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TANZANIA

AUTOS REPORT

INCLUDES 5-YEAR FORECASTS TO 2020

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Tanzania Autos Report Q4 2016

INCLUDES 5-YEAR FORECASTS TO 2020

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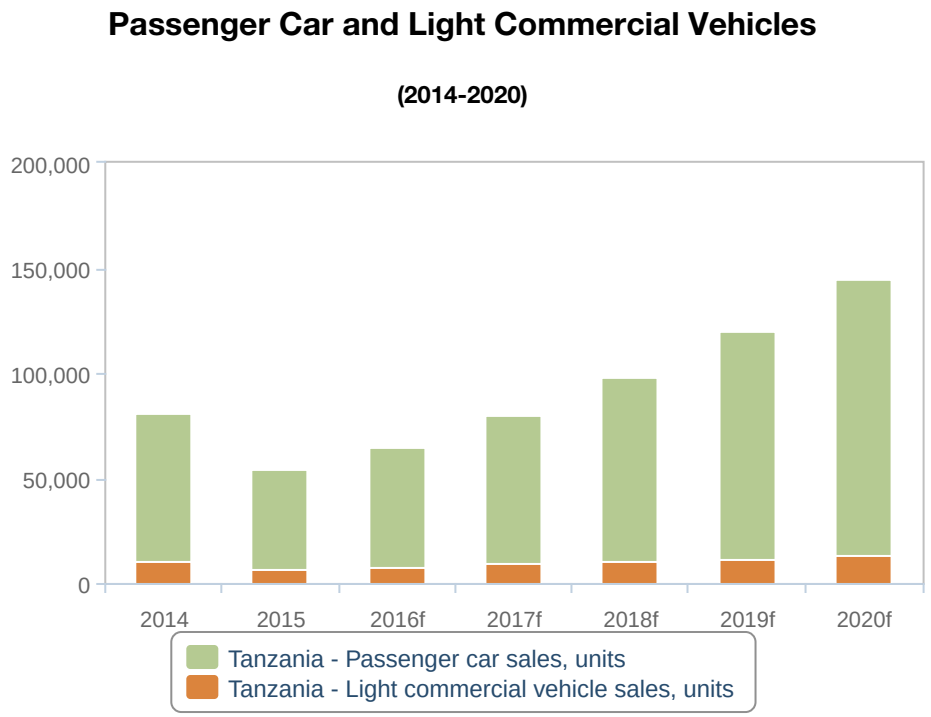
BMI Industry View

BMI View: *We maintain our view that Tanzanian vehicle sales will grow 20.0% in 2016 driven by robust private consumption and strong growth in the construction industry.*



f = BMI forecast. Source: Automobile Association of Tanzania, BMI

Key Views

- Vehicle sales will expand by 20.0% in 2016.
- Robust private consumption will translate into an expansion in passenger car sales.
- Growing financial inclusion will lead to an uptick in auto loan demand.
- A stable currency will limit inflation and bolster consumer spending power.
- Investments in port and rail infrastructure will continue to drive growth in the commercial vehicle segment.

SWOT

SWOT Analysis	
Strengths	▪ Strong GDP growth will help vehicle sales growth. ▪ Government investment in road and transport networks will increase demand for vehicles. ▪ Currency stability and low inflation will support consumer spending and benefit the autos market. ▪ Strong credit growth will support expansion in auto loan demand.
Weaknesses	▪ Tanzania has high import costs. ▪ There is no domestic auto manufacturing planned.
Opportunities	▪ Low vehicle penetration rates create opportunity for market expansion. ▪ The development of the natural gas sector could provide growth in commercial vehicle segment.
Threats	▪ The used car segment is stronger than new car segment. ▪ Kenya is leading the way in terms of being a vehicle production and logistics hub for the East African region.

Industry Forecast

Table: Autos Total Market - Historical Data And Forecasts (Tanzania 2014-2020)

	2014	2015	2016f	2017f	2018f	2019f	2020f
Vehicle sales, units	97,607	63,443	76,102	91,703	111,349	133,888	160,531
Vehicle sales, units, % y-o-y	38.1	-35.0	20.0	20.5	21.4	20.2	19.9

f = BMI forecast. Source: Automobile Association of Tanzania, BMI

Latest Developments

- We have revised our database with newly available historical data from 2009-2014.
- Our commercial vehicle sales outlook for 2016 and 2017 have been revised downward from growth of 18.5% and 17.5% respectively to an expansion of 16.9% and 11.4% for the next two years due to due to continued uncertainty around the financial viability of the Bagamoyo Port project.
- Vehicle sales will grow by 20.0% in 2016.

Structural Trends

Sales

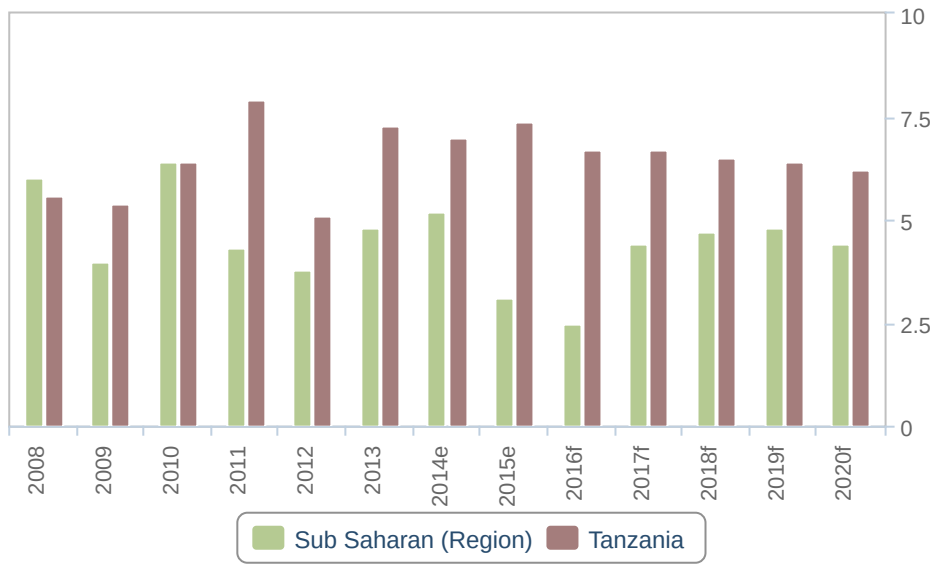
In 2016, we forecast Tanzania's robust economic growth to translate into a 20.0% expansion in vehicle sales, reaching 76,102 units for the year. Over the year, we expect strong economic growth to boost private consumption and thus support spending on passenger cars, while the construction of infrastructure projects will drive demand for commercial vehicles (CVs). As a result, passenger vehicle sales are forecast to grow 21.0% while CV sales will expand by 17.0% in 2016. Over our forecast period 2016-2020, we forecast the country's economic expansion to lead to average annual growth of 20.4% in vehicle sales, characterized predominantly by passenger car growth outpacing CV growth.

Robust Private Consumption To Drive Up Car Sales

Our upbeat outlook for the passenger car segment is informed by our expectation that Tanzania's robust economic growth will continue to drive up private consumption levels, and thus in tern drive spending on passenger cars. Our Country Risk team expect Tanzania's real GDP growth to outstrip its Sub-Saharan African (SSA) region counterparts, with forecast real growth of 6.7% in 2016, compared to the SSA average of 2.5%. As the economy expands and employment prospects rise, we believe that rising incomes will support consumer spending on big-ticket items.

Tanzania Will Outpace Regional Growth

SSA, Tanzania - Real GDP Growth



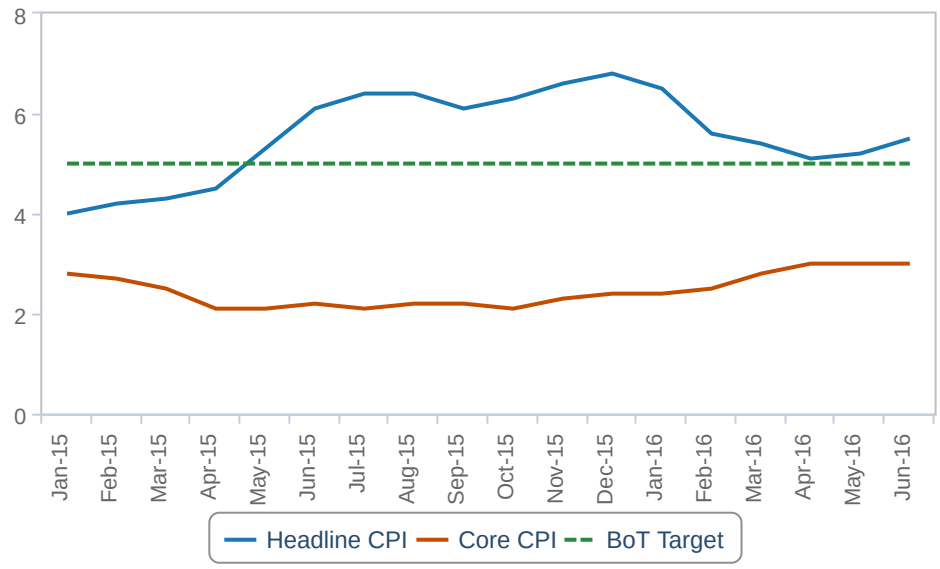
e/f = BMI estimate/forecast. Source:BMI, UN

This robust economic growth will help drive up private consumption, which our Country Risk team forecast will grow 8.0% in 2016 and this will translate into growth in passenger car sales. We expect private consumption in Tanzania to be supported by subdued inflation levels and still growing credit growth in Tanzania, which will bolster consumers' ability to afford passenger car purchases.

Our Country Risk team expects the Tanzanian shilling to continue its depreciatory trend against the US dollar in 2016, with a forecast depreciation of 5.0% , ending the year at an exchange rate of TZS2,257/ USD. However this will be at a far more stable and sedate pace than experienced in 2015, when the currency fell 24.0% against the US dollar. This currency stability will help limit inflationary pressures in the country, with our Country Risk team forecasting inflation to remain subdued in H216, average 5.6% in 2016, near the Bank Of Tanzania's (BoT) 5.0% target, which will bolster consumer spending power and translate into growth in the passenger car segment.

Headline Inflation Will Remain Near Target

Tanzania - Headline And Core Inflation, % y-o-y



Source: BMI, BoT

Furthermore, owing to the fact that Tanzania has no local autos manufacturing, the prices of both new and used vehicles are highly susceptible to currency fluctuations. We therefore believe that a stabilizing currency and certainty over the currency's trajectory will have a positive impact on consumer decision making and thus help drive growth in both passenger car and CV sales.

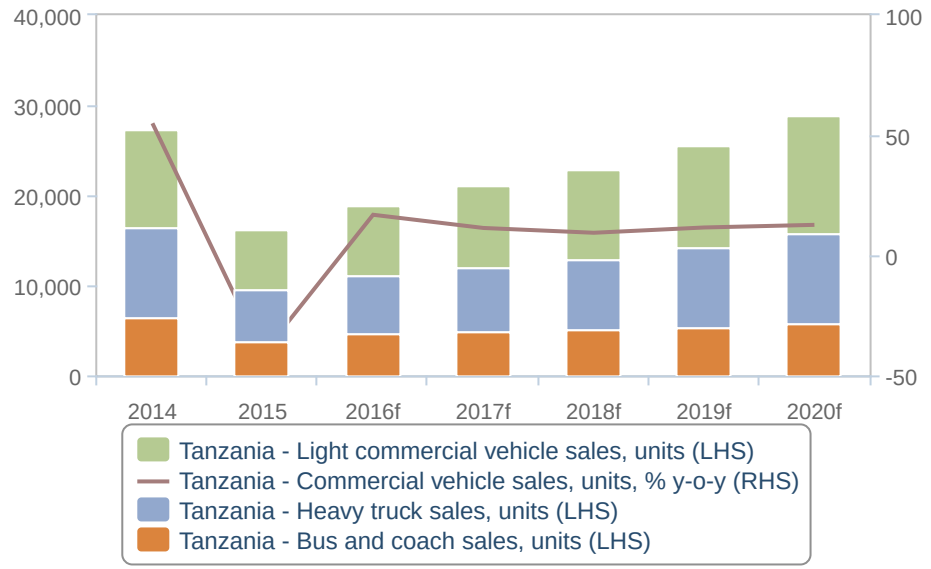
We also expect growing credit growth in Tanzania to translate into increasing demand for auto loans, which will further support growth in passenger car sales as more consumers start to turn to vehicle financing to help purchase their vehicles. Our Country Risk team expect Tanzania's loan growth to remain resilient in the years ahead, benefiting from low sector penetration, a series of recent efforts to bolster financial inclusion and robust economic growth - bolstering demand for financial services. Given these factors, client loan growth is forecast to grow 21.0% in 2016, and we expect auto loans growth to be part of this expansion.

CV Segment To Benefit From Infrastructure Development

Our CV sales outlook for 2016 and 2017 has been revised downward from growth of 18.5% and 17.5% respectively to an expansion of 16.9% and 11.4% for the next two years. This revision comes on the back of our Infrastructure team's downward revision for growth in the construction industry in 2016 and 2017 due to continued uncertainty around the financial viability of the Bagamoyo Port project. Growth in Tanzanian CV sales will however remain robust, driven by the construction of transport infrastructure projects. Breaking down our outlook for the CV segment, we forecast growth of 17.5% in light commercial vehicles (LCVs) in 2016, while heavy truck sales will expand 12.0%. Our Infrastructure team forecast real growth of 7.6% in 2016 in Tanzania's construction industry, driven primarily by investment into the transport sector, particularly port and rail infrastructure. Given the reliance of the CV segment on growth in the construction sector, this robust growth in the construction activity will drive demand for both LCVs and heavy trucks required to meet the logistical demands required to transport materials and works as part of these infrastructure projects.

CVs To Benefit From Constuction Of Transport Infrastructure

Tanzania - CV Sales By Segment, Units



f = BMI forecast. Source: Automobile Association of Tanzania, BMI

Trade

Used cars continue to account for the majority of the vehicles on Tanzanian roads with 30.1% of these vehicles imported from Japan. According to data from Trade Map, the value of car imports into Tanzaniain 2014 amounted to USD1,169,284, up from USD1,128,986 in 2013. We expect Japanese models' dominance in vehicle trade will continue over our forecast period of 2016-2020.

Furthermore, we believe that there is significant potential for autos trade logistics development in Tanzania over the medium term, with the country benefiting not only from demand for automotives, but also its position as a gateway into the EAC. Although Tanzania has the potential to develop into the region's key autos gateway, unless radical changes and investment are made, that regional position could well go to neighbouring Kenya.

Challenges facing Tanzania include the following:

- High growth but low investment
- Ports are bottlenecked which leads to congestion

The bottlenecks and congestion at the country's ports result in the following:

- Delays in transport network shipments
- Increased logistics costs for dealers and vehicle importers

These are problems that are only now starting to be addressed.

Investments into terminal upgrades at the Dar es Salaam port and the Bagamoyo port project will help alleviate the congestion and bottleneck problems faced by the country and in turn help reduce logistics costs. This will give a boost to vehicle importers as they will enjoy reduced costs and help to position Tanzania as a key East African transportation hub and trade gateway to landlocked countries in the region, such as Rwanda and Uganda.

The roll-on/roll-off terminal upgrade at Dar es Salaam port will help increase the ports capacity for handling vehicle imports. The goal of the project is to increase throughput of the Dar es Salaam port to 18 million tonnes a year by FY2016/2017, up from the 14.6 million tonnes handled in FY2013/2014, and reach a capacity of28 million tons by 2020.

Furthermore, authorities and importers hope to relieve the burden on the Dar es Salaam port even more through the development of a new port in the town of Bagamoyo. Leading the project, **China Merchants Holdings (International) Co** has signed a framework agreement with the Tanzanian authorities to develop the new port. The development, worth an estimated USD10bn, will see a new port, export processing zone and interlinking rail and road infrastructure built. Construction began in October 2015, after financial backing for the project was negotiated with the Chinese government. The whole project, including roads, railways and the economic zone, is expected to take 10 years to complete, but it was unclear in how many phases it will be carried out.

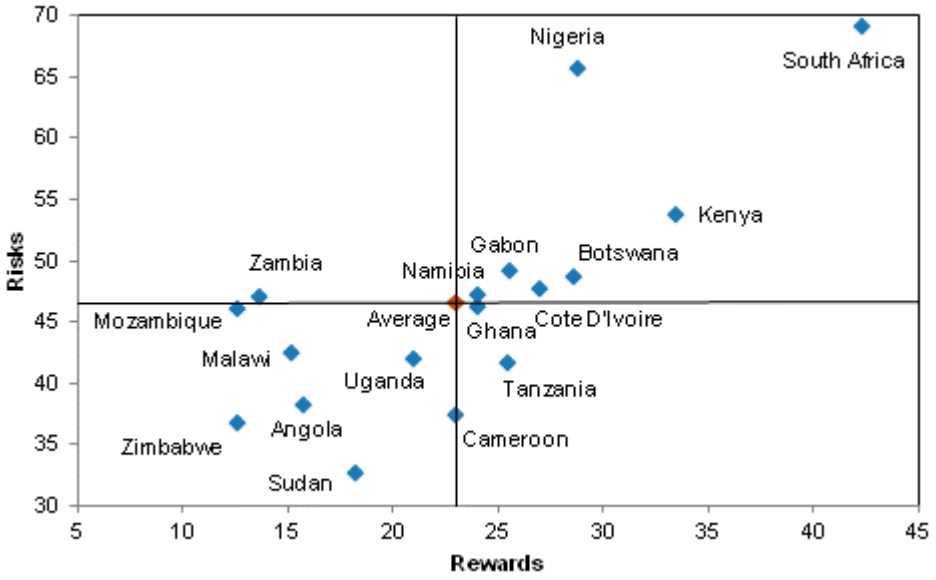
However, it is hard to forecast the completion of such infrastructure projects, so companies will have to wait some time for any improvement in Tanzania's port sector. By the time of completion, automotive firms might have already chosen their bases elsewhere in East Africa, with Kenya being the most likely option. Owing to the development of Tanzania as an auto assembly hub, automotive logistics demands are concentrated on imports. Auto kits are shipped in from abroad via container for construction in-country.

Industry Risk/Reward Index

Weakening currencies across the region, which are making imports more expensive and resulting in declining new vehicle markets, have contributed to a drop in the regional average score for Rewards in our Risk/Reward Index (RRI) for the Autos sector in Sub-Saharan Africa (SSA). Several individual markets have seen their Rewards score fall, which has in turn moved them into a less attractive segment in the index.

Rewards Are Limited

Sub-Saharan Africa - Autos Risk/Reward Index



Scores out of 100, with 100 the best. Source: BMI

Already Low Rewards Fall Further

As we pointed out in our last RRI update, the SSA regional average scores for Risk and Rewards are already low compared with other regions in the world, reflecting the nascent stage in which the SSA autos industry still is (*see 'SSA Autos RRI: Outperformance Is All Relative', April 7*). In this latest update, the regional average Rewards score has fallen even lower as we have revised down the sales forecast (a key component of the Rewards score) for several countries.

This means the SSA region now has regional average scores of just 23.0 for Rewards and 46.6 for Risks (unchanged), both out of a possible 100. Although the Rewards are mostly measured in terms of sales, we

also point out that producers will be faced with limited rewards, even in a market such as Nigeria which offers incentives for investing, as the reduced demand for new cars means headwinds for producers (*see 'Struggling Economy Will Hamper Globe Motors' Assembly Plans', June 15*).

Even The Leaders At Risk

Indeed, Nigeria's waning demand has seen it move markedly down the Rewards index towards the regional average point, although staying in the most attractive segment. To a lesser extent, South Africa has also seen a drop in its Rewards score as its domestic market contracts further. It is industry policy and the opportunity for export to the rest of the region that maintain South Africa's position as possibly the most attractive investment destination in the region (*see 'Autos Investment Round-Up: Investments Mask Risks To Local Production', July 1*).

The Few Positive Movers

While the outlook for the region as a whole has worsened, there are some countries that have positive moves in the index. Gabon and Tanzania are two such examples, moving across into the high reward side of the index, following an increase in their Rewards score, although it should be remembered that these scores are relative to regional peers rather than global attractiveness as investment destinations.

Gabon is one of the few countries where we still forecast positive sales growth in 2016, as we expect the government's efforts to diversify the economy away from hydrocarbons to be supportive of commercial vehicle sales. Tanzania also has a positive outlook thanks to a reasonably stable currency in relation to its regional peers and robust GDP growth.

Regional Overview

Sub-Saharan Africa

BMI View: *Ongoing investment in South Africa and Nigeria mask some of the underlying headwinds against domestic production, particularly the weak consumer in both countries. Moves to develop the supply chain in both countries, however, are a positive step towards adding value to domestic production.*

In **BMI**'s regular round-up of production investments, we track the latest projects from the production side of the industry and analyse trends that we see developing on a regional basis. In doing so, we hope to build a picture of any potential hubs that may be developing, as well as company strategy in terms of production bases and export programmes.

Table: Sub-Saharan Africa Autos Production Investment

Date Announced	Country	City/Province	Company	Value	Brief Description	Date Onstream
Apr-16	South Africa	Pretoria	Ford	USD170mn	Adding production of the Everest SUV and increasing output of the Ranger	Q316
Apr-16	Kenya	Nairobi	GM	USD7.9mn	Doubling output at existing truck plant	2017
Apr-16	South Africa	Uitenhage	VW	ZAR120mn (USD8.3mn)	Addition of new Try Out Press to increase productivity at its Press Plant	2016
Apr-16	South Africa	Port Elizabeth	BAIC	ZAR11bn (USD742mn)	New plant for assembly of CKD kits of sedans and SUVs	TBC
May-16	South Africa	Durban	Toyota	ZAR6.1bn (USD390mn)	Expansion of existing facilities to incorporate production of new Hilux and Fortuner models, adding 20,000 units a year.	2016
May-16	Nigeria	Lagos	Globe Motors	USD150mn	New plant for assembly of semi-knocked down kits initially, building up to completely knocked down kits eventually. Initial annual capacity of 6,000 units, rising to 40,000 covering passenger vehicles, trucks and SUVs.	2016
May-16	Nigeria	Lagos, Kano and Aba	Industrial Training Fund/ National Automotive Council	TBC	Creation of three new manufacturing sites for automotive parts to serve local vehicle producers	TBC

Source: BMI

Export Importance To South Africa Underlined

Toyota Motor's ZAR6.1bn investment in expanding its capacity to add the latest versions of its Hilux and Fortuner models for export is a further example of how the export market is becoming not only a lifeline for manufacturers in South Africa, but a draw for new investment. In fact, the importance of exports to the production industry was further emphasised in a more negative development, when **General Motors South Africa** (GMSA), which largely produces for the domestic market, announced it would have to reduce its production levels, likely resulting in job cuts (*see 'GMSA's Move To Downsize: A Risk To Production', June 27*).

Similarly, we have cautioned that Chinese carmaker **Beijing Automotive Industry Corp** (BAIC) will face headwinds in setting up a new plant to produce sedans and SUVs for the local market, exposing the company to the weak South African consumer (*see 'BAIC's Assembly Plans Hampered By Weak Consumer Outlook', April 25*).

Nigeria Still Cause For Concern

While another investment project has been announced for Nigeria under the government's automotive industry policy, which is ultimately good news for the industry, we maintain our view that this is another market where an embattled consumer and headwinds to any kind of manufacturing will provide obstacles to the segment's development. Although **Globe Motors** plans to produce a full range of vehicles, meaning it is less exposed to one particular market segment, we believe the poor economic situation will not be supportive of the project in the immediate future (*see 'Struggling Economy Will Hamper Globe Motors' Assembly Plans', June 15*).

Supplier Parks A Positive Move

Although there are considerable risks to producing for domestic sales in South Africa and Nigeria, there have been developments in both countries that are big steps forward in adding to the value of the local production industry and reducing the sector's exposure to external factors such as currency swings impacting the cost of imports. Both South Africa and Nigeria are moving to set up supplier parks, which will accommodate companies supplying vehicle manufacturers based in the country.

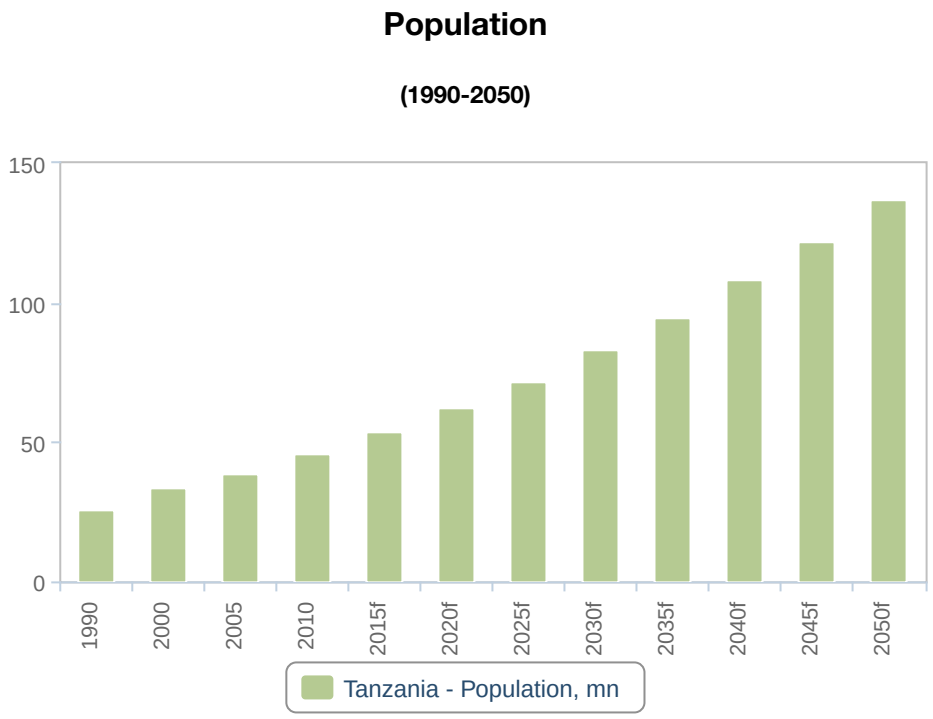
Investment from suppliers in the facility has not yet been announced in South Africa, but the government plans to start developing a ZAR11.5bn (USD739mn) automotive supply park south of Durban in 2018 as part of the country's efforts to increase investment in local parts production. We expect carmakers to benefit from both cost and efficiency gains from having suppliers in close proximity.

Similarly, the Industrial Training Fund and National Automotive Council in Nigeria are teaming up to create three separate sites for suppliers. This goes some way to address concerns that the nascent production industry does not have enough in terms of a local supply chain for carmakers to make local production cost effective.

Demographic Forecast

Demographic analysis is a key pillar of **BMI**'s macroeconomic and industry forecasting model. Not only is the total population of a country a key variable in consumer demand, but an understanding of the demographic profile is essential to understanding issues ranging from future population trends to productivity growth and government spending requirements.

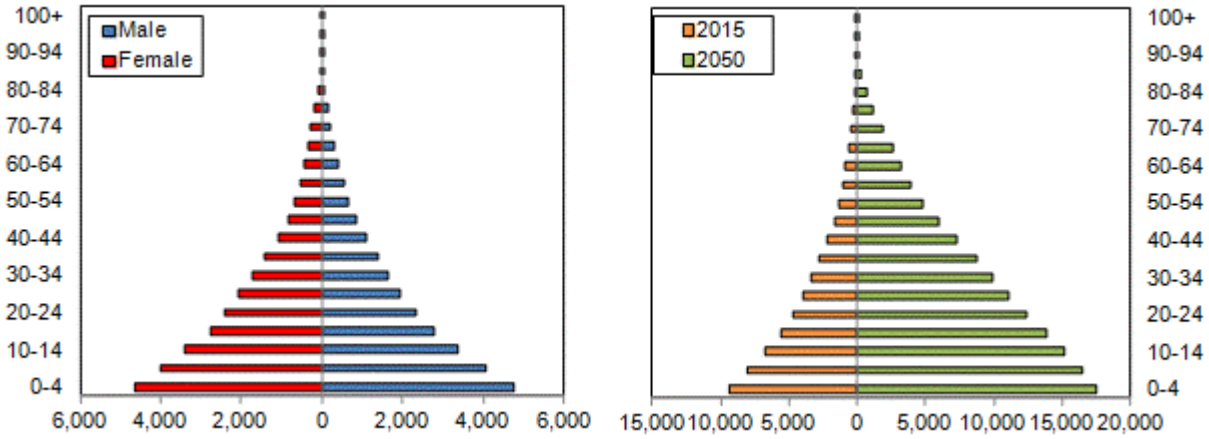
The accompanying charts detail the population pyramid for 2015, the change in the structure of the population between 2015 and 2050 and the total population between 1990 and 2050. The tables show indicators from all of these charts, in addition to key metrics such as population ratios, the urban/rural split and life expectancy.



f = BMI forecast. Source: World Bank, UN, BMI

Tanzania Population Pyramid

2015 (LHS) & 2015 Versus 2050 (RHS)



Source: World Bank, UN, BMI

Table: Population Headline Indicators (Tanzania 1990-2025)

	1990	2000	2005	2010	2015f	2020f	2025f
Population, total, '000	25,458	33,991	39,065	45,648	53,470	62,267	72,032
Population, % y-o-y	na	2.6	3.0	3.2	3.2	3.0	2.9
Population, total, male, '000	12,608	16,910	19,394	22,665	26,574	30,992	35,900
Population, total, female, '000	12,849	17,080	19,671	22,982	26,896	31,275	36,132
Population ratio, male/female	0.98	0.99	0.99	0.99	0.99	0.99	0.99

na = not available; f = BMI forecast. Source: World Bank, UN, BMI

Table: Key Population Ratios (Tanzania 1990-2025)

	1990	2000	2005	2010	2015f	2020f	2025f
Active population, total, '000	13,054	17,744	20,295	23,641	27,590	32,573	38,575
Active population, % of total population	51.3	52.2	52.0	51.8	51.6	52.3	53.6
Dependent population, total, '000	12,403	16,247	18,769	22,006	25,880	29,693	33,457
Dependent ratio, % of total working age	95.0	91.6	92.5	93.1	93.8	91.2	86.7

Key Population Ratios (Tanzania 1990-2025) - Continued

	1990	2000	2005	2010	2015f	2020f	2025f
Youth population, total, '000	11,713	15,283	17,606	20,578	24,167	27,686	31,072
Youth population, % of total working age	89.7	86.1	86.7	87.0	87.6	85.0	80.6
Pensionable population, '000	690	963	1,163	1,428	1,712	2,007	2,384
Pensionable population, % of total working age	5.3	5.4	5.7	6.0	6.2	6.2	6.2

f = BMI forecast. Source: World Bank, UN, BMI

Table: Urban/Rural Population & Life Expectancy (Tanzania 1990-2025)

	1990	2000	2005	2010	2015f	2020f	2025f
Urban population, '000	4,807.5	7,583.2	9,705.8	12,833.6	16,900.9	21,879.5	27,804.7
Urban population, % of total	18.9	22.3	24.8	28.1	31.6	35.1	38.6
Rural population, '000	20,650.7	26,408.4	29,359.8	32,814.9	36,569.5	40,387.8	44,228.2
Rural population, % of total	81.1	77.7	75.2	71.9	68.4	64.9	61.4
Life expectancy at birth, male, years	48.5	49.9	55.1	60.6	64.1	66.2	67.6
Life expectancy at birth, female, years	51.5	51.1	56.1	62.8	66.9	68.6	70.4
Life expectancy at birth, average, years	50.0	50.5	55.6	61.6	65.5	67.4	69.0

f = BMI forecast. Source: World Bank, UN, BMI

Table: Population By Age Group (Tanzania 1990-2025)

	1990	2000	2005	2010	2015f	2020f	2025f
Population, 0-4 yrs, total, '000	4,641	5,907	7,008	8,135	9,398	10,427	11,486
Population, 5-9 yrs, total, '000	3,822	5,031	5,695	6,816	8,019	9,297	10,337
Population, 10-14 yrs, total, '000	3,249	4,344	4,901	5,625	6,750	7,961	9,248
Population, 15-19 yrs, total, '000	2,722	3,733	4,191	4,811	5,540	6,663	7,880
Population, 20-24 yrs, total, '000	2,247	3,166	3,599	4,107	4,717	5,441	6,559
Population, 25-29 yrs, total, '000	1,844	2,590	3,031	3,502	4,005	4,614	5,333
Population, 30-34 yrs, total, '000	1,510	2,066	2,429	2,917	3,393	3,900	4,507
Population, 35-39 yrs, total, '000	1,222	1,646	1,897	2,309	2,797	3,282	3,792
Population, 40-44 yrs, total, '000	1,036	1,322	1,488	1,786	2,194	2,687	3,175
Population, 45-49 yrs, total, '000	836	1,062	1,215	1,404	1,695	2,101	2,591

Population By Age Group (Tanzania 1990-2025) - Continued							
	1990	2000	2005	2010	2015f	2020f	2025f
Population, 50-54 yrs, total, '000	676	891	976	1,142	1,329	1,615	2,014
Population, 55-59 yrs, total, '000	539	709	821	903	1,077	1,259	1,538
Population, 60-64 yrs, total, '000	416	555	643	755	839	1,006	1,181
Population, 65-69 yrs, total, '000	303	412	485	564	677	758	913
Population, 70-74 yrs, total, '000	200	279	339	408	476	577	650
Population, 75-79 yrs, total, '000	114	163	199	257	309	366	448
Population, 80-84 yrs, total, '000	51	76	96	141	163	200	240
Population, 85-89 yrs, total, '000	16	26	33	44	67	80	100
Population, 90-94 yrs, total, '000	3	5	7	10	14	22	27
Population, 95-99 yrs, total, '000	0	0	0	1	1	2	4
Population, 100+ yrs, total, '000	0	0	0	0	0	0	0

f = BMI forecast. Source: World Bank, UN, BMI

Table: Population By Age Group % (Tanzania 1990-2025)							
	1990	2000	2005	2010	2015f	2020f	2025f
Population, 0-4 yrs, % total	18.23	17.38	17.94	17.82	17.58	16.75	15.95
Population, 5-9 yrs, % total	15.01	14.80	14.58	14.93	15.00	14.93	14.35
Population, 10-14 yrs, % total	12.76	12.78	12.55	12.32	12.62	12.79	12.84
Population, 15-19 yrs, % total	10.70	10.98	10.73	10.54	10.36	10.70	10.94
Population, 20-24 yrs, % total	8.83	9.32	9.22	9.00	8.82	8.74	9.11
Population, 25-29 yrs, % total	7.25	7.62	7.76	7.67	7.49	7.41	7.40
Population, 30-34 yrs, % total	5.93	6.08	6.22	6.39	6.35	6.26	6.26
Population, 35-39 yrs, % total	4.80	4.84	4.86	5.06	5.23	5.27	5.26
Population, 40-44 yrs, % total	4.07	3.89	3.81	3.91	4.10	4.32	4.41
Population, 45-49 yrs, % total	3.29	3.12	3.11	3.08	3.17	3.37	3.60
Population, 50-54 yrs, % total	2.66	2.62	2.50	2.50	2.49	2.59	2.80
Population, 55-59 yrs, % total	2.12	2.09	2.10	1.98	2.01	2.02	2.14
Population, 60-64 yrs, % total	1.64	1.63	1.65	1.66	1.57	1.62	1.64
Population, 65-69 yrs, % total	1.19	1.21	1.24	1.24	1.27	1.22	1.27
Population, 70-74 yrs, % total	0.79	0.82	0.87	0.89	0.89	0.93	0.90
Population, 75-79 yrs, % total	0.45	0.48	0.51	0.56	0.58	0.59	0.62
Population, 80-84 yrs, % total	0.20	0.23	0.25	0.31	0.31	0.32	0.33

Population By Age Group % (Tanzania 1990-2025) - Continued							
	1990	2000	2005	2010	2015f	2020f	2025f
Population, 85-89 yrs, % total	0.07	0.08	0.09	0.10	0.13	0.13	0.14
Population, 90-94 yrs, % total	0.01	0.02	0.02	0.02	0.03	0.04	0.04
Population, 95-99 yrs, % total	0.00	0.00	0.00	0.00	0.00	0.00	0.01
Population, 100+ yrs, % total	0.00	0.00	0.00	0.00	0.00	0.00	0.00

f = BMI forecast. Source: World Bank, UN, BMI

Methodology

Industry Forecasts

BMI's industry forecasts are generated using the best-practice techniques of time-series modelling and causal/econometric modelling. The precise form of model we use varies from industry to industry, in each case being determined, as per standard practice, by the prevailing features of the industry data being examined.

Common to our analysis of every industry is the use of vector autoregressions. Vector autoregressions allow us to forecast a variable using more than the variable's own history as explanatory information. For example, when forecasting oil prices, we can include information about oil consumption, supply and capacity.

When forecasting for some of our industry sub-component variables, however, using a variable's own history is often the most desirable method of analysis. Such single-variable analysis is called univariate modelling. We use the most common and versatile form of univariate models: the autoregressive moving average model (ARMA).

In some cases, ARMA techniques are inappropriate because there is insufficient historic data or data quality is poor. In such cases, we use either traditional decomposition methods or smoothing methods as a basis for analysis and forecasting.

BMI mainly uses OLS estimators and, in order to avoid relying on subjective views and encourage the use of objective views, we use a 'general-to-specific' method. **BMI** mainly uses a linear model, but simple non-linear models, such as the log-linear model, are used when necessary. During periods of 'industry shock', for example poor weather conditions impeding agricultural output, dummy variables are used to determine the level of impact.

Effective forecasting depends on appropriately selected regression models. **BMI** selects the best model according to various different criteria and tests, including but not exclusive to:

- R^2 tests explanatory power; adjusted R^2 takes degree of freedom into account;
- Testing the directional movement and magnitude of coefficients;
- Hypothesis testing to ensure coefficients are significant (normally t-test and/or P-value);
- All results are assessed to alleviate issues related to auto-correlation and multi-collinearity.

BMI uses the selected best model to perform forecasting.

Human intervention plays a necessary and desirable role in all of **BMI**'s industry forecasting. Experience, expertise and knowledge of industry data and trends ensure that analysts spot structural breaks, anomalous data, turning points and seasonal features where a purely mechanical forecasting process would not.

Sector-Specific Methodology

A number of principal criteria drive our extrapolations and forecasts for each autos variable.

- **Production And Sales**

At a general level, we approach our forecasting from both a micro and a macro perspective, assessing the expansion plans of relevant multinationals/indigenous firms, while also taking account of the prevailing economic outlook. In this latter respect, our projections for macro variables such as industrial output, private consumption, government investment, monetary policy and GDP growth play a key role.

Figures for production are derived from a generic source (thereby ensuring maximum comparability between country data-sets), and include all vehicles with four wheels or more. For sales, we rely on data from government agencies and national automobile associations. Unless otherwise stated, sales numbers include domestically produced and imported vehicles, but not exports. The sector's contribution to GDP is projected by taking the US dollar production value as a proportion of nominal GDP, using our own macroeconomic and demographic forecasts.

- **Auto Imports And Exports**

These variables are mainly calculated at the micro level, using individual company reports. Changes in government policy, particularly with regard to tariffs and quotas, also have a significant bearing.

Sources

Aside from government departments and official company reports, we rely on the International Organization of Motor Vehicle Manufacturers (OICA), other established think tanks, institutes, and international and national news agencies.

Risk/Reward Index Methodology

BMI's Risk/Reward Index (RRI) provides a comparative regional ranking system evaluating the ease of doing business and the industry-specific opportunities and limitations for potential investors in a given market. The RRI system divides into two distinct areas.

Rewards

Evaluation of sector's size and growth potential in each state, and also broader industry/state characteristics that may inhibit its development. This is further broken down into two sub categories:

- Industry Rewards. This is an industry-specific category taking into account current industry size and growth forecasts, the openness of market to new entrants and foreign investors, to provide an overall score for potential returns for investors.
- Country Rewards. This is a country-specific category, and the score factors in favourable political and economic conditions for the industry.

Risks

Evaluation of industry-specific dangers and those emanating from a state's political/economic profile that call into question the likelihood of anticipated returns being realised over the assessed time period. This is further broken down into two sub categories:

- Industry Risks. This is an industry-specific category whose score covers potential operational risks to investors, regulatory issues inhibiting the industry and the relative maturity of a market.
- Country Risks. This is a country-specific category in which political and economic instability, unfavourable legislation and a poor overall business environment are evaluated to provide an overall score.

We take a weighted average, combining industry and country risks, or industry and country rewards. These two results provide an overall RRI, which is used to create our regional ranking system for the risks and rewards of involvement in the autos industry in a particular country.

For each category and sub-category, each state is scored out of 100 (100 being the best), with the overall RRI a weighted average of the total score. As most of the countries and territories evaluated are considered by **BMI** to be 'emerging markets', our index is revised on a quarterly basis. This ensures that the score draws on the latest information and data across our broad range of sources, and the expertise of our analysts.

In constructing this index, the indicators in the table below have been used. Almost all indicators are objectively based. Given the number of indicators/datasets used, it would be inappropriate to give all sub-components equal weight. The weighting given is described in the table.

Table: Automotive Risk/Reward Index Indicators And Weighting Of Indicators

	Weighting, %
Rewards	70, of which
Industry Rewards	65, of which
Vehicle ownership, % of population	10
Total vehicle stock, mn	10
Total production	10
Production growth, five-year forecast average	10
Total vehicle sales	10
Sales growth, five-year forecast average	10
Country Rewards	35, of which
Urban/rural split	10
Rigidity of employment	10
Labour costs	10
GDP per capita, USD	10
Risks	30, of which
Industry Risks	50, of which
Regulatory environment	10
Competitive landscape	10
Country Risks	50, of which
Corruption	10
Bureaucracy	10
Market orientation - openness	10
Legal framework	10
Long-term monetary risks	10
Long-term external risks	10
Long-term financial risks	10
Long-term policy continuity	10

Source: BMI