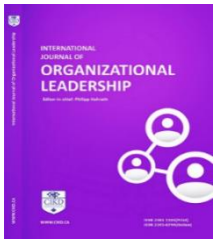


INTERNATIONAL JOURNAL OF ORGANIZATIONAL LEADERSHIP

WWW.CIKD.CA

journal homepage: https://www.ijol.cikd.ca

Competitive Performance of the Ethiopian Flower Industry from a Pre-to Post COVID-19 Pandemic Era (2003-2022): A Comparative Study

Muluken Ayalew Worku[1*], Kenenisa Lemi Debela[2], Huub L.M. Mudde[3]

[1,2]Department of Management, College of Business and Economics, Jimma University, Ethiopia
[3]Maastricht School of Management, Maastricht University, Netherlands

Keywords:
Ethiopia, Export, Import, Industry, Competitiveness, Flower, Performance, COVID-19

Received
20 July 2023
Received in revised form
08 August 2023
Accepted
12 August 2023

***Correspondence:**
muluken815@gmail.com

ABSTRACT

The purpose of this study was to examine the competitive performance of the Ethiopian flower industry in the world market from the pre-to post COVID-19 pandemic era in comparison with the Netherlands, Colombia, Ecuador, Kenya, Italy, China, Malaysia, Israel, and Canada. The study collected secondary data from the International Trade Centre (ITC) database for the years between 2003 and 2022. The data collected was analyzed by NRCA (Normalized Revealed Comparative Advantage) and RTA (Relative Trade Advantage) indexes as a measure of competitive performance as well as using both descriptive and inferential statistical analysis tools: mean, standard deviation, coefficient of variation, Pearson's correlation test, and paired sample t-test. The findings show that Ethiopia, as well as the Netherlands, Colombia, Ecuador, and Kenya, have a strong competitive advantage in the flower industry in the pre-to post COVID-19 pandemic era (2003-2022), with relatively consistent competitive performance trend in the world market; while other countries with fluctuating competitive advantage and self-balancing (Israel, Malaysia, and China) and also countries such as Italy and Canada have a competitive disadvantage in flower in the world market. Ethiopia's flower competitive advantage has achieved a steady improvement in the post COVID-19 pandemic era while other countries are facing inconsistent and huge decline, particularly, Colombia, as the finding revealed. Also, paired sample t-test result shows that statistically significant difference was found between Ethiopia's competitive advantage and those of the top competing countries with a p-value < .05. The finding also indicated that with average values of the relative import advantage (RMA = .48) and relative trade advantage (RTA = 128.80) indexes, Ethiopia is a net exporter of flowers. Therefore, the findings of this study give managers robust evidence of how their flower industry's competitive performance changes over time and the rank of their respective country. The flower competitive performance of Ethiopia, compared to the Netherlands, Colombia, Ecuador, Kenya, Italy, China, Malaysia, Israel, and Canada, is believed to inform the practitioners in the industry to make necessary adjustments aimed at generating comparative and competitive advantages for the country.

In modern economic activities, international trade has progressed from perfect protection to perfect open global trade among nations to provide balance. The most significant economic activities to guarantee economic growth and development are exports in particular and global trade in general. The present-day flower industry is a highly professional, dynamic, and worldwide industry that has been gaining major attention across the globe (Adeola et al., 2018; Rikken, 2011) and ranked as the 344th most traded good in the world in 2021, with a total trade value of US$10.5 billion (BigManBusiness [BMB], 2022). Its exports increased from US$8.47 billion to US$10.5 billion between 2020 and 2021, a 24.1% increase (Observatory of Economic Complexity [OEC], 2023). According to Observatory of Economic Complexity ([OEC], 2023) report, the global trade in cut flowers accounts for 0.05% of all trade. By 2026, the sector is anticipated to reach a value of US$ 103.9 billion, registering a CAGR of 5% during the forecast period (BMB, 2022). The Netherlands (US$5.17B), Colombia (US$1.73B), Ecuador (US$937M), Kenya (US$766M), and Ethiopia (US$235M) were the main exporters of cut flowers in 2021 (OEC, 2023).

In Ethiopia, the flower industry has developed at a rapid and unusually high rate, especially in terms of rose output and export (Gebreamlak, 2021). Numerous factors have contributed to Ethiopia's flower industry's quick growth (Geleta et al., 2021). The most significant factors are, among others, the country's geographic advantages with regard to the global market, the favorable environmental conditions for the production of flowers, and the generous incentive programs offered by the government for the growth of the sector (Diriba & Karzanova, 2020; Kassa, 2017; Mengistie, 2020; Yeshiwas & Workie, 2018). As a result, Ethiopia becomes the second largest producer of flowers in Africa, and the fourth in the world (8.4%) after the Netherlands (40.3%), Colombia (16.5%), Ecuador (10.4%), and Kenya (8.4%) and exports more than 80 million stems a month to 40 countries (GA ISIG Study Tour, 2021). The same source added that the flower industry has had a huge impact on Ethiopia's economy and society, most significantly in generating foreign earnings and job creation; for instance, it created hundreds of thousands of new jobs in the last five years (Geleta et al., 2021).

Despite having a lot of potential and receiving various forms of government assistance, the industry has recently been having some problems. According to (Mebrat et al., 2022), the flower industry is overwhelmed with structural problems ranging from the producers' inability to understand the requirements and also preferences of customers, communicate effectively with customers, capture the new market, and fill knowledge gaps in the marketing channels. According to Schaefer and Grum (2015), COVID-19 pandemic has particularly threatened the flower business and interfered with its ability to compete globally. Ethiopia has a significant comparative advantage in the export of flowers, but the industry lacks enough technical assistance, adequately qualified human resources, adequate capital, and acceptable banking services (Schaefer & Grum, 2015). According to Porter (1990, 1998), relying solely on comparative advantage positions—positions founded on agroecological advantages and favorable resource endowments—to sustain long-term competitive performance is typically viewed as problematic and unviable.

As a consequence, the industry's performance is showing an inconsistent and erratic trend (Aschalew, 2015; Whitfield et al., 2020; Woldemichael, 2020). Additionally, three flower farms went out of business, and five farms changed ownership (Ermias, 2016). In addition,

Mengistie et al. (2017) note that 12 (14%) of Ethiopia's 84 businesses had permanently halted operations in 2017. In the last three months of 2020 only, the Ethiopian flower industry export decreased by 70%, according to Omer and Hassen (2020), and thousands of workers in flower farms lost their jobs in the same year (Pangtu et al., 2020).

To date, several studies have been conducted on the flower industry in Ethiopia such as carbendazim removal (Wehbe et al., 2022); the opportunity of banks in financing (Kenea, 2022); occupational heat stress on workers' health risks and productivity losses (Simane et al., 2022); workers saving (Ryu & Suzuki, 2021); automated climate monitoring system (Weldeslasie et al., 2021); environmental performance evaluation (Hawera et al., 2021); export performance (Seyoum, 2021). These studies were focused on export performance, environmental and policy analysis, saving, and technology utilization and its impact on workers' health and productivity. These studies lack to show the competitive performance of the Ethiopian flower industry in the world market.

Meanwhile, a few studies (e.g., Gebreamlak, 2021; Kinfu et al., 2021; Shentema et al., 2020) were conducted to examine the firm and specific product-level practices and challenges of postharvest handling, physicochemical parameters in wastewater and heavy metals in soils, and pesticide use and serum acetylcholinesterase levels of Ethiopian flower. Although the competitiveness of the country can be examined via product, firm, or industry-level analysis, product and firm-level investigation may be shortsighted. Past studies (e.g., Bojnec & Fertő, 2009; Latruffe, 2010; Traill, 1998; van Rooyen et al., 2011) show that assessment of competitiveness at the industry level helps to reach, conserve, and improve market share over time against other competitors in the international market. In addition, the study by Seyoum (2021) analyzed export competitiveness only. Therefore, this study filled this research gap by examining the competitiveness of the Ethiopian flower industry using both import and export data.

This study has the following contributions. First, it introduces a competitiveness analysis by using Meso level analysis to examine the international competitiveness of the Ethiopian flower industry compared to top exporting countries in the world market. According to Brkić (2020), contemporary theory presents a more comprehensive and multifaceted idea of global competitiveness, tying it to the supply and demand side, exports and imports, a country, and an industry or product. Thus, this study is based on the argument that international competitiveness analysis is more meaningful for products industry like the flower industry as the flower is the most commonly traded sentimental product in the world market.

Second, the study authors believe that the fine-grain combination of competitiveness analysis based on both export and import data provides a complete view of the flower industry's competitive performance compared to some top exporting countries (the Netherlands, Colombia, Ecuador, Kenya, Italy, China, Malaysia, Israel, & Canada in our case). This argument is supported by Brakman and Marrewijk (2017), who argued that gross trade flows (gross import and export) provide sufficient information to analyze the structure of international trade, for example, comparative advantage. The study's use of trade flow data for the analysis of the international competitiveness of the flower industry is believed to significantly contribute to research on comparative and competitive advantage.

Third, the study also contributes to comparative advantage and international competitiveness literature by applying Normalized Revealed Comparative Advantage proposed by Yu et al. (2009) and the Vollrath (1991) Relative Trade Advantage (RTA). Although several models are available for competitiveness analysis like Porter's and Balassa's models, they suffer some shortcomings. For example, Porter's focus on global high-tech industries and its application for less advanced economies like Ethiopia (Abei, 2017; Angala, 2015; Boonzaaier, 2015; Jafta, 2014; van Rooyen & Boonzaaier, 2016). In addition, Balassa's index (1965) has been applied till recently (Erkan & Saricoban, 2014; Worku, 2018), although it suffers from both theoretical foundation and empirical distribution weaknesses (Leromain & Orefice, 2013). Thus, this study's use of Normalized Revealed Comparative Advantage and Relative Trade Advantage (RTA) indexes will certainly contribute to validating these two models' application in a wider set of contexts.

Finally, the study authors believe that this study provides Ethiopian flower companies with an update on the floriculture sector at the global and national levels, which may be valuable for planning production, investments, and designing and implementing marketing strategies. In addition, it can be beneficial as a tool for the Ethiopian government to deliver a comprehensive and wide range of policies to address its economic objectives, including measures related to industry, transport, employment, and agriculture.

Literature Review

COVID-19 Pandemic and Agribusiness Sector (Flower Industry)

The COVID-19 pandemic, which began at the end of 2019, has disrupted the global economy in general and the agribusiness sector in particular and introduced a new narrative and a paradigm change in the world (Siche, 2020). As a result, even though agribusiness continues to be a significant growth driver in most developed and developing nations, the sudden COVID-19 outbreak has adversely impacted every agro-industry (Hazra & Ghosh, 2022). For example, due to the effects of this pandemic, agribusiness production decreased by over half in various parts of the world (Weersink et al., 2021).

More specifically, due to the perishable nature of farm products, the agribusiness sector became vulnerable during the pandemic. For instance, the pandemic exacerbated market risks by raising geographical mobility restrictions and transportation expenses (Bonetti & Zidziunas, 2022). Agribusiness is also at risk due to its strong reliance on labor for harvesting, processing, and transportation (International Development Association [IDA], 2020). Furthermore, the supply shock, which limited labor mobility, transportation, and input availability, had an impact on this sector (Dogan et al., 2022). On the demand side, the consumption patterns changed, which negatively affected the businesses involved in the agribusiness supply chain and threatened trade across the globe (Hohler & Lansink, 2021). Cardamom, tea, coffee, ginger, and cut flowers are some of the major exporting agribusiness sector industries that were adversely impacted by the pandemic (Kaphle et al., 2021).

Meanwhile, agribusiness as a socio-economic activity and sector may experience profound and long-lasting structural and transformational changes as a result of the COVID-19 crisis, as evidenced by its nature, its unprecedented circumstances, and its effects (Adedapo, 2021; Sigala, 2020). The most notable features of this pandemic are, in fact, its global and enormous scale and its multidimensional and interrelated repercussions, which challenge current values

and systems and result in a global recession and depression (Sigala, 2020). According to Bristow (2021), the flower business had the highest decline in flower shipments and consequent loss of mass production in 2020, the year the pandemic started. Since there was no market for flowers during the shutdown, growers were forced to dispose of them (Bonetti & Zidziunas, 2022). In the second quarter of 2020, for instance, Colombian flower sales decreased by 40% as a result of global Covid-19 control measures implemented by many countries (U.S. Department of Agriculture [USDA], 2020). This instance demonstrates how the pandemic affected both supply and demand in the cut flower market (Munson, 2021). According to the same source, the pandemic's main impact is on the supply side of the cut flower businesses. For example, each day a flower is delayed in being shipped results in a 15% loss in value (Chebet, 2021). On the other hand, in the pandemic, the commonality and accessibility of the flower trade internationally have grown, particularly from 2016 to 2020; the export climbed from US$19.6 billion to US$22.4 billion (Guaita-Pradas et al., 2023).

Comparative and Competitive Advantages Theories

This study used two conventional competitiveness theories as a building block for analyzing the competitive performance of the Ethiopian flower industry from the pre-to post pandemic era, particularly in comparison to the top flower-producing and exporting countries in the world. The first theory is the comparative advantage theory, which advocates that the competitiveness of an industry is basically derived out of the natural/ecological resource endowments of a nation, the so-called Ricardo's model, 1817; and the second theory is the new competitiveness or competitive advantage theory, which is based on Porter's "national competitive advantage" theory, 1990, stating that wealth is created by strategic choices, which advocates that strategic choice dominates to ensure industry's competitiveness in both domestic and international market contests. According to different sources (e.g., Munson, 2021; Weersink et al., 2021), including Ethiopia, many other flower-producing and exporting countries suffered because of the COVID-19 pandemic outbreak, which entirely restricted any movement of agribusiness production and marketing, including flower, both at domestic and international levels. Therefore, the two orthodox competitiveness theories, as indicated above, were utilized to investigate the competitive performance of the Ethiopian flower and the top competing countries in the world, particularly in the pre-to post COVID-19 pandemic era.

The Ricardian comparative advantage model is a classical economic theory that compares a nation to another that is interdependent and can mutually benefit each other and one of which is the economic benefit (Camagni, 2017). Hence, a nation or a group of nations needs to benefit from international trade, particularly when analyzing various aspects of global products like flower products. In addition, comparative advantage promises whether a person, a region, or a nation has an advantage or disadvantage in producing a particular good (flower products in this study) compared to the other good that can be produced. Conversely, Porter (1990, 1998) indicated that a sustained long-term competitive performance, relying only on comparative advantage positions, positions based on agroecological advantages, and favorable resource endowments, is generally viewed as problematic and unviable. Therefore, economic units would find a competitive advantage.

According to Porter (1990), a country's success/prosperity through trade is not "inherited". It does not depend on the country's endowment of resources or the exchange rates. A

country's prosperity is "created" by the country's firms that are successful in the world markets. Porter argued that a country's competitiveness depends on the capacity of its industry to innovate and upgrade compared to other nations.

Competitiveness Measures: Comparative and/or Competitive Advantage(s)

Different authors have proposed different competitiveness measures in the existing literature. Some are the Porter Diamond Model, Real Exchange Rate, Foreign Direct Investment, Growth-Share Matrix, Unit Labour Costs, and Business Confidence Indexes (e.g., Abei, 2017; Esterhuizen, 2006). Others include the Revealed Comparative Advantage, Relative Trade Advantage, Net Export Index (NXi), and Porter's Five Forces Model (e.g., Abinsay, 2020; Benalywa et al., 2019; Matkovski et al., 2021). However, the application of these measures varies with the type of data used in the analysis of a study. For example, the Porter Diamond Model and Business Confidence Indexes are mostly used in the analysis of primary data (Angala, 2015; Boonzaaier, 2015; Esterhuizen, 2006; Jafta, 2014; van Rooyen et al., 2011; van Rooyen & Boonzaaier, 2016) while Revealed Comparative Advantage, Real Exchange Rate, Foreign Direct Investment, Growth-Share Matrix, Unit Labor Costs, and Relative Trade Advantage are used for secondary data analysis (e.g., Angala, 2015; Boansi & Crentsil, 2013; Boonzaaier, 2015; Dlamini, 2012; Jackman et al., 2011; Jafta, 2014).

The most commonly used competitiveness measures are Revealed Comparative Advantage (RCA), introduced by Balassa (1965), and Relative Trade Advantage (RTA). However, Balassa's index (1965) has been criticized for problems related to its relative order, according to Yeats (1985). Alternative RCA measures have been introduced so far to solve the weaknesses of RCA such as the BRCA log (Vollrath, 1991), Symmetrical Revealed Comparative Advantage (SRCA) (Laursen, 2015), Weighted Revealed Comparative Advantage (WRA) (Proudman & Redding, 1998, 2000), Additive Revealed Comparative Advantage (ARCA) (Fachrudin & Hastiadi, 2016). As stated by Fachrudin and Hastiadi (2016), none of those indexes could be the one that can be generally applied to the comparison between spaces (commodities, states, or regions) and time. Thus, the current study makes use of the Normalized Revealed Comparative Advantage (NRCA) by Yu et al. (2009) and the Relative Trade Advantage (RTA) by Vollrath (1991) models.

Normalized Revealed Comparative Advantage (NRCA)

The Normalized Revealed Comparative Advantage (NRCA) index was developed by (Yu et al. (2009) - as a model that estimates the degree of deviation of actual export over a period from a neutral level i.e., comparative advantage. The noteworthy part of NRCA is its symmetrical distribution and independence of cross-product and country analysis. The current study applies NRCA for cross-country analysis. The NRCA index is presented as follows:

$$\text{NRCA}ij = Eij/E - EjEi/EE$$

Where:

NRCAij= Normalized Revealed Comparative Advantage of product j of country i

Eij= export of product j of country i,

Ej=total world export of same j product,

Ei= total export of country i, and

E= total world export

NRCAij has both positive and negative signs, whereas the neutral point is zero. If NRCA has a positive value, that means comparative advantage and a negative indicates a comparative disadvantage in products or sectors. Its symmetrical distribution property represents magnitude or NRCA scores ranging from −1/4 (disadvantage) to +1/4 (advantage). The higher the positive value stronger will be the advantage and the higher the negative value stronger will be the disadvantage.

Relative Trade Advantage (RTA)

In 1991, Vollrath suggested an alternative specification of revealed comparative advantage, called the Relative Trade Advantage (RTA) that accounts for exports as well as imports. RTA is computed as the difference between Relative Export Advantage (RXA) and its counterpart, Relative Import Penetration Advantage (RMA).

This method is computed as follows;

$$RCA_{ij} = RXA_{ij} = \frac{\left[\frac{X_{ij}}{X_{ik}}\right]}{\left[\frac{X_{nj}}{X_{nk}}\right]} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (1)$$

Then, RMA:

$$RMA_{ij} = \left[\frac{M_{ij}}{M_{ik}}\right] / \left[\frac{M_{nj}}{M_{nk}}\right] \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (2)$$

In this case, *M* denotes imports. A positive value of RTA reveals the status of competitive advantage.

$$RTA_{ij} = RXA_{ij} - RMA_{ij} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (3)$$

Any value of RTA above one indicates a nation has a competitive advantage in the considered commodity or service, and an index below zero suggests a competitive disadvantage, while index values between zero and one reveal that a nation is marginally competitive in that particular product. The numerators in the model above demonstrate a nation's exports or imports of a particular commodity relative to the exports or imports of the commodity by all other countries. The dominators show the exports or imports of all commodities or services by reflecting the product in terms of the percentage of all other country's exports or imports of all commodities or services.

Only the RTA considers both export and import activities, while the RXA and RMA indexes are exclusively calculated using either export or import data. This is helpful when considering from a trade theory perspective, mostly because of the increase in intra-industry trade (Frohberg & Hartmann, 1997). Several scholars, notably Pitts et al. (1995) and Batha and Jooste (2004), argue that it is crucial to consider both import and export values because if one takes into account only exports (RXA), for example, some countries act as a transit - and the RXA values might show high levels of competitive advantage - that would be purely untruthful.

Method

Philosophical View and Research Design

The purpose of this study was to investigate the competitive performance status of the Ethiopian flower industry from the pre-to post COVID-19 pandemic era in comparison with top flower-producing and exporting countries such as the Netherlands, Colombia, Ecuador, Kenya, Italy, China, Malaysia, Israel, and Canada in the world market. In this regard, the positivist philosophical view was used to investigate the current status of competitiveness of the Ethiopian flower industry in comparison with top producing and exporting countries. As Fadhel (2002) revealed, the positivist research paradigm tries to interpret observations in terms of facts or measurable entities.

This study employed both descriptive and explanatory research designs, which is predominantly descriptive research in nature, and also explanatory research design was used to examine the relationship between variables (specific to this study "variables" refers to comparative advantage and/or competitive advantage indexes of a country or across-countries), which followed a quantitative research approach, to investigate the competitive performance of the Ethiopian flower industry. While the study used trade data, the variables are Relative Export Advantage (RXA), Relative Import Advantage (RMA), Relative Trade Advantage (RTA), and Normalized Revealed Comparative Advantage (NRCA).

Data Source and Method of Collection

The study used secondary data collected from the International Trade Centre (ITC) database covering 20 years of data (between 2003 and 2022). Ghauri et al. (2010) stated that studies and reports of institutions and departments such as universities and other research institutions, central and local government studies and reports, state budgets, rules on international trade, academic as well as professional journals, and newsletters, and other published material and international trade website can also serve as sources of secondary data.

Data Analysis

This study employed descriptive and explanatory methods of data analysis in order to examine trends in the competitive performance of the Ethiopian flower industry from the pre-to post-COVID-19 pandemic era in comparison with top producing and exporting countries such as the Netherlands, Colombia, Ecuador, Kenya, Italy, China, Malaysia, Israel, and Canada in the world market. The study employed the Normalized Revealed Comparative Advantage (NRCA) and Relative Trade Advantage (RTA) indexes as a descriptive methodology and analyzed using Microsoft Excel 16.

In addition to NRCA and RTA analysis methods, the researchers also employed descriptive as well as inferential statistical analysis tools such as mean, standard deviation, coefficient of variation, Pearson's correlation test, and paired sample t-test, using SPSS software version 25 to investigate the competitive performance of the Ethiopian flower industry in the world market from a pre-to post COVID-19 pandemic era in comparison with top producing and exporting countries. Statistical tools such as the Coefficient of Variation and Pearson's correlation test were used to measure relative dispersion or uncertainty and the strength of the linear relationships between (the pairs of) RXA, RMA, RTA, and NRCA indexes, respectively. Whereas a paired t-test was employed to measure whether there is or is

not a statistically significant difference between Ethiopia's flower and the top competing countries using their RTA results.

Study's Reliability and Validity

In order to measure the competitive performance of the Ethiopian flower industry and top competing countries, this study used the industries' import and export values to compare against global competition. The data was obtained from the ITC TRADEMAP database, which is a reputable and internationally acknowledged statistical database. The ITC TRADEMAP provides values and volumes (import and export), market shares, tariffs, and growth rates of 5,300 products coded under Harmonized System (HS) from around 220 countries and territories as of the year 2001. The ITC, as part of its main responsibility, compiles the data and makes it available on the website (http://www.trademap.org). Although questions about the quality of the data can be raised, it is one of the best statistical databases available, given the cost of gathering primary data (Esterhuizen, 2006; van Rooyen et al., 2011). Therefore, in order to calculate the NRCA and RTA of the flower industries, the researchers used 2003-2022 import and/or export data which allows a trend analysis of the industry's competitive performance globally.

Results and Discussion

The study sought to investigate the competitive performance of the Ethiopian flower industry in comparison with top producing and exporting countries in the world: the Netherlands, Colombia, Ecuador, Kenya, Italy, China, Malaysia, Israel, and Canada, particularly, from a pre-to post COVID-19 pandemic era, using NRCA and RTA calculated based on the data obtained from the International Trade Centre (ITC) database as well as employing both descriptive and inferential analysis tools. The following Figure 1 shows the flower export of Ethiopia and the top competing countries used in the analysis of NRCA and RTA.

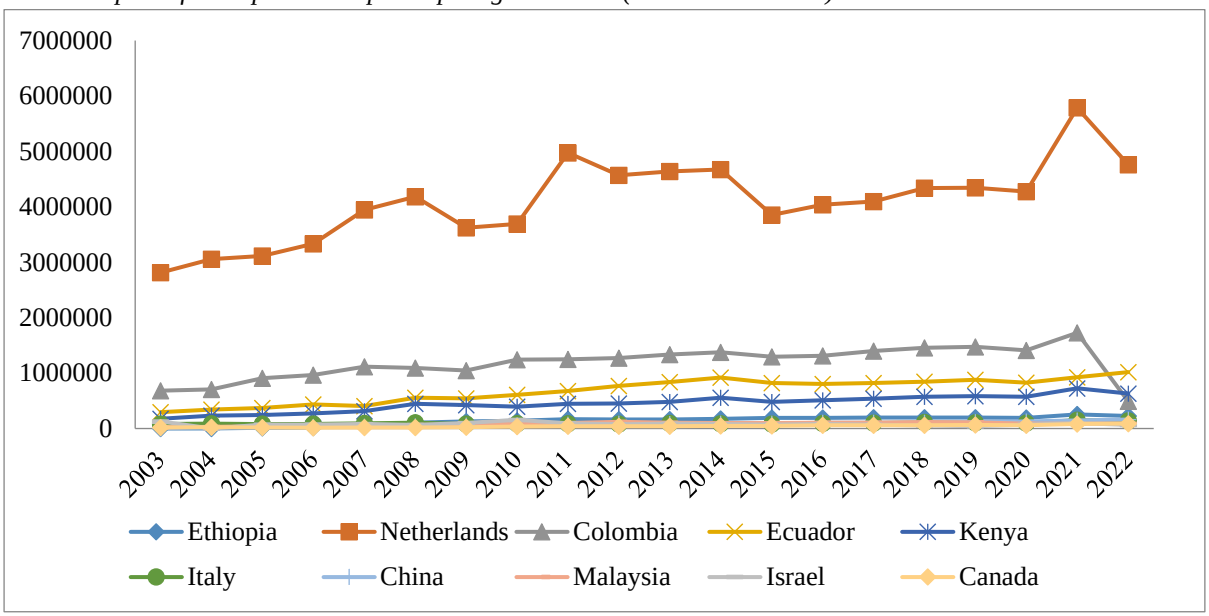
As shown in Figure 1, Ethiopia's flower export is in comparison with top exporters worldwide. The top flower exporters are the Netherlands, Colombia, Ecuador, Kenya, Italy, China, Malaysia, Israel, and Canada; Ethiopia has achieved a somewhat steady increment in export except for a considerable break in the export year of 2020, while other countries recorded a slight inconsistency and increase during the stated year in export value, particularly, Colombia, Canada, China, and Israel. Since 2021 the export of the Ethiopian flower industry has achieved a huge and radical increase with fluctuating trends that any other country could not record. Therefore, it can be concluded that, compared with top flower exporting countries, Ethiopia's trend in flower export showed a somewhat consistent increase before COVID-19, and likewise, in the post-pandemic era, it remarkably recovered from and achieved the comparatively highest export rate relative to other countries such as Colombia, Malaysia, and Italy. However, the Ethiopian flower industry export still increases at decreasing rate even in the post-pandemic era, in particular, in comparison with Ecuador, China, and Canada.

Also, Figure 2 depicts the export trend of the flower industry by growth rate (in value) in comparison with top competing countries: the Netherlands, Colombia, Ecuador, Kenya, Italy, China, Malaysia, Israel, and Canada. According to the result obtained, Ethiopia's flower has achieved the largest growth rate than any other top competing countries, especially in the

years 2003-4, 2004-5, and 2006-7. However, in 2019-2020, the country's export growth became highly affected and faced decreasing and the highest export loss next to Ecuador, Malaysia, and Canada. In 2020-21, the Ethiopian flower export recovered and increased by 34%, the highest, for instance, next to Italy (55%) and Canada (40%). But, as clearly shown in the export value, in particular, in 2021-2022, the growth decreased by 10%, comparatively higher than in some other countries such as Italy (7%) and Malaysia (5%). Therefore, at large, the Ethiopian flower export growth is positive in the pre-to post COVID-19 period except in the years 2011-12, 2015-16, and 2021-22, which is a relatively good record than the majority of top competing countries, for example, the Netherlands and Kenya.

Figure 1

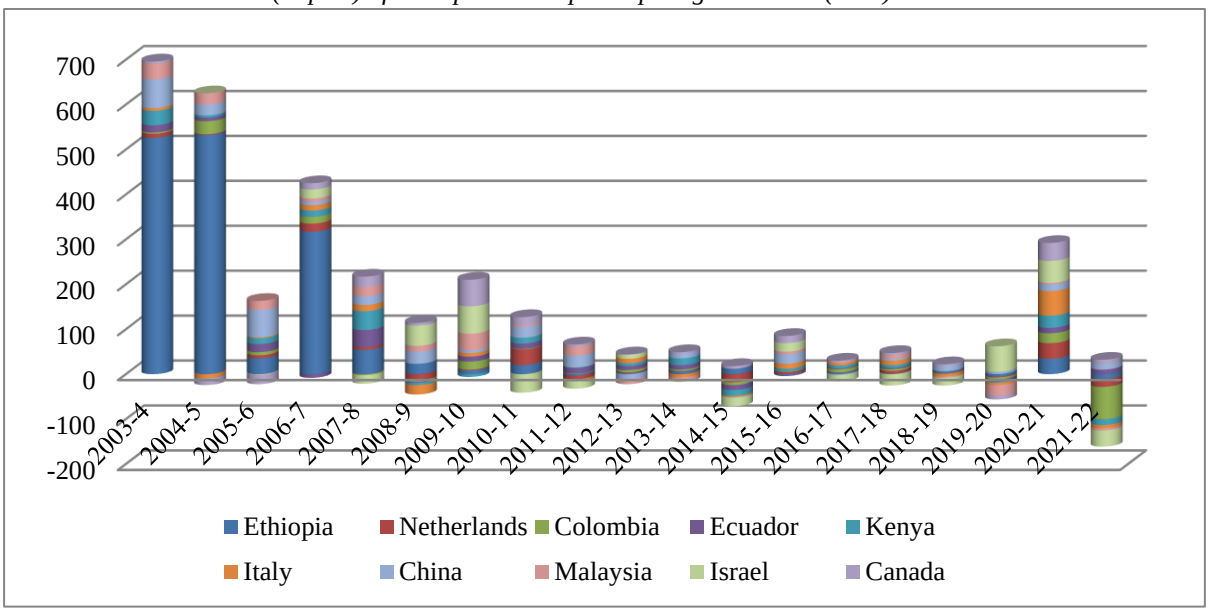
Flower Export of Ethiopia and Top Competing Countries (USD in thousands)



Source: ITC (2023)

Figure 2

Flower Growth in Value (Export) of Ethiopia and Top Competing Countries (in %)

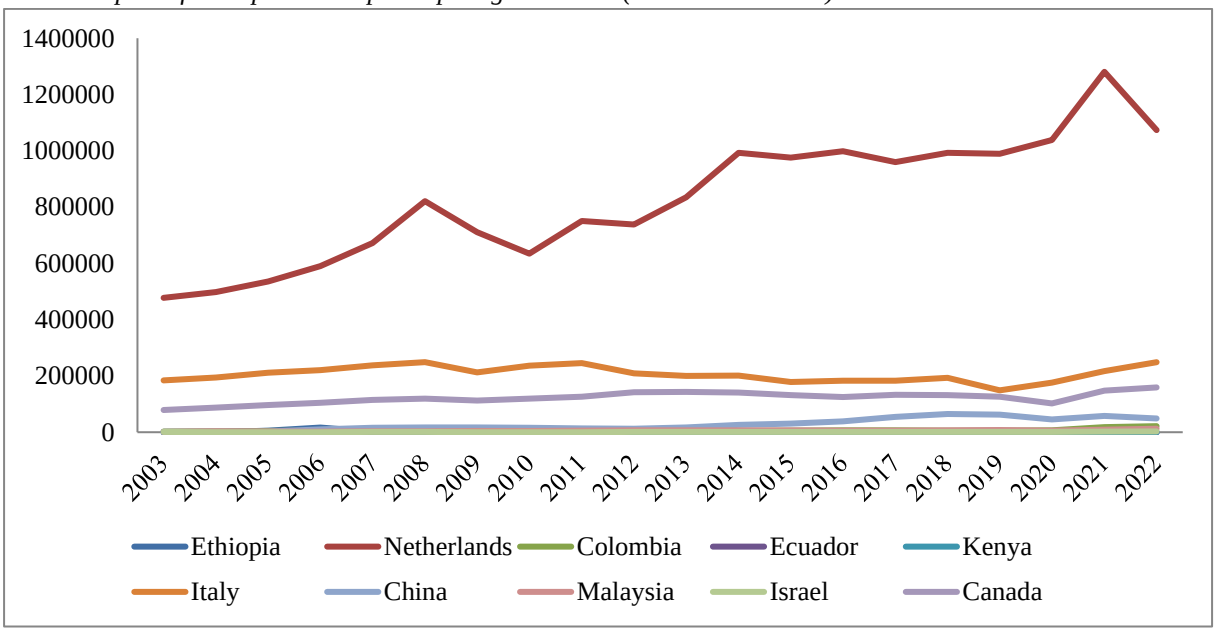


Source: ITC (2023)

Added to the export data presented in Figure 1, Figure 3 presents the import value of Ethiopia and the top exporters of flower in the world market. As shown in Figure 3, Ethiopia's flower import is insignificant and the trend shows inconsistency in the entire years (pre-to post COVID-19 era). This situation happened similarly in other flower-producing and exporting countries, particularly, Ecuador, Colombia, China, Malaysia, Israel, and Kenya. For instance, according to the study finding of Guaita-Pradas et al. (2023), the value of Ecuador and Colombia flower exports can be considered significant compared to their value of imports, which was low. On the other hand, the Netherlands is the highest importer of flowers in the world market, which is significantly followed by Canada and Italy respectively. However, the import value of Ethiopia is much lower than any other top competing country. Unlike other countries, Ethiopia's import value has shown a huge decline since 2008. Therefore, this shows that Ethiopia is a net exporter of flowers such as like some of the top competing countries: Ecuador, Colombia, China, Malaysia, Israel, and Kenya.

Figure 3

Flower Import of Ethiopia and Top Competing Countries (USD in thousands)



Source: ITC (2023)

Therefore, the study used import and/export data from the ITC database for analyzing the competitive performance of the Ethiopian flower industry from the pre-to post COVID-19 pandemic era in the world market. The competitiveness analysis was conducted by comparing Ethiopia with top flower exporters (the Netherlands, Colombia, Ecuador, Kenya, Italy, China, Malaysia, Israel, and Canada) in the world market. Thus, NRCA and RTA indexes were used, as presented in Table 1 and Table 2, respectively. And also, statistical analysis results were shown in Table 3 (mean, standard deviation, and coefficient of variation), Table 4 (Pearson's correlation test), and Table 5 (paired sample t-test), which are computed using comparative advantage and/or competitive advantage indexes results.

Table 1

NRCA of Ethiopia and Top Competing Countries

Year	Ethiopia	Netherlands	Colombia	Ecuador	Kenya	Italy	China	Malaysia	Israel	Canada
2003	-0.00041716*	35.2067*	8.98598*	3.88495*	2.32542*	-1.49494*	-3.70352*	-0.60158*	1.47062*	-2.09972*
2004	0.0170867*	31.5239*	7.61672*	3.70894*	2.52871*	-1.24138*	-3.54038*	-0.440748*	-0.242292*	-1.74288*
2005	0.111146*	28.2367*	8.6391*	3.52282*	2.32405*	-1.19177*	-3.84415*	-0.362489*	0.44598*	-1.72807*
2006	0.131379*	25.9257*	7.95773*	3.57827*	2.27875*	-1.28709*	-4.30451*	-0.354782*	0.355609*	-1.70866*
2007	0.487403*	26.7694*	7.95974*	2.86633*	2.25392*	-1.21042*	-4.31644*	-0.283151*	0.398516*	-1.44954*
2008	0.647966*	24.4624*	6.72371*	3.42569*	2.77112*	-0.987414*	-4.0576*	-0.207344*	0.235318*	-1.24395*
2009	1.03122*	27.1451*	8.30933*	4.34518*	3.37982*	-1.28715*	-5.32637*	-0.182011*	0.556904*	-1.32904*
2010	0.914107*	22.8115*	8.08289*	3.96686*	2.60704*	-0.902032*	-4.88248*	-0.0212797*	0.844975*	-1.05088*
2011	0.912666*	25.8417*	6.74046*	3.68614*	2.45377*	-0.953234*	-4.84495*	-0.0717213*	0.327649*	-1.01087*
2012	0.87352*	23.3894*	6.74609*	4.13001*	2.44516*	-0.83859*	-4.81821*	0.0685153*	0.263976*	-0.936465*
2013	0.868957*	23.1199*	6.92492*	4.3753*	2.53081*	-0.842478*	-5.28158*	-0.0171175*	0.282903*	-0.941808*
2014	0.91716*	23.2613*	7.14196*	4.80063*	2.91578*	-0.927475*	-5.67138*	-0.0933334*	0.268763*	-0.997283*
2015	1.17823*	22.1026*	7.78511*	4.94028*	2.89852*	-0.837949*	-6.2169*	0.00580885*	0.229894*	-0.913662*
2016	1.19088*	23.8579*	8.14043*	4.98514*	3.18212*	-0.910417*	-6.20718*	0.0425759*	0.3175*	-0.90604*
2017	1.11169*	21.8735*	7.86568*	4.61941*	3.06369*	-0.83098*	-5.63384*	0.0193405*	0.233312*	-0.818433*
2018	1.02427*	21.0253*	7.44118*	4.3099*	2.95926*	-0.763439*	-5.4467*	0.00627213*	0.123477*	-0.76528*
2019	1.05945*	21.6733*	7.76216*	4.63354*	3.09994*	-0.833578*	-5.7875*	-0.00970685*	0.0816719*	-0.806248*
2020	1.07939*	22.8586*	7.97078*	4.66778*	3.25156*	-0.850881*	-6.59632*	-0.160599*	0.247702*	-0.767593*
2021	1.142*	24.55*	7.708*	4.128*	3.261*	-0.7076*	-6.944*	-0.2678*	0.3213*	-0.7682*
2022	0.9508*	18.67*	1.983*	4.18*	2.606*	-0.4702*	-4.755*	-0.1759*	0.1573*	-0.5281*

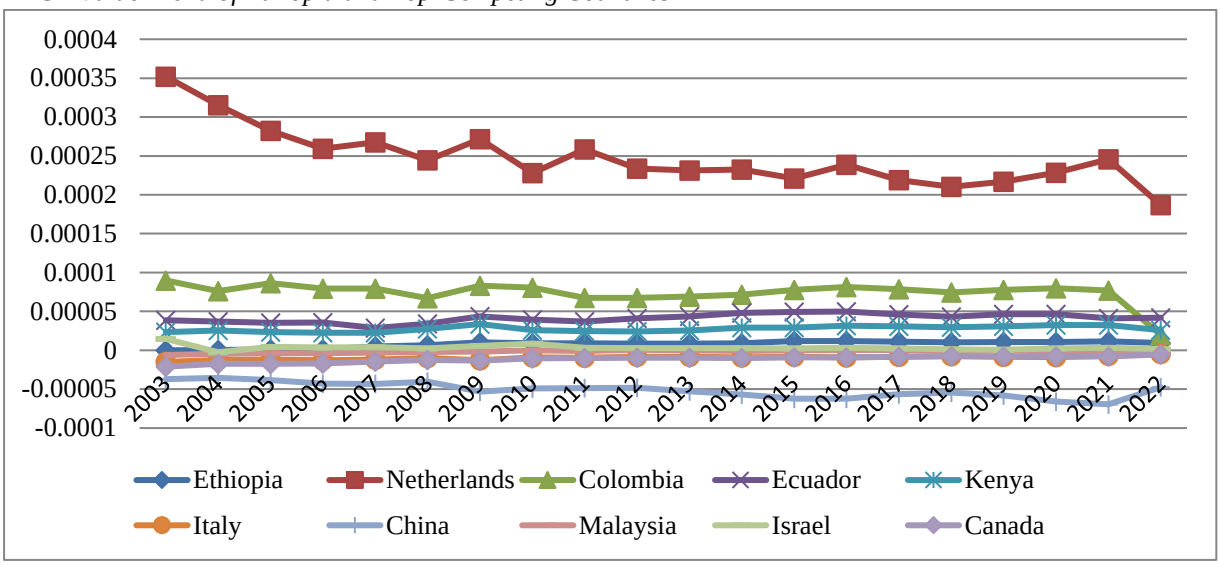
Note. *the numerical values are in "00000"

According to Yu et al. (2009), NRCA has both positive and negative signs, while the neutral point is zero. If NRCA has a positive value, that means comparative advantage, and a negative indicates a comparative disadvantage in products or sectors. Its symmetrical distribution property represents magnitude or NRCA scores ranging from −1/4 (disadvantage) to +1/4 (advantage). The higher the positive value shows stronger will be the advantage, and the higher the negative value stronger will be the disadvantage. Thus, as per the result in Table 1, Ethiopia records a comparative advantage from 2004 through 2022. But, the country had comparative disadvantage in 2003 in flower. The countries such as the Netherlands, Colombia, Ecuador, and Kenya have comparative advantage in flowers as the NRCA value shows positive value.

Table 1 also indicates that Malaysia has a comparative advantage in the year 2012 as well as from 2015 through to 2018; however, between 2003 and 2011 and from 2019 through to 2022 has a comparative disadvantage in flower. Israel has a comparative advantage in flowers in the entire year except in the year 2004. According to Table 1, Italy, China, and Canada have comparative disadvantages in flowers. As the NRCA result indicates, none of the flower exporting countries (included in this study) has either a strong comparative advantage or disadvantage. Therefore, Ethiopia's flower has a better comparative advantage than Italy, Israel, Malaysia, Canada, and China, which positions the country fifth in the world next to the Netherlands, Colombia, Ecuador, and Kenya, which Ethiopia has a comparative advantage in the pre-to post COVID-19 era except in the year 2003, as shown by NRCA value. However, Ethiopia does not have a strong comparative advantage in flower like all top competing countries in the pre-to post-pandemic period (2003-2022), per the NRCA threshold shown earlier. Figure 4 shows the NRCA trend of the countries.

Figure 4

NRCA Value Trend of Ethiopia and Top Competing Countries



Source: Own Computation (2023)

Broadly speaking, Ethiopia had a comparative disadvantage in 2003 in flower compared to the Netherlands, Colombia, Ecuador, Kenya, and Israel countries. And also, Ethiopia's flower competitiveness shows a small improvement between 2008 and 2009 compared to other countries considered in this study such as the Netherlands, Colombia, Ecuador, Kenya, and Israel.

In addition to NRCA analysis, this study also used the RTA index to examine the competitive performance of the Ethiopian flower industry in the world market from the pre-to post COVID-19 pandemic era in comparison with top producing and exporting countries. The RTA index of Ethiopia was compared to the Netherlands, Colombia, Ecuador, Kenya, Italy, China, Malaysia, Israel, and Canada, as presented in Table 2.

Table 2

RTA of Ethiopia and Top Competing Countries

Year	Ethiopia	Netherlands	Colombia	Ecuador	Kenya	Italy	China	Malaysia	Israel	Canada
2003	0.91	33.26	96.75	83.20	116.98	-0.63	0.03	0.32	6.42	-0.41
2004	5.30	36.38	88.32	88.15	173.14	-0.55	0.04	0.39	0.00	-0.42
2005	19.64	31.54	96.15	75.80	144.97	-0.69	0.04	0.49	2.98	-0.46
2006	24.24	24.63	84.49	66.84	156.44	-0.66	0.03	0.49	2.61	-0.52
2007	117.99	31.10	87.85	61.47	167.49	-0.61	0.02	0.52	2.97	-0.53
2008	152.00	29.54	71.77	67.89	214.43	-0.58	0.02	0.60	2.27	-0.54
2009	161.42	22.75	64.29	74.54	185.99	-0.75	0.03	0.69	3.45	-0.61
2010	140.14	24.98	75.88	77.64	173.91	-0.64	0.04	0.91	5.43	-0.46
2011	142.89	34.35	51.62	67.67	176.39	-0.60	0.05	0.82	2.76	-0.40
2012	134.26	31.53	52.39	76.76	176.25	-0.69	0.07	1.03	2.60	-0.54
2013	142.31	28.55	55.41	78.32	194.31	-0.62	0.05	0.89	2.63	-0.53
2014	128.32	27.27	60.74	82.96	214.04	-0.64	0.04	0.77	2.47	-0.49
2015	164.24	26.55	92.23	107.39	192.29	-0.59	0.03	0.93	2.18	-0.45
2016	156.15	26.47	101.05	107.58	202.78	-0.55	0.03	1.01	2.59	-0.36
2017	156.88	25.40	95.33	103.24	230.57	-0.51	0.02	0.97	2.37	-0.40
2018	177.00	25.11	92.25	96.04	240.90	-0.46	0.01	0.94	1.80	-0.35
2019	171.01	24.51	95.61	94.03	246.40	-0.31	0.02	0.90	1.52	-0.33
2020	168.25	24.88	114.40	95.16	227.01	-0.52	0.04	0.69	2.73	-0.26
2021	185.70	28.74	104.66	79.69	257.79	-0.37	0.03	0.52	3.34	-0.35
2022	227.51	32.79	36.49	86.21	275.96	-0.30	0.06	0.56	2.36	-0.30

Source: Own Computation (2023)

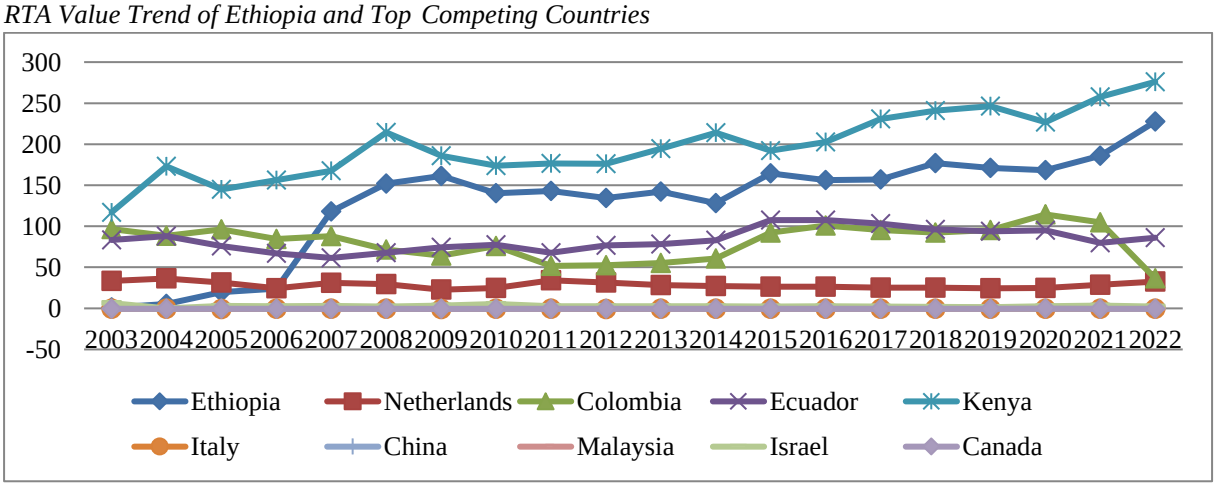
Table 2 shows the RTA index result of Ethiopia, the Netherlands, Colombia, Ecuador, Kenya, Italy, China, Malaysia, Israel, and Canada between 2003 and 2022. A widely accepted threshold for analyzing RTA value is that a positive value of RTA indicates a competitive advantage, and a negative result shows a competitive disadvantage (Gibba, 2017). In another way, this threshold is described by Momaya (1998), which states that if the RTA index is less than 0, an industry does not have a competitive advantage; if the RTA index is close to 0, an industry is self-balancing, and if the RTA index is greater than 0, the industry has a competitive advantage. The RTA value in Table 2, from 2003 through 2022, Ethiopia's flower has a competitive advantage shown by a positive RTA value. Likewise, the Netherlands, Colombia, Ecuador, Kenya, Israel (except in the year 2004, which is self-balancing), and Malaysia (except in the years between 2003 and 2009 and between 2020 and 2022) have a competitive advantage in flower in the world market as indicated in Table 2. However, China's is only self-balancing, and also Malaysia's flower is self-balancing, particularly, in the years between 2003 and 2009 and between 2020 and 2022, as revealed by RTA value close to zero.

Additionally, as shown in Table 2, Italy and Canada have a competitive disadvantage in flowers with negative RTA value in the entire years considered in this study (i.e., 2003-2022). According to the RTA result generated, Ethiopia has a strong competitive advantage in flower in the international market next to Kenya. However, its competitive advantage is facing inconsistency in the considered years like that of the top competing countries with a strong competitive advantage in flower: the Netherlands, Colombia, Ecuador, and Kenya, especially in the pre-COVID-19 era. Conversely, Ethiopia's flower competitive advantage has achieved a steady improvement in the post COVID-19 pandemic era while other countries are facing a huge decline, particularly Colombia. Therefore, this indicated that Ethiopia's flower has shown a constant increment in competitive advantage in the post COVID-19 period, while other top competing countries are encountering fluctuating trends except for the countries such as the Netherlands and Kenya.

Moreover, Figure 5 shows that Ethiopia's flower competitiveness is improving, similar to the Netherlands and Kenya in the post COVID-19 era, while other top competing countries were facing fluctuating and declining competitive advantage trends such as Colombia, Ecuador, Malaysia, and Israel.

Figure 5

RTA Value Trend of Ethiopia and Top Competing Countries



Source: Own Computation (2023)

Descriptive Analysis for Ethiopia's Flower Indexes

Regarding descriptive statistics for Ethiopia's flower competitiveness indexes: RXA, RMA, RTA, and NRCA from 2003-2022, as can be seen in Table 3, the average value of the relative import advantage index (RMA = .48) was low since Ethiopia is not a flower importing country. By the same token, we found a high average value in the relative trade advantage index (RTA = 128.80). This index is essentially based on RXA, which is why RXA and RTA's values are nearly equal.

The average value of the normalized revealed comparative advantage index (NRCA = .78*) indicates the comparative advantage Ethiopia relishes in the world flower industry. The coefficient of variation, nonetheless, revealed a larger relative dispersion or uncertainty for the normalized revealed comparative advantage (CVNRCA = .51) with respect to the relative export advantage (CVRXA = .49) and the relative trade advantage (CVRTA = .49).

Table 3

Descriptive Statistics for Ethiopia's Flower Competitiveness Indexes (RXA, RMA, RTA, and NRCA) from 2003-2022

Indexes	No.	Minimum	Maximum	*M*	*SD*	Coefficient of Variation (%)
RXA	20	0.91	227.52	129.29	63.39	49.03
RMA	20	0	6.08	0.48	1.42	296.75
RTA	20	0.91	227.51	128.80	64.13	49.79
NRCA	20	-0.00*	1.190*	0.78*	0.40*	51.79

Note. *the numerical values are in "00000"

Pearson's Correlation Analysis for Ethiopia's Flower Indexes

Additionally, Pearson's correlation analysis was carried out to measure the strength of the linear relationships between the pairs of the calculated indexes (RXA, RMA, RTA, and NRCA) of Ethiopia's flower. Pearson's correlation method is the most common method to use for numerical variables - it assigns a value between −1 and 1, where 0 is no correlation, 1 is a total positive correlation, and −1 is a total negative correlation (Boslaugh & Watters, 2008). These correlations such as can either be negative or strong positive, moderate positive, or weak positive, according to Guaita-Pradas et al. (2023). Pearson correlation coefficient (*r*) value greater than .5 indicates the relationship is strong positive; between .3 and .5, moderate positive; between 0 and .3, weak positive; between 0 and –0.3, weak negative; between –.3 and –.5, moderate negative; whereas r value less than –0.5 shows strong negative relationship (Turney, 2023).

Therefore, as per the correlation threshold indicated above, on performing Pearson's correlation analysis, Table 4 indicated that three pairs of indexes with a strong positive correlation were reached, whereas three pairs with a strong negative correlation.

Table 4

Pearson's Correlation Test for Ethiopia's Flower Indexes

Correlations

		RXAET	RMAET	RTAET	NRCAET
RXAET	Pearson Correlation	1	-.51*	1.00**	.92**
	Sig. (2-tailed)		.02	.000	.000
	N	20	20	20	20
RMAET	Pearson Correlation	-.51*	1	-.52*	-.53*
	Sig. (2-tailed)	.02		.01	.01
	N	20	20	20	20
RTAET	Pearson Correlation	1.00**	-.52*	1	.92**
	Sig. (2-tailed)	.000	.01		.000
	N	20	20	20	20
NRCAET	Pearson Correlation	.92**	-.53*	.92**	1
	Sig. (2-tailed)	.000	.01	.000	
	N	20	20	20	20

Note. *. Correlation is significant at the 0.05 level (2-tailed). **. Correlation is significant at the 0.01 level (2-tailed).

T-Test Analysis for the RTA Indexes of Ethiopia and Top Competing Countries

This study employed paired sample t-test to investigate whether there is a statistically significant difference between Ethiopia and top competing countries (the Netherlands, Colombia, Ecuador, Kenya, Italy, China, Malaysia, Israel, and Canada) regarding competitive advantage per the shown RTA index result. In this respect, as shown in Table 5, statistically significant differences were found between Ethiopia's competitive advantage and those of the top competing countries. Accordingly, Ethiopia's Vollrath index is not equal to that of the Netherlands (a = .00), neither Colombia's (a = .00), Ecuador's (a = .00), nor Kenya's (a = .00), and also, neither Italy's (a = .00), China's (a = .00), Malesia's (a = .00), Israel's (a = .00) nor Canada's (a = .00).

Conversely, when looking at the country pairs, it is understood that in the case of Colombia versus Ecuador (a = .55), its Vollrath index is statistically equal. This can be elucidated by the fact that Colombia and Ecuador have a similar ratio of flower exports-flower imports.

Table 5

Paired Sample T-Test for the RTA Index of Ethiopia and Top Competing Countries from 2003–2022

Paired Samples Test

		Paired Differences					*t*	*df*	Sig. (2-tailed)
		M	*SD*	SE. Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	RTAET - RTANL	100.29	65.78	14.70	69.50	131.07	6.81	19	.000
Pair 2	RTAET - RTACL	47.92	72.00	16.10	14.22	81.62	2.97	19	.008
Pair 3	RTAET - RTAEC	45.27	61.53	13.75	16.48	74.07	3.29	19	.004
Pair 4	RTAET - RTAKE	-69.59	38.48	8.60	-87.60	-51.58	-8.08	19	.000
Pair 5	RTAET - RTAIT	129.37	64.07	14.32	99.38	159.35	9.03	19	.000
Pair 6	RTAET - RTACH	128.77	64.13	14.34	98.75	158.78	8.97	19	.000
Pair 7	RTAET - RTAML	128.08	64.00	14.31	98.13	158.04	8.95	19	.000
Pair 8	RTAET - RTAIL	126.03	64.34	14.38	95.91	156.14	8.76	19	.000
Pair 9	RTAET - RTACA	129.24	64.10	14.33	99.24	159.24	9.01	19	.000
Pair 10	RTANL - RTACL	-52.36	22.54	5.04	-62.91	-41.81	-10.38	19	.000
Pair 11	RTANL - RTAEC	-55.01	15.21	3.40	-62.13	-47.89	-16.17	19	.000
Pair 12	RTANL - RTAKE	-169.88	41.50	9.28	-189.30	-150.46	-18.30	19	.000
Pair 13	RTANL - RTAIT	29.08	3.86	0.86	27.27	30.88	33.63	19	.000
Pair 14	RTANL - RTACH	28.48	3.85	0.86	26.67	30.28	33.02	19	.000
Pair 15	RTANL - RTAML	27.79	3.97	0.88	25.93	29.65	31.26	19	.000
Pair 16	RTANL - RTAIL	25.74	4.17	0.93	23.79	27.69	27.60	19	.000
Pair 17	RTANL - RTACA	28.95	3.86	0.86	27.14	30.75	33.52	19	.000
Pair 18	RTACL - RTAEC	-2.64	19.56	4.37	-11.80	6.51	-0.60	19	.553
Pair 19	RTACL - RTAKE	-117.51	46.30	10.35	-139.18	-95.84	-11.35	19	.000
Pair 20	RTACL - RTAIT	81.44	21.07	4.71	71.58	91.31	17.28	19	.000
Pair 21	RTACL - RTACH	80.84	21.10	4.71	70.97	90.72	17.13	19	.000
Pair 22	RTACL - RTAML	80.16	21.13	4.72	70.27	90.05	16.96	19	.000
Pair 23	RTACL - RTAIL	78.11	21.08	4.71	68.24	87.97	16.56	19	.000
Pair 24	RTACL - RTACA	81.31	21.06	4.70	71.46	91.17	17.26	19	.000
Pair 25	RTAEC - RTAKE	-114.87	36.85	8.24	-132.12	-97.62	-13.93	19	.000
Pair 26	RTAEC - RTAIT	84.09	13.50	3.01	77.77	90.41	27.84	19	.000
Pair 27	RTAEC - RTACH	83.49	13.55	3.03	77.14	89.83	27.53	19	.000
Pair 28	RTAEC - RTAML	82.80	13.45	3.00	76.51	89.10	27.52	19	.000
Pair 29	RTAEC - RTAIL	80.75	13.94	3.11	74.23	87.27	25.90	19	.000
Pair 30	RTAEC - RTACA	83.96	13.50	3.01	77.64	90.28	27.81	19	.000
Pair 31	RTAKE - RTAIT	198.9	40.06	8.95	180.21	217.71	22.20	19	.000
Pair 32	RTAKE - RTACH	198.36	40.16	8.98	179.56	217.16	22.08	19	.000
Pair 33	RTAKE - RTAML	197.68	40.09	8.96	178.91	216.44	22.05	19	.000
Pair 34	RTAKE - RTAIL	195.62	40.74	9.11	176.55	214.69	21.47	19	.000
Pair 35	RTAKE - RTACA	198.83	40.11	8.96	180.06	217.61	22.16	19	.000
Pair 36	RTAIT - RTACH	-0.59	0.12	0.02	-0.65	-0.53	-21.21	19	.000
Pair 37	RTAIT - RTAML	-1.28	0.25	0.05	-1.40	-1.16	-22.93	19	.000
Pair 38	RTAIT - RTAIL	-3.33	1.35	0.30	-3.97	-2.70	-11.02	19	.000
Pair 39	RTAIT - RTACA	-0.12	0.07	0.01	-0.16	-0.09	-7.47	19	.000
Pair 40	RTACH - RTAML	-0.68	0.22	0.04	-0.79	-0.58	-13.82	19	.000
Pair 41	RTACH - RTAIL	-2.73	1.30	0.29	-3.35	-2.12	-9.35	19	.000
Pair 42	RTACH - RTACA	0.47	0.09	0.02	0.42	0.51	22.05	19	.000
Pair 43	RTAML - RTAIL	-2.05	1.36	0.30	-2.69	-1.41	-6.73	19	.000
Pair 44	RTAML - RTACA	1.15	0.23	0.05	1.04	1.26	21.75	19	.000
Pair 45	RTAIL - RTACA	3.20	1.32	0.29	2.58	3.82	10.83	19	.000

Note. RTA: Relative Trade Advantage; t: test statistic; df: degrees of freedom; ET: Ethiopia; NL: The Netherlands; CL: Colombia; EC: Ecuador; KE: Kenya; IT: Italy; CH: China; ML: Malesia; IL: Israel; CA: Canada

Conclusions

This study sought to examine the competitive performance of Ethiopian flowers in the pre-to post COVID-19 pandemic era in comparison with the world's top producers and exporters (i.e., the Netherlands, Colombia, Ecuador, Kenya, Italy, China, Malaysia, Israel, and Canada).

To this end, the study used quantitative techniques such as NRCA and RTA, as well as statistical analysis tools (mean, standard deviation, coefficient of variation, Pearson's correlation test, and paired sample t-test) for analysis of secondary data obtained from ITC database. The study's findings that compared to countries like the Netherlands, Colombia, Ecuador, Kenya, Italy, China, Malaysia, Israel, and Canada, Ethiopian flower industry has achieved remarkable growth and consistent performance trend from pre-to post COVID-19 pandemic era (2003-2022) in the world market, according to NRCA, RTA, and statistical analysis (mean, standard deviation, coefficient of variation, Pearson correlation, and paired t-test) results has the following theoretical implications.

First, it provides valuable research insight into marketing and management fields in relation to applying Meso-level analysis for competitiveness analysis. It advances competitiveness analysis understanding by focusing on international competitiveness using industry-level analysis of flower products in the world market, mainly at the product or firm level of analysis (Guaita-Pradas et al., 2023). The current study initiates a broader perspective and multi-dimensional view of the competitive performance of Ethiopian flower products on the international stage. In addition, a comparative approach followed in this study may trigger a new perspective for sentimental products like flower products in the world floriculture market across the world.

Second, to fully understand the competitive performance of the flower industry, the study rationalized that international competitiveness analysis based on both import and export data provides a holistic picture for developing countries like Ethiopia. Prior studies (e.g., Brakman & Marrewijk, 2017) noted that gross trade flows (gross import and export) provide sufficient information to analyze the structure of international trade, for example, comparative advantage. Therefore, the study used export data for the determination of the NRCA index of Ethiopia compared to top producing and exporting countries and import data for calculation of the RTA index, as well as orthodox statistical analysis tools such as mean, standard deviation, coefficient of variation, Pearson correlation, and paired t-test, to show the comparative and competitive advantage of flower industry in the world market, particularly, from pre-to post COVID-19 era (2003-2022). Hence, this may add viewpoints to the existing literature on competitiveness analysis on the international stage using theories of comparative and competitive advantage.

Third, the study is believed to expand prior research discussion on the shortcomings of Balassa's index, the most commonly used competitive index, by adopting Normalized Revealed Comparative Advantage (NRCA) and Relative Trade Advantage (RTA) (Leromain & Orefice, 2013; Brakman & Marrewijk, 2017). Particularly, as noted by Leromain and Orefice (2013), Balassa's index (1965) suffers from both theoretical foundation and empirical distribution weaknesses. The Balassa's index does not have a stable distribution over time and provides poor ordinal ranking property (United Nations Industrial Development Organization [UNIDO], 1982; Yeats, 1985). Despite such criticism from the scientific community, some researchers continued to adopt the RCA index for comparative advantage. For example, Guaita-Pradas et al. (2023) used RCA to analyze the comparative advantage of Ecuador's flower industry in global trade. Thus, this study believes that findings from such studies may be misleading and inconclusive. Therefore, using the two competitive performance models,

NRCA and RTA, the focus of this study could improve the validity of findings from studies like the current study.

The findings show that Ethiopia, as well as the Netherlands, Colombia, Ecuador, and Kenya, have strong competitive advantage in the flower industry in the pre-to post COVID-19 pandemic era (2003-2022), with relatively consistent competitive performance trend in the world market; while other countries with fluctuating competitive advantage and self-balancing (Israel, Malaysia, and China) and also countries such as Italy and Canada have competitive disadvantage in flower in the world market, is meaningful for managerial application. First, this study's report on the level and trend of the flower industry competitiveness of Ethiopia and top producing and exporting countries is believed to inform the practitioners in the industry to make necessary adjustments that may be required to be competitive on the international stage. The findings of this study give managers powerful evidence of how their industry competitiveness changes over time and the ordinal rank of their respective countries, as shown mainly by NRCA and RTA results. This is because the flower sector continues to play an important role in the social and economic environment of the countries studied, as the livelihood of hundreds of thousands of people depends on flower production and marketing at different stages consisting mostly of giant businesses.

Second, the competitiveness trend analysis for each country provides flower industry managers to be informed on the extent of flower performance. The study fills research gaps in the flower industry as prior studies focus on carbendazim removal, an opportunity of banks in financing, occupational heat stress on workers' health risks and productivity losses, workers saving, automated climate monitoring system, and environmental performance evaluation factors (e.g., Hawera et al., 2021; Kenea, 2022; Ryu & Suzuki, 2021; Simane et al., 2022; Wehbe et al., 2022; Weldeslasie et al., 2021) and entirely focusing on export performance only (e.g., Seyoum, 2021). Furthermore, the study recommends managers give attention to the sustained comparative as well as competitive strategies and policies needed for countries.

Practical Implications

The results of this study provide strong evidence to the leaders of the flower industry, the government in general, and policymakers in particular about how the competitive performance of the flower industry changes over time and the ranks of their respective countries, which calls attention to the sustained comparative and competitive strategies and policies required for countries. It is thought that Ethiopia's competitive performance in the flower market, as measured against the Netherlands, Colombia, Ecuador, Kenya, Italy, China, Malaysia, Israel, and Canada, will help industry professionals determine what changes should be made to give Ethiopia a comparative and competitive advantage.

The study's results can also be used as stepping stone evidence for the agribusiness sector's comparative and competitive advantages at both the domestic and global levels in various geographic contexts, such as Ethiopia, Africa, and the sector's competitiveness at the global level generally. The findings, for instance, would be helpful for agribusiness sector marketing strategy design and implementation as well as production and investment planning. Additionally, the results would be essential to give governments, especially policymakers, concrete evidence to deliver a comprehensive and wide range of policies intended to address their economic objectives across countries and/or regions, which would include measures

related to the agribusiness sector's comparative and competitive advantages in the global market contest.

Limitation and Future Research Direction

Unlike its theoretical and practical contributions, this study may have some limitations. First, this study only focused on the forward integration of the flower industry, which lacks showing the full chain undertakings contributing to enhance competitiveness. For instance, future studies may include how input and production condition factors are contributing to enhance the competitive performance of the Ethiopian flower industry in the world market.

Second, the study did not also include an analysis of how the different government agencies are contributing to the industry's competitive performance. Although government support for the industry is improving over time, the coordination among government agencies has to be investigated.

Third, this study also has limitations due to a lack of analysis to what extent the international market network has contributed to the industry's level of competitive performance. Through using primary data, for example, via questionnaire, future studies may investigate the extent of the contribution of the international market network to the flower product competitiveness in the world market.

Lastly, the study suffers a generalizability problem due to a lack of using qualitative data to substantiate the quantitative data. The quantitative analysis leads to limited outcomes outlined in the study findings. So the results cannot always represent the actual occurrence in a generalized form. Thus, further study is needed to explore and enhance generalizability by supplementing with qualitative instruments like interviews and/or focus group discussions.

Declarations

Acknowledgements

Not applicable.

Disclosure Statement

No potential conflict of interest was reported by the authors.

Ethics Approval

Not applicable.

Funding Acknowledgements

Not applicable.

Citation to this article

Worku, M. A., Debela, K. L., & Mudde, H. L. M. (2023). Competitive performance of the Ethiopian flower industry from a pre-to post COVID-19 pandemic era (2003-2022): A comparative study. *International Journal of Organizational Leadership, 12*(First Special Issue), 91-114. https://doi.org/10.33844/ijol.2023.60370

Rights and Permissions

References

Abei, L. (2017). *An analysis of the competitive performance of the Cameroonian cocoa industry* [Doctoral dissertation, Stellenbosch: Stellenbosch University].

Abinsay, M. (2020). Porter's Five Forces Analysis of the Organic Farming in Laguna Province. *International Journal of Academe and Industry Research*, *1*(1).

Adedapo, D. A. (2021). *Impacts on local agribusiness supply chain amidst the COVID-19 in Estonia (a case study of the dairy sector)* [Master's thesis, Eesti Maaülikool].

Adeola, O., Meru, A. K., & Kinoti, M. W. (2018). Kenya's blooming flower industry: enhancing global competitiveness. *Africa's Competitiveness in the Global Economy*, 331–349.

Angala, A. (2015). *An analysis of the competitive performance of the Namibian date industry-2001 to 2013* [Doctoral dissertation, Stellenbosch: Stellenbosch University].

Aschalew, B. (2015). *FDI flow and National competitiveness in the Ethiopian Flower Industry* [Master's thesis].

Balassa, B. (1965). Trade liberalisation and "revealed" comparative advantage 1. *The Manchester School*, *33*(2), 99–123.

Batha, S. T., & Jooste, A. (2004). The Effect of Internalization on the beef and maize sub-sectors: the relevance of revealed comparative advantage measures. *Unpublished Article. University of the Free State*.

Benalywa, Z. A., Ismail, M. M., Shamsudin, M. N., & Yusop, Z. (2019). Revealed Comparative Advantage and Competitiveness of Broiler Meat Products in Malaysia and Selected Exporting Countries. *International Journal of Business & Society*, *20*(1).

BigManBusiness [BMB] (2022). (NEW) Top Countries To Buy And Sell Flowers. https://bigmanbusiness.com/380/countries-to-buy-and-sell-flowers/

Boansi, D., & Crentsil, C. (2013). Competitiveness and determinants of coffee exports, producer price and production for Ethiopia. *Journal of Advanced Research in Economics and International Business*, *1*(1), 31–56.

Bojnec, Š., & Fertő, I. (2009). Agro-food trade competitiveness of Central European and Balkan countries. *Food policy*, *34*(5), 417–425.

Bonetti, J., & Zidziunas, A. (2022). Air freight impact on the Colombian flower industry. *College of Business and Management, Lynn University MBA 661 I: International Trade and Investment.*

Boonzaaier, J. D. T. L. (2015). *An inquiry into the competitiveness of the South African stone fruit industry* [Doctoral dissertation, Stellenbosch: Stellenbosch University].

Boslaugh, S., & Watters, P. A. (2008). *Statistics in a Nutshell: A Desktop Quick Reference*, ch. 7. Sebastopol, CA: O'Reilly Media. ISBN-13: 978-0596510497.

Brakman, S., & Van Marrewijk, C. (2017). A closer look at revealed comparative advantage: Gross-versus value-added trade flows. *Papers in Regional Science*, *96*(1), 61–92.

Bristow, M. (2021). Colombia Flower Growers *Recover After Trashing Millions of Roses*. Bloomberg News. https://www.bnnbloomberg.ca/colombia-flower-growers-recover-after-trashing-millions-of-roses-1.1563229

Brkić, S. (2020). Comparative advantages and competitiveness: Evidence from trade of Bosnia and Herzegovina with its Main Partners. *Ekonomska misao i praksa*, *29*(1), 137–155.

Camagni, R. (2017). On the concept of territorial competitiveness: sound or misleading?. *Seminal Studies in Regional and Urban Economics: Contributions from an Impressive Mind*, 93–113.

Chebet, K. E. (2021). *The fragility of Kenya's cut flower sector and impacts as exposed by COVID-19* [Unpublished master's thesis, Ghent University].

Diriba, A. K., & Karzanova, I. V. (2020). Ethiopia. the role of foreign direct investment in economic development. *Aziya i Afrika Segodnya*, (8).

Dlamini, B. P. (2012). *Analysing the competitiveness of the agribusiness sector in Swaziland* [Doctoral dissertation, University of Pretoria].

Dogan, E., Majeed, M. T., & Luni, T. (2022). Analyzing the nexus of COVID-19 and natural resources and commodities: Evidence from time-varying causality. *Resources Policy*, *77*, 102694.

Erkan, B., & Sarıçoban, K. (2014). Comparative analysis of the competitiveness in the export of science-based goods regarding Turkey and the EU+ 13 countries. *International Journal of Business and Social Science*, *5*(8), 1.

Ermias, Z. T. (2016). *An assessment of market dynamics in relation to rose flower export market in Ethiopia* [Masters' thesis, St. Mary's University].

Esterhuizen, D. (2006). *An evaluation of the competitiveness of the South African agribusiness sector* [Doctoral dissertation, University of Pretoria].

Fachrudin, U., & Hastiadi, F. F. (2016). *Impact Analysis of Normalized Revealed Comparative Advantageon ASEAN's Non-Oil and Gas Export Pattern Using Gravity-Model Approach* (No. 201603). Faculty of Economics and Business, University of Indonesia.

Fadhel, K. (2002). Positivist and hermeneutic paradigm: A critical evaluation under their structure of scientific practice. *The Sosland Journal*, *6*(5), 21–28.

Frohberg, K., & Hartmann, M. (1997). *Comparing measures of competitiveness* (No. 2). Discussion paper.

GA ISIG Study Tour (2021). Ethiopia's floriculture industry.

Gebreamlak, T. (2021). *Assessment on practices and challenges of postharvest handling of cut-flowers in linssen roses Ethiopia PLC* [Doctoral dissertation, St. Mary's University].

Geleta, D. H., Alemayehu, M., Asrade, G., & Mekonnen, T. H. (2021). Low levels of knowledge and practice of occupational hazards among flower farm workers in southwest Shewa zone, Ethiopia: a cross-sectional analysis. *BMC Public Health*, *21*, 1–12.

Ghauri, P., Gronhaug, K., & Kristinslund, I. (2010). Research methods in business studies. 4. painos. *Essex: Pearson Education Limited*, 977–979.

Gibba, A. (2017). *The competitiveness of Gambia's agricultural products in international trade: an incentive for economic progress* [Doctoral dissertation, Szent István Egyetem (2000-2020)].

Guaita-Pradas, I., Rodríguez-Mañay, L. O., & Marques-Perez, I. (2023). Competitiveness of Ecuador's flower industry in the global market in the period 2016–2020. *Sustainability*, *15*(7), 5821.

Hawera, T., Tefera, B., & Sahu, O. (2021). Flower farms environmental performance evaluation in Ethiopia. *Journal of Environmental & Earth Sciences*, *3*(1).

Hazra, P., & Ghosh, A. (2022). COVID-19 pandemic and resilience in the agricultural sector: A local strategy may solve the global challenges. *AGBIR*, *38*(6), 401–405.

Hohler, J., & Lansink, A.O. (2021). Measuring the impact of COVID-19 on stock prices and profits in the food supply chain. *Agribusiness* 37 (1), 171–186.

International Development Association. (2020). Impacts of COVID-19 on the Private Sector in Fragile and Conflict-Affected Situations.

International Trade Centre (ITC, 2023). List of Exporters for the Selected Products (Flowers and Buds, Cut for Bouquets or Decorations, Fresh, Dried, Bleached, Dyed, Impregnated . .). https://www.trademap.org/Index.aspx (accessed on 10 June 2023).

Jackman, M., Lorde, T., Lowe, S., & Alleyne, A. (2011). Evaluating tourism competitiveness of small island developing states: a revealed comparative advantage approach. *Anatolia*, *22*(3), 350–360.

Jafta, A. (2014). *Analysing the competitiveness performance of the South African apple industry* [Doctoral dissertation].

Kaphle, B. D., Ghimire, M. S., Subedi, S., & Pandey, I. R. (2021). Post-COVID Horticulture: challenges and way forward for food and nutrition security and income generation (pp. 34-44). *Proceeding of 12th 34 National Horticulture Seminar 2021*.

Kassa, M. (2017). Review on environmental effects of Ethiopian floriculture industry. *Asian Research Journal of Agriculture*, *4*(2), 1–13.

Kenea, M. (2022). Assessing the opportunities available to banks in financing horticulture sub-sector in Ethiopia. *Research Journal of Finance and Accounting*, *13*(9).

Kinfu, A., Gobena, B., Berhanu, M., & Hailu, B. (2021). Analysis of physicochemical parameters in wastewater and heavy metals in soils of flower farms in Ethiopia. *International Journal of Environmental & Agriculture Research*, *7*(2), 24-28.

Latruffe, L. (2010). Competitiveness, productivity and efficiency in agricultural and agri-food sectors. *OECD FAF Paper*, No. 30.

Laursen, K. (2015). Revealed comparative advantage and the alternatives as measures of international specialization. *Eurasian Business Review*, *5*, 99–115.

Leromain, E., & Orefice, G. (2013). New Revealed Comparative Index: dataset and empirical distribution. *CEPII No. 2013-20 June*.

Matkovski, B., Zekić, S., Đokić, D., Jurjević, Ž., & Đurić, I. (2021). Export competitiveness of agri-food sector during the EU integration process: Evidence from the Western Balkans. *Foods*, *11*(1), 10.

Mebrat, S., Degwale, A., Mekonen, T., & Mebrat, A. (2022). Flower production prospects and sustainability challenges in Ethiopia: A systematic review. *Frontiers in Environmental Science*, 10, 1026544. https://doi.org/10.3389/fenvs.2022.1026544

Mengistie, B. T. (2020). Ethiopia: The environmental aspects of policy and practice in the ethiopian floriculture industry. *Environmental Policy and Law*, *50*(4-5), 373–390.

Mengistie, B. T., Mol, A. P., & Oosterveer, P. (2017). Governance of agro-pesticide through private environmental and social standards in the global cut flower chain from Ethiopia. *Ambio*, *46*(7), 797–811.

Momaya, K. (1998). Evaluating international competitiveness at the industry level. *Vikalpa*, *23*(2), 39–46

Munson, A. M. (2021). The effect of the coronavirus pandemic on the us cut flower market: A harris county texas florists wholesale price and quantity change of roses and hydrangeas from January 2018 To August 2021. *Senior Honors Thesis*.

Observatory of Economic Complexity (2023). Cut flowers: Exporters and importers. https://oec.world/en/profile/hs/cut-flowers

Omer, S. A., & Hassen, N. A. (2020). The impacts of COVID-19 pandemic diseases on Ethiopian Agriculture: Food systems, industries, also mitigation and adaptation strategy. *Jurnal Ilmiah Pertanian*, *17*(1), 60–84.

Pangtu, S., Sharma, P., Dhiman, S. R., Thakur, D., & Negi, M. (2020). Impact of Covid-19 on floriculture industry-challenges and strategies, *Recent Advances in Agricultural Sciences and Technology*, 310–319.

Pitts, E., Viaene, J., Traill, B., & Gellynk, X. (1995). *Measuring Food Industry Competitiveness. Structural Change in the European Food Industries*, Discussion Paper Series, No. 7.

Porter, M. E. (1990). The competitive advantage of nations. *Harvard business review*, *73*, 91.

Porter, M. E. (1998). Competitive Advantage of nations. Creating and sustaining superior performance: with a new introduction.

Proudman, J., & Redding, S. (2000). Evolving patterns of international trade. *Review of international economics*, *8*(3), 373–396.

Proudman, J., & Redding, S. J. (1998). Persistence and mobility in international trade. Bank of England Working Paper No. 64, Available at SSRN: https://ssrn.com/abstract=79473 or http://dx.doi.org/10.2139/ssrn.79473

Rikken, M. (2011). The global competitiveness of the Kenyan flower industry. *World Bank*.

Ryu, E. J., & Suzuki, A. (2021). ROSCAS as Insurance: Comparing Formal and Informal Methods of Saving among the Unskilled Workers in the Ethiopian Cut-Flower Industry. *The Developing Economies*, *59*(3), 243–274.

Schaefer, F., & Grum, A. (2015). *The case for industrial policy and its application in the Ethiopian cut flower sector*. EDRI Working Paper 12. Addis Ababa: Ethiopian Development Research Institute.

Seyoum, F. (2021). Determinants of Ethiopian flower export performance: The case of gravity model application. *International Journal of Finance and Banking Research*, *7*(5), 101–110

Shentema, M. G., Kumie, A., Bråtveit, M., Deressa, W., Ngowi, A. V., & Moen, B. E. (2020). Pesticide use and serum acetylcholinesterase levels among flower farm workers in Ethiopia—a cross-sectional study. *International Journal of Environmental Research and Public Health*, *17*(3), 964.

Siche, R. (2020). What is the impact of COVID-19 disease on agriculture?. *Scientia Agropecuaria*, *11*(1), 3–6.

Sigala, M. (2020). Tourism and COVID-19: Impacts and implications for advancing and resetting industry and research. *Journal of Business Research*, *117*, 312–321.

Simane, B., Kumie, A., Berhane, K., Samet, J., Kjellstrom, T., & Patz, J. (2022). Occupational heat stress in the floriculture industry of Ethiopia: Health risks and productivity losses. *Health*, *14*(2), 254–271.

Traill, B. (1998). Structural changes in the European food industry: consequences for competitiveness. *Competitiveness in the Food Industry*, 35–57.

Turney, S. (2023, June 22). *Pearson Correlation Coefficient (r) | Guide & Examples*. Scribbr. Retrieved June 27, 2023, from https://www.scribbr.com/statistics/pearson-correlation-coefficient/

U.S. Department of Agriculture. (2020). *Colombia: Sales of Colombian Flowers Fall During Covid-19 Crisis*. https://www.fas.usda.gov/data/colombia-sales-colombian-flowers-fall-during-covid-19-

United Nations Industrial Development Organization (UNIDO). (1982). *Changing patterns of trade in world industry: An empirical study on revealed comparative advantage*. New York.

Van Rooyen, C. J., & Boonzaaier, J. (2016). Competitiveness in the Agribusiness Environment (From analysis to cooperative strategy development-a South Africa case study). *1st annual lecture of the cooperative Central Bank, University of Cyprus*.

Van Rooyen, J., Esterhuizen, D., & Stroebel, L. (2011). Analyzing the competitive performance of the South African wine industry. *International Food and Agribusiness Management Review*, *14*(1030-2016-82902), 179–200.

Vollrath, T. L. (1991). A theoretical evaluation of alternative trade intensity measures of revealed comparative advantage. *Weltwirtschaftliches Archiv*, *127*(2), 265–280.

Weersink, A., von Massow, M., Bannon, N., Ifft, J., Maples, J., McEwan, K., ... & Wood, K. (2021). COVID-19 and the agri-food system in the United States and Canada. *Agricultural Systems*, *188*, 103039.

Wehbe, S., Zewge, F., Inagaki, Y., Sievert, W., Uday Kumar, N. T., & Deshpande, A. (2022). Performance of carbendazim removal using constructed wetlands for the Ethiopian floriculture industry. *Water Science and Technology*, *86*(1), 142–151.

Weldeslasie, D. T., Assres, G., Grønli, T. M., & Ghinea, G. (2021). Automated Climate Monitoring System: the Case of Greenhouse Industries in Ethiopia. *Internet of Things*, *15*, 100426.

Whitfield, L., Staritz, C., Melese, A. T., & Azizi, S. (2020). Technological capabilities, upgrading, and value capture in global value chains: Local apparel and floriculture firms in Sub-Saharan Africa. *Economic Geography*, *96*(3), 195–218.

Woldemichael, A. (2020). *Determinants of pulse export performance in Ethiopia* [Doctoral dissertation, St. Mary's University].

Worku, F. M. (2018). *Export competition between Ethiopia and Kenya in the European Union* [Doctoral dissertation, Pukyong National University].

Yeats, A. J. (1985). On the appropriate interpretation of the revealed comparative advantage index: implications of a methodology based on industry sector analysis. *Weltwirtschaftliches Archiv*, *121*(1), 61–73.

Yeshiwas, T., & Workie, A. (2018). Social, economical and environmental issues of floriculture sector development in Ethiopia. *Review of Plant Studies*, *5*(1), 1–10.

Yu, R., Cai, J., & Leung, P. (2009). The normalized revealed comparative advantage index. *The Annals of Regional Science*, *43*, 267–282.