

An Analytical and Classification Study of Arab Countries Based on the Availability and Accessibility of Official Statistics Using Hierarchical Cluster Analysis

Received: 12-09-2025

Accepted: 13-12-2025

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Abstract:

This study aims to classify Arab countries according to the level of availability and accessibility of official statistics for the year 2022. To achieve this objective, 22 indicators published by the Open Data Inventory (ODIN) were used, covering social, economic, and environmental dimensions. The study applied Hierarchical Cluster Analysis (HCA) using the R software to systematically group countries based on their performance in these indicators.

The findings revealed that Arab countries can be divided into two main groups: Group 1: advanced countries in the availability and accessibility of official statistics, including Tunisia, Bahrain, Saudi Arabia, the United Arab Emirates, Jordan, and Morocco; and Group 2: lagging countries in the availability and

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accessibility of official statistics, including Libya, Syria, Lebanon, Qatar, Iraq, Yemen, Kuwait, Algeria, and Egypt. The study emphasizes that narrowing the gap between the two groups requires deep structural reforms, most notably strengthening the independence of statistical agencies, investing in digital infrastructure, and fostering a culture of open data as a fundamental pillar for enhancing transparency, accountability, and supporting sustainable development.

Keywords: Open Data; ODIN Indicators; Arab Countries; Hierarchical Cluster Analysis.

Jel Classification Codes: C38; C82; O57; Q56.

1. INTRODUCTION

The availability and accessibility of official statistics have become fundamental pillars for evidence-based policymaking, transparency, and sustainable development. In recent years, international organizations have emphasized the importance of reliable, comprehensive, and open data systems to monitor progress toward the Sustainable Development Goals (SDGs). However, the situation differs widely across regions, particularly in the Arab world, where countries vary significantly in terms of statistical coverage and data openness. Against this backdrop, the present study seeks to provide a systematic classification of Arab countries based on the performance of their official statistics, using hierarchical cluster analysis as the main methodological tool.

1.1. The Question of the Study:

This study addresses the following question: To what extent do Arab countries differ in the availability and accessibility of official statistics across social, economic, and environmental dimensions, and how can these differences be systematically classified using hierarchical cluster analysis?

1.2. Hypothesis:

The study hypothesizes that Arab countries are not homogeneous in their statistical systems. Instead, they can be

divided into distinct clusters, with some countries demonstrating advanced performance in official statistics, while others lag due to institutional, political, or technical constraints.

1.3. The Objective of the Study:

The objective of this research is to analyze and classify Arab countries based on their performance in the Open Data Inventory (ODIN) indicators for 2022. The study seeks to highlight similarities and differences in statistical capacity across social, economic, and environmental dimensions, and to produce a meaningful classification that can inform data reforms and regional strategies.

1.4. The Importance of the Study:

This study is important for several reasons. First, it adds to the existing literature by providing an empirical analysis focused on Arab countries, where official statistics often face systemic challenges. Second, the classification helps identify areas of strength and weakness, offering policymakers actionable insights for enhancing transparency and data-driven governance. Third, the study supports regional cooperation by grouping countries with similar performance, thereby fostering targeted reforms in statistical capacity-building.

1.5. Methodology:

The research adopts a quantitative approach based on secondary data from the Open Data Inventory (ODIN) published by Open Data Watch. Sixteen Arab countries were selected for the year 2022. Twenty-two indicators covering the social, economic, and environmental dimensions were extracted and analyzed. The methodology involved three main steps: (1) descriptive statistical analysis of indicators, (2) data standardization and calculation of distance measures, and (3) application of hierarchical cluster analysis (HCA) using R statistical software to classify countries into homogeneous groups. The resulting dendrogram provides a visual classification of Arab countries, forming the basis for interpretation and policy recommendations.

2. Conceptual Framework of Open Data

2.1. Understanding the Concept of Open Data:

Data can be defined as basic representations of reality, whether in the form of numbers, measurements, or observations. In their raw state, they lack interpretation, assumptions, or analytical value, and therefore cannot be debated or contested. Their utility is confined to being examined or used as input for research purposes (Al-Salami, 2019).

Open data, in contrast, refer to information that is freely accessible for use, reuse, and redistribution by any individual or institution, provided that the original source is acknowledged and that any derivative work remains shareable (Ubaldi, 2013). The notion of open data emerged around 2009 in both the United States and the United Kingdom as a modern approach that seeks to:

- Organize and release public data;
- Enhance cooperation between government agencies and encourage collaboration with civil society and private actors;
- Strengthen transparency by allowing citizens to evaluate and monitor public policies (Al-Salami, 2019).

2.2. Data Accessibility:

The true value of open data lies not only in their availability but also in how easily they can be accessed by different users without restrictions. Accessibility is therefore a cornerstone for enabling individuals, researchers, and organizations to transform raw information into actionable knowledge that informs policy, drives innovation, and supports academic inquiry.

Key aspects of accessibility include:

- Publishing datasets in standardized and machine-readable formats to facilitate automated analysis;
- Hosting data on centralized platforms, either at the national or international level, to simplify discovery and usage;

- Updating datasets regularly and ensuring timely release to maximize their relevance;
- Guaranteeing coverage of diverse domains—economic, social, and environmental;
- Offering data free of charge and without complex access procedures or mandatory registration.

3. Study Framework

3.1. Sample and Study Period:

The analysis covers a group of sixteen Arab countries: United Arab Emirates, Bahrain, Algeria, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Qatar, Saudi Arabia, Syria, Tunisia, and Yemen. The selected reference year for the investigation is 2022.

3.2. Data Sources:

The empirical foundation of the study is based on the Open Data Inventory (ODIN) developed by (Open Data Watch, 2025). ODIN is an internationally acknowledged instrument for evaluating both the scope and openness of official statistical systems.

3.3. Study Variables:

The variables considered in the analysis are derived from ODIN indicators, which reflect the degree of availability and accessibility of official statistics. These indicators are organized around three core

dimensions: economic, social, and environmental. For clarity and consistency of interpretation, the variables are detailed in Table 1.

**Table (1): Variables of Official Statistics Availability and Accessibility
Across Dimensions**

Dimension	Variable
Social	Coverage of population and vital statistics data (%)
	Coverage of education facilities data (%)
	Coverage of educational outcomes data (%)
	Coverage of health facilities data (%)
	Coverage of health outcomes data (%)
	Coverage of reproductive health data (%)
	Coverage of food security and nutrition data (%)
	Coverage of gender statistics (%)
	Coverage of crime and justice data (%)
	Coverage of poverty and income data (%)
Economic	Coverage of national accounts data (%)
	Coverage of labor market data (%)
	Coverage of price indicators (%)
	Coverage of public finance data (%)
	Coverage of money and banking data (%)
	Coverage of international trade data (%)
	Coverage of balance of payments data (%)
Environmental	Coverage of agriculture and land use data (%)
	Coverage of resource use data (%)
	Coverage of energy data (%)
	Coverage of pollution data (%)
	Coverage of built environment data (%)

Source: Prepared by the author based on data from (Open Data Watch, 2025)

4. Analytical Review of Indicators on the Availability and Accessibility of Official Statistics in Arab Countries

This section presents an analysis of the indicators on the availability and accessibility of official statistics in Arab countries for the year 2022. The purpose is to evaluate the extent to which official statistics are available and open across the three key dimensions: social, economic, and environmental.

4.1. Analytical Review of the Social Dimension of the Availability and Accessibility of Official Statistics in Arab Countries:

This subsection provides an analytical review of the social dimension indicators for 2022, ranking Arab countries according to each social indicator.

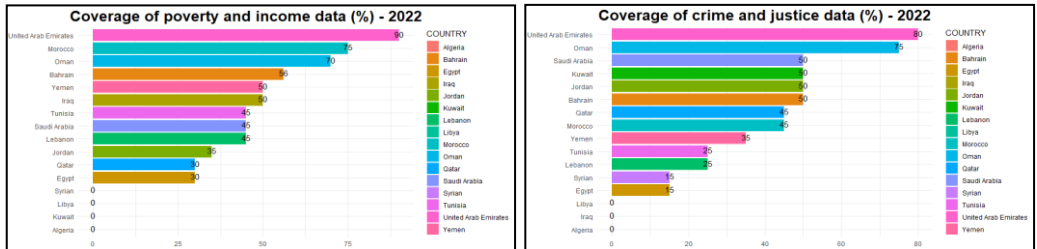
4.1.1. Population Statistics and Vital Data:

The results show that Oman ranked first with full data availability (100%), followed by Tunisia and Jordan (85%), then Bahrain (83%) and the United Arab Emirates (80%). This reflects the existence of effective systems for population registration and vital statistics in these countries, such as periodic censuses and digital civil registries that allow for regular updates of birth and death indicators. On the other hand, Syria (15%) and Libya (35%) were at the bottom of the ranking, which can be linked to political and security conditions that hindered the functioning of official

institutions and their ability to collect accurate demographic data. This disparity indicates that while some countries have succeeded in developing statistical institutions capable of producing up-to-date data, others still face administrative and technical challenges preventing them from doing so.

**Figure (1): Ranking of Arab Countries According to the Social Dimension
Indicators of the Availability and Accessibility of Official Statistics for the Year 2022**





Source: Prepared by the author using R statistical software

4.1.2. Educational Facilities:

Oman and Morocco recorded the highest availability of data on educational facilities (70%), followed by Bahrain (67%). In contrast, Libya ranked last (0%), while Lebanon (25%), Syria (35%), and Algeria (35%) also showed low scores. High availability in some countries reflects the presence of structured educational information systems that record the number of schools, educational centers, and their geographical distribution. Conversely, the sharp decline in countries such as Libya and Syria suggests the absence of updated databases, which may be linked to institutional instability or irregular data collection. In Lebanon, the lower percentage could be explained by the weak integration of the large private education sector into the official system, leading to gaps in published data.

4.1.3. Educational Outcomes:

Morocco topped the list (75%), followed by Oman (65%), Bahrain (61%), and Qatar (60%). Meanwhile, Algeria and Yemen (35%) and

Libya (0%) occupied the bottom ranks. Higher scores in some countries reflect the ability to provide detailed data on student performance and achievement levels, often as a result of national assessments or standardized tests published periodically. Countries with lower scores appear to lack systematic mechanisms for assessing education quality or may refrain from publishing results due to institutional or political considerations. This gap makes it difficult to objectively evaluate the efficiency of their education systems.

4.1.4. Health Facilities:

Oman recorded the highest availability (85%), followed by the UAE (80%) and Bahrain (72%), while Lebanon (25%) and Algeria (30%) lagged behind. Higher scores indicate the presence of comprehensive national records of health facilities, including hospitals, medical centers, and the services they provide. In contrast, low availability in countries such as Lebanon and Algeria may be attributed to the absence of unified databases or weak coordination among health institutions, particularly in contexts where the private sector plays a large role but is not fully integrated into the official system.

4.1.5. Health Outcomes:

The UAE ranked first (75%), followed by Oman (65%) and Bahrain (61%), while Syria, Tunisia, and Lebanon reported lower values. These results show that the leading countries possess

institutional capacity to collect and publish data on health indicators such as mortality rates and chronic diseases. Meanwhile, low availability in Syria, Lebanon, and Tunisia is often linked to the absence of comprehensive national health records or irregular reliance on field surveys, reducing the reliability and timeliness of health data.

4.1.6. Reproductive Health:

Oman and the UAE topped the list (75%), while Syria and Libya scored (20%) and Lebanon (0%). Higher percentages in Oman and the UAE reflect the availability of data on fertility rates, births, maternal mortality, and other reproductive health indicators. Conversely, the very low figures in Lebanon, Syria, and Libya highlight an almost complete lack of published data, which could stem from weak institutional attention or the social and political sensitivity of these indicators, leading to their exclusion from official databases.

4.1.7. Food Security and Nutrition:

Oman ranked first (78%), followed by the UAE and Morocco (72%). By contrast, Lebanon, Kuwait, Egypt, and Algeria showed notably low percentages. This variation indicates that some countries prioritize monitoring food availability and quality indicators, while others with lower scores may suffer from weak

data collection systems or a lack of comprehensive monitoring mechanisms for nutrition and food security conditions.

4.1.8. Gender Statistics:

The UAE recorded the highest score (80%), followed by Jordan (70%), Bahrain (61%), and Oman (55%), while Algeria and Lebanon were among the lowest. Higher availability in certain countries reflects institutional efforts to collect detailed data on gender gaps in education, employment, and economic participation. Conversely, low availability in other countries points to limited initiatives for monitoring such indicators or the absence of institutional mechanisms dedicated to gender-related statistics.

4.1.9. Crime and Justice:

The UAE ranked highest (80%), followed by Oman (75%), while Algeria, Iraq, and Libya showed very low values. These results suggest that some countries have advanced systems for monitoring crime rates and judicial processes, while low figures in others reflect the absence of integrated mechanisms for collecting and publishing criminal justice data—likely influenced by the sensitivity of such information or by weak coordination between security and judicial institutions.

4.1.10. Poverty and Income:

The UAE recorded the highest score (90%), followed by Morocco (75%), while Algeria, Syria, Libya, and Kuwait showed

low values. High availability in the UAE and Morocco indicates strong capacity to gather detailed data on income levels and poverty, which typically requires regular household surveys or robust financial databases. By contrast, low availability in other countries may be attributed to the lack of periodic surveys or limited publication, particularly in politically and socially sensitive indicators.

The analysis of social-dimension indicators for the availability and accessibility of official statistics reveals significant disparities across Arab countries. Oman, the UAE, Morocco, and Bahrain consistently scored high in most indicators, reflecting more organized institutional systems capable of producing population, education, health, food security, gender, justice, and income data on a regular basis. In contrast, Syria, Libya, Lebanon, and Algeria showed persistently low scores, indicating weak statistical infrastructure due to political and security challenges, outdated databases, or limited integration of private sector data. These differences highlight that while some Arab statistical systems have reached advanced levels of accuracy and institutionalization, others still face major structural and technical challenges preventing them from providing comprehensive and reliable data.

4.2. Analytical Review of the Economic Dimension of the Availability and Accessibility of Official Statistics in Arab Countries:

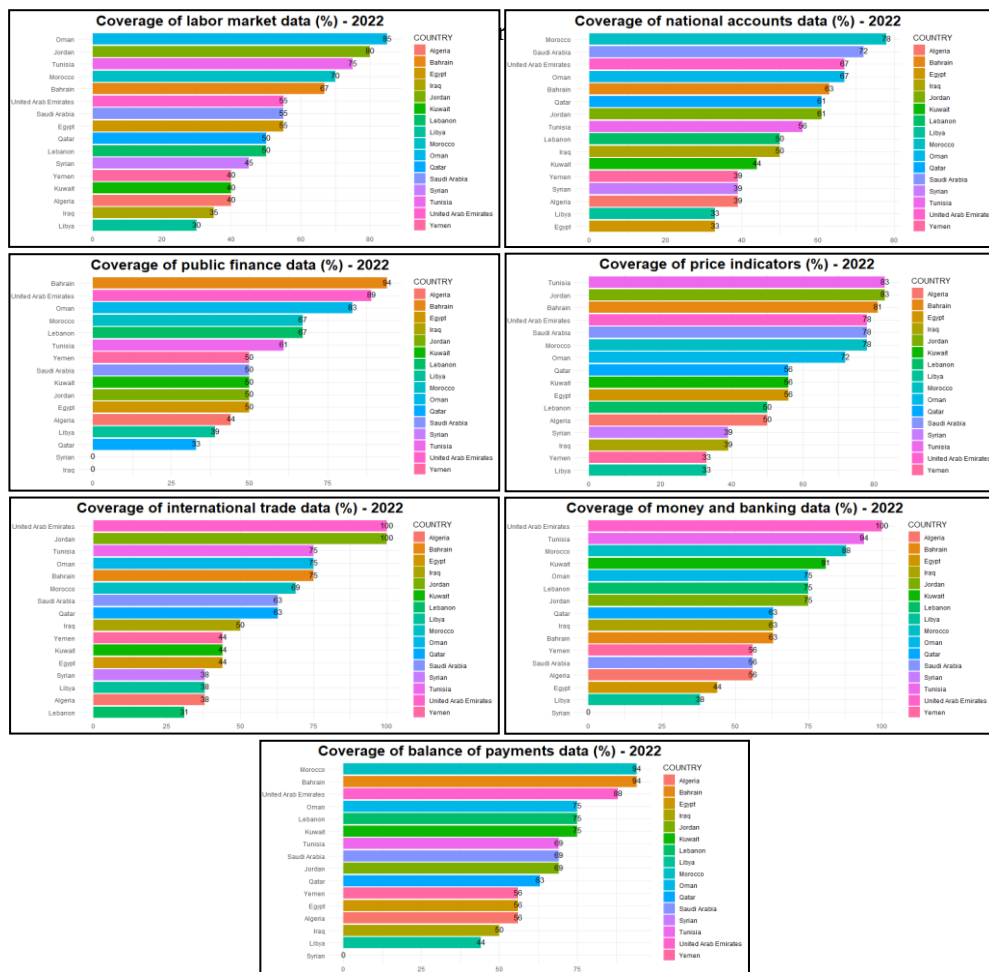
This analytical reading provides an understanding of the level of availability and openness of economic data in Arab countries for the year 2022, through seven key sub-indicators. These indicators form an essential basis for understanding overall economic performance, monitoring the dynamics of markets, public finance, and trade, and directly reflect the ability of countries to formulate effective policies based on accurate and transparent data.

4.2.1. National Accounts Indicator:

The results show that Morocco (78%), Saudi Arabia (72%), and both the UAE and Oman (67%) top the list of Arab countries in terms of national accounts data availability. This ranking reflects these countries' ability to monitor vital indicators such as GDP, expenditure components, investment levels, and income flows. Having such data regularly available enables close monitoring of economic performance and identifying cyclical and structural changes in economic activity.

In contrast, Algeria (39%), Egypt (33%), and Libya (33%) show low levels in this area, indicating a clear gap in their capacity to provide essential data that support the analysis of economic development or the design of realistic planning strategies.

Figure (2): Ranking of Arab Countries According to the Economic Dimension Indicators of the Availability and Accessibility of Official



Source: Prepared by the author using R statistical software

4.2.2. Labor Indicators:

Oman (85%), Jordan (80%), and Tunisia (75%) rank highest in labor data availability. This reflects the existence of statistical systems capable of collecting accurate data on the labor market, unemployment rates, and workforce distribution across sectors and age groups—essential elements for assessing labor market conditions and employment policies.

On the other hand, Libya (30%) and Iraq (35%) demonstrate significant weakness in this area, pointing to shortcomings in their ability to monitor labor market dynamics and direct training and employment programs effectively.

4.2.3. Price Indicators:

Tunisia and Jordan (83%), Bahrain (81%), followed by the UAE, Saudi Arabia, and Morocco (78%) record high performance in this indicator, reflecting strong capacity to monitor inflation and changes in consumer prices. Such data are fundamental for tracking living costs and adjusting price policies.

In contrast, Yemen (33%) and Libya (33%) record low ranks, revealing weaknesses in their data collection systems in this field, and consequently, difficulties in monitoring inflation trends or assessing their effects on the domestic economy.

4.2.4. Public Finance Indicators:

Bahrain (94%), the UAE (89%), and Oman (83%) lead in this area, reflecting high transparency in providing data on government revenues, expenditures, and public finance management. These high levels point to financial and statistical institutions capable of delivering an accurate picture of the public finance situation.

By contrast, Syria (0%) and Iraq (0%) register a complete absence of such data, highlighting deep challenges linked either to political circumstances or institutional weaknesses in providing these statistics.

4.2.5. Money and Banking Indicators:

The UAE (100%) and Tunisia (94%) rank at the top in terms of availability of monetary and banking data, indicating the strength of financial and monetary institutions in these countries. These data enable close monitoring of lending activities, liquidity levels, and oversight of the banking sector.

Conversely, Syria (0%) and Libya (38%) show severe shortages in this type of data, limiting their ability to evaluate the banking system's condition or monitor financial stability.

4.2.6. International Trade Indicators:

The UAE (100%) and Jordan (100%) record full performance, followed by Tunisia, Oman, and Bahrain (75%). This reflects the availability of precise data on exports and imports. Such high levels enable regular monitoring of the trade balance and guiding trade policies.

In contrast, Syria (38%), Libya (38%), Algeria (38%), and Lebanon (31%) show clear weaknesses in this area, hindering their ability to understand foreign trade dynamics or identify imbalances in trade balances.

4.2.7. Balance of Payments Indicators:

Morocco (94%), Bahrain (94%), and the UAE (88%) top this indicator, reflecting the availability of regular and accurate data on external financial flows, including remittances and foreign investments.

Meanwhile, Syria (0%) suffers from an almost complete absence of such data, severely limiting its institutions' capacity to track the external balances of the economy.

The analysis shows that countries such as the UAE, Bahrain, Oman, Morocco, Jordan, and Tunisia emerge as leaders in providing economic data, as they demonstrate broad coverage across most economic indicators (national accounts, labor, prices, public finance, money and banking, international trade, and balance of payments). This reflects strong institutional frameworks, advanced statistical systems, and greater commitment to transparency.

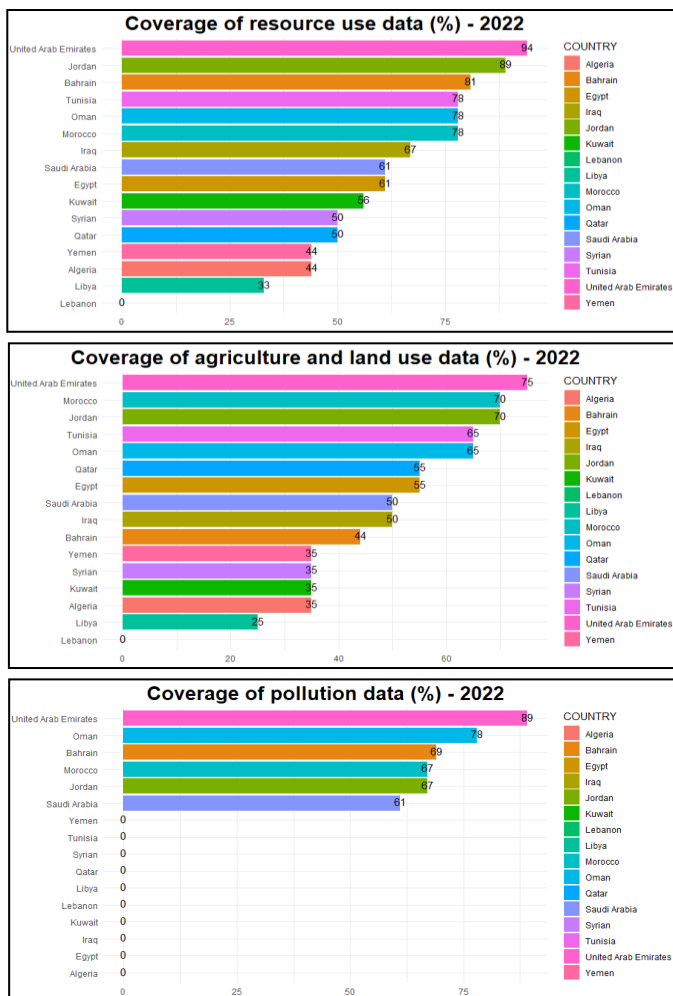
On the other hand, countries such as Syria, Libya, and Iraq register significant weaknesses or almost complete absence across several indicators, highlighting substantial institutional and structural challenges related to data collection and dissemination.

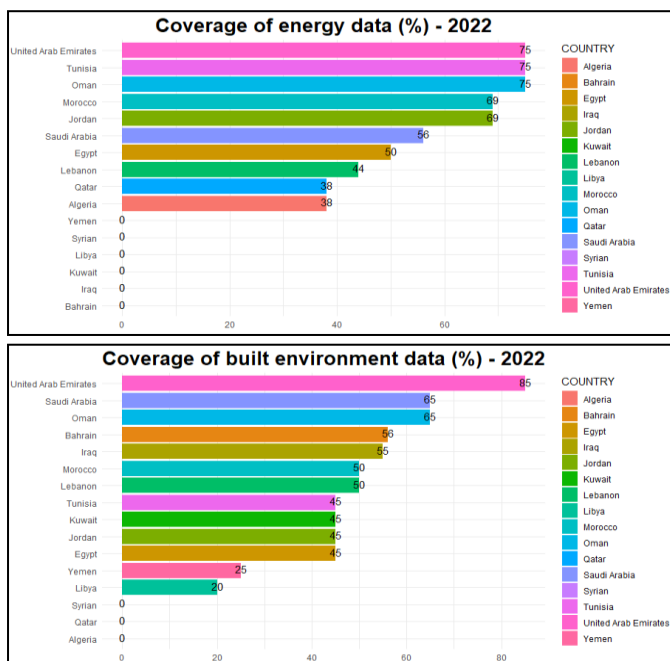
The results also reveal disparities between resource-rich countries and those with diversified economies. For example, some oil-rich countries (such as the UAE and Saudi Arabia) achieved advanced positions across most indicators, whereas others (such as Algeria and Libya) could not reach the same level despite having similar resources. This reflects differences in government priorities and the effectiveness of statistical and economic institutions.

4.3. Analytical Review of the Environmental Dimension of the Availability and Accessibility of Official Statistics in Arab Countries:

This analytical reading makes it possible to assess the extent to which official statistics are available and accessible in Arab countries in 2022 within the environmental dimension. The analysis relies on indicators such as air and water quality, waste management, renewable energy, forests, and biodiversity. Examining these indicators provides a tool for understanding environmental gaps between countries and evaluating governments' capacity to plan and make decisions based on environmental data, thereby supporting sustainable policies and protecting natural resources.

Figure (3): Ranking of Arab Countries According to the Environmental Dimension Indicators of the Availability and Accessibility of Official Statistics for the Year 2022





Source: Prepared by the author using R statistical software

4.3.1. Agricultural Land:

The results showed that the United Arab Emirates (75%) ranked first, followed by Jordan and Morocco (70%), reflecting these countries' ability to monitor the use of agricultural land, plan agricultural production, and estimate the resources allocated to farming activities. In contrast, Lebanon (0%) and Libya (25%) recorded very low levels, indicating the limitations of their statistical systems in this field and, consequently, a weak capacity to design agricultural policies based on accurate data.

4.3.2. Natural Resource Use:

The UAE (94%), Jordan (89%), and Bahrain (81%) topped the ranking, indicating the availability of strong databases on the consumption of vital resources such as water and energy. This enables these countries to monitor exploitation levels and make sound decisions regarding sustainability. On the other hand, Algeria and Yemen (44%), Libya (33%), and Lebanon (0%) showed weak levels, limiting their ability to control natural resource consumption or develop effective management plans.

4.3.3. Energy:

The UAE, Oman, and Tunisia (75%) led the index, reflecting a clear focus on collecting and publishing data related to energy production and consumption, including renewable energy. Meanwhile, countries such as Yemen, Syria, Libya, Kuwait, Iraq, and Bahrain (0%) recorded a complete absence of data, which reflects institutional shortcomings and a lack of attention to building reliable energy databases for future policymaking.

4.3.4. Environmental Pollution:

The UAE (89%), Oman (78%), Bahrain (69%), Morocco and Jordan (67%), and Saudi Arabia (61%) occupied the top positions, reflecting the development of their environmental monitoring systems, whether in terms of air quality, water, or industrial pollutants. In contrast, data were completely absent in the

remaining Arab countries (0%), highlighting weaknesses in environmental monitoring capacity and reflecting the limited priority given to environmental issues in public policies.

4.3.5. Urban Infrastructure:

The UAE (85%) ranked first, followed by Oman and Saudi Arabia (65%), then Bahrain (56%) and Iraq (55%). This ranking reflects the progress of some countries in collecting accurate data on urbanization, transportation networks, and urban activities, enabling them to improve urban planning. In contrast, the other Arab countries recorded low percentages or a lack of data, hindering their ability to keep up with urban expansion and manage its environmental and social consequences.

The review of environmental indicators shows that the UAE leads most indicators thanks to its advanced statistical system and openness to data dissemination. It is followed by countries such as Oman, Jordan, and Morocco, which demonstrated significant levels of coverage in several areas. In contrast, countries such as Lebanon, Libya, Syria, and Iraq stood out for their near-total absence of data in some indicators, reflecting weak institutional capacities or the impact of political and economic conditions. This disparity among countries highlights the lack of homogeneity in environmental statistical structures across the Arab region and points to an urgent need to strengthen data collection and

dissemination mechanisms in order to develop environmental policies based on precise scientific foundations.

5. Classification of Arab Countries According to Indicators of the Availability and Accessibility of Official Statistics Using Hierarchical Cluster Analysis (HCA)

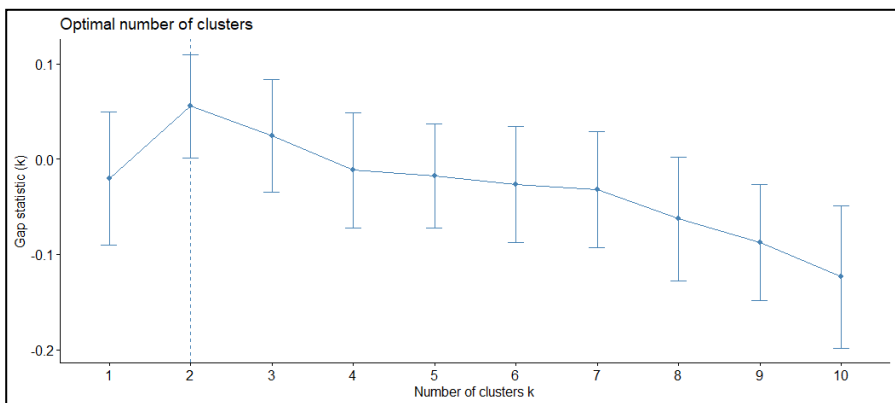
Hierarchical Cluster Analysis is one of the important statistical tools in data science, used to group elements or samples that share similar characteristics into homogeneous clusters. The process proceeds through several stages: starting with the calculation of distances between samples and converting them into a distance matrix, then identifying the most similar samples and grouping them into small clusters. These small clusters are then gradually aggregated into larger clusters, with distances recalculated at each stage, until a complete hierarchical tree is formed that represents the relationships among all samples.

By applying this technique, it becomes possible to determine the levels of similarity and difference among countries according to open data indicators. This facilitates the organization of complex data and the extraction of key patterns and trends, thereby enhancing the capacity to make data-driven decisions with greater accuracy.

5.1. Determining the Optimal Number of Clusters:

The analysis was based on indicators of the availability and accessibility of official statistics across the social, economic, and environmental dimensions of Arab countries. After processing the data using the statistical software R, the optimal number of clusters was determined to be two, as illustrated in Figure (4). This number reflects the best division of Arab countries into homogeneous groups based on their proximity or divergence in values across the indicators used.

Figure (4): Optimal number of clusters according to the indicators of availability and accessibility of official statistics for Arab countries



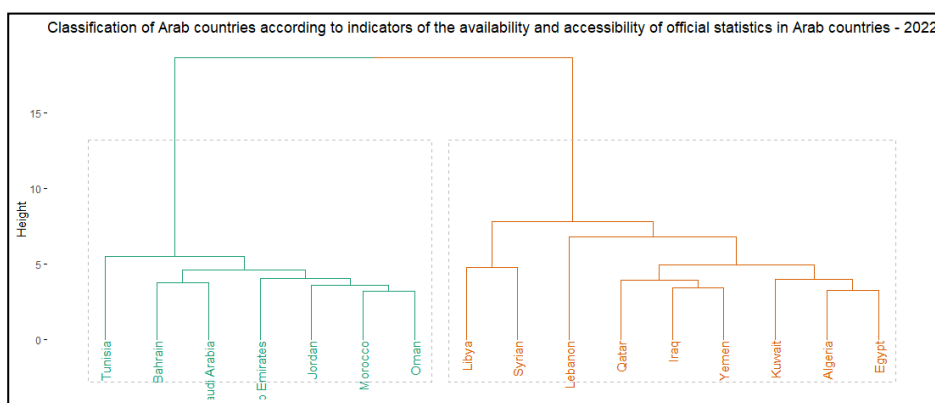
Source: Prepared by the author using R statistical software

5.2. Hierarchical Cluster Tree Structure:

After determining the optimal number of clusters, the hierarchical cluster tree (dendrogram) was constructed, as illustrated in Figure (5). The tree reflects the structural relationships among countries and

highlights the degree of similarity in their performance on open data indicators. By examining the branching levels of the dendrogram, it becomes possible to identify which countries are most closely related in terms of the availability and accessibility of official statistics, as well as those that diverge significantly. This visual representation provides a clear and systematic way to interpret groupings and differences, offering valuable insights into the comparative statistical capacities of Arab countries.

Figure (5): Hierarchical cluster tree structure based on open data indicators for Arab countries



Source: Prepared by the author using R statistical software

Based on the dendrogram of the Hierarchical Cluster Analysis, Arab countries were classified into two main groups according to their performance in the indicators of the availability and accessibility of official statistics.

Cluster 1: Advanced Countries in the Availability and Accessibility of Official Statistics

Countries included: Tunisia, Bahrain, Saudi Arabia, United Arab Emirates, Jordan, Morocco, Oman.

Characteristics: These countries are characterized by broad coverage of official statistics across social, economic, and environmental dimensions, reflecting strong institutional capacities in collecting, processing, and disseminating data. This advancement enables them to design evidence-based public policies, monitor national performance indicators, and align their strategies with international standards. For example, the UAE, Bahrain, and Oman have significantly invested in digital infrastructure and open data platforms, while Tunisia, Morocco, and Jordan benefit from long-standing statistical traditions emphasizing transparency and accessibility. Saudi Arabia, on the other hand, has strengthened its statistical efforts within the framework of Vision 2030, establishing modern foundations for digital governance and improving data quality. Overall, this cluster represents countries that have made substantial progress in fostering an open data culture, thereby enhancing their capacity for knowledge-based strategic planning.

Cluster 2: Lagging Countries in the Availability and Accessibility of Official Statistics

Countries included: Libya, Syria, Lebanon, Qatar, Iraq, Yemen, Kuwait, Algeria, Egypt.

Characteristics: These countries demonstrate low levels of official data availability, with most suffering from limited coverage in key social, economic, and environmental indicators. Such deficiencies undermine policymakers' ability to accurately track development performance or design plans grounded in solid statistical foundations. For instance, Libya, Syria, and Yemen face the consequences of political and security crises that have disrupted the stability of their statistical systems. Algeria and Egypt, despite possessing some statistical databases, remain limited in terms of openness and accessibility. Similarly, Kuwait and Qatar, despite their considerable financial resources, have not yet reached the required level in developing transparent and open data systems.

This classification highlights a clear gap among Arab countries regarding the readiness of their statistical systems. The first cluster includes countries that have advanced in data collection and dissemination, strengthening their ability for strategic planning and evidence-based decision-making. The second cluster, however, underlines the urgent need to develop statistical infrastructures, enhance transparency, and expand the scope of open data

dissemination. Hence, hierarchical cluster analysis proves to be an effective tool for identifying strengths and weaknesses in the Arab statistical landscape and for guiding efforts toward building more integrated and effective systems.

6. CONCLUSION

This study was built upon a central research question: To what extent do Arab countries differ in the availability and accessibility of official statistics across the social, economic, and environmental dimensions, and how can these differences be systematically classified using hierarchical cluster analysis?

The findings revealed that Arab countries are not homogeneous in their statistical performance. Instead, they can be divided into two main groups:

- **The advanced group:** consisting of Tunisia, Bahrain, Saudi Arabia, the United Arab Emirates, Jordan, and Morocco. These countries are characterized by stronger institutional capacities and higher levels of transparency in the dissemination of official data.
- **The less advanced group:** including the remaining countries in the study, which still suffer from limited data coverage, restricted accessibility, and a lack of compliance with international standards.

Thus, the study has addressed the central question, confirming that disparities among Arab countries stem from a combination of factors, including the level of investment in digital infrastructure, the political will for openness and transparency, and the ability to comply with global standards for open data.

Based on these results, the study recommends the following:

- Strengthening the independence of national statistical offices and improving the legislative framework that ensures their good governance;
- Investing in the development of digital infrastructure and adopting modern tools and technologies that align with global advancements;
- Publishing data in open, machine-readable formats to facilitate use by various stakeholders;
- Expanding the scope of statistics to cover all developmental dimensions, with particular attention to marginalized groups and underrepresented areas;
- Promoting regional cooperation and knowledge exchange between advanced and less advanced Arab countries;
- Fostering a culture of open data as a means to strengthen trust and encourage civic participation.

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