports our results.

Most Latin American firms fail to capitalize on the benefits of market digitalization and their performance declines as a result. We extend research on digitalization by incorporating theoretical insights from the restructuring literature, finding that implementing a substantial restructuring strategy is a viable way to overcome market digitalization.

CUST_RESEARCH_LIMITATIONS/IMPLICATIONS__(LIMIT_100_WORDS) :No data available.

CUST_PRACTICAL_IMPLICATIONS__(LIMIT_100_WORDS) :No data available.

CUST_SOCIAL_IMPLICATIONS_(LIMIT_100_WORDS) :No data available.

We demonstrate that the digitalization–firm-performance relationship is more complex than has been described in studies using samples from developed economies. We establish restructuring as an effective adaptation strategy in Latin America, although the institutional environment's characteristics may constrain or discourage firms from adopting it.

1

1. Introduction

Digitalization is the socio-technical process of leveraging digital technologies to enhance the efficiency of economic transactions (Rubino *et al.*, 2020; Warner and Wäger, 2019). Digital technologies can be adopted to varying degrees by governments, individual households, and firms (Ardito *et al.*, 2019). The digitalization index of an economy is the aggregate of all these activities (ITU, 2019). The literature has identified two main perspectives for digitalization studies: the digitalization of consumption (i.e. market digitalization) (Barcena, 2016; Katz and Callorda, 2018; Sein and Harindranath, 2004); and the digitalization of production (Esselaar *et al.*, 2007; Mithas *et al.*, 2012). Market digitalization refers to the size of the digitalized market (e.g. number of people with broadband access, use of internet and ICT skills), while the digitalization of production refers to the investment in digital technologies and services by companies to improve transaction efficiency and reach a wider market (Katz and Callorda, 2018).

Studies in developed countries have consistently found a positive relationship between firm digitalization and firm performance, despite the potentially disruptive effect of technology (Bouwman *et al.*, 2019; Ferreira *et al.*, 2019; Mithas *et al.*, 2012). This overall finding demonstrates that firms typically respond to digital changes in a timely fashion (Ardito *et al.*, 2018). Studies in emerging economies such as Africa and Asia, however, have found mixed effects of digitalization on firm performance (Bogoviz *et al.*, 2019; Chauhan *et al.*, 2020). These mixed findings can be attributed to different conceptualizations of digitalization, without making a distinction between firm and market digitalization. For instance, Bogoviz *et al.* (2019) asserted that, in developing countries, economic actors such as consumers and firms initiate the digitalization process, but that developed countries follow a directive approach (i.e. state initiatives). In developing countries, firms prioritize short-term financial goals through cost control and reduction before considering longer term investments in digitalization.

2

Similarly, Chauhan *et al.* (2020) identified extrinsic barriers in emerging countries, related to national culture and context, such as contractual and legal uncertainty that adversely impact the adoption of technology, which could further reduce firm performance in the presence of market digitalization. Furthermore, Katz and Callorda (2018) argued that the digitalization of consumption and the digitalization of production are two independent measures of digitalization, which may have a combined impact on firm performance (Büchi *et al.*, 2020).

To resolve the inconsistencies in prior research on digitalization and firm performance, we apply institutional theory, incorporating the contextual element of organizational inertia on the relationship between market digitalization and firm performance. We argue that, when a firm is unresponsive to market digitalization, it not only fails to capitalize on the potential benefits of digitalization, but its performance actually declines because it is at a relative competitive disadvantage to firms that do adapt. We argue that this type of inertia is more common when: (a) the competition is oligopolistic and dominated by family-owned firms or by business groups; (b) when technological capabilities are not prevalent; and (c) institutional voids constrain entrepreneurship (Cuervo-Cazurra *et al.*, 2019). Since Latin American economies possess many of these qualities (Cuervo-Cazurra, 2008), their firms may be slower to respond to digitalization than those in other emerging and developed economies.

When managers face external shocks (such as market digitalization) and corporate decline, they may, to varying extents, respond through corporate restructuring (hereafter, referred to as restructuring) (Hoskisson *et al.*, 2004; Singh *et al.*, 2017). For example, when the environment is changing (e.g. due to financial crises, privatization policies, or digitalization), "firms that restructure their set of businesses may improve the chances of achieving synergies and increase performance" (Hoskisson *et al.*, 2004, p.525). Diversification and internationalization have been widely studied in the Latin American context (Aguilera *et al.*, 2017; Cuervo-Cazurra, 2008); however, although restructuring has impacted almost every

sector of the US and European economies, its study in Latin America is far less developed (Hoskisson *et al.*, 2004, 2005). Notably, highly diversified business groups dominate Latin America due to their ability to bridge and overcome institutional voids (Cuervo-Cazurra *et al.*, 2019). However, as market-oriented institutional changes arise, business groups are resistant to making changes that would cause them to incur high organization costs (Hoskisson *et al.*, 2005). Thus, restructuring is necessary when adapting to changes in the business environment, but this strategy involves a substantial reallocation of the company's assets, with some firms unwilling or unable to change. Hence, we also examine the extent to which restructuring alters the relationship between market digitalization and firm performance in Latin America.

We tested our hypothesized relationships between market digitalization and firm performance, as well as the moderating role of restructuring, using a sample of companies from seven Latin American countries (Argentina, Brazil, Chile, Colombia, Peru, Venezuela, and Mexico) during 1997–2018. Our findings support our prediction that market digitalization harms firm performance in Latin America, which we argue is due to incumbent firms' inertia towards adapting to consumer preferences for interconnectivity and globalized digital content and services. However, when companies restructure, our results also suggest that they are able to overcome the negative impact of market digitalization, and their performance subsequently improves substantially.

Our research makes two main contributions to the existing literature on digitalization. First, by focusing on Latin American countries – an understudied yet important region – we add to institutional theory regarding the notion of organizational inertia (Cuervo-Cazurra *et al.*, 2019). We provide empirical evidence that market digitalization in emerging economies may hurt business performance due to this inertia (Cuervo-Cazurra, 2008). This result extends the literature by demonstrating that the digitalization–firm-performance relationship is more nuanced than has been described in studies using samples from developed economies

4

(Bouwman *et al.*, 2019; Ferreira *et al.*, 2019; Mithas *et al.*, 2012). Specifically, the

digitalization–firm-performance relationship is different in developing countries, as compared

to developed countries, due to the greater degree of oligopolistic competition, the absence of

financial markets, and the lack of policy support (Chauhan *et al.*, 2020; Cuervo-Cazurra *et al.*,

2019). In order to empirically test this relationship, we first study market digitalization

separately, providing an alternative perspective on its effect on firm performance. Second, we

extend current digitalization research by incorporating theoretical insights from the

restructuring literature (Forcadell *et al.*, 2020). We offer evidence that suggests that

restructuring is a viable strategy for mitigating the negative impact of digitalization on firm

performance.

2. Theoretical background and hypotheses development

2.1 Digitalization in Latin American countries

Research on the relationship between digitalization and firm performance is substantial, but a

consensus on the nature of this relationship has yet to emerge (Bouwman *et al.*, 2019). In the

context of developed countries, most prior studies have found a positive relationship for several

reasons (Ferreira *et al.*, 2019; Mithas *et al.*, 2012). For example, digitalization enables firms to

develop more products and enter new markets at lower costs (Ray *et al.*, 2013). Thus,

digitalization can increase performance by facilitating cost savings. Digitalization, and in

particular ICT adoption, also enables strategic cooperation between firms with complementary

resources and capabilities (Casseta *et al.*, 2019). Digitalization enables firms to improve their

efficiency and customer service, leading to greater profitability in the long run (Bouwman *et

al.*, 2019). Likewise, digitalization enables efficient global sourcing and higher organizational

flexibility in response to multiple stakeholders now interconnected by digitized business

processes (Mithas *et al.*, 2012). Overall, digitalization has the potential to increase firm

5

revenues by allowing firms to offer new products and enhance customer service (Ferreira *et al.*, 2019). However, this improvement is achieved only on the assumption that firms respond to digital changes in a timely fashion, through *firm* digitalization.

Counter to what has been found in developed economies like Europe and the US, studies from developing economies, such as in Africa, have shown a negative or null relationship between digitalization and firm performance (Esselaar *et al.*, 2007). Benavente *et al.* (2011) also theoretically predicted that this would be the case in Latin America, especially when firms fail to adapt due to organizational inertia (Sebastian *et al.*, 2017). The reason, we argue, is not because consumers are slow to adopt technology and use it for consumption. Indeed, Latin American consumers, like those in other emerging economies, are quick to adopt technology and to e-commerce. For instance, social-network market penetration in Latin American markets is the highest in the world (Benavente *et al.*, 2011). Internet penetration in Latin America, for example, was 61.5% in 2016 and 71.5% in 2020 (Pick *et al.*, 2021). The market digitalization of Latin American countries is usually founded on young people who are eager to adopt new technologies (Pick *et al.*, 2021). By 2019, around 24.2% of the population of Latin America and the Caribbean was between 0 and 14 years old, 67.1% was between 15 and 64, and 8.7% was 65 years old and over (Statista, 2021), while 69% of all mobile connections were for smartphones (Statista, 2020). Furthermore, due to security concerns and the lack of reliable public and private transportation, Uber is used more in Latin America than in the US, making Latin America the fastest growing and most promising market for Uber (Moed, 2018). In this scenario, new competition (national and international) exploits new technologies to serve unsatisfied customers (Ceipek *et al.*, 2020). Another reason why the market in developing countries may be changing faster than the rate at which firms are adopting digital technology is that, due to lack of government support and infrastructure, it is more expensive for firms to adopt digital technologies (Bogoviz *et al.*, 2019). Combined with the less affluent markets of

6

Latin America, this increased expense makes it both more expensive and less lucrative to invest in digital technologies (Ceipek *et al.*, 2020).

Another example of a less dynamic industry in Latin America is the banking sector. It has enjoyed decades of monopolistic control, as evidenced by the forcing of customers to wait in long lines for service (Ozy, 2019). By 2017, around 49% of the population (15+ years old) held a bank account (Global Findex, 2017). Meanwhile, 73% of the population has mobile phone access, and 69% of all mobile connections are for smartphones (Statista, 2020). Local banking firms, unsurprisingly, were less adaptive to changes in the demand environment until new digital competitors, such as mobile payment systems, appeared.

Moreover, Latin American business ecosystems vary substantially from those in Anglo-American economies. First, the underdeveloped infrastructure, weak economic conditions, and inefficient institutions characterize this environment (Bogoviz *et al.*, 2019). Second, Latin American economies are made up of a mix of large and well-established firms in traditional industries[1] with small and micro-enterprises dominating the subsistence marketplace, while conspicuously lacking in vibrant midsize companies (McKinsey Global Institute, 2019). Third, many large firms are mainly family-owned and/or held by only a few large shareholders (Cuervo-Cazurra *et al.*, 2019; Hoskisson *et al.*, 2004). Similarly, many Latin American companies have organized themselves into business group networks. Business groups are defined as a set of firms with formal and informal ties that help coordinate their actions (Aguilera *et al.*, 2017). As the institutional environment evolves, these large, diversified, and sometimes informal structures make organizations less adaptive to change. For instance, family-owned business groups still predominate in Latin American economies, and their dominance often reduces the intensity of competition and impedes organizational change (Cuervo-Cazurra, 2008). Due to the less dynamic competition and more expensive digital

infrastructure, we predict that the market-digitalization–firm-performance relationship is likely to be negative in Latin America:

> *H1.* Market digitalization is negatively associated with Latin American firms'
>
> financial performance.

2.2 Restructuring as a strategic response to digitalization

Corporate strategies alter the scope and boundaries of the firm and can therefore partially explain why performance differs among companies (Singh *et al.*, 2017). Restructuring is a corporate strategy that involves the sale or divestment of unproductive assets and/or peripheral business lines and the reinforcing of critical activities through a more specialized and refocused composition of the businesses in the company (Hoskisson *et al.*, 2005). Through these operations, especially during a corporate decline, managers can discontinue business lines with weak competitive positions or that have low profitability (Bowman *et al.*, 1999).

As one of the critical subject areas of corporate strategy research, restructuring has recently obtained renewed interest due to a series of changes in the global environment, such as rapid economic development, international competition, technology transitions, financial crises, and changes in government policies (Singh *et al.*, 2017). Changing environmental conditions, both endogenous and exogenous, make it necessary for managers to conduct periodic reviews of business activities, and sometimes restructure their assets according to their changing levels of returns (Schmitt *et al.*, 2016). Moreover, accelerated technological changes (e.g. digitalization) can render some of the firm's value-creating activities obsolete, reducing demand, and forcing the company to adapt, even while firm performance is already in decline (Schmitt *et al.*, 2016). Restructuring can be an effective response to digitalization because companies need to tailor their assets and functions to adjust to new market demands (Atluri *et al.*, 2017; Hoskisson *et al.*, 2004).

A restructured company can be more resilient and better adapted to the new demands of market digitalization for several reasons (Crittenden *et al.*, 2019). First, restructuring often involves divesting and/or reconfiguring assets (Bowman *et al.*, 1999). Companies that have implemented such changes tend to be more flexible in responding to external shocks like digitalization. Second, restructuring a company's business portfolio can lead to better performance in the short run. It quickly reduces organizational complexity and enables the firm to be more responsive to emerging opportunities (Bergh and Lim, 2008; Hoskisson *et al.*, 2004). Third, although it might be challenging to reconfigure existing assets during heightened uncertainty, the resulting new organizational capabilities can allow the firm to better respond to new market demands and competitive conditions, thus improving its performance in the longer run (Bergh and Lim, 2008). Finally, significant structural changes in the organization resulting from restructuring can alter managers' attitudes and perspectives towards the competitive landscape and the relevance of the firm's core competencies. This realigned mindset can help managers more effectively discern threats and opportunities in their business environments and respond accordingly (Hoskisson *et al.*, 2004).

Hence, we predict that firms that restructure during market digitalization will outperform those that do not. For instance, firms will choose to conduct transactions internally when market transaction costs are high (Hoskisson *et al.*, 2004). After market digitalization, previously costly transactions often become more efficient, such that a firm that decides to reduce its boundaries through outsourcing and partnerships will see its performance rise, while non-adapting competitors' performance declines (Hoskisson *et al.*, 2005).

Similarly, in Latin American countries, even if the government is slow to respond to globalization forces through pro-market reform, digitalization creates pressures for firms to adapt to a more efficient exchange environment, reducing the cost of external transactions (Ray *et al.*, 2013). Moreover, as digitalization increases, global competition increases, new

9

distribution channels are created, and more service providers become available (e.g. insurance, storage, legal, and accounting services) in just a few clicks (Atluri *et al.*, 2017). The lower the external transaction costs associated with producing an input outside the company, the more likely it is that a firm will buy from an external supplier. Therefore, the company's willingness to restructure increases and the firm prefers to remain focused, both vertically and in the product markets within which it operates (Ray *et al.*, 2013).

Restructuring unproductive assets may be appropriate for business groups to keep their competitive advantage (Hoskisson *et al.*, 2005). Further, as firms decide to restructure, more resources (e.g. cash) become available for investing in IT infrastructure, employee training, etc. Simultaneously, the amount of corporate bureaucracy will decrease, reducing the firm's organizational inertia and potentially leading to increased efficiency (Bowman *et al.*, 1999). Furthermore, the narrower corporate scope can enable firms to specialize in their core activities, thus concentrating their product and service offerings in their respective niches of global markets (Aguilera *et al.*, 2017). We therefore expect that, in Latin America, restructuring mitigates the negative impact of market digitalization on firm performance:

> *H2.* The negative relationship between market digitalization and firm performance
>
>   will be weaker when firms have implemented a restructuring strategy.

3. Data and methodology

3.1 Sample description

We retrieved all firm-level data, reported between 1997 and 2018, from the *Compustat Global* database. Our sample includes all publicly listed firms from Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Venezuela, which constitutes the largest sample of firms analyzed in Latin America in an empirical study of digitalization and restructuring to date (Fernández *et al.*, 2010; Hoskisson *et al.*, 2004, 2005). These firms are broadly similar in size

10

to those analyzed in the restructuring studies of Forcadell *et al.* (2020) and Girod and Whittington (2016). The 21-year window allows us to track firms' restructuring and performance through periods of increasing digitalization, while also allowing for extended lags in the performance implications of digitalization and restructuring. As financial performance is our dependent variable, we dropped firms with missing profitability data (i.e. net income). The companies chosen are from different traditional industry sectors, including agriculture, mining, construction, manufacturing, transport, wholesalers, and services. Financial and banking services were excluded since their accounting methodology differs from other companies (Forcadell *et al.*, 2020). For Latin American companies, the *Compustat Global* database has more limited information than is available for firms from more developed economies. For instance, data concerning digital ventures and venture capital funds were not available. The initial sample consisted of 16,150 observations, corresponding to 1,231 companies during the period 1997–2018. The period was chosen to coincide with the phenomenon of digitalization and to provide a complete set of data without missing values. After lagging the explanatory variables and dropping cases with missing data for the variables of interest, the final sample consisted of 10,711 observations, comprising 907 companies during the period 1999–2018.

3.2 Variables and model

3.2.1 Dependent variable

Following prior studies on the restructuring–performance relationship (Bergh and Lim, 2008; Park and Kim, 2008), we used return on assets (ROA), an efficiency-based measure of performance, as our principal performance measure (Ceipek *et al.*, 2020). Efficiency measures of performance are preferred to market-based measures in this study because digitalization directly impacts firm operations, including the efficiency of supply chain management, distribution, sales, and service. As explained in Section 4.1, we also estimated our models using

11

alternate efficiency performance measures, including net margin (net income divided by total revenue) and gross profit margin (total revenue minus cost of goods sold, divided by total revenue). To reduce the effect of outliers, we winsorized all financial performance ratios (return on assets, net margin, and gross profit) at cut points of 1% and 99% (Leone *et al.*, 2019).

3.2.2 Explanatory variable

To assess the impact of country digitalization on Latin American firms, we generated a current ICT Development Index (IDI)[2] applying the latest conceptual framework and methodology provided by the International Telecommunication Union (ITU, 2019). This methodology was used in the 2017 Measuring the Information Society Report (ITU, 2019). The IDI index was calculated for each of the 20 years (from 1997 to 2016)[3].

The IDI is measured on a ten-point scale, computed for 155 countries worldwide, that combines 11 indicators classified into three categories, or sub-indices, each capturing the three main stages in the evolution towards an information society: readiness; intensity; and capabilities. As ICTs are development enablers (Sein and Harindranath, 2004), the IDI is intended to measure the growth of assets relative to the rest of the world over time, as signals of the development of an information society. The three dimensions of IDI are:

1. *Access* (sub-index 40% readiness): measured by fixed-telephone subscriptions, mobile-cellular telephone subscriptions, international internet bandwidth per internet user, households with a computer, and households with internet access.

2. *Use* (sub-index 40% intensity): individuals using the internet, fixed broadband subscriptions, and mobile-broadband subscriptions.

3. *Skills* (sub-index 20% capabilities): mean years of schooling, gross secondary enrolment, and gross tertiary enrolment.

We leave leading missing values as zero for missing values treatment but replace intermediate missing values using a cubic spline methodology for accounting for the

exponential growth curve of digitalization observed in our data (Allison, 2002). For the normalization method, we followed specific procedures to calculate the IDI (ITU, 2019). Due to the nature of our data, Latin American firms did not present digital information at the firm level.

3.2.3 Moderating variable

To assess the moderating effect of restructuring, we included the interaction of business portfolio restructuring (BPR) and digitalization. We followed the procedure outlined by Forcadell *et al*. (2020) in computing the BPR strategy. We identified cases of BPR when a company had divested at least 10% of its total assets. This percentage was chosen because it represents a significant reduction rather than a random fluctuation or gradual adjustment (Markides, 1995; Park and Kim, 2008). Divestments of business units were recorded using a dichotomous measure for BPR widely used in literature (Forcadell *et al*. 2020; Park and Kim, 2008). While the critical value of 10% portfolio adjustment, chosen to indicate a significant restructuring event, is consistent with the literature, we also conducted a robustness test with a less substantial value of 5% (Park and Kim, 2008)[4].

3.2.4 Control variables

The dichotomous variable *Recession* identifies the periods with economic shocks (Singh *et al*., 2017). We identified two periods of economic recession in the Latin American economy: from 1997–1999 (Singh *et al*., 2017); and 2008–2014 (Camacho and Palmieri, 2017). We expect this variable to have a negative influence on performance (Forcadell *et al*., 2020). Since larger firms typically perform better due to economies of scale and oligopolistic competition (Singh *et al*., 2017), we controlled for the *Size* of the company using the log of total assets. We expect to find a positive coefficient just as Forcadell *et al*. (2020). We also controlled for the *Leverage* of the company by including the logged ratio of debt to total assets (Markides, 1995); it is generally accepted that a high debt level will hurt performance. We also controlled for a firm's

13

Access to Resources, deemed to have a positive impact on performance, using the current ratio (Singh *et al.*, 2017).

Finally, we also included several country-level controls, including GDP, GDP growth, and unemployment rate. All of these macroeconomic variables can positively impact firm performance as they indicate more munificent environments for commerce (Bailey, 2018; Globerman and Shapiro, 2003). We also intended to include GDP per capita to capture market attractiveness but removed this from our final analysis due to high collinearity with other country factors.

3.2.5 Estimation approach

As our data has a panel structure with a high ratio of firm-to-year observations, so we used a regression model with a decomposed error term to test our hypotheses (Allison, 2009). The model estimated was as follows:

$$ROA = \beta_0 + \beta_2 \times Digitalization + \beta_1 \times BPR + \beta_3 \times BPR \text{ x } Digitalization + \beta_4 \times Recession + \beta_5 \times Size + \beta_6 \times Access\ to\ Resources + \beta_7 \times Leverage + \beta_8\ GDP + \beta_9 \times GDP\ Growth + \beta_{10} \times Unemployment + \mu_i + e_{it}$$

where μ_i captures the firm-level disturbances and e_{it} represents the independently and identically distributed (IID) errors. Using a Hausman specification test, we found that firm fix-effects produced consistent estimates of coefficients and that a random-effects model was not more efficient than the fixed-effects model (chi-squared statistics: 153.87, *p*=0.000), and so we report the results of the fixed-effect model. Several transformations of variables were performed to improve the properties of their distributions before being entered into the regression. Specifically, *ROA* and *Digitalization* were winsorized (Leone *et al.*, 2019), and

14

logged values were used for *Size*, *Leverage*, and *Access to Resources*. Finally, centered values were used for *BPR* and *Digitalization* to facilitate the interpretation of their coefficients. Finally, we calculated variance inflation factors (VIFs), finding that no values were above 7 and that the VIFs for the explanatory variables were all below 2.

4. Results

Table I presents cases of *BPR* during the period 1997–2018. Within the sample of 1,231 companies, 136 BPR events were found. However, cases from 2017 and 2018 were not used in our model due to lagging their impact by two years. The proportion of firms that restructured during our study window is in line with prior literature about emerging markets (Fernández *et al.*, 2010; Hoskisson *et al.*, 2004). However, the proportion is smaller than in developed markets where the restructuring process may involve two or more actions per company (Forcadell *et al.*, 2020).

<Insert Table I about here>

Within the 12 years analyzed, a wave of BPR was identified, starting in 2007 and peaking in 2008. Based on the primary SIC code, it was revealed that the main activities of companies that were restructuring were manufacturing (46% of all cases), transport, communication, and public services (28%), public administration (8%), construction (7%), services (5%), distribution (3%), and agriculture (3%). These results are in line with Forcadell *et al.* (2020), who categorized firms within the manufacturing and services sectors as having a greater propensity to diversify and restructure. Table II shows the descriptive statistics and correlation coefficients for all variables used in the model for testing hypotheses.

15

<Insert Table II about here>

Table III presents the results of the model estimates used to test our hypotheses relating to the association of BPR and digitalization with firm performance. Model 1 is the baseline model, with only the control variables added, while Model 2 introduces the main explanatory variables, and Model 3 introduces the interaction term. All models include firm fixed-effects and are significant, with *F*-statistics ranging from 138 to 222.

<Insert Table III about here>

As shown in Model 1, the effect of recession years is negative, as expected, but the coefficient is not significant. The *GDP Growth* coefficient is positive and significant, as expected, but both *GDP*, measured in current USD, and *Unemployment* are negative and significant. Firm-level controls for *Size*, *Leverage*, and *Access to Resources* are all significant, with the expected signs (i.e. negative for *Leverage* and positive for *Size* and *Access to Resources*. The models account for between 29.1% and 29.4% of the *ROA* variance, consistent with other research on restructuring (Bergh and Lim, 2008). Although not shown here, firm fixed-effects account for about 47.6% of the variance in *ROA*, and the null hypothesis that the effect of unobserved firm-heterogeneity is zero is firmly rejected (*F*=7.66, Prob>*F*=0.000).

Model 2 introduces the main explanatory variables, *BPR* and *Digitalization. H1* predicted that digitalization is negatively associated with Latin American firms' financial performance. As shown in the results of testing Model 2, the coefficient is negative, supporting *H1*. The sign of the coefficient indicates that implementing a BPR strategy is positively related

16

to a firm's performance. Both of these variables are lagged for two years to account for a delayed association with firm performance. Finally, in Model 3, we introduce the interaction between *Digitalization* and *BPR* to test *H2*, which predicted that restructuring moderates the relationship between *Digitalization* and firm performance. The positive and highly significant coefficient lends support to this hypothesis, and the magnitude suggests that implementing restructuring allows a firm, on average, to overcome the small negative shock of *Digitalization* completely. We plotted the interaction (see Figure 1) between restructuring and digitalization at two values of *BPR* (low=0=no restructuring, high=1= restructuring) and two values of *Digitalization* (low=mean–1 standard deviation, high=mean+1 standard deviation).

<Insert Figure 1 about here>

4.1 Robustness checks

We conducted several *post-hoc* tests using alternative model specifications to test the robustness of our results. First, we measured firm size based on sales instead of assets. The results of this model were qualitatively similar to that of the model using assets. Second, we tried lagging the effect of *BPR* and *Digitalization* by one year, and then three, as it is not clear from prior research precisely how long it takes for restructuring to take effect. The models lagging these variables by one year and three years had qualitatively equivalent results. Both showed that *BPR* did not have a significant impact on *ROA*, while *Digitalization* still had the same negative effect, and the interaction between *BPR* and *Digitalization* was still positive. Hence, our results are relatively robust regarding the lag period considered (one, two, or three years), but the length of time before the impact of *BPR* alone is unclear.

17

We also tried to use different periods corresponding to evolving macroeconomic conditions in Latin America. For example, rather than including a *Recession* year indicator variable, we also tried running our results for periods before and after recessions. Specifically, we estimated models for years 2003–2016, 2005–2015, and 2003–2013. The models were qualitatively consistent with our findings using the full dataset, and with the *Recession* variable indicated, but of course had reduced power to detect relationships due to the smaller sample size (i.e. while coefficients were all in the same direction as shown in Table III, they were not all statistically significant). As the *Recession* year indicator was not statistically significant, we ran the model without it and found virtually identical results to those shown here. The effect of any recessionary periods may be already captured in the *GDP Growth* variable, although VIFs did not indicate that collinearity was a major issue.

5. Discussion and conclusions

This study contributes to a deeper understanding of the digitalization–firm-performance relationship by providing and empirically demonstrating a rationale for the mixed findings of prior research. Although research on digitalization and firm performance is increasing, including an emphasis on emerging or newly industrializing countries, there is no consensus on whether market digitalization has a positive or negative association with firm performance in developing countries. Our contribution sheds light on this ongoing debate. We found that market digitalization is negatively associated to firm performance and partially attribute this finding to the organizational inertia in responding to increasingly demanding clients, supply chain interconnectivity, and globalized digital content and service provision (Sebastian *et al.*, 2017; Warner and Wäger, 2019). According to Bogoviz *et al.* (2019), in developing countries, the initiators of the digitalization process are economic subjects rather than the state. If, for example, digitalization adoption is extremely difficult for companies (e.g. lack of financial,

legal, and technical support), they will delay its adoption. We empirically show that consumer-led digitalization (market digitalization) affects business performance (in part due to this late adoption of technology).

Our results demonstrate that Latin American firms are slow to respond to digitalization. Latin American companies usually see markets as traditional[1], and very few companies, except telecommunications firms, have begun to take steps towards digitalization. Despite its many benefits, including access to digital content and services, interconnectivity, and reduced paperwork (Katz and Callorda, 2018), we can distinguish two possible reasons why market digitalization is negatively related to firm performance in Latin American countries.

First, some dominant incumbent firms are not readily adapting to the strategic challenges of new technological paradigms (D'Ippolito *et al.*, 2019; Sebastian *et al.*, 2017). Managers of these firms believe that their existing strengths and digital capabilities are enough to sustain industry leadership. This perspective could lead to poorly adapted digital practices (i.e. activities that include incorporating digital technologies into companies' routines). Inertia theory could support this argument, positing that established routines, processes, and policies inhibit a firm's adaptive responses to environmental change (Ceipek *et al.*, 2020). This lack of adaptation is due to current operating models, organizational structures, routinized behavior, and the high cost associated with organizational change (e.g. training, acquisition, and the disposal of new and old assets, respectively) that discourage them from adopting new technologies (Crittenden *et al.*, 2019).

Second, as a result of digitalization, firms' clients become more demanding as they have more choices, higher expectations, and more numerous service requests (Warner and Wäger, 2019). Likewise, many customers are replacing traditional channels with mobile apps, which

19

reduces customers' costs for switching suppliers and provides unsatisfied clients with more alternatives (Atluri *et al.*, 2017; Crittenden *et al.*, 2019).

In the past decade, unexpected consumer behaviors (e.g. the emergence of the sharing economy), disruptive competition, and revolutionary digital technologies have negatively affected incumbent firms' performance due to the arrival of startups in the competitive landscape (Crittenden *et al.*, 2019). Incumbent firms can implement internal innovation, adding value for suppliers and customers, and developing new capabilities. For instance, Warner and Wäger (2019) and Appio *et al.* (2021) identified several means to successfully respond to digital transformation, such as sensing opportunities (and threats), seizing opportunities, and transforming the organizational business model. Unfortunately, most Latin American companies are still laggards in adapting to digital transformation compared to companies in other emerging markets such as Asia (Pick *et al.*, 2021). Moreover, digitalization makes the world smaller, so Latin American companies are no longer competing only among themselves, but also with more digitalized companies worldwide (Correani *et al.*, 2020; Moed, 2018).

Our study also empirically supports the prediction that the restructuring strategy of divestment positively affects firm financial performance (Bergh and Lim, 2008; Bowman *et al.*, 1999) and mitigates the decline in firm performance caused by digitalization. The countries that present more restructuring events are Brazil, Chile, México, and Argentina. Even though Latin American countries are often characterized as having underdeveloped institutional environments, these latter four countries have the most favorable institutional conditions, within Latin America, for pursuing a digitalization strategy (Hoskisson *et al.*, 2004). In line with Hoskisson *et al.* (2005), our work shows that few companies restructure in emerging markets compared to Anglo-Saxon and European companies. This is probably due to less efficient markets that could otherwise encourage restructuring strategies. Those firms that decided to restructure saw a positive result during a period characterized by rapid technological

changes. Our finding of restructuring's moderating effect also indicates that, if Latin American firms were quicker to restructure, they would be less likely to suffer from the acute adverse effects of external shocks, such as digitalization. To that end, firms should be more vigilant in monitoring and reacting to environmental trends. Governments should continue introducing and strengthening pro-market reforms to encourage the development of more competitive and more resilient enterprises. Government support for investment in reliable and lower cost digital communications infrastructure is likely to lead to a much more robust and vibrant environment for domestic firms.

These findings also offer implications for managers. First, we validate the market-digitalization–performance relationship in an institutional environment different from the Anglo-Saxon and Eurocentric ones. For this reason, it is important that managers ask themselves: "What strategies can I implement in my company to avoid market digitalization adversely affecting our performance?" Subsequently, they must be able to identify those tools that confer competitive and corporate advantages to the company. In this research, we propose that a restructuring strategy is a viable response to changes in consumers' digital preferences. Second, the company's management must be vigilant of consumers rapidly adopting technological changes. If more consumers are adopting digital technologies, then is time (and probably more profitable) for the company to start updating their digital infrastructure. Third, this research also reveals insights for managers of firms in other geographic regions regarding the fact that market digitalization does not automatically improve firm performance. A firm that does not adopt IT will surely be at a disadvantage to more responsive competitors and customers. The challenge for managers and consultants is to incorporate digital platforms and change processes, and to empower the workforce to exploit new technologies and customers' demands. Finally, firms could partner with their governments to accelerate the country's digital transformation. One such example of a public and private alliance is the Costa Rica–Intel

21

association. Under this agreement, in which both parties invested, economic and social progress for both was both achieved and sustained (OECD, 2018).

Considering that similar characteristics are prevalent in some Latin American countries (Aguilera *et al.*, 2017; Aguinis *et al.*, 2020), it cannot be ruled out that the results of this work may be of interest to executives in other emerging economies with a similar institutional environment. The implications for government leaders include building an institutional environment with rules that encourage and facilitate the adoption of digitalization for both firms and consumers. Thus, companies are motivated to adopt the best managerial practices for handling disruptive situations that allow them to successfully navigate these precarious environments.

Like all research, this study has limitations. As mentioned previously, we only studied one corporate strategy, restructuring, and we did not look at other possible responses to digitalization, such as diversification. Unfortunately, we could not access the composition of sales (domestic vs international) of the different business lines for each corporation in the Latin American section of the *Compustat Global* database. Future research should consider strategic responses to digitalization that alter the composition of sales, including business-line diversification/divestment, increased export performance, and many others. Also, the *Compustat Global* database only covers companies based in seven Latin American countries, and therefore not all Latin American countries were included in the study. In addition, while most papers have addressed digitalization at the firm level, we could not get this information from the Latin American section of the *Compustat Global* database. Aguinis *et al.* (2020) highlighted these data difficulties, and that is why there is a lack of large-scale empirical studies using information from this region. Moreover, several studies have suggested that the effect of digitalization is improved when it is followed by human capital training, decentralized decision making, and other organizational changes (Warner and Wäger, 2019). More work in emerging

22

and developing countries will contribute to a finer-grained analysis of all these interactions in

a different institutional environment. We hope this paper will motivate academics to build

further research on digitalization and strategy, taking into account the institutional environment

in Latin America.

Endnotes

1. According to Ma *et al.* (2019, p.1): "Traditional industries mainly refer to those labor-
    intensive, manufacturing, and processing industries (i.e., textile industry, shoe-making
    industry, petrochemical industry, paper products industry)."

2. Data and methodology are available from the authors on request.

3. Previous and later years to this period had too many missing values to be included in the
    study.

4. We could also include a continuous variable. The results were almost the same.

23

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1

Table 1.

Business process restructuring in Latin America during 1997-2018.

	Argentina	Brazil	Chile	Colombia	Mexico	Peru	Venezuela	Total
1997	0	0	0	0	0	0	0	0
1998	0	0	0	0	1	0	0	1
1999	1	3	4	1	0	0	0	9
2000	0	5	1	0	1	0	0	7
2001	0	2	2	0	0	0	0	4
2002	3	1	0	0	0	2	1	7
2003	0	2	0	0	0	0	0	2
2004	0	1	1	0	0	2	1	5
2005	1	0	0	0	0	0	0	1
2006	1	3	2	0	0	1	1	8
2007	3	3	4	0	2	0	1	13
2008	1	5	5	0	2	0	0	13
2009	1	3	2	1	0	0	0	7
2010	0	5	1	1	0	1	0	8
2011	0	4	1	0	2	0	0	7
2012	0	2	1	0	1	0	1	5
2013	0	2	0	0	2	0	0	4
2014	0	5	0	0	0	0	0	5
2015	2	5	0	0	1	0	0	8
2016	1	6	0	0	2	0	0	9
2017	1	6	0	0	2	0	0	9
2018	0	2	0	0	0	2	0	4
Total	15	65	24	3	16	8	5	**136**

Note. Restructuring cases in 2017 and 2018 were not used in the model tested in this study, as restructuring was hypothesized to have a delayed impact on firm performance. For example, restructuring in 2016 was hypothesized to have an effect on firm performance in 2018.

2

Table 2.

Descriptive statistics and correlations between variables

	Mean	1	2	3	4	5	6	7	8	9	10
1. ROA	0.011	(0.156)									
2. Recession	0.310	-0.022*	(0.310)								
3. GDP	0.000	-0.107*	-0.198*	(0.000)							
4. GDP growth	2.911	0.096*	-0.140*	-0.199*	(3.201)						
5. Unemployment	7.881	-0.092*	0.146*	-0.027*	0.062*	(2.912)					
6. Firm size	8.230	0.227*	-0.063*	-0.210*	-0.002	0.062*	(2.933)				
7. Leverage	-1.658	-0.324*	-0.004	0.127*	-0.083*	-0.002	-0.027*	(1.398)			
8. Access to resources	0.219	0.452*	-0.033*	-0.063*	0.022*	-0.083*	0.125*	-0.359*	(0.908)		
9. Restructuring	0.009	-0.007	0.024*	0.020*	0.022*	0.022*	-0.025*	0.009	-0.002	(0.095)	
10. Digitalization	3.551	0.011	-374*	0.336*	-0.141*	-0.156*	0.139*	0.018*	0.038*	0.010	(0.164)

Notes. All means, standard deviations, and correlations relate to the sample with no missing values on any of the variables of interest; 11,707 firm-years. Differences between this sample size and those in the regression results are due to the two-year lagging of explanatory variables, digitalization, and restructuring. Statistically significant correlations (p<0.05; two-tailed tests) are indicated with an asterisk. The variables for firm size, leverage, and access to resources are logged. All variables are unstandardized.

3

Table 3.

Fixed effect regression analysis indicating the effects of digitalization and restructuring

on firm performance

Dependent variable: Return on assets	Model 1	Model 2	Model 3
Controls			
Recession year (dummy)	0.003 (0.002)	-0.002 (0.003)	-0.002 (0.003)
GDP	0.000*** (0.000)	0.000** (0.000)	0.000** (0.000)
GDP growth	0.003*** (0.0003)	0.003*** (0.0004)	0.003*** (0.0004)
Unemployment	-0.001 (0.0006)	-0.001** (0.0006)	-0.001** (0.0006)
Firm size (log total assets)	0.012*** (0.001)	0.013*** (0.001)	0.013*** (0.001)
Leverage (log debt to assets)	-0.020*** (0.001)	-0.019*** (0.001)	-0.019*** (0.001)
Access to resources (current ratio)	0.043*** (0.002)	0.042*** (0.002)	0.042*** (0.002)
Explanatory			
Digitalization		-0.004*** (0.001)	-0.004*** (0.001)
Restructuring (dummy)		0.028** (0.012)	0.024** (0.012)
Interactions			
Digitalization x restructuring			0.021*** (0.008)
Intercept	-0.120*** (0.011)	-0.130*** (0.012)	-0.130*** (0.012)
F	222.34	152.52	138.12
p	<0.001	<0.001	<0.001
R^2	0.291	0.294	0.294
Firm fixed effects	Yes	Yes	Yes
N	11,725	10,711	10,711

Notes. Firm size, leverage, and access to resources are logged. Digitalization and restructuring effects are lagged two years to account for delayed impact. Statistical significance is reported as *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

Figure 1.

Interaction of restructuring with digitalization