The Emergence Series: Future Trends

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On the road to our transport future

IN the time it takes you to settle comfortably in your car seat and buckle up, say 10 seconds, the global urban population will have grown by 20 people or two people a second. This unprecedented rate of urbanisation, especially in developing countries where 95% of the urban population growth is expected to take place in the next decades, is necessitating a rethink about how we manage growth across and beyond the urban sphere.

As such, the growth of cities as drivers of innovation and cross-pollinators of ideas and information is the largest single developmental influence of the 21st century. Implicit in this influence are transport and mobility as they promote the feasibility of people to pursue lifestyle choices and economic opportunities, as well as facilitating the flow of goods and services within and beyond city borders and across the globe.

The demands of urban areas, such as the need for mass transit corridors to accommodate increasing numbers of daily commuters, are changing and the complexity of urban challenges such as building resilient cities in the face of heightened environmental risks is increasing. These rapidly changing dynamics are driving some remarkable trends, particularly with regard to transportation in the context of the urban environment.

Increased infrastructural investment

Today, 50% of the global population lives in urban areas and, while savings in infrastructure costs as a result of compact and densely clustered urban development can be as high as 55% as shown in a recent study of Tianjin in China, infrastructural cost gains may be offset by environmental carrying capacity pressures and urban shadow which extends well beyond city borders.

Urbanised areas account for 60% to 80% of energy consumption and 75% of carbon emissions and, by 2030, when 60% or 4.9 billion of the world's people live in cities and we need 50% more water, food and energy, an investment in global urban infrastructure of US$20 trillion for water, US$10 trillion for energy, US$8 trillion for roads and railways, and US$2 trillion for ports and airports will be required to keep pace with urban development.

This increase in investment over the next decades will drive the expansion of hard and soft infrastructure, such as road and rail networks, industrial parks and recreational corridors, with an emphasis on the avoidance of locking-in high-carbon infrastructure for future generations. It will also steer the trend towards more environmentally efficient public transport such as Bus Rapid Transit systems or BRTs, low-emission vehicles and non-motorised modes of transport.

India's urban population grew from 290 million people in 2001 to 340 million in 2008 and is expected to reach 590 million people by 2030 which is nearly twice the population of the United States today. This increase in its urban population will require an investment of US$1.2 trillion over the next 20 years to build 400 kilometres of subway and up to 25 000 kilometres of new roads a year if India's infrastructural development is to keep pace with its immense scale of urbanisation.

And in a bid to plan for urban expansion and in the process make London a cleaner city with safer streets and better transport, the Mayor of London, Boris Johnson, has initiated a £111 million investment in an innovative cycling programme. Cycling Revolution London which has a network of cycle superhighways, cycle hire schemes, biking boroughs and better cycle parking provision is expected to increase cycling in the city by 400% by 2026 compared to 2001 levels, which could be more effective in easing London's congestion problem than its congestion charge.

Green growth and sustainable transport

Emerging paradigms that emphasise investment in nature as infrastructure and the capacity of key ecosystems to provide engineering solutions, such as the management of stormwater runoff, have been formalised in dynamic strategies such as the Global Green Growth Initiative (GGGI) – headquartered in Seoul, South Korea – and UNEP's Green Economy Initiative (GEI) as part of its Global Green New Deal.

New patterns of growth and investment are being driven by these green policies, particularly those that mitigate greenhouse gas emissions, thereby minimising the risks associated with climate change, which, in terms of transport, will impact road safety, congestion, infrastructure maintenance and the overall demand for transportation.

Global greenhouse gas (GHG) emissions are currently five times higher than the Earth can absorb and if we are to have a sustainable future or, indeed, any kind of future at all, substantive reductions in GHG emissions are imperative. One answer lies in clean energy technologies, investment for which increased from US$46 billion in 2004 to US$180bn to US$200bn in 2010.

The transport sector, one of the largest and fastest growing GHG sources, accounts for more than 50% of the world's consumption of liquid fossil fuels and 14% of world GHG emissions. Between 1970 and 2004 global GHG emissions from this sector increased by 120%, reaching 6.4 GTCO2-eq. Looking ahead at the growing demand for personal vehicles, by 2020 the International Energy Agency (IEA) is expecting soaring increases in CO_2 emissions in China (143%), Indonesia (122%) and India (91%) compared with current levels.

To promote the development of clean transport, five transportation-sector methodologies have been approved by the Clean Development Mechanism (CDM) Executive Board. These projects include the construction and operation of BRT systems for sustainable mass urban transport, the production of biodiesel based on waste oils and/or waste fats from biogenic origin for use as fuel, emissions reduction by low GHG-emitting vehicles, plant oil production and use for transport application and the introduction of low-emission vehicles to commercial vehicle fleets.

Of these five methodologies, only two, the BRT Bogotá, Colombia: TransMilenio Phase II to IV and emission reductions by electric and hybrid vehicles, have been registered by the CDM Executive Board. This second methodology points to future vehicles being either all-electric or hybrid-electric, however, the IEA has suggested that by 2050, 30% of the global vehicle stock, some 700 million cars and trucks, could be powered by hydrogen fuel cells.

Nanotechnology-based applications are being developed in energy conservation, production, conversion and storage with specific technologies including hydrogen fuel cell technology and solar photovoltaic cells.

Unlimited, renewable electricity generated from solar power has a huge potential to replace fossil fuels in the automotive industry. Indeed, in the urban future there is likely to be super-efficient transport systems run on electricity produced from renewable sources with the electrification of public transport, making mass transit much more environmentally friendly.

New-generation materials

For many organisations sustainable development has become a source of innovation and a key part of their growth strategy. In order to improve vehicles' fuel efficiency and environmentally friendly profile, exciting new material innovations are being designed for automotive components, making vehicle light weighting an interesting developing trend.

One high-end German car manufacturer has developed a 20% lighter, single-material dashboard carrier solution from tailor-made long glass fibre polypropylene (LGF-PP). This new solution, which replaces two-component dashboard construction with a single material, not only requires less material to achieve mechanical properties of high stiffness, strength and impact performance required from the dashboard carrier, it adds to the overall production cost-efficiency and component performance. The use of recyclable polypropylene (PP) in this low-weight dashboard provides general vehicle weight saving and lowered fuel-consumption benefits which in turn benefit the environment.

Steering wheels whose materials can be difficult to recycle, and involve potentially hazardous waste products from casting and processing, have also benefited from a materials rethink. A new steering wheel innovation has updated the typical die-cast magnesium or aluminium armature overmoulded with flexible urethane foam with, in the high-end case, a two-part injection-moulded design with a leather strap and a one-piece injection-moulded armature with a polyurethane overmoulding. Both designs are attached to the steering column with a small metal hub.

Injection moulding copolymer materials reduces CO_2 emissions dramatically, generating only about one-tenth of the emissions produced in die-casting magnesium alloy, while enabling greater design flexibility for the creation of new shapes and ergonomic configurations. The process also allows for simpler manufacturing by reducing the number of secondary processes.

In an automotive industry first, one car manufacturer is using renewably sourced bio-based thermoplastic polyurethanes in a console door and, by using a new composite technology, one of the world's largest automotive suppliers, headquartered in France, has succeeded in developing a plastic automotive seatback that consists of almost no metal and measurably less textile or foam. The seatback, which should come onto the market in about four years, weighs about one-fifth less than conventional car seats and is approximately 30mm thinner.

As consumers around the world are becoming increasingly aware of the important role that tyres play in reducing fuel consumption, high-performance synthetic rubber tyres are being developed. Even carpeting that uses recycled nylons is an innovative material solution that reduces energy consumption.

Road safety in South Africa

Road transport in South Africa is the major mode of transport, consuming 87% of total transport energy demand and it has been estimated that car users will increase from 14% in 1996 to 19% by 2020 with other categories of travellers decreasing.

This trend represents an increase of 2.6 million people travelling by car, a statistic that has significant on-the-ground ramifications for the transport sector.

In 2008, petrol went over the R10-a-litre mark which saw the development of a trend towards car pooling. With petrol prices hovering very close to, and in some areas surpassing, this psychological marker, car pooling could again become a preferred option for getting to and from work each day, which would ease road congestion and air pollution. A 1 000km fuel cost and wear-and-tear saving a month would also help the average South African household by about R800 a month which could offset increases in electricity and food costs.

According to the AA there has been a resurgence in the number of vehicle sales, up from a year ago, which is an indication of a reasonable path of recovery on unit sales. The more advanced technology of new vehicles, however, is requiring digital and IT-based diagnostic tools and this is raising concerns about the shortage of skilled artisans and technicians in an industry that is not attracting newcomers into the trade as required.

Apprenticeships are expensive and, with few companies wanting to make the investment, technical knowledge is not being transferred, a "hole in the bucket" that to some degree is being filled with the retraining of "old-school" mechanics. However, this means that on a countrywide basis there are fewer qualified people to service vehicles with longer waiting periods as vehicles wait their turn in busy workshops.

This inconvenience factor, together with high servicing costs, means vehicles are not being serviced as often as they should be with commensurate road safety concerns. Road safety considerations are also being impacted by the pressure to provide housing and, with high-speed routes segregating informal settlements, the country has an infamously high road-accident rate.

Total fleet solution and buying trends

One way of ensuring that a vehicle's full maintenance needs are taken care of without undue costs and the hassle of service delays due to skills shortages or the unavailability of a particular part is to go the leasing route. Nobody does the selling, financing and leasing of vehicles better than Bidvest Bank's Fleet and Asset Finance division, a fleet solutions provider of choice and the only fleet asset and finance entity to provide a full "one-stop shop".

Formerly known as McCarthy Fleet Solutions, and acquired by Bidvest Bank Limited in June last year, Bidvest Bank Fleet and Asset Finance has a track record that goes back to 1998 when it was first formed as a joint venture between Stannic and the McCarthy Group Limited. Today, Bidvest Bank Fleet and Asset Finance manages and owns more than 11 500 vehicles ranging from passenger cars and light delivery vehicles to heavy commercial trucks and material-handling equipment. It also offers high volumes of business in unusual-specification vehicles and is able to supply all popular car models with no limitations in terms of preference.

A major player in a mature industry, Bidvest Bank Fleet and Asset Finance differentiates itself with a range of specialist products and services designed to enhance the client experience and, consequently, the value-chain. By having the right knowledge, systems and people in place, it not only provides a full range of finance, leasing and maintenance products, it helps clients take the guesswork out of selecting the right vehicles for different applications by employing engineers to help with the specification of vehicles in applications such as cargo loading for trucks and cranes. It also assists clients with specialist knowledge for warranty claims and its considerable buying power means that clients benefit from lower unit costs in vehicle procurement.

In its day-to-day business Bidvest Bank is well placed to discern some interesting trends, most of which are being driven by monetary considerations and, regrettably, not green imperatives. Although South Africa wasn't as affected by the downturn in the global economy, banks in general have become more cautious, with lending and lease policies being stricter and more restrictive.

The carbon emissions tax has not had a big impact on buying decisions and while there is an emerging affluent market that is demanding expensive top-end luxury vehicles, overall there is a distinct buy-down trend that is influenced by changes in perks tax, the price of petrol and the climb in new car prices.

Although major freeways are improving nationally, regional and rural roads have deteriorated and the increase in potholes on many of our South African roads means that customers are buying less of the low-type sports models in favour of robust, heavy-terrain SUVs. This category of 4x4s, however, is also price-driven with well-priced models being favoured above expensive ones.

The improvement of diesel engine technology has made diesel engines quieter and more powerful and, with lower diesel-engine maintenance costs and the reduction of sulphur in our diesel, which has gone down to ultra-low sulphur level standards, a trend has developed towards diesel in passenger and commercial vehicles.

The automotive and transport sectors, with major players such as Bidvest Bank, are in many ways indicators of the health of national economies and the mood of global citizens as they are being impacted upon by a tidal wave of change. This change is coming not only from the effects of intense urbanisation and game-changing events, such as climate change weather anomalies; it is also being driven by societies undergoing drastic revisions of their worldview. This tsunami of change is driving fascinating trends which, it is hoped, will keep us on the road to a bright and sustainable future.

Acknowledgement is gratefully given to:
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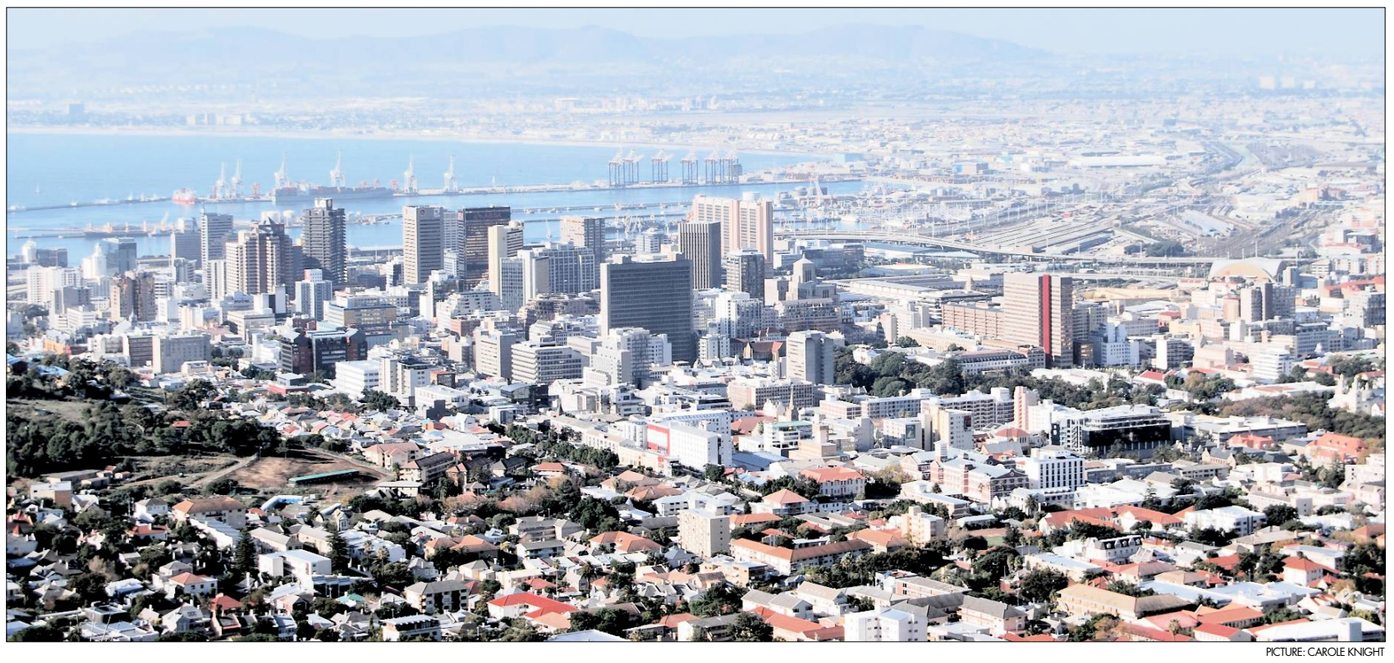

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LANDMARK DEVELOPMENT: The growth of cities is the largest single developmental influence of the 21st century.

PICTURE: CAROLE KNIGHT

ON THE CARDS: The electrification of public transport.

TOTAL FLEET SOLUTION: Bidvest Bank Fleet and Asset Finance offers a full "one-stop shop".