

Value and Integrative Dynamic Capabilities: An Empirical Confirmation

Authors

Jacques Bughin

Solvay Brussels School of Economics and Management, Université Libre de Bruxelles,
Times² (former iCite), Brussels.

Julien Gossé

Solvay Brussels School of Economics and Management, Université Libre de Bruxelles,
Times² (former iCite), Brussels.

Charles Hoffreumon

Solvay Brussels School of Economics and Management, Université Libre de Bruxelles,
Times² (former iCite), Brussels.

Nicolas van Zeebroeck

Solvay Brussels School of Economics and Management, Université Libre de Bruxelles,
Times² (former iCite), Brussels.

Value and Integrative Dynamic Capabilities: an Empirical Confirmation

Julien Gossé, Charles Hoffreumon, Nicolas van Zeebroeck*, Jacques Bughin

*iCITE, Solvay Brussels School of Economics & Management, Université libre de Bruxelles
Avenue F.D. Roosevelt 50 - CP114/4
1050 Brussels, Belgium*

* Corresponding author: Nicolas.van.Zeebroeck@ulb.be

Abstract

Digitalization has changed the way certain firms create and capture value. One channel for this change is through the emergence of business ecosystems. Taking part in these ecosystems requires a certain set of dynamic capabilities, called integrative capabilities. In this article, we use data from a large-scale, cross-industries and cross-continent survey to empirically test whether the presence of such capabilities are associated with faster revenue growth. We conclude that it is the case, providing empirical confirmation to the theory that participation in a business ecosystem helps with the value creation or capture of a firm.

Keywords— Dynamic Capability, Firm Performance, Ecosystems, Strategic Management, Quantitative Research Method

1. INTRODUCTION

There is a broad consensus, among both practitioners and academics, that digitalization has changed the way value is created and captured in many industries all around the world. In the past few decades, scholars have dug deeper into the mechanisms underlying this change and have identified several channels through which this transformation is operated. One of the most recent development in this pursuit is the identification of business ecosystems as a driving force behind this change (Jacobides, Cennamo, and Gawer 2018). Participating in this new environment requires a reorganisation of the firm resources (Amit and Han 2017). Operating this reorganisation calls, in turn, for a certain set of dynamic capabilities, called integrative capabilities (Helfat and Raubitschek 2018). Empirically testing whether those capabilities are connected with the process of value creation or capture, however, remains a challenge. This is what this article sets up to do.

The challenge for this identification is two-fold. First, obtaining data on a sufficiently broad array of companies and their digital strategies and action remains a challenge. In this article, we have access to a survey of more than 1,300 firms from all over the world and across many industries. This dataset is unique in that it allows for controlling for several potential sources of value creation or capture coming both from the digital strategy, such as their digital maturity, or the underlying characteristics of firms, such as their location, industry or size.

The second part of the challenge lies in the fact that, besides the participation in an ecosystem, an often connected but distinct concept, the participation of a firm in a platform strategy, might make identification of the effect of integrative capabilities complex. The platform phenomenon is well-researched, namely under the scope of network effects, whether direct (Eisenmann, Parker, and Van Alstyne 2009; Farrell and Saloner 1985; Katz and Shapiro 1986) or indirect (Boudreau and Jeppesen 2015; Evans 2003; Hagiu 2013; Rochet and Tirole 2003), that result in winner-takes-all outcomes. The connection between the presence of platforms and value creation or capture being established both in the theoretical and the empirical literature, disentangling its effect from the value potentially arising from having integrative capabilities is not simple. In this article, and given the nature of the data we have at our disposal, described in Section 5, we are able to control for aspects of the platform strategy to identify the effect of the integrative dynamic capabilities.

Our main results suggest that the mere fact of participating to a digital platform does not correlate with performance when properly controlling for external and firm-specific factors. We further observe that it is not the ownership of a platform (over the use of third-party platforms) that conditions its relationship with performance. Our results shed light on the importance of firms' specific capabilities in today's platform environment. More precisely, the data indicates that the value creation or capture comes rather from the capabilities to integrate a firm offer with the one of competitors or of partners in order to foster the emergence of a business ecosystem.

This has practical importance as it indicates that strategic leaders should devote their attention primarily to the building of capabilities turned towards integrating their offers and processes with their business partners instead of giving priority to the questions of platform ownership or participation. It confirms, in this instance, the link between internal dynamic capabilities and the creation or capture of a larger share of value. It is, finally, a confirmation of the call for strategic leaders to rethink the role of their company as part of a larger ecosystem as a way to partake into the new industrial organization brought forth by the digital transformation.

The next two sections (2 and 3) will define and detail the two concepts we seek to connect with value creation or capture. Section 5 then details in a conceptual fashion the econometric model we will use to test the connection between those concepts. We then describe the data used in Section 5 and the results of the tests in Section 6. We finally conclude and provide the key take-away points in Section 7.

2. ECOSYSTEMS[ecosystems]

The term ecosystem refers to “a group of interacting firms that depend on each other’s activities” (Jacobides, Cennamo, and Gawer 2018). According to Iansiti and Levien (2004a), this group of interacting firms co-evolve their capabilities and roles and align with the direction given by one or more central firms. The concept of ecosystems has received significant attention both from academia and the industry over the past 20 years (Adner 2017). Illustrating the recent rising interest for the topic in the industry, Jacobides, Cennamo, and Gawer (2018) points out that the word “ecosystem” appeared more than 160 times in Alibaba IPO’s announcement in 2014. In academia, the frequency of the word ecosystem in the titles or abstracts of strategy papers is seven times greater now than it was five years ago (Jacobides, Cennamo, and Gawer 2018). This concept has become so important that Teece (2016) suggests it might replace the traditional notion of industries when performing analyses. According to Jacobides, Cennamo, and Gawer (2018), modularity enables the emergence of ecosystems. It allows indeed interdependent firms to coordinate, integrating their offerings, without a formal hierarchy in place. Based on their literature review, we identified three non-mutually exclusive views on ecosystems.

The first perspective focuses on platform ecosystems. It considers how the different actors organize around a platform (Jacobides, Cennamo, and Gawer 2018). Studies focus on the interdependence between a platform owner and its network of complementors. We observe three main streams of research around platform ecosystems (McIntyre and Srinivasan 2017). First, the industrial organization stream focuses on better understanding network effects (Parker and Van Alstyne 2005; Shapiro and Varian 1999), and their impact on the emergence of dominant platforms. Second, the technology management perspective puts emphasis on the platform architectures (Gawer 2009) and on how platform sponsors can attract third-party complementors. This stream therefore focuses on design strategies to generate indirect network effects (Eisenmann 2006; Evans, Hagi, and Schmalensee 2008). Lastly, the strategic management literature deals with the competitive advantage induced by platforms. Authors like Adner and Kapoor (2010) and Hein et al. (2019) have

shown that competitive advantage in the platform play depends on the capacity of firms to stimulate value co-creation with the ecosystem.

Secondly, the business ecosystems (as defined in (Autio et al. 2018)) stream focuses on a firm and its environment. Teece (2007) defined a business ecosystem as a “community of organizations, institutions, and individuals that impact the enterprise and the enterprise’s customers and supplies”. Still according to Teece (2007), the ecosystem is related to the environment of the firm that affects its dynamic capabilities and competitive advantage. Others, such as Iansiti and Levien (2004b), focus on the performance of involved firms that is dependent on the overall performance of the ecosystem. Iansiti and Levien (2004b) and Dhanaraj and Parkhe (2006) also emphasize the crucial role of the central firm – called hub or keystone firm – in maintaining stability within the network.

The last stream, focusing on innovation ecosystems, concerns the development of new innovations or value propositions, and the latent players involved. This perspective focuses on groups of firms that interact and partner up to combine individual products or services to propose integrated offerings. We can associate this type of ecosystem to what Adner (2017) call “ecosystem-as-structure”, where the “configurations of activity are defined by a certain value proposition”. Earlier, in 2006, Adner defined an innovation ecosystem as “the collaborative arrangements through which firms combine their individual offerings into a coherent, customer-facing solution” (Adner 2006). In innovation ecosystems, an important driver of value creation for customers is the extent to which companies align thanks to different arrangements (Adner 2017). According to Jacobides, Cennamo, and Gawer (2018), research in the field has notably studied the impact on collaborative arrangements between the innovator and its complementors on the ability to invest in and commercialize a new technology (e.g., Kapoor and Lee (2013); Leten et al. (2013)), the positive effect of knowledge sharing on the strength of inter-organizational relationships and the ecosystem (e.g. Alexy, George, and Salter (2013); Brusoni and Prencipe (2013); Frankort (2013)) and the health and survival of the ecosystem (Leten et al. (2013); West and Wood (2013)).

In the present article, we provide evidence that the first type of ecosystem might not be the primary source of value creation or capture. Indeed, its effects partially “fades away” when analysed together with information about the other two aspects. Those, in turn, are robust to a large set of controls, both on the digital strategy of the firm and their other characteristics.

3. INTEGRATIVE DYNAMIC CAPABILITIES[dynamic_capabilities]

The way incumbents or new-entrant alike can be usefully part of ecosystems is by building up what the literature calls *integrative dynamic capabilities*. According to standard strategy literature, sustainable competitive success derives from a specific set of capabilities, called dynamic capabilities (Eisenhardt and Martin 2000). Those capabilities are “the firm’s processes that use resources - specifically the processes to integrate, reconfigure, gain and release resources - to match and even create market change” (Teece, Pisano, and Shuen 1997). These are often grouped into 3 subsets, according to their finality: the ones that enable sensing and scanning the environment, the ones that enable seizing new

opportunities and the ones enabling transforming (or reconfiguring) the resources of the firm (Teece 2007).

The logic behind this strand of literature is based on the classical innovation research, going back to the Schumpeterian notion of creative destruction. The reasoning highlights the fact that, in order to survive, firms have to innovate at least at the same pace as their competitors. In the language of the Resource Based View, the prevalent paradigm in the strategic management literature, this entails being able to reorganize resources to respond to environmental changes. This is why dynamic capabilities are conceived as the strategic source of profit in turbulent industries (Teece 1986).

More recently, scholars have operated a convergence between the general framework of dynamic capabilities and the topics of digital business and platform ecosystems (Helfat and Raubitschek 2018). This convergence emphasizes the importance of integrative capabilities. Those capabilities, that can be either operational - meaning used to operate the current business model of the firm - or dynamic - meaning used primarily to make the business model of the firm evolve - are thought to be important in markets underpinned by ecosystem dynamics. Those capabilities span several categories of dynamic capabilities (mostly *sensing* and *seizing*). They also differ from their more classical counterpart in the sense that they are related to the way they impact the boundary of the firms rather than the resources inside those boundaries. There has, however, been no empirical confirmation of those hypotheses so far in the scientific literature. Moreover, the literature has, thus far, focused mostly exclusively on platform owners (or ecosystems orchestrators) with very little emphasis on firms taking part to the ecosystem.

In the aforementioned context, there is a need for moving beyond the adoption of a platform strategy itself to further look at the required capabilities to benefit from such models. Based on the early Profiting From Innovation (PFI) framework proposed by Teece (1986) and revised in Teece (2018), Helfat and Raubitschek (2018) have recently suggested that in order to not only create but also capture value from digital platform-based ecosystems, three types of capabilities are crucial for orchestrators: innovation capabilities, environmental scanning and sensing capabilities, and integrative capabilities.

4. CONCEPTUAL FRAMEWORK

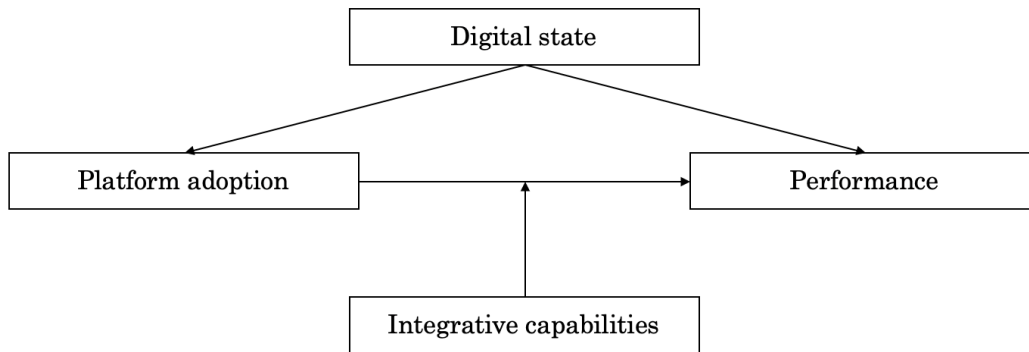


Figure 1 - Conceptual framework

In this article, we propose a theoretical model grounded in the literature presented above. As most platforms have a revenue enhancement component, we define performance based on firms' top line results. The model considers this performance as dependent on elements related to the environment in which the firm operates (e.g.: its industry), its own characteristics (e.g.: size) and its strategic choices such as those linked with digitization.

Figure 1 illustrates the focus of the theoretical model investigated. The central objective is to refine our understanding on the relationship between the platform strategy and performance. To do so, we make the hypotheses that

Hypothesis (H1). Digital maturity is a confounding factor of the relationship between platforms and performance

Hypothesis (H2). This relationship is moderated by the extent to which firms partner up with other organizations to integrate their offerings, used as a proxy for what Helfat and Raubitschek (2018) call "integrative capabilities".

The conceptual model presented above only depicts our variables of interest. However, the regression model used to explore the correlation between platform strategies and performance takes a series of controls into account. Indeed, as stated above, we also account for external (e.g.: industry) and firm-specific characteristics (e.g.: size) that are expected to play a role on firms' performance

Before diving into the statistical description of our variables of interest, the next section describes in greater details the sample used as well as variables included in our analyses.

5. DATA AND EMPIRICAL IMPLEMENTATION

The data used in this article comes from a survey conducted online by the McKinsey Global Institute between May 15 to May 25 2018. It was based on a closed sample of more than 15,000 companies with a skew towards large companies. In total, we have 1,303 responses from executives from all over the world and across a vast array of industries (the typical

response rate was 8-12% in the country/industry pairs). The composition of the sample in each country was conceived to match the economic representation of each industry.

The answer were provided by officers in charge of at least a business unit in the company and was incentivized by the access to the aggregated results of the survey. Additional quality checks, such as questions randomization were performed. This dataset is similar in its conception to the one used in Bloom, Sadun, and Van Reenen (2015, 2012). While other papers, such as Bughin et al. (2017) and Bughin and Zeebroeck (2017) have used previous versions of the survey, it is the first time this version of the survey is used in the academic literature.

A full description of our sample is provided in Appendix A. It shows that the data on which our analysis is based is well-varied, in terms of industry, geography and type of business. As for any survey data, there are biases, but the econometric treatment given in the next sections makes sure those are accounted for when relevant. Moreover, the large cross-sectional nature of the data allows for statistically robust comparisons between different types of actors that will lend credit to the generality of the results presented here. Finally, we firmly believe that this data is as close as one can obtain to analyze such specific topics across a large number of countries and industries. As such, the present article contributes to the literature by generalizing local or industry-specific findings and bringing scale to the discovery in the field of digital platforms, ecosystems and dynamic capabilities. The following paragraphs aim at describing the different variables used throughout the analyses to come.

First, the *Platform Strategy* variable has been derived from a multiple choices question asking: "Which of the following statements best describe your organization's use of digital platforms? (Select all that apply)". Next to the "Other" and "Don't know" options that were left out of our analyses, five main options were proposed:

1. We own at least one platform that is used by others.
2. We use a platform to gain access to customers/partners we otherwise would not reach.
3. We use a platform to improve (or maintain) access to our current customers/partners.
4. We use a platform to monetize our data.
5. Not applicable; we do not own or use any platforms.

This question allows to derive information on the two strategies present in the literature (Van Alstyne and Parker 2017). First, a firm may own its platform and therefore act as platform leader. This case is composed by respondents having answered either the first option alone, or a combination of the first option and one or several of the following excluding the fifth. Second, a firm may only use an existing platform owned by another entity, and therefore act as a complementor. This case is composed by respondents having chosen one or several options among the second, third and fourth options. Used as dummy variable, the alternative option that will be left out of the regressions to come is "having not

adopted any of the platform strategy" and is composed by respondents having chosen the option five to this question.

Second, as we suspect a confounding effect of digitization of firms impacting both the adoption of platforms and performance, we use first a measure of the proportion of core operations that are digitized to account for the *Digital Maturity* of firms represented. This measure is based on a categorical variable composed by 7 levels, from "0%" to "more than 80%". Since the pace of digitization might differ from one industry to another, we subtract the average of the industry (excluding the focal company) from the category of the focal firm. We end up with a relevant measure of the digital stage of firms taking their peers' situation into account.

In order to complete this *Digital Maturity* measure, we add a second dimension that takes both the incumbency and digital status of firms into account. In this case, the dimension of digital maturity is oriented towards firms' output, and more precisely sales. The variable used distinguishes traditional established firms from digital established firms and digital natives. Traditional established firms are companies that are competing primarily in traditional ways (i.e. more than 80% of sales that are not digital). Digital established firms are established firms having operated a digital transformation and that are therefore competing substantially in new ways through digitization (i.e., more than 20 percent of sales consists of digital offerings and/or new digital businesses). Finally, digital natives are firms that are born digital, and that are therefore mostly competing through digitization. We call this variable *Digital Incumbency*.

Third, we are interested in assessing the potential moderating effect of *Integrative Capabilities* over the relationship between platform strategy and performance. Such capabilities are proxied by a survey question asking the extent to which the companies' respondents agree with the following statement: "We partner up with other organizations to propose more integrated offerings". Next to the "Don't know" option, respondents were proposed with the other options "Strongly disagree", "Disagree", "Neutral", "Agree" and "Strongly agree". Based on this question, we derive a measure of the level to which firms collaborate to integrate their offerings, reflecting integrative capabilities possessed by the firms.

Finally, the *Performance* variable is proxied by firms' past revenue growth compared with the median of the industry they operate in. This variable is based on a survey question asking respondents their revenue growth over the past 3 years. To answer this question, respondents had to select one category of past revenue growth among those listed in Table 1. The *Performance* variable is then computed by subtracting the industry's median category from the category of each firm. We finally have a three levels variable that distinguishes under-performers whose past performance has been below the industry median from median-performer and over-performer whose past performance has been respectively equal to or above the industry median.

Table 1 - Categories of past revenue growth

-50 % or less

-25 to -49 %
-15 to -24 %
-10 to -14 %
-5 to -9 %
0 to -4 %
1 to 4 %
5 to 9 %
10 to 14 %
15 to 24 %
25 to 49 %
50 % or more

In order to account for other potential performance drivers, we will include three additional control variables to our regression analyses.

First, the *Geography* control is based on the region in which the HQ and, supposedly, strategic decisions are located. All regions of the world are represented: Europe, North America, Asia-Pacific, India and Developing regions including China, Latin America, North-Africa and Middle East. Taking the geographic dimension into account allows to consider potential macro differences in firms' profiles, strategies and performances.

As strategic decisions and resulting performance may also be influenced by unobservable factors at the industry level, we include a dummy variable for the *Industry* to account for these potential effects. As already explained, a wide range of industries are represented, but three industries are pre-dominant in the sample. These three industries are composed by "Business, legal and professional services", "Financial services" and "High-tech". In order to avoid any misinterpretation coming from over-representation of some industries, and to be able to draw conclusions at the industry level, we have aggregated certain industries according to usual industries' grouping. From a total of 22 initial industries, we end up with 10 groups of industries that will be used throughout the analyses. These groups and their relative distribution are detailed in Appendix B.

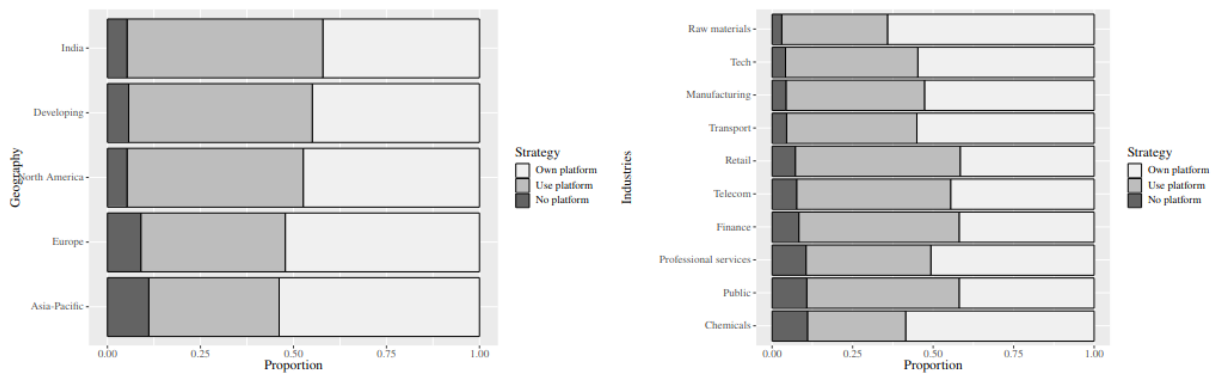
Finally, we also include a control for the *Size* of the company in terms of revenue. *Size* of the company is based on the revenues declared by respondents. It is a broad categorical variable with 12 levels ranging from "Less than \$10 Million per year" to "\$30 Billion or more".

Further information about the questionnaire and the questions is available in the Online Appendix.

6. DESCRIPTIVE ANALYSIS[results_desc]

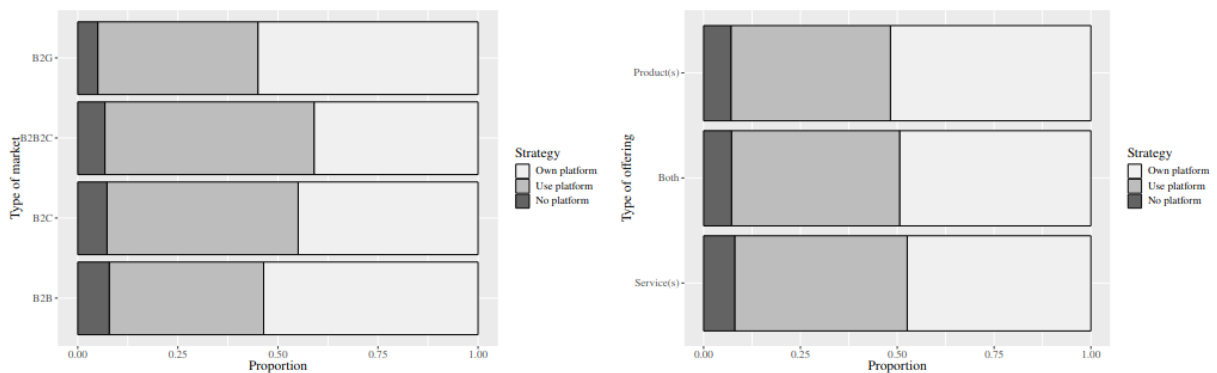
Platform strategy

In total, 92% of companies represented in our sample have adopted a platform strategy. If we restrict the dataset to these platform players, we observe that 54% of platform adopters have launched their own platform while the remaining 46% declare using a third-party one. The present section aims at documenting the phenomenon of platform adoption across different characteristics such as location or market type.



(a) Platform strategy by location of headquarters

(b) Platform strategy by industry



(c) Platform strategy by type of market

(d) Platform strategy by type of offering

Figure 2 - Type of platform strategy by geographical origin, industry, types of market and offering

Looking at Figure 2, our objective is to highlight differences in adoption patterns across several dimensions¹. First of all, while the Figure 2.a depicting the platform strategy by location of headquarters seems to indicate a difference between Europe and North America

¹ Please note that proportion z-tests have been performed in R to assess the significance of these differences. Heterogeneity highlighted is considered as significant if the p-value is lower than 0.05. When differences are declared significant, tables are available in the Online Appendix

in terms of the proportion of firms having adopted a platform strategy, this difference is not significant. The same conclusion holds for industries if we compare each pair of industries. There is no statistical evidence confirming that some industries have a larger proportion of platform adopters than others. Looking at the proportion of adopters versus non adopters, the phenomenon is actually quite homogeneous across all dimensions. In other words, there are no significant differences across different locations, industries, types of markets or offerings, leading us to the conclusion that most firms today have adopted a platform strategy, whatever the environment they evolve in.

Looking at the distinction between platform owners and users, data seem to indicate a significant difference in terms of market types. Indeed, as illustrated by Figure 2.c, our data show that there are proportionally more owners than users of platforms in business-to-business markets than in business-to-consumer ones (see Table 1 of the Online Appendix, where business-to-government and business-to-business-to-consumer have been included in the business-to-business category). This result may be explained by the fact that business-to-consumer markets are characterised by potential for strong network effects due to the size of the targeted markets. These network effects lead to winner-takes-all outcomes that leaves no place for several platform owners. Another potential reason may be related to multi-homing and interoperability potential. In the first case, firms in business-to-business markets may be willing to use several platforms according to specific business needs, leaving place for several platform owners to co-exist. The second case, which may be considered as a cause or consequence of the first one, is related to interoperability. Interoperability tend to increase the potential for platform players to co-exist as platforms can easily be connected to one another. While these reasons may explain the results presented, it is worth noting that this question has not been empirically addressed yet in the literature. Indeed, the literature on platforms has been mainly focused on business-to-consumer markets (e.g. Facebook, Apple, etc.), neglecting the emergence of noteworthy platforms in business-to-business environments and the potential heterogeneity between these two environments. Finally, it is important to emphasize the fact that, while industries tend to show differences in the proportion of owners on Figure 2.b, differences between each pair of industries are not significant enough to draw any conclusion. Based on the data presented, we cannot confirm that, to take the two extreme on Figure 2.b, there are more platform owners in the retail industry than in the mining and raw materials industry.

The last distinction we explore is related to the digital incumbency of firms. As a reminder, we distinguish here traditional incumbents from digital incumbents and digital natives. Our data show a significant difference in terms of adoption of platforms between traditional and digital firms. Indeed, digital firms, whether being a digital native or an incumbent having operated a digital transformation, seem to own or use more platforms than their traditional counterparts (see Table 2 in the Online Appendix). If we look at the strategies into more details, we only observe a significant difference between digital incumbent and digital natives. Indeed, the proportion of platform owners is significantly higher among digital native than among digital incumbents who seem to favour the strategy of using a third-party platform.

Integrative capabilities

While we have seen that a large majority of firms (i.e. 92%) in our sample has already adopted a platform strategy, we turn now our attention to a specific capability supposed to favor both value creation and capture for platform players: integrative capabilities. The first striking result we observe is that the integrative approach and underlying capabilities do not seem to always accompany a platform strategy. Indeed, only 61% of companies having adopted a platform strategy declare integrating their offering with external partners. Before looking closer at the intersection of platform strategies and integrative capabilities, let us first describe this dimension across several characteristics, as we did for platform strategies. The following graphs are based on the complete sample data and consider thus both platform adopters and non-adopters.

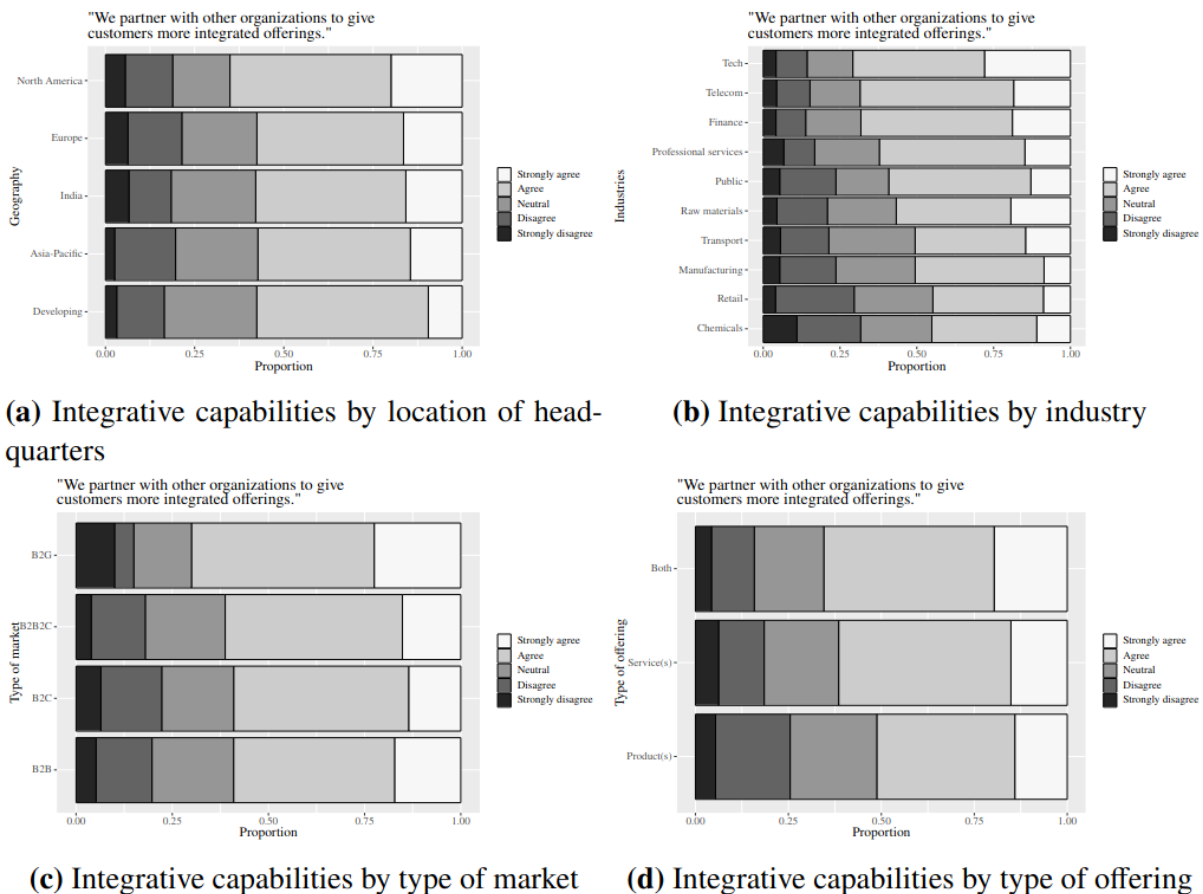


Figure 3 - Integrative capabilities by geographical origin, industry, types of market and offering

Looking at Figure 3.a, there is a clear difference between North America and the other regions. Indeed, it can be observed that North America has a greater proportion of companies that integrate their offerings with external partners than the rest. This difference is statistically significant: North America's share of companies having an integrative approach is higher than in other regions (see Table 3 in the Online Appendix).

Moving on to the industries, we also observe some heterogeneity. As depicted by Figure 3.b, there exist three groups of industries in terms of integration. First, the high tech, finance and telecommunication industries tend to have a greater share of companies that integrate their offerings than the rest. The second group is composed by the retail, chemicals, transport and manufacturing industries that have a lower proportion of integrating firms. Finally, the third group is composed by the rest of the industries that have a share of integrating firms around the average (see significant differences between pairs of industries in Table 4 of the Online Appendix). While we only see a minor difference between types of markets, the types of offerings also show some heterogeneity. Indeed, Figure 3.d clearly shows that pure product firms tend to be less integrative than pure service firms or hybrid ones. These differences are statistically significant (see Table 5 of the Online Appendix). The rationale behind it may be that it is more difficult to adapt your own product to offer it in a combined value proposition than to adapt services. Services can indeed easily be combined with the ones of external partners, while products may incur greater costs to do so.

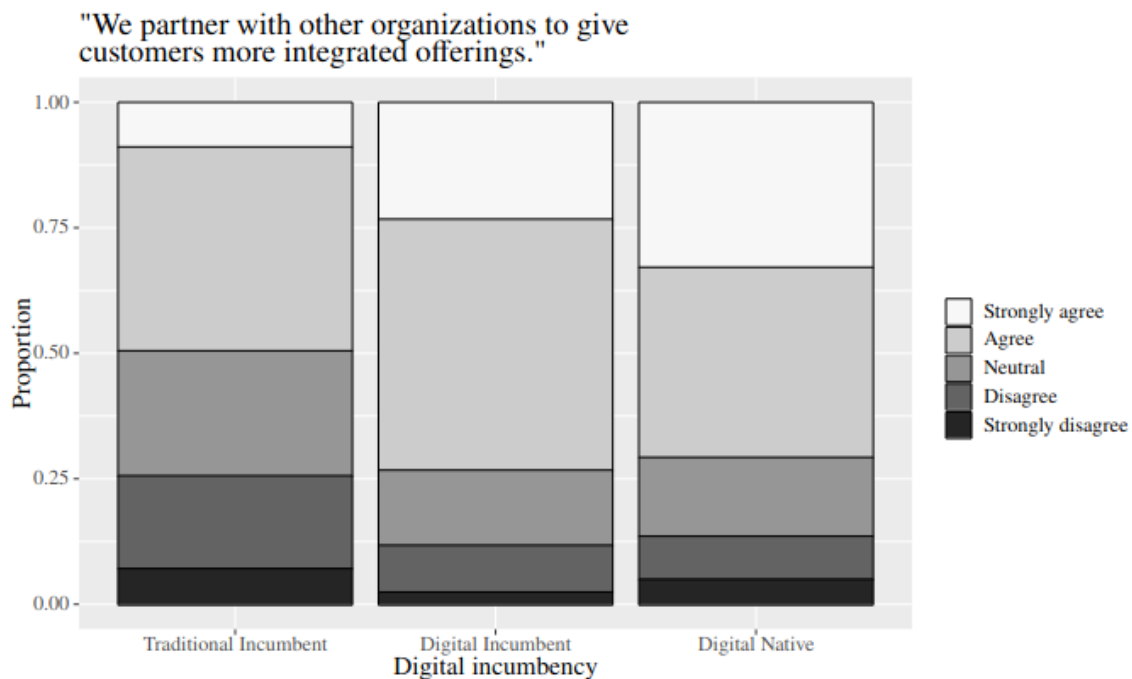


Figure 4 - Integrative capabilities by digital incumbency

Figure 4 depicts the propensity to integrate offerings with external partner by digital incumbency. While digital natives seem relatively similar to incumbents having operated a digital transformation, they differ significantly from their traditional counterparts who haven't done so (see Table 6 of the Online Appendix). Based on this result and previous observation related to the industries, we observe that the integrative approach seems correlated with digitization. Firms that are digital or evolving in a digital environment seem to be more likely to integrate their offerings than others.

To sum up, looking at the data highlights the fact that, while it appears that platform strategies are adopted by the majority of our sample and are equally distributed across several dimensions, the propensity to integrate offerings with external players is much less present and uniform. While interesting as a standalone factoid, it does not answer the question of whether it has an impact on a companies' performance. Before diving into our regression analysis, let us take a look at the descriptive analysis of the combination between platform strategy and integrative capabilities.

On the interplay between platform strategy and integrative capabilities

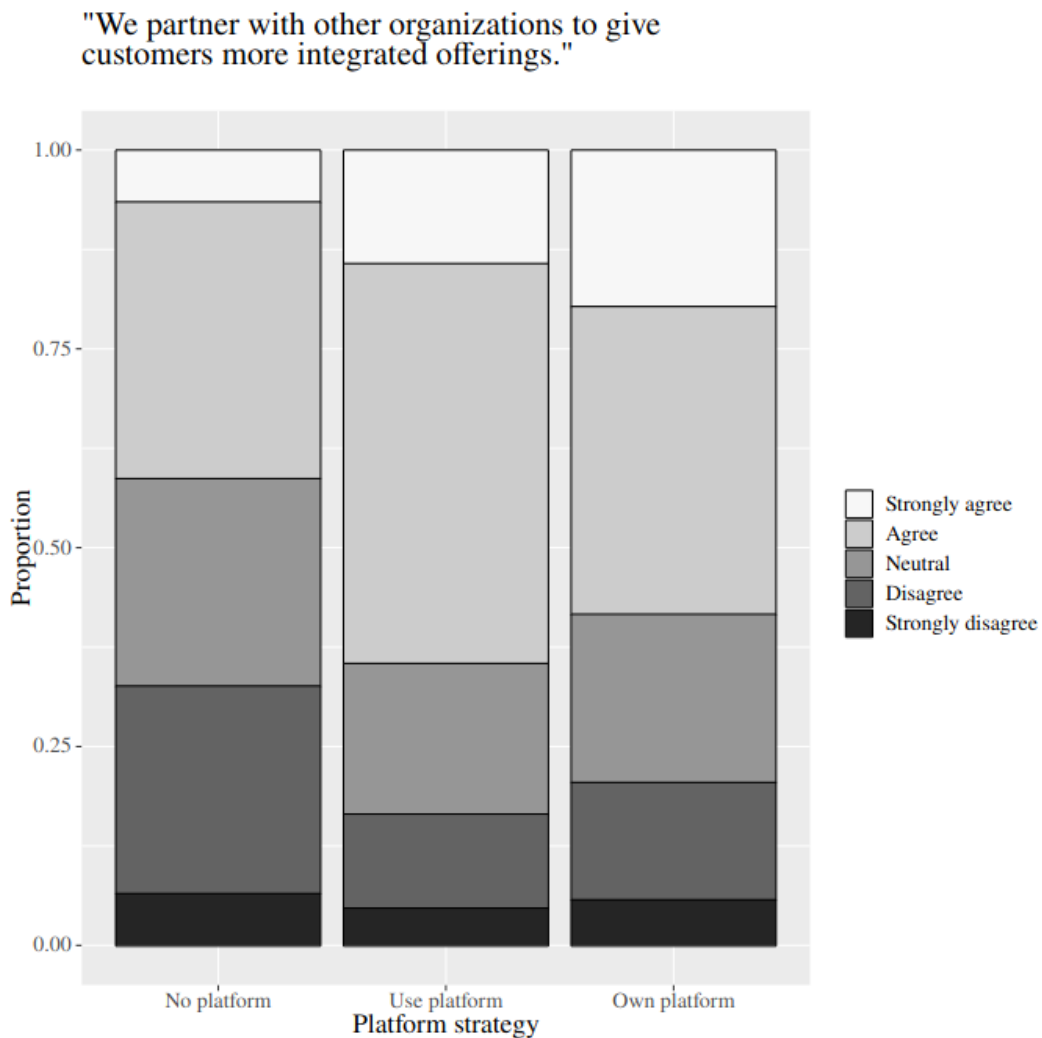


Figure 5 - Integrative capabilities by platform strategy

Combining platform and integrative capabilities, it can be observed on Figure 5 that there are proportionally more firms integrating their offerings with external partners among platform players than among non-platform players. This observation is confirmed by statistical testing (see Table 7 of the Online Appendix). If we look deeper at the different

strategies, the same Figure 5 seems to indicate that there are proportionally more integrative players among users of platforms than among owners. Again, this difference is statistically significant (see Table 7 of the Online Appendix). With these descriptive statistics in mind, we are now able to explore the relationship between platforms and performance.

7. REGRESSION ANALYSIS[results_reg]

The objective of the present section is to further study the relationship between platform strategies, integrative capabilities and performance. To do so, we built a multiple regression model aiming at exploring (1) the potential confounding effect of firms' digital state and (2) the moderation effect of integrative capabilities over platforms strategies' impact on performance.

The ordered categorical nature of the output variable turns the use of simple linear regression spurious as the variable is constrained to a set of discrete values. The most natural way of evaluating the data involves therefore using a member of the generalized linear models' family: the ordered logit regression method. The model assumes proportional odds and is therefore a case of classical ordered logit application. This means that the coefficients are not directly interpretable as proportional effects. In the present econometric analysis, we are mainly concerned about the sign of the coefficient: a positive coefficient indicates that the variable is positively correlated to the outcome variable while a negative coefficient indicates the opposite.

The reader interested in interpreting the magnitude of coefficients should note that data was standardized. As such the coefficient represent the change in odds between two classes when we move a covariate by one standard deviation. This rescaling is fairly common in the literature when using logit models. This avoids oddities in the regression due to difference in scales between variables, although the data at hand is mostly on likert scales. The regressions were also estimated on the unscaled data with the same conclusions.

Platform strategy

Authors in the field of platforms tend to indicate that the participation in a platform strategy correlates with higher performance. The rationale is mostly based on the positive network and resulting winner-takes-all effects (e.g. (Van Alstyne, Parker, and Choudary 2016))

As it turns out, this is confirmed in our data (see Table 2, column (1)). The fact of owning or using a platform correlates indeed positively with performance when compared to the alternative of not participating in the platform game at all. As already mentioned in the description of the dataset, though, most of the respondents declared to be involved at some degree with platforms. It means that the base case in such regression is relatively small.

Table 2 - Regression coefficients of platform strategies. The different regressions in each column were built with different sets of controls.

	<i>Dependent variable:</i>						
	Performance : Past Revenue Growth						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Own platform	0.382* (0.206)	0.351* (0.207)	0.429** (0.209)	0.418** (0.269)	0.442** (0.215)	0.431** (0.216)	0.357 (0.217)
Use platform	0.351* (0.208)	0.287 (0.211)	0.394* (0.211)	0.349 (0.213)	0.370* (0.217)	0.352 (0.218)	0.310 (0.220)
Geography	-	Yes	-	Yes	Yes	Yes	Yes
Industry	-	-	Yes	Yes	Yes	Yes	Yes
Size	-	-	-	-	Yes	Yes	Yes
Digital Maturity	-	-	-	-	-	Yes	Yes
Digital Incumbency	-	-	-	-	-	-	Yes
Observations	1,235	1,235	1,235	1,235	1,211	1,211	1,211

Note:

*p<0.1; **p<0.05; ***p<0.01

If we now look deeper at the distinction between the two platform strategies (i.e. owning versus using a platform), it seems that our data also confirms what the literature suggests. Indeed, when looking at the coefficients, it appears that owning a platform has a greater and positive impact on performance compared with only using a platform owned by a third-party.

Furthermore, it is worth noting that the positive effect of owning a platform persists even if we control for the industry, geography, size and digital maturity in terms of core operations. However, if we account for the fact that a company has or not operated a digital transformation (i.e. is it a digital native, an incumbent having adopted a clear digital strategy or, our base case, a traditional incumbent that has not adapted to the ways of working brought about by the digital revolution), the relation between platform strategy and performance loses relevance at traditional statistical significance levels (this can be seen in column (7) of Table 2). Combining descriptive statistics and regression analyses, results tend to confirm that firms' digital state act as a confounding factor in the link between a platform strategy and performance.

Integrative capabilities

As stated earlier, we took the hypothesis that integrative capabilities moderate the relation between platforms and performance. The first step to assess this moderating effect is to add this variable (i.e. integrative capabilities) as a control variable in our model and look at the impact on the platform effect. While previous results seem to confirm, as long as we don't account for the digital incumbency measure, that companies which have a platform

strategy tend to grow at faster rate , these conclusions fade when we control for the focal company’s integrative capabilities.

Indeed, when we repeat the previous analysis while adding this variable to the set of factors correlating with performance, it makes the relevance of adopting a platform strategy weak, whatever the strategy adopted (see Table 3). As one can notice, integrative capabilities seem to be an important determinant of performance in today’s digital environments².

Table 3 - Regression coefficients of platform strategies with the addition of integrative capabilities. The different regressions in each column were built with different sets of controls.

		<i>Dependent variable:</i>							
		Performance : Past Revenue Growth							
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Integrative capabilities		0.240*** (0.050)	0.234*** (0.050)	0.236*** (0.050)	0.212*** (0.051)	0.219*** (0.052)	0.242*** (0.053)	0.203*** (0.054)	0.199*** (0.055)
Own platform			0.285 (0.208)	0.257 (0.209)	0.345 (0.211)	0.336 (0.212)	0.358* (0.216)	0.308 (0.218)	0.303 (0.218)
Use platform			0.234 (0.211)	0.173 (0.213)	0.294 (0.213)	0.249 (0.215)	0.274 (0.219)	0.210 (0.221)	0.250 (0.222)
Geography		-	-	Yes	-	Yes	Yes	Yes	Yes
Industry		-	-	-	Yes	Yes	Yes	Yes	Yes
Size		-	-	-	-	-	Yes	Yes	Yes
Digital Maturity		-	-	-	-	-	-	Yes	Yes
Digital Incumbency		-	-	-	-	-	-	-	Yes
Observations		1,235	1,235	1,235	1,235	1,235	1,211	1,211	1,211

Note:

*p<0.1; **p<0.05; ***p<0.01

This might be understood as an indication that digital native companies or companies that have operated a digital transformation are expected to see their revenue grow faster than the rest of companies, no matter whether they pursue a platform strategy or not (i.e. a company that is digital from the start but sells through their own webshop has the same expected revenue growth as the same company which built a platform to sell the same wares). However, wanting to integrate its own offer with other companies correlates with revenue growth even when accounting for the fact of having operated this transformation or not (i.e. knowing if the webshop in the previous example somehow sells its products as

² Besides the main regression, we also performed several robustness checks, both to test the influence of the choice of the dependent variable and possible endogeneity between the platform strategy and the variable of interest. The results of such checks do not alter the main conclusions presented here. They are summarize in the appendix in section [\[robustness\]](#)

complements to the services or product of another company as part of a bundled offer, for example).

While this result seems to put in question part of the previous literature about the effects of adopting a platform strategy, it is important to mention that it is not antagonistic to it; indeed, this does not dismiss the effect of platform on revenue growth. Rather than that, it nuances it and helps highlight the mechanism through which platforms create value: by creating joint value through integrating value propositions rather than by just herding the consumer and decreasing search costs on both sides. Platforms are possibly one way to create this joint value but not exclusively. While it can help reaching the critical mass by bringing customers or suppliers together, more value can still come from the creation of a common proposition from different players.

On the interplay between platform strategy and integrative capabilities

Having analyzed the basic model, we now turn our attention towards interactions between the adoption of platform strategies and capabilities. It is possible to use the data to query whether the willingness to integrate a company's offer with other players, that we use as a proxy for dynamic capabilities, has an impact on the company's platform strategy performance. This is done in Table 4. From it, one can see that there is a difference between companies that use or own platforms and state that they aim at integrating their offer with others and the ones that use or own platforms but are not collaborating with other players to serve their customer in a more integrated fashion. The base case left outside of the regressions to avoid multicollinearity is, again, the *No platform* strategy. The companies in the first category tend to have a better results in terms of revenue growth. It seems therefore that, when pursuing a platform strategy, it is less effective to want to retain control over the whole offer than to partner with others to propose the customer a more integrated offer. These results confirm the importance of integrative capabilities in digital platform ecosystems, as suggested by (Helfat and Raubitschek 2018).

Table 4 - Regression coefficients of platform strategies coupled with integrative capabilities. The different regressions in each column were built with different sets of controls.

	<i>Dependent variable:</i>						
	Performance : Past Revenue Growth						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Own platform w/ integrative capabilities	0.537** (0.216)	0.494** (0.218)	0.565** (0.220)	0.546** (0.222)	0.600*** (0.226)	0.565** (0.226)	0.471** (0.229)
Own platform w/o integrative capabilities	0.179 (0.223)	0.169 (0.224)	0.252 (0.226)	0.255 (0.228)	0.240 (0.232)	0.260 (0.233)	0.228 (0.234)
Use platform w/ integrative capabilities	0.461** (0.217)	0.416* (0.220)	0.475** (0.220)	0.451** (0.222)	0.494** (0.227)	0.456** (0.228)	0.415* (0.231)
Use platform w/o integrative capabilities	0.151 (0.235)	0.060 (0.237)	0.251 (0.238)	0.173 (0.240)	0.167 (0.243)	0.182 (0.245)	0.164 (0.246)
Geography	-	Yes	-	Yes	Yes	Yes	Yes
Industry	-	-	Yes	Yes	Yes	Yes	Yes
Size	-	-	-	-	Yes	Yes	Yes
Digital Maturity	-	-	-	-	-	Yes	Yes
Digital Incumbency	-	-	-	-	-	-	Yes
Observations	1,235	1,235	1,235	1,235	1,211	1,211	1,211

Note:

*p<0.1; **p<0.05; ***p<0.01

While Helfat and Raubitschek (2018) highlight the importance of integrative capabilities, among other dynamic capabilities, for platform leaders, our results seem to extend this suggestion to platform users, also called complementors in the literature. However, one may notice that both the magnitude of the effect as well as the significance is higher for platform owners than for platform users, and this is confirmed by our robustness checks (see Appendix B). These results clearly show that integrative capabilities are crucial for platform players, and especially for owners of platforms. Aggregated, these conclusions seem to imply that, while competition between platforms usually exhibit winner-takes-all dynamics, it might be counterproductive to keep this mindset as an individual player. As such, as platforms become important gateways, substituting or coalescing huge swaths of the market, they simultaneously force participants, both orchestrators and complementors, to open and, hence, develop the necessary capabilities to collaborate with external players in what one can hope is a mutually beneficial way.

In conclusion, the data analyzed here points towards a shift of focus from the actual way to create or participate into a platform towards the emphasis on value co-creation and capture based on integrative capabilities. Although this paper does not have vocation to bring about a new consistent theory, it aims at providing additional empirical evidence on the importance of specific capabilities needed to create and capture value from platforms. Furthermore, it is worth noting that conclusions remain unchanged when applying the following changes to the dependent variable : (1) using a binary dependent variable that takes the value 1 if *Past Revenue Growth* is higher the industry's median and 0 if equal or lower, (2) using the same binary variable based on *Future Revenue Growth* expectations and (3) using *Future Revenue Growth* categories compared with the industry and thus, three levels performance as we used throughout this paper. Moreover, results remain

unchanged when the dataset is limited to incumbent firms by excluding the *Digital natives* category from the sample. These robustness checks are presented in details in Appendix B.

8. CONCLUSION

Although the nature of data used may be subject to some bias (as it is survey data) and prevent causal analysis (due to its cross-sectional nature), we have presented evidences showing that platforms strategies per se may not be beneficial if they are not supported by the right capabilities. Building up on Teece (2018) and Helfat and Raubitschek (2018)'s work, we have focused on integrative capabilities and have shown that, especially for platform owners, platform adoption is positively correlated with performance when coupled with an integrative approach towards external partners. Our contribution therefore confirms Helfat and Raubitschek (2018)'s suggestions in a field that has been relatively less investigated compared with other dynamic capabilities such as innovation ones. More generally, this finding seems to indicate that the fact of being a platform orchestrator or simply a participant could have less importance than being part of a larger ecosystem and being able to integrate one's value proposal with that of others.

Besides our contribution to the literature depicted here above, these results have also important managerial implications. By confirming Helfat and Raubitschek (2018)'s suggestions, we have empirically shown that integrative capabilities are crucial to thrive in today's highly connected environments dominated by digital platforms. We have indeed proved that the mere adoption of a platform strategy is not sufficient to succeed. Indeed, in order to profit from platform ecosystems, firms must make sure they have the right capabilities and in particular, integrative ones. These capabilities include, as mentioned by Helfat and Raubitschek (2018), dedicated teams working on selecting partner to form potential alliances and working with them to align activities and products.

Finally, our results opens up doors for future research at the frontier of platforms, ecosystems and dynamic capabilities. The literature on ecosystems is emergent and there is still a lack of unified view on what shapes an ecosystem and what are the success factors in these specific environments. As we know, platforms favour the emergence of such environments by connecting different players. In this context, the source of value creation and hence, capture, shift from assets ownership to relationships' orchestration (Van Alstyne, Parker, and Choudary 2016). Two specific areas for future research can be explored based on our results. First, it would be relevant to study integrative capabilities in further detail in order to assess, in practice, what makes effective integrative capabilities emerge and work. Moreover, better understanding from a process perspective how firms collaborate in digital (platform) ecosystems would also be beneficial for the knowledge around these topics. Second, the same kind of empirical research can be applied to other categories of dynamic capabilities in the context of platforms, such as innovation and sensing capabilities. As more research is done at the frontier of platforms, ecosystems and dynamic capabilities, it is likely that our understanding and therefore the need for empirical testing of the many theories around will be more important than ever.

9. APPENDIX

A Sample

The empirical distributions are shown in Figures A.1-A.4. As one can see, the focus of the survey was on professional and legal services firms as well as financial services and high-tech companies. However, there were still hundreds of respondents from other industries. At the beginning, 22 categories of industries were represented. We have aggregated some of these industries to end up with 10 groups of industries (see Table A.1). The distribution of respondents by groups of industries is presented in Figure A.1.

Table A.1 - Grouping of industries

Groups	Industries
1. Chemicals	Chemicals Pharmaceuticals and medical products
2. Finance	Financial services Private equity
3. Manufacturing	Automotive and assembly Aerospace and defense
4. Professional services	Business, legal, and professional services
5. Public	Public sector Social sector Healthcare systems and services
6. Raw materials	Oil and gas Paper and forest products Metals and mining Electric power and natural gas
7. Retail	Retail Consumer packaged goods
8. Tech	High-tech Advanced electronics
9. Telecom	Telecommunications Media and entertainment
10. Transport	Travel, transport, and logistics Infrastructure

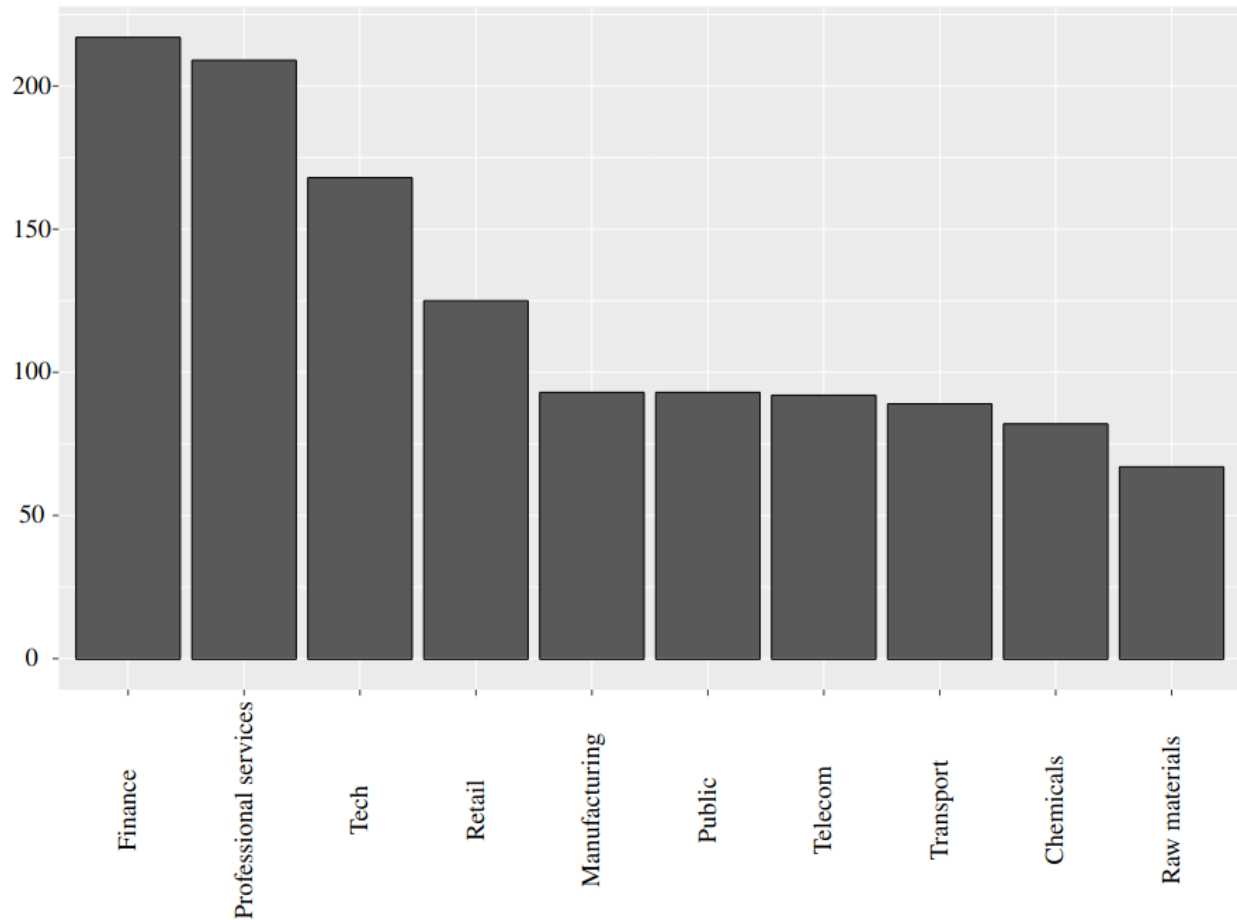
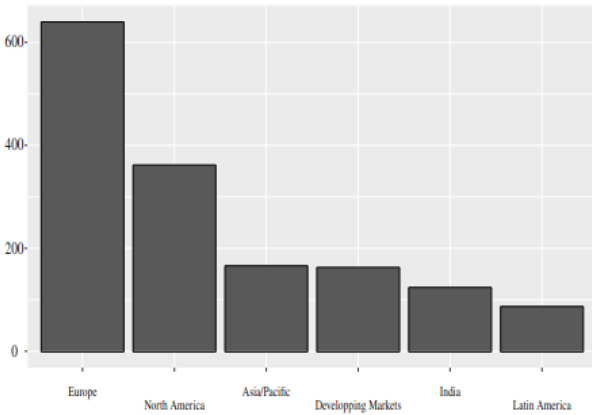
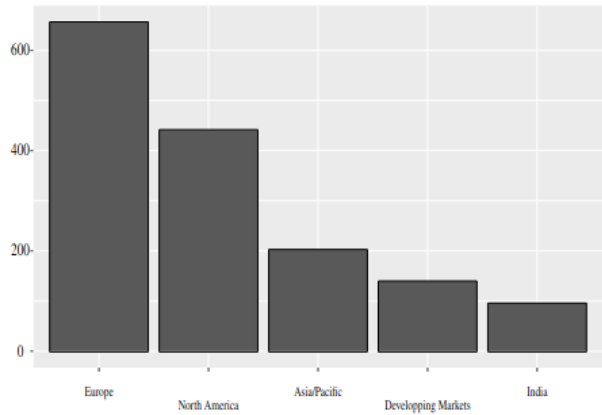


Figure A.1 - Distribution of respondents by groups of industries

The geographic origin of both respondents and the headquarter of the company they work for (respectively, Figures A.2.a and A.2.b) is somewhat biased towards Europe rather than North America and Asia. This might be something to account for in the analysis. However, we see that as a strength of the present study. Indeed, due to data availability or researchers' interests, the academic literature tends to use data on the US or North America in general while, maybe out of concern about privacy, the European side is less prevalent. However, we control for the geographical aspect of the dataset in all our analyses.

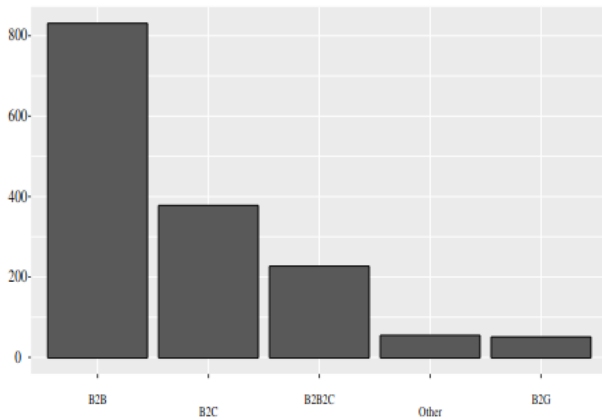


(a) Geographical origin of respondents

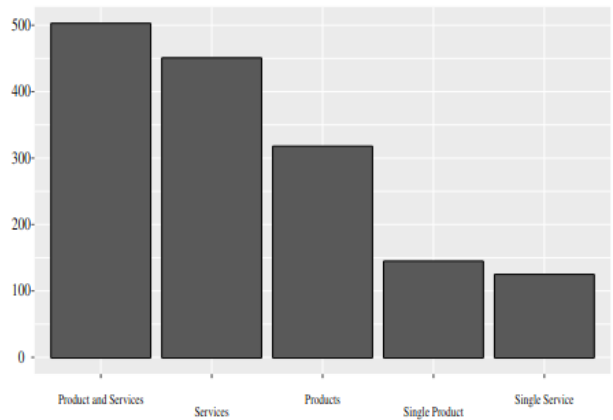


(b) Geographical origin of respondents HQ's

Figure A.2 - Geographical distribution of respondents



(a) Distribution by type of market



(b) Distribution by type of offering

Figure A.3 - Distribution of respondents by type of market and offering

Finally, while there are more respondents working in business-to-business (B2B) companies than to business-to-consumers (B2C) ones (Figure A.3.a), the numbers for each of the first three categories (that also include business-to-business-to-customers (B2B2C)) are all high enough to ensure a broad variety of responses. The same observation holds for what they sell. Indeed, while most of the respondents work in companies that sell more than one product or service, the spread of respondents between products, services and a combination of the two is relatively homogeneous and there remain enough observations in each of those categories to draw conclusions holding for each of them.

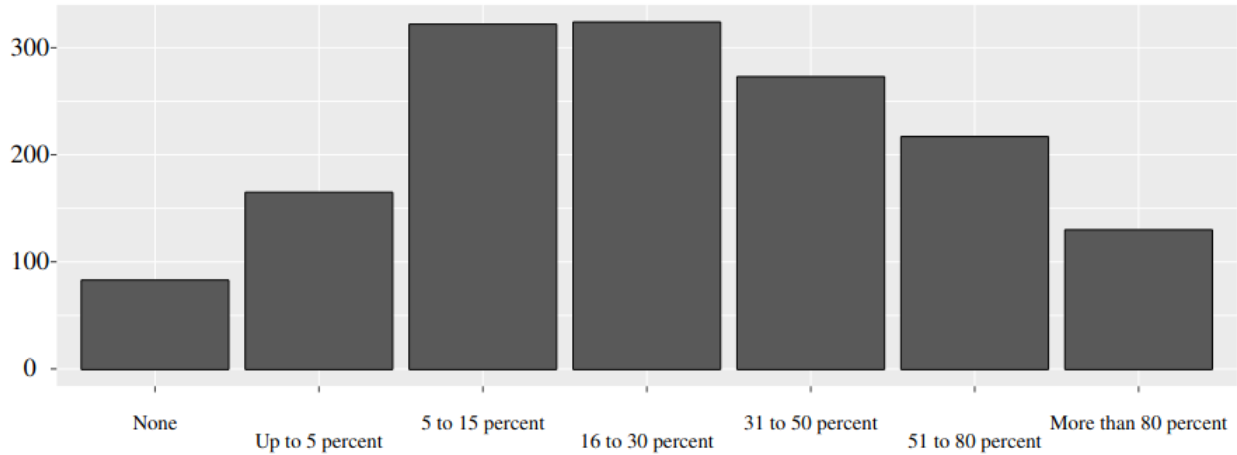


Figure A.4 - Digital maturity - Percentage of core operations that are digitized

Regarding the degree to which the respondents' companies are digitized in their core processes (Figure A.4), we observe what we would expect. Most of the respondents have less than 50% of their core operations that happen through digital means, while a little above a fifth of them have more than that. Finally, we have around 150 respondents who operate only through such channels. While this is certainly more than what would be observed in the economy, this is potentially due to the over-representation of high-tech and financial services in the sample rather than a systematic bias of this survey on that point in particular.

B Robustness checks

Alternative dependent variables and models

One might wonder whether the previous results are not due more to choice of dependent variable or regression model. In order to assess the robustness of our results, we have built three alternative measures of performance. The first one is still based on past revenue growth but compares two groups of performers : the first group is composed by firms that have over-performed compared with the industry's median, while the second group has either performed like their peers or under-performed. We therefore end-up with a binary dependent variable that takes the value 1 if the company has over-performed, and 0 if not. The second and third alternative dependent variables takes Future Revenue Growth (expectations) as an indicator of performance. It is either built as a binary variable like we did with past revenue growth or on the three levels of performance. Both compare the expectations of the firms with the median of the industry, but the categories of performance are actually different. The results shown in Table B.1 confirm our conclusions. Indeed, when taking a measure based on past performance, these results also show that the performance effect of the interaction between platform adoption and integrative capabilities seem more relevant for platform owners than for platform users. We see that both the coefficients and the significance are higher in the case of platform owners than platform users, which tend to confirm Helfat and Raubitschek (2018) propositions focusing on platform owners. If we now look at columns (2) and (3) in the same table, it can be

observed that the performance effects are greater when using indicators for future performance. However, this measure is based on expectations from firms' executives and may involve more biases than with the past performance measure. But what is striking is that both platform owners and platform users with integrative capabilities show better expectations in terms of future results. This conclusion holds both with the probit and ordered logit models. As a reminder, the probit model distinguishes over-performer from the rest, while the ordered logit model is based on three levels of performance i.e. under-performance, median-performance or over-performance.

Table B.1 - Regressions using alternative measures of performance

	<i>Dependent variable:</i>		
	Binary Past Performance <i>probit</i> (1)	Binary Future Performance <i>probit</i> (2)	Future Performance <i>ordered logistic</i> (3)
Own platform w/ integrative capabilities	0.264* (0.160)	0.400** (0.167)	0.608*** (0.235)
Own platform w/o integrative capabilities	0.105 (0.166)	0.108 (0.173)	0.233 (0.239)
Use platform w/ integrative capabilities	0.241 (0.161)	0.331** (0.168)	0.497** (0.236)
Use platform w/o integrative capabilities	0.144 (0.172)	0.129 (0.179)	0.152 (0.251)
Geography	Yes	Yes	Yes
Industry	Yes	Yes	Yes
Size	Yes	Yes	Yes
Digital Maturity	Yes	Yes	Yes
Digital Incumbency	Yes	Yes	Yes
Observations	1,211	1,211	1,211
Log Likelihood	-741.524	-702.718	
Akaike Inf. Crit.	1,527.048	1,449.437	

Note:

*p<0.1; **p<0.05; ***p<0.01

Finally, we also tested some potential endogeneity issue between the platform strategy and the dynamic integrative capability. Applying the Heckman probit method, we find essentially the same effect as the one presented in the main article.

Sub-sample of incumbents

Secondly, we were interested in assessing whether these results were robust when limiting the sample to incumbent firms. This is done in Table B.2. While we still control in regression (4) for the digital state of companies (in terms of output, as described in Section 5), we observe that results remain unchanged. In this case, results show that the integrative approach and underlying capabilities is crucial for both platform owners and users, even if the magnitude and significance of the coefficients are higher for platform leaders than for

complementors. In conclusion, results are robust to a change in the dependent variables as well as to a change in the sample studied in terms of companies' digital profile.

Table B.2 - Regressions on the sub-sample of incumbents, excluding digital natives

	Dependent variable:						
	Performance						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Own platform w/ integrative capabilities	0.408* (0.225)	0.374* (0.227)	0.454** (0.229)	0.440* (0.232)	0.484** (0.236)	0.471** (0.236)	0.438* (0.238)
Own platform w/o integrative capabilities	0.179 (0.231)	0.178 (0.233)	0.253 (0.235)	0.263 (0.237)	0.245 (0.241)	0.265 (0.242)	0.255 (0.242)
Use platform w/ integrative capabilities	0.411* (0.225)	0.365 (0.228)	0.440* (0.228)	0.415* (0.232)	0.454* (0.236)	0.434* (0.236)	0.394* (0.239)
Use platform w/o integrative capabilities	0.098 (0.243)	0.021 (0.246)	0.210 (0.247)	0.146 (0.249)	0.142 (0.252)	0.156 (0.253)	0.139 (0.253)
Geography	-	Yes	-	Yes	Yes	Yes	Yes
Industry	-	-	Yes	Yes	Yes	Yes	Yes
Size	-	-	-	-	Yes	Yes	Yes
Digital Maturity	-	-	-	-	-	Yes	Yes
Digital Incumbency	-	-	-	-	-	-	Yes
Observations	1,095	1,095	1,095	1,095	1,075	1,075	1,075

Note:

*p<0.1; **p<0.05; ***p<0.01

10. Bibliography

Adner, Ron. 2006. "Match Your Innovation Strategy to Your Innovation Ecosystem." *Harvard Business Review* 84 (4): 98.

———. 2017. "Ecosystem as Structure: An Actionable Construct for Strategy." *Journal of Management* 43 (1): 39–58.

Adner, Ron, and Rahul Kapoor. 2010. "Value Creation in Innovation Ecosystems: How the Structure of Technological Interdependence Affects Firm Performance in New Technology Generations." *Strategic Management Journal* 31 (3): 306–33.

Alexy, Oliver, Gerard George, and Ammon J. Salter. 2013. "Cui Bono? The Selective Revealing of Knowledge and Its Implications for Innovative Activity." *Academy of Management Review* 38 (2): 270–91.

Amit, Raphael, and Xu Han. 2017. "Value Creation Through Novel Resource Configurations in a Digitally Enabled World." *Strategic Entrepreneurship Journal* 11 (3): 228–42.
<https://doi.org/https://doi.org/10.1002/sej.1256>.

- Autio, Erkkko, Satish Nambisan, Llewellyn D. W. Thomas, and Mike Wright. 2018. "Digital Affordances, Spatial Affordances, and the Genesis of Entrepreneurial Ecosystems." *Strategic Entrepreneurship Journal* 12 (1): 72–95. <https://doi.org/https://doi.org/10.1002/sej.1266>.
- Bloom, Nicholas, Raffaella Sadun, and John Van Reenen. 2012. "The Organization of Firms Across Countries." *The Quarterly Journal of Economics* 127 (4): 1663–1705.
- . 2015. "Do Private Equity Owned Firms Have Better Management Practices?" *American Economic Review* 105 (5): 442–46.
- Boudreau, Kevin J., and Lars B. Jeppesen. 2015. "Unpaid Crowd Complementors: The Platform Network Effect Mirage." *Strategic Management Journal* 36 (12): 1761–77.
- Brusoni, Stefano, and Andrea Prencipe. 2013. "The Organization of Innovation in Ecosystems: Problem Framing, Problem Solving, and Patterns of Coupling." *Advances in Strategic Management* 30 (2013): 167–94.
- Bughin, Jacques, Tanguy Catlin, Bryce Hall, and Nicolas van Zeebroeck. 2017. "Improving Your Digital Intelligence." *MIT Sloan Management Review*.
- Bughin, Jacques, and Nicolas van Zeebroeck. 2017. "The Best Response to Digital Disruption." *MIT Sloan Management Review* 58 (4).
- Dhanaraj, Charles, and Arvind Parkhe. 2006. "Orchestrating Innovation Networks." *Academy of Management Review* 31 (3): 659–69.
- Eisenhardt, Kathleen M., and Jeffrey A. Martin. 2000. "Dynamic Capabilities: What Are They?" *Strategic Management Journal* 21 (10-11): 1105–21. [https://doi.org/10.1002/1097-0266\(200010/11\)21:10/11<1105::AID-SMJ133>3.0.CO;2-E](https://doi.org/10.1002/1097-0266(200010/11)21:10/11<1105::AID-SMJ133>3.0.CO;2-E).
- Eisenmann, Thomas R. 2006. "Internet Companies' Growth Strategies: Determinants of Investment Intensity and Long-Term Performance." *Strategic Management Journal* 27 (12): 1183–1204.
- Eisenmann, Thomas R., Geoffrey Parker, and Marshall Van Alstyne. 2009. "Opening Platforms: How, When and Why?" *Platforms, Markets and Innovation* 6: 131–62.
- Evans, David S. 2003. "The Antitrust Economics of Multi-Sided Platform Markets." *Yale J. On Reg.* 20: 325.
- Evans, David S., Andrei Hagiu, and Richard Schmalensee. 2008. *Invisible Engines: How Software Platforms Drive Innovation and Transform Industries*. MIT press.
- Farrell, Joseph, and Garth Saloner. 1985. "Standardization, Compatibility, and Innovation." *The RAND Journal of Economics*, 70–83.
- Frankort, Hans TW. 2013. "Open Innovation Norms and Knowledge Transfer in Interfirm Technology Alliances: Evidence from Information Technology, 1980-1999." *Advances in Strategic Management* 30: 239–82.

- Gawer, Annabelle. 2009. "Platforms, Markets and Innovation: An Introduction."
- Hagiu, Andrei. 2013. *Strategic Decisions for Multisided Platforms*.
- Hein, Andreas, Jörg Weking, Maximilian Schrieck, Manuel Wiesche, Markus Böhm, and Helmut Krcmar. 2019. "Value Co-Creation Practices in Business-to-Business Platform Ecosystems." *Electronic Markets* 29 (3): 503–18.
- Helfat, Constance E., and Ruth Raubitschek. 2018. "Dynamic and Integrative Capabilities for Profiting from Innovation in Digital Platform-Based Ecosystems." SSRN Scholarly Paper, no. ID 3122046 (January). <https://papers.ssrn.com/abstract=3122046>.
- Iansiti, Marco, and Roy Levien. 2004a. "Strategy as Ecology." *Harvard Business Review* 82 (3): 68–78.
- . 2004b. *The Keystone Advantage: What the New Dynamics of Business Ecosystems Mean for Strategy, Innovation, and Sustainability*. Harvard Business Press.
- Jacobides, Michael G., Carmelo Cennamo, and Annabelle Gawer. 2018. "Towards a Theory of Ecosystems." *Strategic Management Journal* 39 (8): 2255–76.
- Kapoor, Rahul, and Joon Mahn Lee. 2013. "Coordinating and Competing in Ecosystems: How Organizational Forms Shape New Technology Investments." *Strategic Management Journal* 34 (3): 274–96.
- Katz, Michael L., and Carl Shapiro. 1986. "Technology Adoption in the Presence of Network Externalities." *Journal of Political Economy* 94 (4): 822–41.
- Leten, Bart, Wim Vanhaverbeke, Nadine Roijackers, André Clerix, and Johan Van Helleputte. 2013. "IP Models to Orchestrate Innovation Ecosystems: IMEC, a Public Research Institute in Nano-Electronics." *California Management Review* 55 (4): 51–64.
- McIntyre, David P., and Arati Srinivasan. 2017. "Networks, Platforms, and Strategy: Emerging Views and Next Steps." *Strategic Management Journal* 38 (1): 141–60.
- Parker, Geoffrey G., and Marshall W. Van Alstyne. 2005. "Two-Sided Network Effects: A Theory of Information Product Design." *Management Science* 51 (10): 1494–1504.
- Rochet, Jean-Charles, and Jean Tirole. 2003. "Platform Competition in Two-Sided Markets." *Journal of the European Economic Association* 1 (4): 990–1029.
- Shapiro, Carl, and Hal R. Varian. 1999. "The Art of Standards Wars." *California Management Review* 41 (2): 8–32.
- Teece, David J. 1986. "Profiting from Technological Innovation: Implications for Integration, Collaboration, Licensing and Public Policy." *Research Policy* 15 (6): 285–305. [https://doi.org/10.1016/0048-7333\(86\)90027-2](https://doi.org/10.1016/0048-7333(86)90027-2).
- . 2007. "Explicating Dynamic Capabilities: The Nature and Microfoundations of (Sustainable) Enterprise Performance." *Strategic Management Journal* 28 (13): 1319–50.

———. 2016. “Business Ecosystem.” *The Palgrave Encyclopedia of Strategic Management*, 151–54.

———. 2018. “Profiting from Innovation in the Digital Economy: Enabling Technologies, Standards, and Licensing Models in the Wireless World.” *Research Policy* 47 (8): 1367–87. <https://doi.org/10.1016/j.respol.2017.01.015>.

Teece, David J., Gary Pisano, and Amy Shuen. 1997. “Dynamic Capabilities and Strategic Management.” *Strategic Management Journal* 18 (7): 509–33. [https://doi.org/10.1002/\(SICI\)1097-0266\(199708\)18:7<509::AID-SMJ882>3.0.CO;2-Z](https://doi.org/10.1002/(SICI)1097-0266(199708)18:7<509::AID-SMJ882>3.0.CO;2-Z).

Van Alstyne, Marshall, and Geoffrey Parker. 2017. “Platform Business: From Resources to Relationships.” *GfK Marketing Intelligence Review* 9 (1): 24–29.

Van Alstyne, Marshall W., Geoffrey G. Parker, and Sangeet Paul Choudary. 2016. “Pipelines, Platforms, and the New Rules of Strategy.” *Harvard Business Review* 94 (4): 54–62.

West, Joel, and David Wood. 2013. “Evolving an Open Ecosystem: The Rise and Fall of the Symbian Platform.” *Advances in Strategic Management* 30: 27–67.



WORKING PAPERS 2013

- 01** - Exploring europe's r&d deficit relative to the us: differences in the rates of return to r&d of young leading r&d firms - Michele Cincera and Reinhilde Veugelers
- 02** - Governance typology of universities' technology transfer processes - A. Schoen, B. van Pottelsberghe de la Potterie, J. Henkel.
- 03** - Academic Patenting in Belgium: Methodology and Evidence – M. Mejer.
- 04** - The impact of knowledge diversity on inventive performance at European universities – M. Mejer
- 05** - Cross-Functional Knowledge Integration, Patenting and Firm's Performance – M. Ceccagnoli, N. van Zeebroeck and R. Venturini.
- 06** - Corporate Science, Innovation and Firm Value, M. Simeth and M. Cincera



WORKING PAPERS 2014

- 07** - Determinants of Research Production at top US Universities – Q. David.
- 08** - R&D financing constraints of young and old innovation leaders in the EU and the US – M. Cincera, J. Ravet and R. Veugelers
- 09** - Globalization of Innovation Production; A Patent-Based Industry Analysis – J. Danguy
- 10** - Who collaborates with whom: the role of technological distance in international innovation – J. Danguy



WORKING PAPERS 2015

- 11** - Languages, Fees and the International Scope of Patenting – D. Harhoff , K. Hoisl, B. van Pottelsberghe de la Potterie , C. Vandepuut
- 12** - How much does speed matter in the fixed to mobile broadband substitution in Europe? – M. Cincera, L. Dewulf, A. Estache
- 13** - VC financing and market growth – Interdependencies between technology-push and market-pull investments in the US solar industry – F. Schock, J. Mutl, F. Täube, P. von Flotow
- 14** - Optimal Openness Level and Economic Performance of Firms: Evidence from Belgian CIS Data – M. Cincera, P. De Clercq, T. Gillet
- 15** - Circular Causality of R&D and Export in EU countries – D. Çetin, M. Cincera.
- 16** - Innovation and Access to Finance – A Review of the Literature – M. Cincera, A. Santos.



WORKING PAPERS 2016

- 17** - Effectiveness of Government intervention in the SME sector: Evidence from the Brussels-Capital Region – G. E. Fombasso, M. Cincera.
- 18** - A review of corporate R&D intensity decomposition – P. Moncada-Pastemò-Castello.
- 19** - The laws of action and reaction: on determinants of patent disputes in European chemical and drug industries – R. Kapoor, N. van Zeebroeck.
- 20** - How do the normativity of headquarters and the knowledge autonomy of subsidiaries co-evolve? – M. Hansmans, G. Liu.




WORKING PAPERS 2017

- 21** - The case for offensive strategies in response to digital disruption – J. Bughin, N. van Zeebroeck.
- 22** - Access to finance as a pressing problem: Evidence from innovative European firms – A. Santos, M. Cincera.
- 23** - Platform play among incumbent firms: the wrong focus? – N. van Zeebroeck, J. Bughin.
- 24** - Social Movements – M. Hensmans, K. van Bommel.
- 25** - Decoding Patent Examination Services – L. Gimeno-Fabran, B. van Pottelsberghe de la Potterie.
- 26** - Countries Attractiveness: An Analysis of EU Firms's Decisions to (De) Localize R&D Activities – M. Cincera, A. Santos.



WORKING PAPERS 2018

- 27** - The impact of EUREKA projects on the economic performance of R&D SMEs – M. Cincera, G. Fombasso.
- 28** - Forecasting short-term transaction fees on a smart contracts platform – C. Hoffreumon, N. van Zeebroeck.
- 29** - Sharing the risk of innovative investment: Assessing the effect of new European financing instrument - M. Cincera, A. Santos.
- 30** - Academic scientists: The golden opportunity for high-tech companies – L. Dewulf, M. Cincera.

 **WORKING PAPERS 2019**

- 31** - Experimentation, Learning and Stress. The Role of Digital Technologies in Strategy Change – J. Bughin, T. Kretschmer, N. van Zeebroeck.
- 32** - Types of Innovation and Firm Performance – M. Cincera, E. Ince.
- 33** - Competition and Innovation: Evidence from Worldwide Corporate R&D Spenders - M. Cincera, E. Ince, A. Santos.

 **WORKING PAPERS 2020**

- 34** - Selectivity versus Reach: Flattening the Curve of Covid 19 for Joint Health and Economic Prosperity – J. Bughin.
- 35** - How firms will affect the Future of Work – J. Bughin.
- 36** - Making Sense of the Covid-19 (SARS-CoV-2) Pandemic – J. Bughin.
- 37** - F.O.G. and Teleworking: Some Labor Economics of Covid-19 – J. Bughin , M. Cincera
- 38** - Learning from 20 Years of Research on Innovation Economics – B. van Pottelsberghe de la Potterie.
- 39** - The Value of Platform Strategy. It's the Ecosystem, Stupid! - J. Gossé, C. Hoffreumon, N. van Zeebroeck, J. Bughin.
- 40** - Ten Moments of Truths for the Covid-19 Crisis – J. Bughin.
- 41** – The Great Employee Divide: Clustering Employee « Well-being » Challenge during Covid-19 – J. Bughin, M. Cincera, D. Reykowska, M. Żyszkiewicz.
- 42** - Perceptive Risk Clusters of European Citizens and NPI Compliance in face of the Covid-19 Pandemics – J. Bughin, M. Cincera, D. Reykowska, M. Żyszkiewicz, R. Ohme.

 **WORKING PAPERS 2021**

- 43** - Make it or Break it: Vaccination Intention at the Time of Covid-19 – J. Bughin, M. Cincera, K. Peters, D. Reykowska, M. Żyszkiewicz, R. Ohme.
- 44** - Covid-19 Endemism and the Control Skeptics - J. Bughin, M. Cincera, D. Reykowska, M. Żyszkiewicz, R. Ohme.
- 45** - Vaccination or NPI? A Conjoint Analysis of German Citizens' Preferences – J. Bughin, M. Cincera, E. Kiepfer, D. Reykowska, F. Philippi, M. Żyszkiewicz, R. Ohme, D. Frank.

- 46** - Is this Time Different? Corporate Resilience in the Age of Covid-19 – J. Bughin, S. Berjoan, F. Hintermann, Y. Xiong.
- 47** - Big Data is Decision Science: the Case of Covid-19 Vaccination - J. Bughin, M. Cincera, D. Reykowska, R. Ohme.
- 48** - The Entrepreneurial Returns to Incumbents' Digital Transformation - J. Bughin, N. van Zeebroeck.
- 49** – Are Patent Offices Substitutes? – E. Petit, B. van Pottelsberghe de la Potterie – L. Gimeno-Fabra.
- 50** - Global Patent Systems: Revisiting the National Bias Hypothesis - E. Petit, B. van Pottelsberghe de la Potterie – L. Gimeno-Fabra.



WORKING PAPERS 2022

- 51** - A Good Crisis (not) Wasted: How Exploiting and Expanding Dynamic Capabilities Shape Corporate Performance During the Covid Pandemic – J. Bughin, S. Berjoan, F. Hintermann.
- 52** - Exploiting the Flying Wheels between Corporate Resilience and Performance – J. Bughin, F. Hintermann.
- 53** - AI Inside? Five Tipping Points for a New AI-based Business World – J. Bughin, D. Sickinghe.
- 54** - Why Companies should Scale New Tech-based Flexible Work Practices – J. Bughin, S. Berjoan, Y. Xiong.
- 55** - Identifier les conditions de succès pour le lancement d'une plateforme de crowdfunding – J. Nsonsumuna, O. Witmeur.



WORKING PAPERS 2023



- 56** - Tester les conditions de lancement d'une plateforme de crowdfunding en République Démocratique du Congo (RDC) – J. Nsonsumuna, O. Witmeur.
- 57** - Economic Consequences of the Unitary Patent – L. Kalukuta Mahina, B. van Pottelsberghe de la Potterie.
- 58** - Défis et opportunités du crowdfunding en Afrique : revue de la littérature – J. Nsonsumuna, O. Witmeur.
- 59** – Crisis? What crisis ? Why European companies should double down on AI now – J. Bughin, F. Hintermann, P. Roussière.
- 60** - The Rise of the Intelligent Enterprise – J. Bughin, P. Roussière, P. Tanguturi.
- 61** – Looking beyond ChatGPT: Why AI Reinforcement Learning is set for Prime Time – J. Bughin.

62 - Resilience is more than being able to rebound : it should be used as a competitive advantage – J. Bughin.

63 - ChatGPT goes (not yet) to Hollywood – J. Bughin.

64 - How productive is generative AI really ? – J. Bughin.

65 - Now it is time for AI transformation – J. Bughin, I. Gjepali.

66 - Does Generative AI generate jobs ? – J. Bughin

67 - Hacking trustworthy AI – J. Bughin.

68 - The Cost of Sustainability in the Construction Sector - The Case of Family Houses in Belgium – J. Douhard, B. van Pottelsberghe de la Potterie.

69 - Make or Buy your Artificial Intelligence? Complementarities in Technology Sourcing – C. Hoffreumon, C. Forman, N. van Zeebroeck.

70 - Adoption of ICT and Environmental Management Practices: Empirical Evidence from European Firms – J. Gossé, C. Forman, N. van Zeebroeck.



71 - Strategic Renewal and Corporate Return of Digital Transformation – J. Bughin, N. van Zeebroeck.

72 - Value and Integrative Dynamic Capabilities: An Empirical Confirmation Authors - J. Bughin, J. Gossé, C. Hoffreumon, N. van Zeebroeck.