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Competitiveness of oil-exporting developing and emerging countries and parameters critical for increasing it

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Abstract: This study has attempted to determine the most critical parameters impacting the competitiveness of oil-exporting developing and emerging countries. If such parameters are identified, then their improvement can play a decisive role in the improvement of the overall competitiveness of these countries. This is important, as the imminent end of the oil age will leave these countries without their primary source of revenues. Enhancing competitiveness can at least partially improve the situation. The authors applied the dynamic panel model technique to estimate the influence of different parameters, represented by indicators of the global competitiveness indices using World Economic Forum data. The results received demonstrate that certain indicators, predominantly under pillars 1 (institutions), 5 (higher education and training), 6 (goods market efficiency) and 11 (business sophistication), have the greatest impact. Therefore, their improvement will play a decisive role in enhancing the overall competitiveness of the countries under consideration.

Keywords: competitiveness; global competitiveness index; oil exporting countries; developing and emerging countries; dynamic panel model.

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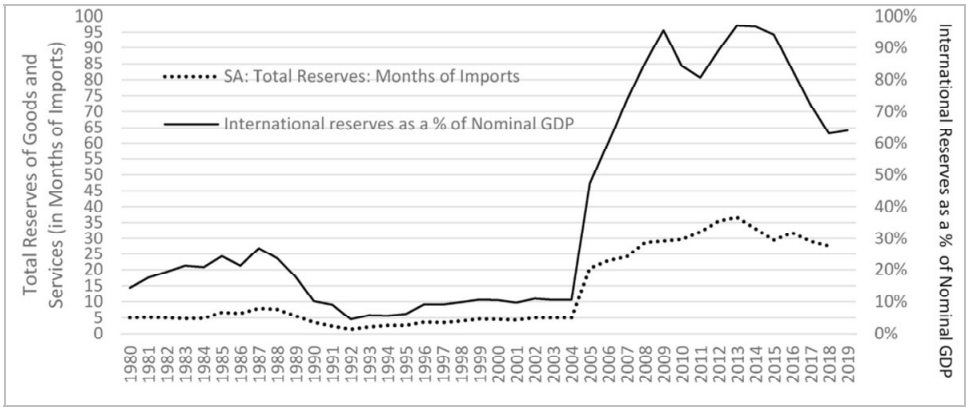
1 Introduction

Oil price plunges during the period from June 2014 until the present day have negatively affected the economic development of oil-exporting developing and emerging countries (OEDECs). In 2014, crude oil prices dropped by roughly 40%, from US$115 per barrel, using the Brent benchmark, to around US$70 per barrel in December 2014. Yardeni et al. (2020) estimated that the total reduction in oil revenues worldwide in 2014 was around US$1.5 trillion. By the beginning of 2016, the price decline reached 70%. Figure 1 gives a clear example of the detrimental effect of the oil price plunges of 2008 and 2014 on the international reserves of Saudi Arabia (Razek and McQuinn, 2021). Later, the situation improved slightly but worsened again in April 2020. It is obvious that negative price shocks have very serious implications for the countries under consideration as they have been the main recipients of these revenues. As a result, they have a seen a serious decline in their economic growth prospects.

Figure 1 International reserves as a percentage of GDP and total reserves of goods and services (in months of imports)



Source: Saudi Arabian Monetary Agency, International Monetary Fund – World Economic Outlook, World Bank

To better understand the importance of the topic, it is necessary to shed light on the dependence of OEDECs on oil export revenues. For example, the Russian Audit Chamber wrote in the 2020 federal budget report that “The country’s oil and gas revenues accounted for 29.3% of the whole federal budget, marking a 13.9% drop on the year”

(Warsaw Institute, 2020). In this regard, it is worth pointing out that Russia is significantly less dependent on oil export revenues than other OEDECs. In Kazakhstan, oil and gas revenues account for nearly 44% of the state budget (International Trade Administration, 2020). "The Saudi Government typically projects around 60pc of its income to come from oil revenues" (Argus Media, 2021). Oil revenues are equal to 75.02% of total budget revenues in Kuwait (Kuwait Ministry of Finance, 2020).

We want to underline that the negative consequences of the approaching end of the oil era, i.e., the period in human history characterised by large-scale use of oil as fuel, will not only impact OEDECs. For example, the world can expect a significant outflow of migrants from the countries under consideration to other parts of the world, mostly to developed countries. This was initially studied by Kitous et al. (2016, p.26) who found "that on average around one third of the total migrants from oil exporting countries reside in EU28" and Vandyck et al. (2018).

To make the situation worse for these countries, the global energy transition is accelerating. For example, in December 2019, the European Commission presented the European Green Deal. One of the consequences of the Deal will be a reduction in the imports and consumption of hydrocarbons. It is clearly stated in this document that "further decarbonising the energy system is critical to reach climate objectives" [European Commission, (2019), p.6]. Other parts of the world are following the same path. Responding to this challenge, Fattouh et al. (2019) has contemplated an adaptation strategy for oil-exporting countries.

The overdependence on oil revenues described above, combined with the lack of diversification into other sectors of economy, make the OEDECs uncompetitive and their development unsustainable. This is despite the fact that the need to decouple their development from oil export proceeds was first highlighted back in 1936 by the famous Venezuelan writer and politician Arturo Pietri. That year he published his famous article "To Sow the Oil" (Pietri, 1936). Later, these problems were studied by Buiter and Purvis (1980), Sachs and Warner (1995, 2001), Mikesell (1997), Ross (2011), Mien (2021) and many other authors. IMF (2016, p.3) noted on this topic that "The challenge therefore is to grow truly self-sufficient non-oil sectors that will provide a sustainable source of growth and employment even when oil resources are depleted". It is worth mentioning that Muhamad et al. (2021, p.13), studied how to reduce dependency on natural resources and "came to the conclusion that the high quality public sector services, institutional quality and human development improve economic diversification for reducing natural resource dependency". This conclusion is in line with the findings of the current research.

There is one important point related to competitiveness: the non-oil sectors of the countries under consideration are usually subsidised by the proceeds from oil exports. These proceeds have allowed them to make significant investments in infrastructure, economic diversification, education, healthcare, etc. (Singh, 2021a). Further, these investments had a positive effect on their competitiveness. Damette and Seghir (2013, p.193) argue that "Considering oil exporting countries, the oil endowment and the higher energy subsidisation lead to low energy price which is used as a tool to distribute state benefits to the population as well as to promote industrialisation and economic diversification aimed at generating employment opportunities and enhancing an economy's global competitiveness". This point of view is supported by IMF (2016, p.3) which points out that "…non-oil activities in many oil-exporting Arab countries are to some extent dependent on funding from oil revenues". The same source continues that "The challenge therefore is to grow truly self-sufficient non-oil sectors that will provide a

sustainable source of growth and employment even when oil resources are depleted". The situation is changing and a substantial reduction in oil export revenues is forcing countries to cope with falling oil prices.

In view of the approaching end of the oil era, which will negatively influence OEDECs through a dramatic decrease in oil revenues, this research presumes that enhancing the competitiveness of non-oil sectors is a logical (although not the only) way for these countries to adapt to the new reality. And the purpose of this research is to understand what is required for this enhancement, specifically, what parameters are critical for it. The research is based on the data of the Global Competitiveness Report prepared by the World Economic Forum (WEF). Therefore, the research question of this article is which parameters, represented by rankings on global competitiveness indices, have the largest impact on the overall competitiveness of OEDECs? Our hypothesis is that in the context of the countries under consideration, some parameters of the Global Competitiveness Report provide a much larger impact in comparison with others. If such parameters are identified, then their improvement will play a decisive role in the improvement of the overall competitiveness of these countries. So, the objective of this research is to identify these most critical parameters. This objective defines the scientific novelty of this study, as this has not been done before.

In spite of the serious importance of the topic, the competitiveness of these countries has received limited attention from researchers in comparison with the competitiveness of oil-importing ones. This issue of insufficient coverage in scientific literature is especially urgent for non-Arab African oil-exporting countries. On one hand, this circumstance substantially complicated our research. On the other hand, it adds to the scientific novelty of this paper.

The article is structured in five sections. The introduction, which includes the purpose of this study, its research hypothesis and objective, is followed by the second section, which provides a review of the literature related to the topic of the article. The third section introduces the data and the methodology used in our research. The fourth section presents the results and their discussion. And the last fifth section presents the conclusions as well as research limitations and areas for further research.

2 Literature review

As mentioned above, the topic of OEDEC competitiveness has not been a focus of researchers. Attention is usually given to the topics of economic diversification or the overall economic performance of these countries and not to their competitiveness. However, there is a small, but growing body of literature that addresses the issues of the lower competitiveness and the unsustainability of the socio-economic development of these countries. In this regard, we can recall that Porter (1998) argued that the national environments of some countries are more stimulating to progress than of other ones. We should acknowledge that the national environments of the countries under consideration are not among the most stimulating for reforms. However, this is not always a case and Dana (1997, p.174) noted that Kazakhstan emerged as a regional leader of market-oriented reforms and "is keen on entrepreneurship, innovation, and change".

Addressing early scientific research in this field we should name such works as Buiter and Purvis (1980), Atkinson et al. (1983), and Beblawi (1986, p.15) who wrote that "economic development in the Arab region, the principal recipient of oil revenues,

remains inadequate and far below expectations. Oil money, huge as it was, has dwindled dramatically while the long dreamt-of new Arab economic power remains as elusive as it was a decade ago, or perhaps more elusive". Unfortunately, we can still use this quotation as a description of what is happening in most of the OEDECs, not just in the Arab region. The situation has not changed since that time and "Descriptive statistics show the exposure of oil-exporting countries to the changes in oil price and oil exports: GDP and government revenues (per capita) in most Middle-East and Africa producers are found to be linked to oil price evolution, with the elasticity of government revenues to oil price being close to 1 for a number of countries" [Kitous et al.. (2016), p.2]. Also, Abdmoulah and Laabas (2013, p.5) found that "that most Arab economies face difficulties in sustaining and developing a competitive trade sector because of lagging industrialisation and slow structural transformation, weak supply of exportable commodities, excess reliance on natural resources and primary products in low technology sectors, and low level of integration in the global production chains".

Other countries under consideration follow this path. Oluwatobi (2015, p.197) is of the view that "Nigeria has performed poorly in terms of competitiveness, transparency, and governance owing to her dependence on natural resources as a major means for economic sustenance". Studying the situation in Colombia, Mesa and Lafuente (2017, p.248) highlighted "that this country depends clearly on natural resources as economic base". This was echoed by Falkowski (2018, p.54): "it is only in the area of exports of mineral fuels, as well as oils and products of their distillation that Azerbaijan has had a relatively stable, strong comparative advantage over the years. It is a very important determinant of the macroeconomic conditions in which the Azerbaijani economy operates." Leskina et al., (2020, p.482) "revealed that there is a rapid decline in human potential in Russia, which negatively affects the dynamics of the gross domestic product and the global competitiveness indicators of modern Russia".

Several studies addressed the impact of oil prices on the competitiveness of the OEDECs. Qudah et al. (2016, p.38) found that "As oil rents increase as a percentage of GDP, this indicates more dependence on oil rents to generate more GDP. However, this reduces the competitiveness of the other sectors in the economy resulting in lower country competitiveness". This opinion is shared by Mukhamediyev and Temerbulatova, (2019, p.49) "a greater reduction in the GCI (when oil prices rise) exists for oil exporting countries than for non-oil exporters". This is happening because the increased inflow of oil export proceeds allows them to postpone needed economic reforms aimed at improving their national competitiveness. Stocker et al. (2018, p.12) also share this opinion: "The prospect of persistently low, and perhaps more volatile, oil prices intensifies the need for improved monetary and fiscal policy frameworks. It also underscores the urgency for reforms to reduce reliance on oil, increase value added and productivity in the non-extractive sector, and boost competitiveness, skills acquisition, and adaptability".

The governments of OEDECs understand the importance of increasing the competitiveness of their countries well. Most of them have prepared different development plans and programmes aimed at enhancing their competitiveness. For example, Bahrain Economic Development Board (2008, p.11) developed the Economic Vision 2030 plan, which states that "Our Vision is that Bahrain attains a high level of competitiveness in a global economy". Saudi Government (2016, p.53) in its Saudi Vision 2030 sets among its goals "To rise from our current position of 25 to the top 10 countries on the Global Competitiveness Index". Describing economic diversification in

Gulf Cooperation Council (GCC) countries, Hvidt (2013) paid special attention to the efforts of these countries to increase their competitiveness. However, no positive, synergistic effect of competitiveness among the GCC countries was observed in this paper. This is in contrast with the work by Verhun et al. (2020), who observed a positive impact on the competitiveness of each United States-Mexico-Canada Agreement member state. It is worth mentioning that these three countries (Canada, Mexico and the USA) are also among the World's biggest oil exporters. Dana et al. (2021) called attention to the efforts to increase competitiveness in the GCC countries as well as to the obstacles these efforts face. Emphasis on improving national competitiveness was made in the Nigeria Vision 2020 plan. In 2006, Kazakhstan announced its strategy to join the World's 50 most competitive countries.

Considering the effect of institutions on competitiveness, which revealed the highest influence in this study, we should mention an important research work, which was undertaken by Thompson (2004, p.197), who concluded "that institutional circumstances are significantly more important than cost conditions to the competitiveness of an economy". The findings of this article are very much in line with this conclusion. This point is shared by Qureshi (2008, p.44). who advised that "institutional factors can enhance diversification and improve the performance of the non-oil sector" and Shehabi (2020, p.59), who argues "that expansion of the non-oil industrial and exports sectors is constrained by institutional, political, economic, and labour constraints and rigidities".

This exact point was made by Froy et al. (2012, p.4): "To be successful in today's knowledge economy, communities need to boost not only the skills of local people but also the utilisation and deployment of these skills by employers. By ensuring that skills are utilised effectively, local economies can become more competitive and host better quality and better paid jobs, while simultaneously improving living standards and stimulating innovation". Unfortunately, it is not possible to argue that the governments of the countries under consideration try their best to utilise local talent. Developing balanced local skills strategies is essential for the improvement of the overall competitiveness of the OEDECs. Moreover, the authors are of the view that this development, along with proper institutional development, is crucial for their success.

The influence of different factors on competitiveness was studied by Jahan-Parvar and Mohammadi (2009), Karimi et al. (2013), Kharlamova and Vertelieva (2013), Silvanto and Ryan (2018), Falkowski (2018), Annoni and Dijkstra (2019), Amiri et al. (2021), and many others who applied different statistical models. A comprehensive study of "what variables better explain the global competitive advantage of economies" was undertaken by Farinha et al. (2018, p.503). Our paper follows their approach to some extent and is also "based on the dimensions analysed by the World Economic Forum", although their study considers a much larger sample of countries.

3 Data, variables, and methodology

We used panel data for this research as we considered dependent and independent variables for 13 countries over the period from 2007–2008 to 2017–2018. More detailed information on the data used is provided below.

3.1 Independent variables

3.1.1 Indicators

The 71 different indicators of the global competitiveness index for each country and for each period under consideration (from 2007–2008 to 2017–2018) are taken as independent variables. They are shown in Appendix 1.

The initial dataset was downloaded from the World Economic Forum website as a single file, is labelled as version 20180226 and has the suggested citation: "World Economic Forum. The Global Competitiveness Index dataset 2007-2017". Schwab (2015, p.4) mentions that "Since an update in 2007, the methodology has remained largely unchanged". The GCI 4.0 methodology was introduced in the 2018 edition. This information assures us that this dataset was prepared as per the common methodology and can be used without additional recalculation.

Keeping in mind that the dataset covers a very short time period, some indicators with insufficient data were excluded. For example, indicators 8.02 (affordability of financial services) and 8.01 (financial services meeting business needs) are given for the time periods 2016–2017 and 2017–2018 only. This is certainly not enough for extrapolation. Then indicators 7.09 (country capacity to attract talent), 7.08 (country capacity to retain talent) and 7.05 (effect of taxation on incentives to work), 6.04 (effect of taxation on incentives to invest) are given for the periods from 2013–2014 to 2017–2018. Indicator 1.10 (efficiency of legal framework in settling disputes) for the periods 2007–2008 and 2008–2009, etc. The remaining time series were extra- or interpolated where necessary. Unlike the majority of indicators, some of them are measured on s scale from 1 to 10. Such indicators were recalculated to the scale of 1 to 7 to ensure the homogeneity of the dataset.

3.1.2 Countries under consideration

The list of countries under consideration was developed based on the list of oil-exporting emerging market and developing economies given in Stocker et al. (2018, p.25). This source indicates that "A country is classified as oil exporter when, on average in 2012–2014, exports of crude oil and natural gas accounted for 20% or more of total exports. Countries for which this threshold is met as a result of re-exports are excluded. Countries that are primarily exporters of natural gas are included in this category, as the price of natural gas is tightly connected to crude oil". We have excluded countries for which the data were insufficient, i.e., Angola. The final list includes 13 countries, namely: Algeria, Azerbaijan, Bahrain, Cameroon, Colombia, Kazakhstan, Kuwait, Nigeria, Oman, Qatar, Russia, Saudi Arabia and the United Arab Emirates.

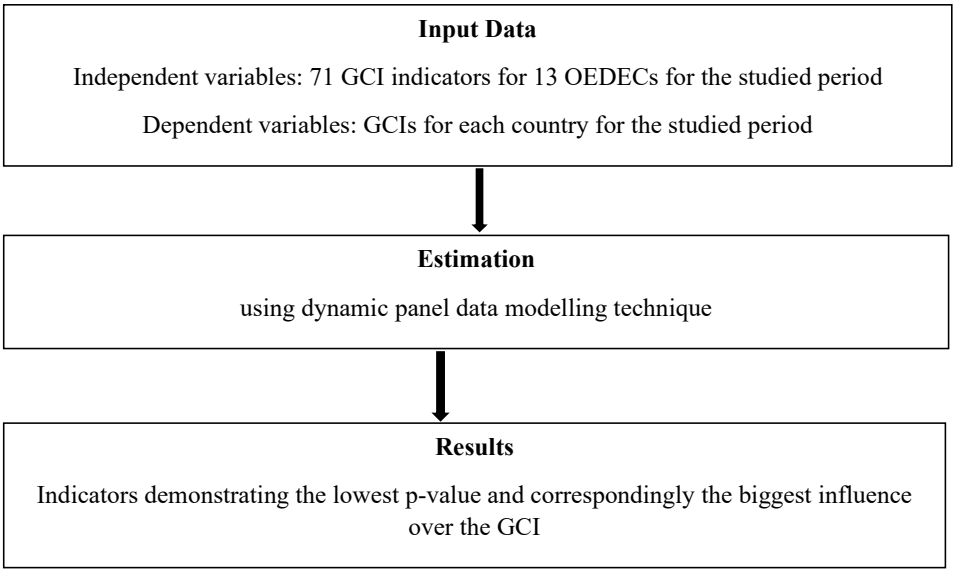
3.2 Dependent variables

The global competitiveness indices for each country and for the period from 2007–2008 to 2017–2018 are taken as dependent variables. The earlier periods cannot be analysed as the Global Competitiveness Report 2006–2007 considers nine pillars as opposed to 12 pillars in the later reports. Representation of the time periods is as in Schwab (2019).

3.3 Methodology

The steps of the research are shown on Figure 2.

Figure 2 Methodology used



In order to test the hypothesis set forth above, the authors applied the dynamic panel data modelling technique, which is best suited because the dependent variable is lagged, and the analysed dataset has few time periods and many individual units (large N and small T panel). This approach allows us to tackle the endogeneity issue as well as to control for the heterogeneity problem to some extent. Gretl software was used for the estimation. The initial model is presented in Appendix 1. The model's tests, shown below, demonstrate that the chosen models as well as the data used are acceptable for the purposes of the present article.

- Test for AR(1) errors: z = –1.58905 [0.1120]
- Test for AR(2) errors: z = 1.3122 [0.1895]
- Sargan over-identification test: Chi-square (4) = 2.79714 [0.5923]
- Wald (joint) test: Chi-square (73) = 315.356 [0.0000].

Test for normality of residual:

- Null hypothesis: error is normally distributed
- Test statistic: Chi-square (2) = 0.371137 with p-value = 0.830632.

Pesaran CD test for cross-sectional dependence:

- Null hypothesis: No cross-sectional dependence
- Asymptotic test statistic: z = -1.27375 with p-value = 0.20275.

A very large number of independent variables (N) inevitably leads to multicollinearity and, thus, spurious coefficient values that cannot be interpreted. This means that one can remove some of these independent variables without negatively impacting the model's performance, and, at the same time, improving the interpretability of the model equation. We applied the "general-to-simple, downward reduction of the model" as recommended in Greene (2012, p.178) and then, eliminated statistically less significant indicators step-by-step in order to improve the model as in Farinha et al. (2018). The final estimation results are shown in Table 1.

4 Results and discussion

4.1 Results

Based on the estimation of data described above, we found that the following indicators demonstrate the lowest p-value and correspondingly the biggest influence over the GCI.

Table 1 Indicators of competitiveness with the biggest influence over the GCI

No.		*Indicator*	*Pillar*	*Coefficient*	*Std. error*	*z*	*p-value*
1	1.01	Property rights	1	0.240208	0.060713	3.956	<0.0001
2	1.02	Intellectual property protection		–0.196760	0.04339	−4.535	<0.0001
3	1.03	Diversion of public funds		0.215132	0.053107	4.051	<0.0001
4	1.04	Public trust in politicians		0.443271	0.050471	8.783	<0.0001
5	1.05	Irregular payments and bribes		–0.360148	0.06233	−5.778	<0.0001
6	1.06	Judicial independence		–0.322308	0.045057	−7.153	<0.0001
7	1.07	Favouritism in decisions of government officials		–0.330749	0.046574	−7.102	<0.0001
8	1.09	Burden of government regulation		–0.137619	0.04108	−3.350	0.0008
9	1.12	Transparency of government policymaking		0.303957	0.064472	4.715	<0.0001
10	1.15	Organised crime		0.341612	0.07222	4.73	<0.0001
11	1.16	Reliability of police services		0.341557	0.051903	6.581	<0.0001
12	1.17	Ethical behaviour of firms		0.491165	0.076184	6.447	<0.0001
13	1.18	Strength of auditing and reporting standards		–0.210536	0.070987	−2.966	0.003
14	2.01	Quality of overall infrastructure	2	0.426811	0.065374	6.529	<0.0001
15	4.04	Business impact of tuberculosis	4	–0.522121	0.079074	−6.603	<0.0001
16	4.06	Business impact of HIV/AIDS		0.334384	0.053152	6.291	<0.0001
17	4.09	Quality of primary education		0.489515	0.070775	6.917	<0.0001

Table 1 Indicators of competitiveness with the biggest influence over the GCI (continued)

No.		*Indicator*	*Pillar*	*Coefficient*	*Std. error*	*z*	*p-value*
18	5.04	Quality of math and science education	5	–1.36525	0.169048	−8.076	<0.0001
19	5.05	Quality of management schools		1.42392	0.161437	8.82	<0.0001
20	5.06	Internet access in schools		–0.213385	0.042102	−5.068	<0.0001
21	5.07	Availability of research and training services		–0.532099	0.092674	−5.742	<0.0001
22	6.01	Intensity of local competition	6	–0.211586	0.071859	−2.944	0.0032
23	6.03	Effectiveness of anti-monopoly policy		–0.200249	0.065869	−3.040	0.0024
24	6.08	Agricultural policy costs		0.153202	0.030442	5.033	<0.0001
25	6.09	Prevalence of trade barriers		0.367577	0.056131	6.549	<0.0001
26	6.12	Business impact of rules on FDI		0.226849	0.053574	4.234	<0.0001
27	6.13	Burden of customs procedures		–0.474173	0.075311	−6.296	<0.0001
28	6.15	Degree of customer orientation		0.494812	0.091411	5.413	<0.0001
29	6.16	Buyer sophistication		–0.366257	0.058634	−6.246	<0.0001
30	7.01	Cooperation in labour-employer relations	7	0.547702	0.098037	5.587	<0.0001
31	7.0	Flexibility of wage determination		–0.610743	0.095218	−6.414	<0.0001
32	7.07	Reliance on professional management		–0.506074	0.076461	−6.619	<0.0001
33	8.03	Financing through local equity market	8	0.289883	0.042319	6.85	<0.0001
34	8.04	Ease of access to loans		–0.508657	0.070775	−7.187	<0.0001
35	8.05	Venture capital availability		0.542739	0.075082	7.229	<0.0001
36	9.02	Firm-level technology absorption	9	–0.313297	0.098979	−3.165	0.0015
37	10.01	Domestic market size index	10	0.254836	0.0526	4.845	<0.0001
38	10.02	Foreign market size index		0.239611	0.052336	4.578	<0.0001
39	11.02	Local supplier quality	11	0.386879	0.084868	4.559	<0.0001
40	11.04	Nature of competitive advantage		0.645767	0.091993	7.02	<0.0001
41	11.06	Control of international distribution		0.281242	0.060512	4.648	<0.0001
42	11.07	Production process sophistication		–0.405951	0.065167	−6.229	<0.0001
43	11.08	Extent of marketing		–0.321665	0.058476	−5.501	<0.0001
44	11.09	Willingness to delegate authority		–0.675368	0.109344	−6.177	<0.0001

Table 1 Indicators of competitiveness with the biggest influence over the GCI (continued)

No.		*Indicator*	*Pillar*	*Coefficient*	*Std. error*	*z*	*p-value*
45	12.01	Capacity for innovation	12	–0.190661	0.036867	−5.172	<0.0001
46	12.03	Company spending on R&D		0.213476	0.037727	5.658	<0.0001
47	12.04	University-industry collaboration in R&D		0.151512	0.057018	2.657	0.0079
48	12.06	Availability of scientists and engineers		–0.238083	0.064174	−3.710	0.0002

We took a combined approach to the analysis of the results received.

First, we looked at the pillars represented by the largest number of indicators and found that they include pillar 1 (institutions) – 13 indicators, pillar 6 (goods market efficiency) – 8 indicators and pillar 11 (business sophistication) – 6 indicators. Then we found that pillar 2 (infrastructure) and pillar 9 (technological readiness) are represented by only one indicator each. Other pillars are between these two groups, except the non-represented pillar 3 (macroeconomic environment).

Second, we looked at the magnitude of influence (impact) of each pillar as this is, in our view, not less important. For this purpose, we calculated the absolute values of coefficients under each pillar.

The analysis summary is given in Table 2.

Table 2 Pillars of competitiveness and their influence over the GCI

No.	*Name*	*Number of indicators*	*Magnitude of influence*
1	Institutions	13	3.935022
2	Infrastructure	1	0.426811
3	Macroeconomic environment	0	0
4	Health and primary education	3	1.34602
5	Higher education and training	4	3.534654
6	Goods market efficiency	8	2.494705
7	Labour market efficiency	3	1.664519
8	Financial market development	3	1.341279
9	Technological readiness	1	0.313297
10	Market size	2	0.494447
11	Business sophistication	6	2.716872
12	Innovation	4	0.793732

4.2 Discussion

The results of the analysis (in terms of pillars and in terms of their influence) are in line with the findings in the literature cited above, especially with regard to pillar 1 (institutions).

The results also support the general perception of the competitiveness of OEDECs in both academic and business circles regarding pillar 6 (goods market efficiency) and pillar 11 (business sophistication). The influence of pillar 5 (higher education and training) is remarkably strong and not surprising. At first glance, the negative value of indicator 5.04 (quality of math and science education) (−1.36525) may appear surprising. In our

opinion, this happens, on one hand, because math and science are usually considered as portable disciplines among talented students wanting to migrate [Gibson and McKenzie, (2014), p.4]. On the other hand, this is because students from these countries, who are very successful in math and science, often cannot find proper use for their knowledge in their home countries and, therefore, tends to emigrate. It is interesting that Pillar 3 (Macroeconomic environment) is not represented. This topic may require separate research. Our opinion is that this is due to insufficient data. Because of this insufficiency, we could only estimate two indicators under this pillar, namely 3.03 (inflation expressed in annual % change) and 3.04 (general government debt expressed in % GDP) out of five macroeconomic indicators existing in the dataset. This number is very small in comparison with all of the other pillars and the overall number of indicators analysed in this study, which is equal to 71. However, we know that oil export revenues allow most of the OEDECs under consideration to keep their macroeconomic indicators at an acceptable level. It is, however, a deceptive macroeconomic stability, which has been and will be shaken by every negative oil price shock.

From Table 1, it is clear that the countries' competitiveness progress is judged foremost by factors that cannot be concealed by oil revenues. Whereas export income can improve the macroeconomic environment, finance infrastructure spending and drive labour market strength (Singh, 2021b), it cannot push OEDEC governments to enforce necessary reforms aimed at improving institutions and financial markets. In addition, the efficiency of the market for goods is likely restrained by Dutch Disease, which makes most domestic goods manufacturing not economically viable and many OEDECs adhere to a fixed/managed exchange rate regime.

The final number of indicators of competitiveness with the biggest influence over the GCI is quite large (48) and this size prevents us from listing all of them here. It is, however, important to note that this large number reflects the nature of this index, where many indicators are interconnected and influence each other. In this regard, the authors note that Thompson (2004, p.197) considered "the notion of national competitiveness" as a combination of "both (i) a narrow, concise conception that relates primarily to cost conditions as determined by exchange rates, and (ii) a broader, more nebulous conception that comprises the institutional and systemic circumstances of an economy, such as legal, governmental, public policy and other factors framing countries' wider business environments".

As mentioned above, the findings of this article are supported by the findings of other authors such as Thompson (2004), Froy et al. (2012), Abdmoulah and Laabas (2013), Stocker et al. (2018) and Muhamad et al. (2021) and many others.

5 Conclusions

The negative oil price shock that occurred in April 2020 once again demonstrated that the reliance of OEDECs on proceeds from oil exports is no longer sustainable. If, before the oil price plunge of 2014, the discourse was more that this reliance is unsustainable in the long-term, the developments of the last year (2020) clearly demonstrate that it is already unsustainable. This is echoed by Razek and McQuinn (2021), who noted that "its [Saudi Arabian] efforts to develop the non-oil sector and endogenise economic growth are no longer optional". The main problem, which OEDECs now face, is that they need to adapt to the new reality and to learn how to live without oil revenues. In this article, the authors

have identified the most critical parameters for the competitiveness of OEDECs. We discovered that pillar 1 (institutions), pillar 5 (higher education and training), pillar 6 (goods market efficiency), and 11 (business sophistication), and their specific indicators listed in Table 1 provide the largest contribution to the competitiveness of OEDECs. Therefore, in order to increase competitiveness, the governments and business leaders of these countries should attempt to develop these parameters. Their improvement will be crucial in determining the futures of the countries under consideration, and it is likely to have a positive impact on the rest of the world.

This research is part of a project aimed at studying and forecasting the situation in oil-exporting, developing and emerging countries both now and after the oil era comes to an end.

5.1 Research limitations and areas for further research

Limitations of this research may be summarised as follows:

- Sample size: Obviously, a larger sample size could have generated more accurate results. However,
  1. This is the largest available sample at the time of writing this article.
  2. Indicators with insufficient data addressed in paragraph 3.2 above cannot be accurately extra- or interpolated and therefore excluded.
- Scope of discussion: Not all the OEDEC are covered by the research. This is primarily caused by data absence or insufficiency for some countries. However, the authors tried their best to ensure proper geographical representation of these countries.

In any case, these limitations do not undermine the cognitive value of our research, but rather serve as an initial point of departure for further studies. It would be interesting to repeat the calculations described above after several years with a larger sample size. Another area for further research is certainly the overall competitiveness of the OEDECs mentioned above.

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Appendix

Model 1: 1-step dynamic panel, using 78 observations
Included 13 cross-sectional units
H-matrix as per Ox/DPD
Dependent variable: ld_v1
Asymptotic standard errors

	Coefficient	*Std. Error*	*z*	*p-value*
ld_v1(-1)	−0.506038	0.212246	−2.384	0.0171**
ld_v1(-2)	0.347034	0.287983	1.205	0.2282
ld_v1(-3)	−0.441413	0.374264	−1.179	0.2382
const	0.00654317	0.00786162	0.8323	0.4052
ld_v2	0.282646	0.255423	1.107	0.2685
ld_v3	−0.262916	0.120933	−2.174	0.0297**
ld_v4	0.213736	0.114426	1.868	0.0618*
ld_v5	0.458515	0.209753	2.186	0.0288**
ld_v6	−0.424984	0.179454	−2.368	0.0179**
ld_v7	−0.267674	0.116548	−2.297	0.0216**
ld_v8	−0.298054	0.208998	−1.426	0.1538
ld_v9	−0.0998336	0.238503	−0.4186	0.6755
ld_v10	−0.105148	0.103852	−1.012	0.3113
ld_v11	−0.0570396	0.182351	−0.3128	0.7544
ld_v12	0.391930	0.199864	1.961	0.0499**
ld_v13	−0.0926699	0.210418	−0.4404	0.6596
ld_v14	0.429360	0.192995	2.225	0.0261**
ld_v15	0.242284	0.142230	1.703	0.0885*
ld_v16	0.612668	0.279411	2.193	0.0283**
ld_v17	−0.199305	0.218641	−0.9116	0.3620
ld_v18	0.120644	0.317310	0.3802	0.7038
ld_v19	0.0651220	0.237912	0.2737	0.7843
ld_v20	0.0684392	0.0756335	0.9049	0.3655
ld_v21	0.426394	0.237445	1.796	0.0725*
ld_v22	−0.340054	0.309141	−1.100	0.2713
ld_v23	0.235226	0.168185	1.399	0.1619
ld_v24	0.553759	0.337188	1.642	0.1005
ld_v25	−0.0890277	0.295670	−0.3011	0.7633
ld_v26	−1.26821	0.619975	−2.046	0.0408**
ld_v27	1.38917	0.518080	2.681	0.0073***
ld_v28	−0.223436	0.149645	−1.493	0.1354
ld_v29	−0.549364	0.434209	−1.265	0.2058

	Coefficient	*Std. Error*	*z*	*p-value*
ld_v30	−0.205314	0.264246	−0.7770	0.4372
ld_v31	−0.308613	0.220500	−1.400	0.1616
ld_v32	−0.0192598	0.132816	−0.1450	0.8847
ld_v33	−0.181044	0.190138	−0.9522	0.3410
ld_v34	0.116734	0.0990197	1.179	0.2384
ld_v35	0.372589	0.149309	2.495	0.0126**
ld_v36	−0.0329950	0.216958	−0.1521	0.8791
ld_v37	0.275991	0.278109	0.9924	0.3210
ld_v38	−0.536640	0.270265	−1.986	0.0471**
ld_v39	0.449246	0.380406	1.181	0.2376
ld_v40	−0.340619	0.189068	−1.802	0.0716*
ld_v41	0.438023	0.328865	1.332	0.1829
ld_v42	0.0368110	0.143455	0.2566	0.7975
ld_v43	−0.742535	0.370872	−2.002	0.0453**
ld_v44	0.119882	0.220203	0.5444	0.5862
ld_v45	−0.507971	0.219229	−2.317	0.0205**
ld_v46	0.254523	0.211969	1.201	0.2298
ld_v47	−0.512297	0.235080	−2.179	0.0293**
ld_v48	0.580935	0.178947	3.246	0.0012***
ld_v49	0.0268111	0.162900	0.1646	0.8693
ld_v50	−0.116048	0.268699	−0.4319	0.6658
ld_v51	0.0106315	0.0334738	0.3176	0.7508
ld_v52	−0.111306	0.245100	−0.4541	0.6497
ld_v53	−0.314134	0.313848	−1.001	0.3169
ld_v54	−0.0101076	0.176428	−0.05729	0.9543
ld_v55	0.225330	0.153896	1.464	0.1431
ld_v56	0.182928	0.158684	1.153	0.2490
ld_v57	0.184979	0.223873	0.8263	0.4087
ld_v58	0.191810	0.410590	0.4672	0.6404
ld_v59	−0.0292554	0.137827	−0.2123	0.8319
ld_v60	0.708756	0.303769	2.333	0.0196**
ld_v61	0.347336	0.175775	1.976	0.0482**
ld_v62	−0.294584	0.317289	−0.9284	0.3532
ld_v63	−0.307524	0.199253	−1.543	0.1227
ld_v64	−0.739518	0.386972	−1.911	0.0560*
ld_v65	−0.0955618	0.167334	−0.5711	0.5679
ld_v66	−0.183287	0.0928940	−1.973	0.0485**
ld_v67	−0.0746876	0.117290	−0.6368	0.5243
ld_v68	0.116627	0.146694	0.7950	0.4266

	Coefficient	*Std. error*	*z*	*p-value*
ld_v69	0.243682	0.196097	1.243	0.2140
ld_v70	−0.0351121	0.151751	−0.2314	0.8170
ld_v71	−0.123193	0.165402	−0.7448	0.4564

Sum squared resid.	0.001405	S.E. of regression	0.018741

Number of instruments = 78

Test for AR (1) errors: z = -1.58905 [0.1120]

Test for AR (2) errors: z = 1.3122 [0.1895]

Sargan over-identification test: Chi-square (4) = 2.79714 [0.5923]

Wald (joint) test: Chi-square (73) = 315.356 [0.0000]

Test for normality of residual:

- Null hypothesis: error is normally distributed
- Test statistic: Chi-square (2) = 0.371137 with p-value = 0.830632

Pesaran CD test for cross-sectional dependence:

- Null hypothesis: No cross-sectional dependence
- Asymptotic test statistic: z = -1.27375 with p-value = 0.20275.