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Developed India by 2047? Look beyond the arithmetic of growth

The fast economic expansion we need will be sustainable only if its job generation eliminates poverty and reduces inequality



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In his address to the nation from the ramparts of the Red Fort on 15 August, Prime Minister Narendra Modi pledged to transform India into a developed country by the centenary of India's independence in 2047. This is obviously a desirable aspiration. Is it feasible?

The World Bank classifies countries into four groups, based on gross national income (GNI) per capita, for 2021, in US dollars at current prices and market exchange rates: low-income, less than \$1,050; lower-middle-income, \$1,050-\$4,100; upper-middle-income, \$4,100-\$12,700; and high-income, more than \$12,700. In 2021, India's GNI per capita was \$2,170, placing it in the lower-middle-income group. In comparison, GNI per capita in other large developing countries was much higher, at \$11,890 in China, \$9,380 in Mexico, \$7,720 in Brazil, and \$4,300 in Indonesia, all in the upper-middle-income group. By contrast, in the high-income group, GNI per capita in the US was \$70,340 and even higher in a few small countries. The average GNI per capita was \$47,900 in high-income countries and \$12,070 in the world. Clearly, India has miles to go.

India could attain developed-country status in 2047 if, by then, it is in the high-income-group. For this, its GNI per capita would have to grow from \$2,170 to \$12,700 at constant 2021 prices, which would require per capita income growth at 7% per annum, in real terms, for the next 25 years. India's population will also grow for much of this period, as its size is projected to stabilize only in 2045. Thus, given population growth, national income growth over the period, in real terms, would have to be about 8% per annum. Adjusting for inflation is necessary but not sufficient because the rupee could depreciate vis-à-vis the US dollar. If the rupee depreciates by 25%, or 50%, during 2022-2047, the required growth in per capita income (and national income) per annum would be pushed up by one, or two, percentage points respectively.

Yet, this does highlight the power of compound growth rates. If per capita income and national income grow at 7% per annum, both will double every 10 years. However, growth is not simply about arithmetic. Indeed, it is about more than economics.

The economic determinants of potential growth suggest that India may be able to sustain high rates of economic growth for the next 25 years, for four reasons. Our large population size is expected to increase further, which makes labour a source of growth, but only if it is absorbed in employment, and income levels are low, which means that the possibilities of growth are greater. The demographic characteristics, particularly the high proportion of young people in the population, which would mean an increase in the workforce and

savings rates for some time to come, are conducive to growth, provided we can harness the demographic dividend through education that creates capabilities among people. Wages are significantly lower than in the world outside, which will be an important source of competitive advantage in times to come. Our social infrastructure for healthcare and education, as well as the physical infrastructure, remains underdeveloped despite modest progress, so further improvements are bound to reinforce the momentum of growth.

The opportunities are, however, juxtaposed with formidable challenges. The most important among these is India's combination of persistent poverty, rising inequality and jobless growth. Of course, if growth sustains, absolute poverty in India might be minimal by 2035. But the problem of rising inequality and inadequate employment opportunities, unless addressed, will mount. The challenge is not simply economic. It is also social and political. And, ultimately, economic growth can be sustained if it eradicates poverty and reduces inequality. Such inclusive growth that creates employment is the only way forward in aspiring for developed-nation status. It will mobilize our most abundant resource, people, to drive growth from the supply side, and reinforce growth through incomes created on the demand side.

In this quest, another challenge is averting the middle-income trap. As India makes the transition from lower-middle to upper-middle income status,

it risks getting stuck there, unable to move from upper-middle-income to high-income status. Many countries are caught in this trap. The first stage in the process is driven by abundant cheap labour and high investment rates. Growth slows down as these factors wane in their impact. And industrialization stops at labour-intensive goods as wages rise. The second stage in the transition requires higher productivity levels and a capacity to innovate. This, in turn, requires nurturing technological capabilities,

fostering vertical diversification in production processes, encouraging technological upgradation, inducing technological-learning, and creating R&D capacities.

My book *Resurgent Asia* (Oxford University Press, 2019) suggests that India's share in world GDP will be about 16% in 2040, returning to its level in 1820, when it was 16%. Macro economic forecasts of GDP at market exchange rates suggest that, by 2050, China, the US and India will be the three largest economies in the world. These projections, based on specified assumptions and statistical

extrapolations, are also attributable to India's population size. However, reaching developed-nation status by 2047 will depend on high growth rates that will be sustainable only if economic growth creates employment which eradicates poverty and reduces inequality. And, even if India becomes a high-income-country in 2047, its per capita income will still be one-sixth to one-fourth that of the US and Europe.

While India's goal of becoming a developed country by 2047 is desirable, achieving it will depend on whether we are able to sustain high growth rates and reach high per capita income levels.

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Contact lenses are being wired to replace our phone screens

Smart contact lenses can blend online feeds with a real-world view



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Eyeball wearables have been devised to grant wearers internet access. ISTOCKPHOTO

Walk down any street and you'll see people craning their necks to look at their phones. But in the not-too-distant future, we'll probably just stare at digital information hovering over the world in front of us, taking in a blend of the digital and real worlds, thanks to augmented reality (AR). In Saratoga, California, engineers are working to realize such a future, churning out prototypes of smart contact lenses stuffed with tiny circuits, batteries and tiny displays.

When I visited Mojo Vision's office, I held its AR smart contact lens about an inch in front of my eye to try it out, shifting a cursor around the space in front of me by moving the lens. I used a virtual reality (VR) headset to test its eye-tracking technology and demo apps, directing a small cursor simply by moving my eye. I could read from a teleprompter that showed a series of words as I moved my eye, and looked around the room to see arrows pointing north and west, designed to help with outdoor navigation. To 'click' on one of the apps dotted around a circle that hovered in front of me, I simply looked at a small tab next to the app for an extra second. Numbers and text appeared in my upper field of view, showing, say, my cycling speed, or displaying the weather, or giving me flight information. To close the app, I'd look away for a full second.

Technologists have talked for years about what next after mobile devices replaced desktops as our big gateway to the internet. Meta chief Mark Zuckerberg is placing his bets on the metaverse, an immersive virtual world entered via a headset. But the bigger shift will be to AR, where glasses or contact lenses display online feeds blended into our view of the real world. It'll aid multitasking. Phones will become more like mini servers that coordinate our wearable devices like earbuds, watches and eyewear.

Mojo Vision's lenses are perhaps one of the most ambitious hardware projects in Silicon Valley. The company had to develop its own chemicals and plastic compounds that would allow an eyeball to breathe through a lens loaded with electronics. The lens was noticeably thick, and large enough to extend beyond the iris to cover parts of the whites of the eyes. It includes nine titanium batteries of the sort used in cardiac pacemakers and a flexible circuit narrower than a human hair. A slightly convex mirror bounces light off a tiny reflector to magnify the display by simulating a telescope. From a few feet away, that tiny display looks like a pinpoint of light. But when I looked through the lens more closely, I could watch a video that looked large enough.

People could watch TikTok videos on this some day, but Mojo Vision wants the lens to have practical uses. It is also working on a lens for visually impaired people that shows glowing digital edges overlaid on objects to make it easier to see those objects. It's also testing different interfaces with companies who make running, skiing and golfing apps for phones, for a new kind of hands-free display of activity. Sinclair says that barring regulatory holdups, consumers could buy a Mojo lens with a bespoke prescription in less than five years. That may be an ambitious timeline, considering other AR projects have been delayed, or, like Google Glass, didn't live up to their hype.

Google parent Alphabet also failed to deliver a smart contact lens for medical use, but overall, Big Tech firms have driven VR and AR development. Apple is working on lightweight AR glasses which it plans to release later this decade. Sometime next year, Apple is also expected to launch a mixed-reality headset. Facebook currently dominates VR device sales with its Quest 2 headset, but it's also racing to launch its first AR glasses in 2024, as reported.

Why is augmented reality taking longer? Because it melds digital elements with physical objects in a view that is constantly moving. That's a complex task and requires a lot of processing power. Even so, our desire to keep at least one foot in the real world means we're likely to spend more time in AR eventually.

The big question is how to balance being present in one's real-world life while constantly seeing digital information. Today, it takes a few seconds to take out a phone, open an app and carry out a task on its screen. In the future, we'll be able to enter an app simply by looking at it for an extra second. That will throw up all kinds of thorny issues around addiction and how we interact with the world around us.

A Mojo Vision executive said this worry came up years ago when the iPhone was being developed: "I can't say how we at Mojo are going to completely mitigate that. But the trend is moving in that direction, that people are going to have instant access to information." Whether with contact lenses or glasses, the human eye will point to a world swimming in more digital information than ever before. Our brains will have a lot to get used to. **©BLOOMBERG**

MY VIEW | PEN DRIVE

We must demand safe roads and not just more airbags

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Visuals of the accident-wrecked Mercedes Benz GLC in which former Tata Sons chief Cyrus Mistry and his friend Jehangir Pandole lost their lives have been doing the rounds of social media and TV channels all week. The public response to the fatal road crash on Charoti bridge in Palghar district of Maharashtra poured out in stages. Much of the initial outrage was directed at airbags: why didn't they inflate to save the two rear passengers in such an expensive car? Was something amiss? This reaction overlooked the fact that only the highest of high-end cars, like the S-Class Mercedes, have rear-seat frontal airbags. The feature is not more than a couple of years old. Curtain airbags for back-seat passengers in the GLC are meant to protect them from a side-impact crash. Mistry and Pandole lost their lives to a frontal collision. Then there was the issue of rear seat belts. They unfortunately weren't wearing theirs, and this is a critical safety feature.

As more details emerged, the public reaction focused on the alleged driving lapses of Dr. Anahita Pandole, who at the wheel might have been trying to overtake a heavy vehicle from the wrong side at high speed (a reliable estimate of which wasn't available).

These, however, are inadequate and even simplistic explanations of the tragic event. The SUV had rammed into a dangerously protruding parapet wall on Charoti bridge on a high-speed road, and this is the part that should really upset us as citizens who pay taxes (and toll money) for the roads we use. While we become savvier customers of cars and expect safer vehicles, why aren't we also asking for safer roads? The state of roads in many parts of the country, especially after the monsoon rains, scream negligence and danger. But have we become so apathetic to this state of affairs that our internalized acceptance of inferior roads should continue to put our lives in danger?

The highest number of road crash deaths (nearly 35%) happen on national highways. Highways that the government aims to construct at a speed of 50km per day. Questions are finally being raised about their quality. But let's consider the humongous baggage we have at hand in the form of treacherously

designed roads already. Road safety advocacy group SaveLife Foundation, a non-profit organization, has consistently flagged "fatal" corridors where a disproportionately high number of crashes and fatalities occur as a result of poor road engineering.

Visuals of the parapet wall jutting out at the point where the road branches out into two separate bridges without warning, which the SUV rammed into, show dubious engineering and design. The structure could have been in Dr. Pandole's blind spot if she had tried to overtake from the left side, but what can one say about a 3-lane carriageway that suddenly forks out and then merges into a 2-lane bridge, except to gasp in horror?

Let's segue away for a moment and consider the roads we take for our daily commutes. Consider the number of jaywalkers on the streets, and how often safety road-markers to guide drivers or pedestrians go

missing. Driving itself is an encounter with chaos, with rules that exist only on paper.

Moreover, our expectations of safety equipment in cars also need to be tempered. Yes, seat belts and airbags save lives... but only if we strap ourselves in. Airbags and seat belts are a system that work in conjunction. The idea is to restrain you if the vehicle undergoes a crash, keep you firmly in your seat and cushion the injuries you may receive from hard surfaces in the cabin or by ramming into co-passengers (and threatening their lives as well). An airbag does little good if a passenger isn't in the seat when it inflates. Seat belts are non-negotiable.

While Cyrus Mistry's death has drawn attention to this, the sad truth is that too many Indian lives are lost to road crashes. In his address at a recent business conclave, Union road and transport minister Nitin Gadkari said that in all the aspects of infrastructure development he oversees, safety

While airbags are critical, they can save lives only when used along with seat belts. We must put an end to laxity on this even as we push our auto industry never to compromise our safety.

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The tragic death of Cyrus Mistry drew airbags and vehicle safety features into public conversation but the menace posed by badly designed roads should be the actual focus of attention.

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