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**Assessing Rwanda's Economic Potential
from an International Perspective**

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Preface

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The objective is to increase research capacity and quality, to promote research and collaboration in research, to share gained insights into important policy issues and to acquire a balanced viewpoint of business, entrepreneurship and management policymaking which enables us to identify the economic problems accurately and to come up with optimal and effective guidelines for decision makers. Another important aim of the series is to facilitate communication with development cooperation agencies, external research institutes, individual researchers and policymakers in the East Africa region.

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Assessing Rwanda's Economic Potential from an International Perspective

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Abstract

This study focuses on the multidimensional characteristics of Rwanda's business climate and potential in terms of foreign economic relations. This country has created macroeconomic stability and increasingly attractive investment conditions for foreign investors, trading partners, business start-ups, entrepreneurs and other private sector actors. The study has the following objectives: (i) assessing Rwanda's economic potential in the background of the East African states using the taxonomic methods (three different types of standardizations were used in the study: classical standardization, standardization by average and standardization by range); (ii) evaluating the potential of Rwandan exports; and (iii) formulating policy recommendations for developing Rwandan international economic relations. The paper also classifies conditions for doing business with non-model methods. The analysis covers almost all East African states. Moreover, an evaluation of Rwandan export potential is based on the index of indicative trade potential. The study takes into account Rwanda's most important export partners: the Common Market for Eastern and Southern Africa, the East African Community, the Democratic Republic of the Congo and Kenya. The analysis spans the period 2001-15. In some cases the research period was extended to 2016.

Keywords: Rwanda, economic potential, foreign trade, indicative trade potential, taxonomic methods, East Africa.

JEL Classification Codes: C1; F14; F17; O1;

1. Introduction

The last decades of the 20th century brought a significant acceleration to the processes of globalization, exemplified by an increase in global interactions, diminishing of geographical barriers in the flow of goods, capital, services, technology, information, and the development of mass culture and increasingly intense bilateral and multilateral trade relations. At that time most of the East African countries¹ played a relatively small part in these processes. The first decade of the 21st century, however, brought about fundamental qualitative changes in East African countries, indicating their potential and developmental possibilities (Cargill, 2010). Individual countries in the region like Rwanda recorded the fastest economic growth in the world, while most of the developed economies suffered from the economic crisis and its consequences. The next few decades are expected to be a period of accelerated economic growth and development for the East African region. Our study focuses on the multidimensional characteristics of the economy of one of the fastest growing states in eastern Africa – Rwanda -- which has created macroeconomic stability and an increasingly attractive investment climate for businesses, entrepreneurs and other private sector actors.

The main objectives of the study are:

- 1) Assessing Rwanda's economic potential in the background of the East African states using taxonomic methods.
- 2) Evaluating the potential of Rwandan exports.
- 3) Formulating policy recommendations for developing Rwandan international economic relations.

The analysis covers the period 2001-15. In some cases the research period was extended to 2016, especially in foreign trade. To make sure that the results were consistent and comparable, data was obtained from databases kept by international organizations, mainly from the World Bank, the Organization for Economic Cooperation and Development (OECD), the United Nations Conference on Trade and Development, the African Development Bank and the World Trade Organization.

2. Rwanda's trade and capital flows with the world

Rwanda developed its international economic relations after the 1994 genocide (IPEP, 1998). The country is a member of a number of global and regional organizations and treaties of interest to potential investors including the African Trade Insurance Agency (ATI), the Common Market for Eastern and Southern Africa (COMESA), the East African Community (EAC), the Cotonou Agreement between EU and the African, Caribbean and Pacific States, the International Centre for the Settlement of Investment Disputes, the Multilateral Investment Guarantee Agency, the Paris Convention on Intellectual Property, the World Intellectual Property Organization and the World Trade

¹ This paper assumes the division of Africa into regions as developed by the United Nations Conference on Trade and Development, therefore the Eastern African region consists of Burundi, Comoros, Djibouti, Eritrea, Ethiopia, Kenya, Madagascar, Malawi, Mauritius, Mozambique, Rwanda, Seychelles, Somalia, South Sudan, Uganda, Tanzania, Zambia and Zimbabwe.

Organization (WTO). Rwanda has also signed several bilateral investment treaties and double taxation treaties (Rwanda Development Board, 2016).

Rwanda is moderately open to the world. In recent years, the share of its international trade in goods in its GDP has been fluctuating at around 40 per cent, while at the beginning of the 21st century this did not exceed 20 per cent. Considering the turnover of goods and services, the openness index in 2015 was almost 49 per cent, which represented a 15 per cent increase over the decade. Rwanda's openness is slightly below the average for Eastern Africa (57 per cent in 2015) (UNCTAD, 2017).

In 2016, Rwanda exported goods worth US\$ 744 million, almost nine times more than their value in 2001. Imports amounted to nearly US\$ 2.3 billion in 2016, that is, eight times more as compared to 2001. The share of services' turnover was smaller: exports of services in 2016 amounted to US\$ 851 million, while the imports were worth less than US\$ 1.1 billion. Rwanda's trade balance has been negative for more than a decade: it was deficit of US\$ 1.5 billion in 2015, which accounted for over 18 per cent of its GDP. The share of Rwanda's trade deficit was higher compared to the whole region (15 per cent) (UNCTAD, 2017).

The country's share of global exports and imports of goods is small. In 2016, it was 0.005 per cent and 0.014 per cent respectively. Compared to 2001, the percentages had increased, but still remained at very low levels. In 2016, Rwanda's share of East African exports was less than 2 per cent; it was almost 3 per cent for imports. Given the tariffs, the effectively applied rate is not high in Rwanda. Its share of trade in services in global turnover is minor, but it exceeds the country's share in commodity trade. In 2015, exports of services accounted for 0.017 per cent and their imports represented 0.022 per cent of global turnover. The share of exports and imports of services in the region was 4 per cent (UNCTAD, 2017). The fact that Rwanda does not have direct access to any port increases transport costs significantly. High transport costs limit trade significantly, typically even more than tariffs.

Rwanda's participation in global value chains is limited (AfDB et al., 2014; Draper and Lawrence, 2013). However, the delocalization and fragmentation of production have not left this region unaffected. Transformations in the Rwandan economy resulted in foreign enterprises deciding to take advantage of the country's comparative advantages (Martin, 2013). Thanks to its factors of production and level of development, Rwanda is attractive for four types of investors looking for four things: resources, a ready market, a reduction in production costs and strategic assets (for example, the railroad network for the power industry) (Proksch, 2003) (Ernst and Young, 2014).

The country's export concentration is high.² In 2014, Rwanda sent about 117 products abroad.³ Many countries in the region such as Kenya, Tanzania and Uganda, provided a more diverse range of goods. Compared to 2001, Rwanda's export offers have improved considerably (back then the country exported 16 product groups) but despite the export expansion, Rwanda's export concentration is one of the highest in the region. In 2015, it amounted to 0.30,⁴ only a few countries in the region (for example, Zambia, Somalia or

² The product concentration index shows how Rwanda's exports and imports are concentrated on a few products or otherwise distributed in a more homogeneous manner among a series of products.

³ Number of products exported at the three-digit SITC, Rev. 3 level.

⁴ For comparison, it was 0.49 in 2001.

Malawi) had higher export concentration ratios. It should be noted that concentration values varied during this period, but in recent years the concentration has decreased slightly. Rwanda exports mainly vegetables, which accounted for almost 36 per cent of exports in 2015. It also sells minerals (22 per cent) and fuel (15 per cent). These three commodity groups account for almost three-fourth of the country's exports. Compared to 2001, Rwanda's export structure has evolved noticeably. At that time, the most important commodity group, accounting for more than two-third of exports. Other commodity groups, except for vegetables (17.5 per cent) and minerals (11 per cent) had a small share (Figure 1). An analysis of the export structure in terms of product processing shows that consumer goods and raw materials dominate (almost 42 per cent and 36.5 per cent respectively). In 2001, consumer goods accounted for over three-fourth of exports. As for services, Rwanda exports mainly tourist services, which accounted for almost 46 per cent of services sold abroad in 2016. This group of services over the period of study accounted for the largest share of exported services (WTO, 2017) (UN, 2017).

Insert Figure 1 about here

We used the merchandise trade specialization index⁵ to indicate commodities in which the country specializes. The index was calculated for commodity groups in accordance with the Standard International Trade Classification (SITC).⁶ The calculations show that in 2015 Rwanda specialized exclusively in exporting fuels and mining products, where this specialization refers mainly to fuels. From a historical point of view (data since 2001), these two commodity groups are the only ones in which Rwanda has ever specialized (Table 1).

Similar results were obtained by calculating the revealed comparative advantage index for Rwanda's exports as developed by Balassa. In general, the Balassa Index (BI) (Balassa, 1965, 1998) for the j commodity group in country A compared to the reference group of countries is represented by:

$$(1) \quad BI_j^A = \frac{s_j^A}{s_j^{REF}}$$

where, s_j means the share of a given commodity group in exports. Interpreting this index is simple. Values greater than 1 indicate commodity groups where the country has a revealed advantage compared to the reference group of countries. Another approach, somewhat simpler, is based on the following index (the revealed comparative advantage index):

$$(2) \quad RCA_i = \frac{X_i}{M_i}$$

where, X_i represents the volume of exports in a given commodity group and M_i represents the volume of imports in this commodity group. If the value of revealed comparative advantage exceeds unity for a commodity, the country is said to have a revealed

⁵ $TSI_j = \frac{X_j - M_j}{X_j + M_j}$ where, TSI_{ji} = the index of trade specialization of economy j for goods i in a specific period; i = product or product groups; j = economy (country or country group); X_{ij} = economy's j exports of goods i; M_{ij} = economy's j imports of goods i. The range of values is between -1 and 1, the positive value indicates that an economy has net exports (hence it specializes in the production of that specific product) and negative values means that an economy imports more than it exports (net consumption).

⁶ All product groups are defined according to Revision 3 of SITC.

comparative advantage in the production of that commodity. In contrast, if RCA_i is below 1, the country is at a comparative disadvantage in the production of that commodity.

Unfortunately, this index is faulty as it is not comparable over time because trade deficit changes. A corrected measure of revealed comparative advantage is then used:

$$(3) \quad CRCA_i = \frac{X_i}{\sum_i X_i} - \frac{M_i}{\sum_i M_i}$$

We also calculated the difference between the share of a given commodity in a given country's exports and the share of that commodity in its imports. Interpreting the index value is also simple. Values greater than zero indicate commodity groups where the country has a revealed comparative advantage. This method is used in Table 2.

It shows that in 2015 Rwanda had a revealed comparative advantage in the export of agricultural products, food stuff, fuels and mining products. Unfortunately, there was no comparative advantage for other commodity groups. It should be noted that over the entire study period, except for 2002, Rwanda had a revealed comparative advantage in agricultural products and food stuff. Fuels and mining products also revealed comparative advantage during the analysis period, but the fuel sub-group did not show positive index values until recently (Table 2). The revealed comparative advantage index has improved lately in many groups of export commodities, except for fuels and mining products, chemicals and pharmaceuticals, integrated circuits and electronic components, transport equipment and automotive products.

Technically advanced products have a small share in Rwanda's exports.⁷ In 2015, the country exported high-tech products worth over US\$ 7.6 million. For comparison, the value of such products exported in the 1990s was less than several tens of thousands of dollars. The highest increase in the sale of high-tech products abroad was in 2002, when Rwanda exported products worth over US\$ 9 million. At that time, their share in the export of industrial goods accounted for almost 84 per cent. By 2015, this share had fallen to less than 13 per cent (World Bank, IBRD, IDA, 2017). In 2015, ICT products accounted for 0.81 per cent of the country's exports, while imports of this group of commodities were 9.82 per cent. At present, the country does not have a comparative advantage in any of the high-tech product groups; it mainly imports goods from the category of high-skill and technology-intensive manufactures (Table 3).

Insert Table 1, 2, 3 about here

The commodity concentration in imports is significantly lower than the concentration in exports. Although Rwanda does not import much in terms of quantity (212 products in 2015)⁸ the imports' concentration factor is one of the lowest in the region at 0.073. Only Eritrea had more diverse imports. During the analysis period, the volume of imported goods did not increase as significantly as in the case of exports -- in 2001 Rwanda imported 155 commodity groups. However, the concentration decreased from 0.18 in 2001. Rwanda imports machinery and electronics (23 per cent), chemicals (12 per cent) and metals and vegetables (11 per cent each). Other commodity groups have a small share in imports. Since 2001, the structure of imports has not changed significantly as machinery and electronics continue to rank high (14.5 per cent) followed by fuels (14 per

⁷ More about high technology exports' impact on development is available in Srholec (2005) and (Mani (2000).

⁸ Number of products imported at the three-digit SITC, Rev. 3 level.

cent), vegetables and wood (less than 14 per cent) (Figure 2). Rwanda imports mainly consumption goods (39 per cent), but the share of capital goods and semi-finished products is also not much smaller (27 per cent and 28 per cent respectively). In 2001, consumer goods dominated (over 54 per cent) in imports. An analysis of imported services shows that Rwanda mainly purchased transport services from abroad (in 2016, their share in imports was 38 per cent), followed by other services and tourist services (WTO, 2017) (UN, 2017).

Insert Figure 2 about here

In 2015, Rwanda's leading export and import trading partner in terms of value was sub-Saharan Africa (US\$ 885 million, which accounted for over 36 per cent of the trade). Its most important trading partners in that year were China (US\$ 372 million, 15 per cent of total trade), Uganda (US\$ 243 million, 10 per cent) and Kenya (US\$ 238 million, 10 per cent). In regional integration groups of which Rwanda is a member the share was: COMESA (exports: US\$ 303 million, imports: US\$ 697 million) and EAC (exports: US\$ 82 million, imports: US\$ 711 million); they were the country's most important trading partners. Besides Uganda and Kenya, DRC and Tanzania play an important role in Rwanda's trade. Trade between members of COMESA and EAC is quite intense, but an increase in trade between Rwanda and the groups has remained steady in recent years.⁹

Rwanda's exports are more focused on sub-Saharan African markets. In 2015, more than 57 per cent of its exports went to these markets, while in 2001 the region was the recipient of 48 per cent of Rwandan goods. The second major market for the country's exports is Europe and Central Asia (20 per cent in 2015 and 35 per cent in 2001). The geographic structure of exports has changed since 2001, when Rwanda's most important partners were Kenya (36 per cent), Switzerland (14 per cent) and the Netherlands (12 per cent). Currently Rwanda's export partners include DRC (32 per cent of export value in 2015), Kenya (16 per cent) and Switzerland (9 per cent). The first two countries mainly buy consumer goods (from 66 per cent to 86 per cent of the exports) such as vegetables, fuels and food stuff. Switzerland is the main recipient of raw materials (99 per cent of exports) (WTO, 2017).

The geographical concentration of the Rwandan export market was investigated with the Herfindahl-Hirschman Index (HHI)¹⁰ which amounted to 0.08 in 2015. Rwanda experienced generally unconcentrated exports in the geographical concentration of exports.

The situation is the opposite for imports: less goods are imported from sub-Saharan countries (only 39 per cent in 2001 and only 30 per cent in 2015) in favor of markets in developing East Asia and the Pacific (27 per cent). The geographic structure of Rwanda's import partners has also changed: in 2001, Belgium was the most important import

⁹ Rwanda is actively engaged in COMESA and EAC, and has also assented to the COMESA-EACSADC tripartite free trade area agreement, whose objective is to promote deeper economic integration to facilitate strong trade performance and economic growth in Africa. In the context of recent developments in business interests in Central Africa, Rwanda was officially readmitted to the Economic Community of Central African States in 2015.

¹⁰ A HH index below 0.01 indicates a highly competitive market. A HH index below 0.15 indicates an unconcentrated market. A HH index between 0.15 and 0.25 indicates moderate concentration. A HHI above 0.25 indicates high concentration. HH index formula: $HHI = \sum^n S_i^2$, where S_i : market share of country i .

market for Rwanda (18 per cent), followed by Saudi Arabia (11 per cent) and Kenya (10 per cent). In 2015, Rwanda's main import partners were China (19 per cent), Uganda (13 per cent) and India (10 per cent). China sold mainly machinery and electronics (44 per cent) and metals (14 per cent), Uganda provided vegetables (31 per cent) and minerals (27 per cent), while metals, chemicals (23 per cent) and food stuffs (20 per cent) were imported from India (WTO, 2017). Import market concentration indices measured in HHI are the same as HH indices in exports and in 2015 amounted to 0.09. This means that the import market was also unconcentrated.

In general, Rwandan trade balance remains negative -- the country recorded a US\$ 1.2 billion trade deficit in 2015. Until about 2010, the increasing trade deficit was not due to deteriorating export prices. In fact, Rwanda enjoyed a major improvement in its terms of trade, even better than the average for sub-Saharan Africa (WTO, 2017).

The country's trade deficit with COMESA and EAC has been reported for years (US\$ 394 million and US\$ 629 million respectively in 2015). Rwanda also recorded a trade deficit with its main trading partners such as China, (US\$ 345 million), Uganda (US\$ 224 million) and Kenya (US\$ 58 million) (WTO, 2017).

Compared to East Africa, Rwanda neither attracts foreign direct investment (FDI) nor is it an investing country itself. An analysis of Rwanda's financial flows shows that there is a huge disproportion between FDI inflows and outflows. Since 2001, the country has been attracting more FDI, but practically it does not invest abroad at all. In 2015, FDI inflows amounted to US\$ 471 million, while FDI outflows did not exist. In general, Rwanda's FDI inward stocks amounted to less than US\$ 1.2 billion by 2015, representing just 1 per cent of FDI inward stocks in the region. The share of FDI inflows in Rwandan GDP increased from 3.9 per cent in 2014 to 4.2 per cent in 2015. The FDI outward stocks are much worse, as by 2015 Rwanda had invested only US\$ 15 million abroad.¹¹ FDI inflows also fluctuate a lot. In 2001-15, the average annual flow of investments was 67 per cent, but there were years when FDI inflows were up to 285 per cent (for example, in 2006) and years when they were significantly down (for example in 2002 and 2011). In 2015, FDI inflows increased by only 3 per cent. Such fluctuations show that Rwanda is considered a host economy for FDI inflows.

FDI outflows have been occurring sporadically over the study period and their average annual dynamics cannot be calculated. Rwanda is perceived to be a good place to do business. It is particularly valued for foreign investors' protection. For example, according to the Index of Transaction Transparency or Index of Shareholders' Power, Rwanda is at the same or even higher level than the USA. The main investors in Rwanda include Mauritius, South Africa and Kenya (UNCTAD, 2017).

Rwanda is a landlocked country with few natural resources. It has **resources such as gold**, tin, wolframite, tungsten, coltan, iron, methane gas and some arable land (U.S. Geological Survey, 2017). Some of the natural resources have not been completely exploited yet (for example, unexploited opportunities in ores) (New African, 2014). It is worth noting that deforestation is prevalent and is caused by the cutting of trees for fuel, as well as issues with the soil (erosion) and widespread poaching. Generally, Rwanda is not among the top countries in African mineral exporters. It has only recently seen a significant increase in foreign direct investment in the mining sector. This can be

¹¹ Only Malawi, Madagascar, Burundi and Mozambique had invested less by 2015.

attributed to Rwanda's adherence to all international regulations required for mineral exports, which has increased investor confidence in the area. The various concessions also indicate a desire to diversify the export market. Currently, the country's mining sector is mostly artisanal. The sector was developed first to a semi-mechanized and later to industrial level to increase production which is still low compared to existing potential. The fact that the country is not dependent on commodity prices in world markets favors a sustainable development of its economy and reduces its exposure to external shocks. In addition, it helps the government develop non-commodity sectors which are considered a key factor affecting the economic growth of the country.

In May 2015 the Government of Rwanda launched a new investment code aimed at attracting FDI into selected sectors -- tourism, energy and new technologies. FDI inflows are expected to reach US\$ 1.5 billion in a year. After these new measures, foreign investors are no longer required to invest a minimum of US\$ 100,000. The introduction of this code was written in line with the development program 'Vision 2020' which aims to significantly improve the business climate in Rwanda (Rwanda Development Board, 2012). Coffee, tea, tin, energy and telecommunications are some of the traditionally targeted sectors for foreign investments. In 2012, the Rwandan government and VISA Inc. signed a contract for developing electronic financial services, opening the door to new investments in this sector (VISA Inc., 2012). Rwanda has since continued to develop its technology sector; the country also has highly developed demonetized payment systems. In early 2016, the Rwandan Development Board signed an agreement with Thomson Reuters to support further innovations within the country (Rwanda Development Board, 2016).

3. Rwanda's foreign trade: Potential development

The diversity of Rwanda's revealed comparative advantage is also reflected in the degree of similarities between foreign trade commodity structures in Rwanda and those in the other states. We adopted the foreign trade commodity structures of the largest economic blocs in Africa as the model. This analysis enabled us to indicate the economic integration blocs that are similar to Rwanda in terms of foreign trade structures (applying Standard International Trade Classification, Rev.3). The Euclidean metric formula was used to study the degree of similarity. Comparing 2001, 2005, 2010 and 2016, it can be observed that the structure of commodities exported by Rwanda is becoming similar to EAC and COMESA's structures since 2005. We also observed that at the beginning of the 21st century, Rwanda had clearly drifted away from COMESA's model and had become similar to EAC. Rwandan exports are quite similar to Kenya's but differ from DRC's exports significantly (Figure 3). This raises the possibility that the larger the difference between export structures, the higher the possibility for bilateral trade development.

Insert Figure 3 about here

An evaluation of Rwandan export potential is the base of the index of indicative trade potential (ITP).¹² We took into account the country's most important exports partners: COMESA, EAC, DRC and Kenya.

¹² The methods are based on the study (Bano, et al., 2013).

ITP it is a purely mechanical indicator defined as:

$$(4) \quad ITP_{ijk} = \min (X_{ik}, X_{jk}) - X_{ijk},$$

where:

$$(5) \quad X_{i.k} = \sum_{j=1}^J X_{jik} -$$

$$(6) \quad X_{.jk} = \sum_{i=1}^I X_{ijk}$$

The idea behind the ITP indicator is identifying the goods for which there is the highest trade complementarity between the exports of a country (in our case Rwanda) and the imports of the target country/ region (COMESA, EAC, DRC and Kenya). The trade potential indicator assumes that the importing country/ region could in-principle absorb all imports from Rwanda perfectly.

Comparing the indicative trade potential of the analyzed countries and integration groups in 2016 we did not observe the largest trade potential in absolute numbers in the case of COMESA or EAC, but in the case of Kenya: US\$ 694.5 million, which is 7.19 per cent of actual exports. Actual trade with Kenya covered only a small part of Rwandan exports. This constitutes a great opportunity for increasing the value of trade, especially in the following product groups: petroleum oils or bituminous minerals > 70 per cent oil; tea and mate, zinc, rice; and fixed vegetable fats and oils, crude, refined, fract. We observed the greatest potential in bilateral trade in primary and not in advanced goods. This draws average or unfavorable prospects for future bilateral trade and shows the need for rebuilding export structures into more advanced products in the near future (Table 4).

Insert Table 4 about here

Rwanda's second export partner with the largest potential trade was members of EAC (US\$ 652.2 million). Actual Rwandan exports covered 14.14 per cent of the value of potential exports. Except for the product group 'petroleum oils or bituminous minerals > 70 per cent oil' of which the potential trade was the highest in 2016 (US\$ 96.8 million), the most promising product groups were zinc (EAC's members do not import this product from Rwanda), tea and mate and rice. Rwandan trade with EAC suffers from the same problem as it does with Kenya: the export structure is not dominated by advanced products. This indicates an urgent need to change the structure and focus on more technologically advanced goods (Table 5).

Insert Table 5 about here

DRC has been Rwanda's most important export market for many years. Rwanda's current exports to DRC cover more than half of its potential trade amounting to US\$ 468.3 million. In general there is the potential to increase trade in the following product groups: petroleum oils or bituminous minerals > 70 per cent oil, vegetables and other crude minerals. These three groups characterized the largest potential trade in 2016. It is important that the large export potential is in more advanced products such as telecommunication equipment and motor vehicles for people and also for special purposes. This provides prospects of advancing and improving the trade structure with DRC (Table 6).

Insert Table 6 about here

The lowest potential in bilateral trade development is with COMESA, because the actual trade between Rwanda and COMESA was more than 96 per cent of indicative trade. The total amount of ITP was only US\$ 379.1 million. The most promising export niches for Rwandan products were petroleum oils, oils from bitumen materials, crude, copper ores and concentrates; copper mattes, cement and zinc. Like with EAC and Kenya, COMESA's imports from Rwanda seem to be very primary and the prospects of improvements are quite poor (Table 7).

Insert Table 7 about here

Petroleum oil, zinc and minerals were the most promising export goods for almost all Rwanda's analyzed partners. However, there is low potential in more advanced products. Therefore, the prospects for Rwandan exports are pessimistic if the country does not rebuild its exports structure.

However, we should be aware of some limitations of this study. Firstly, the analysis was carried out ex-post and did not take into account any future trends and developments in trade between Rwanda and its trade partners. Secondly, the construction of the ITP indicator is based on the assumption that all Rwandan exports within the scope of a product group may be intended to cover all the demands of the analyzed trade partners. However, we should treat Rwandan potential export values only as indicative values. These results can be used as future directions for Rwandan exports to analyze markets.

4. Selected doing business indicators in Rwanda

Rwanda is a country with a low level of international competitiveness, but its position is rapidly strengthening in many rankings. In terms of the best-known competitiveness index developed by the WEF (Global Competitiveness Index), Rwanda ranked 52nd out of 138 countries (the report covered 2016-17). It was 58th in the previous rankings. Only Mauritius ranked higher (45th place) (WEF, 2017). Labor market performance and institutional development were appraised highly but the size of the market and the level of higher education were poor. The main barrier to doing business in Rwanda is access to sources of finance and low educational levels of the Rwandan workforce.

The Global Innovation Index (2017) shows that the level of innovation in Rwanda is still low (the country was ranked 99th out of 127 countries). However, Rwanda was classified as a so-called 'innovation achiever.'¹³ The government has invested in developing ICT infrastructure and skill development in ICT is a priority of the current government. Rwanda was also evaluated positively in terms of government expenditure on education per pupil and secondary and general infrastructure. Its performance was the worst in ISO 14001 environmental certifications, trade, competition, market scale and ICT use (Johnson Cornell University, INSEAD, WIPO, 2017). The Global Information Technology Report (2016) ranked Rwanda 80th among 139 countries covered in the ranking (WEF, 2017).

According to the Doing Business (2017) report, Rwanda was ranked 56th out of 190 countries in terms of the ease of doing business. This means that Rwanda has improved six places as compared to 2016. The most significant improvement has been in credit financing (the country was ranked second in the world) and in registration of property (it

¹³ Only Kenya was ranked higher in the region. Kenya, Rwanda and Uganda are considered the most innovative countries in sub-Saharan Africa.

came fourth globally). The country came out poorly in obtaining construction permits (158th place in the world), getting electricity and protecting minority investors (IFC, The World Bank, 2017).

A business-friendly environment largely depends on the level of economic freedom in a country. In this respect, Rwanda was ranked 51st as a moderately free economy (The Heritage Foundation, 2017).

The country has also increased the effectiveness of its anti-corruption efforts. According to CPI, Rwanda ranked 50th (out of 176 economies), which means a four-step improvement compared to 2015. The [Office of the Ombudsman](#) is operating in Rwanda; it is an independent public institution preventing and combating corruption but it is a young institution (it was established in 2003) and its anti-corruption practices are still ineffective¹⁴ (Business Anti-Corruption Portal, 2017).

According to the Ibrahim Index of African Governance's 2016 annual statistical assessment, Rwanda was ranked as one of the top ten African countries with best governance practices. Taking the 9th place, except for Mauritius (leader in the ranking), Rwanda has become the best-rated economy in East Africa and is moving up the ranking every year (Mo Ibrahim Foundation, 2016).

The country is not considered in many of the world's most popular investment attractiveness rankings (for example, AT Kearney or Fraser Institute) because of lack of detailed data needed for evaluation. Rwanda is unlikely to be favored by potential investors in terms of long-term ratings prepared by international agencies. Some rating agencies do not take the country into account (for example, Fitch last rated Rwanda in 2014), while others like Moody's or S&P, assign a B2 or B rating to Rwanda. Therefore, the country is counted among the group of highly speculative countries. In practice what this means is that credit risk in Rwanda is still considered high and investments in securities issued by the country are considered speculative (Standard & Poor's, 2017).

5. Data description, survey method and results

To assess the conditions for doing business in Rwanda compared to East Africa, the methods of multidimensional comparative analysis seem particularly useful as they provide researchers with a synthetic measure to describe objects with many statistical indicators. Hence, we classified conditions for doing business using non-model methods. A non-model classification of objects is one of the multidimensional data analysis methods to deal with objects characterized by many features. Information on the objects to be analyzed is placed in the observation matrix. The use of non-model methods in our study was necessary because it was difficult to find countries in this region of Africa that could serve as a model to be followed by others. But this was not the only obstacle as using standard models typical of developed countries such as the United States or the EU, with reference to African countries is pointless.¹⁵

To describe the level of development of conditions for doing business in individual countries in East Africa, the following diagnostic variables were selected:

¹⁴ The Office of the Ombudsman declares that it is largely based on solutions adopted by Botswana.

¹⁵ The methods were based on a study by (Pociecha, et al., 1998).

- 1) X_1 – labor productivity per employer (OECD);
- 2) X_2 – average labor productivity growth (OECD);
- 3) X_3 – minimal wage (ILO);
- 4) X_4 – rank in ‘Doing Business’ (the World Bank);
- 5) X_5 – Index of Economic Freedom (Heritage Foundation);
- 6) X_6 – Global Competitiveness Index (World Economic Forum);
- 7) X_7 – Global Innovation Index (INSEAD and World Intellectual Property Organization);
- 8) X_8 – *Corruption Perceptions Index* (Transparency International);
- 9) X_9 – Ibrahim Index African Governance (Mo Ibrahim Foundation); and
- 10) X_{10} – Human Development Index (UNDP).

The study was based on data from institutions constructing these indices (information in parentheses); the minimum wage figures were derived from ILO data, while data on labor productivity and its dynamics was derived from OECD databases. All figures refer to the last available year, which means that most of them refer to 2015 or 2016. An exception is made in the case of an increase in minimum wages, which is the average of the years 2011-14 (ILO, 2017). The countries in East Africa, except for Djibouti, Eritrea, Comoros, Madagascar, Somalia and South Sudan, are the subject of the study. These countries were not considered because statistical data was incomplete.

Although only 10 diagnostic variables were included in the analysis, a significant amount of information carried by individual variables must be considered. Many of them contain a whole set of other, detailed measures that accurately describe the business climate in the analyzed countries.

With an arbitrary selection of variables that illustrate the advancement of the business environment in the analyzed countries, three guiding principles were followed. First, the diagnostic variables that are important from the point of view of business conditions were selected, which together adequately describe the scope of the area concerned (in this case, the climate for doing business). Secondly, the variables were selected in such a way that they remained separate as far as possible. Unfortunately, meeting this requirement is quite difficult, especially when analyzing phenomena based on multidimensional, often qualitative indices. GCI and a place in the World Bank's Doing Business ranking are examples of variables carrying similar information. Thirdly, efforts were made to maintain proportionality in the variables that illustrate the level of development of a business-friendly economic environment.

Limited access to statistical data remains a major barrier in our study. Considering the lack of some competitiveness indices, these features had to be omitted in the study in the case of some countries that were analyzed. The indices that were taken into consideration include the Knowledge Economy Index, international agency ratings and returns on investments.

In a multidimensional analysis, it is important to standardize the level of variability or the range of variability of the features concerned. High value variables more significantly affect the distance between objects to a greater degree than variables with lower values.

In addition, partial indices of some aspects of the potential are expressed in different measurement units (for example, in percentages or with respect to the value) and have different ranges of variability. That is why their direct aggregation to a synthetic measure is impossible. Hence, to compare these indices and to be able to use them to perform arithmetical operations which are necessary for constructing one measure, it is essential to transform them suitably. The transformation of diagnostic variables (partial indices assigned to different aspects of conditions for doing business in analyzed countries) includes a stimulation of variables, their normalization and, should the diagnostic features be negative, additional transformation. The effect of the transformations is a set of variables that satisfy the following conditions: uniform preference, additivity, range constancy and non-negativeness.

In the variable stimulation process, neutral variables and inhibitors are transformed into boosters (stimulants). Transformation of this type is necessary because individual diagnostic variables can affect the phenomenon concerned differently. For our purpose, the differential transformation method was applied:

$$(7) \quad x_{ij}^S = a - bx_{ij}^D, \quad b > 0,$$

where, a, b – arbitrary variables, usually $b = 1$ and $a = 0$ or $a = \max_i \{x_{ij}^D\}$.

$$(8) \quad x_{ij}^S = -|x_{ij}^N - x_j^N|$$

where,

x_j^N – nominal (desirable) value of the j variable

x_{ij}^N – value of the j neutral variable in the i object

The first step was to normalize the variables according to the formula:

$$(9) \quad z_{ij} = \left(\frac{x_{ij} - a}{b} \right)^p, \quad i=1,2,\dots,n; j=1,2,\dots,m; b \neq 0,$$

where, z_{ij} – normalized value of the j variable in the i object, and a, b, p – normalization parameters

Three types of standardizations were used in the study: classical standardization, standardization by average and standardization by range.

- 1) For performing classical standardization, the following normalization formula was used:

$$z_{ij} = \frac{x_{ij} - \bar{x}_j}{S(x_j)}, \quad i=1,2,\dots,n; j=1,2,\dots,m,$$

- 2) In the case of standardization by average, the following formula was used:

$$z_{ij} = \frac{x_{ij}}{(\bar{x}_j)}$$

- 3) To obtain variables with a uniform range of variability, defined by the difference between their maximum and minimum values in classical terms, the so-called standardization by range was used. Because the following normalization formula was used, variables with values in the [0; 1] range were obtained:

$$z_{ij} = \frac{x_{ij} - \min_i \{x_{ij}\}}{\max_i \{x_{ij}\} - \min_i \{x_{ij}\}}, \quad i=1,2,\dots,n; j=1,2,\dots,m.$$

Once the data was normalized and the negative values were eliminated, they were ranked according to the following standardization formula:

$$z_{ij} = h \quad \text{dla} \quad x_{hj} = x_{ij}, \quad h,i=1,2,\dots,n.$$

where, h – rank assigned to the i object on the h th place in an ordered array of objects because of the j variable.

Due to limitations about the length of this paper, we do not give the presentation of a long process of normalization and ways of standardizations according to diagnostic variables and present only the results of the calculations - ranking of East African countries in terms of doing business conditions in 2015 (Table 8).

Insert Table 8 about here

Our study shows that Mauritius had the highest potential for foreign business partners. Regardless of the standardization formula, this island nation in the south-western Indian Ocean was classified high in the ranking. The country has a high level of GDP per capita and according to the World Bank, it belongs to upper-middle-income economies. It is also counted among countries with high levels of human development and its level of internationalization remains substantial (Mauritius is second only to Seychelles in the region). Mauritius takes the highest position among East African countries in terms of ease of doing business. The areas in which the country is rated high include economic diversity, starting a business, financial market development, institutional advancement, enforcing contracts, tax system, dealing with construction permits, getting credit and protecting minority investors. These features, along with its high position in the Financial Secrecy Index, make the country a tax haven, where financial services are the basis of the economy and a well-developed infrastructure is driving the growth in tourism. Further, Mauritius has been ranked as having the 8th most free economy in the world, which makes the country the preferred seat for more than 30,000 offshore companies. Goldman Sachs, Moran Stanley, JP Morgan Chase, Citi group and Pepsi have registered their branches on the island.

In the case of two standardizations (by range and classic), the study pointed to Seychelles as second to Mauritius in terms of the ease of doing business. This country, like the leader in the ranking, ranked high in the diagnostic variables applied. Seychelles, like Mauritius, has long been considered one of the most popular tax havens in the world, hence its high position in various rankings. It is the most developed country in East Africa, leaving other countries of the region far behind. As the only African country, it has been

considered a high-income country. Seychelles' economic freedom status is moderately free. However, corruption remains at an average level (like in Mauritius). Seychelles is well perceived in labor market efficiency, infrastructure, institutions and macroeconomic environment, tax system, resolving insolvencies and ease of registering businesses. Seychelles, unlike Mauritius, has improved its position in many rankings. Tourism and financial services remain the primary industries on the island.

Considering the specifics of Mauritius and Seychelles' economies, it seems justified to exclude them from the ranking of East African countries. These island countries are different from the other countries mainly because they are tax havens.

Rwanda is the first non-tax haven in the ranking. Twice it ranked third (by range and classic standardizations) and once it ranked second. Rwanda's prospects for development are good as evidenced by multidimensional indicators improving year to year. According to the Global Competitiveness Index, the Rwandan labor market efficiency is particularly effective (7th place in the world) and its institutional development is rapid (13th place in the world). The country's chief assets are financial market development, market efficiency and innovations; its position in all these areas is getting higher. According to the Doing Business rankings, the ease of getting credit, obtaining construction permits and starting a business proves Rwanda's attractiveness. The rule of law indices, respect for political rights and civil liberties, participation in political decisions and integration and the level of internal security in Rwanda have improved considerably in recent years. In addition, the development strategies implemented by the government have created a positive image of the country. Rwanda is among the free economies in Africa and its level of corruption is relatively low as compared to other analyzed countries. Although there are many symptoms of accelerated development in the country and Rwanda is rated high in selected areas against other East African economies, the country is still perceived as under-developed. Market size and the level of education, technology and infrastructure look particularly unfavorable.¹⁶

Potential foreign investors are faced with formidable barriers in the issuance of construction permits, there are serious problems with the supply of electricity and the protection of minority investors remains negligible. Considering the comprehensive indicators of socioeconomic development (such as HDI), Rwanda is in the group of countries with low levels of human development; it had the 159th place in 2015 (Uganda, Malawi, Djibouti, Ethiopia, Mozambique and Burundi were ranked lower). In terms of all HDI components, Rwanda is at a low position. However, its index value is growing and the country's position is getting higher annually. Moreover, the country is spending more on education (5 per cent of GDP in 2016) than the average for Africa (4.7 per cent) (UNDP, 2017). A big chunk of Rwanda's adult population is illiterate, particularly women (adult literacy rate among women was 68.3 per cent and among men was 74.7 per cent in 2010-15). According to the African Development Bank, in 2010-15 about 71.2 per cent of the citizens knew how to read and write. Rwanda has also made huge strides in gender equality.

¹⁶ This strict assessment perhaps does not consider the latest plans of the Rwandan government which are connected to improvements in educations (for example, ICT in education, promoting quality education) and infrastructure, for example, a new railway line (Mombasa-South-Sudan- Kampala-Kigali; almost 96 per cent of paved roads are in good conditions).

Zambia had the 4th position in the rankings, regardless of what standardization method was used. For several years, the country has been dealing with an economic crisis caused by falling copper prices in international markets. The country is also struggling with an energy crisis. It has created major barriers to foreign trade and its level of education development and healthcare is low. However, despite these problems, Zambia was rated relatively well in terms of institutional development, innovations, commodity market efficiency, getting credit and a foreign investment-friendly tax system. Zambia was ranked higher than Rwanda in terms of human development (among middle-income countries). However, the Corruption Perceptions Index and the Index of Economic Freedom show serious economic problems in the Zambian economy; the country suffers significantly from corruption and its economic freedom is also severely limited.

Zambia is followed by either Kenya or Ethiopia, depending on the adopted standardization method. These two major economies in the region are responsible for most of the region's production, capital flows and trade, although their Economic Freedom Index has declined and the level of human development is low. Ethiopia is much better perceived in terms of dealing with corruption as compared to Kenya. It is difficult to point out the assets of these countries because according to international rankings they come out poorly in terms of the ease of doing business. Labor market efficiency is a strength of both the countries. Kenya, on the one hand may boast of a fairly good level of financial market development, the ease of getting credit and high innovations as compared to the region. On the other hand, the Ethiopian internal market is of the right size and the macroeconomic environment in the country is relatively well-developed. Moreover, there is a tendency that shows that both the countries are moving up in international business reports on conditions for doing business.¹⁷

Burundi ranked the lowest, regardless of the type of standardization method applied. The country is particularly disadvantaged in terms of financial market development, the level of higher education, technological development, energy supply, dealing with construction permits and getting credit. Burundi is counted among countries with the lowest level of human development and massive corruption. Its economic freedom status is mostly not free. In addition, its position in many international reports is deteriorating.

Based on our analysis, it can be confirmed that tax havens with well-developed economies offer the most favorable terms and conditions for doing business, which translates into a considerable intensity of their relations with the world, mainly tourism and capital. However, Rwanda which is taking advantage of its improving economic situation and has intensified the processes of internationalization is just behind them. Although foreign investors or business partners may encounter many issues when starting a business in Rwanda, the country looks promising as compared to the others in the region, especially in terms of efforts to maintain internal stability, internal security and resistance to external shocks.

6. Conclusion and policy recommendations

The Rwandan government's current priority is reducing the development gap between the country and the developed states. One of the ways of achieving this goal is by ensuring the proper management of foreign trade, gradually joining the global economy

¹⁷ More about the East African economies' development see (Heshmati, 2017), (Heshmati, 2016).

(being a signatory to many international agreements) and shaping its doing business environment. Moreover, Rwanda characterizes sustained and high economic growth, which is supported by sound macroeconomic management and a good fiscal discipline. A clear vision of the government for growth and its engines makes the country attractive. Rwanda's institutions are stable and functional. Moreover, introduction of the rule of law and zero tolerance for corruption has created an investor friendly climate. The Rwandan market may not be huge and developed, but it has grown rapidly and the middle class is getting richer. Rwanda is also very labor efficient and offers a flexible supply of employees. Of late its workforce has been improving its capacity in knowledge-based industries.

It is noticeable that Rwanda has climbed in almost all important global rankings. Its infrastructure is advanced and rail, air, logistics and investment opportunities abound to develop Rwanda as an EAC hub. Rwanda continues to be one of the fastest growing African countries in ICT (key priority in 'Vision 2020') and there are several avenues for the growth of the advanced technology sector: from e-commerce and e-services, mobile technologies, applications' development and automation to becoming a regional center for the training of top quality ICT professionals and researchers.¹⁸ The intensification in the economic expansion of the Rwandan market is linked to economic and geopolitical reasons such as developed countries, inter alia, the EU's economic and political problems, Brexit, debt and the migration crisis. Moreover, developed and developing countries are focused on geographic diversification of their foreign trade and capital flows in order to ensure their positive impact on the level of foreign income in their economies. Therefore, Rwanda can be perceived as a prospective market for trade and investment in the geographical diversification process.

Based on our research, the following conclusions and recommendations are offered to stimulate Rwanda's international expansion in terms of foreign trade and foreign investments:

1. Rwanda is characterized by high economic potential, development opportunities and growing competitiveness (in international terms) in the background of the East African states. Moreover, Rwanda's prospects for development are good as evidenced by multidimensional indicators improving year to year. However, many areas of the Rwandan real economy and financial sector need improvement, for example, the level of development of education, technology and infrastructure, barriers to the issuance of construction permits, problems with electricity supply and the protection of minority investors. These critical areas need changes and improvements. They are pointed out, inter alia, by international organizations when they create multidimensional indices and rankings.
2. Rwanda's market still needs advanced technology solutions in almost every dimension of economic activity. In terms of foreign trade, Rwanda does not have any real competitive advantage or specialization in the export of any advanced products. The country still imports most of the technologically advanced product groups. Therefore, the Rwandan government should support and be interested in international cooperation for this.

¹⁸ Tourists in Rwanda have access to the highest level of mobile internet, 4G.

3. Rwanda's total export potential is high, especially when we analyze its main trade partners and indicative trade potential. However, the export structures with its main trading partners (countries and integration groups) need improvements for more advanced product groups. The most popular export goods are primary. If Rwanda wants to join global value chains and wants to be ranked in upmarket segments in terms of value added embodied in the gross exports of its partners, it should rebuild its export structure and focus more on advanced products. At the moment, the structure of Rwandan exports to DRC seems to be the pattern to follow for rebuilding its export structure.
4. The intensification of economic expansion needs action at the level of central and local government administrations. It will be necessary to gather detailed information on African markets and other prospective global markets for Rwandan exporters and entrepreneurs, their potential, development opportunities, consumer demand, institutional conditions (including trade barriers, tax systems and investment incentives), conditions and the climate to operate and identifying priority markets and industry directions for potential cooperation.
5. The Rwandan government should consider expanding and developing its diplomatic missions, consular offices, chambers of commerce etc., not only in Africa, but also in its most important trade and investment partners. These entities will strengthen the presence of Rwandan enterprises abroad and support their businesses. Moreover, Rwanda should develop the economic sections of existing diplomatic missions and set up targeted governmental economic agencies. This will help to better understand the specifics of the markets and support Rwandan companies in foreign markets. An increase in the number of governmental agencies will also indicate its desire to strengthen relations with continental countries which could facilitate pursuit of business interests and increase interconnectedness.
6. An effective stimulation of economic expansion in Rwanda will require further development of trade and investment support instruments such as government guarantees, export credits (preferential ones) and interbank investment funds as well as the implementation of new measures. Another important element of governmental support can be encouraging the setting up of chambers of commerce in new agencies abroad and also in existing ones which also provide free advisory and consultation services. It will be important to create and support existing governmental consulting agencies and capital groups that serve Rwandan companies planning to move abroad.
7. It will be necessary to institutionalize promotional activities in selected (priority) markets with specific information campaigns for them. It is important to strengthen the promotion and long-term development of the perception of both the country and the products and services offered by various Rwandan enterprises. National branding activities aimed at creating a proper image for Rwanda in African markets are also needed. It is important that the Rwandan products offered abroad are identified with modernity, solidity and high quality workmanship.
8. It is important for Rwandan entrepreneurs and supporting agencies to seek and identify international market niches in which they can achieve competitive advantage in the long term. Moreover, they should anticipate the changes that have taken place in export markets and the prospects for their further development.

9. In terms of foreign investments consideration should be given to the interests of internationalization in the form of investments of a minority character. In the initial stages of internationalization, Rwandan investors and entrepreneurs need business partners from well-developed or more developed countries in order to better understand the market and culture, including business culture, increasing efficiency in recruitment and confidence and efficiency in building relationships at the central and local government levels. This seems particularly important at the beginning of the expansion of the Rwandan capital. At the same time, such investment projects should allow Rwandan entrepreneurs' access to East African and global markets - increasing exports as a result - through existing distribution networks, business contacts and market knowledge.
10. In the context of international cooperation in investments, it is desirable for Rwandan government agencies to cooperate with other government agencies (from other countries) in promoting mutual investments. More bilateral or multilateral investment agreements can stimulate capital flows between Rwanda and the world.
11. It is advisable to use the knowledge of other countries (for example, China, the US and EU states) and economic operators with greater experience in international expansion, especially in more advanced markets. It is worth establishing cooperation with such foreign agencies, both public and private. Selection and implementation of selected actions and measures could contribute to improving the effectiveness of expansion in international markets with greater demand for Rwandan products and businesses.
12. If Rwandan companies (private and public ones) want to develop international relations, they should cooperate with well-developed and fast developing countries' enterprises in the form of joint ventures. These forms of cooperation can be extremely useful in common direct investments and undertakings that are logistic and distributional in nature. These forms of investment activities will help bridge the barriers associated with different business cultures and doing business standards in Rwanda and the developed and developing markets.
13. The reasons for intensifying foreign economic cooperation with Rwanda include growing private consumption and governmental expenditure, which are connected to building the transport, telecommunication and production infrastructure and social services; demographic potential and demographic structure, a growing middle class; and changing the global economy and joining global value chains (Dicken et al., 2001).
14. The Rwandan government should be interested in international cooperation in developing services such as research and development, banking, financial and business services, transport and logistics, telecommunications and the energy sector, especially the renewable energy sector.¹⁹ For investment inflows, good progress can be made in the construction industry (mainly transport infrastructure), food and agriculture, pharmaceuticals, hotels and medical and chemical industries.

¹⁹ Rwanda withholds immense potential in solar and hydroelectric power. The Africa-EU Renewable Energy Cooperation Programme states that Rwanda's hydropower supplies amounted to 59 per cent of the existing electricity generation capacity at 59.43MV, and has the capability to achieve over 300MV.

15. From the international perspective of well-developed and fast developing countries the export product groups that have the most prospects for Rwanda include different types of high quality industrial products, mainly mining machinery, construction machinery, agricultural machinery and equipment, simple and easy-to-use equipment, consumer goods especially electronics, cars and their parts, and furniture, telecommunications equipment, household appliances and office supplies. The growing middle class also offers an opportunity to export luxury goods, specialized high-standard services, jewelry, clothing, food products, advanced technology, electronics and automotive industry products.

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Table 1: Rwandan merchandise trade specialization index (2001-15)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Agricultural products	-0.320	-0.852	-0.139	-0.052	-0.200	-0.018	-0.258	-0.185	-0.191	-0.348	-0.266	-0.193	-0.224	-0.276	-0.192
Food	-0.289	-1.000	-0.069	0.030	-0.178	0.020	-0.253	-0.114	-0.150	-0.337	-0.271	-0.193	-0.233	-0.273	-0.177
Fuels and mining products	0.000	-0.415	-0.508	-0.182	0.057	-0.125	0.135	0.223	-0.189	-0.015	0.091	0.120	0.362	0.482	0.556
Fuels	-0.250	-0.907	-0.864	-0.840	-0.818	-0.966	-0.963	-0.970	-0.978	-0.938	-0.728	-0.435	-0.236	0.137	0.421
Manufactures	-0.942	-0.819	-0.943	-0.931	-0.889	-0.938	-0.915	-0.944	-0.888	-0.952	-0.922	-0.896	-0.925	-0.859	-0.885
Iron and steel	-1.000	-1.000	-1.000	-1.000	-1.000	-1.000	-1.000	-0.977	-0.966	-0.973	-0.980	-0.918	-0.912	-0.788	-0.983
Chemicals	-1.000	-1.000	-1.000	-1.000	-0.967	-0.973	-0.966	-0.970	-0.979	-0.978	-0.964	-0.967	-0.962	-0.950	-0.954
Pharmaceuticals	-1.000	-1.000	-1.000	-1.000	-1.000	-1.000	-1.000	-1.000	-1.000	-1.000	-0.954	-1.000	-1.000	-1.000	-1.000
Machinery and transport equipment	-0.906	-0.910	-0.923	-0.927	-0.803	-0.872	-0.871	-0.948	-0.833	-0.954	-0.889	-0.862	-0.920	-0.801	-0.858
Office and telecom equipment	-1.000	-1.000	-0.905	-0.900	-0.892	-0.949	-0.922	-0.976	-0.970	-0.961	-0.963	-0.986	-0.953	-0.922	-0.947
Electronic data processing and office equipment	-1.000	-1.000	-1.000	-1.000	-1.000	-1.000	-1.000	-1.000	-0.949	-0.952	-1.000	-1.000	-0.950	-0.956	-1.000
Telecommunications equipment	-1.000	-1.000	-0.833	-0.750	-0.800	-0.909	-0.929	-0.955	-0.956	-0.963	-0.925	-0.976	-0.951	-0.901	-0.934
Integrated circuits and electronic components	0.333	-1.000	-1.000	-1.000	-1.000	-1.000	-1.000	-1.000	-1.000	-1.000	-1.000	-1.000	-1.000	-1.000	-1.000
Transport equipment	-0.810	-0.857	-0.882	-0.931	-0.744	-0.773	-0.816	-0.878	-0.586	-0.950	-0.753	-0.621	-0.891	-0.731	-0.675
Automotive products	-0.889	-0.833	-0.929	-0.920	-0.742	-0.778	-0.818	-0.884	-0.644	-0.956	-0.696	-0.551	-0.887	-0.739	-0.714
Textiles	-1.000	-0.714	-0.600	-0.667	-0.778	-1.000	-1.000	-1.000	-0.826	-1.000	-0.926	-1.000	-0.952	-0.875	-0.920
Clothing	-1.000	-1.000	-1.000	-1.000	-1.000	-1.000	-1.000	-1.000	-1.000	-1.000	-1.000	-1.000	-1.000	-0.909	-0.920

Source: Author's calculations based on WTO (2017).

Table 2: Rwandan exports' revealed comparative advantage index (2001-15)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Agricultural products	0.1605	-0.1401	0.3338	0.3453	0.1906	0.3917	0.2385	0.2521	0.3505	0.2205	0.2225	0.2552	0.1829	0.1519	0.2121
Food	0.1657	-0.1653	0.3089	0.3571	0.1738	0.3828	0.2158	0.2585	0.3480	0.2110	0.2015	0.2331	0.1601	0.1408	0.2041
Fuels and mining products	0.3631	0.1068	0.0605	0.1835	0.3868	0.2177	0.3921	0.4377	0.2226	0.2671	0.3247	0.2593	0.3693	0.3836	0.2819
Fuels	0.1367	-0.1346	-0.1107	-0.1214	-0.0761	-0.0972	-0.0631	-0.0516	-0.0645	-0.0373	-0.0192	0.0306	0.0526	0.1118	0.1111
Manufactures	-0.5397	-0.3781	-0.5770	-0.5345	-0.5374	-0.5475	-0.5218	-0.5626	-0.4292	-0.6554	-0.4267	-0.4417	-0.5515	-0.4310	-0.4724
Iron and steel	-0.0392	-0.0363	-0.0502	-0.0458	-0.0488	-0.0584	-0.0532	-0.0687	-0.0393	-0.0484	-0.0454	-0.0424	-0.0398	-0.0243	-0.0465
Chemicals	-0.0890	-0.1371	-0.1236	-0.1480	-0.1291	-0.1246	-0.1379	-0.1058	-0.1352	-0.1219	-0.0978	-0.0967	-0.1050	-0.1166	-0.0985
Pharmaceuticals	-0.0320	-0.0565	-0.0502	-0.0740	-0.0651	-0.0639	-0.0740	-0.0400	-0.0604	-0.0468	-0.0374	-0.0339	-0.0439	-0.0397	-0.0353
Machinery and transport equipment	-0.1822	-0.2119	-0.2420	-0.2479	-0.1593	-0.1592	-0.1717	-0.2265	-0.1287	-0.2914	-0.1417	-0.1552	-0.2359	-0.1276	-0.1730
Office and telecom equipment	-0.0925	-0.0686	-0.0614	-0.0568	-0.0653	-0.0626	-0.0523	-0.0661	-0.0924	-0.0639	-0.0472	-0.0605	-0.0500	-0.0604	-0.0692
Electronic data processing and office equipment	-0.0214	-0.0363	-0.0309	-0.0388	-0.0372	-0.0292	-0.0260	-0.0315	-0.0248	-0.0253	-0.0226	-0.0235	-0.0155	-0.0164	-0.0236
Telecommunications equipment	-0.0676	-0.0282	-0.0266	-0.0145	-0.0258	-0.0315	-0.0294	-0.0329	-0.0595	-0.0337	-0.0207	-0.0340	-0.0315	-0.0383	-0.0434
Integrated circuits and electronic components	0.0197	-0.0040	-0.0039	-0.0035	-0.0023	-0.0018	-0.0026	-0.0017	-0.0038	-0.0042	-0.0039	-0.0030	-0.0030	-0.0057	-0.0042
Transport equipment	-0.0444	-0.0741	-0.0918	-0.0885	-0.0389	-0.0372	-0.0499	-0.0469	0.0239	-0.1188	-0.0240	-0.0054	-0.0852	-0.0196	-0.0177
Automotive products	-0.0489	-0.0579	-0.0884	-0.0744	-0.0306	-0.0312	-0.0439	-0.0404	0.0095	-0.1102	-0.0100	0.0059	-0.0762	-0.0158	-0.0180
Textiles	-0.0107	-0.0088	0.0004	-0.0074	-0.0106	-0.0401	-0.0221	-0.0145	-0.0075	-0.0384	-0.0106	-0.0183	-0.0164	-0.0094	-0.0173
Clothing	-0.0071	-0.0081	-0.0116	-0.0071	-0.0093	-0.0073	-0.0104	-0.0077	-0.0061	-0.0077	-0.0059	-0.0061	-0.0057	-0.0071	-0.0086

Source: Author's calculations based on WTO (2017).

Table 3: Rwandan high-technology exports' revealed comparative advantage index (2001-15)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
High-skill and technology-intensive manufactures	-0.284	-0.214	-0.207	-0.246	-0.263	-0.218	-0.236	-0.263	-0.306	-0.277	-0.221	-0.263	-0.242	-0.276	-0.273	-0.364
High-skill: Electronics (excluding parts and components) (SITC 751 + 752 + 761 + 762 + 763)	-0.023	-0.025	-0.018	-0.029	-0.025	-0.016	-0.020	-0.030	-0.026	-0.018	-0.020	-0.031	-0.021	-0.021	-0.028	-0.017
High-skill: Parts and components for electrical and electronic goods (SITC 759 + 764 + 776)	-0.100	-0.049	-0.025	-0.038	-0.068	-0.056	-0.053	-0.081	-0.105	-0.046	-0.041	-0.045	-0.041	-0.058	-0.063	-0.064
High-skill: Other. excluding electronics	-0.162	-0.140	-0.165	-0.179	-0.171	-0.146	-0.163	-0.153	-0.175	-0.213	-0.160	-0.187	-0.179	-0.197	-0.182	-0.284

Source: Author's calculations based on UNCTAD (2017).

Table 4: Indicative trade potential with Kenya in 2016 (in thousand US\$)

Products group	X_{ik}	X_{jk}	X_{ijk}	$\min(X_{ik}, X_{jk})$	ITP_{ijk}
[334] Petroleum oils or bituminous minerals > 70 % oil	119721.3	1446671	4427.363	119721.3	115294
[074] Tea and mate	73791.28	82051.81	36135.2	73791.28	37656.08
[686] Zinc	0	35657.96	0	35657.96	35657.96
[042] Rice	29104.59	123872.7	43.472	29104.59	29061.12
[422] Fixed vegetable fats and oils, crude, refined, fract.	14238.7	393565.1	0	14238.7	14238.7
[431] Animal or veg. oils and fats, processed, n.e.s.; mixt.	20446.79	14227.8	92.239	14227.8	14135.56
[046] Meal and flour of wheat and flour of meslin	23800.24	12209.13	6.192	12209.13	12202.94
[831] Travel goods, handbags and similar containers	11940.21	60363.21	12.305	11940.21	11927.9
[047] Other cereal meals and flour	9520.818	11731.11	0	9520.818	9520.818
[278] Other crude minerals	8198.481	26575.72	0.563	8198.481	8197.918
Total	744400	14141306	49921.78	744400	694478.2

Source: Author's calculations based on UNCTAD (2017).

Table 5: Indicative trade potential with the EAC states in 2016 (in thousand US\$)

Products group	X_{ik}	X_{jk}	X_{ijk}	$\min(X_{ik}, X_{jk})$	ITP_{ijk}
[334] Petroleum oils or bituminous minerals > 70 % oil	119721.3	4079317	11465.59	119721.3	108255.8
[686] Zinc	0	58116.53	0	58116.53	58116.53
[074] Tea and mate	73791.28	87358.33	37146.39	73791.28	36644.89
[042] Rice	29104.59	189034.3	51.588	29104.59	29053.01
[046] Meal and flour of wheat and flour of meslin	23800.24	22959.91	64.825	22959.91	22895.08
[071] Coffee and coffee substitutes	76308.78	24135.07	2512.179	24135.07	21622.89
[431] Animal or veg. oils and fats, processed, n.e.s.; mixt.	20446.79	77444.01	188.692	20446.79	20258.1
[422] Fixed vegetable fats and oils, crude, refined, fract.	14238.7	791669.5	6.905	14238.7	14231.8
[831] Travel goods, handbags and similar containers	11940.21	92471.75	46.107	11940.21	11894.1
[047] Other cereal meals and flour	9520.818	21855.31	64.714	9520.818	9456.104
Total	744400	31748280	92217.03	744400	652183

Source: Author's calculations based on UNCTAD (2017).

Table 6: Indicative trade potential with DRC in 2016 (in thousand US\$)

Products group	X_{ik}	X_{jk}	X_{ijk}	$\min(X_{ik}, X_{jk})$	ITP_{ijk}
[334] Petroleum oils or bituminous minerals > 70 % oil	119721.3	245904.9	98071.23	119721.3	21650.12
[054] Vegetables	7353.956	11420.18	173.288	7353.956	7180.668
[278] Other crude minerals	8198.481	56738.82	1081.285	8198.481	7117.196
[764] Telecommunication equipment, n.e.s.; and parts, n.e.s.	4855.509	70229.26	243.881	4855.509	4611.628
[081] Feeding stuff for animals (no unmilled cereals)	4741.939	4587.677	0.978	4587.677	4586.699
[781] Motor vehicles for the transport of persons	6690.693	49441.26	2480.292	6690.693	4210.401
[292] Crude vegetable materials, n.e.s.	4128.712	4890.127	217.783	4128.712	3910.929
[782] Motor vehic. for transport of goods, special purpo.	3736.498	83496.67	175.406	3736.498	3561.092
[716] Rotating electric plant and parts thereof, n.e.s.	2744.123	54521.17	53.144	2744.123	2690.979
[723] Civil engineering and contractors' plant and equipment	2378.788	154475	5.061	2378.788	2373.727
Total	744400	4698989	276092.1	744400	468307.9

Source: Author's calculations based on UNCTAD (2017).

Table 7: Indicative trade potential with the COMESA states in 2016 (in thousand US\$)

Products group	X_{ik}	X_{jk}	X_{ijk}	$\min(X_{ik}, X_{jk})$	ITP_{ijk}
[333] Petroleum oils, oils from bitumen. materials, crude	0	2256179	0	2256179	2256179
[283] Copper ores and concentrates; copper mattes, cement	0	631692.6	0	631692.6	631692.6
[686] Zinc	0	158173.4	0	158173.4	158173.4
[287] Ores and concentrates of base metals, n.e.s.	129913.5	206315.1	959.099	129913.5	128954.4
[043] Barley, unmilled	0	126419.4	0	126419.4	126419.4
[677] Rails and railway track construction mat., iron, steel	0	123158.5	0	123158.5	123158.5
[071] Coffee and coffee substitutes	76308.78	219844	2408.236	76308.78	73900.55
[971] Gold, non-monetary (excluding gold ores and concentrates)	56719.42	92702.31	0.229	56719.42	56719.19
[074] Tea and mate	73791.28	412829.3	37278.76	73791.28	36512.52
[831] Travel goods, handbags and similar containers	11940.21	242375.8	95.854	11940.21	11844.36
Total	744400	144837825	365231.8	744400	379168.2

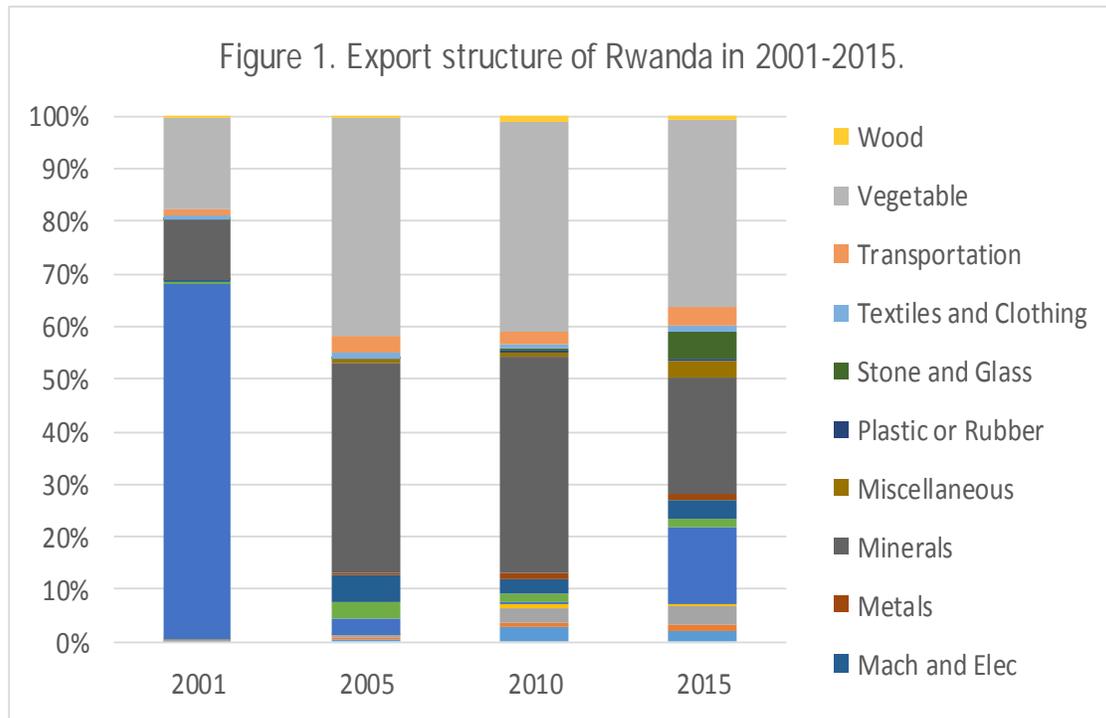
Source: Author's calculations based on UNCTAD (2017).

Table 8: Ranking of East African countries in terms of doing business conditions

standardization by average		standardization by range [0;1]		classical standardization	
Rank		Rank		Rank	
1	Mauritius	1	Mauritius	1	Mauritius
2	Rwanda	2	<i>Seychelles</i>	2	<i>Seychelles</i>
3	<i>Seychelles</i>	3	Rwanda	3	Rwanda
4	Zambia	4	Zambia	4	Zambia
5	Kenya	5	Kenya	5	Ethiopia
6	Ethiopia	6	Ethiopia	6	Kenya
7	Zimbabwe	7	Tanzania	7	Zimbabwe
8	Tanzania	8	Zimbabwe	8	Tanzania
9	Mozambique	9	Mozambique	9	Mozambique
10	Malawi	10	Malawi	10	Malawi
11	Uganda	11	Uganda	11	Uganda
12	Madagascar	12	Madagascar	12	Madagascar
13	Burundi	13	Burundi	13	Burundi

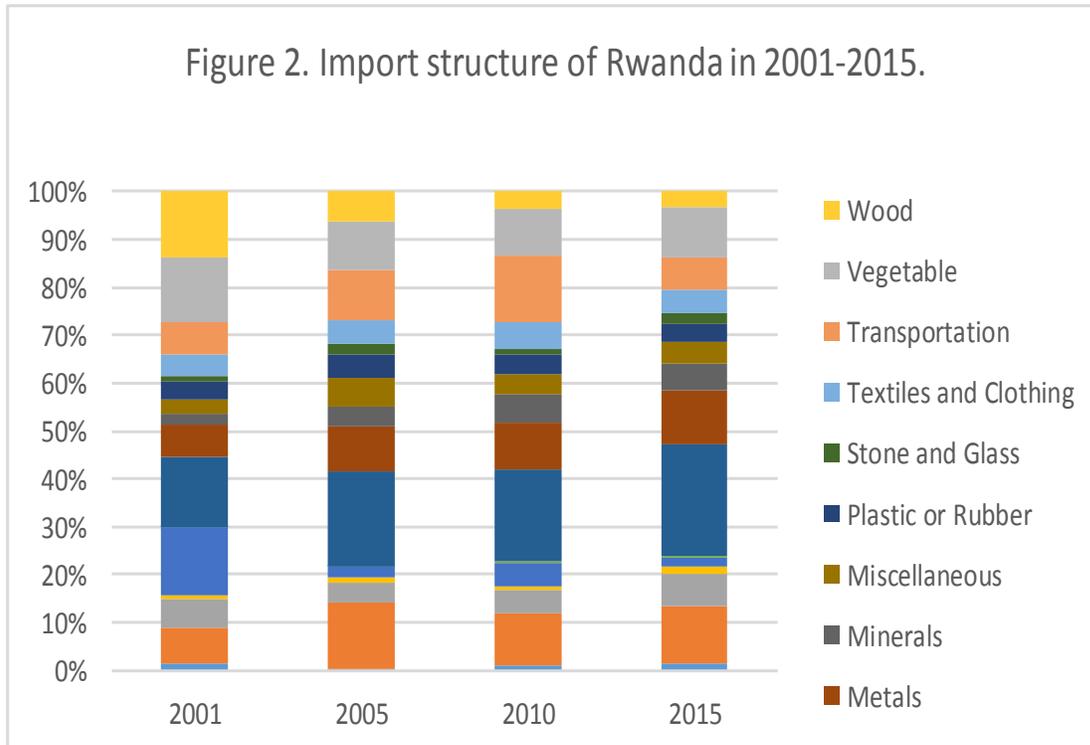
Source: Author's calculations based on ILO (2017), OECD (2017), (Mo Ibrahim Foundation (2017), (IFC, the World Bank (2017), WEF (2017), (Transparency International (2017), (Johnson Cornell University et al., (2017), UNCTAD (2017) and the Heritage Foundation (2017).

Figure 1. Export structure of Rwanda in 2001-2015.



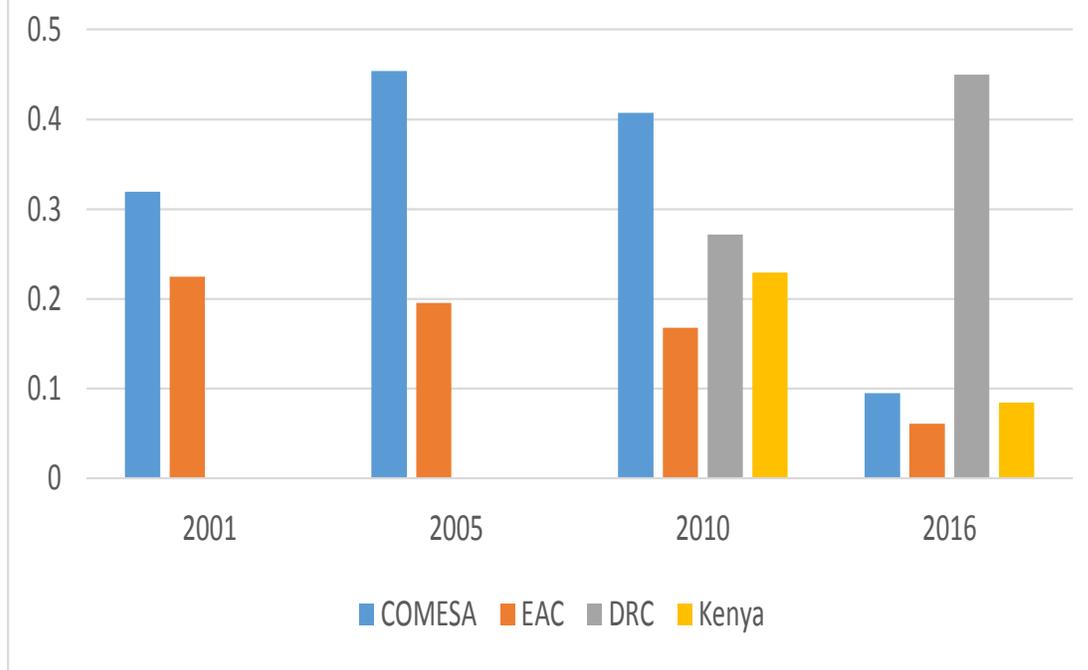
Source: Author's calculations based on UNCTAD (2017).

Figure 2. Import structure of Rwanda in 2001-2015.



Source: Author's calculations based on WTO (2017).

Figure 3. Indicators of similarity of the export commodity structure of Rwanda with the COMESA states, the EAC states, the DRC and Kenya in 2001, 2005, 2010 and 2016.



Note: The Euclidean metric $\sqrt{\sum_{i=1}^n (x_i - y_i)^2}$ has been used as a measure of similarity. The closer the value is to one, the more different are the export structures of the analyzed blocs. The closer the value is to zero, the more similar the commodity structures.

Source: Author's calculations based on UNCTAD (2017) using SITC Rev.3.