RESEARCH ON CLUSTERING CONDITIONS IN SOUTH AFRICA

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Abstract

Initially, clusters focused on creating a framework for cooperation between economic actors, research institutes, and public authorities from the same geographical concentration. Considering the European cluster model as a way of developing solid cooperation, the same steps were presented to find the interest of South African's economic actors in developing a feasible partnership model. This includes analyses on a wider scale, such as the degree of development of the compared countries where the model was implemented, the particularities and political priorities, the fields of activity. Going forward, the next steps that can be done are: mapping the existing clusters and their operating characteristics, assessing the regional business environments and the degree of competitiveness. After carrying out the analysis, there is concern about whether this concept can be implemented in countries like South Africa. Additional investigation will focus on other elements that affect the model's successful application.

*Key words***:** *clusters, competitiveness, cooperation, environment, impact, South Africa model*

INTRODUCTION

The links created between players in the same industry or between various industries are shifting as a result of constant dynamism and change, along with the borders of those industries.

Some industries experience such intense competition because of how interconnected they are. The biggest problem today might be to figure out ways or procedures that could be used to assist economic actors in becoming more creative and competitive in such a dynamic global market (European Commission- European Observatory for Clusters and Industrial Change, 2019) [16].

At the European level, industrial clusters may be an effective economic and regional support instrument. The European Cluster Collaboration Platform (ECCP) describes industrial clusters as "geographical concentrations of firms and other actors working in related spheres of economic activity, such as Sectoral Industries and Industrial Ecosystems [6].

Clusters are a significant component of the European industrial landscape, according to the European Expert Group on Clusters - Recommendation Report [9]. In 2020, there were 2,950 regional industrial clusters, which accounted for almost every fourth job in Europe (61.8 million jobs, or 23.4% of all employment) and roughly half of employment in exporting industries (50.3%) [10, 17] (European Commission- European Observatory for Clusters and Industrial Change, 2020) [17].

Theoretically and empirically, clustering is beneficial for businesses and regions, which is why it has been widely used in the field of economic framework development.

Clusters are a component of a more comprehensive conceptual framework for comprehending factors that affect regional and national competitiveness. This approach, which is based on the paper named Competitive Advantage of Nations by Michael E. Porter (1990) [29], established a connection between firm-level conduct and economic policy at both the micro and macroeconomic levels (European Commission- Europe INNOVA, 2007) [11, 12].

Industrial clusters can provide a compelling paradigm for municipal and state leaders to evaluate and sustain the economies they lead. The value of clusters was recognized at the European level, and the EU established the EU cluster policy to put this understanding into practice by using clusters to carry out

European priorities. The following table emphasizes the role played by the Clusters in carrying out the priorities settled on at the European level.

Table 1. The integration of clusters to carry out of EU actions

EU CLUSTER ACTIONS	
Definition/ Purpose	Key points
EUROCLUSTERS	
Industry clusters and other economic actors are gathered by cross-sectoral, interdisciplinary, and trans-European strategic initiatives known as euroclusters.	▽ Carry out the industrial policy of the EU ▽ Develop novel opportunities for SMEs ▽ Successfully integrate SMEs into global and European strategic value chains.
European cluster partnerships	
The goal of launching European cluster partnerships was to enhance cooperation between regions and industries.	▽ Take initiatives for the benefit of their SME members as a whole; ▽ Boost economic growth and competitiveness in Europe; Type of European cluster partnerships: 1.Innovation (INNOSUP) [11] 2.International (ESCP-4i)[13] 3.Excellence (ESCP-4x) [14] 4.Smart Specialisation (ESCP-s3) [15]
ClusterXchange	
This is an exchange program for clusters, SMEs and scale-up support organizations.	▽ Support short-term exchanges to better connect industrial ecosystems in Europe ▽ Facilitates transnational cooperation, peer learning, networking and innovation
European Clusters Excellence	
Promotes the excellence of cluster organizations and the services they offer	▽ Cluster benchmarking methodology ▽ Quality of cluster organisations' management

Source: European Commission [18].

The afore mentioned initiatives represent some of the programs in which the clusters have participated over time, contributing significantly to the growth of the industrial ecosystem. In addition to these, the European Commission claims that a number of other actions have been implemented using clusters as:

▽ **The European Cluster Collaboration Platform-** serves as a European virtual hub for industrial clusters [18, 19]:

◊ tracks cluster activity;

◊ offers specialist assistance to clusters;

◊ organizes matchmaking activities and events.

▽ The initiative called "**Advanced Technologies for Industry**" (**ATI**) keeps methodically checks on technological advancements and disseminates accurate and up-to-date information on these technologies [18, 19]:

◊ provides statistical data and analytical reports;

◊ analyses of policy measures and policy tools related to the uptake of advanced technologies

◊ analyses of technological trends in competing economies

◊ access to technology centres and innovation hubs across EU countries

▽ **The Technical Assistance Facility for Modernization (TAF)** as part of the **Interregional Investment** financing support provided project owners with the opportunity to interact with business, corporate finance, and legal experts from top business consulting firms to improve their business strategies and interregional projects' readiness for investment [19].

Additional features of the cluster:

▽ Promoting the green transformation within the EU and beyond;

▽ Assistance to policymakers;

▽ Discussion among EU nations: European expert group on clusters;

▽ Emerging industries and value chains- Within the environment built by clusters, businesses from many industries can compete and work together.

As can be seen, the European Commission has exploited the strong ecosystem of clusters that has grown over time and positions clusters at the centre of the measures they recommend for implementation at the European level.

This paper aims to present a perspective of South African initiatives for developing an ecosystem of clusters and cluster policies in comparison to European ecosystem of clusters and cluster policies.

In order to reach this goal, it is required to establish some essential components for the creation of clusters, namely: **cluster architecture, the type of clustering initiative and the governance structure and cluster policies.**

1. Cluster architecture-this paper defines the cluster's architecture as consisting of all the actors that compose the cluster. The Triple Helix Model, which includes **authority ⇔ business ⇔ university**, is the most used framework for describing cluster components [5, 25].
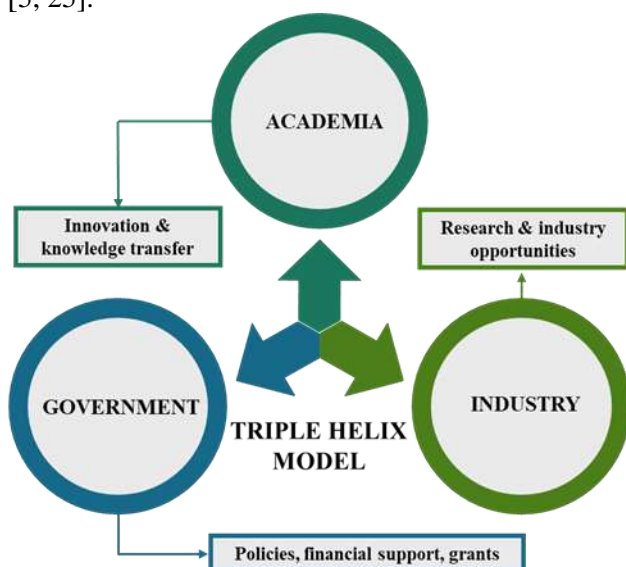

Fig. 1. The Triple Helix Model
Source**:** Figure of the authors represented in accordance with Egorova, Babkinb, Kovrova, Muravevab, (2015) characterization)[5].

Some states, such as Romania, have extended the Triple Helix model by including additional elements to fully group the relevant actors and create a functional cluster.
The triple helix model was modified by Romania by including **catalytic organizations**, giving it the name "four-leaf clover" model [20, 27].
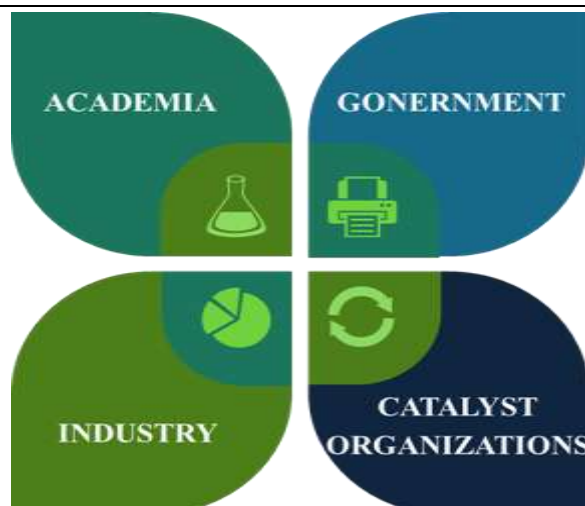

Fig. 2. "Four-leaf clover" model
Source: Figure of the authors represented in accordance with Mazilu's 2013 characterization [27].

2. Cluster initiative refers to how the cluster initiative was established, such as whether it came up naturally from the industry (**"bottom-up approach"**) or whether public authorities took the initiative to create specific clusters (**"top-down approach"**) [23, 28].

3. Governance structure - it consists of the organisational structure needed for the cluster to operate.In this respect, the following can be mentioned:

∇ The term "**cluster initiative**" refers to concerted efforts by businesses, the government, and/or the scientific community to advance the growth and competitiveness of clusters in a certain area [1, 3].

∇ **Cluster organisation-** legal structures known as cluster organizations help networks merge and form, encourage learning in innovation clusters, and help members of the community receive specialized and individualized services [8].

∇ **Cluster management-** in cluster management, there are two main parts: the operational cluster management, which consists of the cluster manager and the employees, and the strategic management structure, which consists of a cluster board and advisory committee made up of representatives of the companies/entities in the cluster [31].

∇ **Cluster strategic plan-** this is a tool for organizing and tracking organizational performance as well as one that presents

growth options consistent with the chosen goals and course of action. It refers to the framework required for boosting the cluster's long-term value [24].

4. Cluster policies- are regulation that consists of a selection of specific government initiatives designed to support already-existing clusters and/or encourage the creation of new ones [8].

The maturity of cluster policies has been mapped by ECCP at both the EU and worldwide levels, taking into account the legislative role in establishing and fostering the growth of clusters.

In determining maturity, ECCP examined 4 key elements [18].

∇ **Policy scope-** if the country has a specific policy for clusters or aims to build and/or develop clusters through more general strategies

∇ **Consistency of cluster policies-** rates the country's duration and experience when creating cluster policies, are evaluated only existing cluster policies not general policies.

∇ **Evidence of performance-** the existence of evaluation and assessment mechanisms to measure the level of political development in the country.

∇ **Instruments-** rates if policies offer any resources to aid in the execution of policies, either financial and/or technical help.

The clustering potential in South Africa will be further examined using the components outlined above, starting with the European perspective of clusters and cluster policies.

MATERIALS AND METHODS

To demonstrate the potential of clustering in South Africa, qualitative research was conducted through a bibliographic review and documentary analysis (documents, records and case studies).

An investigation of the criteria used to characterize the maturity of cluster policies was also carried out [21].

Official reports and official statistics data regarding clusters in Europe and South Africa were the sources of the research materials.

European Commission and European Clusters Collaboration Platform, Department of Trade Industry and Competition Republic of South Africa served as the research's primary sources [4, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 32].

As can be seen secondary data were consulted by the authors to carry out the present research [26].
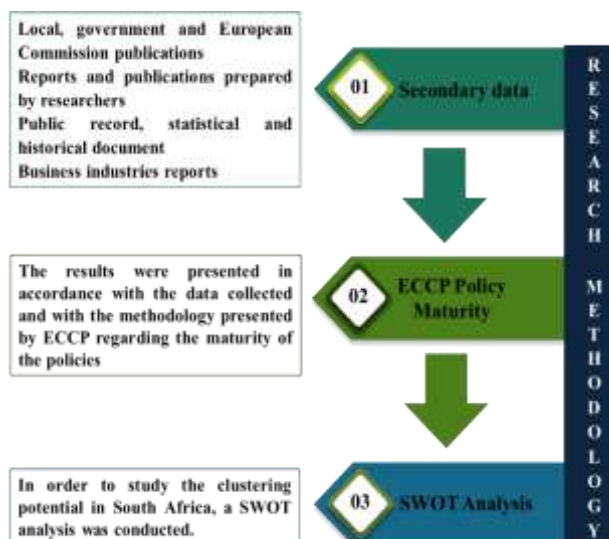

Fig. 3. Research methodology outline
Source: Authors' processing.

According to ECCP, there are only two countries in Africa that have had to do with the cluster concept or cluster policies over time, namely South Africa and Morocco. The findings were provided in line with the ECCP methodology on the maturity of the policies after consulting all the data gathered to highlight the outcomes. This was followed by an analysis based on the SWOT Analysis. The SWOT analysis, also referred to as the SWOT matrix, is used in the business field to assess a certain decision, project, or extensively to evaluate a policy direction [22, 30].

RESULTS AND DISCUSSIONS

The ECCP report on cluster policies in South Africa served as the starting point for the presentation of the outcomes, which then moved on to the presentation of the results at the national level. The authors conducted a SWOT analysis on the basis of the findings to

assess the possibility of building a strong ecosystem of clusters in South Africa.

Based to the report prepared by ECCP, South Africa established and carried out two initiatives oriented to industrial agglomerations, namely the Competitiveness Improvement Programme and the Special Economic Zone Programme.

The Competitiveness Increasing Programme, as can be observed, takes a specialized sectoral approach.

Table 2. Overview of the CIP programme for cluster support in South Africa (2009-present)

COMPETITIVENESS IMPROVEMENT (CIP)PROGRAMME		
OBJECTIVE	**INSTRUMENTS**	
▽ Cooperation between businesses or industry and RTDI actors should be improved ▽ Enhancing SMEs' capacity for growth and competitiveness the promotion of internationalization efforts ▽ Promoting R&D, technology development, and application ▽ Promoting inventiveness and enhancing innovation ecosystems ▽ Enhancing the cluster organizations' network and cross-clustering	▽ **Financial:** Funding collaboration initiatives; Support to R&D projects, SMEs becoming cluster members ▽ **Technical assistance:** Infrastructure; Support for hard skill and soft skills development; Support for networking and partnership building; Marketing activities.	**2009**
BUDGET	**FOCUS & BENEFICIARS**	
Maximum overall support for common cluster projects: EUR **1.3 million** Financing for national clusters and the subnational clusters that sustain them: ▽ grant for initial investment equal to 100% of the first year's approved expenses; ▽ 95% from the CIP in the second year; ▽ 90% in the third year ▽ 80% in the fourth year ▽ 70% in the fifth year from the CIP	**SECTORAL APPROACH** ⇒ Mainly targets: clothing, textiles, footwear, leather, and leather goods manufacturing industries ▽ SMEs ▽ Research organisations ▽ Large firms ▽ General population	
RESPONSIBLE AUTHORITIES & SOURCE OF FINANCING: The main organization in charge of creating, implementing, and funding the CIP in South Africa is the Department of Trade and Industry (DTI).		**present**
RESULTS: Overall, the CIP was successful, according to a 2017 assessment. Cluster members have been able to increase their direct exports of clothing or their sales to regional stores. The export of shoes to other countries and the Eurozone helped to supplement these exports. CIP also succeeded in keeping existing jobs in the sector and adding new ones. Moreover, Big Retailers work more closely, either individually or in groups, with regional producers.		
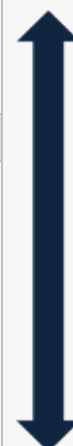
Source: Authors' processing according to data from the ECCP report [17].

According to the findings that have been made public, the program was able to help accomplish the objectives that were intended. A report on the CIP outcomes states that 61 applications were submitted in 2017, of which 22 company-level projects and 39 cluster initiatives [17]. The program is able to fund applications for up to five years, and even if

the grant rate declines, the financial help is still significant until year five (70% grant).

Table 3. Overview of the SEZ programme for cluster support in South Africa (2012-present)

SPECIAL ECONOMIC ZONE (SEZ) PROGRAMME		
OBJECTIVE	**INSTRUMENTS**	
▽ Boosting competition and encouraging the growth of SMEs ▽ Facilitating internationalization efforts ▽ Promoting of technological development, technology implementation, and research and development ▽ Building innovative ecosystems and encouraging innovation ▽ Encouraging business startups and spinoffs ▽ Promoting the social economy, the sustainable economy, and other initiatives based on solidarity ▽ Encouraging employment and enhancing abilities ▽ Linkage to world supply chains	▽ **Financial:** Subsidies to hire personnel; Subsidies for cluster infrastructure (e.g. offices, equipment); Other: encouraging foreign investment; tax stimulants; discounts; customs controlled areas; donation of land or provision of land at a reduced rate by municipalities for the establishment of SEZs; provision of utilities; sometimes at preferential rates. ▽ **Technical assistance:** Infrastructure; Support for hard skill and soft skills development; Marketing activities; Others: Specialised waste services	**2012**
BUDGET	**FOCUS & BENEFICIARS**	
Dates about the budgets are not available	**SECTORAL APPROACH** ⇒ Mainly targets: industries and manufacturing focused on exports, including those in the automotive, agro-processing, chemical, general, business process outsourcing, and energy industries. ▽ SMEs ▽ Start-ups ▽ Large firms ▽ General population ▽ Others: Foreign investors	
RESPONSIBLE AUTHORITIES & SOURCE OF FINANCING: The main organization in charge of creating, implementing, and funding the SEZ in South Africa is the Department of Trade and Industry (DTI). The SEZ Programme is also financed by Department of Economic Development Environmental Affairs and Tourism, and regional organizations such the Buffalo City Metropolitan Municipality for the East London IDZ.		**present**
RESULTS: According to ECCP, the last information was recorded at the level of the years 2012–2013 in terms of data about the evaluation of the impact that the SEZ Programme had.		

Source: Authors' processing according to data from the ECCP report [17].

To complete the information above, the Special Economic Zone (SEZ) program aims to facilitate the growth process of industrial agglomerations that attract investment and encourage the development of business capacity through the creation of clusters. The

SEZ program, like the CIP program, adopts a sectoral approach; the beneficiaries being almost the same category, but they support a number of industries, especially those with export potential.

South Africa received a score of **6p** for its performance in the analysis conducted by ECCP regarding the maturity of cluster policies. This score is obtained as follows: Policy Scope 2p, Continuity 1p, and Clusters Cluster Support Instruments 2p. A maximum of 2 points can be earned by each of the three criteria. South Africa received a score of 1 (out of a possible 1 point) for the Evidence of Performance criteria.

The ECCP report's data analysis revealed that there are measures that address the economic environment and that have persisted despite brief interruptions.

In addition to the European perspective provided in the ECCP study, the authors also reviewed the specific websites of the bodies in charge of putting cluster support policies into action and were able to note the following:

∇ A program called the Cluster Development Program (CDP) which was funded by the DTI existed, which aimed to promote industrialisation, long-term economic growth and the need for job creation in South Africa [4].

∇ No information is available regarding the status of CDP funded initiatives.

In the following, a brief presentation of the CDP will be made, based on the data contained in the document Pilot Guidelines for the Cluster Development Program (CDP).

The CDP's goal was to make businesses within a cluster more competitive. Additionally, it suggested putting the plan into action through clearly defined collaborative initiatives that deal with marketing, productivity, and production.

The following industries were chosen as priority and qualified for application:

∇ Metal fabrications, capital equipment and rail transport;

∇ Plastics, chemicals, cosmetics and pharmaceuticals;

∇ Forestry, timber, pulp, paper and furniture;

∇ Agro-processing;

∇ Business process services;

∇ Cultural and creative industries, crafts, music and film;

∇ Boat building;

∇ Green and energy saving industries;

∇ Development of minerals downstream;

∇ Upstream oil and gas services and equipment;

∇ Nuclear;

∇ Advanced manufacturing (including defence, aerospace, electrotechnical and white good.

Table 4. Supported activities of the Cluster Development Programme and the requirements for applications

SHARED INFRASTRUCTURE GRANT	
Financing conditions	*Focus areas*
∇ Non-taxable matching cash grant of up to 80% of the investment ∇ Maximum of R10 million per cluster ∇ Shared infrastructure	∇ Enterprise Development ∇ Location ∇ Skills development ∇ Export promotion
Eligible expenses	*Excluded expenses*
∇ Building ∇ Machinery and equipment ∇ Commercial vehicles ∇ Tools, jigs and dies	∇ Office furniture ∇ Computer furniture ∇ Land costs

BUSINESS DEVELOPMENT SERVICES	
Financing conditions	*Focus areas*
▽ Non-taxable cash matching grant of up to 80% of the investment ▽ Maximum grant of R5 million per cluster	▽ Innovation ▽ Employment creation ▽ Product development ▽ Supplier Development Programme (SDP)
Eligible expenses	*Excluded expenses*
▽ Cost of consulting ▽ Costs of benchmarking ▽ Conformity reviews, and accreditation, as well as local and international intellectual property registration ▽ Feasibility analysis fees ▽ Product/technology advancements ▽ Post-prototype development (validation and testing of the prototype) ▽ Bio-prospecting	▽ Engines and other assets ▽ Land and structures ▽ Automobiles ▽ Travel and expenses for accommodation
CLUSTER MANAGEMENT ORGANISATION (CMO) FUNDING	
Financing conditions	*Focus areas*
▽ Grant of non-taxable matching funds equal to up to 80% of the expenditures associated with establishing the CMO ▽ R5 million maximum per cluster	▽ Relevant industry knowledge and experience ▽ Compliance with governmental directives ▽ Public/Private Partnership ▽ Proven capacity to expand and foster the launch of new companies or SMEs in the industry ▽ Demonstrated capacity to organize workshops that foster networking and information sharing for the cluster
Eligible expenses	*Excluded expenses*
▽ Project management fees ▽ Administration fees ▽ Wages and salaries (limited to a total of three employees and capped at R2 million or 70% of the total payroll, whichever is smaller) ▽ Rent limited to R250 000 and may not exceed 70% of the rental cost ▽ Office furnishings and supplies ▽ Operating expenses, including those for electricity, water, telephones, and stationery ▽ Travel and accommodation expenses, including travel expenses and allowances (limited at R50,000 annually) ▽ Charges for event management (for networking events)	▽ Capital equipment ▽ Land and buildings ▽ Vehicles

Source: Authors' processing in accordance with information from the paper Pilot Guidelines for the Cluster Development Program (CDP) [2].

Clusters in the automotive, clothing, leather and footwear sectors that are already receiving were not eligible for funding benefits from the DTI industrial policy sector office. The program focused on funding for cluster management organizations, business development services, and supporting investments in shared infrastructure. The DTI, the organization in charge of carrying it out, suspended the Cluster Development Program since April 1, 2018 [4]. There are no public statistics on the impact it had on the applicants. It can be seen that CDP was a program that complemented SEZ and CIP in that it targeted the other industries. Both CIP and SEZ have so far succeeded in maintaining continuity with and supporting their intended beneficiaries over a long period of time.

In order to determine South Africa's potential for creating a cluster environment and the enabling policies for this ecosystem, the authors used the information indicated above to conduct a SWOT analysis.

∇ there is a legal framework that has taken the first steps in supporting similar structures with the cluster model
∇ the **sustainability and consistency** of policies to support certain structures that are similar to the cluster model
∇ the **increased interest in the cluster model** that resulted from studying the specialized literature

∇ limitation regarding the support of financing programs
∇ the **top-down approach** has limitations when it comes to the priorities of the economic environment or stakeholders across the value chain
∇ the policies developed until now have focused more on the industrial and production sector, leaving out sectors with potential

∇ clusters can be a key driven in order to **boost the competitiveness** of the economic sector
∇ clusters by their nature can **stimulate collaboration and support innovation, and knowledge transfer** and can **integrate the entire value chain** in a field
∇ **using lessons learned** from the government programmes in order to build a strong cluster model

∇ considering the history related to the way of creating programs and policies for the prioritization of sectors, it will be difficult to introduce a new concept
∇ the economic inconsistency does not provide the predictability of the country's priorities
∇ the limited understanding of the cluster designed by the government due to the lack of experience and operational capacity can lead to unsuccess
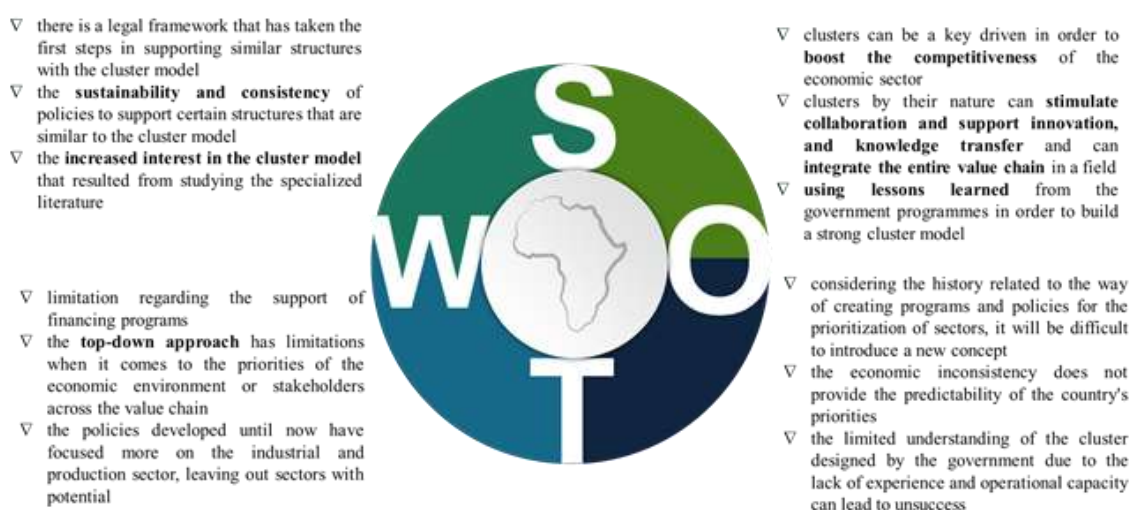
Fig. 4. SWOT assessment of the clustering potential in South Africa
Source: Authors' processing.

With experience in administering complex programs to facilitate cooperation in several industries, South Africa has good prospects for the creation of high-performance cluster ecosystems. There are cluster efforts that were supported, according to both the data from the ECCP report and the official sources of the authorities in charge of developing and implementing the programs specific to the different clusters, but there is no hard evidence of the lessons learned. However, it is unclear why the DTI decided to stop funding the CDP initiative. This cluster support program was the one that was most similar to the ones in Europe.

CONCLUSIONS

Cluster ecosystem creation and preservation require a variety of strategies, and South Africa has been effective in adjusting its programs to the local economic circumstances.

Regarding the clustering potential, South Africa offers promising prospects, and the European models can unquestionably serve as examples of good practices for developing a useful cluster model.

A perspective more closely aligned with the economic realities of the business, academic, and research environments that represent the major actors involved in the operation of a cluster could be obtained by broadening the way of approaching how clusters are formed through the transition from **top-down to bottom-up approach.**

In order to design cluster policies that are as tailored to the development requirements of

the cluster ecosystem as possible, the authorities in charge of establishing them could draw on the knowledge gained from earlier initiatives.

Beyond clusters, there are undoubtedly other layouts and strategies for interventions that impact businesses. Cluster initiatives may not be the best way to encourage regional economic development for many regions or even for many countries. Each government should design its own strategy to encourage the growth of collaboration and boost business competitiveness.

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