Pulling from the front or pushing from behind: How competency prioritisation should differ to optimise firm competitiveness

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Abstract:

Purpose: This study contrasts the disparities in optimal competitiveness configurations across international economies. Additionally, we analyse competitive efficiency across firms of different performance endowments so as to identify distinctions and determine whether standardised or customised competitiveness configurations are optimal.

Design/methodology/approach: The study uses a multilevel regression model to confirm country-specific effects followed by a non-parametric 'Benefit-of-the-Doubt' (BoD) method to conduct an international comparison of the competitive efficiency of top and poor performing firms across eight European and Latin American economies.

Findings: Not only are national ecosystems significant differentiators of competitive efficiency, but contrasted firm-level characteristics also explain these differences. Generally, it is found that more recent start-ups tend to experience significantly greater competitive efficiency. However, by separating the top performing firms from the poor performers in each economy, it is found that the configurational outputs that potentially contribute most to competitive efficiency are not necessarily the same; while 'technology' is a key factor for driving the competitive efficiency of top performing firms, 'market' drivers are most essential for improving the competitive potential of poor performers.

Originality/value: The configurational outputs that potentially contribute most to competitive efficiency are not necessarily universal.

Pulling from the front or pushing from behind: How competency prioritisation should differ to optimise firm competitiveness

1. Introduction

Competitiveness is a key output of an economy's entrepreneurial and business activity (Amoros *et al.*, 2012). But not all firms optimise their competitive efficiency to adequately maximise their potential in the same way (Raposo *et al.*, 2014). For proper intervention from a policy perspective, it is essential to know how to optimise firm competitiveness (Acs & Amoros, 2008), but it has long been demonstrated that when it comes to stimulating competitiveness, there is no '*one size fits all*' (Audretsch & Walshok, 2013).

The competitiveness impact of firms (Carree *et al.,* 2002) and the factors influencing firm competitiveness have been found to differ across countries (Wennekers *et al.,* 2005) and between the regions of a single country (Acs and Armington, 2004). Certain external institutional factors such as exchange rates and legal systems often uniformly facilitate or hinder attempts by firms to successfully compete within the same country, generating country-fixed effects. Other external factors differ across industries (e.g. labour market) and hence add other layers to be considered when comparing competitiveness across firms (European Commission, 2017). This multi-levelled perspective of the potential competitiveness of entrepreneurial and business activity can be narrowed down to the firm, where it is not only its resource endowments that can influence its competitiveness, but also how these endowments are optimised into competencies.

From a resource-based perspective, a firm or entrepreneurial venture's resources will determine its capability frontier (Grant, 1991), which gives an indication of the domain of competitive alternatives that the firm could potentially reach given different combinations and configurations of its existing resource endowment. Because resources are limited, especially in the case of entrepreneurial ventures, a firm's capability alternatives cannot all be reached simultaneously, and resource-capability configuration choices must be made and optimised. Such choices of business strategy will determine the potential competitive advantages that a firm prioritises in order to best compete.

However, the way firms choose to utilise their limited resources, and the capability configuration they use to compete, often produces sub-optimal competitiveness outcomes (Oliver, 1997). Firm level competitiveness is the result of the amalgamation of a set of complex and heterogeneous resources and capabilities (Lafuente *et al.*, 2020). The set of resources are specific to each organisation, and determines what an entrepreneurial or business venture has at its disposal to compete with, and subsequently the capabilities that it can generate from these. The ideal resource configuration for the competitiveness of one firm may not be the same for another with a different set of resources and capabilities.

Certain competencies, such as innovativeness and technological capabilities, have become requisites for competing in today's 'Smart' economy (Vendrell-Herrero *et al.*, 2021). Subsequently, these traits are increasingly encouraged by policy (European Commission, 2017; OECD, 2017). But other drivers of competitiveness, such as human capital based, strategic, or even market-oriented competencies, are also 'essentials' that firms must master in order to optimise their competitive potential (Lafuente *et al.*, 2020). The driver that should optimally be prioritised given distinct resource limitations and contrasting capability frontiers is likely to differ from firm to firm (Lafuente *et al.*, 2021). Benchmarking of the best performers to encourage similar capability-building across different institutionally-bonded international economies, or uniformly among firms that are part of the same economy, may be inadequate for the optimal competency configuration of less endowed and potentially poorer performers.

As such, this study will not only contrast the disparities in optimal competitiveness configurations across international economies, but will also analyse competitive efficiency across firms of different performance endowment so as to identify distinctions and determine whether standardised or customised competitiveness configurations are optimal. To do so, the study uses a multilevel regression model to confirm country-fixed effects followed by a non-parametric 'Benefit-of-the-Doubt' (BoD) method (Cherchye *et al.*, 2007) to conduct a multilevel international comparison of the competitive efficiency of top and poor performing firms across eight European and Latin American economies.

The results of the multilevel model point to important national and firm level distinctions across the optimal competitiveness configurations. However, despite this heterogeneity, certain trends are identified. It is generally found that more recent start-ups tend to experience significantly greater competitive efficiency. Other trends are found when separating the top performing firms from the poor performers in each economy. The configurational outputs that potentially contribute most to competitive efficiency are not necessarily universal; while 'technology' is a key factor for the competitive efficiency of top performing firms, 'market' competencies are most essential for improving the competitive potential of poor performers.

2. Development of the theory and hypotheses

2.1 Institutional country-specific conditions

National institutional frameworks, which are specific to every economy, generate the environmental conditions faced by local firms. As a result, the optimal competency configurations, at the country level, are particular to each national economy. This can be explained from the premises of institutional economic theory (North, 1981; 1990; Williamson, 2000).

Institutional economic theory uses a very broad understanding of "institution". North (1990: 3) suggests that "institutions are the rules of the game in a society." According to this author, they contain all forms of restriction that people design to shape human interaction (North, 1991). Institutions can be formal (such as political rules, economic rules, and contracts) or informal, such as codes of conduct, attitudes, values, norms, and conventions, or rather, the culture of a particular company. Williamson's Framework for Institutional Analysis sets the formal institutional environment and the boundaries that set internal economic activity and development (Williamson, 2000).

In complement to the work by North, Coase (1992) and Williamson (2000) reinforced the notion of basis-setting institutions as central to macroeconomic analysis by linking institutions to economic growth and development. This line of thought evolved from a neoclassical emphasis on the role of technological change, to organisational and institutional innovation (Ménard & Shirley, 2014). This led to a macro level framework to analyse the long-term change in specific economies (North *et al.*, 2009). A key feature of their approach is the specific path-dependence that sets different bounded institutional frameworks of nations onto separate development trajectories, influencing internal competitiveness at the micro level (Loyd & Lee, 2018). This view finds resonance in the work by Acemoglu *et al.* (2005; 2012) on the run-term growth and comparative development of nations.

North (1990) explains how institutions and institutional frameworks affect socio-economic and organisational development. The main function of institutions in a society is to reduce insecurity by creating a stable structure for interaction (Lafuente et al, 2007). From a business competitiveness point of view, national economies set themselves formal institutional constraints in the form of legal and regulatory codes that affect the national competitive capacity of firms operating within each country (Williamson, 2000). Detailed literature reviews of the analysis in institutional economics of the long-run performance of nations (Lloyd & Lee, 2018) and the strategic capacity of competitive advantages as a result of national institutional configurations (Moré *et al.,* 2016) help to develop this argument further. The particular national institutional framework of an economy therefore influences the optimal competency configuration in country-specific ways, helping to explain economic differences between geographically proximate countries (Acemoglu *et al.*, 2005).

The institutional evolution argument included within institutional economic theory is especially important for the study of competitiveness efficiency across countries, as some of the main distinctions that separate business competencies across economies lie in the institutional history specific to each country (Acemoglu *et al.*, 2012). North (1990) uses an institutional lens to explain how the competitive structure and performance of different national economies can be 'radically differential' in the long run. Institutions determine the opportunities of a national economy and the competency structure of firms created within that economy to take advantage of these opportunities (Vaillant & Lafuente, 2007).

As a result of this theoretical logic, it can be hypothesised that:

H1: *The optimal competency configuration at the national level is unlikely to follow a standardised transnational pattern.*

2.2 Firm-specific resource-based competency configurations

The resource-based view (RBV) of the firm states that businesses and entrepreneurial ventures have specific resources that they can transform into capabilities that ultimately determine their competitiveness and superior performance (Barney, 1991; 2001). From this perspective, a firm's competitiveness is the result of the amalgamation of a set of complex and heterogeneous resources (what it has) and capabilities (what it can do with what it has) that are specific to each organisation (Grant, 1991). Because each firm's attainable capability frontier will impact its competitive advantage potential in different ways, the heterogeneous distribution of resources across firms ultimately forms the building blocks of each venture's competitiveness. The utilisation of resources to generate a specific set of capabilities within a firm's possible capability frontier ultimately results in a configuration of the business' system of competencies (Lafuente *et al.*, 2020). The potentially positive value that a focal competency may create is a function of both its availability and the configuration of the system of competencies within the firm.

In the context of this study, configuration refers to a multidimensional trait that differs from one firm to another. These are defined as the extent to which fixed resources can be utilised in different combinations and intensities in order to generate contrasting capability sets that are linked by a single theme (Miller, 1996). Based on the configuration theory developed by Miller (1986), the elements of a system cannot be fully understood in isolation, so the analysis of the complete system is inevitable. If a single item is easy to copy, the competitive advantage comes from the orchestrated complementarities of the system as a 'whole' (Miller & Whitney, 1999).

This argument is consistent with RBV's postulations that organisations are a set of interrelated resources and capabilities, and that a precise competitive analysis should consider the differentiated role of firm competence configuration (generating strong or poor competitive performance). Kraaijenbrink *et al.* (2010) offer a comprehensive review and assessment of the literature that uses the RBV postulates to conduct research. From this general line of research, competencies can be understood to fall within the capability frontiers set by the resource strengths or weaknesses of the firm. The position of a firm in the domain within its capability frontier differs across firms based not only on their competency configuration strategies, but also on their competitive efficiency for exploiting these resources and capabilities (Lafuente *et al.*, 2020). An optimal competitive efficiency would lead the firm to compete at its capability frontier under the chosen competency configuration. As a consequence, otherwise similar firms competing within the same national institutional context can demonstrate relatively different competitive efficiencies; while a certain competency may represent a weak point for one business, it might constitute a competitive strength for another. Therefore, within an optimum competency configuration, firms may nevertheless vary in terms of their competitive efficiency levels, and as a consequence achieve different competitive performance.

The competencies that firms should prioritise to improve their competitiveness are therefore necessarily related to the specific resource strengths or weaknesses limiting their available capability frontier, which binds their performance potential. A performance analysis based on net-effect logic would emphasise that competitiveness depends on available resources and skills and that the ideal configuration for optimal competitiveness is largely dependent on what can be achieved with what is at hand. This deduction therefore leads us to hypothesise that the optimal competency configuration of firms is likely to vary across firms with differing performance potential.

H2: *The optimal competency configuration in an economy is unlikely to follow a standardised pattern across firms of differing performance levels.*

3. Data, variable definition and methods

3.1 Data

The study's empirical design employs a unique dataset drawn from an international research project on competitiveness (Global Competitiveness Project, GCP: www.sme-gcp.org) developed by the Polytechnic University of Catalonia (UPC Barcelona Tech, Spain) and the

University of Pécs (Hungary). In 2020, universities from ten European and Latin American countries participated in the GCP—i.e., Bosnia, Czech Republic, France, Hungary, Spain, Russia, Brazil, Colombia, Costa Rica, and Mexico. The objective of the GCP is to analyse business competitiveness by using composite indicators (Lafuente *et al.*, 2020). Recent work by Alonso-Ubieta and Leiva (2019), Moreno-Gómez and Lafuente (2019), Bayon and Aguilera (2020), Horváth and Lafuente (2020), Lafuente *et al.* (2020) and Moreno-Gómez *et al.* (2021) corroborate the validity and robustness of the GCP databases.

Researchers from the participating universities supervised the entire data collection process. The selection process of the surveyed firms in each country was conducted in two different phases. First, each participating team identified businesses operating in different industries. Owners and/or top managers are the relevant respondent group at this phase. After an initial telephone call to gain approval from the owners or a top manager, an appointment was arranged. In the second phase, a face-to-face interview was held with one of the owners (only if he/she is part of the top management team) in the case of businesses with less than 20 employees, while a top manager was interviewed in firms with more than 20 employees.

Self-administrated, structured interviews were conducted during the data collection process in which managers were asked to answer essentially closed questions. The survey was conducted by members of the participating teams, and the data was collected between March and June 2019. The GCP teams use a homogeneous questionnaire so as to ensure enhanced comparability of results.

The final sample includes information for 1,146 businesses from eight different countries: Bosnia, Colombia, Costa Rica, Czech Republic, France, Hungary, Mexico, and Spain (Table 1). Note that the sampled firms operate in manufacturing, retail, consumer services, and knowledge-intensive business service sectors.

----- Insert Table 1 about here -----

3.2 Measuring business competitiveness

Rather than employing aggregate metrics to evaluate the individual contribution of various competitiveness-related variables, this study follows the methodology proposed by Lafuente *et al.* (2020) to measure competitiveness via a systemic composite indicator. The competitiveness index (CI) includes 46 variables linked to different resources and capabilities to define the ten competitive drivers. Details of the 46 variables that make up the CI are presented in Table A1 of the Appendix. Also, Table A1 shows the average normalised value for the ten competitive pillars included in the competitiveness index. From the table we note that the highest (normalised) pillar value is reported for marketing (overall mean value = 0.4706; mean value for Colombia = 0.5286 and mean value for Spain = 0.5152), whereas the online presence variable is the weakest pillar among the sampled firms (mean normalised value = 0.4569; mean value for Czech Republic = 0.3715 and mean value for Bosnia = 0.3999).

Despite common questions of accuracy of balanced measures, the appropriateness of the distributed weight specific to the CI composite chosen for this study has been widely used and is now consolidated within the relevant literature (Alonso-Ubieta and Leiva, 2019; Moreno-Gómez and Lafuente, 2019; Bayon and Aguilera, 2020). The CI drivers match the postulates of the resource-based theory of the firm (Barney, 2001; Newbert, 2007; Wernerfelt, 1984), and their relevance flows from the recognition that their interactions shape competitiveness. Respondents were asked to rate the relevance of each variable using a 5-point Likert scale in which 1 represents low relevance, 4 represents high relevance, and 0 indicates that the focal variable has no strategic value whatsoever for the firm.

To calculate the CI, the five-step methodology proposed by Lafuente *et al.* (2020) was followed. First, a set of 46 normalised variables ($x_{ij}^* = x_{ij}/\max(x_j)$, where $j=1,...J$ and J = 46) is used to build the ten drivers that shape the CI. Second, the ten CI drivers ($\boldsymbol{v} = (v_1,...,v_{10} \in R_+^v$) are computed as the average of the normalised variables (j) included in each driver ($\mathbf{v}$):$p_{iv} = \sum_{J_v=1}^{J_v} x_{iv}^* / J_v$ and $p_{iv}^* = p_v / \max(p_v)$, where v = 1,…,10 and j_v = 1,…,J_v. Driver scores are computed at the firm level (i = 1,…,N) and the number of variables used to estimate each driver (j_v = 1,…,J_v) varies across drivers (**v**).

Third, the marginal effect resulting from improving a given driver (p_{iv}) was equalised and the magnitude of the adjustment was estimated for each driver as (estimation of the root for δ): $y_{iv} = {p^{*}_{iv}}^{\delta}$, where $\sum_{i=1}^{N} {p^{*}_{iv}}^{\delta} - N\overline{y_v} = 0$. The term δ is the adjustment magnitude for driver *v*, that is, the δ moment that equalises ${p^{*}_{iv}}^{\delta}$ at the mean of the focal pillar $(\overline{y_v})$. Step four adds the penalty of bottleneck in order to consider the interconnection between the CI drivers. Mathematically, the penalty of bottleneck is modelled via a correction form of an exponential function of ae^{-bx} (Tarabusi and Guarini, 2013). The penalty function has the form $h_{i,v} = \min(p^{*}_{i,v}) + (1 - e^{-(p^{*}_{i,v} - \min(p^{*}_{i,v}))})$, where $h_{i,v}$ is the post-penalty value for the *vth* driver and $\min(p^{*}_{i,v})$ is the lowest pillar value reported for the *ith* firm.

Finally, the fifth step uses the values obtained for each aggregate driver to estimate the CI:

$$CI_i = \sum_{v=1}^{10} p^{*}_{iv} \quad (1)$$

Table 2 presents, for each country, and each industry, the descriptive statistics of the competitiveness results (CI estimated in equation (1)) used in this study.

----- Insert Table 2 about here -----

3.3 Competitive efficiency based on the Benefit-of-the-Doubt (BOD) weighting model

The CI presented in Section 3.2 has a strong informative capacity; however, this index does not identify the strategic priorities that firms should emphasise in order to improve resource allocation and, subsequently, their competitiveness level. This is the core of this study. The analysis proposed in this research seeks to evaluate the competitiveness level of firms operating in two countries with different CIs in order to identify optimal competitiveness-enhancing strategies.

To achieve this objective, the Benefit-of-the-Doubt (BOD) model is employed (e.g., Cherchye *et al.*, 2007). Rooted in Data Envelopment Analysis (DEA) techniques, the BOD model—originally proposed by Melyn and Moesen (1991) and further developed by, among others, Cherchye *et al.* (2007) and Sahoo *et al.* (2017)—is a special case of the input-oriented

DEA model (Charnes *et al.*, 1978) with a single constant input (Lovell and Pastor, 1999). Formally, for each business (i), the BOD model considers the ten drivers of the CI ($p^{*}_{i,v}$), and employs a set of endogenous weights ($\mathbf{w}$) to compute the weighted average of the indicators ($\mathbf{y}$) that maximise the CI score (CI_i^{BOD}).

Three relevant methodological aspects are worth mentioning. First, for enhanced estimation accuracy all BOD models are estimated at industry level and for each country separately. Thus, the BOD model acknowledges both industry-specific and country-specific factors that may shape competitiveness-enhancing strategies.

Second, for the purposes of this study, the ten CI drivers (equation (1)) are grouped into four outputs ($\mathbf{y} = y_1,\ldots,y_k \wedge K = 4$) as follows: y1: 'Human capital' (human capital driver); y2: 'Markets' (domestic market and internationalisation drivers); y3: 'Innovation' (product innovation and technology drivers); and, finally, y4: 'Strategy' (including network, marketing, online presence, decision-making and strategy drivers). Because the industry-specific samples are relatively small, the proposed BOD specification with four outputs seeks to reduce the potential loss of discriminatory power of BOD models with large numbers of inputs and/or outputs, relative to the number of units.[1]

Third, the CI presented in Section 3.2 quantifies the overall competitiveness level for each business (i) as the weighted sum of ten drivers (v) ($\sum(w_v \times p^{*}_{iv}) = CI_i \; \forall \; w_v = 1/10$). This weighting system—based on homogeneous (across firms) and fixed (across drivers) weights—reflects a value judgment regarding the optimal configuration of drivers of competitiveness and ignores firm-specific heterogeneity that may obscure decision-making processes. By construction, additional resources to improve competitive drivers (raw data) would produce the same quantitative improvement in the CI score. Nevertheless, if managers are given more objective, non-arbitrary information about the importance of competitive drivers, resource allocation should follow a more strategically meaningful process. Quantity

[1] Within the literature dealing with non-parametric frontier models, Banker *et al.* (1989) suggested a 'rule of thumb' to ensure the discriminatory power of DEA models: the number of observations should be at least three times the number of inputs ($\mathbf{k}$) and outputs ($\mathbf{y}$) ($N \geq 3 \times (\mathbf{y} + \mathbf{k})$) (Cook *et al.*, 2014, p. 2).

improvements are ensured if additional resources are deployed, whereas for an equal quantitative variation in the CI, competitive enhancements will be qualitatively superior if managers target a clear set of strategic drivers. Therefore, we computed a weight matrix generated via principal component analysis (PCA) in order to offer valuable information that can be used for strategic purposes. We computed a PCA model using the four CI outputs (**y**) as inputs.

The results of the PCA model as well as the descriptive statistics for the weight matrix computed for each output ($\mathbf{y} = y_1,\ldots, \wedge K = 4$) are presented in Table 3. The findings in the table confirm the internal validity of the output set used in this study. Also, the internal consistency of the ten CI drivers was evaluated. Also, at the country level the results for Cronbach's alpha confirm that the CI drivers efficiently measure the competitiveness construct among the sampled firms (Nunnally and Bernstein, 1994).

----- Insert Table 3 about here -----

Having verified the robustness of the output set (competitive drivers) used in this study, the following linear program solves the BOD weighting problem and computes the optimal CI score for each firm (i):

$$CI_i^{BOD} = \max_{w,k} \sum_{k=1}^{K} w_{ik} y_{ik} \qquad k = 1,\ldots,K = 4 \quad i = 1,\ldots,N \qquad (2)$$

subject to:

$$\sum_{k=1}^{K} w_{ik} y_{ik} \leq 1$$

$$w_{ik} \geq 0$$

$$L_k \leq \frac{w_{ik} y_{ik}}{\sum_{k=1}^{K} w_{ik} y_{ik}} \leq U_k$$

Equation (2) computes for each firm a vector of endogenous weights for the four outputs ($w_k = w_1,\ldots,_4$) that maximises the CI score. The CI performance value is bounded ($CI^{BOD} \leq 1$): for efficient firms $CI^{BOD} = 1$, while for inefficient firms $CI_i^{BOD} < 1$ and $1 - CI_i^{BOD}$ are the degree of inefficiency (i.e., the output expansion required to be fully efficient). Weights are constrained to be non-negative, which makes CI^{BOD} a non-decreasing function of the output set (**y**) (equation (2)).

This constraint allows for extreme scenarios—i.e., high number of artificially efficient businesses—that render BOD results inaccurate. Thus, a 'pie share' restriction was added: $L_k \leq \frac{w_{ik}y_{ik}}{\sum_{k=1}^{K} w_{ik}y_{ik}} \leq U_k$. This restriction is attractive because pie shares ($w_{ik}y_{ik}$) do not depend on measurement units and they directly reveal the individual contribution of each pie share to the CI score, while allowing for weight heterogeneity within and between firms. In equation (2), L_k and U_k are the lower and upper limit sets for each pie share, respectively. Note that the endogenous weights are business-specific and the sum of the pie shares equals the CI score (CI_i^{BOD}) (equation (2)).

Finally, note that equation (2) assumes that all outputs (**y**) are relevant for firm competitiveness and that businesses will prioritise drivers that maximise competitiveness.

4. Results

The results of the study will first present in Section 4.1 the findings of the multilevel regression model that focuses on the country and firm level impacts over competitive efficiency. Section 4.2 will evaluate the competency configuration choices adopted by the sampled firms.

4.1 Multilevel analysis model

The first stage of our analysis is to determine the possible presence of country level influence over firm competitiveness and the competitive efficiency of the way firms exploit their resources. To address this point, which is related to this study's first hypothesis, a multilevel mixed-effects linear regression is used. As a consequence of the nested nature of the dataset by countries, a conventional regression model would be likely to produce inefficient estimates and biased standard errors (Snijders & Bosker, 2012). A multilevel model is therefore preferable and can be presented in the following form:

$$BOD_{ic} = \beta_{00} + \beta_{0c} + \beta_1 \text{Firm level variables}_{ic} + \beta_2 \text{GEI}_c + \varepsilon_{ic} \quad (3)$$

In equation (3), i indexes business and c countries, β_{00} is the overall mean of the dependent variable (i.e., BOD scores) and β_{0c} is the randomly distributed country effect, that is, the variance of the mean value of the BOD scores for each country (c) around the overall average BOD score. The firm level variables include size (ln employees), age (ln years of market experience) and industry. Among the sampled firms, note that average size is 52.84 employees (ranging between 15.96 for Hungary and 96.01 for France) and average market experience is 16 years (ranging between 11.12 years for Mexico and 20.56 years for Spain) (see Table 4).

The country-specific effect is measured via the Global Entrepreneurship Index (GEI) for 2018 provided by the Global Entrepreneurship and Development Institute (https://thegedi.org) (Acs *et al.*, 2018). By compiling 14 variables linked to 14 individual-level variables properly matched with selected institutional variables related to the country's entrepreneurship ecosystem, the GEI—which ranges between 0 and 100—measures the quality of countries' entrepreneurial ecosystems (Acs *et al.*, 2014). From Table 4 we observe that, of the sampled countries, France (GEI = 68.50) and Spain (GEI = 45.30) enjoy the healthiest entrepreneurial ecosystem whereas the poorest results for the GEI are reported for Bosnia (GEI = 20.70) and Mexico (GEI = 26.40).

----- Insert Table 4 about here -----

As a necessary pre-requisite, the country effect was verified to ensure that it represents the institutional umbrella backing new and incumbent firms in the economy. To determine the appropriateness of the proposed multilevel model (equation (3)) the between-country variance of the dependent variable was estimated. The results of the intercept-only model (model 1 in Table 5), which captures the proportion of the total variance in the dependent variable that exists between countries, was used to compute the intra-class correlation coefficient (ICC). The results in model 1 indicate that mean competitive efficiency (BOD scores) among countries is 0.6011 (without controlling for business-level covariates), and that there is more variation within countries (0.0316) than between countries (0.0027). The ICC value for Model 1 is 0.1856—which is higher than the commonly accepted rule of thumb of 0.15 (Hox *et al.*, 2010). This would suggest that 18.56% of BOD variations lie between the analysed countries. Consequently, the results for Model 1 indicate that there is enough between-country variance to justify a multilevel approach.

----- Insert Table 5 about here -----

For the full model (specification 2), the ICC value (0.2022) is larger than that reported for the unconditional model (as expected, given that the model controls for some business-level variation). The results in Model 2 indicate that the country-level effect has a significant impact on the level of competitive efficiency. These findings are in line with our first hypothesis and its argument that there is no dominant cross-country pattern when it comes to optimal competency configuration. The national institutional setting where firms are embedded is found to meaningfully impact the ideal resource and capability allocations among the drivers of competitiveness so as to generate significant distinctions in the optimal competency configuration across the analysed countries. This gives evidence of strong formal institutional path dependency (Acemoglu *et al.*, 2012) and leads us to accept the study's first hypothesis (**H1**) that proposed that: *The optimal competency configuration at the national level is unlikely to follow a standardised cross-country pattern.*

Other interesting findings coming out of the study's full model multilevel regression results in specification 2 of Table 5 is that in general terms, younger entrepreneurial firms tend to make more efficient use of their resources when it comes to optimising towards better competitiveness (Mancilla *et al.*, 2016). This is likely to come from more optimal use of limited resources and possible bootstrapping on the part of younger entrepreneurial ventures (Coad, 2018). There may also be technological leapfrogging in the processes implemented by younger firms when it comes to cost-effective process innovations (Coad *et al.*, 2016). But at the same time this result may contradict the potential cost competitiveness gains coming from the premise of economies of learning (McKelvey, 1998). In contrast, larger businesses are found to demonstrate greater competitive efficiency. As for sector-based factors, only companies categorised in the Knowledge Intensive Business Services (KIBS) sector demonstrated relatively greater competitive efficiency compared to those from other industries. Similar findings associating KIBS to an increase in competitive efficiency and innovative capability development are found in Lafuente *et al.* (2018) and from a territorial perspective in Vaillant *et al.* (2021).

4.2 BOD model's assessment of firm level competitiveness

The multilevel analysis focused on the link between national frameworks and competitiveness. In order to address the study's second hypothesis, this section deals with the identification of the strategic paths followed by firms in order to assess whether the prioritised configurations among competitive drivers is conducive to superior competitiveness. Table 5 presents the country-level breakdown of the CI results—by country and distinguishing between top (Q1) and bottom (Q4) performing firms—as well as the firm-specific weights that represent the competitive drivers that should be prioritised in order to optimise firms' competitiveness level.

The findings for the strategic priorities—i.e., endogenous weights estimated via the BOD model—show that businesses prioritise different competitive drivers. At the country level, we have a visual confirmation in Table 6 of the results obtained previously by the multilevel regression that confirmed the lack of transnational trends in optimal competency configuration (**H1**). When analysing the ideal competency configuration among the eight European and Latin American countries surveyed, no clear general dominance is found as to whether it is better for firms to prioritise their "Human capital", "Market", "Innovation" or "Strategic" competencies to achieve an optimal competitiveness configuration. Nor is there a clear continental pattern, with Mexico's ideal configuration resembling that of some Eastern European economies, whereas Costa Rica's results most resemble Spain's competitiveness pattern, reinforcing the macroeconomic path-dependency institutional argument upon which the study's first hypothesis is based (North, 1990; 2009; Williamson, 2000).

----- Insert Table 6 about here -----

However, in order to test the study's second hypothesis that considers the premise that the biggest differences in attainable capability frontiers exist between firms from the same country leading to distinct optimal competency configurations, the model in Table 6 separates the resource-poor and under-performing ventures (Q4) from the top performing ones (Q1) with presumable resource strengths. The results of the BoD model (Table 6) after performing this separation offer a completely different story to the results obtained from the full model. Whereas no clearly dominant competitive driver characterised the results from the full sample of firms across sampled countries, when segmenting the firms according to performance level, this is no longer the case. In both segments of firms, a dominant competitive driver is clearly identifiable as a consistent part of the optimal competency configuration. The dominant driver, however, is not the same for both top performing firms and those with poor competitive performance.

Top performing firms from most sampled countries needed their competency configuration to prioritise capability building in the 'Innovation' driver in order to optimise their competitiveness. This is not found to be the case among the segment of poorly performing firms of the sampled economies. To optimise the competitiveness of the relatively lowest performing firms within the observed economies, these had to prioritise 'Market'-related capabilities within their competency configuration. This result is surprising as the 'Market' driver is found to be the least important of the ideal configurations of the top performers. These results visibly support the study's second hypothesis (**H2**): The optimal competency configuration in an economy is unlikely to follow a single standardised pattern across firms of differing performance levels.

5. Concluding remarks, implications and future research lines

5.1 Concluding remarks

This study aimed to contrast the disparities in optimal competency configurations for optimal competitiveness across international economies. It also analysed the competitive efficiency across firms of different performance endowment so as to identify distinctions and determine whether standardised or customised competitiveness configurations were optimal.

More specifically, it was argued based on the premise of institutional economic theory that due to the important country-fixed effects of national institutional frameworks affecting the efficiency of firm competitiveness (North, 1990), it was unlikely that any standardised optimal competency configurations would be consistent across countries. Furthermore, even among firms from the same country, the resource-based view of firm competitiveness would suggest that the heterogeneous resource endowments found across business ventures means that different firms have inherently distinct capability frontiers (Grant, 1991), and therefore different competitiveness and performance possibilities. The drivers of competitiveness that dominate the optimal competency configuration of an economy's top performing firms are likely to be beyond the reach of less resource-endowed businesses. It was therefore argued that the optimal competency configuration for competitiveness is likely to vary across firms of different performance level.

These arguments were translated into theoretically-grounded hypotheses that were tested using a multilevel regression model to capture the country-fixed effects over firm competitive efficiency, while at the same time helping to identify certain firm-level trends affecting competitiveness. Furthermore, a Benefit-of-the-Doubt (DoB) weighting model was used to conduct an international comparison of the ideal competency configurations to optimise the competitive efficiency of top and poor performing firms. These models were carried out using a sample of 1,148 firms from eight European and Latin American countries.

These analyses found no internationally dominant driver of competitiveness that characterises any one optimal competency configuration. Nor were there any clear continental competency patterns required for firms to attain optimum competitiveness. However, when segmenting firms according to performance level, certain dominant configurations were observable. It was found that the configurational outputs that potentially contribute most to competitive efficiency are similar among the top performing firms in each economy. The segment of poor performers was also found to be characterised by a commonly shared optimum configuration for maximising their competitive efficiency. The common competency configuration for optimal competitiveness, however, is found to be different for the segment of top performing firms than for poor performers. Whereas innovativeness and technological competencies are key factors for driving the competitive efficiency of top performing firms, poor performers are found to gain the greatest competitive efficiency by prioritising their 'market' drivers within their competency configuration. This finding generally holds throughout both the European and Latin American firms analysed.

5.2 Implications

The study's analysis of the role of the configuration of drivers of competitiveness on the efficiency thereof provides an opportunity to assess how different competencies contribute to competitiveness in contexts where the interactions between resources and capabilities are complex and heterogeneous. The results of the study indicate that there are important differences in attainable capability frontiers between firms from the same country, leading to distinct optimal competency configurations.

Therefore, from a policy perspective, competency prioritisation should differ in order to optimise firm competitiveness. Standardised promotion of preferred firm competencies through public policy and measures is likely to be sub-optimal for a large proportion of an economy's entrepreneurial and business population. As the benchmarking of top performing firms as models to imitate is a common practice in business promotion policy (Lundvall & Tomlinson, 2002), the findings of this study indicate that by doing so, policy is in fact leading less-performing firms towards a misallocation of resources that generates competency configurations that are likely to surpass the capability frontiers of many firms. As a result, these firms neither achieve the expected competitive benefits nor their potential optimum competitive efficiency.

Policy often encourages common 'silver bullet' drivers of competitiveness, but these may be futile for ventures lacking certain key basic competencies upon which to build their competitiveness. The findings of the study would appear to indicate that underperforming firms should first optimise their market and strategic drivers of competitiveness as basic competencies so as to not be left behind. Only once this is achieved and competitiveness has been gained, should firms then attack the more resource-demanding technological and innovative competency-building tasks. The maximisation of the competitive efficiency of firms and entrepreneurial ventures within an economy is found not to depend on standardised capability-building measures, but rather on customised competitiveness configurations where resource endowment and the consequent firm performance are significant customisation criteria.

From an academic perspective, the use of institutional economic theory and the premise of the RBV is nothing new in business research, but bringing them together to produce a more thorough multilevel analysis has been shown by this study to be an adequate approach. Similarly, the innovative use of the BOD approach to compute endogenous country-specific weights to illustrate how the analysis of country competitiveness contributes to the minimisation of discretionary decision-making by identifying relevant indicators that can be targeted to optimise resource allocation policies has proven to be an affective research tool.

5.3 Future research lines

In order to further verify the results obtained by this study, it would be interesting for future research to include a greater number of countries in its samples, possibly including other continents to the two included here. Despite having found significant country-fixed heterogeneity using the study's current sample, the inclusion of firms from a greater number of countries may better capture the inherent diversity of those in Europe and Latin America.

As with most composite indicator studies, it is not possible to perform a direct analysis of the decision-making process underlying firms' competency configurations. Future research could therefore address this issue by exploring micro-foundational and intra-firm resource allocation decision-making processes and their impact on the competitive efficiency of firms. The competitiveness indicator used in the study was a composite of seven sub-indicators that bear equal weight. Although this indicator is now widely used and is consolidated in the relevant literature, questions have been asked in the past as to the accuracy of this balanced measure as the resources required across competency drivers to generate improvements in competitive efficiency may vary (Lafuente *et al.*, 2020).

New research can also be done to further specify the capability-performance association made in the study. Performance was used as a theoretically supported proxy for a firm's attainable capability deployment. But further research may look to find ways to specifically measure and take into consideration what a firm can achieve with the resource endowment that it has. Similarly, certain authors have found national variations across the formal institutional frameworks affecting firm competitiveness within countries (Vaillant & Lafuente, 2007; Driga *et al.*, 2009). Although these were often more informal in nature, the implementation of institutional regulatory constraints is unlikely to be applied uniformly across all firms. Further research should attempt to address this potential limitation.

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List of Tables

Table 1. Country- and industry-configuration of the sampled businesses

	Industry				
	Manufacturing	Retail	KIBS	Consumer services	**Total**
Bosnia and Herzegovina	13	10	15	17	**65**
Colombia	36	26	43	37	**175**
Costa Rica	49	92	33	41	**231**
Czech Republic	18	23	31	29	**108**
France	17	17	56	56	**179**
Hungary	21	38	31	27	**132**
Mexico	19	11	13	42	**85**
Spain	22	30	40	56	**171**
Total	**195**	**247**	**256**	**305**	**1146**

Table 2. The dependent variable: Competitiveness index

	Industry				
	Manufacturing	Retail	KIBS	Consumer services	**Total**
Bosnia and Herzegovina	4.2904	4.0815	3.7961	3.8486	**3.9811**
Colombia	5.3540	4.7405	5.5009	5.1503	**5.2331**
Costa Rica	4.5414	4.3798	4.9043	4.8852	**4.5935**
Czech Republic	4.1437	3.8104	3.9662	3.6583	**3.8740**
France	6.0221	4.9608	4.4524	4.3511	**4.6555**
Hungary	4.8456	4.5040	4.5822	4.2737	**4.5329**
Mexico	5.0137	3.6150	5.9103	4.5911	**4.6737**
Spain	5.0802	5.2524	5.2276	4.8664	**5.0741**
Total	**5.0032**	**4.5202**	**4.8547**	**4.5983**	**4.7257**

Table 3. Dependent variable: Results of the factor analysis and matrix of endogenous weights (business-specific and country-specific)

	Factor analysis: goodness of fit statistics			Weight matrix (upper bound) for the output set			
	Cronbach's alpha	Proportion of variance explained	KMO test	Y1	Y2	Y3	Y4
Bosnia and Herzegovina	0.7795	60.56%	0.7303	0.2337	0.2611	0.2454	0.2598
Colombia	0.8745	72.81%	0.7930	0.2390	0.2524	0.2528	0.2557
Costa Rica	0.8575	70.30%	0.8001	0.2557	0.2492	0.2583	0.2368
Czech Republic	0.8584	70.45%	0.7933	0.2388	0.2477	0.2522	0.2613
France	0.9162	88.42%	0.8599	0.2493	0.2511	0.2534	0.2461
Hungary	0.8721	72.41%	07947	0.2486	0.2432	0.2496	0.2587
Mexico	0.9062	78.14%	0.8217	0.2429	0.2485	0.2527	0.2559
Spain	0.8823	74.23%	0.8165	0.2549	0.2337	0.2589	0.2525

Note: The BOD outputs are the following: Y1= human capital, Y2= markets, Y3= innovation and technology, and Y4= strategy. Bolded figures are competitiveness drivers (BOD model).

Table 4. Multilevel model: Descriptive statistics for the selected independent variables

	GEI*	Firm size (employee)	Firm age (years)	Obs.
Bosnia and Herzegovina	20.70	83.55 (54.75)	12.16 (8.76)	65
Colombia	38.30	91.18 (250.37)	16.01 (16.58)	175
Costa Rica	33.30	44.31 (114.01)	17.69 (15.12)	231
Czech Republic	43.40	28.01 (69.52)	16.62 (7.67)	108
France	68.50	96.01 (288.48)	12.54 (5.89)	179
Hungary	36.40	15.96 (19.47)	16.01 (7.75)	132
Mexico	26.40	17.53 (29.90)	11.12 (10.19)	85
Spain	45.30	37.38 (99.33)	20.56 (19.28)	171
Total	**41.05**	**52.84 (163.51)**	**15.99 (13.41)**	**1146**

Note (*): The GEI is a country-level variable so at business level this variable has no standard deviation. Standard deviation is presented in parentheses.

Table 5. Multilevel regression model: Results

Variables	**Model 1: Baseline model**	**Model 2: Full model**
Intercept	0.6011 (0.0209)***	0.4681 (0.0240)***
Firm size (ln employees)		0.0641 (0.0041)***
Firm age (ln years)		–0.0239 (0.0069)***
Manufacturing (dummy)		0.0099 (0.0136)
KIBS (dummy)		0.0427 (0.0122)***
Retail (dummy)		–0.0058 (0.0141)
Random effects		
Country intercept variance (GEI index)	0.0072 (0.0038)*	0.0056 (0.0021)*
Residual variance	0.0316 (0.0014)***	0.0221 (0.0011)***
Log likelihood	298.9483	415.5480
Wald test (chi2)	---	263.60***
Pseudo R2 (McFadden)	---	0.2806
LR test vs. linear regression	50.78***	37.76***
Number of observations	1146	1146
Number of countries	8	8

All variables are at business level (level 2) except the GEI index (level 1). Standard error is presented in parentheses. *, **, *** indicate significance at the 10%, 5% and 1%, respectively.

Table 6. 'Benefit of the Doubt' (BoD) model: Results

			Full sample: Pie shares (BoD model)				Top performers (Q4): Pie shares (BoD model)				Poor performers (Q1): Pie shares (BoD model)			
	CI	BOD score	Y1	Y2	Y3	Y4	Y1	Y2	Y3	Y4	Y1	Y2	Y3	Y4
Bosnia and Herzegovina	3.9811	0.7245	0.1693	**0.1892**	0.1778	**0.1882**	0.2153	**0.2406**	0.2261	**0.2394**	0.1189	**0.1328**	0.1248	**0.1321**
Colombia	5.2331	0.6351	**0.1571**	0.1438	**0.1825**	0.1516	**0.2053**	0.1810	**0.2420**	0.2018	0.1028	0.0963	**0.1180**	**0.1041**
Costa Rica	4.5935	0.5570	**0.1424**	0.1388	**0.1439**	0.1319	**0.1952**	0.1902	**0.2072**	0.1708	0.0911	**0.0935**	**0.0945**	0.0866
Czech Republic	3.8740	0.6572	0.1569	**0.1657**	0.1628	**0.1717**	0.2066	0.2143	**0.2182**	**0.2261**	0.1001	**0.1057**	0.1038	**0.1095**
France	4.6555	0.5488	0.1312	**0.1339**	**0.1593**	0.1244	**0.2089**	0.2066	**0.2483**	0.1944	0.0719	**0.0873**	**0.0728**	0.0683
Hungary	4.5329	0.5493	**0.1371**	0.1336	0.1365	**0.1421**	0.1928	0.1887	**0.1936**	**0.2007**	0.0785	**0.0806**	0.0803	**0.0835**
Mexico	4.6737	0.5452	0.1324	**0.1378**	0.1355	**0.1395**	0.1884	0.1927	**0.1960**	**0.1985**	0.0712	**0.0741**	0.0729	**0.0751**
Spain	5.0741	0.6021	**0.1535**	0.1407	**0.1559**	0.1520	**0.2064**	0.1792	**0.2196**	0.2044	**0.0937**	0.0859	**0.0951**	0.0928
Total	4.7257	0.5988	0.1477	0.1455	**0.1578**	**0.1477**	0.2059	0.2030	**0.2216**	**0.2083**	0.0863	**0.0895**	**0.0950**	0.0875

Note: The BoD outputs are the following: Y1= human capital, Y2= markets, Y3= innovation and technology, and Y4= strategy. Bolded figures are competitiveness drivers (BOD model).

Appendix

Table A1. Variables used to estimate the business competitiveness index

Competitive pillars (mean value)	Variables included in each pillar
1. Innovation	
1.1 Product innovation (mean value = 0.4660)	The introduction of new or amended products The share of new product in sales The uniqueness of firm's product and continuous innovation
1.2 Technology (mean value = 0.4682)	The level of firm's technology The age of available technology used by the firm and technological innovation Environmental investment and quality assurance The level of application of ICT tools Uniqueness of applied technology, possession of license or know-how, product management and quality assurance
2.Strategy	
2.1 Networks (mean value = 0.4648)	The number of economic cooperation and innovation agreements The time of networking as compared to the establishment of the firm The reliance to outside help in business development Uniqueness of networking relationship.
2.2 Marketing (mean value = 0.4706)	Product The pricing of the main product Sophistication of distribution channels Applied marketing and communication tools Marketing innovation
2.3 On line presence (mean value = 0.4569)	Webpage technical characteristics Webpage offered services Webpage content Online marketing applications
2.4 Decision making (mean value = 0.4630)	The application of the different sources of information The application of financial analyses in the business Information sharing Consultation in decision making Administrative routines/operations knowledge sharing of the business organization
2.5 Competitive strategy (mean value = 0.4674)	The direction of strategy (defensive, proactive) Growth strategy based on the number of business units The leader's entrepreneurial traits

	The uniqueness of firm' proactive strategy.

Table A1. Continued

Competitive pillars	**Variables included in each pillar**
3. Markets	
3.1 Domestic market (mean value = 0.4621)	The geographic scope of selling The level of firm's competition in the market The expected growth of the target market in five years The intensity of competition Quick response to costumers' demand
3.2 Internationalization (mean value = 0.4675)	The significance of foreign buyers The share of export in sales Language capabilities at business level The uniqueness of location
4. Human Resources	
4.1 Human capital (mean value = 0.4705)	The number and share of employees with higher education degree The problems with employees The share of employees participating in training programs The sophistication of compensation systems The uniqueness of human capital

Source: Lafuente, Leiva *et al*. (2020). We included in the table the average normalized value for each of the ten variables that form the competitiveness index.