The competitiveness of Latin-American economies: Consolidation of the double diamond theory

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\textbf{ABSTRACT}

The aim of this research is to assess the competitiveness of countries through the development of a new model, which is much simpler than those currently in use. The premise of this research is based on the fact that the current models contain numerous indicators/measures and cannot be applied to other contexts, such as the Latin American (LA) one. Based on the “diamond competitiveness” approach, we developed a model for the LA economies (Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Paraguay, Peru, Uruguay and Venezuela). Our model has clear implications for both academics and policymakers and could help design state policies to improve economic growth, especially for the less developed LA economies.

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1. Introduction

The financial downturn of industrialized countries – with particular reference to the more specific economic crisis suffered in Europe, which has had a knock-on effect on worldwide recovery – has led to the overall economy of the Latin American region being viewed in a positive light. Opinions voiced in economic and academic circles point to South America and Asia as the motors of future worldwide growth, at least for the next decade (WEF, 2012a,b). This is because South America (SA) has shown economic stability and a considerable improvement in international competitiveness (Feinberg, 2008). Furthermore, several international economic agents and investors have made a positive assessment of SA, viewing the region not only as a traditional exporter of raw materials but as a possible strategic partner for processing raw materials into final products and acting as a trustee of their investments and productive projects. Marianne Van Steen, spokesperson of the European Union in South America, recently commented: “Companies from the euro zone are considering the possibility of extracting and transforming raw materials, particularly in Peru, and exporting them, given the global economic crisis”.

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Kalimeris (2012) suggests that there is a direct and positive relationship between economic growth, foreign direct investment (FDI) and competitiveness, especially in times of global economic crisis. The question therefore arises: Do methodologically reliable sources that measure the competitiveness of South American countries exist? A review of international economics and business journals highlights the lack of a single defining study that examines the competitiveness of the South American region. The purpose of this research is therefore to fill this inherent gap.

We should note the existence of the yearly publications of the WEF (2014) and IMD (2014), which assess the competitiveness of nations annually by compiling a list of rankings. The publications produced by these two organizations are well known and used by governments, economic agents and researchers, who almost consider them bibles. Some academics base their research on the results published in these reports. There are also some publications dedicated to South American countries (Gariazo, 2004; García-Vega, 2011; Lora, 2005). The WEF and IMD reports have, however, been criticized by a group of academics (Peña-Vinces, 2009; Lora, 2005). The criticisms and observations highlight a series of weaknesses, ranging from a lack of reliability of the surveys on which the models are based (specifically, low participation) to the lack of a robust statistical analysis due to the arbitrary allocation of the “weights” of the competitiveness indicators used in the rankings, leading to a certain bias and low reliability (Cho and Moon, 2000; Kaplan, 2003; Lall, 2001; Lora, 2005; Squalli et al., 2008).

Our study presents a solution to the problems highlighted in the literature review. First, we use structural equation models (SEM) to assign the weights that each competitiveness indicator provides, a method which allows us to propose a parsimonious model that is statistically reliable (Peña-Vinces et al., 2012). These indicators have been taken from data published by international organizations such as the World Bank (WB), the International Monetary Fund (IMF), Doing Business (DB) and the Economic Commission for Latin America and the Caribbean (ECLAC). Secondly, the weights calculated (λ) were used to generate a ranking of the competitiveness of South American countries using the double diamond (DD) model. This ensured that our study would have implications for academics as well as practitioners, given that the tool will be useful and statistically reliable, while also being methodical and impartial (Lora, 2005; Cho and Moon, 2000). In turn, policymakers can identify the most relevant variables when establishing macroeconomic and investment policies.

2. Research model

The starting point is to clearly define the meaning of ‘country competitiveness’. According to Krugman (1994), country competitiveness is achieved by producing the greatest number of goods and services that compete worldwide, which allows the country’s inhabitants to enjoy an improved and sustainable standard of living. Garelli (2006) stated that competitiveness is the ability of countries to create and maintain an environment that supports the competitiveness of companies. Kalimeris (2012) defined competitiveness as the degree to which a nation can produce goods and services that can withstand international markets, under the conditions of a free market and fair commerce, while maintaining and increasing the actual incomes of its inhabitants over the long term. Previous concepts complement the WEF’s (2015) definition of national competitiveness as the set of institutions, policies and factors that determine the level of productivity of a country. The level of productivity, in turn, sets the level of prosperity that can be attained by an economy.

Porter (1990) put forward one of the first proposals to explain the competitiveness of nations, considering four determinant factors: factor conditions (FC), demand conditions (DC), related and supporting industries (RSI), and firm strategy, structure and rivalry (FSSR). He proposed that the stronger these factors were, the more strength a country had to compete internationally, which in turn meant that these countries could attract international companies more easily, so as to establish their presence in the country of origin through FDI (Dunning, 1993; Gugler, 2007). One of the main contributions of Porter’s (1990) model is that a country’s competitiveness is systemic and depends on the interaction among these factors (FC, DC, RSI, and FSSR). Competitiveness should therefore not be evaluated as an independent variable but as a result of the four

![Fig. 1. The double diamond model.](source: Adapted from Cho and Moon (2000))
factors of Porter’s (1990) model (Peña-Vinces, 2009). This work coincides with the systemic approach to competitiveness, as do others, such as Cho et al. (2009), Cho and Moon (2000) and Liu and Hsu (2009).

Rugman (1991) criticized Porter’s model because it could not be appropriately applied to small countries with a strong export performance. To address these limitations, Moon et al. (1995) proposed the double diamond (DD) model (Fig. 1), which incorporates the activities of multinational companies and the role of governments.

As mentioned in the introduction, the WEF-IMD reports, which also assess the competitiveness of countries, raised a number of issues for several researchers. Cho and Moon (2000) and Kaplan (2003) dispute the WEF and IMD reports, highlighting the large number of indicators that are sourced from questionnaires (between 60% and 70%) with a low response rate (between 15% and 35%). Cho and Moon (2000) indicate that these reports do not properly explain the weight of the factors, which themselves are arbitrary, and that it is not clear why some variables are more important than others. Kaplan (2003) and Lall (2001) highlight that the basis on which the WEF-IMD competitiveness indicators are constructed displays analytical, methodological, and quantitative weaknesses. Squalli et al. (2008) argue that the data used by WEF-IMD lacks the statistical procedures for extreme data, and that certain indicators are assigned in an arbitrary manner (for example utilitarian patents). Said authors suggest the use of structural equations to improve the model and avoid a certain statistical vulnerability. Lora (2005) states that the assessments made by these institutions favor rich and industrialized countries, as they also top the list. Due to the low response rates of the surveys, the arbitrariness of the weights, lack of appropriate statistical methods and partiality towards rich countries, the results of the reports of WEF-IMD show inconsistencies (Cho and Moon, 2000; Kaplan, 2003; Lall, 2001; Lora, 2005; Squalli et al., 2008).

Based on this idea, this study evaluates the competitiveness of South America in a regional context, due to the importance of the region at a time when the phrase “Latin America is in vogue” is frequently uttered. Our search for literature relevant to regional competitiveness uncovered several studies of certain regions of the world, but also a lack of research examining the South American region as a whole. Some studies on competitiveness have been carried out concerning specific economic sectors, such as those by Pietrobelli and Rabello (2005), who examined the increased competitiveness of clusters and supply chains in Latin America, or Cerda et al. (2008), who analyzed Chilean wine exports. Among the studies on the competitiveness of Latin America, we did not find any using the double diamond approach to analyze the competitiveness of the South American region. There are some published studies that relate to certain industrial sectors of the Latin American countries or to particular countries. Among these are Stone and Ranch hod (2006) analyzing the competitiveness of Brazil, Russia, India and China (BRIC) in the context of it being more robust than the Porter diamond models, the work of Barragán and Usher (2009) using the “double diamond” model to examine the sources of competitiveness of the auto industry and auto suppliers, and possible spillover effects in Mexico, Peña-Vinces (2009) examining the competitiveness of Peru and Chile, and Castro-Gonzáles et al. (2013), who look at the competitiveness of Puerto Rico, Costa Rica and Singapore. Conversely, all these authors suggest using more reliable statistical models to assess country competitiveness, but none put this into practice.

3. Sample and methodology

Of the twelve Latin American countries, ten were chosen for this study on the basis of data availability, as a quantitative model was used for the purpose of this research. Guyana and Suriname were omitted from the study due to a lack of data. The countries included are Argentina, Brazil, Colombia, Peru, Venezuela, Chile, Ecuador, Bolivia, Paraguay and Uruguay.

We used the averages of data relating to the period 2000–2010 in order to reflect the general tendency of the data and minimize the effects of any outliers. The variables used were based on the factors included in Porter’s (1990) diamond model and the subsequent double diamond model. We take the double diamond approach (Moon et al., 1995) as the main theoretical basis for our model of competitiveness in order to calculate the weights and rankings (see Fig. 1), as this model rectifies the deficiencies of Porter’s model (1990). The DD-model was selected because it is one of the models that effectively operationalize the complex concept of competitiveness in a simple way, especially when comparatively analyzing the competition between countries, since the result is reduced to a comparison of areas between countries (Castro-Gonzáles et al., 2015; Moon et al., 1995). However, it should be noted that the DD-model has a weakness: the weights assigned to the different factors are proportional to the number of factors used in each construct. This study proposes to correct this weakness by using partial least squares-structural equation modeling (PLS-SEM) to calculate the weights of the indicators used. One of main advantages of PLS-SEM is the standardization of the measures of a construct, which might be scales or amounts (Chin, 1998; Hair et al., 2013).

The factors used in the DD-model are microeconomic and macroeconomic indicators recommended in previous research. Such indicators are the result of the execution of the countries’ policies, based on the criterions used in analyzing competitiveness (particularly in undeveloped regions such as South America).

Taking into account that the process of the internationalization of home companies is conditioned by the political actions of their governments (Saavedra, 2012; González, 2006), it is also important that the DD-model incorporates variables related to the export of home industries to foreign markets (Peña-Vinces et al., 2012).

Cartwright (1993), Lagrosen (2007) and Moon et al. (1998) confirmed that the DD model is useful to analyze the competitiveness of small countries with high export intensity. We used the model because, although the countries studied are considered to be part of the South American region, as small economies they are compared with the most developed ones in the world in terms of GDP. Of the ten countries analyzed, nine are small economies, with the exception of Brazil. In
addition, because the DD model is set to 100% of these economies, where the greater part of GDP (over 50%) is based on exports, each focuses on the comparative advantages it possesses, so that extractive and agricultural export products mostly prevail.

The DD-model has been validated in previous studies (Castro-Gonzáles et al., 2013; Moon et al., 1998; Moon and Lee, 2004; Peña-Vinces, 2009; Wyk, 2010); however, it has a serious shortcoming: the weight of the factors used for each construct (factor of competitiveness) is proportional to the number of indicators, and the same weight is given to each factor/indicator. The DD-model was used by Moon et al. (1995) to mitigate, amongst other things, the arbitrary weights assigned by WEF-IMD. However, as Castro-Gonzáles et al. (2013) and Sardy and Fetscherin (2009) note, this continues to be a weakness of the model. To overcome this issue, we used PLS-SEM to assign the weights/loads of each factor that forms part of the construct based on its variance. In other words, the statistical contribution of the indicators denotes the competitiveness (Peña-Vinces et al., 2012).

The conceptual framework of this study is the research of Moon et al. (1995, 1998), who created and operationalized the DD model (see Fig. 1) featuring the same variables proposed by Porter (1990), but with two approaches: a local diamond and an international diamond.

### 3.1. The Latin-American double diamond (LDD)

As previously mentioned, the DD is comprised of four determining factors taken from Porter’s (1990) diamond. Adapted to the context of Latin America, the factors are as follows.

#### 3.1.1. Factor conditions (FC)

#### 3.1.1.1. Local factor conditions (LFC).

Following the recommendations of Liu and Hsu (2009), we included the workforce participation rate, as this is an important factor when analyzing the economic conditions of a country. We also examine the

| LOCAL FACTORS | INTERNATIONAL FACTORS |
|---------------|-----------------------|
| **Factor** | **Local factor conditions (LFC)** | **International factor conditions (IFC)** |
| LFC1 | Share of workforce (% population) | IMF | IFC1 | Exports. goods/services (% GDP) |
| LFC2 | Literacy rate (% older than 15 yrs. old) | IMF | IFC2 | Growth in exports of goods/services (%) |
| LFC3 | R & D expenditure (% of GDP) | IMF | IFC3 | Direct foreign investment (inflows % GDP) |
| LFC4 | Scientific/technical articles in journals (x100) | IMF | IFC4 | Direct foreign investment (Outflows % GDP) |
| LFC5 | Agricultural land (% total land) | WB | IFC5 | Industrial added value (% GDP) |
| LFC6 | Prod. Renewable energy (kilowatts) | IMF | IFC6 | Manufacturing added value (growth%) |
| LFC7 | Total income from nat. resources (% GDP) | IMF | | |
| LFC8 | Net rate of migrations (% pop.) | IMF | | |

| **Local demand conditions (LDC)** | **International demand conditions (IDC)** |
|-------------------------------|-----------------------------------------|
| LDC1 | Public spending in Edu. (% GDP) | IMF | IDC1 | Exports of services (% GDP) |
| LDC2 | Enroll in tertiary. Edu. (% pop) | IMF | IDC2 | Growth in exports of services (%) |
| LDC3 | Gross domestic product p/c (cte. a $ 2,000) | IMF | IDC3 | External balance (% GDP) |
| LDC4 | Growth of GDP per capita (%) | IMF | IDC4 | Commercial transactions (% GDP) |
| LDC5 | Imports of goods/services (% GDP) | BM | IDC5 | Total reserves (%total ext. debt) |
| LDC6 | Annual pop. Growth rate (%) | IDC6 | Total unemployed. Rate (% working pop.) | IMF |
| LDC7 | Rate of growth of GDP (%) | IMF | | |

| **Local Related and supporting industries (LRSI)** | **International Related and supporting industries (IRSI)** |
|-----------------------------------------------|-------------------------------------------------------|
| LRSI1 | Internet users (per 100 people) | IMF | IRSI1 | Air transportation cargo (MM of TM-Km.) |
| LRSI2 | Mobile phone users (x 100) | IMF | IRSI2 | Applications for patents by residents (#) |
| LRSI3 | Train lines (total Km.) | IMF | IRSI3 | Quality of port infrastructure (WEF) |
| LRSI4 | Road density | IMF | IRSI4 | Scientific & technological articles in Journals (#) |
| LRSI5 | Secure internet servers (x MM pers.) | IMF | IRSI5 | Income from minerals (% GDP) |
| LRSI6 | Telephone lines (per 100 people) | IMF | IRSI6 | Income from gas (%GDP) |
| LRSI7 | Electricity consumption (kilowatts per capita) | BM | IRSI7 | Container cargo by ports (m.de20 feet) |

| **Local Firm strategy, structure and rivalry (LFSSR)** | **International Firm strategy, structure and rivalry (IFSSR)** |
|-----------------------------------------------------|-------------------------------------------------------------|
| LFSSR1 | Real minimum wage (2000 annual index) | ECLAC | FSSR1 | Company well-known abroad (%) |
| LFSSR2 | Average wage/annual (2000 index) | ECLAC | FSSR2 | Companies with majority shareholders (%) |
| LFSSR3 | Business start-up costs (% income p/c) | DB | FSSR3 | Export value index (2000 base) |
| LFSSR4 | Time needed to start a business (x10days) | DB | FSSR4 | Export. Countries/growth n/region (% total) |
| LFSSR5 | Growth value-added services (annual%) | WB | FSSR5 | Taxes averages for products (%) |
| LFSSR6 | Businesses in services (% GDP) | WB | FSSR6 | PCs and components. exports (%Serv. exports) |
| | | | FSSR7 | Exports to developed countries (% exports) |
| | | | FSSR8 | High-tech exports (% exports) |
| | | | FSSR9 | Consumer Price index |


number of scientific/technical articles published and the number of researchers working on research and development (R&D) activities. These indicators demonstrate whether the research of a country and its applications have a direct effect on its competitiveness (Dufour and Gingras, 1988; Moon et al., 1998; Peña-Vinces, 2009). Cho and Moon (2000), Peña-Vinces (2009) and Chiu and Lin (2012) also contemplate the percentage of agricultural land as part of the construct, as this indicates the physical resources at the disposal of companies from certain industrial sectors. These resources can then be made into products with greater added value. Agricultural land and the total income from natural resources (an approximation of national natural resources) are therefore also considered. Owing to the lack of non-renewable energy and the high costs involved, Dögl et al. (2012) suggest that countries need to use renewable energy, as this encourages the country’s industries to become more innovative through the use of less contaminating production systems (Peña-Vinces and Delgado-Márquez, 2013). We therefore also consider this in the measurement of local factor conditions. Following the recommendations of Moon et al. (1998), the literacy rate is also considered, as is the migration rate, as the amount of migration increases when countries experience negative economic development (Kentor and Sanderson, 2009). The complete list of indicators is shown in Table 1, identified by LFC1 . . . LFC8.

3.1.1.2. International factor conditions (IFC). In economies characterized by less economic development, FDI (inbound) propels nations to achieve rapid economic development. FDI measures the ability of companies and governments to exploit the advantages they provide (Clarke, 2009; Peña-Vinces, 2009). Liu and Hsu (2009) and Postelnicu and Ban (2010) also recommend including the export of goods and services as a factor in IFC, as this reflects the ability of industries to commercialize products with greater added value. To this end, the growth of annual exports was employed as a measurement parameter. Castro-Gonzáles et al. (2013) and Peña-Vinces (2009) also propose using the added value provided by the industries of a country as an indicator of IFC. This indicator shows the extent to which national production (exporting) is accepted in foreign markets, taking into account that more developed markets have higher demands than those in Latin America (the complete list of indicators is shown in Table 1, identified as IFC1 to IFC6).

3.1.2. Demand conditions (DC)

3.1.2.1. Local demand conditions (LDC). The education level of consumers determines the level of sophistication of the market (Liu and Hsu, 2009). The rate of enrolment in secondary and tertiary education is considered as an indication of the sophistication of demand. Due to the fact that the rate of enrolment is related to government investment in public education, we used spending in public education and the rate of enrolment in tertiary education. The annual per capita growth of GDP is considered, as this implicitly reflects the spending power of the citizens (Castro-Gonzáles et al., 2013; Chiu and Lin, 2012). The rate of GDP growth is employed as it is synonymous with productivity (Liu and Hsu, 2009; Moon et al., 1998; Peña-Vinces, 2009). The level of imported goods and services also indicates the level of sophistication of demand (Peña-Vinces, 2009), and the rate of population growth is also included as it reflects the growth of local markets (Peña-Vinces, 2009; Porter, 1990). The complete list is included in Table 1, identified as LDC.

3.1.2.2. International demand conditions (IDC). Sardy and Fetscherin (2009) use the exports of goods and services that companies produce to indicate the international demand conditions. For the purpose of this study, we employed three indicators that are closely related to this topic: services exports (IDC1), annual growth of services exports, and commercial transactions. External balance (IDC2) measures the level of competitiveness of certain macroeconomic and microeconomic indicators of countries, as indicated by Jüppner and Schneider (2012). Van Rijckeghem and Weder (2001) note that country competitiveness is affected by the total reserves held by a country, as this implies sound financial management of the economic sectors and government. We therefore used the total accumulated reserves to reflect this variable. As a last indicator, we used the total unemployment rate, given that countries characterized by a high level of unemployment have diminished buying power, which in turn could affect the supply of national production in foreign markets (Castro-Gonzáles et al., 2013; Clarke, 2009). A full list of indicators is available in Table 1.

3.1.3. Related and supporting industries (RSI)

3.1.3.1. Local related and supporting industries (LRSI). Moon et al. (1998) and Postelnicu and Ban (2010) indicate that information technologies are related to the efficiency and security of the commercial communications of a country. Based on this, we have included the following as indicators of LRSI: a) internet users, b) mobile phone users, c) number of secure internet servers, and d) access to landlines. Clarke (2009), Moon and Lee (2004) and Sardy and Fetscherin (2009) emphasize that transportation infrastructure is the key to the growth of industries, so we have chosen to include the density of roads and total number of train lines. Finally, Postelnicu and Ban (2010) and Dögl et al. (2012) suggest that electrical energy consumption rates should be contemplated as a way to measure the degree of industrialization of a country (see the list in Table 1).

3.1.3.2. International related and supporting industries (IRSI). For an effective internationalization process, countries need to have a comprehensive air transportation and maritime infrastructure. Thus, we include the quality of seaports (Clarke, 2009; Moon et al., 1998; Peña-Vinces, 2009). As a measurement parameter, we used millions of tons of air transportation and
container traffic in the ports (Castro-Gonzáles et al., 2013). Liu and Hsu (2009) take the number of research studies published to indicate the degree of internationalization of the academic and business sectors, and thus we studied the numbers of patents submitted by residents and articles published in indexed and technical publications.

We should also note the inclusion of data pertaining to the export of minerals and natural gas from Latin America, given that these industries lend their weight to the economic growth of the region (Peña-Vinces, 2009) and boost the growth of other services (banks, transportation). Following the recommendations of Chiu and Lin (2012), we included the income from minerals and gas.

3.1.4. Firm strategy, structure and rivalry (FSSR)

3.1.4.1. Local firm strategy, structure and rivalry (LFSSR). The reasonable minimum salary of a country serves as a basis for economic development given that its citizens have access to the basic family shopping basket, which itself is the basis for the growth of established companies in stable economies (Liu and Hsu, 2009; Sardy and Fetscherin, 2009). An appropriate environment in which to do business becomes an attractive element for companies wishing to establish themselves there. Following the recommendations of Chiu and Lin (2012), indicators such as the time required to start a business and the necessary costs involved were used. It is important to note that companies require the help of third parties in order to grow and compete in foreign markets, particularly service companies (Heizer and Render, 2011), and therefore the growth of value added in services and the percentage of business in services were used as measurements (see Table 1).

3.1.4.2. International firm strategy, structure and rivalry (IFSSR). According to Agosin (2009), the diversification of a country’s exports is one of the main drivers of economic growth. To this end, we included the index value of exports, the national production exported to developing countries and high-income countries, as indicators of IFSSR. In the same vein, Castro-Gonzáles et al. (2013) and Peña-Vinces (2009) suggest that high-tech exports should also be included in this variable, as they reflect the export potential of the national industries and the ability to compete with other products in foreign markets. These authors recommend including exports related to communications systems, such as computers and software, as they suggest this reflects the level of technological dependency of a country. The costs of export product prices were also included due to the fact that a country characterized by high export costs will face difficulties when competing with products with cheaper prices (Sardy and Fetscherin, 2009). Ramirez and Flores (2006) purport that, in Latin America, companies where the controlling shareholders are owners achieve a greater degree of competitiveness in certain industries due to the ease with which these entrepreneurs implant global corporate strategies. Based on this, we used the proportion of companies with majority shareholding (FSSR2). Finally, the indexes of consumer prices (FSSR9) have been used in this construct, as they are one of the factors influencing the international competitiveness of countries, given that they improve the countries’ macroeconomic conditions (Pérez and Bermúdez, 2012).

Table 1 provides a summary of all the indicators of the Latin American DD model (LADD). The table comprises two sections. The section on the left reflects national variables, while international variables are shown on the right. The first column shows the codes used in PLS-SEM, the second the corresponding indicator and its unit, and the third the data source.

As previously indicated, the DD model (Moon et al., 1995, 1998) served as a theoretical basis for the construction of our Latin American model of global competitiveness. Fifty-eight indicators/measurements were thus used to calculate the LA DD model. The study covers the period from 2000 to 2010. In order to calculate the competitiveness ranking, the average of each factor was calculated in order to reflect the general tendency of each of the factors and eliminate any unexpected random events. The data was compiled from different databases such as those of the IMF (International Monetary Fund), WB (World Bank), BD (Doing Business), and ECLAC (Economic Commission for Latin America and the Caribbean).

3.2. An introduction to PLS-SEM

The partial least squares-structural equation modeling (PLS-SEM) procedure has been gaining interest and use among researchers of management and economics because of its ability to model latent constructs under conditions of non-normality and small to medium sample sizes (Chin, 1998; Diaz-Casero et al., 2011; Peña-Vinces et al., 2012). For this reason,
we chose this particular statistical technique. The use of this technique involves two stages or approaches: (1) the evaluation of the measurement model; and (2) the assessment of the structural model. Hair et al. (2013) recommend using PLS-SEM when the phenomena under study stem from a theory examined at the macro level and the relevant variables are unknown. As we do not know the weight of the factors/items and their relevance in the construct of competitiveness, we employed the PLS-SEM technique using the PLS Graph® software developed by Chin and Frye (2003). PLS-SEM suggests that a latent construct shares more variance with its indicators than with itself (Hulland, 1999) (see Fig. 2), so that when specifying the structural parameters and measurement of the construct, the process can be described as shown in Fig. 3.

3.2.1. The PLS-SEM procedure and its results

In the first stage of the PLS-SEM procedure, the constructs were evaluated to assess their reliability and validity. The validity of construct (VC) measures high-quality measurements or indicators. VC concerns the degree to which a scale has an appropriate sample of items to represent the construct of interest—that is, whether the domain of content for the construct is adequately represented by the items (Chin, 1998; Nunnally, 1997). Individual item reliability was assessed by analyzing the standardized loadings (Hair et al., 2011). In order for an item’s measurement to be accepted as part of a construct, it must exceed a threshold of 0.40 when the measurement scales are applied across different contexts, in our case to the Latin American context (Peña-Vinces et al., 2012). Although some of the items do not fit this rule, we decided not to eliminate them for two reasons. The first is that we are not validating scales; on the contrary, we are evaluating the importance that an indicator has as part of the construct. Another reason is that the construct conforms to the rest of the requirements for a PLS-SEM. These results can be seen in Table 2. The communality of the indicators was also estimated. This evaluation indicates the quantitative value added to the construct. For example, a communality value of (λ²) 0.55 squared would give us a value of 0.3025, meaning that only 30% of the variance of the indicator is related to its construct (see Table 2). On the other hand, the reliability attributes in a PLS-SEM seek to analyze whether the theoretical concepts correctly measure the construct via the observable variables (Hair et al., 2013), in other words, assess whether the indicators really measure what they are meant to measure (Nunnally, 1978).

Following the analysis, the next step in this first stage is the evaluation of the construct reliability (CR). Nunnally (1978) established that a CR or a value greater than 0.70 is required in the early stages of research. All constructs for our research recorded values above the set limit of 0.70 (Table 2). Simultaneously, the convergent validity (CV) of the construct was evaluated. CV is usually assessed by the average variance extracted (AVE) (Fornell and Larcker, 1981). Finally, we evaluated the discriminant validity (i.e., the diagonal in Table 3) indicating the extent to which a given construct differs from other constructs (Henseler et al., 2009). We followed Fornell and Larcker’s (1981) approach, who suggest that the AVE should be greater than the variance between the construct and other constructs in the model (i.e., the squared correlation between two constructs). Our model doesn’t record values below 0.50 of AVE. The competitiveness dimensions show discriminant validity (see Table 3) and convergent validity, as the values of the correlations are lower for each construct than between themselves.

The second phase of PLS-SEM is an assessment of the structural model. PLS-SEM evaluates the individual path estimates or standardized regression coefficients (β), analyzes the assessment of the coefficient of determination (R²) of the endogenous constructs (Hair et al., 2011; Roldán and Sanchez-Franco, 2012), and finally assesses the predictive relevance of the endogenous constructs (Q²). Hair et al. (2013) suggest that the three previous estimations should only be applied when testing a hypothesis, which is not the case here.

As indicated previously, we focus our attention on determining the weight/ loadings of the indicators of a country for competitiveness. We are not testing a hypothesis (variable dependents). Nevertheless, we would like to highlight that this is part of a clear line of research, since no author has yet tested the directionality of the four factors of competitiveness.

Given that PLS-SEM is a well-known statistical technique to which many international contributions have been devoted (e.g. Diaz-Casero et al., 2011; Peña-Vinces et al., 2012; Peña-Vinces and Urbano, 2014), we will not go into it in depth. As can be seen in Fig. 1, our model evaluates competitiveness from a systemic approach (Cho and Moon, 2000; Porter, 1990).

![Fig. 3. Latent construct process and corresponding parameters.](source: Adapted from Roberts and Thatcher (2009))
Table 2
Results of the factors of the national diamond and the international diamond.

| National Diamond Factors | International Diamond Factors |
|--------------------------|--------------------------------|
| Variable | Weight (λ) | Communality (λ²) | CR | Direction | Variable | Weight (λ) | Communality (λ²) | CR | Direction |
| Local factor conditions | | | | | | | | | |
| LFC1 | 0.4157 | 0.1728 | 0.753 | (+) | IFC1 | 0.1568 | 0.0246 | (+) |
| LFC2 | 0.5487 | 0.3010 | | | | | | | |
| LFC3 | 0.7187 | 0.5165 | (++) | | | | | | |
| LFC4 | 0.8220 | 0.6757 | (++) | | | | | | |
| LFC5 | 0.3609 | 0.1302 | (++) | | | | | | |
| LFC6 | 0.5248 | 0.2754 | (++) | | | | | | |
| LFC7 | 0.1277 | 0.0163 | (++) | | | | | | |
| LFC8 | 0.5944 | 0.3534 | (++) | | | | | | |
| Local demand conditions | | | 0.790 | | | | | | |
| LDC1 | 0.2997 | 0.0898 | (++) | | | | | | |
| LDC2 | 0.7466 | 0.5573 | (++) | | | | | | |
| LDC3 | 0.8938 | 0.7990 | (++) | | | | | | |
| LDC4 | 0.5496 | 0.3021 | (++) | | | | | | |
| LDC5 | 0.6047 | 0.3656 | (++) | | | | | | |
| LDC6 | 0.8376 | 0.7016 | (++) | | | | | | |
| LFC7 | 0.039 | 0.0015 | (++) | | | | | | |
| Local Related and supporting industries | | | 0.923 | | | | | | |
| LRS1 | 0.902 | 0.8136 | (++) | | | | | | |
| LRS2 | 0.7971 | 0.6354 | (++) | | | | | | |
| LRS3 | 0.4808 | 0.2312 | (++) | | | | | | |
| LRS4 | 0.5943 | 0.3533 | (++) | | | | | | |
| LRS5 | 0.9193 | 0.8452 | (++) | | | | | | |
| LRS6 | 0.9452 | 0.8934 | (++) | | | | | | |
| LRS7 | 0.8461 | 0.7159 | (++) | | | | | | |
| Local Firm strategy, structure and rivalry | | | 0.804 | | | | | | |
| LFSSR1 | 0.2072 | 0.0429 | (++) | | | | | | |
| LFSSR2 | 0.5826 | 0.3394 | (++) | | | | | | |
| LFSSR3 | 0.5152 | 0.2654 | (++) | | | | | | |
| LFSSR4 | 0.8134 | 0.6617 | (++) | | | | | | |
| LFSSR5 | 0.7774 | 0.6043 | (++) | | | | | | |
| LFSSR6 | 0.8351 | 0.6974 | (++) | | | | | | |
| International Diamond factors | | | | | | | | | |
| Variable | Weight (λ) | Communality (λ²) | CR | Direction | Variable | Weight (λ) | Communality (λ²) | CR | Direction |
| International factor conditions | | | | | | | | | |
| IF4 | 0.0813 | 0.5152 | (++) | | | | | | |
| IF5 | 0.2923 | 0.0854 | (++) | | | | | | |
| IF6 | 0.1600 | 0.0256 | (++) | | | | | | |
| IF7 | 0.8647 | 0.7477 | (++) | | | | | | |
| IF8 | 0.4116 | 0.1694 | (++) | | | | | | |
| International demand conditions | | | 0.805 | | | | | | |

Notes: To estimate construct reliability (CR), we have utilized a nonparametric technique of re-sampling with 500 samples following Chin’s (1998) recommendations. This is bootstrapping, which entails repeated random sampling with replacement from the original sample to create a bootstrap sample (Hair et al., 2011).

The results of the local competitiveness study are shown in Table 2. The second column shows the factorial weight (λ) for each of the factors used to calculate the competitiveness diamonds. The factorial weight indicates what the factor contributes for each of the latent variables (determinants of the DD). The third column outlines the corresponding communality (λ²) and the fourth the reliability of the construct (α). In the fifth column, based on economic and international business theory, we present the direction of each variable considered as a component of global competitiveness.

Table 3
The correlation matrix of the national and international diamond factors.

| National Diamond | | | | | | | |
|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| Latent Variable  | AVE   | DV   | (1)  | (2)  | (3)  | (4)  |
| (1) Factor conditions | 0.523 | 0.723 | 1     |     |     |     |
| (2) Demand conditions | 0.549 | 0.740 | 0.119 | 1   |     |     |
| (3) Related and supporting industries | 0.641 | 0.800 | 0.028 | 0.450 | 1 |     |
| (3) Firm strategy, structure and rivalry | 0.559 | 0.748 | 0.432 | 0.130 | 0.133 | 1 |

| International Diamond | | | | | | | |
|-----------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| Latent Variable | AVE   | DV   | (1)  | (2)  | (3)  | (4)  |
| (1) Factor conditions | 0.500 | 0.707 | 1     |     |     |     |
| (2) Demand conditions | 0.559 | 0.741 | 0.568 | 1   |     |     |
| (3) Related and supporting industries | 0.596 | 0.772 | 0.038 | 0.382 | 1 |     |
| (3) Firm strategy, structure and rivalry | 0.540 | 0.735 | 0.854 | 0.351 | 0.468 | 1 |

AVE: Average Variance Extracted; DV: Discriminant validity. For DV, diagonal elements should be larger than off-diagonal elements.

Notes: To estimate CR, AVE and DV, we have utilized a nonparametric technique of re-sampling with 500 samples following Chin’s (1998) recommendations. This is bootstrapping, which entails repeated random sampling with replacement from the original sample to create a bootstrap sample (Hair et al., 2011).
3.3. Evaluation of the results and competitiveness ranking

The competitiveness rankings of the South American countries (see Table 5) were estimated using the weights of the communalities (λ^2), which were assigned to each factor using PLS-SEM and the average values for the years 2000–2010. The country which occupies the first position has the highest level of competitiveness at both local and international levels. The ranking follows a descending order, meaning that the country with the least competitiveness is placed last. The procedures for compiling the rankings are as follows:

Local Competitive Indexes for each country:

\[
LCl_j = \left( \sum_{i=1}^{n} ICCF_i \cdot \lambda^2_{ICF,i} \right) + \left( \sum_{i=1}^{n} IDF_i \cdot \lambda^2_{IDF,i} \right) + \left( \sum_{i=1}^{n} IRSI_i \cdot \lambda^2_{IRSI,i} \right) + \left( \sum_{i=1}^{n} FSSR_i \cdot \lambda^2_{FSSR,i} \right) \times \frac{100}{LDF_i}
\]

where \( LCl_j \) = local competitiveness index of a country \( j \) (\( j = 1,2,\ldots,10 \)); \( ICCF \) = local competitiveness of factors \( i \) of a country \( j \); \( \lambda^2_{ICF,i} \) = communality of the local FC \( i \) of a country \( j \); \( IDF \) = local demand factors \( i \) of a country \( j \); \( \lambda^2_{IDF,i} \) = communality of the local DC \( i \) of a country \( j \); \( IRSI \) = local IRSI \( i \) of a country \( j \); \( \lambda^2_{IRSI,i} \) = communality of the local RSI \( i \) of a country \( j \); \( FSSR \) = local FSSR \( i \) of a country \( j \); \( \lambda^2_{FSSR,i} \) = communality of the local FSSR \( i \) of a country \( j \).

Using the same criteria, calculations were made for the international competitiveness indexes of the countries:

\[
ICl_j = \left( \sum_{i=1}^{n} ICCF_i \cdot \lambda^2_{ICF,i} \right) + \left( \sum_{i=1}^{n} IDF_i \cdot \lambda^2_{IDF,i} \right) + \left( \sum_{i=1}^{n} IRSI_i \cdot \lambda^2_{IRSI,i} \right) + \left( \sum_{i=1}^{n} FSSR_i \cdot \lambda^2_{FSSR,i} \right) \times \frac{100}{LDF_i}
\]

where \( ICl_j \) = international competitiveness index of a country \( j \) (\( j = 1,2,\ldots,10 \)); \( ICCF \) = international competitiveness of factors \( i \) of a country \( j \); \( \lambda^2_{ICF,i} \) = communality of the international FC \( i \) of the country \( j \); \( IDF \) = international demand factors \( i \) of a country \( j \); \( \lambda^2_{IDF,i} \) = communality of the international DC \( i \) of a country \( j \); \( IRSI \) = local IRSI \( i \) of a country \( j \); \( \lambda^2_{IRSI,i} \) = communality of the local RSI \( i \) of a country \( j \); \( FSSR \) = international FSSR \( i \) of a country \( j \); \( \lambda^2_{FSSR,i} \) = communality of the international FSSR \( i \) of a country \( j \).

The communality has been calculated using various formulas, as it represents the weight or importance of a particular factor in determining competitiveness. For example, the local competitiveness index has been calculated for Brazil (\( LCl_{Br} \)):

\[
LCl_{Br} = \frac{(69.51 + 0.1728) + \ldots + (0.37 + 0.3534) + (4.59 + 0.0898) + \ldots + (3.67 + 0.0015) + (22.06 + 0.8136) + \ldots + (2.00 + 0.7159) + (1.37 + 0.0429) + \ldots + (4.56 + 0.6974)}{100}
\]

\[
LCl_{Br} = 2.86
\]

The local and international competitiveness indexes are calculated on the basis of the above criteria and the previous formulas. The country with the highest local and international competitiveness value is assigned a nominal value of 100, and the remaining countries are then benchmarked against the most competitive country. Finally, the countries are listed in descending order against this reference value. Global competitiveness has been calculated following the recommendations of the authors who developed the model, Moon et al. (1995), as validated by Moon and Lee (2004), Peña-Vinces (2009) and Castro-Gonzáles et al. (2013), who view the degree of local competitiveness as equally important as the international competitiveness of countries (see Table 4). Various authors (Peña-Vinces, 2009; Castro-Gonzáles et al., 2013) have noted that international competitiveness cannot exist without local competitiveness.

Based on Table 4 and adhering to the previous process, a summary is provided of the local, international and global Latin American competitiveness rankings. This has also been ranked from the most to the least competitive. The results of global competitiveness are shown in Table 5.

Analyzing the results of Table 4, the following characteristics are observed:

- There are three South American economies that stand out in terms of competitiveness over the past ten years analyzed (Brazil, Argentina and Chile, in that order). This means that both the domestic and international diamonds are located in the same order, so it could be argued that in the South American context these three countries enjoy stable and well-positioned determinants, which reflect their global competitiveness (Table 5).
- In this first group, Brazil is notable because its national diamond shows advantages over Argentina (164.2%) and Chile (111.5%) in the factor conditions. However, the factor related and supporting industries show disadvantages compared to these countries (Chile 84%, Argentina 96% and 96%). In the international diamond, particularly in the related and supporting industries factor, Brazil is rated higher than Argentina and Chile, and in accordance with quantitative information, this is because Brazil has 5942 published scientific/technical articles in journals per 100,000 people, while Argentina only has 3220 and Chile 1537.
- Based on Table 5, the remaining seven countries have a different order in the rankings of global competitiveness (national and international). Among these six countries, the country that stands out in national competitiveness is Uruguay, because it exceeds its nearest competitor, Colombia, by 37.3% (93.47/68.07). Nevertheless, when the international diamond is analyzed, Colombia exceeds Venezuela by 74.4% and is the closest country to its international competitiveness.
4. Conclusions and implications

The first objective of this investigation was to determine the weights (importance) of the factors comprising the latent variables studied. This was due to the limitations of the DD model and the traditional models of WEF and IMD. Specifically, these models proportionally and arbitrarily assign the weight of the factors of each competitiveness determinant. Using PLS-SEM, these loads were calculated and the communality value (Λ²) was assigned to each factor, thus providing a solution to the inherent limitations of previous studies (Castro-Gonzáles et al., 2013; Liu and Hsu, 2009; Moon et al., 1995, 1998; Peña-Vinces, 2009; Sardy and Fetscherin, 2009).

This study highlights the fact that certain factors are not significant in the DD model, which means that some variables do not add value to the competitiveness of countries due to their minimal loading-weight. The criteria that the authors used to select the variables that do not add value to the construct were based on Hair et al.'s (2014) assertions. Using the same logic, the indicators' commonality and a value of 0.50 or higher indicates that, on average, the construct explains more than half the variance of its indicators. Conversely, a commonality of less than 0.50 indicates that, on average, more error remains in the items than the variance explained by the indicator. This study follows the recommendations of Cho et al. (2008) to perform...
studies of regional competitiveness rather than placing all countries of the world in one ranking, since one size does not fit all when analyzing the competitiveness of countries with various attributes, as different countries require different criteria. As such, this study becomes a useful tool for future research in the Latin American region.

Among the variables that did not contribute significantly to the local competitiveness, we found: 1) In terms of factors, the percentage of agricultural land of a country (LFC5; $\lambda^2 = 0.1302$) and the total income from natural resources (LFC7; $\lambda^2 = 0.0163$), which supports the hypothesis of Porter (1990), who stated that countries are not made more competitive through their endogenous resources but that wealth is created through the competitiveness of their industries. 2) As far as demand conditions are concerned, the rate of growth of GDP (LDC7; $\lambda^2 = 0.0015$). As regards strategy, structure and rivalry, a factor that does not exert influence on competitiveness is the real minimum wage (FSSR1; $\lambda^2 = 0.0591$), as noted by Frear et al. (1992). In themselves, low wages only facilitate comparative advantages, and if they are not administered correctly they do not become a source of competitive advantage. There are also other indicators of competitiveness that do not appear important ($\lambda^2$) in the DD model, which provides a clear line of investigation for future research (see Table 2). These studies should strive to understand why these factors do not appear to spur economic development in Latin America, when they have done so in more advanced economies.

The most relevant factors for determining local competitiveness in terms of FC were the expenditures on R&D (LFC3; $\lambda^2 = 0.5165$) and the articles published in scientific journals (LFC4; $\lambda^2 = 0.6757$), which is in line with the reviewed literature (Dufour and Gingras, 1988; Liu and Hsu, 2009; Moon et al., 1998; Peña-Vinces, 2009; Castro-Gonzáles et al., 2013). This data shows that research and scientific publications have a direct effect in improving a country’s competitiveness. In DC, the most important factors are enrolment in tertiary education (LDC2; $\lambda^2 = 0.5573$), GDP per capita (LDC3; $\lambda^2 = 0.7990$) and annual population growth (LDC6; $\lambda^2 = 0.7016$), which is also consistent with the literature (Liu and Hsu, 2009; Moon et al., 1995). For local RSI, five factors have values greater than 0.64, which highlights the importance of the DD model. Finally, three factors stand out when determining local firm strategy, structure and rivalry, namely, the time needed to start a business (LFSRR4; $\lambda^2 = 0.6617$), the growth of value added in services (LFSRR5; $\lambda^2 = 0.6043$) and the percentage of service companies (LFSRR6; $\lambda^2 = 0.6974$). This data shows the recent tendency of national industries, where service industries play a decisive role in doing business abroad (Heizer and Render, 2011). This should also serve as a wake-up call for Latin American policymakers to ease bureaucratic red tape and allow businesses to open as quickly as possible.

The findings of this research also identified various factors that are not relevant to international competitiveness: first, in FC the export of goods and services (IFC1; $\lambda^2 = 0.02462$), due to the inconsistencies shown over the period studied, and the direct foreign investment “outflow” (IFC4; $\lambda^2 = 0.0256$), owing to the fact that Latin American countries are mainly recipients rather than exporters of FDI; second, in DC the percentage of total reserves (IDC5; $\lambda^2 = 0.0669$). Third, in RSI two factors had low values: the quality of the port infrastructure (IRSI3; $\lambda^2 = 0.0505$), as these values do not hold any statistical input $\lambda^2$, probably due to the lack of representative surveys (data from the WEF), and income from minerals (IRSI5; $\lambda^2 = 0.0359$), which is in line with the proposals of Porter and Klaus (2008), who suggest that competitiveness is not about achieving a higher volume of exports and cheaper workforce, but ensuring that businesses and personnel are more productive. Lastly, in reference to the strategic factor, the average tax applied to products (FSSR5; $\lambda^2 = 0.0359$) is not important.

Of the 28 international factors, we found that 22 are important; however, we should note that in FC the growth of goods and service exports (IFC2; $\lambda^2 = 0.9369$) is particularly relevant. This is in line with the classical theory of economic growth, where the prosperity of a nation is directly related to the growth of its exports and the value added to industry (IFC5; $\lambda^2 = 0.7477$), whereby countries achieve more competitive advantages when national production adds value. Second, in demand conditions, the most important factors are the growth of services exported (IDC1; $\lambda^2 = 0.6543$), commercial transactions (IDC4; $\lambda^2 = 0.7777$), and total unemployment (IDC6; $\lambda^2 = 0.6538$), which supports the concepts of the theories of economic growth and country development (Krugman, 1994). In related and supporting industries, three factors stand out: freight cargo (IRSI1; $\lambda^2 = 0.7153$), patents submitted by residents (IRSI2; $\lambda^2 = 0.9052$) and sea containers (IRSI7; $\lambda^2 = 0.9862$), which all reflect the quality and quantity of a country’s exports and innovations, as stated by Liu and Hsu (2009) and Castro-Gonzáles et al. (2013). Lastly, in international FSSR, we identified two important factors; the consumer price index (FSSR9; $\lambda^2 = 0.5660$) and local shareholding (FSSR2; $\lambda^2 = 0.5810$).

In terms of global competitiveness (Table 5), our results show that Brazil is the most competitive country in the Latin American region. It is followed by Argentina, Chile, Uruguay and Colombia. These five economies thus have the best competitive advantages compared to the remaining Latin American countries. With regard to FDI, the aforementioned countries could be the first to be chosen by foreign investors. The countries lagging behind in terms of competitiveness, namely Venezuela, Ecuador, Peru, Paraguay and Bolivia, should strive to improve the determining factors that could boost their international economic development. Specifically, they should increase spending on R&D, increase the number of articles in indexed publications, improve the infrastructure related to information and communications technology (ITC), and encourage the creation of service companies.

The analyzed data has enabled us to identify three distinct competitive levels (high–medium–low) in the Latin American region. The countries characterized by a high level of competitiveness are Brazil (100), boasting a clear advantage over the second–placed Argentina (63.50), which is followed by Chile and Uruguay, whose scores are 59.96 and 48.19, respectively. The countries with medium competitive levels are Colombia (41.37), Venezuela (37.75), Ecuador (36.65) and Peru (33.47), whose scores indicate that their competitive indicators are close to one another, and who compete amongst themselves to attract foreign capital and technology, as noted by Feinberg (2008). Paraguay (28.72) and Bolivia (24.81) comprise the group of countries with low competitive levels.
Regarding local competitiveness, Brazil is the best-placed country, followed by Argentina, Chile, Uruguay and Colombia, whilst Venezuela, Ecuador, Peru, Paraguay and Bolivia follow in succession. While it is true that Brazil and Argentina boast large quantities of endogenous resources, they do not have significant natural resources such as minerals, gas, petrol, etc., which other less well-placed countries such as Venezuela, Peru, Ecuador and Bolivia, which are categorized as traditional mining countries, have. These results support the ideas of Porter (1990), insofar as competitiveness is not only related to the resources of a country but also requires the companies based there to be more innovative.

Our analysis of international competitiveness reveals that Brazil has a superior competitive advantage over the other countries included in the study. These advantages are due to factors such as the capacity and quality of its air transportation, the number of patents developed, the number of scientific and technological articles, low technological dependency, a stable consumer price index, and exports produced nationally with high added value. Some countries, such as Argentina or Chile and to a lesser extent Colombia, show signs of following Brazil, although the data shows they still have some way to go. With this in mind, one appreciates the need to evaluate countries using both local and international indicators in order to obtain an overall view of their competitiveness (Moon et al., 1995, 1998).

Given that the data used in this research is the average figure for the eleven years covered and that the techniques employed are more sophisticated than those of the traditional WEF and IMD models, we would expect our results to differ slightly from those of these institutions, which base their findings on data from the previous year. According to the “Global Competitiveness Report 2011–2012” (the results of which are based on data from 2010), the five most competitive economies in South America are Chile, Brazil, Uruguay, Peru and Colombia, whereas our findings produce the following results: Brazil, Argentina, Chile, Uruguay and Colombia. Our investigation identifies Argentina as the second most competitive country, while Peru doesn’t figure in the top five. The main reason for this is that when applying our model, Argentina has a competitive advantage over Chile and the other remaining countries (see Table 5). In fact, in terms of international competitiveness, Argentina is superior to Peru by 31 points, particularly in reference to the international related factor and supporting industries, which are related to R&D, indexed publications, etc., while Peru has serious shortcomings in these areas. According to WEF, the least competitive countries are Bolivia and Paraguay. These two countries also figure as the least competitive in our model, although the order is reversed.

This study is not without its limitations. Due to lack of space, we were unable to carry out a more in-depth analysis and compare the various indexes for all countries, which needs to be addressed in future research. We used the averages of data relating to the period 2000–2010. In order to validate the DD model, future research should use the averages for shorter periods, for example three years, and apply the moving average method to contrast the data with other global competitiveness rankings such as WEF or IMD. Finally, the methodology used in this research should be replicated with other economies of Central America and the Caribbean, as well as other world regions. Similarly, a natural progression of this work would be to analyze international competitiveness from a multi-level factor approach (region-wide, sector, and country, country-sector specific and idiosyncratic components) to determine whether similar results are obtained, given that we need to continue to learn more about the different aspects of Latin American economies due to the lack of empirical studies from these countries. Because the indicators used in measuring the competitiveness of countries reflected a different level of importance in the commonalities assigned to the region and the level of development among the countries, replicating this model for other regions such as Africa or Asia is a task for the future. It would also be interesting to evaluate the four factors determining competitiveness as conditioning it, which implies the creation of the construct of competitiveness as a dependent variable, since our research has investigated competitiveness from a systemic point of view.

An issue that we have not addressed in this study is the fact that there are other indicators that also have an impact on the country competitiveness of Latin American economies, which should be taken into account when competitiveness is studied. Likewise, we must mention some difficulties that could operate as indicators in a model of competitiveness. Of the factors which might have an impact we would like to cite, for example, the terrorism that persists in Colombia and makes foreign direct investors choose other locations. However, Colombia is not a unique case; there are also remnants of terrorism in Peru. On the other hand, high levels of metropolitan delinquencies, such as robberies in municipal areas, are generalizable for all Latin American countries, including Brazil. These issues hinder the growth of the tourism industry.

According to World Bank (2015) statistics, only around 15% of the total exports of the last decade were high technology exports, confirming that most Latin American exports are based on traditional products that are intensive in labor and agricultural resources. Another more visible factor that constrains the countries’ competitiveness but is difficult to estimate involves the existence of corruption within public institutions in Latin America. This problem results in a limitation of doing business, because behind the institutions, there are people who often do not work if companies do not give them an economic incentive or gift.

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