Regional Integration vs. Globalization: A Social Network Analysis of the Trade within and Outside the Southern African Development Community (SADC)

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According to its treaty, one of the primary objectives of the Southern African Development Community (SADC) is to achieve "development and economic growth" through regional integration. However, by the time of its creation in 1992, the powerful wind of globalization was already blowing across the continent and the whole world, removing or lowering trade barriers everywhere. In the meantime, China and—to a lesser extent—India emerged as major trading partners of many Sub-Saharan African countries. Analyzing the trade network within and outside SADC, the purpose of this study is to find out whether the SADC member states are integrated more to their regional organization than to the global economy (or globalized) and whether they are forming among themselves a true single community or different clusters. Using the basic statistical analysis of the trade directions and values along with the Social Network Analysis (SNA) of the trade network within and outside the SADC, this study finds that the member states of this organization trade more with partners outside their organization than among themselves and that South Africa, the EU, and—to a lesser extent—China occupy the central position in the trade network within and outside SADC. Furthermore, this study also reveals that instead of forming a true single community, the SADC member states are actually divided into two major clusters revolving around South Africa and the European Union.

Introduction

Despite the existence of a disparaging stereotype portraying it as a "club of dictators," the Southern African Development Community (SADC), which includes some of the most developed and democratic states on the continent, can be considered one of the most effective regional organizations in Sub-Saharan Africa (SSA) (Nyakudya and Jakarasi, 2015). With a total population of 312 million (32% of the total population of SSA), the regional organization generates a total GDP of 684 billion dollars (40% of the GDP of SSA) and a total trade value of 498 billion dollars (50% of the total trade value of SSA).[1] In addition, some of the few Sub-Saharan African states with high and middle incomes (Seychelles, Mauritius, Botswana, South Africa) are parts of the organization, which has an average GNI per capita of $3,829, compared to $1,709 for SSA.[2] Furthermore, four out of the ten stable democracies in Africa (South Africa, Mauritius, Botswana, and Namibia) are also member states of SADC.

The SADC was officially created in 1992 as the successor of the Southern African Development Coordination Conference (SADCC), which was established in 1980 (SADC, 2015a). However, while the SADCC was mainly focused on political and security objectives, the

1. See Table 1, Figure 1a and Figure 1b.

2. See Table 1, Figure 1a and Figure 1b.

Table 1. SADC's Basic Statistics (2014)

Country/Entity Name	Total Population	Popula-tion Annual Growth Rate (%)	GDP (current US$)	GDP Annual Growth Rate (%)	GNI per capita, Atlas Method (cur-rent US$)	Exports of Goods and Services (current US$)	Imports of Goods and Services (cur-rent US$)	Total Trade Value (current US$)
Angola	24,227,524	3.3	131,400,635,026.1	3.9	4,850.0	76,919,675,441.6	55,179,487,679.6	132,099,163,121.20
Botswana	2,219,937	2.0	15,813,371,063.2	4.4	7,240.0	7,875,859,226.2	6,846,681,743.7	14,722,540,969.90
Congo, Dem. Rep.	74,877,030	3.2	32,962,261,155.7	9.0	380.0	10,991,882,637.4	12,810,617,755.1	23,802,500,392.50
Lesotho	2,109,197	1.2	2,088,021,624.1	2.0	1,340.0	-	-	-
Madagascar	23,571,713	2.8	10,593,147,526.9	3.0	440.0	-	-	-
Malawi	16,695,253	3.1	4,258,033,615.3	5.7	250.0	1,949,618,017.6	2,389,744,854.9	4,339,362,872.50
Mauritius	1,260,934	0.2	12,616,421,088.4	3.6	9,710.0	6,770,808,840.8	7,963,724,952.3	14,734,533,793.10
Mozambique	27,216,276	2.8	16,385,584,919.0	7.4	620.0	4,458,423,097.1	6,331,135,420.5	10,789,558,517.60
Namibia	2,402,858	2.4	13,429,503,284.9	4.5	5,680.0	5,319,413,602.1	8,481,944,585.2	13,801,358,187.30
Seychelles	91,526	1.8	1,405,764,157.9	2.8	13,990.0	1,182,134,585.9	1,399,700,224.6	2,581,834,810.50
South Africa	54,001,953	1.6	349,817,096,206.5	1.5	6,800.0	109,340,532,770.6	115,850,617,818.6	225,191,150,589.20
Swaziland	1,269,112	1.5	3,400,422,936.2	2.5	2,700.0	-	-	-
Tanzania	51,822,621	3.2	49,183,884,817.5	7.0	930.0	9,581,812,252.1	14,701,946,942.7	24,283,759,194.80
Zambia	15,721,343	3.1	27,066,230,009.1	6.0	1,680.0	11,071,017,829.3	10,239,182,729.8	21,310,200,559.10
Zimbabwe	15,245,855	2.3	13,663,314,279.7	3.2	830.0	3,625,330,130.1	7,578,631,311.0	11,203,961,441.10
SADC	**312,733,132**	**2.3**	**684,083,691,710.50**	**4.4**	**3,829.33**	**249,086,508,430.80**	**249,773,416,018.00**	**498,859,924,448.80**
Sub-Saharan Africa	**974,315,323**	**2.7**	**1,728,322,315,101.6**	**4.2**	**1,709.1**	**469,921,528,716.4**	**511,311,037,697.1**	**981,232,566,413.50**
World	**7,260,652,256**	**1.2**	**77,868,767,983,901.5**	**2.5**	**10,778.6**	**23,666,445,445,029.3**	**22,814,888,356,017.1**	**46,481,333,801,046.40**

Source: World Bank. (2015). World Development Indicators. Retrieved December 8, 2015, from: http://databank.worldbank.org/data/reports.aspx?source=world-development-indicators

Figure 1a. SADC's Basic Statistics: Population (million)

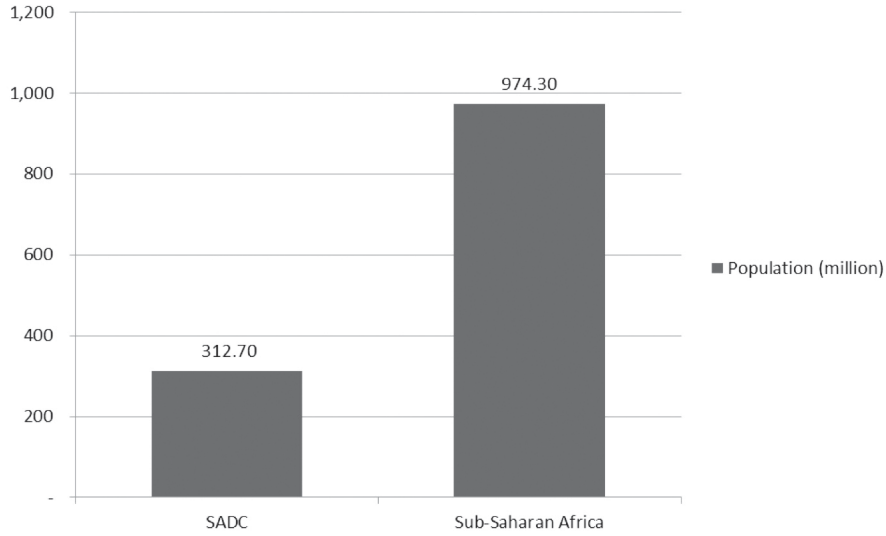
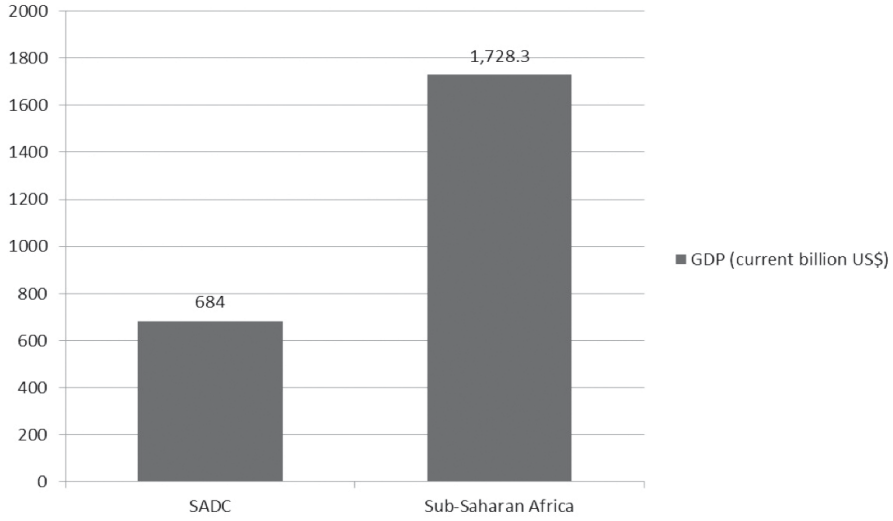


Figure 1b. SADC's Basic Statistics: GDP (million current U.S. $)



SADC was primarily geared toward the creation of a regional economic integration in order to achieve the following objectives:

- Achieve development and economic growth, alleviate poverty, enhance the standard and quality of life of the people of Southern Africa and support the socially disadvantaged through Regional Integration
- Evolve common political values, systems, and institutions
- Promote and defend peace and security
- Promote self-sustaining development on the basis of collective self-reliance and the inter-dependence of Member States

- Achieve complementarity between national and regional strategies and programs
- Promote and maximize productive employment and utilization of resources of the region
- Achieve sustainable utilization of natural resources and effective protection of the environment
- Strengthen and consolidate the long-standing historical, social and cultural affinities and links among the people of the Region (SADC, 2015b)

However, as the Southern African political leaders were creating SADC as part of their development strategy, the wind of globalization was already blowing across the continent and throughout the whole world. Regional integration and globalization are similar in some ways, even though they operate at different levels and seem to contradict each other. Indeed, both aim at improving the economic conditions of the member states by removing or lowering trade barriers between them. Nevertheless, while regional integration, like SADC, does this at the regional level, globalization does it at the level of the whole world. Globalization seems to work against regional integration by opening up the market to the whole world.

Thus, the question one may ask about the SADC member states, facing these two seemingly contradictory phenomena, is whether they are integrated more to their regional organization than to the global economy. Additionally, one may also ask whether they are forming a true single community or different clusters among themselves. The analysis of the trade network within and outside the SADC, applying the Social Network Analysis (SNA) research method, will help answer these questions.

Literature Review

By and large, the original definition and classification of economic integration proposed by Bela Balassa in his seminal work the *Theory of Economic Integration* (1961), have been preserved since the 1960s (Hosny, 2013). As Balassa puts it:

> Economic integration [can be defined] as a process and as a state of affairs. Regarded as a process, it encompasses measures designed to abolish discrimination between economic units belonging to different national states; viewed as a state of affairs, it can be represented by the absence of various forms of discrimination between national economies (1).

Based on their degrees of integration, Balassa distinguishes different types of economic integration, which include "a free-trade area, a customs union, a common market, an economic union, and complete integration" (Balassa 1961, 2). Concerning the advantages of an economic integration for its member states, Balassa builds on ideas previously presented by Jacob Viner (1950) on trade creation and trade diversion. According to Balassa, "The former [i.e., trade creation] relates to newly created trade between the member countries of the union, the latter [i.e., trade diversion] to trade diverted from a foreign country to a member country, both consequent upon the abolition of tariffs within the union" (Balassa 1961, 25). Nevertheless, the major contribution of Balassa in the study of economic integration is the introduction of a dynamic analysis, which allows him to highlight, among other things, the effects of "economies of scale" for the member states (Hosny, 2013).

Following the footsteps of Balassa, many other scholars have analyzed the implementation and evaluation of various regional integrations, not only among developed countries like those in Europe but also among developing countries like those in Africa (among many others, Dosenrode 2015; de Melo and Tsikata 2014; and ECA 2012, etc.). With regard particularly to the sub-Saharan African countries, the bulk of the literature focuses on the difficulties and challenges in creating and sustaining regional integrations. In line with this, according to the Economic Commission for Africa, one the major challenges facing the African regional integrations is the overlapping membership (ECA 2012). Referring to the cases of Southern and Eastern African countries, the ECA makes the following remark:

> Consider the case of COMESA, EAC and SADC. EAC is already a common market, but it shares four member States with COMESA and one Member State with SADC. Five

> SADC member States are members of Southern African Customs Union (SACU). Ten countries in the region are already members of customs unions, but all of them are also in negotiations to establish alternative customs unions from the one they now belong to. COMESA and SADC have seven Member States in common that are not part of a customs union, but all are preparing customs unions. So, of the 26 countries in COMESA, EAC and SADC, 17 are either in a customs union and negotiating an alternative customs union to the one they belong or are negotiating two separate customs unions. Similar overlaps, though to a lesser scale exists among members of RECs in Western and Northern Africa (ECA 2012, 1).

Another major problem facing the regional economic integrations in SSA is the problem of efficiency. Indeed, just like most of the states that are creating them, these regional integrations are not always efficient and cannot take advantage of the "economies of scale" being created. Among the multiple factors of inefficiency, ECA highlights the following: energy access, security of investment, countries' inadequate administrative and financial capacities, etc. (ECA 2012, 20–21). In a more recent study, de Melo and Tsikata (2014) summarize as follows the expectations and disappointments of regional integrations in Africa:

> The small, sparsely populated, fragmented, and often isolated economies across Africa make a compelling case for these economies to integrate regionally to reap efficiency gains, exploit economies of scale, and reduce the thickness of borders. But lack of complementarities among partners and diminishing returns to the exploitation of resources has reduced supply response to market integration-oriented regional policies. Additionally, a very uneven distribution of resources has sharpened the trade-off between the benefits of common policies needed to tackle cross-border externalities and their costs, which are heightened by the sharp differences in policy preferences across members (1).

However, while the African political leaders were busy creating and managing inefficient regional economic integrations, the powerful wind of globalization was sweeping across the continent and throughout the whole world. Globalization is not a new phenomenon, but it became more intensive and complex since the end of the Cold War and involved different aspects of human activities (economic, social, political, cultural, etc.). Thus, while the early definitions of this phenomenon were very simple and emphasized its economic and technological aspects primarily, some of its recent definitions become more complex and try to capture its multiple economic, political, and cultural aspects (Al-Rodhan and Stoudmann 2006).

In their comprehensive review of the definitions of globalization, Al-Rodhan and Stoudmann (2006) refer to an early definition provided by Robert Cox in 1994, who stated:

> The characteristics of the globalization trend include the internationalizing of production, the new international division of labor, new migratory movements from South to North, the new competitive environment that accelerates these processes, and the internationalizing of the state . . . making states into agencies of the globalizing world (15).

For their part, in an attempt to capture the complexity and different aspects of globalization, Al-Rodhan and Stoudmann (2006) propose the following definition: "Globalization is a process that encompasses the causes, course, and consequences of transnational and transcultural integration of human and non-human activities" (Al-Rodhan and Stoudmann 2006, 2). In other words, in this attempt to propose a comprehensive definition of the term, the authors emphasize its transnational and transcultural dimensions.

With regard to Africa, globalization and its effects were interpreted differently by different people. Some saw in it a threat to African independence and ways of living (Amadi 2012; Shizha and Diallo 2015). Others saw in it an opportunity to jump start the African economy (Nkoro and Uko 2014). Nevertheless, globalization, viewed as integration to the global economy, would lead the African states to move away from their existing regional integrations, which were originally created to shield them from the global domination or influence of some states outside their region.

Kim and Shin (2002) analyze the contradiction and/or complementarity between regional integration and globalization, and specifically, address the following questions: "(1) Has the world been globalized and/or regionalized? and (2) If it has, what are the consequences of these processes?" (445). In response to these questions, they find that "the world trade network became denser" over the years. Nevertheless, they argue, "globalization and regionalization are not contradictory processes" (445).

For their parts, assessing the general impacts of globalization in SSA, Nkoro and Uko (2014) draw the following conclusion:

> SSA [Sub-Saharan Africa] has been marginalized or has not fared well in spite of the high integration of its member countries. Indeed, SSA has relatively remained poor and with high incidence of poverty. However, in order to maximize the benefits of globalization, Sub-Saharan Africa needs to adopt among others: development of strong production base that is predicated on value-added products, export structures diversification, development of manufactured export capacity and the political-will to implement these policies among others (57).

In parallel to the phenomenon of globalization, China and India also emerged as major trading partners for many Sub-Saharan African countries (Subramanian and Matthijs 2007). However, it was China that quickly became the most dominant newcomer on the African market and attracted much of the attention of various analysts and simple observers around the world. The assessments of the Chinese influence in SSA range from the overt praise presenting China as "an alternative source of trade and finance from Africa's traditional development partners" to "sinister prophesies of coming catastrophe" (Renard 2011; Asongu and Aminkeng 2013). In fact, most of the criticisms of the Chinese influence have nothing to do with China's financial and technological contributions to SSA but more with its "failure to promote good governance and human rights" (Alessi and Xu 2015). Nonetheless, in their seemingly balanced assessments, Asongu and Aminkeng draw the following conclusion:

> No substantial empirical evidence is found to back-up sinister prophesies of coming catastrophe from critics of the direction of China-Africa relations. In the [meantime], the relationship from an economic standpoint is promising and encouraging but more needs to be done regarding multilateral relations, improvement of institutions and sustainability of resources management (2013, 2).

In sum, multiple issues are involved in the trade relations of the fifteen member states of SADC. This paper can only address some of these issues.

Purpose and Research Questions

The purpose of this study is to find out whether the SADC member states are integrated more to their regional organization than to the global economy and whether they are forming a true single community or different clusters. To this end, this study analyzes the trade network within and outside the SADC and specifically addresses the following questions:

1. Do the SADC member states trade more among themselves than with partners outside their regional organization?
2. What are the states that play central roles in the trade network within and outside SADC?
3. Is there a true single community or different clusters of states in the trade network within and outside SADC?

Methodology

The method of Social Network Analysis (SNA) has been widely used since the 1960s in various social science disciplines such as psychology, sociology, and anthropology (Prell 2012; Kadushin 2012). However, political scientists in general and students of international relations and international organizations in particular seemed to be reluctant to use in a consistent manner this powerful research method (Fowler, et al. 2007; Ward, et al. 2011). Indeed, summarizing

the great advantages of using the SNA research method, Hansen and his colleagues state that "Using network analysis, you can visualize complex sets of relationships as maps (i.e., graphs or sociograms) of connected symbols and calculate precise measures of the size, shape, and density of the network as a whole and the positions of each element within it" (Hansen, et al. 2010, 32).

For the purpose of this study, we choose to use the SNA research method in connection with the NodeXL software, which is relatively easier to operate compared to other available software.[3] Specifically, the trade links of the fifteen SADC member states, which constitute the edges of the trade network, were entered in NodeXL.[4] Based on these edges (or trade links), NodeXL automatically generates a list of all states (known as vertices in SNA) involved in the trade network. Next, NodeXL also helps to draw the trade network figures[5] and calculates different network metrics (or measures), such as density, degree centrality, betweenness centrality, closeness centrality, eigenvector centrality, etc.[6] Furthermore, it allows us to identify the existence of a true single community or different clusters of states in the trade network. In addition to NodeXL, we also use SPSS and Microsoft Excel software to generate other tables and figures and preform additional calculations.

The data used in this study come from two sources: 1) the statistics database maintained by the World Trade Organization (WTO) on its official web site (WTO 2015), and 2) the World Bank's online databank (World Bank 2015). WTO provides on its web site, under the rubric "Trade Profiles," information on the origins, destinations, and value of trade for most states in the world (WTO 2015). WTO's trade profile contains information about the trade links of each country in the world. These trade links consist of the top five destinations of trade (exports) and top five origins of trade (imports) of the country, along with their respective value. The trade links of the fifteen SADC member states were collected and constitute the units of analysis of this study. Additionally, the World Bank also provides in its online databank the basic statistics for each country in the world (World Bank 2015). For the purpose of this study, we collect for each SADC member state the following basic statistics: total population, Gross Domestic Products (GDP) (in current U.S. dollars), GDP annual growth, GNI per capita based on the World Bank's Atlas method (in current U.S. dollars), values of exports and imports, and their total value (exports plus imports).[7]

Findings

Before focusing on the properties and metrics (or measures) of the trade network within and outside SADC, it is worth analyzing the basic statistics on the international trade of the member states.

Descriptive Statistics

There are 130 trade links involving the fifteen member states of SADC that have been identified through the country profiles provided by the World Trade Organization (WTO 2015). As shown in Table 2 and Figure 2, only thirty-three of these trade links (or 25.4%) connect one SADC member state to another SADC member state. The remaining vast majority of trade links, totaling ninety-seven (or 74.6%), connect one SADC member state to another state or entity outside the regional organization.[8] These remaining trade links can be disaggregated as follows:

- Forty-seven trade links (or 36.2%) move from one SADC member state to a nonmember state of SADC, and

3. For more information concerning NodeXL, see Hansen, Shneiderman, and Smith (2010), or go to their web page at https://nodexl.codeplex.com/

4. Ibid.

5. See Figure 5 and Figure 6.

6. See Table 5a, Table 5b, Table 5c, and Table 5d.

7. See Table 1, Figure 1a and Figure 1b.

8. See Table 2 and Figure 2.

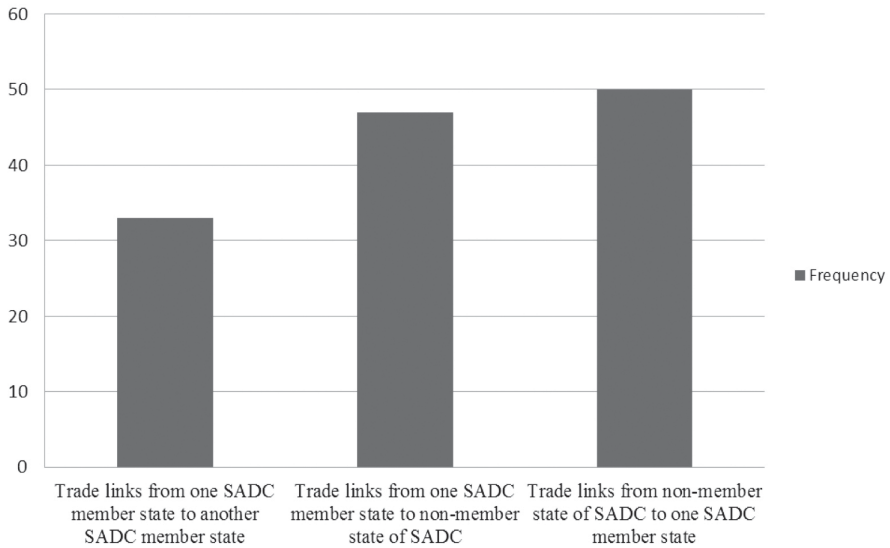
- Fifty trade links (or 38.5%) move from one nonmember state of SADC to one SADC member state.

This information concerning the trade directions clearly demonstrates that the fifteen member states of the SADC are trading about three times more with partners outside their organization than among themselves. The trade links among the member states only represent 25.4% of the total trade links, compared to 74.6% with partners outside the SADC.

Table 2. Directions of Trade Within and Outside SADC

	Frequency	Percent	Valid Percent	Cumulative Percent
Trade links from one SADC member state to another SADC member state	33	25.4	25.4	25.4
Trade links from one SADC member state to non-member state of SADC	47	36.2	36.2	61.5
Trade links from non-member state of SADC to one SADC member state	50	38.5	38.5	100.0
Total	130	100.0	100.0	

Figure 2. Directions of Trade Within and Outside SADC



In terms of value, the total value of the trade carried out through the 130 trade links was $1.9 billion in 2014,[9] which can be disaggregated as follows:

- $832.2 million (or 41.8% of the total value) for the trade between one SADC member state and another SADC member state
- $656.7 million (or 33% of the total value) for the trade from one SADC member state to a nonmember state of SADC
- $503.3 million (or 25.3% of the total value) for the trade from one nonmember state of SADC to one SADC member state

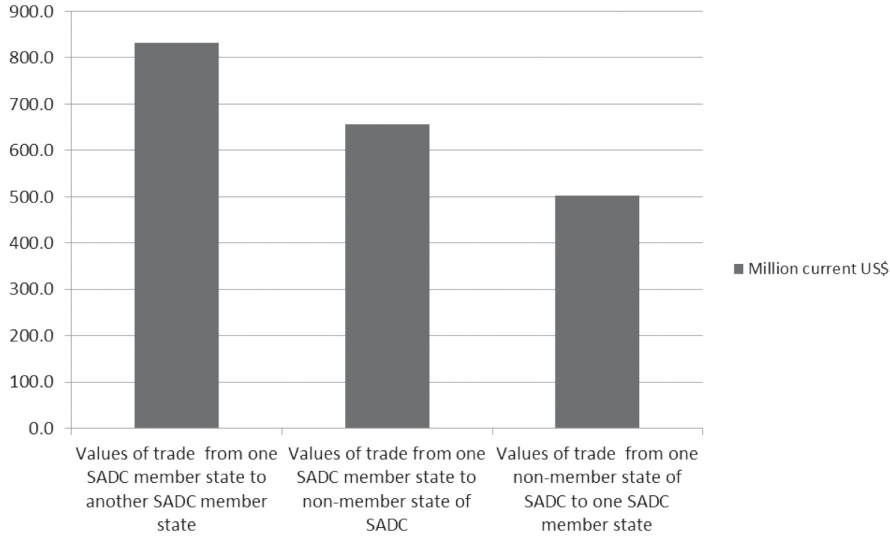
This information on the trade value confirms the above information concerning the directions of trade and clearly indicates once again that the SADC member states are trading more with partners outside their organization than among themselves. The total value of the trade

9. See Table 3 and Figure 3.

Table 3. Values of Trade Within and Outside SADC

	Million current US$	Percent	Cumulative Percent
Values of trade from one SADC member state to another SADC member state	832.2	41.8	41.8
Values of trade from one SADC member state to non-member state of SADC	656.7	33.0	74.8
Values of trade from one non-member state of SADC to one SADC member state	503.3	25.3	100
Total	1992.2	100.0	

Figure 3. Values of Trade Within and Outside SADC (million, current US$)



with partners outside the organization amounted to $1.1 billion (or 58.3% of the total value), whereas the value of the trade among the member states amounted only to $832.2 (or 41.8% of the total value).

Furthermore, the statistical analysis of the data on the origins and destinations of trade[10] reveals that, on the one hand, the top three sellers in the trade network are: South Africa, the EU, and China, which are responsible for 30.8% of the total exports;[11] on the other hand, the top three buyers in the trade network are: South Africa and the EU followed by a group of three states with the same number three rank (Botswana, Mozambique, and Namibia), which are responsible for 36.7% of the total imports.[12] It is worth noting that, even though China is one of the top three sellers to the SADC member states, it does not figure among the top five buyers. This information clearly indicates that China is more interested in selling to the SADC member states than buying from them.

Network Properties and Metrics

Given our main concern with the level of regional integration and/or globalization of the SADC member states, the most important network metrics in this study is the density of the trade network within and outside the regional organization. As Hansen, Shneiderman, and Smith put it, "Network density captures how highly connected vertices [or actors] are by calculating

10. See Tables 4a and 4b and Figures 4a and 4b.

11. See Table 4a and Figure 4a.

12. See Table 4b and Figure 4b.

Table 4a. Origins of Trade Within and Outside SADC

	Frequency	Percent	Valid Percent	Cumulative Percent
South Africa	16	12.3	12.3	12.3
European Union	13	10	10	22.3
China	11	8.5	8.5	30.8
Mozambique	6	4.6	4.6	35.4
Namibia	6	4.6	4.6	40
Zambia	6	4.6	4.6	44.6
Botswana	5	3.8	3.8	48.5
Lesotho	5	3.8	3.8	52.3
Madagascar	5	3.8	3.8	56.2
Malawi	5	3.8	3.8	60
Mauritius	5	3.8	3.8	63.8
Seychelles	5	3.8	3.8	67.7
Swaziland	5	3.8	3.8	71.5
Tanzania	5	3.8	3.8	75.4
United Arab Emirates	5	3.8	3.8	79.2
Zimbabwe	5	3.8	3.8	83.1
India	4	3.1	3.1	86.2
Chinese Tapei	2	1.5	1.5	87.7
Saudi Arabia	2	1.5	1.5	89.2
Singapore	2	1.5	1.5	90.8
Switzerland	2	1.5	1.5	92.3
Bahrain, Kingdom of	1	0.8	0.8	93.1
Canada	1	0.8	0.8	93.8
Congo, Dem. Rep.	1	0.8	0.8	94.6
Hong Kong	1	0.8	0.8	95.4
Israel	1	0.8	0.8	96.2
Japan	1	0.8	0.8	96.9
Kenya	1	0.8	0.8	97.7
Marshall	1	0.8	0.8	98.5
Nigeria	1	0.8	0.8	99.2
Viet Nam	1	0.8	0.8	100
Total	130	100	100	

Figure 4a. Origins of Trade (%)

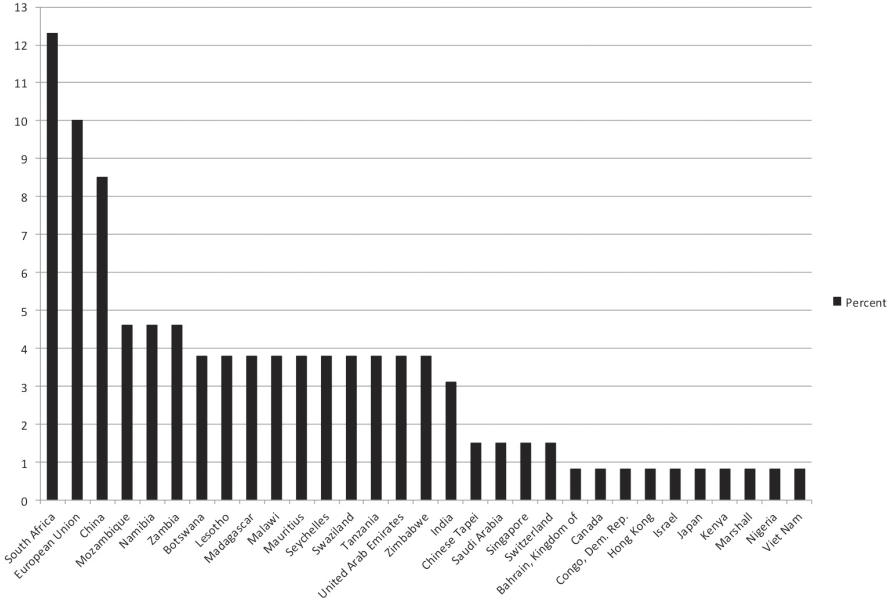
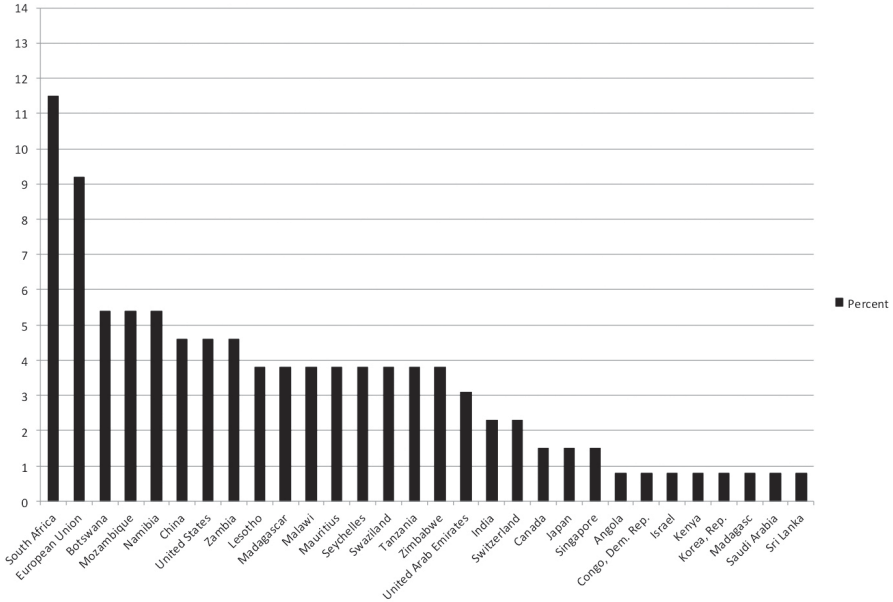


Table 4b. Destinations of Trade Within and Outside SADC

	Frequency	Percent	Valid Percent	Cumulative Percent
South Africa	15	11.5	11.5	11.5
European Union	12	9.2	9.2	20.8
Botswana	7	5.4	5.4	26.2
Mozambique	7	5.4	5.4	31.5
Namibia	7	5.4	5.4	36.9
China	6	4.6	4.6	41.5
United States	6	4.6	4.6	46.2
Zambia	6	4.6	4.6	50.8
Lesotho	5	3.8	3.8	54.6
Madagascar	5	3.8	3.8	58.5
Malawi	5	3.8	3.8	62.3
Mauritius	5	3.8	3.8	66.2
Seychelles	5	3.8	3.8	70
Swaziland	5	3.8	3.8	73.8
Tanzania	5	3.8	3.8	77.7
Zimbabwe	5	3.8	3.8	81.5
United Arab Emirates	4	3.1	3.1	84.6
India	3	2.3	2.3	86.9
Switzerland	3	2.3	2.3	89.2
Canada	2	1.5	1.5	90.8
Japan	2	1.5	1.5	92.3
Singapore	2	1.5	1.5	93.8
Angola	1	0.8	0.8	94.6
Congo, Dem. Rep.	1	0.8	0.8	95.4
Israel	1	0.8	0.8	96.2
Kenya	1	0.8	0.8	96.9
Korea, Rep.	1	0.8	0.8	97.7
Madagascar	1	0.8	0.8	98.5
Saudi Arabia	1	0.8	0.8	99.2
Sri Lanka	1	0.8	0.8	100
Total	130	100	100	

Figure 4b. Destinations of Trade (%)



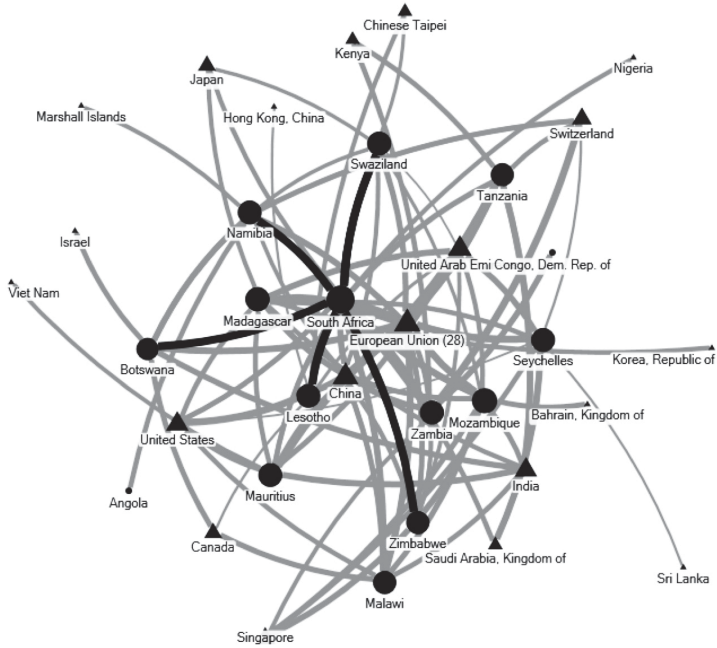
the percentage of all possible connections that are realized" (2010, 39). In other words, as De Benedictis and Tajoli explain, "The density of a network is higher the higher the number of its vertices [or actors] pertaining to the same direct neighbourhood. If all *n* vertices are linked together, the network is complete, and its density is $\gamma = 1$" (2011, 1421). In line with these considerations, De Benedictis and Tajoli) found that whereas the highly integrated countries of the EU form "a complete network with density equal to 1," the loosely interconnected countries in the whole world form a network with a density equal to 0.487 (2011, Table 8, 1444).

In running the graph metrics in NodeXL, we find that the density of the trade network within and outside SADC is equal to 0.156. This density score clearly demonstrates that the SADC member states are not integrated into their regional organization (unlike the EU member states, which have a density score equal to 1), nor are they integrated into the global economy at the same level as most countries in the world (the density score of the world trade network being 0.487) (De Benedictis and Tajoli, 2011).

In addition to the network density, the other key metrics that are of interest for this study are the degree centrality, the closeness centrality, the betweenness centrality, and the eigenvector centrality, which reveal the most important actors in the trade network. Concerning these metrics, De Benedictis, et al. (2013) provide the following explanations:

> Centrality measures can be classified into four main groups [. . .]: a) degree centrality, C_D, that measures how a node [or actor] is connected to others (with strength centrality C_S as

Figure 5. SADC: Trade Network Within and Outside the Regional Organization (Figure created with NodeXL)



Legend

represents a SADC member state, with a size corresponding to its degree centrality.

represents a non-member state of SADC, with a size corresponding to its degree centrality.

represents a trade link, with a size and a color corresponding to its value.

a weighted version of C_D); b) closeness centrality, C_C, showing how easily a node can be reached by other nodes; c) betweenness centrality, describing how important a node is in terms of connecting other nodes; d) the fourth group of indexes, such as the eigenvector centrality measure, C_E, or the Bonacich centrality, C_B, associates node's centrality to the node neighbors' characteristics, directly referring to how important, central, influential or tightly clustered a node's neighbors are (23–24).

In terms of centrality, all of the network metrics (degree centrality, closeness centrality, betweenness centrality, and eigenvector centrality) generated through NodeXL for this study demonstrate the central position occupied by South Africa and, to some extent, the EU and China.[13] Consequently, the other fourteen SADC member states are occupying semi-peripheral or peripheral positions. Among the actors occupying semi-peripheral positions figure Madagascar, Mozambique, Lesotho, and Namibia.[14] In other words, the great majority of the SADC member states (ten out of fifteen) are holding peripheral positions in the trade network within and outside the organization.

Moreover, in terms of degree centrality, as shown in Table 5a, the actors with the highest degree centrality scores (10 and more) are South Africa (18), the EU (13), China (11) and

Table 5a. Degree Centrality in the Trade Network Within and Outside SADC

Vertex	Degree	In-Degree	Out-Degree
South Africa	18	15	15
European Union	13	12	13
China	11	6	11
Mozambique	10	7	6
Madagascar	9	6	5
Swaziland	8	5	5
Mauritius	8	5	5
United Arab Emirates	8	4	4
Lesotho	8	5	5
Namibia	8	7	5
Zambia	8	6	6
Seychelles	8	5	5
Zimbabwe	7	5	5
Malawi	7	5	5
Tanzania	7	5	5
United States	6	6	1
India	6	3	4
Botswana	6	5	5
Singapore	4	2	2
Switzerland	4	3	2
Japan	3	2	1
Canada	3	2	1
Saudi Arabia, Kingdom of	2	1	2
Chinese Taipei	2	0	2
Kenya	2	1	1
Nigeria	1	0	1
Bahrain, Kingdom of	1	0	1
Korea, Republic of	1	1	0
Viet Nam	1	0	1
Hong Kong, China	1	0	1
Angola	1	1	0
Marshall Islands	1	0	1
Congo, Dem. Rep. of	1	1	1
Sri Lanka	1	1	0
Israel	1	1	1

Table 5b. Closeness Centrality

Vertex	Closeness Centrality
South Africa	0.020
European Union	0.018
China	0.017
United Arab Emirates	0.015
Mozambique	0.015
Swaziland	0.015
Namibia	0.015
United States	0.015
Zimbabwe	0.014
Madagascar	0.014
Zambia	0.014
Mauritius	0.014
Lesotho	0.014
Seychelles	0.014
Malawi	0.014
Botswana	0.014
Tanzania	0.014
India	0.013
Japan	0.013
Saudi Arabia, Kingdom of	0.013
Switzerland	0.012
Nigeria	0.012
Singapore	0.012
Canada	0.011
Chinese Taipei	0.011
Kenya	0.010
Bahrain, Kingdom of	0.010
Angola	0.010
Marshall Islands	0.010
Korea, Republic of	0.010
Congo, Dem. Rep. of	0.010
Viet Nam	0.010
Hong Kong, China	0.010
Sri Lanka	0.010
Israel	0.010

13. See Figure 5, Table 5a, Table 5b, Table 5c, and Table 5d.

14. See Figure 5, Table 5a, Table 5b, Table 5c, and Table 5d.

Table 5c. Betweenness Centrality

Vertex	Betweenness Centrality
South Africa	164.882
Namibia	75.652
European Union	71.157
Zambia	56.266
Lesotho	55.145
Mozambique	51.670
Seychelles	48.363
Botswana	46.298
China	41.905
Madagascar	40.666
Mauritius	36.999
Swaziland	28.520
Tanzania	25.350
United Arab Emirates	22.380
Malawi	14.201
India	12.508
United States	9.732
Zimbabwe	8.456
Switzerland	8.130
Singapore	4.163
Canada	2.923
Japan	0.600
Kenya	0.551
Chinese Taipei	0.483
Saudi Arabia, Kingdom of	0.000
Nigeria	0.000
Bahrain, Kingdom of	0.000
Korea, Republic of	0.000
Viet Nam	0.000
Hong Kong, China	0.000
Angola	0.000
Marshall Islands	0.000
Congo, Dem. Rep. of	0.000
Sri Lanka	0.000
Israel	0.000

Table 5d. Eigenvector Centrality

Vertex	Eigenvector Centrality
South Africa	0.087
European Union	0.071
China	0.063
Mozambique	0.055
Madagascar	0.049
Swaziland	0.047
Mauritius	0.046
Zimbabwe	0.045
Malawi	0.043
United Arab Emirates	0.043
Lesotho	0.039
Namibia	0.039
Tanzania	0.039
Zambia	0.038
United States	0.036
Seychelles	0.035
India	0.031
Botswana	0.029
Japan	0.022
Singapore	0.021
Switzerland	0.018
Saudi Arabia, Kingdom of	0.015
Canada	0.013
Nigeria	0.010
Chinese Taipei	0.010
Kenya	0.009
Bahrain, Kingdom of	0.007
Korea, Republic of	0.006
Viet Nam	0.006
Hong Kong, China	0.005
Angola	0.005
Marshall Islands	0.005
Congo, Dem. Rep. of	0.005
Sri Lanka	0.004
Israel	0.004

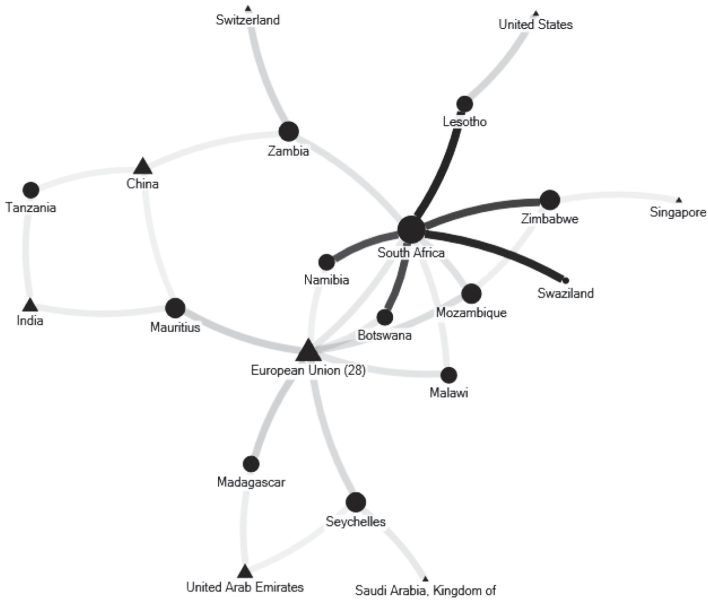
Mozambique (10). These are the actors that receive and send the most trade links in the trade network. Once again, the vast majority of the SADC member states occupy semi-peripheral positions (with degree centrality score of 7–9) or peripheral positions (with degree centrality score of 6 and less).

In terms of closeness centrality, as shown in Table 5b, the actors with the highest closeness centrality scores are South Africa (0.020), the EU (0.018), and China (0.017). In other words, these are the actors that can be easily reached by the other actors in the trade network. Once again, the great majority of the SADC member states have lower closeness centrality scores of 0.015 or less and would be considered to be difficult to reach by the other.

Furthermore, in terms of betweenness centrality and eigenvector centrality, Table 5c clearly shows that South Africa is the single most important actor in connecting with other actors in the trade network. Indeed, South Africa has a betweenness centrality score of 164.882, and the rest of the actors have a score of 75.652 or less. Table 5d also shows that South Africa is the most important actor connecting with other important actors in the trade network. Indeed, South Africa has an Eigenvector centrality score of 0.087, just ahead of the EU and China, with respectively the scores of 0.071 and 0.063, and the rest of the actors have a score of 0.055 or less.

Finally, in order to identify the existence of a true single community or different clusters of states within the trade network, we select the most significant trade links that have

Figure 6. The Major Clusters in the Trade Network Within and Outside the Regional Organization (Figure created with NodeXL)



Legend

represents a SADC member state, with a size corresponding to its degree centrality.

represents a non-member state of SADC, with a size corresponding to its degree centrality.

represents a trade link, with a size and a color corresponding to its value.

a value above the average of $15.7 million. As Hansen, Shneiderman, and Smith put it: "In the language of network analysis, clusters are pockets of densely connected vertices [or actors] that are only sparsely connected to other pockets" (2010, 93). In running the procedure for the identification of clusters through NodeXL, we can identify two major clusters in the trade network:[15]

- The first cluster revolves around South Africa and includes the following countries: Namibia, Mozambique, Swaziland, Zimbabwe, Lesotho, Zambia, Switzerland, and Singapore.
- The second cluster revolves around the EU and includes the following countries: Botswana, Malawi, Seychelles, Madagascar, Saudi Arabia, and the United Arab Emirates.

It is worth noting that, according to Figure 6, some states seem to belong to both of these clusters. That is particularly the cases of Namibia, Botswana, and Malawi. Nevertheless, we are following the classification automatically generated by NodeXL in the above lists.

Conclusion

The purpose of this study is to find out whether the member states of SADC are more integrated to their regional organization than to the global economy and whether they are forming among themselves a true single community or different clusters. The analysis of the basic statistics on the direc-

15. See Figure 6.

tions and values of trade reveals that the SADC member states trade far more with partners outside the regional organization than among themselves. Indeed, only 25.4% of the trade links (with a total value of $832.2 million) connect one SADC member state to another, compared to 74.6% (with a total value of $1.1 billion) connecting the member states to outside partners. This means that even though the "economies of scale" potentially exist for the SADC member states the "trade creation" among them and "trade diversion" from outside partners did not occur as expected. The "lack of complementarities" among Sub-Saharan African economies can explain this failure to take advantage of the potential existence of "economies of scale" (Melo and Tsikata 2014).

Moreover, even though the SADC member states are trading more with partners outside their organization than among themselves, the SNA of trade within and outside the SADC clearly indicates they are far less globalized or integrated to the global economy than most states in the world. Indeed, whereas the density of trade network among the EU member states (the most interconnected states in the world) is 1.0 and among the members of the global economy is 0.487, among the SADC member states it is only 0.156.

Furthermore, despite its objective to "promote self-sustaining development on the basis of collective self-reliance," the organization is in fact dominated by outside actors, such as the EU and China, which occupy—with South Africa—the central positions in their trade network. Nevertheless, contrary to the assumption of many observers concerning the Chinese penetration and domination of the African market, based on the data available at the writing of this article, China is not the most dominant actor in the trade network within and outside the SADC. In fact, the data reveals this country is selling more to the SADC member states than it buys from them.

Finally, instead of forming a true single community (like the member states of the EU, for instance), the SADC member states are divided into two major clusters revolving around South Africa and the European Union. This confirms once again, on the one hand, most SADC member states were trading more with partners outside their organization (with the EU in this case) than among themselves, and on the other hand, their organization is far less integrated than other regional organizations like the EU, for instance.

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