

THE BEI INDEX: AN APPROACH FOR MEASURING THE BUSINESS ENVIRONMENT IN AFRICA

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Abstract. Africa is becoming more and more attractive for trade and investment, while entrepreneurs are concerned about the quality of the business environment. This paper aims to analyze the Africa's business environment and its dimensions in order to identify the most favorable destinations for starting a business. The methodology for this study includes research reviewing the existing literature and a quantitative approach based on a composite instrument. The results of the empirical study show that three regions have a favorable business environment for starting a business, while the most important dimensions of business are related to costs incurred, time and procedures required and trade aspects.

Keywords: Southern Africa, starting a business, doing business in Africa, composite index, dimensions of business environment, African regions.

JEL Classification: M21, C1, F23, L51, O55.

Introduction

Specialists, academics, businessmen and politicians have analyzed various correlates between multinational companies' behavior and regulations on starting business, adopted by countries and groups of countries. The existence of institutions and the implementation of economic and institutional reforms are not enough to attract companies; a lot of ingredients related to starting a business are necessary to be considered, such as taxation, insolvency, property, trade, the financing regulations and the energy policy.

The developing countries need a quality business environment and high-performance institutions for two reasons. On the one hand, the government support is essential in helping local firms to develop the capacity needed to compete effectively in export markets. Even if government support has a positive effect on export performance, due to weak institutions, this support can be inefficiently allocated to these companies (Charoensukmongkol, 2016).

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On the other hand, a quality business environment is necessary in order to attract multinational companies and capital flows required for a strong economic growth and for sustainable development. It seems that formal and informal institutions (represented by colonial history, common law and socialist history), but also the institutional quality have a positively impact on entrepreneurship density, while human capital has a positive contribution in reducing the negative impacts of weak institutions (Nguyen et al., 2021). At the same time, countries with properly designed institutions tend to have a higher level of productivity and of economic growth in the very long run, but also to trade more (Dollar & Kraay, 2003). A solid taxation system, development level and education positively determine the institutional quality, while good institutions can improve the coordination between companies and other economic entities on the market, and can also reduce transaction costs (Alonso & Garcimartin, 2013).

These factors are more important in African countries which are becoming more and more attractive for trade and investment, especially due to existing natural resources, fast-growing population and to performances in terms of democracy, business environment, governance and ease of starting a business. More than 400 companies with annual revenues of 1\$ billion or more operate in Africa, recording a fast and profitable growth (Leke & Signe, 2019). Moreover, Africa has a lot of business opportunities due to its potential for agriculture, energy, communications, industry and infrastructure. For emerging and developing countries, in particular the African ones, these factors are important, especially for companies. If they have resources available for international expansion, these companies tend to have a higher level of satisfaction with their export performance (Charoensukmongkol, 2020). Leke and Signe (2019) present five business opportunities in Africa, taking into account the fast-growing and urbanizing of population, agriculture and mineral resources, industrial growth, infrastructure progress and potential for digital and mobile access. Byaro and Kin-yondo (2020) suggest that improving a high level of institutional quality will boost natural gas revenues, offering a higher economic growth for African countries, especially those with natural resources such as Tanzania.

Despite these, many entrepreneurs do not seize the opportunities, but see only the Africa's weaknesses in terms of infrastructure gaps, healthcare problems, high levels of poverty and education gaps (Leke & Signe, 2019). Pelletier and Stijns (2018) present the biggest business obstacles in sub-Saharan Africa for small and medium-sized firms (SME) over the period 2011–2017. More than 5% of surveyed SME firms identified business obstacles such those related to access to finance, electricity, competitors' practices, political instability, tax rates and corruption. However, the performance of SMEs depends not only on the advantages and disadvantages offered by states. The entrepreneurial orientation is also needed, which is positively related to firms' performance (Vaitoonkiat & Charoensukmongkol, 2020). On the other hand, there are some challenges for doing business in Africa related to cost of starting and doing business, low cross-border trade, lack of access to finance, high taxes and lack of access to electricity and energy (Asongu & Odhiambo, 2019a). Therefore, Africa's potential for business is considered underestimated and untapped (Leke & Signe, 2019).

The purpose of this paper is to analyze the business environment in African regions by identifying its most important dimensions, in order to highlight which are the most favorable destinations for starting a business. This purpose is fulfilled using a composite instrument

called Business Environment Index (henceforth BEI), which reveals the level of business environment's attractiveness of the African regions and their conditions for starting a business. Based on the scores obtained by BEI, a hierarchy of these regions will be presented. Also, the BEI scores will reveal which are the most relevant conditions and factors for starting a business in Africa. The sample of regions considered in the empirical study consists of Central Africa, Eastern Africa, Western Africa, Southern Africa and Northern Africa.

The research hypotheses are settled as: (i) Which of the institutional, fiscal and ease of doing business factors have a significant influence in the process of increasing the business environment's attractiveness for African regions? (ii) Are there significant differences between the African regions in terms of business environment's attractiveness?

The paper is structured as follows. The next section examines the main approaches related to the African business environment and the existing measurement tools presented in the literature. Then, the second section provides the data and the methodology description for this empirical study. Subsequently, the results obtained through the Business Environment Index and the most important dimensions of the business environment are presented. Finally, the last section provides the conclusions and limitations of the empirical study.

1. Approaches for building a business environment index

Most studies and articles in the literature analyze the business environment in Africa considering certain regions or groups of states. Betila (2021) has investigated the impact of ease of doing business index on real annual GDP growth rate for 44 African countries between 2010 and 2018. He suggests that there is a positive and significant impact, while business regulatory reforms can help African countries to achieve a sustainable economic growth. Williams and Kedir (2017) have analyzed the starting up of unregistered and future firm performance for 41 African countries for the period 2006–2013. They showed that employment, annual sales and productivity growth rates are higher for companies which do not register their operations at startup compared to those that started up registered. At the same time, Eifert et al. (2005) have suggested that the competitiveness of the African manufacturing sectors is influenced by the business environment and a reform in business practices is necessary in order to reduce the high indirect costs and business–environment–related losses relative to African levels of productivity and income. On the other hand, Tchamyou (2017) has investigated the role of knowledge economy in African business for 53 countries for the period 1996–2010 and found that knowledge economy, with its four components (education, innovation, information and communication technology, but also economic incentives and institutional regime) positively influences the starting and doing business in Africa.

Most studies regarding business environment in Africa are focused on Sub-Saharan region. Adams and Opoku (2015) have examined how the regulatory quality and foreign direct investment (FDI) influence the economic growth in 22 Sub-Saharan Africa countries over the period 1980–2011. They suggested that business, credit and labor market regulations do not have any significant effect on economic growth. Some positive effects on economic growth occur in interaction of these regulations with FDI when efficient and quality regulations determine a stimulating effect of FDI. On the same time, Nketiah-Amponsah and

Sarpong (2020) have showed that ease-of-doing business indicators have a significant role in attracting FDI in 45 Sub-Saharan African countries for the period 2004–2018. The FDI flows have increased with 0.79% when the ease of starting a business has improved with a percentage point and with almost 0.2% when the tax administration has improved with 1%. Chewaka and Zhang (2021) have found that investment growth is driven by ease of doing business indicators, but there are some opportunities (trade openness and growing market size) and vulnerabilities (corruption and the lack of access to the sea) for Sub-Saharan African countries. Dwumfour (2020) has determined that the welfare in the Sub-Saharan African countries increases when the burden regulations regarding starting business are at low level. He used as variables the Human Development Index and the GDP per capita as welfare/poverty measure, along with inflation, infrastructure, domestic credit to private sector, trade, government expenditure, the Doing Business and the CPIA indicators. At the same time, Asongu and Odhiambo (2019b) found that increasing constraints upon doing business affects inclusive human development. They used three doing business variables, namely: the number of procedures necessary to register a business, time required for paying taxes and for starting a business in 48 sub-Saharan Africa countries for the period 2000–2012. Asongu and Nwachukwu (2018) were interested in examining the positive influences of information and communication technology (ICT) over the improvements of doing business conditions in sub-Saharan Africa for period 2000–2012, focusing on ten indicators of doing business relating to cost of business start-up, to procedures required to register a business and to enforce a contract and to time required for various activities (enforce contract, build a warehouse, export, resolve insolvency, register property, start a business and paying taxes). Akpalu and Wilson (2021) were focused on the role of the ease of doing business in stimulating the total factor productivity for 41 Sub-Saharan Africa countries from 2000 to 2015, discovering an inverted U-shape relation between them. They found that total factor productivity is enhanced by skills development through education, while ease of doing business has a positive impact on technical efficiency change and scale economies.

The business environment in other regions of Africa is less analyzed than sub-Saharan Africa. Examining the Eastern Africa, Barasa et al. (2017) were interested in explaining the innovation process in the region, starting from the interaction between firm-level resources and regional institutional quality. They have analyzed three countries from Eastern Africa (Uganda, Tanzania and Kenya) and found that the effects of firm-level resources are positively influenced by regional institutional quality. Also, Osoro and Santos (2018) have showed that companies in Eastern Africa had difficulties in accessing credit, except Eritrea and Kenya, particularly for SME enterprises. At the same time, Abban (2020) has studied Burundi and Rwanda, finding that joining the East African Community brought benefits of 81% for both. According to him, infrastructure is contributing significantly to trade, while institutions not, but there is a higher potential to trade due to new institutional reforms by reducing trade barriers. Bosire (2019) found that almost all ease of doing business variables have a significant impact on FDI inflows for 12 Eastern Africa countries between 2004 and 2017, excepting the dealing with construction permits and starting business. This is why he suggested that reforming of the African business environment has an important role to determine the inflows of FDI. For Western Africa, Benjamin et al. (2015) have focused on

intra-regional trade and cross border informal trade between Togo, Benin and Nigeria and between Senegal and The Gambia. They suggested that Benin and Togo are unofficial transit countries for trade due to their neighborhood with Nigeria and gateways for landlocked countries to the Northern Africa. Moreover, there are some differences in import barriers and differential import taxation which determine the re-export trade. Lower import taxation is specific to Benin, The Gambia and Togo in order to re-export products which are highly protected in their neighbors, while Senegal and Nigeria apply high import barriers to protect their domestic industries. Cali et al. (2018) found that access to credit is one of the biggest challenges for companies in Western Africa, while small firms reported the lack of external funding. Also, Nageri (2020) has analyzed the doing business indicators for West African countries and suggested that improving the electricity supply will help to develop the capital markets. At the same time, Nageri and Gunu (2020) have found that ease of doing business is positively influenced by corruption score, education, lending rate spread and control of corruption while the corruption rank, import and inflation have a negative influence. On the other hand, Ayadi et al. (2013) have examined the informal trade in Northern Africa, especially between Tunisia with Libya and Algeria, existing due to the varying tax regimes and differences regarding level of subsidies and consumer sale prices. Akisik et al. (2020) found that African countries are stimulated to adopt International Financial Reporting Standards (IFRS) by FDI, control of corruption, openness and education. They have indicated that Anglophone African countries are more willing to adopt IFRS than the Francophone ones.

The World Bank (2020a) examines the business environment in Africa at the country level. In order to analyze the African business environment, the World Bank considers all the countries on the continent, but not the regions. In the World Bank top of Doing Business in 2020, in the first 100 countries according to ease of doing business, there are five countries from East Africa (Mauritius, Rwanda, Kenya, Zambia and Seychelles), two each from Southern Africa (South Africa and Botswana) and North Africa (Morocco and Tunisia) and one from West Africa (Togo). None of Central African countries is presented in the first 100 countries according to the ease of doing business ranking. Unfortunately, the doing business scores are not presented at the regional level by the World Bank. Therefore, in order to have a complete image of the Africa's regions, it is necessary to calculate the arithmetic mean of the component countries for each region. The results are presented in Table 1, where the Southern Africa is the only region with more than 60 points.

Table 1. The Doing Business scores at regional level (source: own calculation based on The World Bank, 2020a)

Position	Region	DB Score	The highest value in the region
1	Southern Africa	62.70	South Africa with 67.02 points
2	Northern Africa	54.70	Morocco with 73.38 points
3	Eastern Africa	53.99	Mauritius with 81.47 points
4	Western Africa	53.27	Togo with 62.29 points
5	Central Africa	40.74	Cameroon with 46.10 points

Three countries from this region have more than 60 points on ease of doing business according to The World Bank, starting with South Africa, Botswana and Namibia. Northern Africa has, on average, 55 points, being the second on doing business after Southern Africa. But, for this region, there is Morocco with more than 70 points, also Tunisia and Egypt both scored with more than 60 points. Eastern Africa and Western Africa has, on average, almost the same score. The differences appear at the countries level, Mauritius having more than 80 points and scores for Kenya and Rwanda are bigger than 70 points, while in Western Africa only Togo and Cote d'Ivoire exceed 60 points. The lowest Doing Business score at the regional level is assigned to Central Africa; none of its countries exceeding the 50-point threshold (The World Bank, 2020a).

Studies in the literature focus on some regions (Adams & Opoku, 2015; Ayadi et al., 2013; Barasa et al., 2017; Benjamin et al., 2015; Bosire, 2019; Nketiah-Amponsah & Sarpong, 2020; Nageri, 2020), without making a precisely comparative study of the business environment in these regions. Other studies (Dwumfour, 2020; Tchamyou, 2017; Williams & Kedir, 2017; Abban, 2020) analyze only some groups of states and consider only some aspects of the business environment, while the World Bank (2020a) publishes the doing business indicators at the country level. In accordance with previous studies, which analyze African regions separately or only part of the countries, this research provides a comparative study of the business environment for all African regions and makes a hierarchy of them. Also, this paper has an important contribution as it combines institutional, fiscal and ease of doing business factors to determine which African regions are the most favorable destinations to start a business, while previous studies used various variables from different fields. One of the main contributions of this paper is that it highlights the role of the institutional and fiscal factors in increasing the level of business investment attractiveness, based on a composite index approach.

2. Data and methodology

For calculating BEI, the Doing Business 2020 indicators (data are current as of May 2019) have been taken into account, meant to reflect a complete and accurate picture of the African business environment. These indicators are extracted from the statistical base of The World Bank, where a detailed description of each can be found. These indicators cover 10 areas of business regulation (The World Bank, 2020a), including: dealing with construction permits, enforcing contracts, getting credit, getting electricity, paying taxes, protecting minority investors, registering property, resolving insolvency, starting a business, trading across borders. All available indicators for each of the 10 areas of business regulation were extracted, as specified and presented by the World Bank. The indicators have been extracted and statistically analyzed in order to eliminate the outliers and the insignificant data. After this step, from all indicators available at the World Bank, only 37 indicators have been statistically eligible for the Business Environment Index construction. Therefore, the key variables used to measure the business environment derive from the indicators used by the World Bank, of which only those statistically eligible were taken into consideration. This procedure was chosen because the World Bank indicators are already validated, recognized and used in previous studies (Asongu & Odhiambo, 2019a; Nketiah-Amponsah & Sarpong, 2020; Bosire, 2019) and their

use cannot question the credibility of the statistical study. The list of indicators selected and their details used to design the BEI index are reflected in Appendix (Table A1). Some of these indicators are marked with a “positive” sign (+) and others with a “negative” one (–) showing their relation with the business environment for the African regions. The indicators marked with “L” are those whose influences are low and insignificant to be taken into consideration for the BEI. In the following, the methodological steps will be presented.

The development of a composite indicator and its use for measuring the level of attractiveness of the business environment for starting a business require several steps, presented in the Organization for Economic Cooperation and Development (OECD) methodology (Nardo et al., 2008) and used by Pintilescu and Viorica (2019).

The first step involves the Principal Component Analysis (PCA), a method that explains the variation of variables based on combinations between statistical data. This method is used for extracting from a wide database the main components, a small number of variables, which explain the variation of data. The second step is related to selection of significant indicators for each factorial axis. Using the PCA, only some indicators are the most significant for the business environment analysis of the African regions. The business attractiveness of these regions is driven by the significant indicators. From the 37 indicators, we selected those whose factor loadings are higher than 0.7, regardless of the positive or negative sign. These indicators are grouped on the main components (factorial axes) on which the hierarchy is made in descending order of variation. The first factorial axis reflects the maximum variation between variable. These factorial axes reveal several dimensions which influence the business environment.

Nevertheless, the selection of significant factorial axes must achieve certain standard conditions (Nardo et al., 2008), such as:

- Kaiser’s criterion that eigenvalues are greater than 1;
- the individual contribution of factorial axis must explain more than 10% of the total variation;
- the cumulative contribution of the selected factorial axes to the explanation of the total variation is greater than 60%.

The third step implies the final calculation of the BEI using four mathematical formulas for the values obtained through the PCA. First formula is used for calculation of the weight (W_i) of each factor loadings (L_i), where S_i^2 means the square value of the factor loadings on the factorial axis:

$$W_i = \frac{S_i^2 L_i}{\sum S_i^2 L_i} . \quad (1)$$

The second formula is needed to determine the value of each factorial axis (A_i) according to the standardized value for each indicator (Y_i) and its weight (W_i):

$$A_i = W_1 \times Y_1 + W_2 \times Y_2 + W_3 \times Y_3 + \dots + W_i \times Y_i . \quad (2)$$

The next step involves a third formula for calculation of the weight (W_{ai}) of the influence for each axis (A_i) in the cumulative influence of the eligible factorial axes:

$$W_{ai} = \frac{A_i}{\sum A_i} . \quad (3)$$

Using the last formula, the final score of BEI will be determined for each African region:

$$BEI = Wa_1 \times A_1 + Wa_2 \times A_2 + \dots + Wa_i \times A_i. \quad (4)$$

The final BEI scores will help to identify a hierarchy for the African regions and to present the most relevant conditions for starting a business in these regions.

3. Empirical results

3.1. Selecting the variables and calculating factorial axes

In the following sections, the selected variables, the main dimensions that influence the African business environment and the BEI scores for each African region will be presented.

The construction of the BEI begins with PCA in order to select the relevant variables and the eligible factorial axes. As mentioned previously, the selection of the factorial axes must achieve three conditions. The results for extracting the eligible factorial axes for the BEI are presented in Table 2.

Table 2. Eigenvalues and total variance explained of the factorial axes (source: authors' calculation)

Component	Initial Eigenvalues	Rotation Sums of Squared Loadings		
		Total	% of Variance	Cumulative %
1	18.211	12.386	33.475	33.475
2	8.043	10.868	29.374	62.849
3	7.037	7.165	19.364	82.213

Three factorial axes have been extracted that explain more than 82% of total variance of the data and each factorial axis' individual contribution is greater than 10%. Also, the Kaiser's criterion is accomplished, the eigenvalues being greater than 7 for each axis. Therefore, the first two stages of the methodology were completed.

For each factorial axis have been selected the significant variables whose factor loadings are higher than 0.7, regardless the sign, as can be observed in Appendix (Table A2). Using the factor loadings of each variable and applying the first mathematical formula, the weight of each variable has been calculated.

Those three factorial axes reveal the most important dimensions which influence the business environment in Africa. Considering the nature of the selected variables which contribute to the formation of each factorial axis, three dimensions have been established. The dimensions considered in the empirical analysis are the costs and fees incurred; time required and trade aspects; procedures required and business launch. Each dimension and its eligible indicators are presented below:

Costs and fees incurred (13 indicators): Cost of business start-up procedures; Dealing with construction permits, Cost for legally build a warehouse; Court fees to enforce contracts; Cost to get electricity; Reliability of electricity supply and transparency of tariff index; Enforcement fees; Getting electricity; Paying taxes; Tax payments; Procedures to register property; Resolving insolvency; Recovery rate – resolving insolvency.

Time required and trade aspects (11 indicators): Time required to deal with construction permits; Time for enforcement of judgment; Time for filing and service to enforce contracts; Time for paying taxes; Registering property; Time required to enforce a contract; Getting credit; Time to export: Documentary compliance; Cost to export: Documentary compliance; Cost to import: Documentary compliance; Labor tax and contributions.

Procedures required and business launch (7 indicators): Procedures required to build warehouse; Procedures required to start a business; Time required to start a business; Starting a business; Procedures required to deal with construction permits; Profit tax; Cost to register property.

Half of the indicators related to costs and fees incurred have a positive influence on business environment in Africa, while those regarding getting electricity and related costs, dealing with construction permits, paying taxes and resolving insolvency have a negative impact. At the same time, according to Appendix (Table A2), the business environment is positively influenced by almost all variables related to time required and trade aspects, except getting credit and registering property. As for the third dimension of business environment, it seems that only the number of procedures required building warehouse and the score of starting a business negatively influence the business environment in Africa.

The following step includes the application of the second mathematical formula in order to determine the value of each factorial axis. For each dimension, there is a specific equation, based on its composition and the variables weights, considering the standardized values of the variables.

The dimension referring to costs and fees incurred includes numerous costs regarding starting a business, building a warehouse and obtaining construction permits, getting electricity and to register property. Also, this dimension implies costs and fees related to enforce contracts and taxes and contributions paid by a company to comply with tax laws in an economy, such as sales tax, value-added tax and labor taxes. The equation for this dimension is presented below:

$$A_1 = D \times 0.065 + E \times 0.050 + F \times 0.068 + L \times 0.075 + M \times 0.065 + S \times 0.076 + T \times 0.077 + U \times 0.064 + V \times 0.040 + W \times 0.048 + AC \times 0.069 + AE \times 0.044 + AF \times 0.057. \quad (5)$$

The second dimension of African business environment refers to time required for different operations such as: obtaining the construction permits, enforcing contracts, registering property, getting credit and paying taxes, including labor tax and contributions. Furthermore, this dimension includes the time for documentary compliance to export borne by a company, in order to respect the requirements of all government agencies of the origin economy, the destination one and any transit ones. Together with this trade aspect, this dimension also includes other trade elements such those regarding costs for documentary compliance to export and to import, closely related to time for paying taxes and with a company trade activity. For this dimension, the equation is the following one:

$$A_2 = I \times 0.048 + N \times 0.053 + O \times 0.083 + Q \times 0.046 + R \times 0.088 + X \times 0.057 + Y \times 0.056 + AA \times 0.076 + AH \times 0.074 + AI \times 0.070 + AK \times 0.081. \quad (6)$$

The last dimension refers to procedures required to build a warehouse, to deal with construction permits and to start a business. Among these aspects, when an entrepreneur is looking to launch and formally operate a business in an economy, he is interested in issues related to profit tax and to completing the procedures to transfer the property, including the associated costs for this action. The equation for this dimension is presented below:

$$A_3 = A \times 0.115 + B \times 0.131 + C \times 0.102 + G \times 0.123 + K \times 0.088 + Z \times 0.073 + AB \times 0.112. \quad (7)$$

In order to determine the final scores of BEI for the African regions two more mathematical formulas are needed. For each factorial axis, namely for each dimension it is necessary to calculate the weights of the individual influence in the cumulative influence. In Table 3 are presented the weights of each dimension in the composite BEI.

Table 3. The dimensions weights in the composite index (source: authors' calculation)

Component	Explained variance of each factorial axis	The factorial axis weights (Individual variance / Total variance)
1	12.386	0.407
2	10.868	0.357
3	7.165	0.236
Total variance	30.419	1.000

Each of these weights will be multiplied with the value of its factorial axis, resulted after the application of the second mathematical formula. In this way, for each African region a BEI score will be determined in order to present the most favorable destinations for starting a business.

3.2. The Business Environment Index

Following the calculations, a hierarchy of business environment for African regions has been established according to each dimension of BEI index, as well as for the total value. In Table 4 the value of each dimension for all the African regions is presented. Regarding the costs and fees incurred, also the time required and trade aspects, the Southern African business environment is the most favorable, having the highest scores, while Western Africa business environment is better positioned than ones of other regions at procedures required and business launch.

Table 4. The hierarchy of African regions according to BEI Index (source: authors' calculation)

Region	Costs and fees incurred	Time required and trade aspects	Procedures required and business launch	BEI Index
1. Southern Africa	0.844	0.778	-0.525	0.489
2. Northern Africa	0.671	-0.515	0.385	0.180
3. Western Africa	-0.389	0.155	0.770	0.078
4. Eastern Africa	-0.191	0.400	-0.328	-0.012
5. Central Africa	-0.935	-0.818	-0.302	-0.744

The Southern Africa business environment superiority is given by the highest scores regarding dealing with construction permits, paying taxes and resolving insolvency. The business environment of Southern Africa is rated, on average, by 67.1 points for dealing with construction permits, by 76.35 points for paying taxes and by 43.12 points for resolving insolvency by the World Bank. No other African region has, on average, a higher score than 65 points on construction permits and on paying taxes or more than 40 points on resolving insolvency. Also, the recovery rate in case of insolvency is bigger than in other region, on average, at almost 40.1 cents on the dollar compared with almost 30.7 cents in Northern Africa and more than 23 cents in Eastern and Western Africa. Moreover, the Southern Africa has the highest score related to cost to get electricity as percentage of income per capita (on average 94.21 points), followed by Northern Africa (86.35 points) and Western Africa (60.95 points). Also, it is the second region after Northern Africa according to getting electricity score, having on average 64.2 points, and to the reliability of supply and transparency of tariff index, with 2.8 points (The World Bank, 2020b).

Beyond these advantages, the Southern Africa business environment is characterized by the lowest cost of business start-up procedures and of court and enforcement fees. On average, in Southern Africa an entrepreneur must pay 4.32% of enforcing contract claim as court fees and 2.2% of claim as enforcement fees, while the cost of business start-up procedures reaches 5.3% of GNI per capita, compared with other regions, which record more than 10% of GNI per capita. Despite these, Southern Africa is the second after Northern Africa at the total number of taxes and contributions paid by a company and at costs to legally build a warehouse. On average, an entrepreneur pays 21.5 taxes and contributions per year in Northern Africa and 26.6 taxes in Southern Africa, while the costs of building a warehouse reach 2.85% of warehouse value in Northern Africa and 3.8% in Southern Africa (The World Bank, 2020b).

Regarding the second dimension of business environment, the Southern Africa has the highest score, followed by Eastern Africa and Western Africa, while the Northern and the Central of the continent record negative values, as it can be seen in Table 4.

The time required for enforcement of judgment, for filing and service on enforcing contracts and for documentary compliance to export is shorter in Southern Africa than in other regions. On average, almost 15 weeks is necessary for enforcement of judgment in Southern Africa, almost 22 weeks in the East and more than 35 weeks for the other African regions. Also, for filing and service on enforcing contracts it is required, on average, about 26 days in Southern Africa, 33 days in Western Africa, 34.5 days in East and more than 35 in Central and Northern Africa. Nevertheless, the time required to enforce a contract is shorter in Eastern Africa than in Southern Africa. There are necessary, on average, almost 82 weeks in Eastern Africa to enforce a contract, while the time required in Southern is almost the same with the one in Western Africa, on average 94 weeks (The World Bank, 2020b).

From a trade point of view, the time associated for documentary compliance to export, borne by a company in order to respect all the requirements, reaches, on average, almost 36 hours in Southern Africa, between 63 and 66 hours in Eastern and Western Africa and more than 87 hours in Northern and Central Africa. More aspects related to trade where Southern Africa business environment is better positioned than the one of other regions are the costs

associated with compliance with the import documentary while for export documentary, Southern Africa is second after Western Africa. The cost for documentary compliance to import reaches, on average, \$73.54 for Southern Africa and more than \$240 for the other African regions. But, for export, a company costs for documentary compliance are, on average, almost \$131 in Western Africa, \$149.5 in Southern Africa and more than \$150 for the rest of the regions (The World Bank, 2020b).

Besides these trade aspects, Southern Africa has some advantages regarding paying taxes and registering property. For paying taxes, almost 9 hours per year are necessary in Southern Africa, better positioned being Eastern Africa with almost 7 hours per year. But, in Southern Africa, the labor tax and contributions are, on average, almost 2.5% of profits, while in the East are 8.88% and more than 20% for Western and Northern Africa. In order to register property, the Southern Africa has the same score as Eastern Africa, on average, 57 points. This score involves the time, the procedures and other aspects for registering property (The World Bank, 2020b).

The third dimension of business environment is related to procedures required and business launch, as it can be observed in Table 4, where the highest value is recorded by Western Africa, followed by Northern Africa, while the other regions have negative values.

Western Africa's superiority is given by the fewest procedures required for starting a business and for obtaining construction permits. On average, there are necessary almost 5 procedures to start a business in Western Africa and more than 7 in the rest of the regions. Also, with only nearly 6 procedures, an entrepreneur can obtain the construction permit, while in the other regions are needed more than 6 procedures. Moreover, the costs associated with completing the procedures to transfer the property are, on average, almost 5.8% of property value in Western Africa, compared to 6% in Northern Africa and more than 6% in the rest of regions. Besides these advantages, the Western Africa has a better environment for a business launch. Here, the score for starting a business reaches, on average, almost 88 points, the highest among the African regions, followed by Northern Africa (nearly 84 points), while the time required for such an initiative involves less than 10 days. Compared to Western Africa, the scores of the other regions do not exceed more than 85 points and the time for starting a business surpasses 19 days. At the same time, the Western Africa has the lowest profit tax among the African regions, on average, 14.7% of profits, followed by North Africa with 15.13% and East Africa with 18.6% (The World Bank, 2020b).

Beyond the analysis of each dimension of business environment, it is interesting to study the hierarchy of African regions according to BEI index, presented in Table 4. Using the last mathematical formula, the final score of BEI index is determined. The Business Environment Index is calculated in units of a standard normal distribution. A high quality of business environment and a favorable climate for starting a business is given by high positive values. On the other hand, high negative values suggest a poor business environment, rather to be avoided than to start a business.

Southern Africa has the most favorable business environment among the African regions due to its costs and fees incurred and also due to time required and trade aspects. Even if at procedures required and business launch Western Africa has a better position and Southern Africa a negative value, the final BEI scores indicate that the Southern Africa business envi-

ronment is more favorable for starting a business than the other Africa regions. Having a BEI score of almost 0.49 points, the Southern Africa is followed by Northern Africa and Western Africa, both with positive values of BEI, 0.18 points and 0.078 points. The other two regions have negative values, -0.012 for Eastern Africa and -0.744 for Central Africa.

The superiority of Southern Africa can be justified by reforms adopted by countries of this region from May 2018 to May 2019 in order to make the business environment more efficient and attractive. Three of five Southern African countries have adopted reforms that have generated benefits and positive results in areas such starting business, dealing with construction permits, getting electricity, enforcing contracts and registering propriety. Lesotho and South Africa have adopted two reforms each, while Eswatini has introduced free online services for business registration, has increased the transparency process of obtaining construction permits and published the fee schedule for register a property. Also, in order to get electricity faster, Eswatini has extended the availability for materials needed in connections works (The World Bank, 2020a).

The most important aspect regarding reforms of business environment in Southern Africa is that these reforms generated only positive effects. On the other hand, even if countries from Northern, Western and Eastern Africa have made some improvements, their business environment has been affected by measures taken by other countries. In these three regions, the reforms adopted by countries have led to both positive and negative results.

Having the second most favorable business environment after the Southern Africa, with 0.18 points, Northern Africa have also implemented some reforms to improve the business environment, but less than those in Southern Africa and with difficulties at registering propriety, resolving insolvency and getting credit and electricity. Half of the countries in this region, namely Morocco, Egypt, and Tunisia have had reforms with beneficial results for the business environment. Morocco has introduced most reforms, reducing the corporate income tax, introducing e-payment and expanding ports operating schedule. Despite the improvements of these three Northern African countries, the business environment of this region has been affected by measures taken by Sudan and Morocco. The first made more difficult to resolve insolvency and to get electricity and credits, while the second made the property transactions less transparency (The World Bank, 2020a).

The BEI index places Western Africa in third place after Southern Africa and Northern Africa in terms of business environment. Having 0.078 points, this region improved its business environment due to reforms adopted by 14 countries in almost all areas of business environment, except resolving insolvency. But, only 10 countries recorded positive effects, while for Ghana and Guinea the effects were various, both positive and negative (The World Bank, 2020a).

Eastern Africa has a negative value of BEI index at -0.012 , but has made some improvements to the business environment. Unfortunately, these reforms have been fewer than in other regions, being implemented by only half of the countries in the region and with a low positive impact. Kenya, Mauritius and Zimbabwe have implemented most of the reforms in this region, with various effects. Reforms have been adopted in almost all areas of business environment, except registering property, because Kenya had some problems, increasing the fees for property registration (The World Bank, 2020a).

Africa's most unfavorable business environment is in the central region, with a negative BEI score of -0.744 . Almost all Central African countries have improved their business environment, except Angola and São Tomé and Príncipe, but the number of reforms has been lower than in other regions and the positive effects were limited. Reforms have been adopted only in areas such as starting business, getting credit, paying taxes and dealing with construction permits (The World Bank, 2020a).

4. Discussion

The results allow concluding that there are three dimensions by which the African business environment can be analyzed: the costs and fees incurred; the time required and trade aspects; and procedures required and business launch. For each dimension, the most relevant variables were selected, most of them having a positively impact on business environment. Therefore, these factors have a significant influence in the process of increasing the business environment's attractiveness for African regions. The results are to some extent in line with Asongu and Nwachukwu (2018), Bosire (2019) and with Nketiah-Amponsah and Sarpong (2020). On the one hand, Asongu and Nwachukwu (2018) identified ten indicators of doing business which are important in sub-Saharan Africa, of which seven were found in this study among the factors of the business environment, except the procedures to enforce a contract, time required to build a warehouse and to resolve insolvency. But through this study more determining factors were identified. Bosire (2019) found that almost all ease of doing business variables are important for FDI inflows of 12 Eastern Africa countries, excepting the dealing with construction permits and starting business. On the other hand, for Nketiah-Amponsah and Sarpong (2020), the ease-of-doing business indicators play a key role for 45 Sub-Saharan African countries and their business environment due to the stimulation of FDI.

The hierarchy of African regions according to BEI is to some extent in line with the World Bank (2020a). For every region, the arithmetic mean of the countries was calculated and the results were standardized in order to facilitate the comparison between BEI and Ease of Doing Business, given that the World Bank records data only at the country level. This study, also the World Bank present that Southern Africa has the most favorable business environment, followed by Northern Africa. The differences appear later; while this study reveals that the hierarchy is continued by Western, Eastern and Central Africa, the World Bank (2020a) suggest that the third place is taken by Eastern Africa, followed by Western and Central Africa. This situation occurs as BEI analyzes the most important dimensions of business and the most significant aspects regarding business environment.

Conclusions

Africa is becoming more and more attractive for trade and investment considering its strengths and its weaknesses. This paper analyzes the business environment and its dimensions in African regions in order to present the most favorable destinations to start a business. The business environment in Africa is studied through of a composite instrument.

A first conclusion from the analysis is that the African business environment can be studied from three perspectives: the costs and fees incurred; the time required and trade aspects; and procedures required and business launch. Most factors in these three dimensions have a positive impact on the business environment in African regions.

Another conclusion is that there are differences between the African regions in terms of business environment. The BEI shows that Southern Africa has the highest level of attractiveness of the business environment, followed by Northern and Western Africa, both having positive values, while Eastern and Central Africa have negative values. The business environment of Southern Africa is more than twice as favorable as that of Northern Africa, offering great conditions for starting a business in terms of cost, fees, time required and trade aspects. On the other hand, considering the procedures required and business launch, Western Africa has a better business environment. Due to the BEI results, Southern Africa can be considered as having the most favorable business environment in Africa for starting a business. Its superiority can be motivated by reforms adopted. More than half of countries in this region implemented successful reforms, with positive effects on business environment. The other African regions have also countries which adopted reforms, but less than those in Southern Africa. Moreover, for some of these countries, the effects of reforms were various, even negative.

This research is relevant to both policy makers and individual business owners. Policy makers and institutions have a major role to play in improving the business environment in their country or region by reducing the cost and fees for starting a business, by decreasing the time and procedures required for various activities and by facilitating trade flows. Even if Southern, Northern and Western Africa are characterized by favorable business environments to one degree or another, it is necessary that the policy makers of these countries to continue to adopt successful reforms and to improve their business climate. On the other hand, for individual business owners, this study shows the main advantages of the business environment in the certain areas in which they operate. Also, they can observe the regions with a higher level of business environment, especially in the situation where they want to expand in other markets, as well as the challenges that may arise.

Although this study provides a comparative analysis of business environment in African regions, there are some limitations. First, the sample of selected indicators; future research may investigate the economic development of African regions taking into considerations other indicators or a wider sample, including governance factors, infrastructure, economic structures and the political and institutional progress. Secondly, the time span can be extended to capture the evolutions over time for these regions. In this regard, the BEI index can be extended in order to include more variables and several years. In addition, this analysis may have some limitations due to the small number of studies related to business environment for African regions. Moreover, this analysis considers the African business environment at the regional level, without specifying exactly the situation in each country involved. Future research may explore the opportunity to cover a wider sample for all African countries, not only at a regional level. For an accurate measurement of business environment using BEI index, also a quantitative survey may be used. Further analysis from these perspectives will provide a better understanding of the business environment in Africa.

Disclosure statement

The authors declare that they have no competing financial, professional, or personal interests from other parties.

Author contributions

SCT and SLS conceived the study and were responsible for the design and development of the data analysis.

SCT and SLS were responsible for data collection and analysis.

SCT was responsible for data interpretation. SCT wrote the first draft of the article.

References

- Abban, S. (2020). *Institutions, infrastructure and East African Community membership of Burundi and Rwanda on Trade* (MPRA Paper 100654). University Library of Munich, Germany.
- Adams, S., & Opoku, E. E. O. (2015). Foreign direct investment, regulations and growth in sub-Saharan Africa. *Economic Analysis and Policy*, 47, 48–56. <https://doi.org/10.1016/j.eap.2015.07.001>
- Akisik, O., Gal, G. & Mangaliso, M. (2020). IFRS, FDI, economic growth and human development: The experience of Anglophone and Francophone African countries. *Emerging Markets Review*, 45, 100725. <https://doi.org/10.1016/j.ememar.2020.100725>
- Akpalu, W., & Wilson, J. (2021). *Ease of doing business and total factor productivity growth in renewable energy production in Sub-Sahara Africa*. SSRN. <https://doi.org/10.2139/ssrn.3904608>
- Alonso, J. A., & Garcimartin, C. (2013). The determinants of institutional quality. More on the debate. *Journal of International Development*, 25(2), 206–226. <https://doi.org/10.1002/jid.1710>
- Asongu, S., & Nwachukwu, J. C. (2018). Openness, ICT and entrepreneurship in Sub-Saharan Africa. *Information Technology & People*, 31(1), 278–303. <https://doi.org/10.1108/ITP-02-2017-0033>
- Asongu, S., & Odhiambo, N. (2019a). Challenges of doing business in Africa: A systematic review. *Journal of African Business*, 20(2), 259–268. <https://doi.org/10.1080/15228916.2019.1582294>
- Asongu, S., & Odhiambo, N. (2019b). Doing business and inclusive human development in Sub-Saharan Africa. *African Journal of Economic and Management Studies*, 10(1), 2–16. <https://doi.org/10.2139/ssrn.3237386>
- Ayadi, L., Benjamin, N., Bensasi, S., & Raballand, G. (2013). *Estimating Informal Trade across Tunisia's Land Borders* (Policy Research Working Paper 6731). The World Bank. <https://doi.org/10.1596/1813-9450-6731>
- Barasa, L., Knoben, J., Vermeulen, P., Kimuyu, P., & Kinyanjui, B. (2017). Institutions, resources and innovation in East Africa: A firm level approach. *Research Policy*, 46(1), 280–291. <https://doi.org/10.1016/j.respol.2016.11.008>
- Benjamin, N., Golub, S., & Mbaye, A. A. (2015). Informality, trade policies and smuggling in West Africa. *Journal of Borderlands Studies*, 30(3), 381–394. <https://doi.org/10.1080/08865655.2015.1068203>
- Betila, R. (2021). The impact of Ease of Doing Business on economic growth: A dynamic panel analysis for African countries. *SN Business & Economics*, 1(10), 144. <https://doi.org/10.1007/s43546-021-00143-9>
- Bosire, E. (2019). Does better business regulatory environment translate to increased foreign direct investment inflows? Evidence from Eastern Africa. *International Journal of Economics and Financial Issues*, 9(4), 119–136. <https://doi.org/10.32479/ijefi.8153>

- Byaro, M., & Kinyondo, A. (2020). Institutional quality explains the difference of natural gas revenues to contribute in the economy: Empirical evidence from Tanzania. *African Journal of Economic Review*, 8(3), 84–97.
- Cali, C., Davradakis, E., Fenton, N., & El-Kourchi, A. (2018). Banking sector trends in West Africa. In *Banking in Africa: Delivering on financial inclusion supporting financial stability* (pp. 47–74). European Investment Bank.
- Charoensukmongkol, P. (2016). The interconnections between bribery, political network, government supports and their consequences on export performance of small and medium enterprises in Thailand. *Journal of International Entrepreneurship*, 14(2), 259–276.
<https://doi.org/10.1007/s10843-016-0164-1>
- Charoensukmongkol, P. (2020). The interplay between firm resources and government agency social capital on Thai firms' satisfaction with export performance. *International Journal of Globalisation and Small Business*, 11(1), 18–38. <https://doi.org/10.1504/IJGSB.2020.105581>
- Chewaka, D., & Zhang, C. (2021). Multinational firm growth and sustainability responses to dynamics of business regulations in host market. *Sustainability*, 13(24), 13945.
<https://doi.org/10.3390/su132413945>
- Dollar, D., & Kraay, A. (2003). Institutions, trade and growth. *Journal of Monetary Economics*, 50(1), 133–162. [https://doi.org/10.1016/S0304-3932\(02\)00206-4](https://doi.org/10.1016/S0304-3932(02)00206-4)
- Dwumfour, R. A. (2020). Poverty in Sub-Saharan Africa: The role of business regulations, policies and institutions. *Social Indicators Research*, 149, 861–890. <https://doi.org/10.1007/s11205-020-02277-z>
- Eifert, B., Gelb, A., & Ramachandran, V. (2005). *Business environment and comparative advantages in Africa: Evidence from the Investment Climate Data* (Working Paper 56). Center for Global Development. <https://doi.org/10.2139/ssrn.1112857>
- Leke, A., & Signe, L. (2019). Spotlighting opportunities for business in Africa and strategies to succeed in the world's next big growth market. In *Africa's untapped business potential: Countries, sectors and strategies* (pp. 77–95). Brookings Institution.
- Nageri, K. (2020). Ease of doing business and capital market development in a demand following hypothesis: Evidence from ECOWAS. *Studia Universitatis Vasile Goldis, Arad, Economic Series*, 30(4), 24–54. <https://doi.org/10.2478/sues-2020-0023>
- Nageri, K., & Gunu, U. (2020). Corruption and ease of doing business: Evidence from ECOWAS. *Acta Universitatis Sapientiae Economics and Business*, 8(1), 19–37.
<https://doi.org/10.2478/auseb-2020-0002>
- Nardo, M., Saisana, M, Saltelli, A., Tarantola, St., Hoffman, A., & Giovannini, E. (2008). *Handbook on constructing composite indicators. Methodology and user guide*. OECD Publishing.
- Nguyen, B., Canh, N. P., & Thanh, S. D. (2021). Institutions, human capital and entrepreneurship density. *Journal of the Knowledge Economy*, 12(3), 1270–1293.
<https://doi.org/10.1007/s13132-020-00666-w>
- Nketiah-Amponsah, E., & Sarpong, B. (2020). Ease of doing business and foreign direct investment: Case of Sub-Saharan Africa. *International Advances in Economic Research*, 26(3), 209–223.
<https://doi.org/10.1007/s11294-020-09798-w>
- Osoro, J., & Santos, R. (2018). The banking sector in East Africa – Responding to market shocks. In *Banking in Africa: Delivering on financial inclusion, supporting financial stability* (pp. 99–120). European Investment Bank.
- Pelletier, A., & Stijns, J. P. (2018). Sub-Saharan African banking sectors: Results from a survey of banking groups. In *Banking in Africa: Delivering on financial inclusion, supporting financial stability* (pp. 13–46). European Investment Bank.
- Pintilescu, C., & Viorica, D. (2019). Current methodological approaches in economic resilience analysis. Empirical findings in the EaP Countries. In G. Rouet & G. C. Pascariu (Eds.), *Resilience*

and the EU's Eastern Neighbourhood Countries: From theoretical concepts to a normative agenda (pp. 321–348). Palgrave Macmillan. https://doi.org/10.1007/978-3-030-25606-7_11

Tchamyou, V. (2017). The role of knowledge economy in African business. *Journal of the Knowledge Economy*, 8, 1189–1228. <https://doi.org/10.1007/s13132-016-0417-1>

The World Bank. (2020a). *Doing business 2020: Comparing business regulation in 190 economies*. The World Bank Publications.

The World Bank. (2020b). *Doing business indicators*. Retrieved October 20, 2020, from <https://databank.worldbank.org/source/doing-business>

Vaitoonkiat, E., & Charoensukmongkol, P. (2020). Interaction effect of entrepreneurial orientation and stakeholder orientation on the business performance of firms in the steel fabrication industry in Thailand. *Journal of Entrepreneurship in Emerging Economies*, 12(4), 453–473. <https://doi.org/10.1108/JEEE-05-2019-0072>

Williams, C. C., & Kedir, A. M. (2017). Evaluating the impacts of starting up unregistered on firm performance in Africa. *Journal of Developmental Entrepreneurship*, 22(3), 1–20. <https://doi.org/10.1142/S1084946717500170>

APPENDIX

Table A1. Variables used in the study (source: authors' calculation)

No.	Variable used	Short name	Sign* (+/-)
1	Starting a business (0–100)	A	–
2	Procedures required to start a business (number)	B	+
3	Time required to start a business (days)	C	+
4	Cost of business start-up procedures (% of GNI per capita)	D	+
5	Dealing with construction permits (0–100)	E	–
6	Cost for legally build a warehouse (% of warehouse value)	F	+
7	Procedures required to deal with construction permits (number)	G	+
8	Professional certifications requirements index (0–4)	H	L
9	Time required to deal with construction permits (weeks)	I	+
10	Time required to build a warehouse (weeks)	J	L
11	Procedures required to build warehouse (number)	K	–
12	Court fees to enforce contracts (% of claim)	L	+
13	Enforcement fees (% of claim)	M	+
14	The time for enforcement of judgment (weeks)	N	+
15	The time for filing and service to enforce contracts (days)	O	+
16	The time for trial and judgment to enforce contracts (weeks)	P	L
17	Time required to enforce a contract (weeks)	Q	+
18	Getting credit (0–100)	R	–
19	Getting electricity (0–100)	S	–
20	Cost to get electricity (% of income per capita)	T	–
21	Reliability of electricity supply and transparency of tariff index (0–8)	U	–

End of Table A1

No.	Variable used	Short name	Sign* (+/-)
22	Paying taxes (0–100)	V	–
23	Tax payments (number per year)	W	+
24	Time for paying taxes (hours per year)	X	+
25	Labor tax and contributions (% of profits)	Y	+
26	Profit tax (% of profits)	Z	+
27	Registering property (0–100)	AA	–
28	Cost to register property (% of property value)	AB	+
29	Procedures to register property (number)	AC	+
30	Time required to register property (weeks)	AD	L
31	Resolving insolvency (0–100)	AE	–
32	Recovery rate – resolving insolvency (cents on the dollar)	AF	–
33	Time required to resolve insolvency (years)	AG	L
34	Cost to export: Documentary compliance (USD)	AH	+
35	Cost to import: Documentary compliance (USD)	AI	+
36	Time to export: Border compliance (hours)	AJ	L
37	Time to export: Documentary compliance (hours)	AK	+

Note: * The sign of the relationship with the factor to which it contributes. L means that the contribution of that factor is very low and insignificant for study.

Table A2. The results of applying the first mathematical formula (source: authors' calculation)

Short variable name	Factor loadings			Weights		
	L1	L2	L3	W1	W2	W3
A	–0.307	–0.137	–0.907a	0.008	0.002	0.115a
B	–0.170	–0.019	0.969a	0.002	0.000	0.131a
C	–0.323	–0.205	0.856a	0.008	0.004	0.102a
D	0.895a	0.301	0.326	0.065a	0.008	0.015
E	–0.789a	–0.518	0.003	0.050a	0.025	0.000
F	0.917a	–0.025	–0.316	0.068a	0.000	0.014
G	–0.132	–0.302	0.939a	0.001	0.008	0.123a
H	–0.306	0.358	–0.152	0.008	0.012	0.003
I	0.086	0.719a	0.063	0.001	0.048a	0.001
J	0.310	0.281	0.172	0.008	0.007	0.004
K	0.224	–0.400	–0.794a	0.004	0.015	0.088a
L	0.966a	0.102	–0.222	0.075a	0.001	0.007
M	0.897a	0.402	–0.162	0.065a	0.015	0.004
N	0.439	0.757a	–0.437	0.016	0.053a	0.027

Short variable name	Factor loadings			Weights		
	L1	L2	L3	W1	W2	W3
O	0.063	0.947a	-0.086	0.000	0.083a	0.001
P	-0.421	-0.065	0.613	0.014	0.000	0.052
Q	0.121	0.707a	-0.008	0.001	0.046a	0.000
R	-0.106	-0.979a	0.095	0.001	0.088a	0.001
S	-0.973a	0.104	-0.017	0.076a	0.001	0.000
T	-0.979a	-0.189	0.071	0.077a	0.003	0.001
U	-0.889a	0.050	0.119	0.064a	0.000	0.002
V	-0.701a	-0.620	0.153	0.040a	0.035	0.003
W	0.770a	0.161	-0.200	0.048a	0.002	0.006
X	0.242	0.789a	-0.010	0.005	0.057a	0.000
Y	0.205	0.781a	-0.584	0.003	0.056a	0.048
Z	0.385	0.140	0.725a	0.012	0.002	0.073a
AA	-0.183	-0.910a	0.031	0.003	0.076a	0.000
AB	-0.130	-0.420	0.897a	0.001	0.016	0.112a
AC	0.927a	0.285	0.017	0.069a	0.007	0.000
AD	0.423	-0.122	0.189	0.014	0.001	0.005
AE	-0.737a	-0.545	0.063	0.044a	0.027	0.001
AF	-0.841a	-0.497	0.051	0.057a	0.023	0.000
AG	0.598	-0.518	-0.437	0.029	0.025	0.027
AH	0.003	0.895a	0.441	0.000	0.074a	0.027
AI	0.438	0.869a	-0.208	0.016	0.070a	0.006
AJ	0.679	0.559	-0.042	0.037	0.029	0.000
AK	0.337	0.936a	-0.088	0.009	0.081a	0.001

Note: a. These values reveal the factors with an important contribution for study and their weights. For each of these, the factor loading values must be greater than 0.7, regardless the sign.