Sectoral contribution to economic growth: The case of Namibia

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Abstract

The main macroeconomic goal for every economy is undoubtedly to achieve rapid and steady economic growth. Knowledge of the present economic situation remains essential to formulate policy. Each economic sector plays a vital role in the overall growth of the economy. This study investigates the contributions of the various sectors to the economic growth of Namibia, using 1990 to 2021 time series data. A log-linear regression model is employed in the analysis. The study results show that each sector component in the analysis makes a distinct contribution to the growth rate of the economy; with the service sector making the most contribution, the industrial sector coming in second, and the agricultural sector making the least. The findings indicate that the contributions from the industrial and service sectors have not separately impacted economic growth. As a result, the integration of the contributions from these two sectors has a major influence on economic expansion. The study concludes with policy implications.

Keywords: Economic Growth; Economic Sectors; Macroeconomic; Namibia

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1. Introduction

Namibia is a country located in Southern Africa. Its borders are shared by Angola, Botswana, South Africa, and Zambia. It is a vast country with a population of only 2.53 million (2021). Also, it is the driest country in sub-Saharan Africa (World Bank, 2024). Namibia is an 'upper-middle-income' developing country with an abundance of natural resources including coal, copper, diamond, gold and uranium (Mosikari and Eita, 2020; National Planning Commission, 2017).

Since gaining independence in 1990, the nation has advanced both socially and economically, with a gross domestic product (GDP) growth rate of 4.5 per cent on average between 2000 and 2016. This growth has been supported by long-term political stability, prudent macroeconomic management, and effective governance (African Development Bank, 2023). Despite a plethora of positive indicators, Namibia is confronted by major economic challenges. The significant expansion of its economy has neither resulted in a decrease in unemployment, nor its economy appropriately diversified. Namibia is one of the world's most unequal countries when it comes to income inequality. Its economic imbalance has been exacerbated by a lack of industrialisation (National Planning Commission, 2017).

Namibia's economic structure is divided into three sectors, namely primary, secondary, and tertiary. The primary sector comprises agriculture and forestry. The majority of Namibians, over 70 per cent of them, rely on agriculture for their sustenance needs. In Namibia, agriculture accounts for 5.1 per cent of GDP, with 70 per cent of that output coming from the livestock sub-sector. Over time, the sector has performed poorly due to several factors, including the low and delayed rainfall that occurred in the 2014/15 season, which caused a drought that resulted in a decline in crop and livestock production. Even with its decreasing contribution to GDP, the sector continues to be the backbone of the Namibian economy and prosperity for many (GIZ, 2022; Sikanda and Mabuku, 2018).

The Namibian economy also depends on the secondary industry. This industry describes the role of manufacturing. It includes industries engaged in construction, as well as those that produce finished, and usable products. It generates a sizable portion of the nation's foreign exchange earnings from the export of commodities. The sector accounts for 29.7 per cent of GDP and employs about 17 per cent of the workforce. The mining industry dominates the sector. The main commodities mined are arsenic, copper, diamonds, lead, and uranium. Approximately 70 per cent of all mining exports are from diamonds. Furthermore, Namibia ranks third globally in terms of uranium production. Also, the country is home to the world's largest marine mining (Homateni et al., 2020; Wesgro, 2021).

The tertiary sector, also referred to as the service sector of the economy, continues to contribute the most to GDP. Services make up 54.2 per cent of GDP and employ 62 per cent of people in the labour force. In services, the most important sub-sectors are public administration, financial services, retail and wholesale trade, tourism, transport and communication. Tourism is the main driver of this sector, contributing 10 per cent directly to the GDP (Homateni et al., 2020; Wesgro, 2021).

In addition, since 2017, the Namibian economy has shown weak growth patterns. Agriculture, tourism, and fishing have all seen a decline in productivity because of climate change. The negative effects on domestic economic growth were also caused by a decrease in the demand from around the world for Namibia's exports of diamonds, beef, fish, uranium ore, and copper, particularly from the Euro area. Maintaining macroeconomic

stability has grown more challenging in light of the COVID-19 pandemic's detrimental effects on the economy and the impact Russia's invasion of Ukraine has had on global growth (African Development Bank, 2023).

The main macroeconomic goal for every economy is undoubtedly to achieve rapid and steady economic growth. Namibia's national development plans have always had similar goals with economic expansion as the main objective (Nakale, 2017). The Vision 2030 initiative serves as Namibia's development roadmap. This plan is long-term in nature, describing Namibia's desired development path to be an industrial nation by 2030 (April and Itenge, 2020; Office of the President, 2004).

Knowledge of the present economic situation is essential for formulating policy. This is because it influences the selection of the appropriate policy stance, based on the most recent understanding of the macroeconomic framework. Each economic sector plays a vital role in the overall growth of the economy (George and Ibiok, 2015).

In Namibia, limited research has been conducted regarding the contributions made by different sectors and sub-sectors to economic growth. Nonetheless, scholarly work on economic analysis has primarily ignored interdependence and linkages among economic sectors, focusing instead on macroeconomics or concerns specific to a single sector or sub-sector. For instance, how tourism contributes to economic growth (Habibi et al., 2018), the role of agriculture in economic growth (Khan et al., 2020; Zaman et al., 2021), the role of the mining sector in economic development (Olalekan et al., 2016), and the role of the manufacturing sector in driving economic growth and economic development (Behun et al., 2018; Ur Rahman and Bakar, 2019).

Thus, for the overall economic development of nations, it is essential to understand the links and interdependence among economic sectors, like agriculture, industry, and services. Thus, this research aims to explore the impact of the various sectors and to ascertain which economic sectors significantly contribute to Namibia's economic growth.

2. Literature review

Numerous studies have been undertaken on various economic sectors and their contribution to economic growth. A study by Arifien et al. (2020) examines the impact of the agriculture sector in the province of West Java, Indonesia for the period 2010 to 2018. The study employs shift-share analysis, multiple regressions, and location quotient analysis. The results confirm that the agricultural sector in West Java significantly impacts the pace of economic growth.

In another study, El-Rasoul et al. (2021) investigates the role of agriculture-based manufacturing in Egypt's economic development. This research uses Kaldor's hypotheses to analyse the role of agriculture-based manufacturing in economic development between 1997 to 2018. The findings indicate that the actual rate of growth in agricultural manufacturing increases in tandem with an increase in the output growth rate of the industry.

Alaloul et al. (2021) evaluate the vital role played by the construction sector in maintaining economic stability in Malaysia for the period from 1970 to 2019. The study makes use of the vector error correction model (VECM) and impulse response function (IRF) in its analysis. The study reveals that the construction sector is receiving greater attention as the Malaysian economy shifts towards sustainable production. Other countries can utilise this result as a model to attain sustainable development.

A study by Majeed and Mazhar (2021) observed tourism's impact on economic growth and its uncertainty. The study uses a panel data approach to analyse 155 countries in upper-, middle- and low-income countries for the period 1971 to 2017. The findings show that for upper-income groups, the growth contribution of tourism and its volatility is not significant in these economies.

A recent study by An et al. (2021) on how financial development impacts economic growth in 30 sub-Saharan African countries from 1985 to 2015, employed dynamic and static panel data model analysis. The study concluded that considering varying income levels, financial liberalisation and development are significant factors influencing economic growth. In another study, Jia et al. (2020) investigate the relative contributions of manufacturing and non-manufacturing total factor productivity (TFP) growth to long-term economic growth. The case study included 12 developed economies for the period 1970 to 2011. The study uses econometric regressions and growth accounting decomposition in its analysis. The findings of the study show that (i) manufacturing TFP directly contributes to economic expansion, (ii) manufacturing TFP increases labour and capital input, thus encouraging growth, and (iii) non-manufacturing TFP adds nothing to the growth of the economy.

Furthermore, Nurcayah et al. (2023) conducted a study on ascertaining how the manufacturing and agricultural sectors promote economic growth. The study area was Southeast Sulawesi Province of the island of Sulawesi from 2016 to 2021 and uses a descriptive-quantitative analysis. The study concludes that the agricultural sector contributes more to economic growth than the manufacturing sector, but its growth is slower because agricultural productivity output declines annually.

Sadiq et al. (2023) analyse the effects of the growing service sector on economic growth and employment from 1990 to 2020 in six emerging South Asian countries. The study employs a generalised method of moments in its analysis. The outcome is that both economic growth and employment levels are positively correlated with the expansion of the service sector. Similarly, Oladinrin et al. (2012) examines the nexus between the construction sector and the economy in Nigeria, from 1990 to 2009. Their study employs multiple analytical techniques. The conclusion is that the construction sector of Nigeria is vital and has great potential to steer economic growth positively.

Likewise, Ullah et al. (2023) estimates the impact of sector-specific foreign direct investment (FDI) on economic growth and the role played by business regulations in shaping the relationship between FDI and growth. The focus is on 85 developing countries for the period 1996 to 2019. The study uses the two-stage least square to estimate the impact of sector-specific FDI on economic growth. The findings were that sectoral FDI inflows provide a major contribution to economic growth. Also, FDI inflows boost economic growth in high-income countries across all sectors.

Economic growth in the primary, secondary, and tertiary sectors contributes to stabilising the economy and is a crucial determinant of a country's prosperity (Müller and Veser, 2020; Musarat et al., 2021). One-third of nations are thought to be dependent on resources for social and economic growth (Yu-Chin and Kenneth, 2012). Conversely, achieving sustainable goals requires technological innovation and industrial processes, rather than resource abundance (Olamade et al., 2014).

A review of the literature indicates that numerous scholars have made an effort to assess the links between economic sectors and their contribution to economic growth. These empirical studies have usefully advanced the knowledge of the links between various economic sectors and economic growth but there is little and/or limited empirical research regarding Namibia. Therefore, this research aims to bridge this gap by examining

the sectoral contribution to economic growth in the context of Namibia. The findings from this research could help decision-makers determine the best course of policy action to sustain economic growth.

3. Methodology

3.1. Model specification

This study examines the role that the sectors of agriculture, industry, and service play in the economic growth of Namibia. In other words, this study explores the impact and ascertains which of these economic sectors contribute significantly to Namibia's economic growth. The study employs regression analysis to investigate the links between the variables (dependent and independent). The model is specified as follows;

$$Economic\ growth = f(agriculture, industry, services) \tag{1}$$

Equation (1) is transformed into a log-linear regression model:

$$\ln (GRPC)_t = \beta_0 + \beta_1 \ln (agriculture)_t + \beta_2 \ln (industry)_t + \beta_3 \ln (service)_t + \varepsilon_t \tag{2}$$

where β_0 is the constant term, β_1 is the coefficient of a variable (agriculture), β_2 is the coefficient of variable (industry), β_3 is the coefficient of variable (service), t is the time trend, and ε_t is the error term presumed to be normally, uniformly, and autonomously distributed.

One of the strengths of the log-linear regression model is that it satisfies the homoscedasticity and normality assumptions. Secondly, it permits a more accurate assessment of the underlying patterns by interpreting the relationships between the variables' percentage changes. However, on the downside, it does not apply to the data with zero or negative input values (Brownlee, 2021; Gujarati and Porter, 2003).

The above model can further be expressed as:

$$\ln GRPC_t = \beta_0 + \beta_1 \ln AGRI_t + \beta_2 \ln INDS_t + \beta_3 \ln SERV_t + \varepsilon_t \tag{3}$$

where $lnGRPC$ represents the natural log value of economic growth, $lnAGRI$ denotes the natural log agriculture, $lnINDS$ represents the natural log of industry, and $lnSERV$ represents the natural log services.

3.2. Data sources

The study uses time series data from the World Development Indicators (WDI) for the years 1990 to 2021. WDI is the World Bank's compilation of internationally comparable development indicators that include reliable data on all facets of development, past and present. The rationale for selecting these variables is they represent the main economic sectors in Namibia. In addition, these present Namibia with an excellent opportunity to embark on its long-term goal of becoming an industrialised nation by 2030. Any change in these sectors will be evident in the Namibian gross domestic product.

3.3. Variable definitions

GDP per capita (GRPC): GDP per capita (proxy for economic growth) is a measure of the economic output of each person in a country. The aggregates are expressed in US dollars and based on constant 2015 prices. GDP

is the total gross value added by all producers who are residents of the country, plus any product taxes and minus any subsidies that are not factored into the product value.

Agriculture (AGRI) sector: Agriculture is a contributor in the primary sector and includes livestock production and the cultivation of crops, as well as fishing, forestry, and hunting. In many countries, agriculture has a significant impact on socioeconomic development. A previous study by Arifien et al. (2020) indicates that the agriculture sector impacts the pace of economic growth. Therefore, it is expected that this variable will be positively associated with economic growth.

Industry (INDS): It includes value added in the areas of construction, electricity, gas, manufacturing, mining, and water. Value added represents the net output of this sector after the addition of all outputs and the subtraction of intermediate inputs. It is computed without accounting for the depletion of natural resources and degradation or depreciation of fabricated assets.

Other scholars have conducted studies on the interaction between economic growth and components of the industrial sectors, such as construction and manufacturing. Oladinrin et al. (2012) point out that the construction sector is vital and has great potential to steer economic growth. Also, Jia et al. (2020) indicate that manufacturing directly contributes to economic growth. Therefore, it is expected that the variable will be positively associated with economic growth.

Service (SERV) sector: Another name is the tertiary sector in the economy sector. In terms of employment and GDP share, it is quickly overtaking other sectors in many developing nations. It represents the total of all goods and other market services exported. It includes the value of freight, license fees, insurance, merchandise, royalties, travel, and transport, plus other services, like business, communication, financial, government services, information, and personnel. Not included are transfer payments, investment income, or employee compensation. Sadiq et al. (2023) observed that economic growth and employment levels are positively correlated with the expansion of the service sector. As a result, a positive correlation between this variable and economic growth is anticipated.

3.4. Unit root test

In this study, the unit root test is carried out using the Augmented Dickey Fuller (ADF) test. Dickey and Fuller devised a method for determining if a variable follows a random walk or has a unit root (Moffatt, 2023; Syed et al., 2021). The ADF test is part of a set of tests, known as unit root tests, which is the appropriate way to determine if a time series is stationary. A time series is considered non-stationary if it has a unit root.

$$\Delta Y_t = \beta_0 + \beta_{1t} + \beta_2 Y_{t-1} + \sum_{i=1}^{k} \alpha_i \Delta Y_{t-i} + \varepsilon_t \tag{4}$$

where Δ is the difference operator, All β_s and α_i are estimated coefficients and k represents the number of lags.

4. Results and discussions

4.1. Descriptive statistics

This section discusses the characteristics of the data followed by the empirical results. According to the variable summary statistics among the sectors between 1990 to 2021, the service sector had the greatest mean

GDP growth, followed by the industrial and the agricultural sectors, respectively. There are no variations in any of the variables, as demonstrated by a comparison of the mean and the standard deviation (Table 1).

Table 1. Descriptive statistics

	GRPC	AGRI	INDS	SERV
Observations	32	32	32	32
Mean	3756.36	8.66	26.18	41.91
Std.Deviation	733.56	1.12	3.07	5.30
Maximum	4965.67	10.73	34.19	53.65
Minimum	2857.95	6.65	21.20	31.86

GRPC = GDP per capita (constant 2015 US$)/ (proxy for economic growth), AGRI= Agriculture sector, INDS= Industry sector, SERV= Service sector

Figure 1 depicts the sectoral contribution to economic growth in Namibia from 1990 to 2021. The service and industrial sectors have contributed the largest share to economic growth, while the agricultural sector has contributed the least. Over time, the agriculture sector's average contribution to GDP growth is 8.66 per cent. In addition, the industrial sector's contribution indicates a modest growth, accompanied by occasional swings. Over the years, its average contribution to GDP growth is 26.18 per cent.
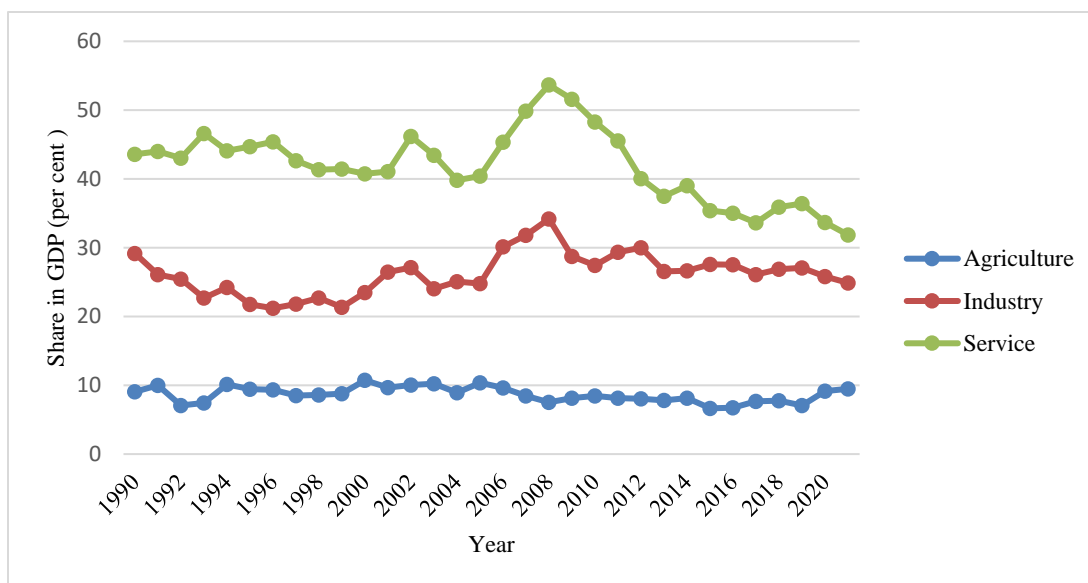

Figure 1. Sectoral contribution to economic growth (Source: Author's computation based on World Development Indicators (WDI) data. https://data.worldbank.org/indicator)

The service sector's contribution to GDP peaked in 2008, after which it began to fall. This is attributed to the global financial crisis, which had varying effects on low-income nations and developed economies. According to UNDP (2010, p. 39), in the instance of Namibia,

In the service sector, tourism has been affected by the global crisis, with substantial declines in tourism arrivals and receipts, hotel bookings, and air travel. The decline in tourism activity is threatening to reverse recent gains in the service sector, which is becoming an important driver of growth.

Lastly, each sector component in our analysis makes a distinct contribution to the growth rate of the economy, with the service sector contributing the most to economic growth.

Table 2 displays the unit root test results. Except for agriculture, all other variables are non-stationary in their levels but eventually are stationary after first differencing. As a result, all three variables are unable to reject the unit root hypothesis at level but can do so at first differencing. Differencing induces stationarity, which eliminates the likelihood of having a spurious relationship among the variables. Given that stationarity has been induced, the data set can be used for additional analysis.

Post-estimation tests indicate that there was no multicollinearity between any two or more of the independent variables. When there is multicollinearity between the independent variables, the separate effects of each parameter estimate on the dependent variable are difficult to distinguish. If multicollinearity was present, the confidence in any policy prescriptions based on these estimations would be very low.

Table 2. Unit root test results

Level			First difference			
Variables						
	ADF-Stat	**p-value**	**ADF-Stat**	**p-value**	**Order of integration**	**Conclusion**
GRPC	-1.121	0.707	-3.972	0.002	1	I(1)
AGRI	-3.011	0.034	-3.011	0.034	0	I(0)
INDS	-2.089	0.249	-5.572	0.000	1	I(1)
SERV	-0.603	0.870	-4.28	0.001	1	I(1)

The model findings are shown in Table 3. Based on the results, the agriculture sector has a positive and significant effect on economic growth at a 1 per cent level. According to the marginal effect, if value added for the agriculture sector increases by 1 per cent, real GDP per capita is expected to increase by 16.8 per cent. The agricultural sector is critical to the expansion of the economy of Namibia. The results align with those of Agboola et al. (2022) and Mohammed et al. (2021) which demonstrates a beneficial contribution of the agriculture sector to economic growth.

The results compare with the goals set out in Namibia's Vision 2030, in that agriculture is seen as one of the sectors in which Namibia has a comparative advantage. The sector is thought to have the potential to boost both national and household food security and enhance Namibia's sustainable growth.

In addition, the findings indicate that the contributions from the industrial and service sectors have not independently impacted economic growth. Meanwhile, according to the summary of the overall model, the contribution of both the industrial and service sectors affects economic growth (F (3, 27) = 5.88; p = 0.003). This implies that the integration of the contributions from the industrial and service sectors has a major influence on economic expansion.

The results compare with Namibia's Vision 2030 goals, which recognise that to achieve sustainable economic growth, the country must foster the development of an open market economy that is diverse, has a resource-based industrial sector and an efficient service sector.

Table 3. Multiple regression analysis results

Variables	Marginal effects (*dy/dx*)
AGRI	0.168***
	(0.043)
INDS	0.042
	(0.072)
SERV	-0.087
	(0.088)
Number of obs	31.000
F(3, 27)	5.880
Prob > F	0.003
R-squared	0.395

Note: *Standard errors appear in parentheses. The other coefficients are marginal effects (dy/dx).*
*Asterisks represent level of statistical significance: *** (p ≤ 1%); **(p ≤ 5%); *(p ≤ 10%).*

5. Conclusion and policy implications

The purpose of this study is to explore the contributions of the various sectors to the economic growth of Namibia and to ascertain which economic sectors significantly contribute to economic growth. The study results indicate that relatively, the service and industrial sectors have contributed the largest share to economic growth, while the agricultural sector has contributed the least. Besides, each sector component in the analysis makes a distinct contribution to the growth rate of the economy, with the service sector contributing the most to economic growth. In addition, the findings indicate that the contributions from the industrial and service sectors have not separately impacted economic growth. This implies that the integration of the contributions from the industrial and service sectors has a major influence on economic expansion.

The study findings align with economic theory. For instance, modern economic growth processes involve changes in the distribution of inputs and outputs across sectors vis-a-vis notable increases in productivity. Kuznets states that 'it is impossible to attain high rates of growth per capita or per worker without commensurate the substantial shifts in the shares of various sectors' (Kuznets, 1979, p. 130). All economies include economic sectors; these are the building blocks of the economy and determine economic progress. These economic sectors represent economic growth.

This study offers the following policy implications; first, given that the service sector accounts for an even bigger portion of economic growth, policymakers ought to prioritise this sector when formulating national development policies. Policymakers should give the service sector thoughtful consideration and take advantage of the transformative prospects it offers. Economic transformation, driven by services, presents new

opportunities for innovation, scalability, and ripple effects akin to those that have increased manufacturing productivity in the past.

Employment implications: The service sector has shown that it can stimulate employment and economic growth. The creation of opportunities for productive employment determines inclusive development and poverty reduction. An efficient service sector can positively affect employment and output in other sectors, considering that gains in productivity typically compound with technological advancement.

Second, according to the findings, the industrial sector contributes significantly to the economic growth in Namibia. Thus, industrialisation will keep driving economic growth. Subsequently, policy interventions should seek to increase industrial output by raising the general productivity of all the sub-sectors in this industry. Industrial growth can be fostered by eliminating structural rigidities in the economy, thereby creating an environment that is favourable for investment.

Employment implications: The industrial sector continues to be a major driver for both economic growth and direct employment. It is still a significant employer. Therefore, major industry players must recognise how industrial progress contributes to increased economy-wide employment.

Third, the agricultural sector plays a key part in the economic development of Namibia. The sector is one of the main engines of the economy and can support other sectors. Thus, policies that seek to promote the agriculture sector as a useful tool for boosting economic growth, should focus on boosting productivity, efficiency, and competitiveness in the sector. Lastly, this sector remains one of the most important and largest employers in Namibia.

Employment implications: Agriculture has a key role to play in the economy. The agriculture sector and the rest of the economy are closely linked, both 'upstream' and 'downstream'. This sector has the ability to generate employment (self-employment and wage employment), as well as provide opportunities for livelihood sustenance.

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