



# **An analysis of the competitive performance of the Congolese palm oil industry**

by  
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## Declaration

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## Summary

The palm oil industry of the Democratic Republic of the Congo (DRC) provides an interesting case study. Richly endowed with the required natural resource base, the DRC was a leading palm oil producer and the main African exporter of palm oil and second in the world with 150 000+ metric tons from 1961 to 1975. Thereafter and due to neglect and decline, the Congolese palm oil industry reached the point, in the 1990s to 2010, where palm oil had to be imported to meet local demand. Since 2015, indications of recovery have been observed.

This study measures and analyses the competitive performance of the Congolese palm oil industry to understand the factors constraining and enhancing competitiveness and to propose strategies for improvement. The New Trade Theory and Porter Diamond model provided a grounded theoretical construct for the analysis as it relates to converting comparative advantages, based on natural resource endowments (for palm oil production in the DRC), into business related competitive advantage positions.

The relative trade advantage (RTA), the revealed comparative advantage (RCA), and the normalised revealed comparative advantage (NRCA) were used as quantitative measures, with trade data from FAOSTATS and Trade Map ITC. The RTA measurement shows fluctuating trends for the Congolese palm oil industry from highly competitive to negative ratings, with four phases of competitiveness: Phase 1 - "Post-impence highly competitive but fluctuating" (1961-1975), with 1 849 as highest RTA and 703 as lowest; Phase 2 - "Decreasing positive competitiveness" (1975-1985), with 489 as highest RTA, and 0 as lowest; Phase 3 - "Neglect and nationalization with marginal to negative competitive performance"(1986-2015), with 50 as highest RTA and -83 as lowest; and Phase 4 - "Recovery towards competitiveness" (2016 onwards), with 95 as highest RTA and 15 as lowest. From an export competitive performance perspective, RCA and NRCA indices show a marginal positive performance since 2015, indicating some recovery from the net import years.

To explore the current reality of the competitive performance of the Congolese palm oil industry, analysis structured through the Porter Diamond model indicated that demand and market conditions (rating 3.4/5) and firm strategy, structure, and rivalry (rating 3.2/5) enhance competitiveness, with production factor conditions (rating 2.4/5) near neutral. Competitive performance is however constrained by weak related and supporting industries (rating 1.7/5), chance factors (rating of 1.8/5), and government policies and support (rating of 1.9/5) Note: 5/5 is viewed as most enhancing; 1/5 most constraining. The conversion of comparative into competitive advantages for the industry thus indicates constraining conditions within the Congolese palm oil industry.

Strategies towards improving competitive performance require collaboration between the industry and government and include improving the business climate, power and electricity provision and rebuilding the general infrastructure. Linked to these are actions to be dealt with through private-public cooperation and improved industry value chain collaboration. These include research and development through the upgrading of the Nationale de Recherche Agronomies (INERA), technological innovation, replacement of obsolete equipment and improved processing facilities to increase the extraction rate of palm oil.

## Opsomming

Die palmoliebedryf van die Demokratiese Republiek van die Kongo (DRK) bied 'n interessante gevallestudie. Die DRK, ryklik toegerus met die vereiste natuurlike hulpbronnas, was vanaf 1961 tot 1975 'n toonaangewende palmolieprodusent, die belangrikste uitvoerder in Afrika asook die tweede grootste uitvoerder van palmolie - met 150 000+ metrieke ton - in die wêreld. Daarna, en as gevolg van organisatoriese en bestuurs verval en verwaarlosing, het die Kongolese palmoliebedryf in die 1990's tot 2010 die punt bereik waar palmolie ingevoer moes word om in die plaaslike vraag te voorsien. Sedert 2015 is daar egter aanduidings van herstel in die bedryf.

Hierdie studie meet en ontleed die mededingende prestasie van die Kongolese palmoliebedryf oor die afgelope 50 jaar heen, om die faktore van mededingendheid te verstaan, asook om strategieë vir verbetering voor te stel. Die *New Trade Theory en Porter Diamond*-model het 'n begroonde teoretiese konstruksie vir die analise verskaf, aangesien dit verband hou met die omskakeling van vergelykende ekonomiese voordele, gebaseer op natuurlike hulpbronnas (vir palmolieproduksie in die DRK), na besigheidsverwante mededingende voordeelposisies.

Die relatiewe handelsvoordeel (RTA), die geopenbaarde vergelykende voordeel (RCA) en die genormaliseerde geopenbaarde vergelykende voordeel (NRCA) is as kwantitatiewe maatstawwe gebruik. Die FAOSTATS en Trade Map ITC se handelsdata is gebruik. Die RTA-meting toon wisselende tendense vir die Kongolese palmoliebedryf; van hoogs mededingend tot negatiewe graderings. Vier fases van mededingendheid word beskryf: Fase 1 is die "na-onafhanklikheidsfase (1961-1975), hoogs mededingend maar wisselend" met 1 849 as die hoogste RTA en 703 as die laagste (telling). Fase 2 is die "verminderende maar steeds positiewe mededingendheidsfase" (1975-1985), met 489 as die hoogste RTA, en 0 as laagste (telling). Fase 3 is die "verwaarlosing en nasionalisering met marginale tot negatiewe mededingende prestasie-fase" (1986-2015), met 50 as die hoogste RTA en -83 as laagste RTA. Fase 4 is die herstel na mededingendheidsfase" (2016 en daarna), met 95 as hoogste RTA en 15 as laagste RTA. Vanuit 'n uitvoermededingende prestasieperspektief toon RCA- en NRCA-indekse marginaal positiewe prestasies sedert 2015. Dit dui 'n mate van herstel deur toenemende uitvoer, alhoewel invoer steeds voorkom.

Om die huidige realiteit van die mededingende prestasie van die Kongolese palmoliebedryf te verken, het ontledings, gestruktureer deur die Porter Diamond-model, aangedui dat vraag en marktoestande (gradering 3.4/5) en ook bedryfstrategie, struktuur en wedywing (gradering 3.2/5) die mededingendheid verbeter met produksiefaktortoestande (gradering 2.4/5) grootliks neutraal. Mededingende prestasie word beperk deur swak verwante en ondersteunende bedrywe (gradering 1.7/5), toevalsfaktore (gradering van 1.8/5), en regeringsbeleid en -ondersteuning (gradering van 1.9/5). Let wel: 5/5 word as die mees ondersteunende mededingende prestasie beskou; 1/5 as die mees beperkende.

Strategieë om mededingende prestasie te verbeter vereis verbeterde samewerking tussen die bedryf en die regering en sluit in die verbetering van besigheidsklimaat (business climate), krag- en elektrisiteitsvoorsiening en die herbou van die algemene infrastruktuur (vervoer en verskeping). Aksies wat hieraan verwant is, is sterker privaat-openbare samewerking en verbeterde industriewaardeketting koördinasie, en verbeterde produksie navorsing en ontwikkeling deur onder andere die opgradering van die *Nationale de Recherche Agronomies (INERA)*, tegnologiese innovasie, vervanging van uitgediende produksie toerusting en verbeterde verwerkingsfasiliteite om onttrekkingskoers van palmolie te verhoog.

I would like to dedicate this master's thesis to the almighty God who provides everything by miracle to us to complete his work. Glory be to him, the master of time and circumstances.

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The formation of man is not the task of a single person but several people to whom we take great pleasure in expressing our gratitude, although it is unfortunately impossible to mention them all here.

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## Chapter 1: Introduction

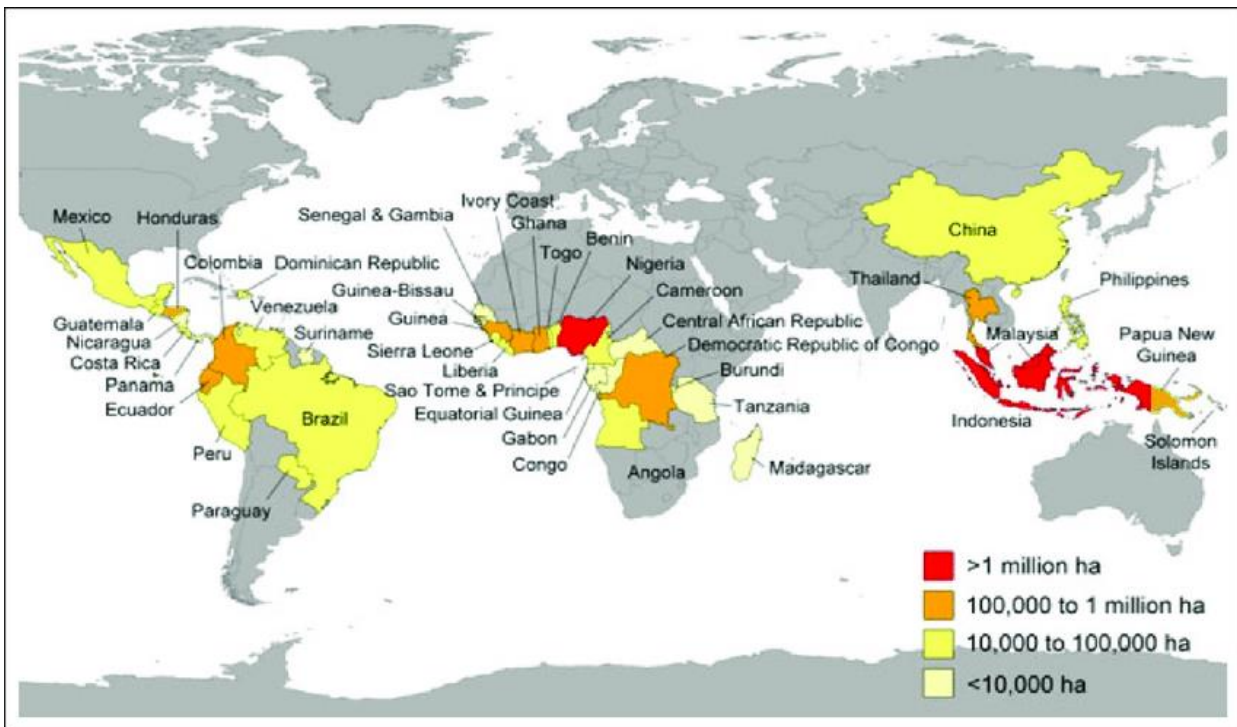
### 1.1 Background

The palm oil tree (*Elaeis guineensis Jacq*) is indigenous to western Africa. It grows naturally (in the spontaneous or sub-spontaneous state) in a belt from Senegal to Angola (Luyindula et al., 2016). It has provided local communities with many benefits for centuries, such as palm oil, sauces, soap, beverages, fertilizer, roofing (leaves), building material (trunk), and medicines (roots). These traditional uses remain present in many parts of African culture in palm oil-producing countries (Carrere, 2013). In the 15th century, when European colonial powers arrived in these areas on the African continent, they activated a profitable trade in palm kernels and palm oil, first from natural palm groves, and in 1911, they started establishing large-scale plantations. In the 19th century, palm oil seeds were transported to Dutch East India (modern-day Indonesia), and the Malay states (modern-day Malaysia) by Europeans (Dutch and English) as part of colonial ventures to grow cash crops in the region (EJEM, 2019).

Palm oil has a significantly higher yield than other vegetable oils, with high yields such as 3.8 MetricTons/ha on average worldwide and 6 Metric Tons/ha in Southeast Asia. This compares favourably with other vegetable oils such as soy – 0.4 Metric Tons/ha, coconut – 0.7 MetricTons/ha, sunflower – 0.7 MetricTons/ha, and grapeseed – 0.7 MetricTons/ha (Fern, 2022).

Palm oil is traded in local and international markets. The main exporter of palm oil is Indonesia (27,500 Metric tons), followed by Malaysia (16,220 Metric Tons), then Guatemala (810 MetricT tons) (USDA, 2022). The export values of Indonesia, Malaysia, and Guatemala are USD27 765 830, USD17 006 286, and USD919 581 respectively (ITC, 2022). The top importers of palm oil in the world are India China and the EU-27, with 8,130 MT tons, 7,200 Metric Tons, and 6,000 Metric Tons respectively (USDA, 2022).

Global production of palm oil is steadily growing. In 2023, it reached 79,464 Metric Tons , and it is expected to reach 240 million Metric Tons by 2050. Indonesia is the top producer of palm oil, with 46,500,000, and Malaysia is the second largest global producer, with 19,800 000 Metric Tons respectively (USDA,2023). The two countries make up more than 75 per cent of global palm oil production (Fern, 2022). Figure 1.1 shows the countries that produce palm oil.



**Figure 1.1** Palm oil cultivation in 43 countries in 2019  
Source: Koy & Wilcove (2008); ACT (2019)

The Democratic Republic of the Congo (DRC) is the second largest country in Africa with a land area of 2 345 408 km<sup>2</sup> and shares borders with nine countries. The climate is equatorial; however, the country is hot and humid in the North, and West, and the southern, central, and eastern areas are cooler and drier. The population is around 86.7 million people (2019) with a population growth rate of 3.2 per cent. The country has natural resources, 80 million hectares of arable land, and 1.100 listed minerals, but the people are living in extreme poverty on less than USD 1.90 per day (World Bank Group, 2021).

The DRC is rich in minerals such as cobalt, lithium, gold, and diamond, with a natural endowment for the expansion of crops such as coffee, cotton, and palm oil. The agriculture sector employs 60 per cent of workers which provides 19 per cent of the GDP (DRC Country Commercial Guide, 2021). It is one of the top producers of palm oil. From 1957 to the 1960s, it was the second-largest global exporter of palm oil, with a production of around 270,000 Metric Tons (Maindo, 2021). It lost this position due to wars, political instability, and bad governance, and the current production is 300,000 Metric Tons of palm oil (USDA, 2023)

Today, the Congolese palm oil industry's competitiveness is viewed to be recovering: In mid-2000, after the end of the war and political instability, companies such as PHC (Plantation et Huileris du Congo) and GAP (Group Agropastoral) in the provinces of Tshopo and Mongala received investments to replant old palm oil plantations and replace obsolete processing industries (Carrere, 2013). This has been raising the production of palm oil; therefore, the DRC has returned to the international market. Today, the country competes in the global market and exports to Belgium, France, Canada, Angola, and Uganda with the total values exported in

2016 being USD 133 968; in 2017, USD 85 536; in 2018, USD 111 216, and in 2019, USD 92 672 (Wamucii, 2021). The DRC however still imported 101,000 Metric Tons , 85 000 Metric Tons , 130 000 Metric Tons , and 135 000 Metric Tons in 2020, 2021, 2022, and 2023 respectively (USDA,2023).

From this, the performance of the Congolese palm oil industry has fluctuated over time in a highly competitive global environment and is attempting to recover to previous levels of production and trade. However, no comprehensive competitiveness analysis has been compiled for the industry yet. In this study, such an enquiry will be conducted.

In the agribusiness environment, several studies on competitiveness also emerged over recent decades (ISMEA, 1999; Esterhuizen, 2006; Mashabela & Vink, 2008, Dlamini, 2012, Van Rooyen, Esterhuizen & Stroebel, 2011, van Rooyen & Esterhuizen, 2023, Jafta, 2014, Boonzaaier, 2015, Angala, 2015, Abei, 2017, Barr, 2019, Bekele, 2023). This inquiry will build on these studies and focus on determining and analysing the competitive performance of the Congolese palm oil industry. An appropriate theoretical construct, analytical framework, and data sets fitting the Congolese palm oil situation will be considered to measure and analyse performance and recommend actions to enhance the competitiveness of the industry.

## **1.2. Problem statement**

The DRC has the natural resource endowment to develop the palm oil industry. Historically it has been the main exporter of palm oil in Africa, and second in the world with 150,000 plus tons from 1961 to 1975. However, from 1975 to 2015 due to wars, political instability, and constraining policies, the production and trade of palm oil fell, and the country currently imports 50,000 million tons to meet the intern demand (Maindo, 2021). The palm oil industry in the DRC is recognized to represent one of the potentially important economic development pathways for poverty alleviation, food security, and ensuring economic growth stability in the country (BCDC, 2020). However weak governance, inappropriate policies (inter alia related to Zairisation), weak infrastructure, processing infrastructure and weak access to extension services and inputs such as pesticides and fungicides, research, and lack of electricity in production areas, all constrain the expansion of the palm oil industry in the DRC (USAID, 2015). The industry with a well-endowed resource base providing a strong comparative advantage is thus challenged to create a competitive advantage, trading globally, reducing imports, and dealing with the opportunities and constraints effectively.

The DRC's Ministry of Agriculture, in recent years, launched several national campaigns for the improvement of palm oil and joined the TFA initiative (WWF, 2020). Efforts are thus underway to improve the performance of the industry. There is however no benchmark measurement and statement on the competitiveness of the Congolese palm oil industry – no comprehensive study on its competitive performance has been conducted yet. The current reality indicates a record of uncompetitive behaviour in the Congolese palm oil industry.

In this study, the focus is on applying the concept of competitiveness to the Congolese palm oil industry, to measure and analyse performance and propose strategic recommendations to enhance the industry's competitive performance.

### **1.3. Research questions**

This study attempts to answer the following questions:

- How can competitiveness be defined and measured in the context of the DRC (Congolese) palm oil industry?
- What are the factors that determine the competitive performance of the Congolese palm oil industry? Did they change over time? What trends can be observed in the competitive performance of this industry?
- What actions can be proposed to strategically improve the Congolese palm oil industry competitiveness?

### **1.4. Objectives of the study**

This study has an overall objective to generate a comprehensive statement on the competitiveness of the Congolese palm oil industry, tracing performance over time and identifying factors that affect such performance. To achieve this, the following sub-objectives were set:

- To do an overview of the trends in production and trade in the Congolese palm oil industry, linked to policy and events impacting the performance of the industry;
- To define, measure, and analyse the competitive performance of the Congolese palm oil industry; and
- To propose a strategy intervention to improve the competitive performance of the Congolese palm oil industry.

### **1.5. Hypothesis**

Analysing the competitive performance of the Congolese palm oil industry, and combining the stated research question the following hypothesis was formulated:

H1: The competitive performance of Congolese palm oil fluctuated significantly, with highly positive to negative performances recorded over time, and shows improvement over recent years. The performance is partly due to exogenous events such as the recent civil wars, inappropriate policies, and infrastructure neglect, but a broader range of occurrences, including mainly indigenous factors, impacted the competitive performance of the industry.

The research questions are covered by this hypothesis as the measurement of competitiveness performance, the identification of impacting factors and proposals to improve the competitive performance will be required to accept or reject this stated hypothesis.

### **1.6. Importance of the study**

Palm oil is a main driver in attaining economic development in the case of the DRC with an exported value of 51,58K MT tons (export volume) and USD 5 560 000 (export value) in 2021 (ITC 2022). This study will:

- Set a benchmark to measure considering competitive performance in the Congolese palm oil industry;
- Take a strategic view of such performance and identify the constraining and enhancing factors of competitiveness; and
- Propose strategic interventions for the Congolese palm oil industry to increase its competitive performance.

### **1.7. Delimitations of the study**

This study analysed the competitive performance of the Congolese palm oil industry from an agribusiness and trade viewpoint. It does however not focus on policy analysis and development per se, although it takes notice of related policy developments as this impacts competitiveness. It also does not focus on firm-level analysis and applications such as the position of farmers in the industry. It does also not attempt to make any predictions on future scenarios for the industry. A view of factors impacting the “historical future” will, however, be taken when strategic interventions are proposed.

### **1.8. Study outline**

This study has six chapters:

- Chapter 1 contains the introduction, which includes the background, the problem statement, research questions, hypotheses, the importance of the study, the delimitation of the study, and the study outline.
- Chapter 2 provides an overview of the industry from a competitive perspective.
- Chapter 3 provides a review of literature relevant to the competitiveness theory and competitiveness analysis applicable to the Congolese palm oil industry and references various appropriate measurement techniques.
- Chapter 4 discusses the analytical framework, methodology, and data requirements for the analysis.
- Chapter 5 focuses on the findings and interpretation of the research.
- Chapter 6 summarises the key findings and recommends strategies to improve the competitive performance of the Congolese palm oil industry.

## Chapter 2: Palm oil Industry Overview

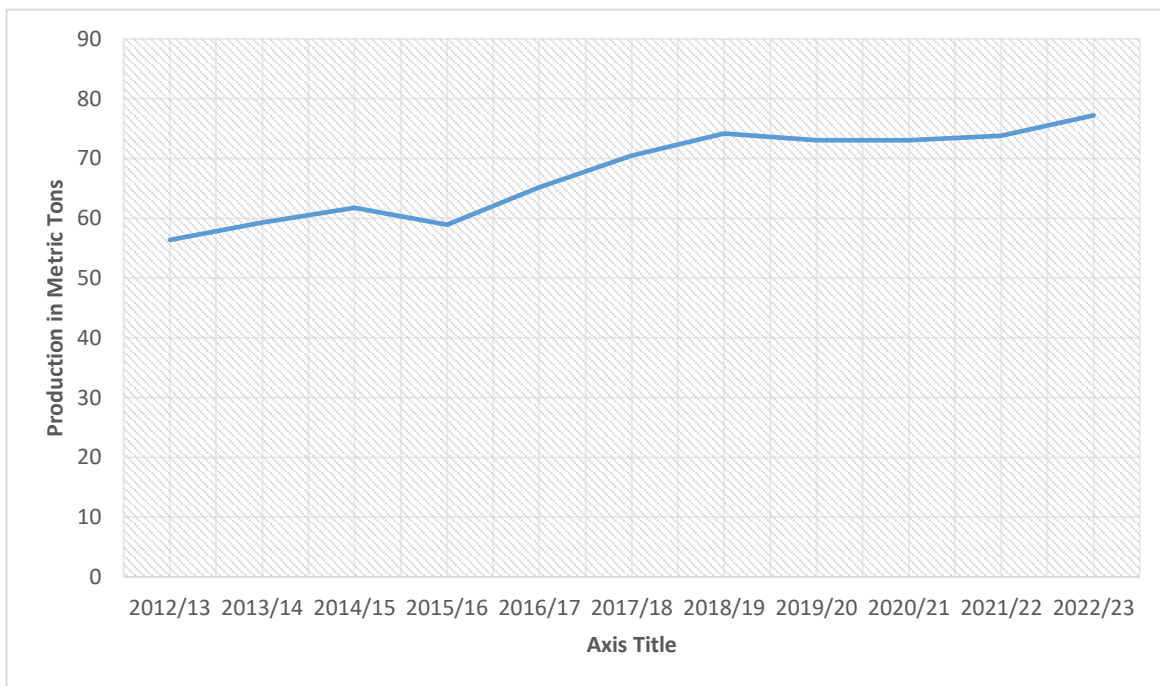
### 2.1. Introduction

This chapter describes the Congolese palm oil industry in the context of competitive performance. Firstly, it gives a global description of the industry - the production of palm oil, global market evolution and consumption, trends in demand, and regulation. Secondly, it gives a descriptive overview of the Congolese palm oil industry, starting from a historical background of the industry, production, market trends, and value chain operation, and ending with a strategic SWOT analysis of the industry, to identify strategic points of possible interventions.

### 2.2. Global palm oil industry

#### 2.2.1. World palm oil production

Palm oil is generally produced in the tropical zone. It requires high rainfall, adequate sunlight, and humidity. Countries across Africa, South America, and Southeast Asia are the best areas to produce palm oil (Palm Oil, 2021). The production of palm oil is increasing to meet the high demand for vegetable oil; in 1970, 2 million metric tons were produced globally; in 2018, 71 million metric tons were produced; in 2020/21, 73.8 million metric tons; and in 2023, 79.16 million metric tons were produced (Palm Oil, 2021; Statistic, 2023). Figure 2.1 shows the production volume of palm oil worldwide from 2012/13 to 2022/23 in million metric tons.



**Figure 2.1** The production volume of palm oil worldwide from 2012/13 to 2022/23 in million Metric Tons



The top producers of palm oil are Indonesia, and Malaysia followed by Thailand, Colombia, and Nigeria. Indonesia and Malaysia produce 88 per cent of global palm oil. Indonesia is the largest producer: in 2014 it produced 33,000 Metric tons with a growth rate of 8.20%; in 2019, it produced 42,000 Metric Tons with a growth rate of 2.41%; and in 2023 it produced 47,000 Metric Tons with a growth rate of 2.17%. The second largest producer of palm oil in Malaysia: in 2014 it produced 19,879 Metric Tons with a growth rate of -1.40%; in 2019, it produced 19,255 Metric Tons with a growth rate of 7.43%, and in 2023 it produced 19,000 Metric Tons with a growth rate of 2.15%. Thailand is the third largest producer of palm oil: in 2014 it produced 2,068 Metric Tons with a growth rate of 3.40%; in 2019 it produced 2,652 Metric Tons, and in 2023 it produced 3,450 Metric Tons with a growth rate of 1.02%. Table 2.2 shows the global production of palm oil from three top countries and their respective ranking and tonnage.

**Table 2.1** Palm oil production of five top countries (in Metric Tons), 2023

YEAR/COUNTRIES	INDONESIA	MALAYSIA	THAILAND	COLOMBIA	NIGERIA
2014	33000	19879	2068	1110	940
2015	32000	17700	1804	1275	955
2016	36000	18858	2500	1146	990
2017	39000	19683	2778	1627	1025
2018	41000	20800	3034	1632	1130
2019	42000	19255	2652	1529	1140
2020	43000	17854	2963	1558	1275
2021	42000	18152	3376	1747	1400
2022	46000	18600	3415	1768	1400
2023	47000	19000	3450	1800	1400

Source: United States Department of Agriculture (2023)

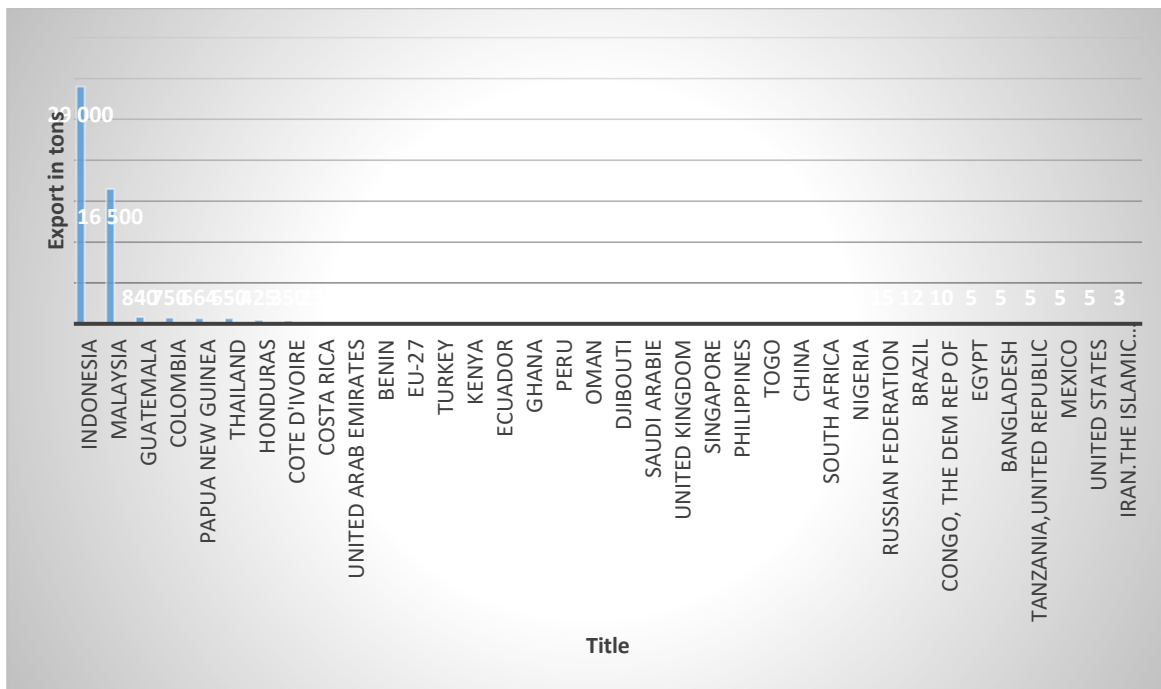
The expansion of palm oil is driven by the high demand for palm oil which is estimated to reach 240 million Metric Tons by 2050 (Pacheco et al., 2017). However, the effect of climate change such as flooding, water scarcity, and declining biodiversity due to the expanding production of palm oil reduces the capacity of the global palm oil industries to meet these demands (Paterson, 2020a, 2021a, b; Murthy, 2021). On the other hand, the COVID-19 pandemic, pests, and diseases and a stagnation in crop yield have also negatively impacted the production and trade of palm oil (Murphy, 2021).

### 2.2.2. World palm oil export

The palm oil industry is an important branch of the agricultural sector and contributes to the national income and the reduction of poverty in countries producing it. Indonesia and Malaysia are the top exporters in the world; in 2020, Indonesia exported 259 million Metric tons (USD 17.3 billion) and Malaysia 14,6 million Metric tons (USD 9.8 billion). In addition, in Malaysia, the industry contributed 3.6 per cent of its gross domestic product (GDP) and in Indonesia, it contributed 3.5 per cent of its GDP in 2020. Furthermore, this industry has many benefits for both countries, for example, millions of people in Malaysia and Indonesia whose livelihoods

depend on the palm oil industry. This motivated both countries to develop the palm oil industry to remain competitive in the international market (Khalid et al., 2022).

In 2019, 111 countries exported palm oil, the top exporters being Indonesia, Malaysia, the Netherlands, and Guatemala with a total palm oil export of USD 14.7 billion (UNcontrade, 2022). Figure 2.4 shows the global exporters of palm oil and their respective ranking and tonnage exports.



**Figure 2.2** The global exporters of palm oil and their respective ranking in metric tonnage export  
Source: Researcher’s calculation from FAOSTAT (2022)

### 2.2.3. World palm oil import

The importation of palm oil worldwide is due to its dense use as an ingredient, staple food, non-food consumer products, biomass, and biofuels. In addition, it contributes to the diets of millions of people around the world and the economic development of countries. In countries with large populations like India and China, the demand for palm oil is also high. Furthermore, in terms of import value, India is the top importer of palm oil (USD 1 billion) followed by China (USD 4.1 billion) and Pakistan (USD 2.1 billion), then the EU and the United Kingdom (USD 5.4 billion together in 2020) (Fern, 2022). In addition, in terms of import on volume, India is the top importer country of palm oil, followed by China and EU-27 with 8,530 Metric Tons, 7,200 Metric Tons, and 5,500 Metric Tons respectively (USDA, 2022).

The global import value of palm oil was 42.48 (million Metric Tons) from 2012/13 to 2021/22. In addition, the import volume of palm oil worldwide from 2012/13 to 2022/23 fluctuated. From 2012/13, it was 42.12 Metric Tons; from 2013/14, it was 41.94 Metric tons; from 2014/15, it was 44.47 Metric Tons; from 2015/16, it was 42.42 Metric Tons; from 2016/17, it was 46.06 Metric Tons; from 2017/18, it was 46.6 Metric Tons;

from 2018/19, it was 50.54 Metric Tons; from 2019/20, it was 47.48 Metric Tons; from 2020/21, it was 47.53 Metric Tons; from 2021/22, it was 42.69 Metric Tons, and from 2022/23, it was 49.48 Metric Tons (Shahbandeh, 2023; Statistic, 2023). In Table 2.2 the top five importers of palm oil are indicated.

**Table 2.2.** The five top global importers of palm oil and their respective ranking in Metric Tons imports, 2014 to 2023

YEAR/COUNTRIES	INDIA	CHINA	EU-27	U.S. A
2014	9,139	5,696	6,935	1,143
2015	8,857	4,689	6,717	1,307
2016	9,341	4,881	6,834	1,367
2017	8,608	5,320	6,834	1,527
2018	9,710	6,795	7,070	1,526
2019	7,398	6,719	7,112	1,503
2020	8,411	6,818	5,970	1,576
2021	8,004	4,387	4,979	1,593
2022	9,450	7,200	5 000	1,900
2023	9 000	7,300	4,800	1,900

Source: United States Department of Agriculture (2023)

The growing population in both top importer countries (India and China) significantly increased the global demand for palm oil. This required further expansion of palm oil which harms the environment: greenhouse gas emissions, loss of biodiversity, water pollution, soil erosion, land use, and social conflict (UNDP, 2020).

#### 2.2.4. World palm oil consumption

Palm oil is used to feed animals, as a biofuel, as cooking oil, as ingredients in the manufacturing industry, food, cosmetics, and personal care, and as oleochemicals, energy, and biomass. In addition, it can be used as crude oil in southern Asia, Africa, and parts of Brazil for domestic cooking. However, in Europe and the United States, it is used in its refined form (Murphy, 2021).

The consumption of palm oil is increasing in many countries. Indonesia is the top producer and consumer of palm oil. The domestic consumption of palm oil in Indonesia in 2016, 2017, 2018, 2019, and 2020 was 9,125.00 Metric Tons; 11,565.00 Metric Tons; 13,721.00 Metric Tons; 14,645.00 Metric Tons, and 15,050.00 Metric Tons respectively. The second top country consumer of palm oil is India with the domestic consumption of palm oil in 2016, 2017, 2018, 2019, and 2020 being 9,270.00 Metric Tons; 9,495.00 Metric Tons; 8,078.00 Metric Tons; and 9,350.00 Metric Tons respectively. The third top country consumer of palm oil is China with domestic consumption in 2016 of 4,750.00 Metric tons; in 2017, it was 5,100.00 Metric tons; in 2018, it was 7,012.00 Metric tons; in 2019, it was 6,433.00 Metric tons, and in 2020, it was 6,920.00 Metric tons (USDA, 2022). Table 2.3 shows the top 10 countries with the highest share of palm oil consumption from 1996 to 2019, and Table 2.4 shows the global domestic consumption of palm oil by country in 1,000 Metric Tons.

**Table 2.3** Countries with the highest share of palm oil consumption from 1996 to 2019

Countries	1996-2003	Countries	2004-2011	Countries	2012-2019
Indonesia	15.80 per cent	China	13.73 per cent	Indonesia	16.73 per cent
India	12.84 per cent	Indonesia	12.91 per cent	India	15.00 per cent
China	9.78 per cent	EU-27	12.0 per cent	EU-27	10.93 per cent
EU-27	8.57 per cent	India	12.07 per cent	China	9.49 per cent
Malaysia	7.38 per cent	Malaysia	5.87 per cent	Malaysia	4.96 per cent
Pakistan	5.69 per cent	Pakistan	4.65 per cent	Pakistan	4.74 per cent
Nigeria	4.3 per cent	Nigeria	3.18 per cent	Thailand	3.52 per cent
Thailand	2.55 per cent	Thailand	2.73 per cent	Bangladesh	2.28 per cent
Egypt	2.32 per cent	Bangladesh	2.20 per cent	Nigeria	2.21 per cent
Japan	1.92 per cent	Egypt	2.15 per cent	USA	2.20 per cent

Source: USDA, Indexmundi (2022)

**Table 2.4.** Ten top palm oil domestic consumption by country in 1000 Metric Tons

RANK	COUNTRY	CONSUMPTION (1000MT)
1	Indonesia	20,100
2	India	9,325
3	China	6,950
4	EU-27	4,600
5	Malaysia	3,675
6	Pakistan	3,495
7	Thailand	2,740
8	United States	1,888
9	Nigeria	1,865
10	Bangladesh	1,545

Source: United States Department of Agriculture (2023)

### 2.2.5. World palm oil price and market

Palm oil is a lower-cost source of vegetable oil in the international market than many competing oils (Murphy, 2022). This is the reason for the rapid development of palm oil plantations in the tropics. However, the expansion of palm oil is limited due to the deforestation of tropical rainforests and pressures on biodiversity (InJAR, 2019).

The increasing population in the world, COVID-19, and the Russian invasion of Ukraine (which blocked other oilseed trade of vegetable oil produced by Ukraine in the Black Sea) impacted the palm oil price in the market (Fern, 2022). On the other hand, the high demand for it by the agro-industry, biodiesel, food, beverage, energy, personal care, and cosmetics industries, regulation changes, influence the palm oil price (Fern, 2022; WWF, 2022). However, the price tends to be lower than the soybean and groundnut products of other competitors. According to Index Mundi (2022a), the average price of palm oil per month from December 1996 until 2019 was USD 672 which is below the average price of soybean and groundnut oil per month of USD 762 and 1,323 respectively. Furthermore, the price of palm oil will be established by the application of

the RSPO (the international “Round Table for the sustainability of palm oil”) certificate, favouring sustainable practices such as reducing pesticides (Global Market Report, 2023).

The overall palm oil market attained a value of USD 50.6 billion in 2021. It reached USD 53.1 billion in 2022, and it is projected to be USD 65.5 billion by 2027 (Research and Market, 2022). Furthermore, the global demand for palm oil is driven by its high productivity in small land, and its shelf-life (Fern, 2022).

## **2.3. The Congolese palm oil industry**

### **2.3.1. Brief history of the Congolese palm oil industry**

Palm trees are naturally growing in the DRC, which has over a million hectares of natural palm groves, and of these 250,000 hectares are suitable for exploitation on a semi-intensive level. In the 20th century, palm oil plantation companies exploited natural palm groves in the district of Kwilu and other districts; later, plantation companies were established on 25,000 hectares in 1930 and increased to 147,000 hectares in 1959 (Carrere, 2013).

In 1911, the government of Congo's free state (private property of King Leopold II of Belgium) signed an agreement with private palm oil companies (brothers William and James Lever) that granted them a licence to develop large-scale palm oil plantations and build modern processing facilities. In addition, they made a law to increase production and required all citizens in rural areas to plant palm trees around the village. Furthermore, King Leopold II created forced labour called Force Publique (FP) to control all the instructions made by the government. The British company Lever Brother merged with the Dutch company Margarine Unie to form Unilever. These laws above helped the company Unilever to become the world's first modern multinational (FMO, 2023). In 1920, the Huilerie of Congo installed its first plantation, which produced 5,000 Metric Tons; in 1930, it produced 18,000 Metric Tons with 25,000 workers and 12 factories. In addition, it accounted for 80 per cent of Congolese palm oil exportation (Currier, 2022).

In 1950, Belgium-Congo exported 150,000 tons of palm oil which made it the top exporter in Africa and the second-largest exporter in the world after Dutch East India (now Indonesia). After the independence of the country in 1960, exportation since the mid-1990s fell to zero due to the policy called Zairisation and the two wars from 1996 to 1997 and 1998 to 2003 (Maindo, 2020).

From 2009, new investors such as Feronia, which brought Huilerie of Congo of Lever Brother, and GAPPlé, re-planted the abandoned plantation and installed modern processing facilities in the provinces of Mongala and Tshopo and others. In addition, the new company called Chrisnovic replanted palm trees on 2,000 hectares in the abandoned plantation of PGZ (Plantation et Galerie du Zaïre) in the province of Kwilu,

especially in Vanga. This company produces 9,000 Metric Tons per year, and it started in November 2022 (DRC Ministry of Industry, 2022). Since 2016 the Congolese palm oil industry has been trading in the international market again. According to the BCC 2022, the DRC exported 46,437 Metric Tons of palm oil to the international market from January to November 2022.

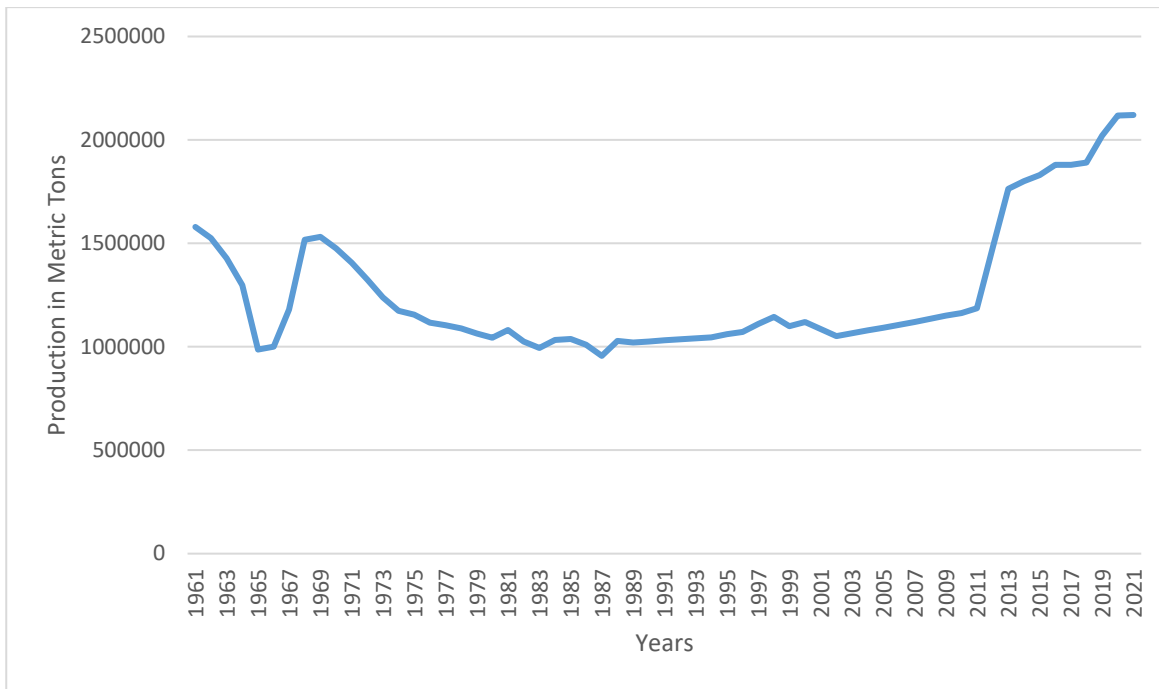
### **2.3.2 Palm oil production overview**

History proves that the DRC has the natural factor endowment to significantly expand current palm oil production, supply the domestic market, and trade on global markets. However, its production is still far from satisfying the current demand in the country (Hoof, 2011; Shindano et al., 2017).

Palm tree plantations are to be found in the former provinces such as Bandundu and Mayombe in the province of Congo Central, and the provinces of Orientale and Equateur. In 1960, the country was the second-largest exporter of palm oil in the world with a production of 270,000 Metric Tons. However, due to the policy called Zairisation in 1973, political instabilities, and the two wars, the production collapsed between 1970 and 2000 from 5,000 Metric Tons, then increased in 2002 from 15,000 Metric Tons, and finally in 2012 it steadied from 50,000 Metric Tons (Global Press Journey).

From the 1960s to the 70s, the DRC produced 200,000 Metric Tons per year, compared to Malaysia, which produced 40,000 Metric Tons. However, in the 1970s, the production of Malaysia increased by 9 million Metric Tons per year since 2005 (Business and Finance, 2015).

Today, the Democratic Republic of Congo is considered the 15th biggest producer of palm oil in the world with 300,000 Metric Tons, and Indonesia is the biggest producer with 47,000,000 Metric Tons (USDA, 2023). The production of palm oil in the DRC is also coming from smallholders, who are independent producers, self-organised, and self-financing. They are not bound by any association and they face many challenges due to the lack of access to technical assistance, lack of financial support, and lack of training on pest control, therefore, the quality of their palm oil is poorer. They collected fresh fruit from abandoned plantations, and they used artisanal processing (manual) to extract palm oil (Carrere, 2013). Figure 2.3 below shows the evolution of palm oil production in the DRC from 1961 to 2021.

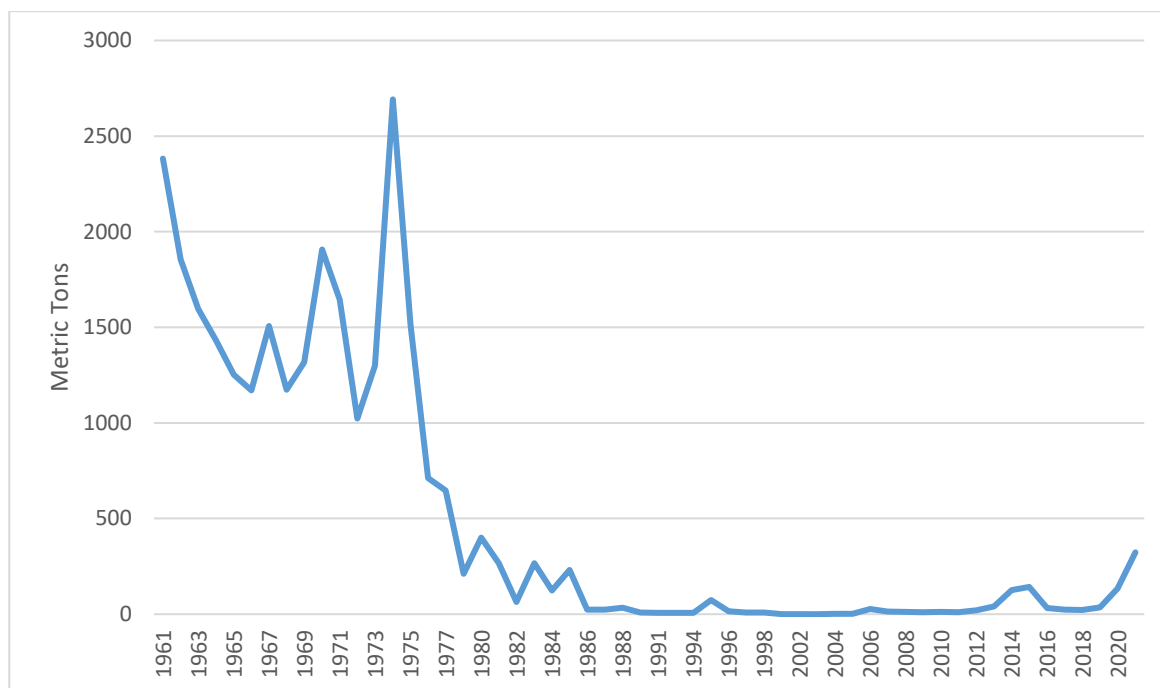


**Figure 2.3.** Palm oil production in the DRC from 1961 to 2021, Metric Tons  
Source: FAOSTAT (2022)

### 2.3.3. Palm oil export overview

In the 1960s, the DRC was the second-largest exporter of palm oil in the world, and the top exporter in Africa with 167,000 Metric Tons of palm oil and 60,000 Metric Tons of “d’huile de palmiste”. However, due to the nationalisation policy of 1974 (Zairisation), all private companies became the government’s company, and during the two wars (from 1996 to 1997 and 1998 to 2003), the exportation collapsed to 0 Metric Tons in 1988 (Maindo, 2020).

After the crisis in 2006, the DRC revived the palm oil industry, exporting USD 744 Million in 2020 which made it the 73rd largest exporter of palm oil in the world. In 2021, it exported 51.58 Million Metric Tons (export volume) and USD 55.60 Million (export value). The DRC exported it to the following countries: Uganda (USD 512,000); (USD Burundi 153,000); Rwanda (USD 67.9,000); France (USD 8.6,000) and Switzerland (USD 1.7,000) (FAO, 2020). Figure 2.4 below shows the evolution of the exportation of palm oil in the Democratic Republic of Congo from 1961 to 2021 – from 1961, the exportation fell, then became steady from 1963 to 1971. In 1972, it increased, then from 1975, it collapsed dramatically. The DRC increased its exportation in the 2000s.



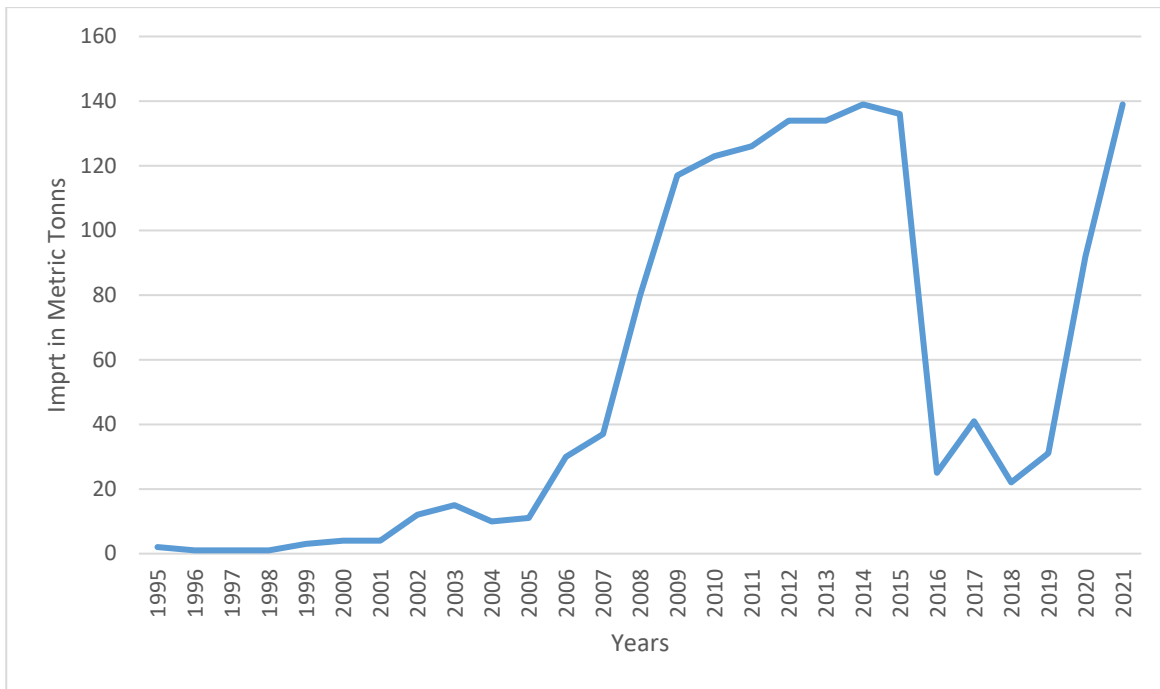
**Figure 2.4** Palm oil export in the DRC from 1961 to 2021, Metric Tons  
Source: Researcher’s calculation from FAOSTAT (2022)

### 2.3.4. Palm oil import overview

The Democratic Republic of Congo used to be the greatest producer and exporter of palm oil in the world. Due to events such as wars and Zairisation, their exportation collapsed to zero, and the country lost its position in the international market. Therefore, the DRC imported 50,000 Metric tons of palm oil to reach the domicile demand (Maindo, 2020). This importation is driven by the growth of the Congolese population and the high demand for it by agro-industries.

The DRC imported palm oil primarily from Uganda (USD 24.2 Million); Malaysia (USD 8.35 Million ); Kenya (USD 4.21 Million ); Indonesia (USD2.06 Million ), and Zambia ( USD1.5 million). In 2020, the DRC imported USD 41.9 Million of palm oil which made it the 75<sup>th</sup> largest importer in the world (FAO, 2020). Figure 2.5 below shows the evolution of the import of palm oil in the DRC from 1961 to 2021.





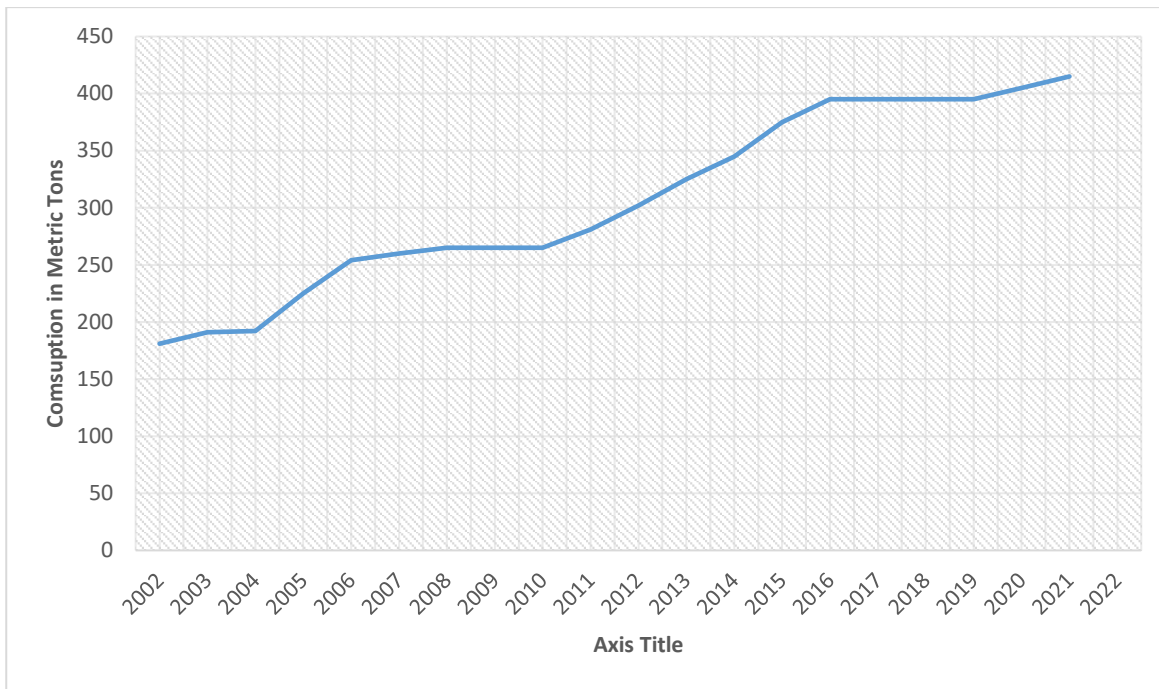
**Figure 2.5** Palm oil import in the DRC from 1995 to 2021, Metric Tons  
Source: Researcher’s calculation from FAOSTAT (2022)

From 1961 to 1994, the DRC was not importing palm oil. Only from 1995, when the production fell, the country started to import, and the importation increased from 1995 to 2015, then imports fell but from 2019, importation started increasing and continued until the present day. This is due to the gap between high demand and less production, and wars in the countries which could not facilitate the business.

### 2.3.5. The palm oil market, consumption, policy overview

The total annual production of palm oil in the Democratic Republic of Congo is 300,000 Metric Tons and can no longer satisfy the domestic demand. Domestic palm oil consumption is around 425,000 Metric Tons in 2022, which is increasing day to day (USDA,2022). Expectations are projected that the international market for palm oil will be more than 85 million Metric Tons by 2024. This high demand for palm oil is driven by increasing industrial demand (soap-making, refining, margarine production, etc.) and an increasing population rate (WWF, 2020).

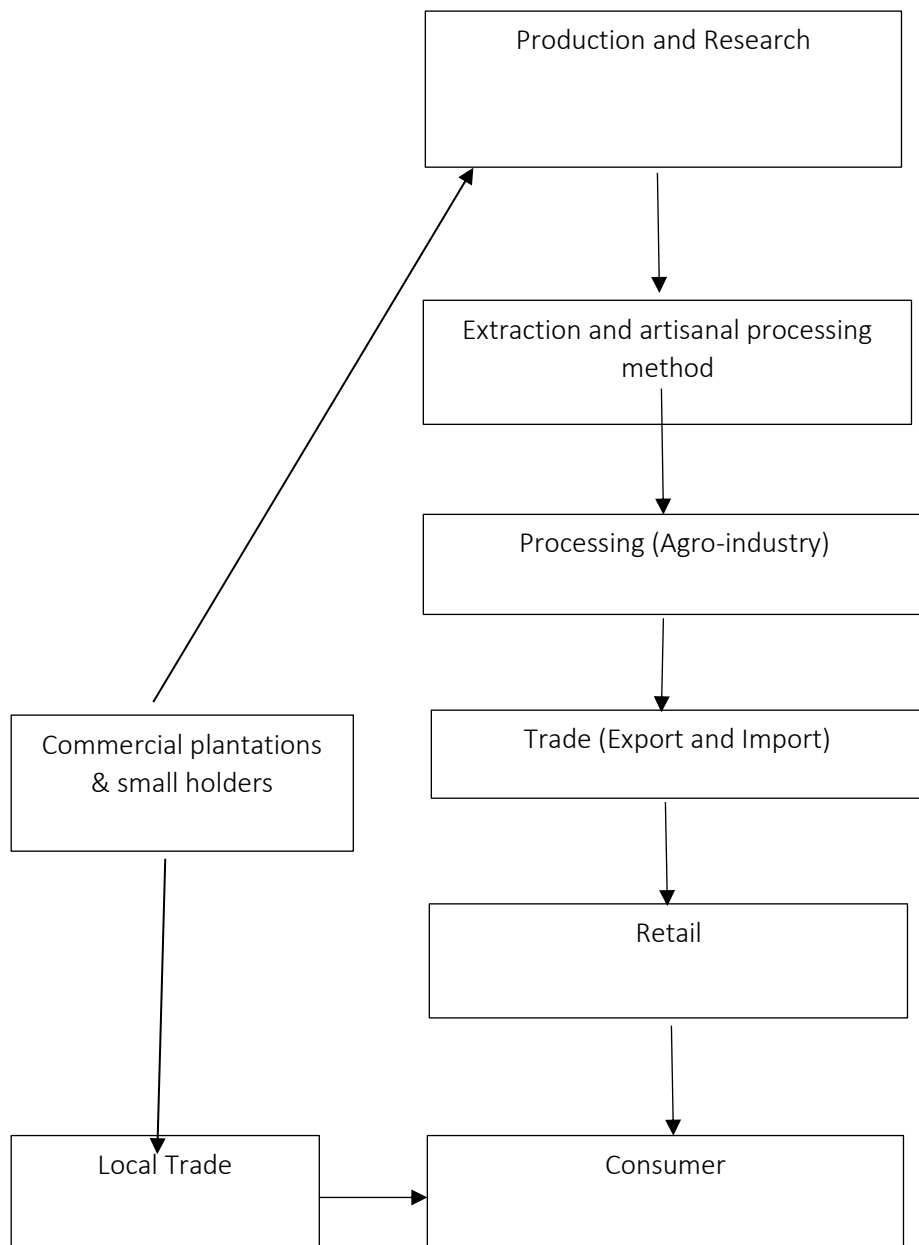
The production of palm oil in the Democratic Republic of Congo is supplied by village plantations, which in 2005 produced 200,000 Metric tons for domestic usage and the agribusiness (industrial plantation), produced 25,000 Metric Tons. During the crisis (wars) only the village plantation supplied palm oil. The famine early warning systems network estimated that a Congolese family of five uses 100 grams of it a day (Global Press Journal, 2018). Figure 2.6 below shows the increasing palm oil consumption in the DRC from 2001 to 2022 (in 1,000 Metric tons).



**Figure 2.6** Palm oil consumption in the DRC from 2001 to 2022, Metric Tons  
Source: USDA, 2022

#### 2.4. The Congolese palm oil value chain

The value chain describes activities or services from the production, transformation, trade, retail, and consumption of a product (Webber & Lambaste, 2011). The chain is shown schematically in Figure 2.7.



**Figure 2.7** Congolese palm oil value chain  
Source: Author's research 2022

#### 2.4.1. Production research and support services

INERA (Institut National de Recherche Agronomique) was working in collaboration with the Congolese palm oil industry companies which made the country one of the top global producers of palm oil (USAID, 2015). The role of INERA is to do agricultural production research technology development, solve agricultural problems, and advise industry companies. This institute was funded by the Congolese government. From the 1990s, the Congolese government could not fund the institution due to the bad governance of the Congolese government. In the 2000s, the government started to re-fund the institute but it was not sufficient to support the expansion of palm oil in the country. The role of INERA is to do agricultural research and find solutions to agricultural issues such as pest control, and ameliorated seed, then to assist the palm oil companies with

agricultural techniques, the use of ameliorated seed, training, and exchange to increase the production and quality of palm oil. However, the smallholders in the context of DRC do not have any association and they do not receive any direct assistance from INERA[ as a consequence they produce poor-quality palm oil. Currently in the DRC, four private plantation companies produce most of the palm oil in the country: Feronia which is the biggest producer of palm oil, Socfin, GBE, and Miluna( B.C.C, 2022).

In the case of the DRC, the government does not have any palm oil plantations, all the palm oil companies that the government took under the organisation policy have been abandoned. All the palm oil companies in the DRC are private. The smallholders collected the palm oil fruits from the abandoned plantation to extract them in traditional processing.

#### **2.4.2. Transportation and processing**

The lack of transportation infrastructure and the deterioration of the rural roads in all provinces in the DRC are barriers to reinvesting in the agriculture sector, especially in the palm oil sector and to evacuating agricultural products such as palm oil for exportation, consumption, and agro-industries (I.M.F, 2022). However, the low productivity of the DRC palm oil industries was due to obsolete equipment which produced little palm oil in processing. The extraction rate is low: 15 per cent for industries and less than 10 per cent for smallholders (USAID, 2015). Since 2009, commercial palm oil industries such as Feronia, Socfin, GBE, Miluna, and Christvit have replaced the obsolete processing infrastructure with modern mills to improve the extraction rate of palm oil. In Kwilu (Vanga), a new palm oil industry started with the production of 9,000 metric tons per year (D.R.C. Ministry of Industry, 2022). The smallholders use the artisanal processing method to extract palm oil and the rate of extraction is very low.

#### **2.4.3. Retail**

In the Democratic Republic of Congo, the wholesaler (privates) buys palm oil from the palm oil industry companies and sells it to retailers and agro-industries such as Marsavco Retailers, repackage it and in turn, resell to consumers in the local market (Maindo, 2021). This is mainly run by women who buy palm oil from the wholesaler and then sell it to the consumer. The price is driven by the increasing population rate with a consumption of 415 metric tons in 2021 (Shahbandeh, 2022), and the high demand for agro-industries. The scarcity of palm oil is experienced in some periods in the local market (Mwanasaka, 2019).

#### **2.4.4. Trade**

According to Index Mundi 2023, there is an imbalance between Import-Export in DRC. The import of palm oil in the country is rising steadily. In 2021, 2022, and 2023 the country imported 85 Metric Tons: 130 metric

Tons, and 135 Metric Tons of palm oil respectively. In 2021; 2022, and 2023, the country exported 10 metric tons for each respective year (USDA,2023).

On imports of palm oil into DRC, Indonesia which is the main global supplier with Congolese exports to Rwanda, and Belgium. The trade of palm oil in DRC is conducted by private companies, with certification issues from the DRC Ministry of Commerce.

### 2.5. Industry SWOT analysis

The Democratic Republic of Congo has the potential to expand the production of palm oil to satisfy local and international demand. However, recent productions have failed to do so. There is a clear production-demand gap. This situation is summarised in terms of a SWOT analysis. This information was obtained from interviews with experts (see chapters 4, 5 and 6).

**Table 2.5.** Swot analysis of the Congolese palm oil industry, 2023

Strengths	Weaknesses
<p>Natural resource endowments: The DRC has the natural resources base to extend the plantation of palm oil according to agronomical conditions: With 278 million hectares of land favourable to growing palm oil trees in the Congo basin, only the DRC has 60 per cent of this land in congo-basin, and it is a good climate and soil to grow palm trees.</p> <p>Labour and Social Capital: The DRC has 100 million people, and 80 per cent are young This constitutes a great labour pool for the expansion of palm oil in the Democratic Republic of Congo. Training and skills development will however be required to harness this social capital prospect.</p> <p>Experience and expertise: A pool of experts exists from the period of high-level production and exportation of palm oil 10 to 20 years ago. These need to be harnessed into the industry again</p>	<p>Infrastructure: No or weak -access to electricity to the palm oil industry: The company in charge of electricity in the DRC is called SNEL. It has 39 electrical centers 24 themes and 15 hydroelectrical. However The Inga Central Hydroelectrical Centre project can supply the entire DRC and the African continent with power, but palm oil industry companies in the DRC are not supplied with electricity from SNEL, it is supplied by group electrogene (DRC Ministry of Energy, 2020).</p> <p>Processing and transportation infrastructure: In the DRC, the roads in urban and rural areas are not in a good condition for moving agricultural products from plantation to processing infrastructure, from processing infrastructure to agro-industries, and then to trade and consumer. The processing infrastructure in the country is obsolete, and the extraction rates at processing are very low: 15 per cent comparable to Malaysia and Indonesia are around 22-25 per cent (USAID, 2015).</p> <p>Corruption: The corruption in the DRC is the main barrier to the development of the country. There is corruption at each level.</p> <p>Regulation service: lack of regulation service in the DRC.</p> <p>Policy: Lack of policy in the palm oil sectors</p>
Opportunities	Threats
<p>Local market: Palm oil development is a great opportunity for the country to reduce food imports, and finance economic development. What would this entail—give some ideas here.</p> <p>Global market expansion: The rising demand for palm oil due to the growth of population in the world and the high demand for agro-industries, and soap</p>	<p>Climate change: globally, climate change is threatening the expansion of palm oil by flooding, and water scarcity. so Research is required to mitigate the impact of climate change. Agricultural research in the DRC was conducted by INERA in all provinces. During the period of crisis, the Congolese government neglected the agricultural sector and its research and the political instability... INARA was not</p>

processing constituted the opportunity for large-scale extension of palm oil in the country.	financed as a consequence it could not supply good seed quality, and ADVISE against the degradation of land inter alia due to climate change (USAID, 2015) Technology: The old technology (processing and extraction of palm oil) is the main barrier to cost-effective palm oil development in DRC. Market: The local markets are not well organized in the country. There is a lack of policy on fixing prices.
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Source: Own research (2022) and expert interviews

## 2.6. Conclusion

This chapter describes the global trends and the Congolese palm oil industry's trends. Indonesia is the top producer and exporter of palm oil, followed by Malaysia, and the two countries produce more than 70% of global palm oil production. This chapter also revealed that the demand for palm oil is increasing due to the rising global population. However, the Congolese palm oil industry was the second palm oil exporter in the world and the top palm oil exporter in the 1960s in Africa. Due to the civil wars in the country and policy interventions since 1974, production virtually collapsed. With the high demand for palm oil in the country, the low levels of production could not satisfy the domestic demand resulting in imports. Currently, the industry is recovering with higher production, a reduction in imports, and expanding exports. Since 2019, however, imports again increased due to the high demand for palm oil by agro-industries, soap factories and the rising population rate in the DRC. Production levels however are still below the potential of the industry.

A Swot analysis revealed the weaknesses of the industry highlighting the lack of general infrastructure and corruption constraining the competitive performance. The Congolese palm oil industry has a natural factor endowment for the expansion of palm oil. This chapter gives a clear indication of uncompetitiveness and the inability of the Congolese palm oil industry to convert comparative advantages, build on a strong and proven natural resource endowment, and compete for advantageous positions in the global market, increasing exports and decreasing imports.

## **Chapter 3: Literature Review**

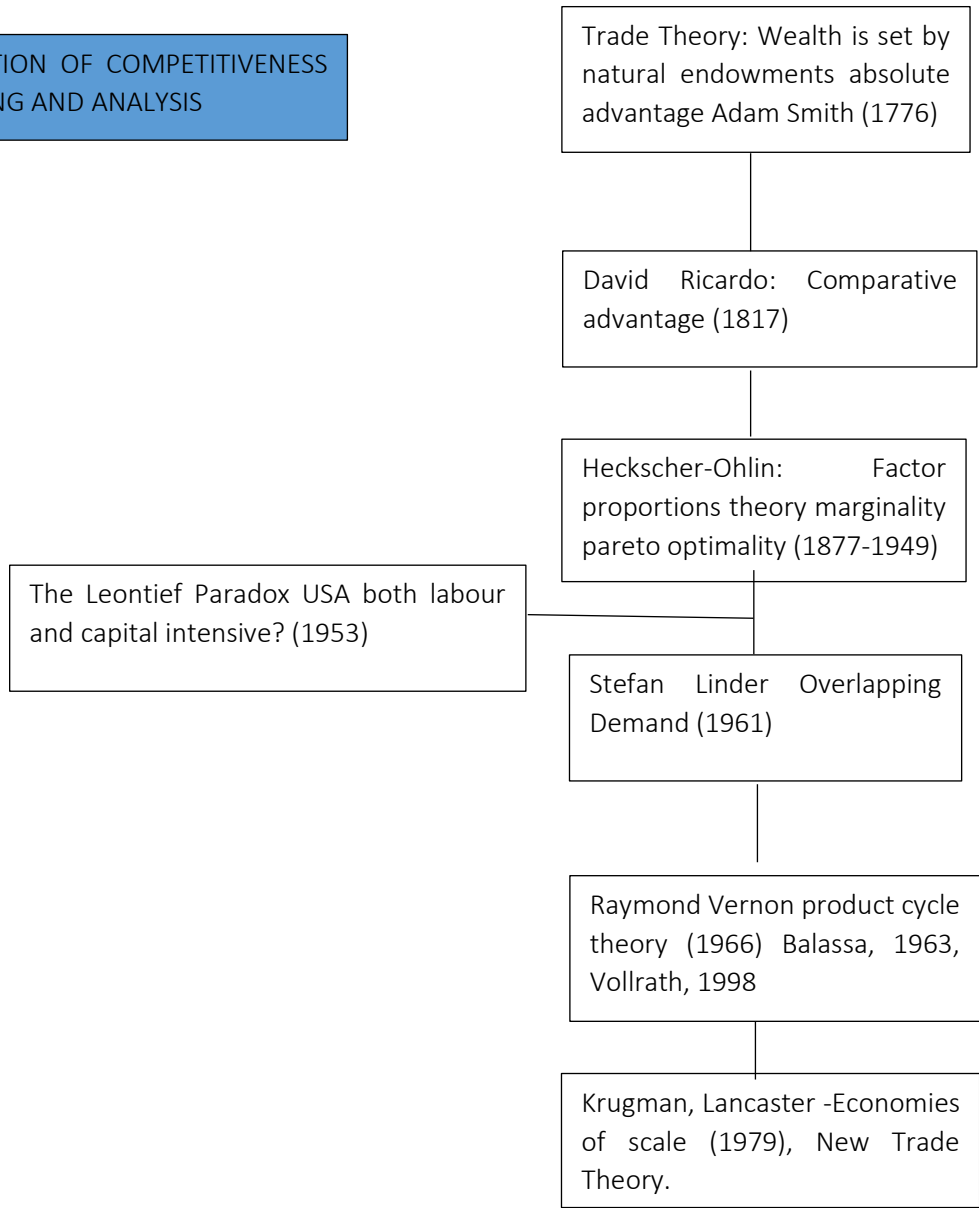
### **3.1. Introduction**

This chapter reviews the theories of competitiveness from a trade perspective and establishes a theoretically grounded construct and definition that is appropriate for this inquiry. Techniques for quantitatively and qualitatively measuring and analysing competitive performance will also be considered.

### **3.2. Evolution of competitiveness theory**

The evolution of competitiveness theory is shown in Figure 3.1 and discussed below.

EVOLUTION OF COMPETITIVENESS THINKING AND ANALYSIS



Extending the Porter Diamond to agribusiness analysis: ISMEA (1999), Esterhuizen (2006), Webber and Lambaste (2011), Tuna et al (2012), Jafta (2014), Angala(2015), Boonzaaier(2015), Abei(2017), Sultan and Qainary (2017), Sibulali( 2028), Dlikilili(2018), Barr(2019), Mtshiselwa(2020), Bekele(2023).  
Macro applications: World Economic Forum; World Competitiveness Report (IMD)

New Competitive Theory: Wealth created by strategic choices not natural endowments Michael Porter competitive Diamond model (1985/90.98)



**Figure 3.1** The evolution of competitive theory  
Source: adapted from Van Rooyen (2023)



### **3.2.1. Competitiveness through absolute advantage-based trade**

The notion of competitiveness was captured as early as 1776 by Adam Smith when he argued that trade between nations should be free and based on an absolute advantage position (Smirt, 2010). Smith further said that to become rich, it was necessary for countries to specialise in the production of goods and services in which they have an absolute advantage and to enter free trade with other nations to sell their goods (Encyclopaedia Britannica, 2023). According to him, absolute advantage is any country's intrinsic ability to produce more of a commodity than can be done by its global competitors. Furthermore, he said that the country should specialise in those goods whose cost is less than the others.

Smith believed that the cost of commodities was computed by the relative amount of labour that was needed in their various production processes; whereas labour can be mobilised within a country, it is immobile between countries. Smith further considered two frameworks for his analysis – a two-country and a two-commodity framework. His implicit assumption was that, in trade between two countries, one would have a lower cost concerning the production of one of the commodities.

### **3.2.2. Competitiveness through comparative advantage-based trade**

Ricardo developed and popularised the notion of comparative advantage in 1817. He referred to factor endowments to explain why Portugal exported wine and Britain cloth and emphasised physical and natural endowment influences over competitiveness. Technological and human factors were given weight by later economists. This theory has come to be accepted as an almost universal law of economics (Goldin, 1990). The theory of comparative advantage says that “a country has a comparative advantage if it can produce a good at a lower opportunity cost than another country” (Smirt, 2010).

The benefit of the concept of comparative advantage is that it condenses much valuable data. According to Salvadores (2002:91): “The comparative advantage displays the state of manufacture, the autarchy opinion of manufacture and feeding, the balance comparative benefit of respectively state... it can moreover display the grade of specialism in manufacture through employment, the size of business, the period of business, the advantage as of business, and the part of this advantage to individually of the interchange countries.”

According to Linder: “Comparative advantage refers to the ability of one nation to produce a commodity at lower opportunity cost relative to the output of another nation”. Lipsey et al. (1993) state “that comparative advantage describes in what way a business might promote countries over the more than effective usage of the supply ground (property, labour force, and investment response”. From these views, it can be concluded that this construct needs to be considered for the analysis of the competitiveness of a natural resource's endowment-based product such as palm oils, and its global trade.

### **3.2.3. Heckscher-Ohlin (H-O) Theory**

The Heckscher-Ohlin theory is a modification of David Ricardo's theory of comparative advantage (Todaro, 2007) and was developed by Eli Heckscher (1919) and Bertil Ohlin (1933). They found that countries "in which the capital is abundant, and labour scarce tend to export capital-intensive product and import labour-intensive product. While the countries with scarce capital and abundant labour tend to export labour-intensive products and import capital-intensive products".

### **3.2.4. The Leontief paradox**

Leontief did a study on competitiveness and specialisation based on the Heckscher-Ohlin construct. He found that the United States has a relatively good endowment of capital. According to H-O theory, the United States should be exporting capital-intensive products and importing labour-intensive ones. According to Leontief, however, the opposite is the case in the United States, with its exports generally being both capital-intensive and more labour-intensive than the products it imports. This opposite finding to comparative advantage-based H-O theory is known as the Leontief paradox (Smirt, 2010).

### **3.2.5. The product cycle theory**

The product cycle theory was introduced by Raymon Vernon in 1966 to consider trade-based competition. It is determined by the opportunities and demand levels for a product and factors that impact the supply. Vernon demonstrated four stages: embryonic, growth, mature, and declining for a particular product growth path. Competitive strategy will be driven by the stage in which a product falls, and changes as the stage changes. This theory further argues that "When a product is in its early life cycle stage, all the raw material and the labour used in making and producing that product is initially grounded to the place/country where the product has been invented or produced. But when that new product is introduced in the world market, then its area of origin shifts to different places" (Smirt, 2010). This will require particular strategic actions to increase competition in these localities. This theory can be related to different value-adding strategies in different localities outside the country of origin (DRC) when a raw material (oil palm) is exported.

### **3.2.6. New Trade Theory (NTT)**

The New Trade Theory explains, describes, and analyses trade and the development of strategic industries based on new growth prospects. As a theory, it was developed in the 1970s to 1990s. The Leontief contradiction spurred economic experts to examine alternate descriptions of the Heckscher-Ohlin concept. The concept of Baldwin (1971) and Bowen (1985) which clarified philosophy (Gruber, Metha & Vernon, 1967; Gold, 1981) argued that the comparative advantage bases of Heckscher-Ohlin theory remained "RELEVANT" in clarifying economic efficiencies in trade but failed to explain "REAL WORLD" trade patterns based on commercial principles and business considerations. Balassa (1965) added to this arguing that real-world trade is influenced by many interventions, distorting market prices away from scarcity-based economic

rational prices. To clarify such “real world” trade movements the new trade theory (NTT) was proposed (Glubel & Lloyd, 1995; Smirt, 2010), supported by Krugman (1979) and Porter (1990).

### **3.2.7 Moving from comparative advantage to competitive advantage thinking and the Porter Diamond model**

Based on the concepts of the NTT, a new “competitiveness theory” was introduced by Michael Porter (1990) of the Harvard Business School (1990; 1998). He argues that the difference between his theory and traditional competitiveness theory, based on comparative advantage thinking, is that a country’s prosperity is not primarily based on its natural resource endowments, as argued by Riccardo and Heckscher-Ohlin but rather created by strategic choice. In other words, “The national wealth is not set by inherited natural endowments but created by strategy choices”. According to Porter (1990), a country’s wealth is created, therefore not inherited, and its competitiveness depends on the extent to which the country’s industry can innovate and upgrade, and in this process utilize its endowments best.

Comparative advantage helps when making decisions on whether it is viable from an economic efficiency standpoint to continue with the production of a certain commodity (Pugel, 2007; Kannapiran & Flemming, 2000; Serin & Civan, 2008; Smirt, 2010). From a business view, this may be of less relevance as market prices set the scope for profits, cost efficiencies, and returns on investments, and not economic efficiency considerations per se. These are however relevant in matters of policy choices and analysis. From a theory concerning business strategy and the commercial feasibility thereof, the concept of “competitive advantage” concentrates on commercial experiences and business predictions constructed on realism where prices are articulated in market value (Porter, 1990). Porter therefore argued that competitiveness is about creating competitive advantage through strategic planning.

The key distinction between comparative advantage and competitive advantage is that the former describes the optimal economic efficiency application of scarce resources and natural endowments, while competitive advantage concentrates on business opportunities in a “real world” competitive environment, which often is distorted by price interventions, impacting trade on an inter- and intra-country basis.

Based on these views, Porter (1990; 1998) advanced a competitive theory based on the “five forces” and the “competitive diamond model”. In this theory, Porter argues that strategic management and productivity constitute the key drivers of competitiveness and the creation of competitive advantages. He defines four classes of indigenous attributes or determinants: Factor conditions; Demand conditions; Related and Support industries; and Firm strategy, structure, and rivalry – which would create a competitive advantage. He added two exogenous determinants: Government and Chance opportunities (Porter, 1990; 1998). These are briefly described below.

### Production factor conditions

According to traditional trade theories, production factor conditions can be defined as land, labour, and capital (including human capital) (Porter, 1990a), and the following categories can be distinguished: human resources; physical resources; knowledge resources; and capital resources. Conditions relating to the infrastructure factor can be subdivided further into basic factors (general), such as unskilled labour, raw materials, climatic conditions, water resources, and infrastructure, which is inherited and requires either very little or even no new investment to be of use in production. Advanced factors are created and upgraded to specialised factors by way of reinvestment and innovation.

### Demand and market conditions

According to Porter (1990; 1998), the essential conditions of demand include a home demand, which anticipates and leads international demand, along with industry segments that contain a large share of home demand, as well as buyers who are sophisticated and demanding.

In this analysis, home demand will play a significant role as reflected by the high rate of imports of palm oil. However, the DRC is also exporting palm oil and plans to do so increasingly based on competitiveness considerations. This determinant will thus be adjusted in this analysis to accommodate both home demand and global demand.

### Firm strategy, structure, and rivalry

Porter argued that “firm strategy, structure, and rivalry is the third determinant of national competitive advantage”. He identified rivalry as the most critical driver of a country’s competitive advantage through economic policy and believes that firms are forced to become cost-competitive and improve quality innovation through the forces of domestic rivalry.

Porter believes that “It is firms that ultimately compete internationally, but it is the international competitiveness of a country that shapes the international competitive advantage of firms”. In this analysis no firm-level actions will be considered, only focus on industry-based analysis and strategies will be referred to, although features of general rivalry and structure will fit into such considerations.

### Related and supporting industry

Whether a country does or does not have supplier industries and related industries will determine whether the nation is internationally competitive. Porter (1990, 1998) acknowledges this implicitly by not including governments as an attribute of the Diamond but rather views government as an influencing factor. Porter (1990; 1998; 2000) says specialisation leads to location advantages that can be described as sticky (in other

words that are not easily moveable), and this forms the true source of countries' sustainable competitive advantage.

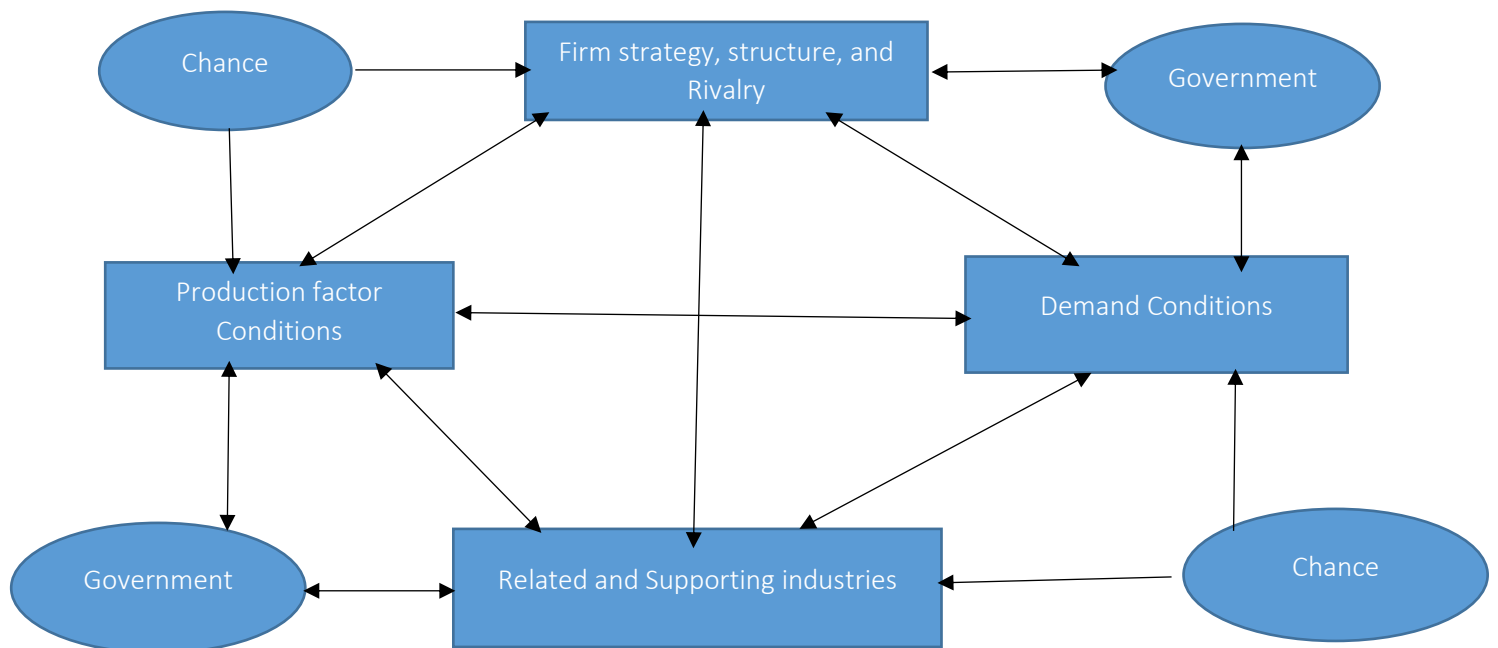
Porter (1998) claims that the core challenge of economic development is to build clusters to realise external economies. He adds that the focus should be on cutting-edge issues of public policy to remove any obstacles there might be to productivity improvement and innovation in the development of clusters.

### Government policy and support

Porter does not believe that the government is a helper and supporter of industries either; rather, the government should encourage and push companies to raise their aspirations to move to even higher levels of competitiveness.

### Chance factors

Chance often is included in the Diamond model, as there is a likelihood that external events, such as war and natural disasters, can either harm a country or benefit it. The Porter competitive diamond is illustrated schematically in the figure below:



**Figure 3.2** Porter's Competitive Diamond Model  
Source: Porter (1990)

### **3.2.8. Critique and extensions of Porter's Diamond model**

Porter's Diamond model has been criticised by two schools: the Management School (Rugman, 1991; Dunning, 1992, 1993; Cartwright, 1993; Rugman, Verbeke & Weiss, 1993; Rugman & D'cruz, 1993), and the Economic School (Waterman, 1993; Jegers, 1995; Davies & Ellis, 2000; Boltho, 1996). Criticism from the former suggests that the Diamond does not take the attributes of the largest trading partner of the home

country into account (Rugman, 1990) and that it does not apply to most of the world's smaller nations (Bellak & Weiss, 1993; Cartwright, 1993). Furthermore, it also ignores the role of multinational organisations, which can influence the competitive success of nations (Dunning, 1992, 1993). Krugman found that Porter's Diamond does not apply to countries that have small economies with open trading. She suggests that an extension of Porter's Diamond could include the attributes of the home country's largest trading partner. The Double diamond model was proposed by Moon et al. (1995) to address this weakness, introduced multinationals, and considered government an important endogenous variable. Porter's (1990) view also gained criticism from the economic school.

According to Waverman (1995), "the Diamond is so general that it tries to explain all aspects of trade and competition but ends up explaining nothing". Grant (1991) says further that Porter's primary contribution is explaining patterns of trade and investment in new world economies better than what was done by the up-to-then-existing theories of international trade and investment. The Porter Diamond was extended by Webber and Lambaste (2011) to accommodate analysis of the agri-value chain and by the ISMEA Report (1999). Porter's Diamond model was expanded on further by the World Economic Forum in its reports on world competitiveness. Applications of the Porter Diamond model (Figure 3.2) were applied to agri-business competitiveness, including the Agri-industry value chain analysis in various African economies (Webber & Lambaste, 2011; Van Rooyen, 1998; Esterhuizen & Van Rooyen, 2006; Van Rooyen & Botha, 2011; Jafta, 2015; Boonzaaier, 2018; Angela, 2015; Abei, 2016; Sibulali, 2018).

It was also expanded by Barr (2019) by adding socio-economic factors to consider economic and social transformation dynamics in the competitive performance of the South African economy. Institutions such as the World Economic Forum (WEF) and the World Competitive Report (IMD) also applied extensions of the Porter Diamond to country analysis.

### **3.3. Measuring competitiveness**

Competitiveness is measured at different levels of analysis: mega (international), macro (countries, territories), meso (commercial sectors, and industries), and micro (companies, firms) levels. In this study, the focus will be on trade based on industry and country-level analysis, i.e. macro and meso. The following methods are generally used to measure competitiveness.

#### **3.3.1. Revealed Comparative Advantage (RCA)**

The concept of revealed comparative export advantage derived from comparative advantage theory was listed by Leisner (1958) but developed and promoted by Balassa (1965). As a measure for measuring competitiveness, Balassa argued that the notion of comparative advantages must be shaped by real-world

market prices, which may reflect economic distortions but are relevant in policy business decisions and strategies. This method thus relates to the new competitiveness theory and Porter's construct of competitive advantage.

The RCA is calculated in the formula below:

$$RCA = \ln[(X_i/M_i)/(X/M)],$$

where:

Value of export of the commodity from the country.

Value of imports of the commodity to the country.

Value of the total exports of products from the country.

M = Value of the total imports to the country.

If  $RCA > 0$ , the commodity has a comparative advantage.

If  $RCA < 0$ , the commodity does not have a comparative advantage.

The RCA measure is used by Webber and Lambaste (2010) in their analysis of competitive agri-value chains in sub-Saharan Africa. It promotes an export orientation, i.e. to determine how competitive industries are exporting a commodity – an important consideration for the Congolese palm oil industry. It must, however, be noted that the RCA does not reflect any imports in its measurement of competitiveness. In cases of both import and export trade, where import substitution is considered a trading strategy, such as in the Congolese palm oil case, this method may thus be inadequate to comprehensively reflect on industry competitiveness.

### 3.3.2. Relative Trade Advantage (RTA)

The relative trade advantage (RTA) (Vollrath, 1991) was derived from the RCA. Vollrath (1991) recommended that the RTA might be more desirable than other measures such as the RCA and NRCA as it contains both exports and imports as an indicator of competitive performance, and as stated in Chapter 2, this is highly relevant in the DRC's case.

A positive RTA indicates that exports of a product surpass its imports, therefore offering a competitive advantage. Negative values therefore represent a competitive disadvantage.

The RTA index can be expressed as follows:

$$RTA_{ij} = RXA_{ij} - RMP_{ij}$$

$$RXA_{ij} = (X_{ij}W_1, = jX_i1)(=1XKjwK, K= 1W1.1 = iXK1)$$

$$RMA_{ij} = (M_{ij}W_1, = jM_i1)(WK, K = jMKjWK, K = iW1.1 = jMK1),$$

where:

X = export value

M = import values

Subscripts 1 and K represent the merchandise types, and j and 1 represent the nation types.

Importations are deemed and the entire activities are valued at market prices, i.e. competitive advantage ranks.

### 3.3.3. Normalised Revealed Comparative Advantage (NRCA)

Yu et al. (2009) presented a normalised revealed comparative advantage (NRCA) index. This index calculates the extent to which a country's actual exports deviate from its competitive advantage. A neutral level of its relative scale concerning world export markets provides a proper indication of the underlying comparative advantage. The NRCA is described in the formula below:

$$RCA(i) = [(DRC's \text{ exports of good } I \text{ to the world}) / (DRC's \text{ exports of all goods to the world})] / [world's \text{ exports of good } I \text{ to the world} / (world's \text{ exports of all goods to the world})]$$

From the formula above, a normalised version of the RCA (called NRCA) was constructed using the following formula:

$$NRCA(i) = (RCA(i)-1)/(RCA(i)+1)$$

A particular drawback with the NRCA is that it, as in the case of the RCA, does not cover imports. For a country such as the DRC, with large palm oil imports, such a formula would thus provide underestimations and incomplete rankings. The NRCA however would provide a measurement of the export competitiveness of Congolese palm oil against competing countries – an important consideration for the Congolese industry.

Inter-country and intra-country comparisons: It must also be noted that the RTA and RCA formulae both provide a biased index for inter-country comparisons, based on the unique local economic structure composition of the country and industry under consideration (Bekele, 2023). Bekele found that by applying the RTA/RCA for the competitiveness ranking of Ethiopian coffee against global competitors, Ethiopia scored the highest position. Coffee represents the largest economic sector in the Ethiopian economy. However, all indications are that countries such as Brazil, Colombia, and Vietnam, all with substantially different economic structures, are indeed far more competitive in global coffee markets than Ethiopia. With the NRCA index, not biased by local economic structure, Ethiopia's position dropped to seventh place with Brazil, Vietnam, and Colombia as the leading countries.



The NRCA will thus be used in this study, for inter-country comparisons of export competitiveness, with the RTA, albeit not the “best” measurement (Esterhuizen, 2006; Bekele, 2023), used to provide a relative comparative measure of inter-country competitive performance, with both import and export trade included. In Chapter 6 (6.5), a recommendation is made for the development of a more appropriate measure (than the NRCA and RTA) to compare countries, including both imports and exports.

The RTA and RCA will be used for intra-country comparisons where the mentioned economic structure bias will not be of any relevance as it compares with a country’s economic structure (Bekele, 2023)

### 3.4. Recent studies on agricultural competitiveness

The table below reviews relevant studies on agricultural competitiveness and the theoretical constructs and measurement methods applied. Several competitive studies have been conducted on agricultural competitiveness globally and in Africa in the last decades. The results and interpretation of the competitiveness of the studies are illustrated in Table 3.1.

**Table 3.1** Studies on Agricultural Competitiveness

Topic of research paper	Author(s)	Framework applied	Finding/Conclusion
RSA food commodity chain	Esterhuizen and Van Rooyen (1999).	RTA, Porter Diamond model	Sixteen (16) selected food commodity chains. The majority are marginally competitive, except for the maize, pineapple, and apple chains. When moving from primary to processed products, the index decreases.

Competitiveness of the European Union food chain in a global environment	ISMEA (1999)	RTA and Porter diamond model	The score for European Union integration.
RSA apple industry	Du Toit (2000)	Comparative analysis, Porter diamond model	RSA is less competitive than Chile.
Competitiveness of the RSA flower industry	Van Rooyen et al. (2001)	RCA and private cost ratio (PCR, Porter diamond model)	RSA has a competitive advantage over Australia, although the Porter analysis found that the determinants are stronger, viz. government support.
Hungarian agricultural food sectors	Ferto and Hubbard (2002)	RCA and RTA	Hungary has a comparative advantage for 11 of the 22 aggregated commodities.
Comparative advantage of the production of organic wheat in the Western Cape	Mahlanza et al. (2003)	Social cost-benefit (SCB) DRC police analysis matrix(PAM)	The results reveal a comparative advantage for wheat grown under organic practices with distortions that exist in the market though
Wheat production in the Western Cape	Mahlanza et al. (2003)	Social cost-benefit (SCB) DRC policy analysis matrix (PAM)	The results reveal a comparative advantage for wheat grown organically, although there are distortions in the market.
The relative competitiveness of the South African oilseed industry	Hallat (2005)	RCA, RTA, net export index	The primary industry in the RSA is more competitive than that of Argentina. Argentina enjoys a competitive advantage over South Africa in the secondary industry.
RSA wine industry.	Esterhuizen and Van Rooyen (2006)	RTA, GCR (WEF)	There has been a sustained improvement in competitiveness in the industry.
Competitive performance of global deciduous fruit supply chains: South Africa versus Chile	Mashabela and Vink (2008).	RTA	The RSA's deciduous fruit supply chains are globally competitive. Deciduous fruit supply chains in Chile are highly competitive internationally.
RSA deciduous fruit-canning industry.	Madima (2009).	RTA, Porter diamond model	The industry is internationally competitive in the following areas: Cost of labour, quality of products, the efficiency of production technology, and regulatory standards.
Analyzing the competitiveness of the agribusiness sector in Eswatini.	Dlamini (2012)	Porter diamond	From a competitive point of view, the environment in which the sector operates is unfavourable; competitiveness is not enhanced.
Competitiveness of the RSA agribusiness sector	Van Rooyen and Esterhuizen (2012)	RTA	The sector is only marginally competitive, although it has shown an increasing negative trend since 2004.

Ghana cocoa exports	Boansi (2013)	RCA and RSCA	Ghana enjoys a competitive advantage, but competitiveness is higher in cocoa beans than in processed cocoa.
Analysis of the tobacco sub-sector in the Republic of Macedonia	Tuna, Georgiev and Nacka (2013)	RCA and Porter diamond model	The Republic of Macedonia has a competitive advantage in producing tobacco.
Analyzing the competitive performance of the South African Apple industry	Jafta (2014)	RTA and Porter diamond framework	The RSA's apple industry is marginally competitive.
Analysing the competitive performance of the Namibian date industry	Angala (2015)	RTA, Porter diamond	The Namibian date industry is competitive in the international market.
South African stone fruit industry chain	Boonzaaier (2015)	RTA, WEF and Porter diamond framework	In global trade, the RSA stone fruit industry was competitive mostly in the period of deregulation in the mid-1990s. Plums were the most competitive stone fruit type, followed by apricots, peaches, nectarines, and cherries.
Analyzing the competitive performance of the Cameroonian cocoa industry	Abei (2017)	RTA, Porter diamond model.	The cocoa industry in Cameroon performed positively; however, it could increase competitiveness by applying selected industry-based strategies.
Report on the analysis of the competitiveness of the Agri-value chain	Van Rooyen and Boonzaaier (2017)	RTA Porter diamond model	In the RSA, the deciduous fruit industry and wine industry are competitive.
Measuring the competitive performance of the South African citrus industry	Dlikilili (2018)	RTA, Porter diamond, two-step Delphi	The RSA citrus industry has remained competitive and has maintained its positive figures since the early 1960s.
Analyzing the competitive performance of the South African subtropical fruit industry	Sibulali (2018)	RTA, Porter diamond, two-step Delphi	The subtropical fruit industry of the RSA shows marginally competitive performance.
Factors affecting the Competitive Performance of the South African wine industry value chain	Barr (2019)	RTA extended Porter diamond, two-step Delphi	The country has a competitive wine industry concerning its global competitors; however, the trend has been declining since 2009.
Competitive performance of smallholder wool growers.	Nkamisa (2020)	RCA and RTA Porter diamond, two-step Delphi.	The smallholder wool value chain in the RSA has continued to be competitive, even when compared to its major competitors.
Competitiveness of the South African table grape industry	Mtshiselwa (2020)	RCA and RTA extended Porter diamond, two-step Delphi	South Africa has a competitive table grape industry.

Analysing the competitive performance of the Eswatini sugar industry.	Simelane (2021)	RTA, Porter diamond	Sustained competitiveness, depending on government interventions and price support.
An analysis of the competitive performance of the Ethiopian coffee industry and value chain	Bekele (2023)	RTA, NRCA, Pentagon model (derived from the Porter Diamond model)	Ethiopia shows a high but fluctuating trend in competitiveness performance. Strategies to convert its comparative advantages for quality coffee production and coffee culture into competitive advantage are proposed.

Source: Adapted from Dikilili (2018); Barr (2019); Mtshiselwa (2020); Simelane (2021); and Bekele (2023)

### 3.5. Defining competitiveness

The choice of the Porter Diamond model allows for several notions to be incorporated into the analysis of competitive performance, viz. indigenous factors related to the views of Freebairn (1986) and Sharples and Milham (1990), namely that competitiveness can be defined as “the ability to deliver goods and services at the time-space and form sought by buyers in both the domestic and international market while earning at least the opportunity cost of resources employed”. This definition fits this study because it identifies three aspects of competition: the international market; the domestic market for products, and the domestic market for scarce resources. These are related to the Congolese palm oil industry. Application of this definition was also used in studies on competitive performance by Esterhuizen (2006), Angala (2015), Boonzaaier (2015), Abei (2017), Van Rooyen and Boonzaaier (2017), Dlikilili (2018), Barr (2019), Simelane (2021), and Bekele (2023).

### 3.6. Conclusion

The focus of this chapter was to review the literature applicable to agricultural competitiveness. The development of competitiveness theory based on comparative advantage thinking of trade patterns evolved from Ricardo (1817), and Heckscher-Ohlin (1933), with a critique by Leontief (1953) and Balassa (1965) to the New Trade Theory (Krugman, 1979; Porter, 1990, 1998)) where competitive advantage is considered as the core concept for explaining business/commercial-based trade patterns. The Porter Diamond model, with adjustments, to cover global together with domestic markets, was selected as a theoretical construct for this study, i.e. to explore business-based competitive performance trends of the Congolese palm oil industry.

Methodologies used to quantitatively measure competitive performance were reviewed. Among the methods, the RTA, RCA, and NRCA will be employed to determine different aspects of competitiveness in this study. Recent studies analysing the competitive performance of agricultural industries were referenced. The analytical framework utilized in this research, along with empirical and qualitative data-collecting techniques, are dealt with in Chapter 4.



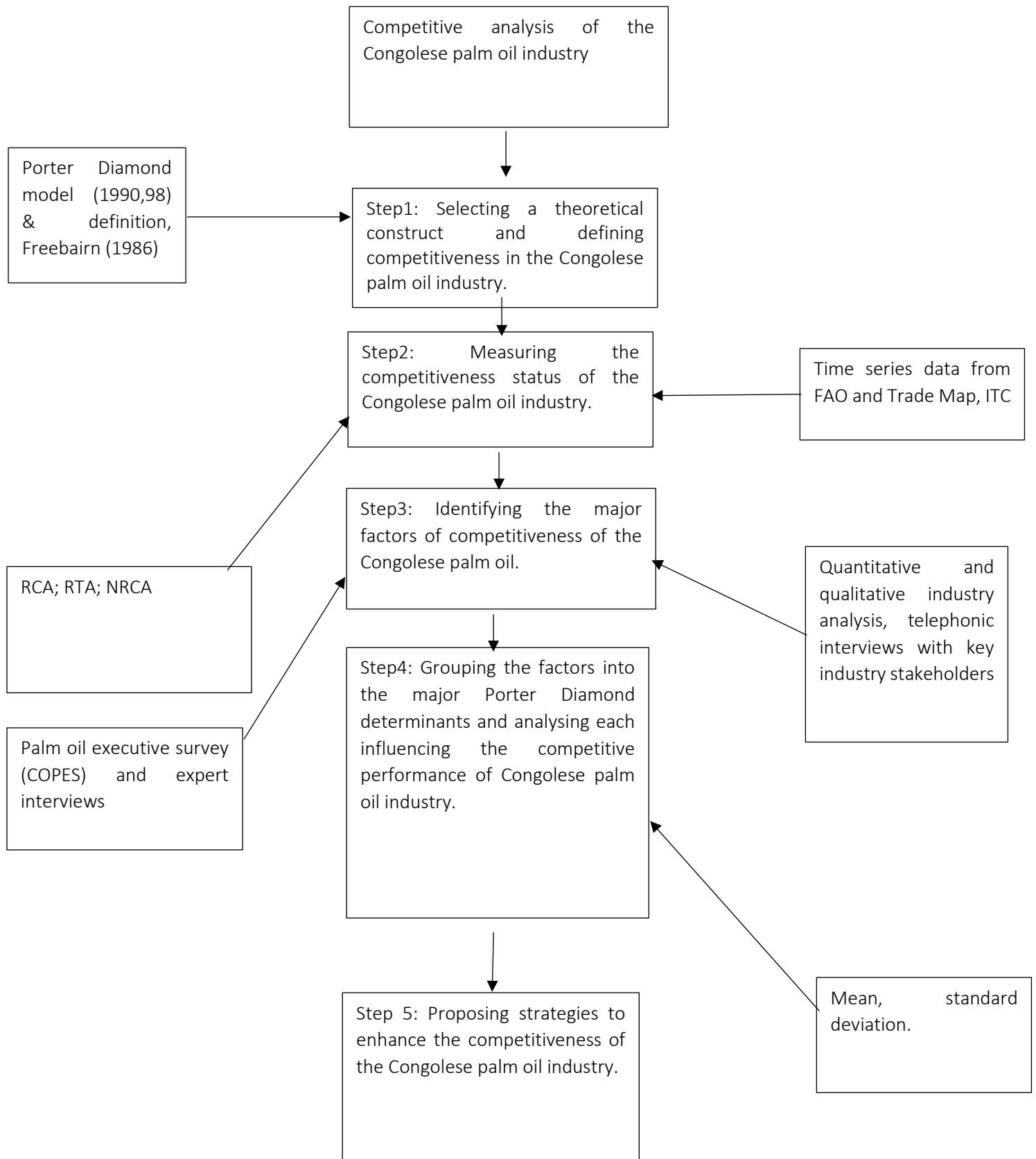
## **Chapter 4: Research Methodology and Framework**

### **4.1. Introduction**

This chapter discusses the research methodology and analytical framework used in the competitive analysis of the Congolese palm oil industry, i.e. a stepwise approach to systematically measure and analyse the competitive performance of the industry and to identify the key factors and determinants in this process.

### **4.2. Analytical framework**

The research approach followed in this study utilised the Porter Diamond model (1998) as a grounded theoretical construct, and the RCA, NRCA, and RTA methods to empirically measure competitive performance. A structured survey, the Congolese Palm Oil Executive Survey (COPES), and expert interviews were conducted to obtain qualitative views and ratings of factors enhancing or constraining competitiveness. The analytical process was applied through an adapted stepwise framework, derived from the format and process used by Boonzaaier (2015), Abei (2016), Barr (2019), Simelane (2021), and Bekele (2023) for competitive analysis of long-term crops. A five-step analysis used in this study entails Step 1: Finding a theoretical construct and defining competitiveness; Step 2: Measuring performance; Step 3: Identifying the major factors of competitiveness; Step 4: Analysing factors enhancing and constraining competitiveness; and Step 5: Recommendations on strategic action to improve the competitive performance of the industry. The process is summarised in Figure 4.1. and each step is described in more detail below.



**Figure 4.1.** Analytical Framework  
Source: Adapted from Van Rooyen (2023)

#### **4.2.1 Step 1: Select a theoretical construct and define competitiveness in the Congolese palm oil industry**

A theoretically grounded construct derived from the NTT, the Porter Diamond model, was accepted for this study, but with adjustment to the demand determinant of competitiveness (see 3.2.9 in Chapter 3). The following definition of competitiveness was proposed: “the ability of the Congolese palm oil industry to deliver goods and services at the time, space, and form sought by buyers in both the domestic and international market while earning at least the opportunity cost of resources employed”.

#### **4.2.2. Step 2: Measuring competitive performance**

As argued in Chapter 3 and given the trade orientation of the Congolese palm oil industry, the study uses the RTA, RCA, and NRCA measures to consider different aspects of competitiveness viz. inter- and intra-country competitiveness, and export competitiveness.

FAOSTATS, available from 1961, provides agricultural-based data; while the Trade Map, ITC database, only available from 2015, provides comparable information on all economic sectors. ITC data, therefore, provides a more comprehensive basis of analysis as it accommodates a broader opportunity cost component. The FAO, however, provides a longer-term base for analysis and will be applied for a long-term trend analysis.

#### **4.2.3 Step 3: Identify key factors that influence the competitiveness of the Congolese palm oil industry**

Qualitative methods were used to identify factors that enhance or constrain the competitive performance of the Congolese palm oil industry. This was done by surveying key players in the Congolese palm oil industry value chain. The information obtained represents primary data for the competitiveness analysis.

#### Sampling method

In this study, purposive sampling was used for selecting respondents in the Congolese palm oil industry's value chain. These included executives, leaders, and experts with detailed knowledge and decision-making influence in the industry.

Purposive sampling, also referred to as judgment sampling, is the intentional preference of an applicant due to the characteristics the participant has (Etikan et al., 2015). This technique is used in qualitative research to identify and select the data-rich cases for the most appropriate use of accessible resources, which consists of the identification and selection of individuals or groups of individuals who are capable and well-informed (Etikan et al., 2015). Due to the need for informed participants, the sample being considered appropriate is generally small when compared with probability sampling techniques. According to Jenson, “purposive sampling” is a technique used to select sets of components in such a manner “that the object



depending on make approximately the same estimation or per cent as the population for those personal characteristics that are currently the subject of data gathering”.

The benefits of purposive expert sampling are:

- A wide variety of sampling techniques can be used, such as qualitative research design;
- It is less expensive and less time-consuming;
- A lot of time can be saved because it facilitates data collection; and
- People from various situations that are related to the issue under discussion can be selected.

Data collection: The Congolese Palm Oil Executive Survey (COPES)

The questionnaire for the COPES was formulated based on the Porter Diamond model's six determinants of competitiveness (production factor conditions, demand, and market conditions, related and supporting industries, firm strategy and structure, government support and policy, and chance factors), and referenced similar studies on agricultural competitiveness. The COPES, with 90 questions, was first sent by email to five industry experts as a pilot with four experts responding, and then, with the necessary adjustments and explanations, distributed by email to the selected respondents. The interviews were done on WhatsApp phone calls (as the DRC has less access to networks and technology than Webinars). The interview contained four questions, details are shown in Annex B, and eight experts were interviewed. A total of 25 questionnaires were distributed via email, and 10 (40%) were completed and returned. The details of the COPES are shown in the annexure.

The relatively low response (40%) is partly due to communication constraints in the DRC. However, as the respondents were made up of knowledgeable and influential persons from different positions in the value chain with executive experiences and expert knowledge, their views were considered informative to comment on identified factors constraining and enhancing competitiveness in the industry. The table below shows the positions of respondents in the value chain.

**Table 4.1** Position of the respondent in the value chain

Respondent numbers	Position in the value chain
2	Expert in palm oil (researchers in palm oil companies)
3	Agricultural engineers in plantations
3	Agro-industry engineers in the processing industry
1	Exporter
1	Local trader

A Likert scale ranging from 1 to 5 was used, where 1 meant the most constraining/negative effect and 5 the strongest, most enhancing effect on competitiveness. The table below shows the Likert scale we used.

**Table 4.2** Likert scale

Scale rating	Meaning
1	Agree wholeheartedly that factors constrain competitiveness
2	Somewhat agree that the factor constrains competitiveness.
3	Indifferent between the two answers
4	Agree somewhat that the factor enhances competitiveness
5	Strongly agree that this factor enhances competitiveness

#### Validity of the questions

Research in surveys relates to the extent to which the survey measures the right elements that need to be measured (Ehrlick et al., 2014). A pilot survey (pretest) of the questionnaire was done to consider the appropriateness of questions regarding impacting factors, and the required process to obtain reliable results. Rudimentary questions, based on the Porter Diamond model, and also derived from comparable studies, i.e. competitiveness analysis of long-term industrial-type crops (Boonzaaier, 2015; Angela, 2015; Dikilili, 2018; Abei, 2019; Barr, 2019) were first tested on industry experts. This led to the relevant wording and clarification of the COPES. From these responses, the impact of the various factors on the competitive performance of the industry could be rated and clustered into the six Porter Diamond determinants in Step 4.

#### **4.2.4. Step 4: Structuring the Porter Diamond determinants of competitiveness**

In this step, the factors identified and rated in Step 3 are firstly clustered into the appropriate Porter Diamond model determinants and then analysed in terms of each respective determinant.

#### Data analysis

The data from the survey was entered into spreadsheets and then examined per determinant; radar diagrams were used for each determinant. The following descriptive statistical measures were used: mean, standard deviation, and frequency. The mean value showed central tendency and the standard deviation, the indication of the average distance of the values from the Mean, i.e. the status of the mean values.

#### **4.2.5 Step 5: Recommend strategies for improving the industry's level of competitiveness**

In this step, the systemised and analysed information from Steps 3 and 4 will be used to recommend considered strategies, in the context of the Porter Diamond model, to improve the competitive performance of the Congolese palm oil industry.

### **4.3. Conclusion**

This chapter provided a systematic description and review of the five steps, methods and activities in each step of the analytical framework.

## Chapter 5: Findings and Results

### 5.1. Introduction

This chapter set out the results of steps 2, 3 and 4 of the analytical frameworks. Step 1 was dealt with in Chapter 3, i.e. selecting an appropriate theoretical construct and definition for the study. In Step 2, the competitive performance of the Congolese palm oil industry from 1961 to 2022 will be measured; Steps 3 and 4 present an analysis of the identified factors contributing to either negative or positive competitive performance of the Congolese palm oil industry and how it fits into the Porter Diamond model. Based on this analysis, the study proposes strategies that could enhance the competitive performance of the Congolese palm oil industry (in Step 5 in Chapter 6).

### 5.2. Measuring the competitive performance of the Congolese palm oil industry

This study used the RTA, RCA, and NRCA, with trade datasets from FAOSTAT from 1961 to 2020, and Trade Map, ITC from 2015 to 2022 to measure trends in the competitive performance of the Congolese palm oil industry.

#### 5.2.1. Relative Trade Advantage (RTA)

The RTA quantitatively measures competitive performance from an intra-country perspective, i.e. how competitive the palm oil industry is in the context of the Congolese economy, accounting for both imports and exports. Table 5.1 shows RTA calculations for the Congolese palm oil industry from 1961 to 2020.

**Table 5.1** RTA Calculations for the Congolese palm oil industry (FAO)

Years	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970
Pam oil.	1,636	1,274	1,095	985	860	804	1,035	807	905	1,310
Years	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
Palm oil	1,129	703	892	1,849	1,041	489	444	145	0	275
Years	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Palm oil	184	44	182	85	160	17	16	23	6	0
Years	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Palm oil	5	0	5	5	50	10	6	5	-2	-3
Years	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Palm oil	-2	-8	-11	-5	-6	-3	-17	-50	-77	-80
Years	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Palm oil	-83	-82	-69	-15	-11	15	22	84	95	27

Source: FAOSTATS data (2020)

Table 5.1 shows from 1961 to 1979 the RTA in the Congolese palm oil industry was higher, from 1980 to 1985, the RTA was positive, but from 1986 to 2015 the RTA decreased. From 2016 to 2020, the RTA started to increase.

**Table 5.2** RTA calculations for the Congolese palm oil industry, Trade Map ITC values

Years	2015	2016	2017	2018	2019	2020	2021	2022
Palm oil	-14	-18	-12	-16	-23	-9	-22	-17

Source: ITC, 2021.

Table 5.2 revealed that from 2015 to 2022 the RTA was negative.

### 5.2.2 Revealed Comparative Advantage (RCA)

As discussed in Chapter 4, RCA is a method to calculate the export-based competitiveness of the Congolese palm oil industry from an intra-country perspective, i.e. in the context of the Congolese economy (Webber & Lambaste, 2010). It does not include import data. Only the export performance of the Congo palm oil industry will thus be considered through the RCA and the NRCA.

**Table 5.3** RCA calculations for the Congolese palm oil industry Trade map, ITC data

Years	2015	2016	2017	2018	2019	2020	2021	2022
Palm oil DRC	0.333	4	1.5	1	2.5	0.2	2	2

Source: Trade Map, ITC data (2021)

From these ratings, some marginal improvements in the export competitive performance are recorded, with a drop in 2020, but recovery thereafter.

### 5.2.3. Normalised Revealed Comparative Advantage (NRCA)

The NRCA is a method to compare the export competitiveness of different countries, i.e. an inter-country analysis.

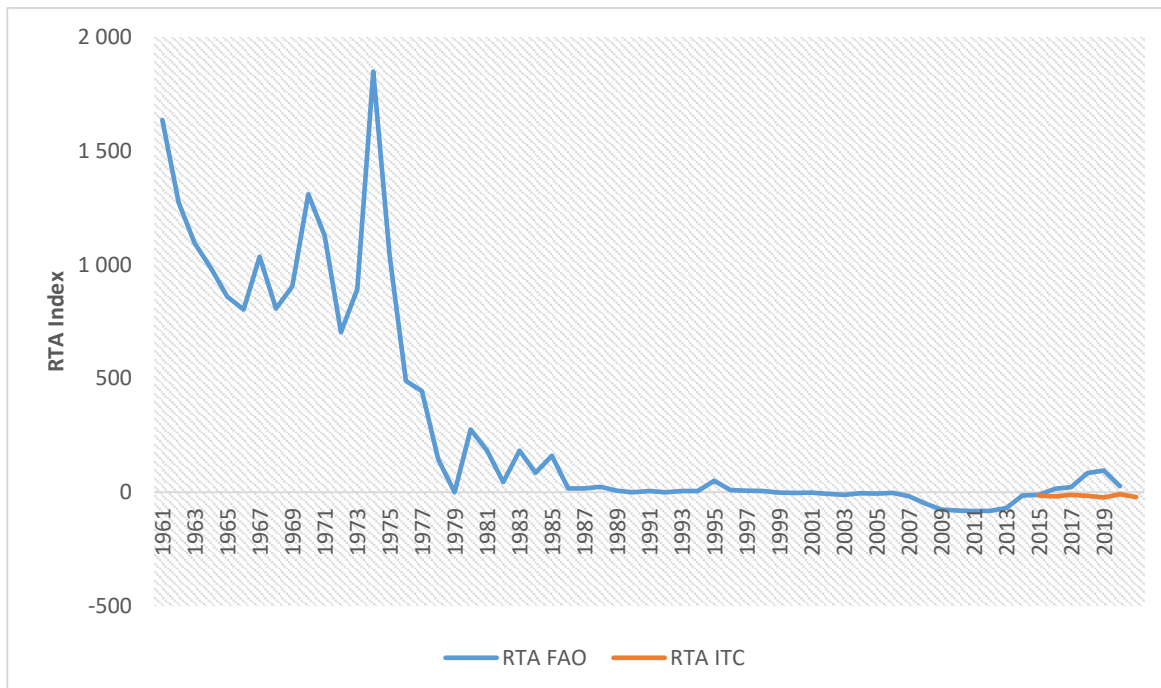
**Table 5.4** NRCA calculation for the DRC, Cameroon, Indonesia, and Malaysia, Trade Map ITC data

Years/countries	DRC	Cameroon	Indonesia	Malaysia
2003	N/A	-0.20	0.0032	0.0056
2004	N/A	0.005	0.0003	0.0056
2005	N/A	0.006	0.0040	0.0078
2006	N/A	0.007	0.0025	0.0087
2007	N/A	0.005	0.0060	0.0045
2008	N/A	0.006	0.0056	0.0062
2009	N/A	-0.210	0.0003	0.0004
2010	N/A	0.004	0.0007	0.0042
2011	N/A	0.005	0.0067	0.0052
2012	N/A	0.009	0.0001	0.0008
2013	N/A	0.025	0.0078	0.0007
2014	N/A	0.034	0.0008	0.0070
2015	0.007	0.053	0.0020	0.0006
2016	0.007	0.047	0.0006	0.0076
2017	0.007	0.056	0.0009	0.0002
2018	0.006	0.078	0.0030	0.0001
2019	-0.200	0.060	0.0072	0.0045
2020	0.023	0.089	0.0060	0.0009
2021	0.001	0.089	0.0007	0.0053
2022	0.06	0.207	0.0002	0.0076

Source: ITC data

#### 5.2.4. Trends and phases in the competitive performance of the Congolese palm oil industry

The differences in the intra-country performance of the Congolese palm oil industry were identified by RTA calculations from FAO and ITC databases. This is shown in Figure 5.1. The competitive performance of the industry is described through four phases.



**Figure 5.1** RTA calculations from FAOSTAT and Trade Map/ITC database  
Source: Author's construction from FAO data (2020) and ITC data (2021)

From this figure, four phases in the competitiveness of the Congolese palm oil industry since 1961 can be identified:

- First phase: “post-independence performance– highly competitive but fluctuating” (1961-1979)
- Second phase: “positive but decreasing competitiveness” (1980-1985)
- Third phase: “neglect and nationalization – marginal/negative competitive performance” (1986-2015)
- Fourth phase: “recovery towards competitiveness” (2016 onwards)

#### First phase: “Post-Independence performance – highly competitive but fluctuating” (1961-1979)

Before the DRC attained independence in 1960, the nation was the second main exporter of palm oil in the world, after Malaysia, and by 1959 mining and copper accounted for 60 per cent of export revenues (Maindo, 2021). Congolese palm oil was rated to be highly competitive because effective institutional and origination

structures had good governance, with investment in agriculture, especially in the palm oil industry, with support policy.

After the independence of the DRC in 1960, the palm sector had many challenges and experienced uncertainties and a lack of continued organisation and support. Firstly, the law of “bakajika” which said that the government is the only owner of the land and can no longer provide the land to the palm oil firms for longer than 25 years. The policies severely constrained investment and productivity with the time for the palm oil tree to be produced and harvested about 25 years. Since 1964, with the war of mulele in Kwilu, plantations were also not attended to as before. This resulted in fluctuating and eventually decreasing competitiveness. In 1974, the President of the DRC (Mobutu) instated the policy of Zairisation, which took all companies from foreign investors and handed them to the Congolese politicians, with a dramatic collapse in structure, management, and performance in the industry. In 1975, the country had a high RTA, but the impact of Zairisation started to be observed in the 1980s.

#### Second phase: “Positive but decreasing competitiveness” (1980-1985)

This phase is the period of recovery and increased competitiveness, but not reaching previously recorded high levels. The government of the second republic (Zaire) organised and invested in operational research institutions, INERA, and in the agricultural sector, especially the palm oil industry sector, private investments followed. The DRC again became the second-largest exporter of palm oil in the world after Malaysia. However, the impact of the Zairisation policy and the lack of expertise who running the palm oil industry caused the sector to perform at lower (RTA) levels than in the early 1960s.

#### Third phase: “neglect and nationalization – marginal/negative competitive performance” (1986-2015)

After 1986, the government seriously neglected the agriculture sector, resulting in a lack of collaboration between palm oil industries, scientific institutions, AND financiers, in the palm oil sector. The policy of Zairisation intensified and continued to nationalise land, constraining production. During this period, the production of palm oil fell from 224,000 metric tons to 187,000 in 2011 (Global Press Journey, 2018), leading to marginal, even negative rates of competitive performance.

#### Fourth phase: “Recovery towards competitiveness” (2016-2022)

After the two civil wars came the period of cease-fire and political settlement in which the DRC re-installed democratic institutions and political dialogue in the DRC obtained the first democratic vote in 2006, the second in 2011, and the third in 2018 when the country started to be organised in business systems. Palm oil companies re-started their activities, re-planting plantations, and companies received financing from commercial banks. Therefore, production increased, leading to increased trade and competitiveness. The Democratic Republic of Congo again entered the global market. Collaboration between INERA and palm oil

companies improved. All these resulted in a substantive improvement in competitiveness from previous years, showing increasing RTA values. There was an increase in RTA in this period because the Congolese government started to invest in the palm oil sector, and supported private investment in the industry in the DRC.

### 5.2.5 Comparison between RTA and RCA

The RTA and RCA are used to measure intra-country competitiveness. In Figure 5.2 a comparison is shown, to illustrate the difference between these two indexes, using Trade Map ITC trade data from 2015 to 2021 (FROM TABLES 5.2 AND 5.3).



**Figure 5.2** Comparing the relative trade advantage (RTA) and relative comparative advantage (RCA) of the Congolese palm oil industry, 2015-2021

Source: Researcher’s construction from Trade Map ITC data (2021)

The RTA reflects the trade competitiveness performance and includes import and export values. The RCA, on the other hand, looks at export competitive performance only. The figure above shows the RTA at a much lower (and negative level) than the RCA (also see Table 5.3). From a trade perspective, using RTA values, the Congolese palm oil industry is therefore operating at an uncompetitive level due to the substantial imports to serve local demand. From export competitiveness, however, the RC shows positive, albeit marginal competitive performance. The use of both measures is justified as they depict different views of the competitiveness of the palm oil industry in the Congolese economy. Both however are required to gain a comprehensive perspective on the intra-country competitiveness of palm oil in the DRC.

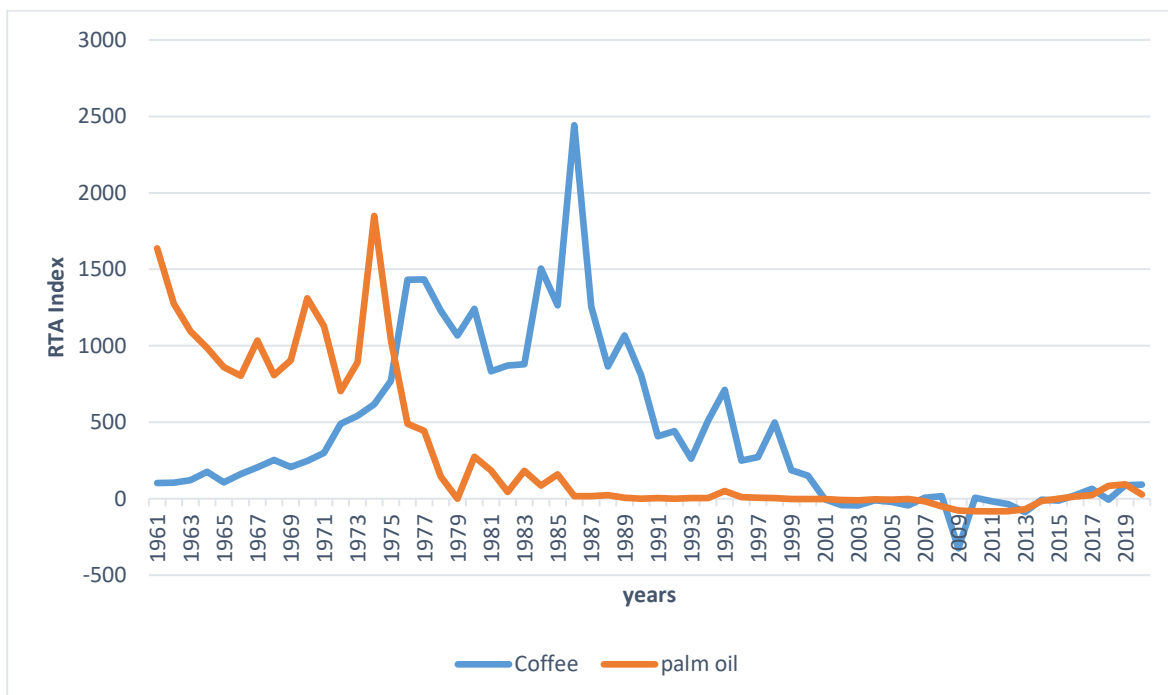


### 5.2.6. Intra-country comparison between other DRC agree-export crops

Competitiveness is about “opportunity cost” consideration, as defined in Chapter 3. For this reason, the Congolese palm oil industry must also be compared to other Congolese Agri-export crops, i.e. an intra-country analysis, using RTA values.

Coffee, the other main crop, is used for such a comparison. Figure 5.3 shows the evolution of the competitive performance of the Congolese coffee industry from 1961 to 2020 in comparison to the palm oil industry. From 1991, the competitive performance of the Congolese coffee industry was increasing, reaching a high in 1985. However, from 1985 due to Zairisation, continued wars from 1996 to 1997 and 1998 to 2023, and related breakdowns, the competitive performance of the Congolese coffee industry fell dramatically, even to negative levels in 2010. As a consequence, the DRC lost its position as the first global exporter of coffee.

The similarity, and the consequent impact of exogenous factors- chance factors as referred to by the Porter Diamond model, must be noted here. While coffee performed at higher levels of competitiveness for many of the past decades, RTA values over the past 20 years show both industries are struggling with low competitive performance rates.



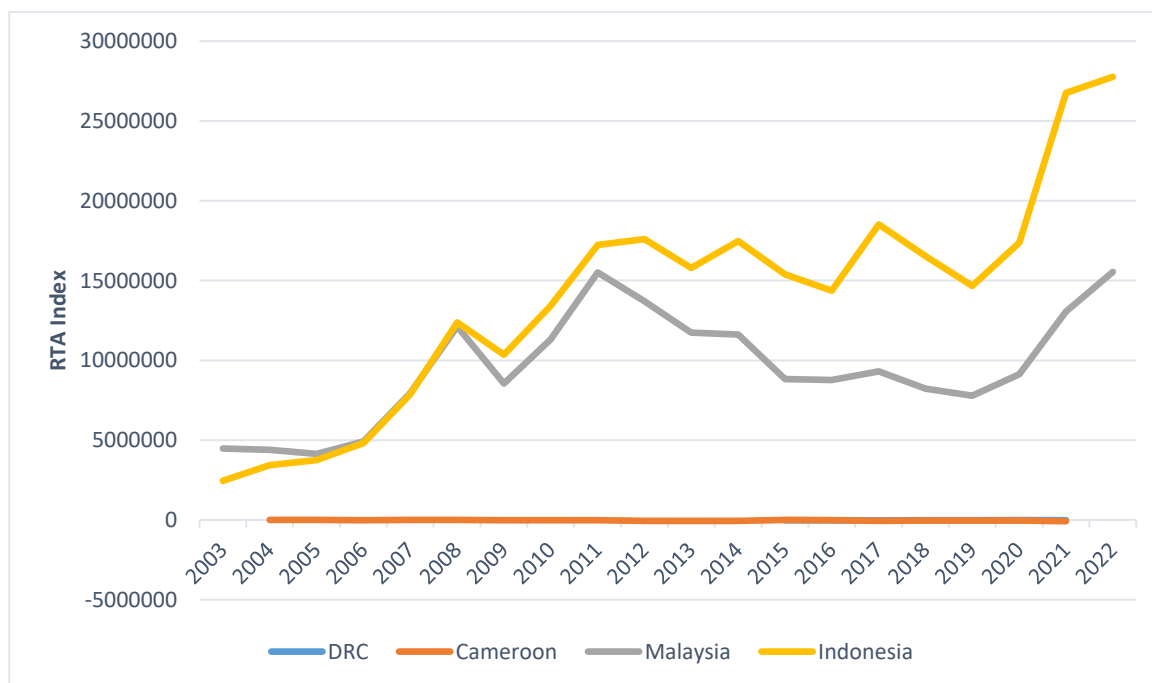
Source: FAO data 2020

Figure 5.3 Comparison between RTA of coffee and palm oil, 1961-2020

### 5.3 Inter-country comparisons: DRC and competing producers of palm oil from other countries

One main aim of this study was to analyse the competitive performance of the palm oil industry in the DRC with other countries producing palm oil. As discussed above, the NRCA and RTA were used to compare competitiveness between those countries. Table 5.4, Figure 5.4 and Figure 5.5 show how competitive the Congolese palm oil industry is concerning its competitors.

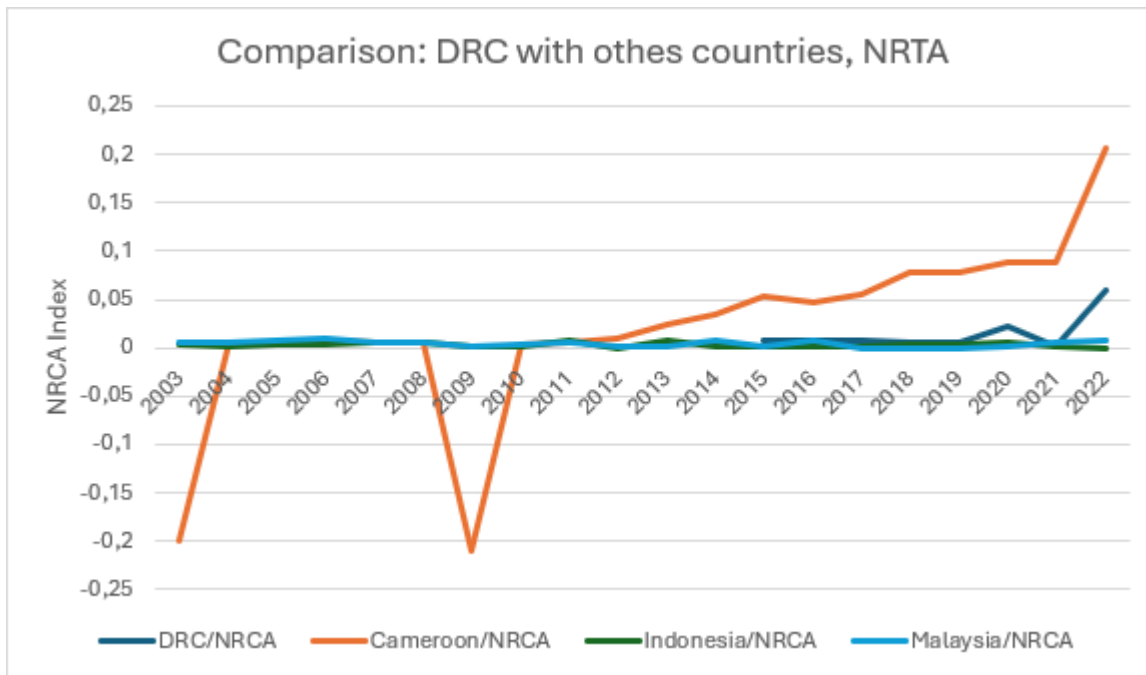
The RTA and NRCA are not the best measures to use in this study for inter-country comparisons, i.e. to compare competing countries. The RTA, while including both exports and imports, only gives a relative value and is influenced by local economic structure (Esterhuizen, 2006; Bekele, 2023). Where economic structures differ between countries, inappropriate comparisons are recorded (Bekele, 2023). The RTA is thus used in this study with the noted reservations.



**Figure 5.4** Comparison between DRC and producers of palm oil from other countries, RTA values

Source: Researcher’s calculations from trade map ITC data 2022

Table 5.4 shows that the Congolese palm oil industry has a negative RTA, or uncompetitive performance, with Cameroon. However, from 2003 to 2006, Malaysia had an RTA higher than Indonesia, but from 2006 to 2022, Indonesia's RTA was recorded as the highest.



**Figure 5.5** Comparison between DRC and producers of palm oil from other countries, NRCA values. Source: Researcher’s calculation from Trade Map ITC data 2022

Using NRCA values, only export competitiveness is compared in Table 5.4 and Figure 5.5. This will give a different perspective than the RTA comparisons above, including both imports and exports. The NRTA ratings show that from 2015 to 2018, the Congolese palm oil industry had a marginal advantage in NRCA, then from 2018 to 2020, it had a negative rating, but from 2020 to 2022, the Congolese palm oil industry again showed increasing positive values. Cameroon showed a negative rating in 2003 but improved to marginal positive ratings from 2004 to 2008, with another drop to negative ratings from 2008 to 2010 and increasing positive NRCA ratings to 2022, to become the leading export competitive country, followed by the DRC. Indonesia and Malaysia show sustained competitive ratings from 2003 to 2022, albeit lower than the other two countries over recent years. This shows that the DRC (and Cameroon) succeeded in recent times to improve their standing in global export competitiveness.

**5.4. Factors influencing the competitive performance of the Congolese palm oil industry (Step 3)**

The preceding section quantitatively measured the competitive performance of the Congolese palm oil industry from 1961 to 2022. The outcome indicated that the Congolese palm oil industry was performing sporadically and at a fluctuating level of competitiveness. From highly competitive levels in the late 1960s, it fell dramatically to operate uncompetitively from the mid-1990s, mostly importing palm oil until the mid-2010s and is currently in recovery, but only marginally enhancing its performance. From an export competitive perspective, some positive numbers were recorded from 2016 onwards.

The next section, to explain the current performance levels of the Congolese palm oil industry, identifies and rates factors that impact competitiveness.

An online survey (COPES), supported by individual interviews with knowledgeable respondents enabled this process. The COPES listed 91 questions, aimed to identify factors, mailed to 25 respondents, with only 10 responding (40% response). Due to the informed level of respondents, this was considered adequate for the study. It was formulated based on the Porter Diamond model's six determinants of competitiveness (production factor conditions, demand, and market conditions, related and supporting industries, firm strategy and structure, government support and policy, and chance factors), and referenced similar studies on agricultural competitiveness. The COPES, with 90 questions, was first sent by email to five industry experts as a pilot with four experts responding, and then, with the necessary adjustments and explanations, distributed by email to the selected respondents. The interviews were done on WhatsApp phone calls (as the DRC has less access to networks and technology than Webinars). The interview contained four questions, details are shown in Annexure B, and eight experts were interviewed. The details of the COPES are shown in the annexure.

The questions focused on whether the factor enhanced or constrained competitiveness; and what the rating was. The factors with the highest average rating were the enhancing factors, whereas the lowest average rating indicated the constraining factors. The scale was 1 to 5 where 1 is the most constraining and 5 is the most enhancing. On 91 identified factors in the COPES, 55 per cent received a score of less than 2.5, i.e. constraining; 16 per cent received a score between 2.5 and 3, i.e. neutral; and 29 per cent received a score higher than 3, i.e. enhancing. The average factor ratings across all responses were ranked from most constraining to most enhancing and are illustrated in Appendix B. Table 5.6 shows the top ten enhancing and constraining factors of the Congolese palm oil industry.

**Table 5.5.** Top ten enhancing and constraining factors of the Congolese palm oil industry

Constraining Factors	Mean	Enhancing Factors	Mean
Government financial support	1	Importance of having industry infrastructure.	4.6
Government scientific institutions	1	Rising demand for palm oil in the local market (DRC)	4.5
The credibility and reliability of the current political system	1.2	Growth in the local market same as above??	4.4
Wars and conflict	1.2	Political change towards good governance, democracy, and development.	4.3
Health-HIV/AIDS, TB, Covid-19	1.2	RESPO requirement: To avoid deforestation	4.3
General infrastructure (is in a bad state in the DRC)	1.2	RESPO regulation: This will lead to the expansion of palm oil	4.3

		without destroying the environment.	
Administration regulation	1.4	Research availability	4.2
Corruption and opportunism	1.4	Willingness to reinvest in palm oil by the private sector	4.2
The call for land expropriation without compensation	1.3	The potential deforestation regulation to mitigate climate change	4.2
The inappropriate tax regarding the development of the palm oil sector explains	1.5	Possibility of expansion in the market (local and international)	3.9

Source: COPES 2022

Notes: <2.5 = constraining; 2.5<3 =Neutral; >3 = enhancing; 5 = most enhancing.

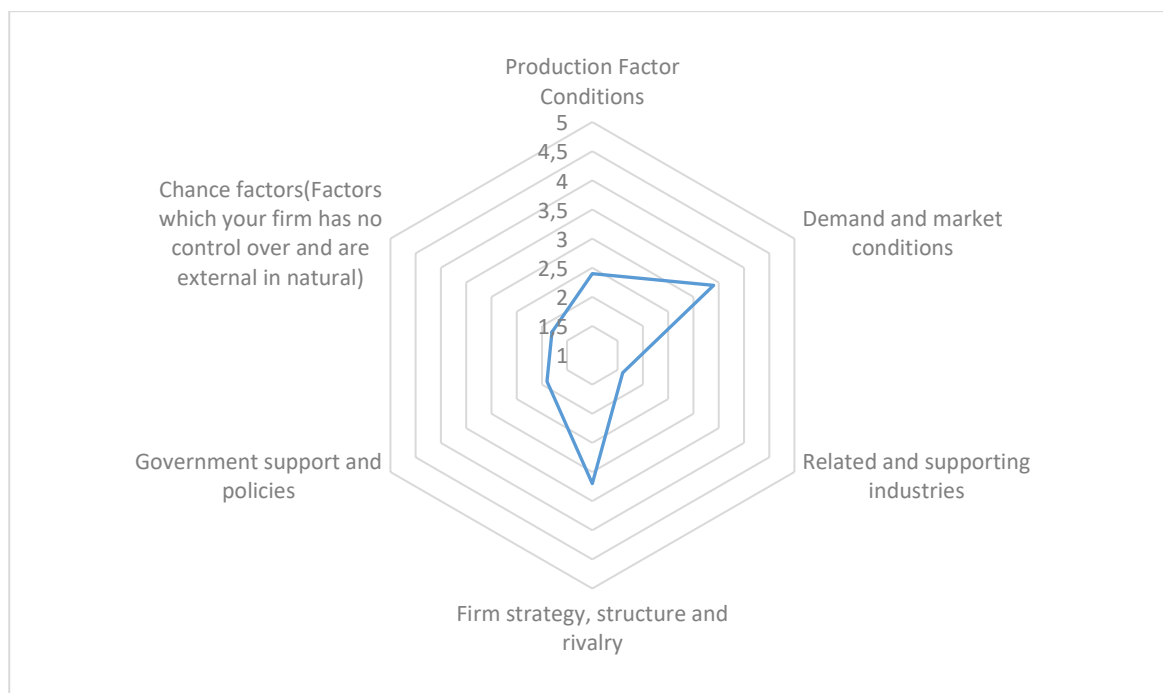
### 5.5. Porter Diamond: Determinants of the competitive performance of the Congolese palm oil industry (Step 4)

This section focuses on the application of the Porter Diamond model as a qualitative analytical construct. It clusters the rated factors into the six determinants to enable a coordinated analysis of such factors. The mean and standard deviation were calculated in the factor rating process per determinant. Table 5.6 and Figure 5.6 illustrate the rating scores of the determinants.

**Table 5.6** Rating scores of the determinants of competitive performance of the DRC palm oil industry

Porter model determinant	Average factor score
Production factors	2.4
Demand factors	3.4
Related and supporting industries	1.7
Firm strategy, structure, and rivalry	3.2
Government support and policies	1.9
Chance factors	1.8

Source: COPES (2022)



**Figure 5.6.** Rating scores of Porter Diamond determinants, Congolese palm oil industry, 2020  
 Notes: <2.5 = constraining; 2.5<3 =Neutral; >3 = enhancing; 5 = most enhancing

In this presentation, it is shown that the respondents viewed factors related to the Porter determinants- “Related and supporting industries”; “Government support and policy”; and “Chance factors” as constraining the competitive performance with impact rating scores of 1.7, 1.9, and 1.8 respectively. The “Production factor “determinant scored 2.4, representing a near-neutral rating. “Demand factors”, and “Firm strategy, structure, and rivalry” represent the determinants, currently enhancing the competitive performance of the DRC palm oil industry with impact rating scores of 3.4, and 3.2 respectively.

The Porter Diamond model determinants are discussed below.

**5.5.1. Production factor conditions (2.4/5)**

The production factor conditions refer to the status of endowment factors – natural resources, climate, and levels of production cost for inter alia items such as labour, inputs-diesel, pesticides, machinery, knowledge, and production infrastructure. Table 5.7 and Figure 5.7 show the impact of production factor conditions on the competitive performance of the DRC palm oil industry.

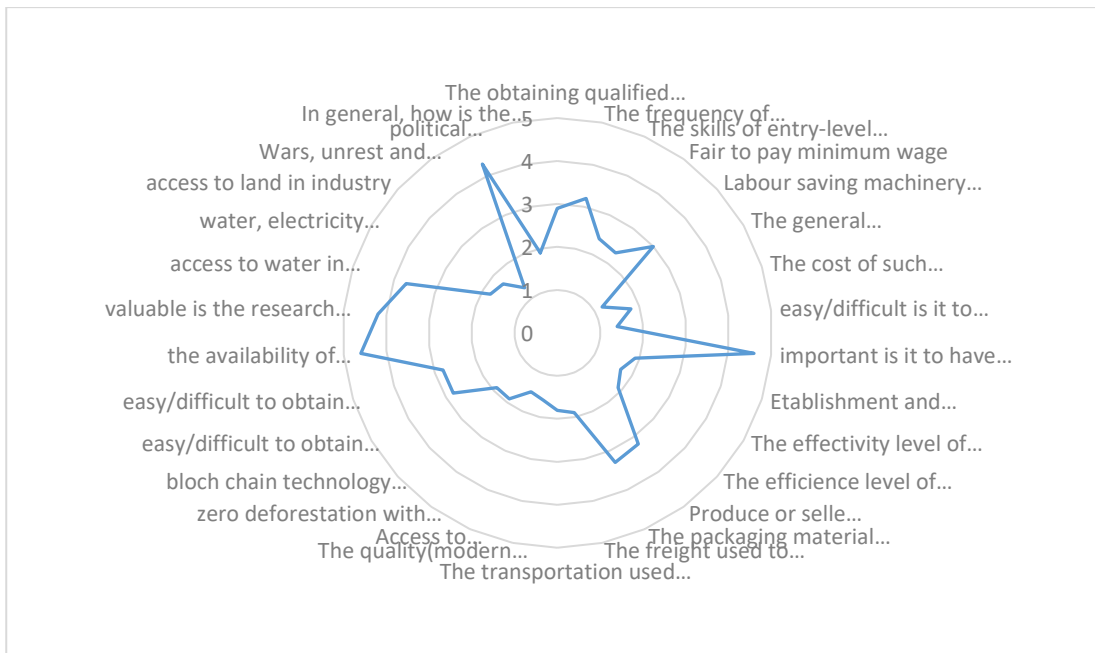
**Table 5.7** Impact of production factor conditions on the competitive performance of the DRC palm oil industry, 2020

Factors	Mean	Standard deviation
1) Obtaining qualified and experienced labour	2.9	0.56
2) The frequency of obtaining such labour	3.2	0.63
3) The skills of entry-level labour	2.4	0.51
4) fair to pay minimum wage	2.3	0.82
5) labour-saving machinery being used	3.0	0.66

6) How is the general infrastructure used	1.2	0.42
7) Cost of such infrastructure	1.8	0.78
8) easy/difficult to obtain such infrastructure	1.4	0.51
9) Well-developed infrastructure	4.6	0.69
10) Establishment and production costs are	1.9	0.56
11) The effectiveness (Being successful in achieving a desired result) level of your industry is	1.7	0.67
12) The efficiency (input: output) level of your industry is	1.9	0.79
13) To produce or sell environmentally friendly products is	3.2	0.78
14) The packaging material for your product	3.3	0.66
15) The freight used to export your product	1.9	0.73
16) The transportation used to export your product	1.8	0.63
17) The quality (modern technology such as sensing technology) available in your industry	1.6	0.51
18) Access to quality (modern) technology such as digitalizing palm oil value	1.5	0.52
19) Zero deforestation with the help of new technology.	1.9	0.73
20) Modern processing for the palm oil industry	1.9	0.64
21) To obtain long-term finance for your industry i.e., loans, grants, advances from exporters	2.8	0.33
22) To obtain short-term finance for your industry, i.e., loans, grants, advances from exporters?	2.8	0.63
23) Availability of research advice in your industry (generally lags other industries or is up to standard.	4.6	0.51
24) Technical information available to your industry.	4.2	0.78
25) Access to water in your industry enough for current production activities	3.7	2.06
26) Is electricity available in your industry enough for expansion	1.8	0.63
27) Access to land in your industry	1.7	0.63
28) Do unskilled workers impact the industry's competitiveness?	1.3	0.52
29) Cost of skilled workers impacts the industry's competitiveness	4.3	0.67
30) the cost of doing business	1.9	0.56

Source: Copes (2022)

Notes: <2.5 = constraining; 2.5<3 =Neutral; >3 = enhancing; 5 = most enhancing.



**Figure 5.6** The impact of the production factor conditions on the competitive performance of the DRC palm oil industry. Source: COPES (2022)  
Notes: <2.5 = constraining; 2.5<3 =neutral; >3 = enhancing; 5 = most enhancing

In this determinant, 12 factors are considered as enhancing factors (40 per cent), and 18 factors as constraining factors (60 per cent). This shows an unbalanced production factor system. The constraining competitiveness factors are the general infrastructure and unskilled workers with low average scores of 1.2 and 1.3 respectively. The enhancing factors are the availability of pieces of research advice and the cost of skilled workers with average scores of 4.6 and 4.3 respectively.

**5.5.2. Demand and market conditions (3.4/5)**

The demand and market conditions show the nature of demand for the industry’s product and service, domestically and internationally expanding on the Porter notion that only home demand drives competitiveness. In the case of the oil palm industry in the DRC, this is however partly valid as a reduction in imports will contribute to increased competitiveness as measured by RTA. However, export competitiveness also remains important for the growth and development of a product such as palm oil in the DRC. In this study, both home and global demand are thus viewed as the DRC is also affected by global market conditions. Table 5.8 and Figure 5.7 revealed the impact of demand and market conditions on the competitive performance of the Congolese palm oil industry.

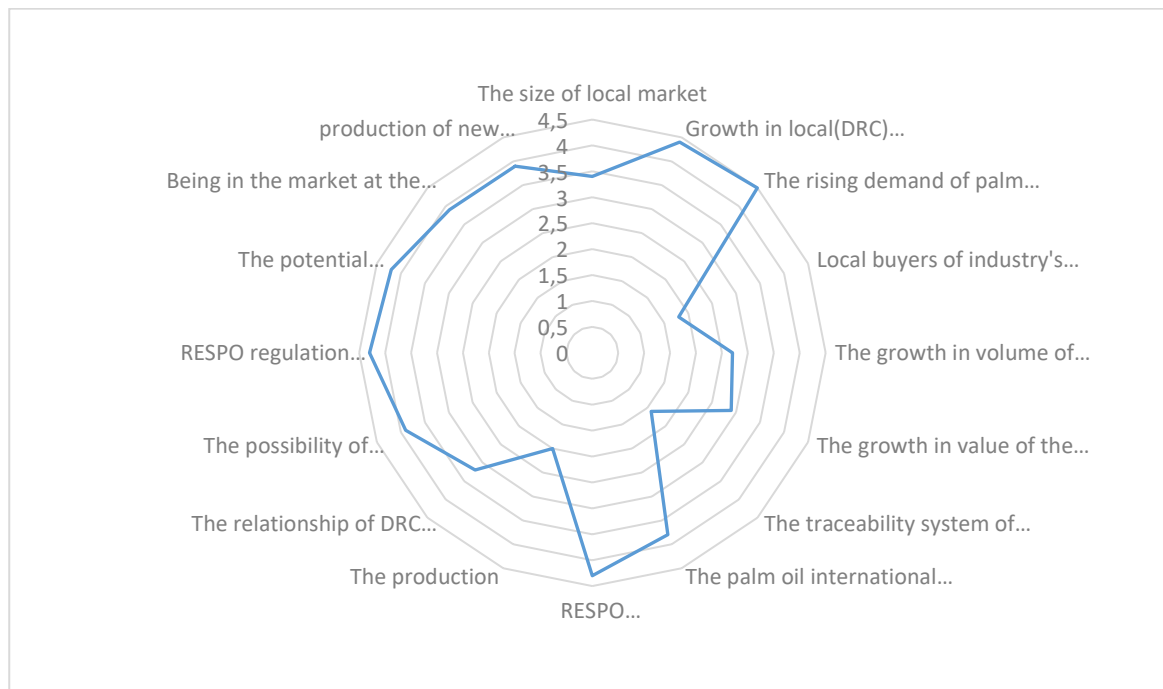


**Table 5.8** Impact of demand and market conditions on Congolese palm oil industry

Factors	Mean	Standard Deviation
1) Size of the local (DRC) market:(unable to handle large volumes of your produce or able to handle large volumes of your produce)	3.4	0.69
2) Growth in the local (DRC) market	4.4	0.66
3) The rising demand for palm oil in the local market is:(low or high)	4.5	0.52
4) Local buyers of your industry’s products are	1.8	0.63
5) Growth in the volume of the local market:	2.7	0.48
6) Growth in the value of the local market	2.9	0.56
7) Traceability system for the supplier of the product to the producer	1.6	0.51
8) The palm oil demand national market is	3.8	0.63
9) RESPO requirement (international market): (constraints competitiveness or enhances competitiveness)	4.3	0.48
10) The international palm oil market	2.0	0.66
11) The relationship of the DRC palm oil industry with mega industries such as Marsavco soap factories...	3.2	0.63
12) The possibility of expansion in the existing local and international market is (less likely or very likely)	3.9	0.56
13) RESPO regulation influence your industry:(big impact or less impact)	4.3	0.67
14) The potential deforestation regulation	4.2	0.63
15) Being in the market at the same time as a country like Indonesia, Malaysia, Colombia, Guatemala, Nigeria, etc. affect your industry’s competitiveness	3.9	0.56
16) Production of new cultivars such as a new variety of palm oil influences competitiveness:( negatively or positively)	3.9	0.87

Source: COPES (2022)

Notes: <2.5 = constraining; 2.5<3 =Neutral; >3 = enhancing; 5 = most enhancing.



**Figure 5.7.** Impact of demand and market conditions on the competitive performance of the Congolese palm oil industry

Source: COPES (2022)

Notes: <2.5 = constraining; 2.5<3 =Neutral; >3 = enhancing; 5 = most enhancing.

The performance of factors in this determinant shows a varied pattern, with some constraining performance. In this determinant, 81 per cent of factors are considered as enhancing factors and 19 per cent are constraining factors. The constraining competitiveness factor relates to whether there is a traceability system for the supplier of the product to the producer; local buyers of the industry’s products scored 1.6 and 1.8 respectively. The best-enhancing competitiveness factors are growth in the local market and RESPO requirements (for the international market), with average scores of 4.4; 4.3 and 4.2 respectively.

### 5.5.3. Related and supporting industries (1.7/5)

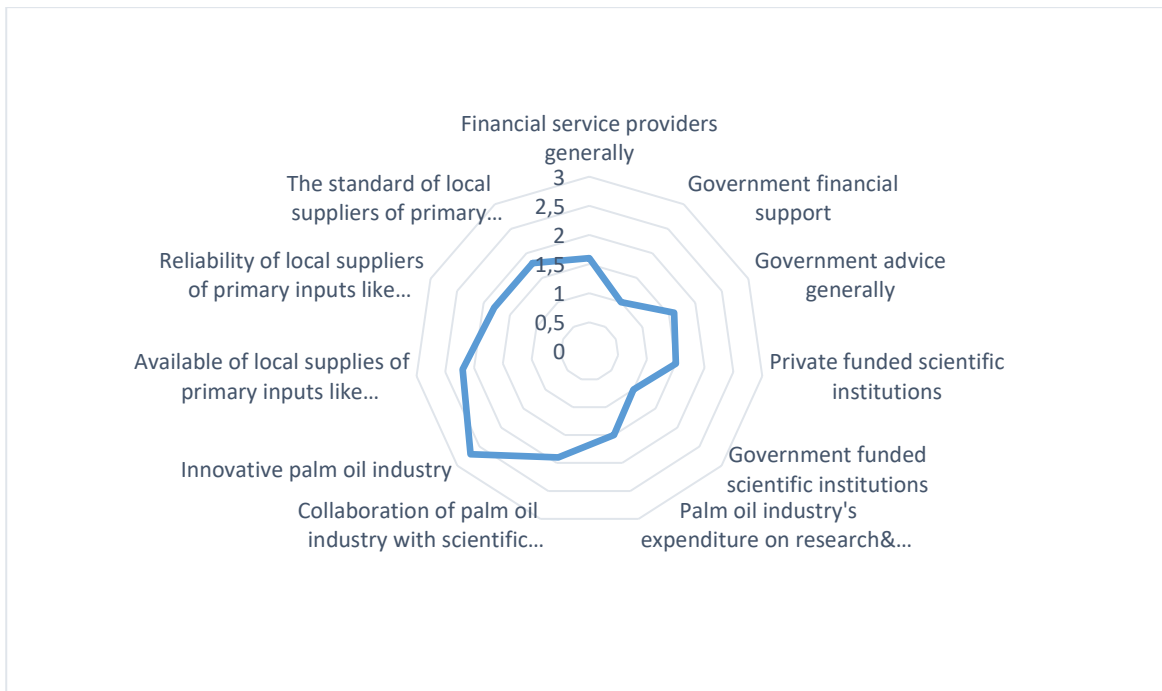
The related and supporting industries show the presence or absence of competitive, efficient, and competent supplier industries and related industries. Table 5.9 and Figure 5.8 show the impact of related and supporting industries on the DRC palm oil industry.

**Table 5.9** Impact of related and supporting industries

<b>Factors</b>	<b>Means</b>	<b>Standard Deviation</b>
1) Financial service providers generally	1.6	0.51
2) Government Financial Support	1.0	0.00
3) Government Advice generally	1.6	0.69
4) Private-funded scientific institutions	1.5	0.52
5) Government Funded Scientific Institutions	1,0	0.00
6) Palm oil industry’s expenditure on research & development	1,5	0.52
7) Collaboration of the palm oil industry with scientific research institutions	1.9	0.76
8) Innovation in the palm oil	2.7	0.67
9) Availability of local suppliers of primary inputs like fertilizers, pesticides, etc.	2.2	0.42
10) Reliability of local suppliers of primary inputs like fertilizers, pesticides	1.8	0.63
11) Standard of local suppliers of primary inputs like fertilizers, pesticides	1.6	0.60

Source: COPES (2022)

Notes: <2.5 = constraining; 2.5<3 =Neutral; >3 = enhancing; 5 = most enhancing.



**Figure 5.8** Impact of related and supporting industries on the Congolese palm oil industry  
Source: COPES (2022)

Notes: <2.5 = constraining; 2.5<3 =Neutral; >3 = enhancing; 5 = most enhancing

In this determinant, 91 per cent of factors are constraining, and only 9 per cent of factors are enhancing factors. The highest constraining competitiveness factors are public/government financial support and scientific institutions with average scores of 1.0 and 1.0 respectively. These are also viewed to also constrained activities by the private sector, such as finance, input support, etc. The best-enhancing competitiveness factor is viewed as an innovative palm oil industry with an average score of 2.7.

#### 5.5.4. Firm strategy, structure, and rivalry (3.2/5)

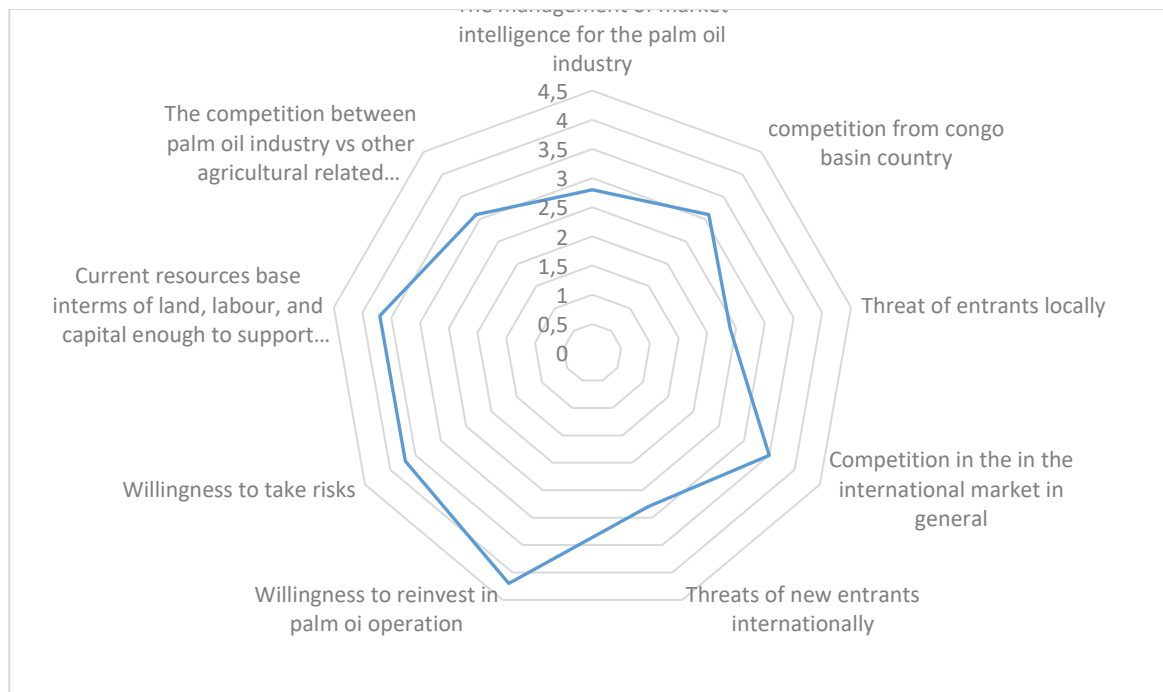
The firm strategy, structure, and rivalry show the industry conditions in the Congolese palm oil industry – how companies are created and organised, and the nature of the domestic rivalry. Tables 5.10 and Figure 5.9 show the impact on the competitive performance of the Congolese palm oil industry.

**Table 5.10** Impact of firm, structure, and rivalry on the Congolese palm oil industry

Factors	Means	Standard Deviation
1)The management of market intelligence for the palm oil industry	2.6	0.63
2) Competition from Central Africa	3.1	0.56
3) Threat of entrants (new palm oil farmers) locally	2.4	0.69
4) Competition in the international market in general	3.5	0.52
5) Threats of new entrants (new palm oil farmers) internationally	2.8	0.63
6) Willingness to reinvest in palm oil operations	4.2	0.63
7) Willingness to take risks	3.7	0.60
8) Current resource base in terms of land, labour, and capital enough to support future palm oil operations	3.7	0.67
9) Competition between the palm oil industry vs other agricultural-related activities for the following resources (land, labour, capital	3.1	0.56

Source: COPES (2022)

Notes: <2.5 = constraining; 2.5<3 =Neutral; >3 = enhancing; 5 = most enhancing.



**Figure 5.9** Impact of firm strategy, structure, and rivalry on the competitive performance of the Congolese palm oil industry

Source: COPES (2022)

Notes: <2.5 = constraining; 2.5<3 =Neutral; >3 = enhancing; 5 = most enhancing

In this determinant, 89 per cent of factors are enhancing factors, and 11 per cent are constraining factors. The strongest constraining factors are the threat of new entrants (new palm oil producers, locally, and the management of market intelligence for the palm oil industry with average scores of 2.4 and 2.6 respectively. These scores however are close to neutral and do not warrant action. The best enhancing factor is the willingness to reinvest in palm oil operations with an average score of 4.2.

**5.5.5. Government support and policies (1.9/5)**

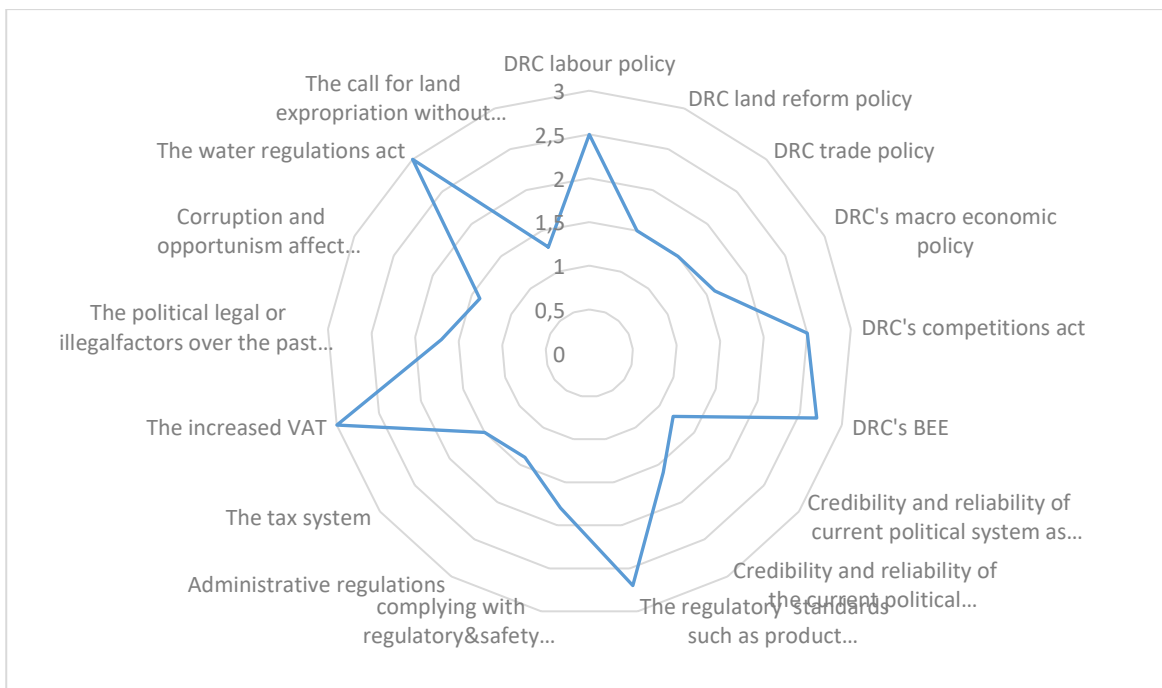
The government through policies and support measures plays a vital role in creating a conducive environment for competitive performance. Table 5.11 and Figure 5. 10 show the impact of government support and policies on the palm oil industry.

**Table 5.11** The impact of government support and policies on the Congolese palm oil industry

Factors	Means	Standard Deviation
1) DRC labour policy (i.e., minimum wage)	2.6	0.51
2)DRC land reform policy:(constrains your industry’s competitiveness or enhances your industry’s competitiveness)	1.5	0.52
3)DRC trade policy:(constrain your industry’s competitiveness or enhance your industry’s competitiveness)	1.5	0.32

4) DRC C's macro economy policy:( constrain your industry's competitiveness or enhance your industry's competitiveness)	1.6	0.42
5) DRC's competitions act:(constrains your industry's competitiveness or enhances your industry's competitiveness)	2.5	0.70
6) Policy of taxation for agricultural equipment such as tractors...	2.7	0.48
7) The credibility and reliability of the current political system i.e., constitutional action, elections, etc. is:(very low or very high)	1.2	0.42
8) The credibility and reliability of the current political system as it applies to the palm oil industry is: (very low or very high)	1.6	0.52
9) In your opinion, how are the regulatory standards such as product standards, energy, safety, and environment:(non-existent or among the world's most stringent	2.7	0.67
10)Complying with regulatory & safety standards:( obstructs competitiveness or increases competitiveness)	1.8	0.63
11) Administrative regulations are: (burdensome or routine with minor effort)	1.4	0.51
12) The tax system: (impedes business environment or promotes business environment)	1.5	0.52
13) What effect do you think the increased VAT will have: (Negative or positive)	3.0	0.66
14) Political and legal factors over the past five years undermine your industry's strategic positioning (negatively or positively)	1.7	0.81
15) Corruption and opportunism affect your industry's competitiveness: (impedes business environment or promotes business investment)	1.4	0.51
16) The Water Regulation Act: (hinges level of competitiveness or does not have an impact)	3.0	0.66
17) The political call for land expropriation without compensation will: (constrain your industry's competitiveness or enhance your industry's competitiveness)	1.3	0.48

Source: COPES (2022); Notes: <2.5 = constraining; 2.5<3 =Neutral; >3 = enhancing; 5 = most enhancing.



**Figure 5.10** The impact of government support and policies on the Congolese competitive performance of the palm oil industry

Source: COPES (2022)

Notes: <2.5 = constraining; 2.5<3 =Neutral; >3 = enhancing; 5 = most enhancing

As in the previous cases, this determinant shows a varied performance, with 65 per cent of factors constraining factors and 35 per cent enhancing factors. The highest constraining factors are the credibility and reliability of the current political system; the call for land expropriation without compensation; government corruption and opportunism in the industry with average scores of 1.2; 1.3 and 1.4 respectively. The Water Regulation Act and increased VAT are rated as neutral and scored 3.0.

### 5.5.6 Chance factors (1.8/5)

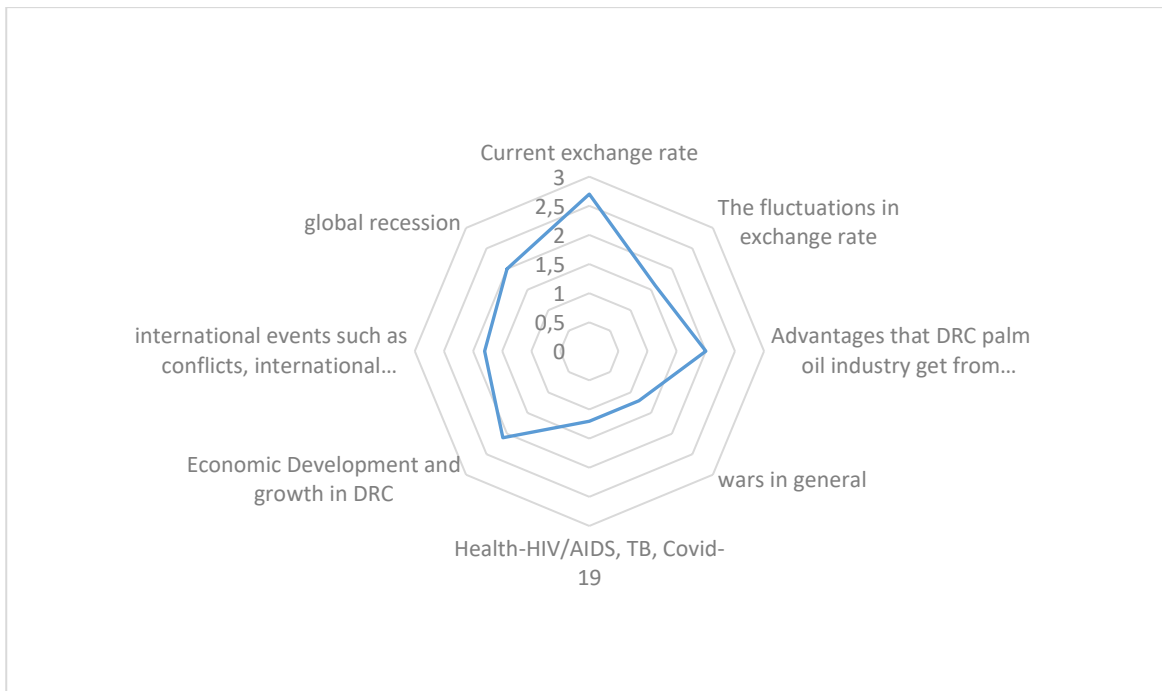
Chance events are occurrences beyond the direct influences of the industry and its firms. There are events such as wars, political decisions by a foreign government, and health matters such as the COVID-19 pandemic, changes in the world financial markets, and exchange rates. Table 5.12 and Figure 5.11 show the impact of chance factors in the DRC palm oil industry.

**Table.5.12** The impact of chance factors on the Congolese palm oil industry

Factors	Means	Standard Deviation
1) The current exchange rate: (constrains your industry's competitiveness or enhances your industry's competitiveness)	2.7	0.43
2) The fluctuations in exchange rate:( constrain your industry's competitiveness or enhance your industry's competitiveness)	1.6	0.50
3) Advantages that the DRC palm oil industry gets from the occurrence of unfortunate events to competitors:( no advantages or more advantages)	2.0	0.66
4) Wars: (imposes a significant threat to your industry or does not impose a significant threat to your industry)	1.2	0.42
5) Health-HIV/AIDs, TB, COVID-19, etc.: (imposes a significant threat to your industry or does not impose a significant threat to your industry)	1.2	0.33
6) Economic development and growth in DRC: (constrain the industry's competitiveness or is an opportunity to increase your industry's competitiveness)	2.1	0.73
7) Extent do international events such as conflicts, and international boycotts impact your industry's competitiveness:( Constraints the industry's competitiveness or enhance the industry's competitiveness)	1.8	0.63
8) Global recession will have: a big negative impact on your industry or no impact on your industry	2.0	0.66

Source: COPES (2022)

Notes: <2.5 = constraining; 2.5<3 =Neutral; >3 = enhancing; 5 = most enhancing



**Figure 5.11** Impact of chance factors on the Congolese competitive performance in the palm oil industry  
Source: COPES (2022)

Notes: <2.5 = constraining; 2.5<3 =Neutral; >3 = enhancing; 5 = most enhancing

In this determinant, 89 per cent of factors are constraining factors and 11 per cent are enhancing factors. The highest constraining factors are health, AIDS, TB, COVID-19, and wars, with an average score of 1.2 for both. HIV/AIDS, TB, and COVID-19 affect participants severely.

## 5.6. Conclusion

This chapter discussed the outcome and findings of the first four steps of the applied analytical framework. The RTA, NRCA, and RCA measurements showed that the Congolese palm oil industry has fluctuated positive and negative trends. Over recent years, competitive rates improved but are still at uncompetitive levels. Export competitive performance over this period however shows improvements and operates marginally positive.

When we compared the Congolese palm oil industry with international producer countries like Indonesia, and Malaysia, it was less competitive, however as stated in section 5.2.6, operated above the export competitive performance of DRC. To recognise the factors affecting or influencing the competitive performance of the Congolese palm oil industry, the Porter Diamond model is being used to analyse the status of competitiveness. Several, 91, factors were identified to enhance or constrain competitive performance through an industry survey of knowledgeable executives and industry experts; 67 per cent of the factors were viewed as constraining, and 33 per cent of the factors were viewed as enhancing.

These factors were clustered into the six determinants of the Porter Diamond model. The result showed that production factor conditions, related and supporting industries, and government support and policy factors were constraining determinants with a rating of 2.4/5: 1.6/5, and 1.9/5 respectively. Demand and market condition and firm strategy, structure, and rivalry were enhancing determinants with a rating mean of 3.4/5 and 3.2/5 respectively.



## **Chapter 6: Summary, Recommendation, and Conclusion**

### **6.1 Introduction**

This chapter summarises the main findings and results, followed by proposed strategies to improve the competitive performance of the DRC's palm oil industry, then the recommendation for future research on the Congolese palm oil industry, and concludes with the evaluation of the stated hypothesis and the listing of research themes to be considered.

### **6.2 Summary of main findings**

The problem statement for this study is developed around the reality that the Congolese palm oil industry is not realising the comparative advantage into a competitive advantage trade position to meet the growing demand in domestic and global markets for palm oil. The New Trade Theory and the Porter Diamond model are considered to provide a grounded theoretical construct to fit the analysis as it relates to competitive advantage and strategy to realise it. Competitiveness in this study is defined "as the ability to deliver goods and services at the time-space and form sought by buyers in both the domestic and international market while earning at least the opportunity cost of resources employed".

The relative trade advantage (RTA), the Normalised Revealed Comparative Advantage (NRCA), and the Revealed Comparative Advantage (RCA) were selected as appropriate quantitative measures, using trade data from FAOSTATS and Trade Map ITC. The RTA index indicated an uncompetitive position for the industry over recent years, although the industry did succeed during earlier stages (1961 to mid-1980) to competitively serve both the domestic and global markets, with the DRC as a leading palm oil exporter. Since 2015 onwards, RCA and NRCA ratings show some form of recovery, albeit marginal, from an export competitiveness view.

To explain these ratings, the factors of competitiveness of the Congolese palm oil industry were identified through an executive-based survey (COPES) and expert interviews and analysed through the determinants of the Porter Diamond model.

The Porter Diamond determinant analysis revealed that production factor conditions (rating 2.4/5) are essentially not constraining efforts and are well supported by demand and market conditions (rating 3.4/5) and firm strategy, structure, and rivalry (rating 3.2/5). However, performance in the DRC is heavily constrained by weak related and supporting industries (rating 1.7/5), chance factors (rating of 1.8/5), and government policies and support (rating of 1.9/5). Ratings of 5/5 are viewed as most enhancing and 1/5 most constraining. In Table 6.1 below, these findings are considered, in Step 5 of the analytical framework, to propose strategic interventions to enhance the competitive performance of the Congolese palm oil industry.

### 6.3 Towards improving the competitive performance of the DRC palm oil industry (Step 5)

This study had a general objective to make a comprehensive statement on the competitive performance of the Congolese palm oil industry and to identify the factors affecting the industry to suggest a set of strategic interventions to improve it. The results from COPES, interviews and discussions with industry experts, and the Porter Diamond analysis give a clear view of the determinants and scores of related factors affecting the Congolese palm oil industry. Based on this analysis, strategy proposals to enhance competitive performance are listed in Table 6.1.

**Table 6.1.** Strategies for improving the competitive performance of the Congolese palm oil industry

Porter Determinants	Constraining factor competitiveness	Strategic Proposals
Production factor conditions	The skills of entry-level labour	After recruiting workers, the palm oil companies must give specific training to the new workers about the palm oil industry to raise their skill level
	the general infrastructure used such as electricity, water supply, telecommunication	The government is to supply water, and electricity, and develop telecommunication in the production area for the expansion of palm oil but should they not rather collaborate with the private sector?? Rethink your proposal
	Cost of such infrastructure development	The government to invest in infrastructure development in collaboration with private institutions and financiers such as the African Development Bank and the World Bank, etc.
	The effectiveness level of the industry	The palm oil companies raise the effectiveness level of the industry by replacing obsolete technology, training workers, and ameliorating seeds to avoid crop diseases to reach the high demand for palm oil in local and international markets.
	The freight cost to export product (palm oil) What is the problem to justify the proposed action—not clear!	Businessmen, palm oil companies, and agroindustry purchase modern containers and ship containers to freight palm oil from industries to the town or for exportation to conserve palm oil quality. Due to the bad state of the roads in DRC, it is difficult to evacuate products from the industry to the city. This is increasing the cost of export.
	Transportation	The palm oil companies invest in trucks and ships to export palm oil in good condition i.e. to conserve quality shelf life.
	Modern technology	Palm oil companies replace obsolete technology and make available modern technologies such as modern processing to increase the extraction rate of palm oil, digitalisation, etc.

	Zero deforestation with the help of new technology	The production of palm oil has been accused as the cause of deforestation. The expansion of palm oil requires new technology and a new technical culture to avoid or reduce deforestation. Applying agroforestry, for example.
	Water and electricity	The DRC has many central hydroelectricity schemes which can provide power for the expansion of palm oil. Furthermore, The DRC has many rivers, so the palm oil companies provide water or irrigation for the expansion of palm oil.
	Access to land in your industry	The government provides access to palm oil companies to have access to the land for the large-scale production of palm oil.
	Do unskilled workers impact the industry's competitiveness	The palm oil industries organise skills development and training for unskilled workers to increase productivity.
	The cost of doing business in the DRC.	The government in collaboration with the industry to consider various measures to enable business development and to reduce constraining measures, red tape, and tax regimes and to attract new investors. Corruption should also be visibly reduced.
Demand and market conditions	New entrants that deliver inferior and unregulated produce into the market	The palm oil companies inform new entrants and local buyers of environmental and ethical requirements in the market.
	Traceability system of the supplier of the product to the producer what is the issue?	The palm oil industry is to proceed towards the use of improved systems, for example, blockchain technology, to ensure traceability. The companies need to have the feedback of the product in the market to plan.
Related and Supporting Industries	Financial service providers, generally what are the problems?	Government and industry should engage institutions such as the Africa Development Bank, the World Bank, FMI, and the African Bank to enhance the competitiveness of the Congolese palm oil industry. Those financial providers may trust and invest in the palm oil sector for expansion together with the government and the palm oil companies.
	Government financial support	The Congolese government to support the palm industries financially through appropriate funding to inter alia modernise production systems, train workers, etc.
	Private-funded scientific institutions.	Government and industry collaboration is required to create an environment for the palm oil sector to attract privately funded institutions.
	Government-funded scientific institutions	The Congolese government is to increase investment in agricultural research institutions such as INERA (Institute Nationale de Recherche Agronomies) support to agricultural science faculties.
	The palm oil industry's expenditure on research & development problems.	The palm oil industry should financially support the scientific institutions of research and agricultural science faculties for training and research on palm oil.

	Collaboration of the palm oil industry with scientific research institutions.	Strengthen the collaboration of the Congolese palm oil industries with scientific research institutions through seminars, and conferences on the expansion of palm oil.
	Availability of local suppliers of primary inputs like fertilizers, and pesticides. Reliability of local suppliers of primary inputs like fertilizers, pesticides The standard of local suppliers of primary inputs like fertilizers, pesticide	The DRC imports primary inputs like fertilizers and pesticides. So, the Congolese palm oil industry companies with the Congolese government should consider these matters collaboratively, for example through a value chain, to promote cost-effective solutions.
Firm Strategy, Structure, and Rivalry		
	DRC land reform policy	The government of the DRC to reform policies on agricultural land expropriation without compensation.
	DRC Trade policy	The DRC's government is to reform trade policy in the country to strengthen exports and protect the local industry against global dumping of inferior palm oil.
	The credibility and reliability of a current political system as it applies to the palm oil industry.	The Government to strengthen good governance and transparency.
	The credibility and reliability of the current political system through, constitutional action, elections, etc.	The Government to promote free elections to have credibility to enable responsible and democratic governance.
	Complying with regulatory & safety standards.	Improved regulatory and safety standards through government and industry collaboration.
	Water regulations act	The government to reform the Water Regulations Act to protect against pollution and crop quality-related matters,
Chance factors	Wars	The government must endeavour to restore peace to favour the business climate.
	Health-HIV/AIDS, TB, COVID-19, etc.	The government to actively reform the health system of the DRC, to arrest the spreading of HIV/AIDS, TB, and COVID-19.
	Economic development and growth in the DRC	Government in collaboration with industry and other economic contributors embark on a country growth and development strategy inter alia. Improve the educational system, reform, and invest in the agriculture sector, and mining sector, improve the health sector, instore good governance, and fight corruption to name some actions

Source: Own research, interviews, and COPES (2022)

When this set of proposals to enhance the competitive performance of the Congolese palm oil industry is considered, the importance of collaboration between the government and the industry value chain is emphasised. These proposals expand much on the SWOT analysis conducted in Chapter 2 and provide a

comprehensive set of strategic actions to be considered in more detail by the industry in dialogue with government agencies.

#### **6.4. Revisiting of research questions and stated hypothesis**

This study responded to the following questions:

- How can competitiveness be defined in the context of the Congolese palm oil industry?
- What theoretical constructs, data, and tools are appropriate to measure and analyse the competitive performance of the Congolese palm oil industry?
- What are the factors that determine the competitive performance of the Congolese palm oil industry?
- What actions can be proposed to strategically improve and sustain the DRC palm oil competitiveness?

These research questions were all found to be valid and assisted with the structuring of the analysis. Findings were reported in section 6.2 above.

The stated hypothesis derived from these research questions read:

H1: The competitive performance of Congolese palm oil fluctuated significantly, with highly positive to negative performances recorded over time and showing improvement over recent years. The performance is partly due to exogenous events such as the recent civil wars, inappropriate policies, and infrastructure neglect, but a broader range of occurrences, including mainly indigenous factors impacted the competitive performance of the industry.

The determination of the competitive performance through quantitative measurements – RTA, RCA, and NRTA – indicates that the competitive performance of the Congolese palm oil industry has improved albeit marginally after a long period of decline. The RTA measures are however still recording negative or marginally positive rates, inter alia due to high imports to serve the domestic market. From an export competitiveness perspective, the industry is succeeding in producing positive ratings. In general, however, much needs to be improved.

The Porter Diamond model analysis revealed that a range of factors, clustered in the six Porter Diamond determinants, impact competitive performance. The production factors determinant score around neutral, but related and supporting industries, government support and policies, and chance factors are constraining determinants. Demand and market conditions, and firm strategy, structure, and rivalry as enhancing determinants were considered as enhancing determinants. Many factors, clustered into these six

determinants were listed as strategies to improve the competitiveness of the industry. These findings support the acceptance of the stated hypothesis.

### **6.5 Recommendations for future research**

Extended industry analysis: The demand for palm oil is increasing in the DRC and globally. This study revealed that the competitive performance of the DRC palm oil industry is showing signs of recovery. What strategic and policy support would be required and how to conduct such analyses? This will require extended research into the Congolese palm oil industry, firstly focusing on investigating value chain efficiencies and constraints, business strategies, support systems, certification and quality control, horizontal and vertical models, and private-government dialogue (along the lines proposed by Webber and Lambaste in their World Bank publication, 2010).

Policy analysis: The analysis of current and proposed policies to strengthen the emerging recovery of the industry is required. Policy analysis methods such as the Policy Analysis Matrix Direct Resource Cost analysis and Social Cost Benefit analysis will support such policy investigation.

Expanding the quantitative measuring methods: The competitive performance analysis in this study was constrained from an inter-country perspective. The applied method, the NRCA, does not account for imports, while the RTA provides a relative measurement only. To obtain a comprehensive view of the competitiveness of the Congolese palm oil industry compared to competing countries, the expansion of the NRCA to account for both imports and exports needs to be researched.

### **6.6. Conclusion**

The analysis of the competitive performance of Congolese palm oil has the objective of measuring competitive performance and understanding the factors that enhance and constrain the industry's performance. The study focused on analysing the competitive performance of the Congolese palm oil industry and the main finding revealed that the industry was highly competitive from 1961 to 1975; then the competitive performance reduced to 1985. From the mid-1980s, the performance increasingly recorded negative levels until 2015 due to policy and related investment problems that resulted in increased imports to compensate for domestic production that could not supply the domestic market. Exports also dropped, but recently, in 2015, indicated signs of improved competitiveness. From this study, several strategic recommendations, based on a Porter Diamond model application, are proposed to be considered through a government-industry initiative to improve the competitiveness of the industry.

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## APPENDIX

### A: DRC palm oil executive survey 2022(COPES)

#### Production Factor Conditions

1	Obtaining qualified labour	Not easy	1	2	3	4	5	easy
2	The frequency of obtaining this labour	Not very high	1	2	3	4	5	Very high
3	The skills of entry-level labour	Below expectations	1	2	3	4	5	Above expectations
4	Do you think it is fair to pay minimum wage	Not fair	1	2	3	4	5	fair
5	The labour-saving machinery used	Not used	1	2	3	4	5	Will be use
6	The state of general infrastructure	Not developed	1	2	3	4	5	Developed
7	The cost of infrastructure	Not affordable	1	2	3	4	5	Affordable
8	Is difficult to have this infrastructure	Extremely difficult	1	2	3	4	5	Very easy
9	How is important it to have a developed infrastructure	Not important	1	2	3	4	5	Very important
10	The production cost	Costly	1	2	3	4	5	No costly
11	The level of industry is	Very low	1	2	3	4	5	Very high
12	The efficiency is	Very low	1	2	3	4	5	Very high
13	To produce an environmentally friendly product	Very important	1	2	3	4	5	Not important
14	The packaging material	Constrains competitiveness	1	2	3	4	5	Not constraint's competitiveness
15	The freight to export the product	Constrain the competitiveness	1	2	3	4	5	Enhancing the competitiveness
16	The transport to export product	Constrain competitiveness	1	2	3	4	5	Enhancing the competitiveness
17	The quality of modern technology	Available	1	2	3	4	5	outstanding
18	Access to quality technology	Difficult	1	2	3	4	5	Easy

19	Zero deforestation	Low	1	2	3	4	5	high
20	Bloch chain technology	Less	1	2	3	4	5	high
21	The long-term finance obtention	Difficult	1	2	3	4	5	Easy
22	Short Term finance obtention	Difficult	1	2	3	4	5	Easy
23	Availability of research	Not available						Available
24	Evaluable is the research available	Not valuable	1	2	3	4	5	Valuable
25	Access to water	Limited	1	2	3	4	5	Available
26	Water and electricity for expansion	Not sufficient	1	2	3	4	5	Sufficient
27	Access to land	Limited	1	2	3	4	5	Available
28	Unskilled workers	Negative impact	1	2	3	4	5	Positive impact
29	Skilled workers	Negative	1	2	3	4	5	Positive
30	The cost of doing business	High						Affordable
Comment								

**Demand Conditions**

1	The size of the Market of DRC	Unable	1	2	3	4	5	Able to handle
2	The growth of the local market	Not to much	1	2	3	4	5	To much
3	The increasing demand for palm oil in the local market	Low	1	2	3	4	5	High
4	Local buyers	Not concerned	1	2	3	4	5	Concerned
5	The growth volume in the local market	Low	1	2	3	4	5	high
6	The growth value in the local market	Slow	1	2	3	4	5	Fast
7	The traceability system of the supplier	Not available	1	2	3	4	5	Available
8	The palm oil demand in the international market from the local market	Not high	1	2	3	4	5	High
9	RESPO market	Constrains the competitiveness	1	2	3	4	5	Enhance the competitiveness
10	The Required production of palm oil in DRC	Negative	1	2	3	4	5	Positive
11	Relation of palm oil industry and mega industries	Not good	1	2	3	4	5	Good
12	The possibility of expansion	Less	1	2	3	4	5	high
13	The RESPO regulation	No impact	1	2	3	4	5	Big impact
14	The Potential Deforestation Regulation	Constrains the competitiveness	1	2	3	4	5	Enhance the competitiveness
15	Being in an international market with competitor countries	Negative	1	2	3	4	5	Positive
16	Production of new cultivars'	Constrain	1	2	3	4	5	Enhance

Comment:								
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**Related and Supporting Industries**

1	Finance Service providers	Constraining	1	2	3	4	5	Enhance
2	Government Finance support	Constraining	1	2	3	4	5	Enhancing
3	Government Advice	Absent	1	2	3	4	5	Present
4	Private funders of scientific institutions	Not available	1	2	3	4	5	Available
5	Government funding for scientific institution	Not available	1	2	3	4	5	Available
6	The Palm oil research and development	Limited	1	2	3	4	5	High
7	Collaboration of scientific research and palm oil companies	Limited	1	2	3	4	5	Available
8	Innovation of palm oil companies	Less innovative	1	2	3	4	5	Highly innovative
9	Availability of inputs	Limited	1	2	3	4	5	available
10	Reliability of local supplies of inputs	Not reliable	1	2	3	4	5	Reliable
11	Standard local supplies of primary inputs	Low	1	2	3	4	5	High
Comment:								

**Firm Strategy, Structure, and Rivalry**

1	The management of market intelligence	Inadequate	1	2	3	4	5	Excellent
2	Competition from central Africa	Limited	1	2	3	4	5	high
3	Threat of entrants	Low	1	2	3	4	5	high
4	Competition in the international market	Less	1	2	3	4	5	high
5	The threat of new entrants	Less	1	2	3	4	5	high
6	Willingness to reinvest	Less	1	2	3	4	5	keen
7	Willingness to risks	Less	1	2	3	4	5	Keen
8	Current resources to support expansion	Less	1	2	3	4	5	High
9	Competition between palm oil companies and other agricultural companies	Less	1	2	3	4	5	high
Comment:								

**Government Support and Policies**

1	DRC labour policy	Constraining	1	2	3	4	5	Enhancing
2	DRC land reform policy	Constraining	1	2	3	4	5	Enhancing
3	DRC trade policy	Constraining	1	2	3	4	5	Enhancing
4	DRC macroeconomic policy	Constraining	1	2	3	4	5	Enhancing
5	DRC competition act	Constraining	1	2	3	4	5	Enhancing
6	DRC's policy for taxation of agricultural equipment as tractor	Constraining	1	2	3	4	5	Enhancing
7	Credibility of the political system	Negative	1	2	3	4	5	Positive
8	Credibility of the political system to the palm oil industry	Low	1	2	3	4	5	high
9	Regulation standard: energy, safety.	Not available	1	2	3	4	5	Available
10	Regulation and safety standard norms	Not available	1	2	3	4	5	Available
11	Administration Regulation	Bad	1	2	3	4	5	good
12	The tax system	Not promote business	1	2	3	4	5	Promote business
13	Increasing VAT	Negative impact	1	2	3	4	5	Positive impact
14	Political legal illegal factor	Negative	1	2	3	4	5	Positive
15	Corruption	Constraining	1	2	3	4	5	Enhancing
16	The water regulation	Constraining	1	2	3	4	5	Enhancing
17	Land expropriation without compensation	Constraining	1	2	3	4	5	Enhancing
Comment:								

**Chance Factors (Factors which your firm has no control over and are external)**

1	The current exchange rate	Constraining	1	2	3	4	5	Enhancing
2	The Fluctuation in the exchange rate	Constraining	1	2	3	4	5	Enhancing
3	Unfortunate events in the palm oil industry	Not benefit	1	2	3	4	5	Benefit
4	Wars	Constraining	1	2	3	4	5	Enhance
5	Health-HIV AIDS, TB, COVID-19	Constraining	1	2	3	4	5	Enhance
6	Economic Development and Growth In DRC	Constraining	1	2	3	4	5	Enhancing
7	Conflicts, international boycotts	Constrain	1	2	3	4	5	Enhance
8	Global Recession	Negative impact	1	2	3	4	5	Positive impact
Comment:								

Thank you for your time