

MakingIt

Industry for Development

Number 25



17 PARTNERSHIPS FOR THE GOALS



Partnering for impact: achieving the SDGs



A quarterly magazine.
Stimulating, critical and
constructive. A forum for
discussion and exchange
about the intersection of
industry and development.



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Editorial

The contribution of industrialization to the 2030 Agenda is most directly recognized in the progress that nations are making on Sustainable Development Goal (SDG) 9. However, the multiplier effect of industrialization on all other areas of development will contribute to the achievement of the SDGs in their entirety.

In SDG 9, Member States of the United Nations call on the international community to “build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation”.

Inclusive and sustainable industrial development, which is the core of the United Nations Industrial Development Organization’s mandate, means that:

- Every country achieves a higher level of industrialization and benefits from the globalization of markets for industrial goods and services.
- No one is left behind in benefiting from industrial development, and prosperity is shared among women and men in all countries.
- Broader economic growth is supported within an environmentally sustainable framework.

SDG 17 on partnerships is central to the realization of all the SDGs and is also at the core of achieving inclusive and sustainable industrial development. Partnerships are intrinsic for trade capacity development, technology transfer, finance for development, and private sector involvement.

Indeed, the implementation of the SDGs requires partnerships with a strong country ownership and the alignment of inclusive and sustainable growth policies, public and private investments and societal goals. Only this combination will allow the high-impact services that the international community can bring to support nations in their progress towards 2030.



Illustration: Heroes for Change comic book: the Global Goals for Sustainable Development

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GLOBAL FORUM

The Global Forum section of *Making It* is a space for interaction and discussion, and we welcome reactions and responses from readers about any of the issues raised in the magazine. Letters for publication in *Making It* should be marked 'For publication', and sent either by email to: editor@makingitmagazine.net or by post to: The Editor, *Making It*, Room D1862, UNIDO, PO Box 300, 1400 Vienna, Austria. (Letters/emails may be edited for reasons of space).

LETTERS

Metropolitan beacons

Peter Frankopan's essay on the Belt and Road Initiative (BRI) in *Making It* 24 ('Cities of the Silk Roads: past, present and future') is stirring stuff.

By placing the BRI in the historic context of past silk roads, he extolls the power of cities to be, as he puts it, "beacons to ensure environmental sustainability rather than be part of the process of destruction".

It reminds me of Benjamin Barber, who died recently, when he said, "The odds are two to one or better that you live in a town or city, and not just for economic reasons. Spend a few days in Singapore or Cape Town or Nashville. Witness Oslo's Tesla taxicabs, or Seoul's rehabilitated centre-city river or Medellin's public cable-car system. Keen to confront global warming, but not yet fully empowered to do so, cities must not only accept their responsibility for assuring a sustainable world but assert their right to do so."

● **Joe Nicholls, website comment**

Interested to read your issue on 'When industry meets the city' and particularly ZOU Ciyong where he highlights Shanghai ("The Belt and Road Initiative: A platform for



sustainable urban and industrial development', *Making It* 24).

As he says, the city is transforming "into an internationally recognized financial and manufacturing powerhouse" through urbanization and at the same time recognizing the importance of the well-being of city residents.

Shanghai is the most vulnerable major city in the world to serious flooding, according to a recent UN Climate Central analysis. Over 17 million people could be displaced by rising water if global temperatures increase as predicted by three degrees.

To tackle this threat the city has built the country's largest deepwater drainage system beneath the Suzhou Creek waterway and rolled out a US\$6bn river flood discharge project between Lake Taihu and the Huangpu river.

It's great to see cities aggressively attacking climate change. The greater Seoul

region in South Korea has a population of almost 25 million. Its carbon fuel bus fleet of 120,000 vehicles has been a massive source of pollution so it has made a huge investment in electric-powered buses with an aim to convert half of their fleet to electric in the next three years. A massive commitment.

What I would like to know is why do cities seem to be able to do this yet governments seem slow to respond?

● **Jabez Darnell, website comment**

Delhi: a lesson to learn

Your feature on the Malaysian company (Good Business: Free the Seed, *Making It* 24) converting rice straw and husks into biodegradable packaging (so that farmers stop burning it) was very timely.

As I write this, Delhi is in the midst of a public health crisis as mass burning of crop waste has

sent dense smoke billowing across the north Indian hinterland.

This, together with the dust, industrial emissions and vehicle fumes means the city has heavy metals and other carcinogens at more than 30 times the World Health Organization limits.

The city is trying to curb a problem that has seen lung cancer reach epidemic proportions, with a ban on diesel generators and an attempt to close down at least one of the 13 coal-fired power stations that belch out smoke within a 185-mile radius of Delhi. We need initiatives in India right now.

This is not an Indian problem though. There are 800,000 deaths worldwide every year related solely to burning coal, according to a recent study from 26 institutions including the WHO, published in *The Lancet*.

The good news is that the country is set for a 'solar boom' over the next five years, with the country's renewable energy forecast to double by 2022, overtaking the EU on growth. But it has been difficult to solve bottlenecks such as integrating solar firms with the grid.

I understand that the state governments of Punjab and Haryana are finding it hard to persuade farmers to stop burning their crop waste. The work of companies like Free the Seed must be part of the solution.

● **Lena Duquemin, website comment**



For further discussion of the issues raised in *Making It*, please visit the magazine website at www.makingitmagazine.net and our Twitter page, @makingitmag. Readers are encouraged to surf on over to these sites to join in the online discussion and debate about industry for development.



Growing pains

We badly need investment to develop industry across the world – everyone agrees. The slowdown in real GDP growth since the end of the 2008 recession is clearly connected to the slowdown in business investment growth.

In the United States this has ground to a halt and to add to the problem old equipment and technology is not replaced. Companies would rather save their cash or hand it back to shareholders than put it to work.

In addition, President Trump claims that American corporations have the highest tax rate in the world and that this needs to be cut to boost investment and growth.

Highest? The official US federal tax rate on corporate profits is 35% and when you add in state taxes, the top rate rises to 39%. Even on that measure, the US is actually third highest out of 188, behind the United Arab Emirates and Puerto Rico.

Most importantly will it boost investment and growth? There is no empirical relationship between cutting corporate tax rates and job growth, according to a recent study by the Center for Effective Government. Twenty-two of the 30 profitable Fortune 500 companies that paid the highest tax rates (30% or more) from 2008 to 2010 created almost 200,000 jobs between

2008 and 2012. The 30 profitable corporations that paid little or no taxes over the three years collectively lost 51,289 jobs between 2008 and 2012.

What these corporations did with the extra profit from less tax was to buy back their own shares to boost the stock price, or issue bonds at very low rates to enable them to take over other companies. Thus the tax shortfall merely led to a boom in fictitious capital (debt and shares) – not real investment.

● **Roberta Soldo, by email**

Switch on Africa

Kofi Annan's article ('Lights, power, action', *Making It* 23) has a disturbing statistic – that 620 million people in Africa still don't have access to electricity!

He rightly says that African governments have a vital task to fix the national energy grids that are unreliable and financially fragile and he is strikingly honest when he outlines the "serious and

persistent problems" of mismanagement, inefficiency, lack of transparency and corruption in the energy utilities and governments across the continent.

But he's absolutely right when he says that "Africans have a right to expect more and better international support for low-carbon energy." It seems unlikely that the western governments will step in so I am very interested to see how China's Belt and Road Initiative will help in electrifying Africa.

● **James Reaves, by email**

Robots with chips

It's not just the startling size and scope of the Belt and Road project but also China's plans to replicate foreign technologies within its own economy which are impressive.

I don't know if you have covered it, but a couple of years ago Beijing launched a programme called 'Made in

China 2025', which aimed to make the country competitive across 10 industries, including aircraft, new energy vehicles and biotechnology. It wants to boost the share of domestically made robots to more than half of total sales by 2020. It stood at 31% in 2016. It will be interesting to see if Chinese companies such as E-Deodar Robot Equipment, Siasun Robot & Automation and Anhui Efort Intelligent Equipment themselves become multinationals, and challenge the likes of Switzerland's ABB Robotics and Japan's Fanuc for the leadership in a market worth over US\$10 billion.

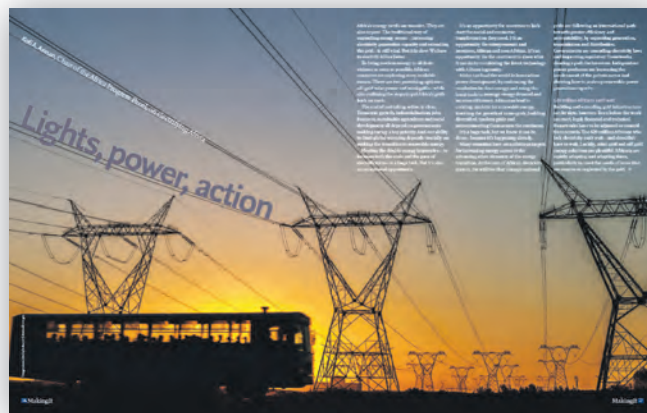
China's also building its own semiconductor industry. The country buys about 59% of the chips sold around the world, but in-country manufacturers account for only about 16% of the industry's global sales revenue. To rectify that, 'Made in China 2025' earmarked US\$150bn.

● **Teemu Tainio, by email**

Taxing question

Billionaires increased their combined personal wealth by almost a fifth last year to a record US\$6tn – that's nearly twice the GDP of Germany! The International Monetary Fund is right – it said western governments should force the top 1% of earners to pay more tax to try to reduce dangerous levels of inequality.

● **Patrice van der Schoot, by email**



Change the mindset

KATE RAWORTH argues that we should stop looking back and be more ambitious in our economic goals

No one can deny it: economics matters. Its theories are the mother tongue of public policy, the rationale for multi-billion-dollar investments, and the tools used to tackle global poverty and manage our planetary home. Pity then that its fundamental ideas are centuries out of date yet still dominate decision-making for the future.

Today's economics students will be among the influential citizens and policymakers shaping human societies in 2050. But the economic mindset that they are being taught is rooted in the textbooks of 1950 which, in turn, are grounded in the theories of 1850. Given the challenges of the 21st century – from climate change and extreme inequalities to recurring financial crises – this is shaping up to be a disaster. We stand little chance of writing a new economic story that is fit for our times if we keep falling back on last-century's economic storybooks.

When I studied economics at university 25 years ago I believed it would empower me to help tackle humanity's social and environmental challenges. But like many of today's disillusioned students its disconnect from relevance and reality left me deeply frustrated. So I walked away from its theories and immersed myself in real-world economic challenges, from the villages of Zanzibar to the headquarters of the United Nations, and on to the campaign frontlines of Oxfam.

In the process I realized the obvious:



KATE RAWORTH is the author of *Doughnut Economics: seven ways to think like a 21st century economist*.

that you can't walk away from economics because it frames the world we inhabit, so I decided to walk back towards it and flip it on its head. What if we started economics with humanity's goals for the 21st century, and then asked what economic mindset would give us half a chance of achieving them?

Spurred on by this question, I pushed aside my old economics textbooks and sought out the best emerging ideas that I could find, drawing on diverse schools of thought including complexity, ecological, feminist, behavioural and institutional economics, and set out to

"The challenge now is to create economies that ensure that no one falls short on life's essentials while safeguarding Earth's life-giving systems, from a stable climate and fertile soils to healthy oceans and a protective ozone layer."

discover what happens when they all dance on the same page. The insights that I drew out imply that the economic future will be fascinating, but wildly unlike the past, so long as we equip ourselves with the mindset needed to take it on. So here are seven ways in which I believe we can all start to think like 21st century economists:

1. Change the goal: from GDP growth to the Doughnut

For over half a century, economists have fixated on GDP as the first measure of economic progress, but GDP is a false goal waiting to be ousted. The 21st century calls for a far more ambitious and global economic goal: meeting the needs of all within the means of the planet. Draw that goal on the page and – odd though it sounds – it comes out looking like a doughnut. The challenge now is to create local to global economies that ensure that no one falls short on life's essentials – from food and housing to healthcare and political voice – while safeguarding Earth's life-giving systems, from a stable climate and fertile soils to healthy oceans and a protective ozone layer. This single switch of purpose transforms the meaning and shape of economic progress: from endless growth to thriving in balance.

2. See the big picture: from self-contained market to embedded economy

Exactly 70 years ago in April 1947, an ambitious band of economists crafted a ►

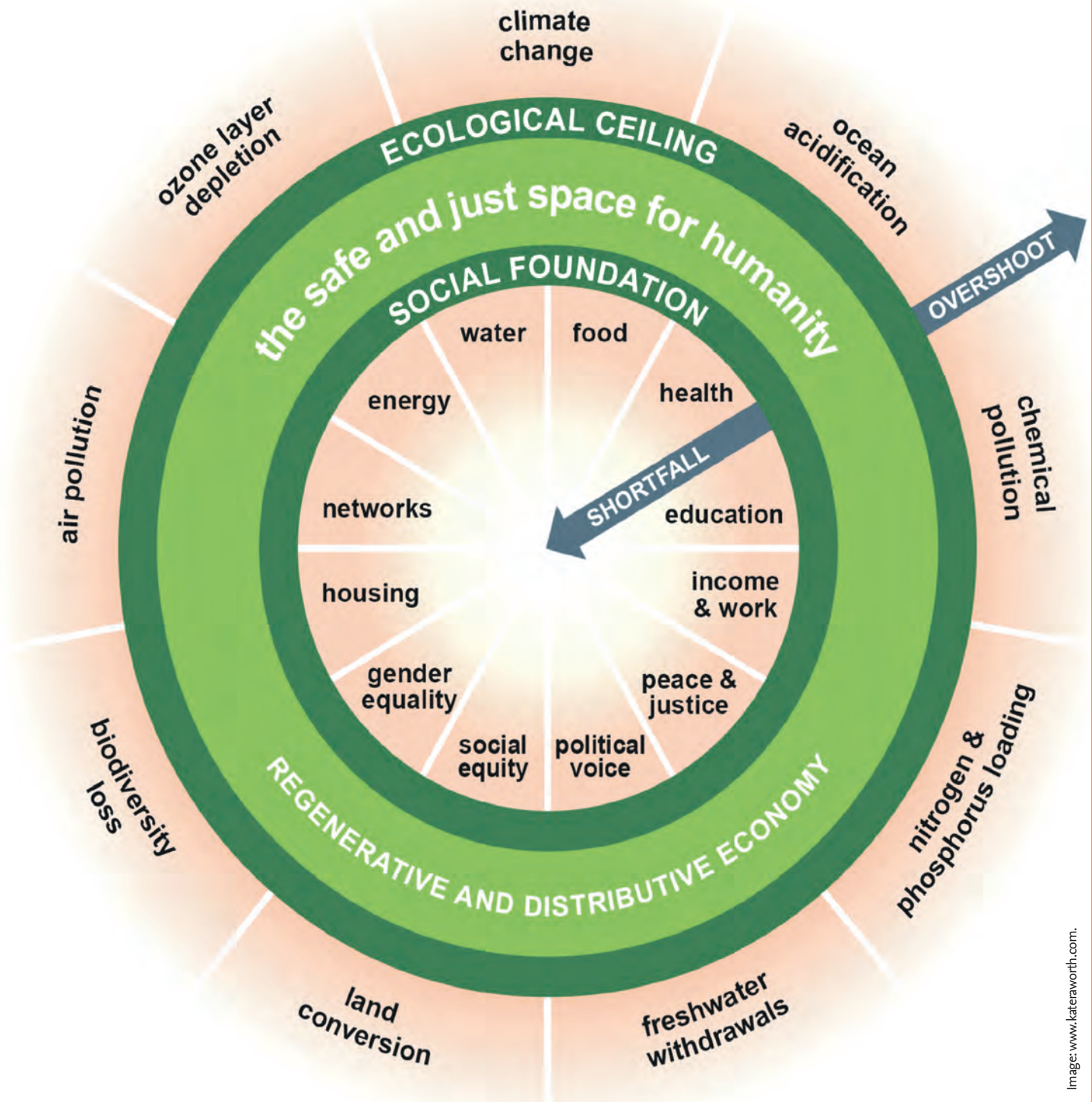


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► neoliberal story of the economy and, since Thatcher and Reagan came to power in the 1980s, it has dominated the international stage. Its narrative about the efficiency of the market, the incompetence of the state, the domesticity of the household and the tragedy of the commons, has helped to push many societies towards social and ecological collapse. It's time to write a new economic story fit for this century – one that sees the economy's dependence upon society and the living world. This story must recognize the power of the market – so let's embed it wisely; the partnership of the state – so let's hold it to account; the core role of the household – so let's value its contribution; and the creativity of the commons – so let's unleash their potential.

3. Nurture human nature: from rational economic man to social adaptable humans

The character at the heart of 20th century economics – 'rational economic man' – presents a pitiful portrait of humanity: he stands alone, with money in his hand, a calculator in his head, ego in his heart, and nature at his feet. Worse, when we are told that he is like us, we actually start to become more like him, to the detriment of our communities and the planet. But human nature is far richer than this, as emerging sketches of our new self-portrait reveal: we are reciprocating, interdependent, approximating people deeply embedded within the living world. It's time to put this new portrait of humanity at the heart of economic theory so that economics can start to nurture the best of human nature. Doing so will give us – all ten billion of us to come – a far greater chance of thriving together.

4. Get savvy with systems: from mechanical equilibrium to dynamic complexity

Economics has long suffered from physics envy: awed by the genius of Isaac Newton and his insights into the physical laws of motion, 19th century economists became fixated on discovering economic laws of motion. But these simply don't exist: they are mere models, just like the theory of market equilibrium which blinded economists to the looming financial crash of 2008. That's why 21st-century economists embrace complexity and evolutionary thinking instead. Putting dynamic thinking at the heart of economics opens up new insights for understanding the rise of the one percent and the boom and bust of financial markets. It's time to stop searching for the economy's elusive control levers (they don't exist), and instead start stewarding the economy as an ever-evolving system.

5. Design to distribute: from 'growth will even it up again' to distributive by design

In the 20th century economic theory whispered a powerful message when it comes to inequality: it has to get worse before it can get better, and growth will eventually even things up. But extreme

“Economic theory has long portrayed a clean environment as a luxury good, affordable only for the well-off – a view that says that pollution has to increase before it can decline, and (guess what), growth will eventually clean it up.”

inequality, as it turns out, is not an economic law or necessity: it is a design failure. Twenty-first century economists recognize that there are many ways to design economies to be far more distributive of value among those who help to generate it. And that means going beyond redistributing income to pre-distributing wealth, such as the wealth that lies in controlling land, enterprise, and the power to create money.

6. Create to regenerate: from 'growth will clean it up again' to regenerative by design

Economic theory has long portrayed a clean environment as a luxury good, affordable only for the well-off – a view that says that pollution has to increase before it can decline, and (guess what), growth will eventually clean it up. But as with inequality there is no such economic law: environmental degradation is the result of degenerative industrial design. This century calls for economic thinking that unleashes the potential of regenerative design in order to create a circular, not linear, economy – and to restore ourselves as full participants in Earth's cyclical processes of life.

7. Be agnostic about growth: from growth-addicted to growth-agnostic

To the alarm of governments and financiers, forecasts for GDP growth in many high-income countries are flat-lining, opening up a crisis in growth-based economics. Mainstream economics views endless GDP growth as a must, but nothing in nature grows forever, and the economic attempt to buck that trend is raising tough questions in high-income but low-growth countries. That's because today we have economies that need to grow, whether or not they make us thrive. What we need are economies that make us thrive, whether or not they grow. That radical flip in perspective invites us to

“Environmental degradation is the result of degenerative industrial design.”



Image: Pixabay released under Creative Commons CC0

become agnostic about growth and to explore how our economies – which are currently financially, politically and socially addicted to growth – could learn to live with or without it.

I am convinced that these seven ways to think like a 21st-century economist are fundamental to the new economic mindset this century demands. Their principles and patterns will equip new economic thinkers – and the inner economist in us all – to start creating an economy that enables everyone to

prosper. Given the speed, scale and uncertainty of change that we face in coming years – and the diversity of contexts from Beijing to Birmingham to Bamako – it would be foolhardy to attempt to prescribe now all the policies and institutions that will be fit for the future. The coming generation of thinkers and doers will be far better placed to experiment and discover what works as the context continually changes.

What we can do now – and must do well – is to bring together the best ideas to

create a new economic mindset that is never fixed but always evolving. The task for economic thinkers in the decades ahead will be to bring these seven ways of thinking together in practice, and to add to them. We have barely set out on this adventure in rethinking economics. Please join the crew.

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trends



■ The International Energy Agency (IEA) reports that energy efficiency is helping to reshape the entire energy system. According to the IEA's report *Energy Efficiency 2017*, in 2016, the world would have used 12% more energy had it not been for energy efficiency improvements since 2000 – equivalent to

adding another European Union in the global energy market.

The report states that industry energy efficiency has improved, with use of energy management systems increasing. Energy use per unit of economic output in the industrial sector fell by nearly

20% between 2000 and 2016.

In some energy-intensive industries, such as aluminium smelting and cement manufacturing, average efficiency has improved sharply as a result of rapid expansion in production capacity, especially in emerging economies, since new facilities tend to be much

more efficient than old ones.

The application of energy management systems, which provide a structure to monitor energy consumption and identify opportunities to improve efficiency, is growing, driven by policy and financial incentives. (IEA)

■ A report published by the University of Cambridge Institute for Sustainability Leadership and a group of companies including Marks &

BUSINESS MATTERS

Not so sweet: West Africa's chocolate industry

West Africa, the world's leading cocoa producer, is facing up to a disastrous 2016/17 cocoa season. Over the last year, international cocoa prices have collapsed by one third.

The drastic drop in prices reflects softening chocolate demand and a historically large cocoa crop from West Africa. The impact of the cocoa price slump has been devastating. Cocoa farmers' incomes have plummeted, leading to panic in cocoa-growing communities. Government spending plans have had to be revised following the loss of billions of dollars in cocoa export earnings.

Although West Africa controls over three-quarters of the world's cocoa supply, the region is vulnerable to the volatility of commodity markets. Furthermore, the region's cocoa producers only capture a tiny share of value in the cocoa value chain, estimated at between 3% to 6%. Companies processing cocoa beans to make semi-finished



Cocoa farmer David Kebu Jnr holding the finished product, dried cocoa beans ready for export.

Spencer, Jaguar Land Rover, Hammerson plc, Tetra Pak, Novo Nordisk and Keller plc, concludes that delivering the Sustainable Development Goals is imperative for business growth, continuity and stability.

The report, 'Towards a sustainable economy: The commercial imperative for business to deliver the UN Sustainable Development Goals', calls for companies to adopt a systems approach in order to maximise the chances

of delivering the SDGs.

Given the significant interdependencies between the Goals, their scale and urgency, and the changing expectations and operating context for business, the report warns companies against cherry-picking the SDGs that have the easiest business case, as this will be insufficient and potentially counterproductive.

To succeed, the report calls for business to 'reframe' the SDGs as a 'vision for the future' of

business that inspires interest and creativity, identifies opportunities for future growth, and a framing strategy for difficult trade-offs and problem solving.

■ New technology is changing work everywhere. In Latin America, a lack of people who know how to harness that technology is slowing its diffusion, says a new report by the Inter-American Development Bank (IDB). In

surveys, a growing number of employers complain that they can't find qualified workers.

Latin America's labour markets are characterized by high job turnover, low pay and meagre investment in skills both by firms and workers. Overall, only around 10% of Latin American workers receive some training each year, compared with around half in developed countries, according to a study last year by the Inter-American Dialogue.

Photo: Irene Scott/AusAID

products like cocoa liquor, butter and powder don't fare much better, capturing only 8% of the value. The lion's share of value, 80%, is unlocked at the chocolate manufacturing and retail levels.

In an effort to climb the cocoa value chain, and reduce exposure to volatile cocoa prices, the region's cocoa producers – led by Côte d'Ivoire and Ghana, which together produce over two-thirds of global supply – have focused their discourse on producing chocolate and confectionery for export.

However, West Africa, as the world's dominant cocoa producer, is not well-positioned to produce and export chocolate. Local chocolate producers are unable to absorb even a tiny share of the region's massive cocoa crop, owing to their niche production levels in the face of weak demand.

One key reason for the absence of a thriving local chocolate industry is high manufacturing costs. High production costs make West Africa an unattractive location for chocolate production because factories require imports of key chocolate ingredients such as sugar, milk powder and nuts. Factories also lack a steady power supply, which prevents them from running at full capacity. Moreover, chocolate

is costly to ship. As cocoa butter has a low melting point at 34°C, chocolate is shipped in cold storage containers to consumption markets, leading to a dramatic increase in already high shipping costs.

Therefore, unlike other finished goods (like apparel and footwear), chocolate production needs to be close to the final consumption market, as chocolate companies constantly

refine their products to meet changing consumer tastes.

Victoria Crandall, a researcher Singapore's Centre for African Studies, argues that given the significant barriers to entry in making chocolate faced by West Africa, the region should instead refocus its energies on further expansion of its cocoa processing capacity.

Crandall believes that the region can extract more value

from its cocoa production by continuing to invest in grinding lines, especially in cocoa butter and powder, which command a higher price than block cocoa liquor. An expansion in cocoa processing capacity, coupled with a control of its cocoa crop so that output stays in tandem with global demand, are critical in helping West Africa extract more value from its abundant cocoa production.

"Development aid does not prevent migration"

Hein de Haas, Professor of Sociology at the University of Amsterdam and founding member of the International Migration Institute (IMI) of the University of Oxford, believes that the debate over migration is plagued by a variety of inaccuracies and misunderstandings.

In *Myths of migration: Much of what we think we know is wrong*, de Haas examines eight myths that he has often encountered in his research. One of those is the notion that development aid in origin countries prevents migration.

de Haas writes: "Many governments as well as development organizations see development aid as a tool to

reduce migration. This view is based on the misleading idea that poverty and violence are the main drivers of South-North migration. In reality, however, development initially leads to increasing levels of emigration."

"Confirming this 'migration paradox', research has confirmed that the poorest countries exhibit a much lower level of emigration than more developed nations. Migration, after all, requires significant resources. Extreme poverty immobilizes people - they get trapped because they cannot afford to leave their homeland. This is also why the idea that climate change will lead to mass migration to the West is

unrealistic. Adverse environmental change can increase aspirations to move, but it can also limit the capacity to do so."

"Economic growth and improved education typically increase people's capacities and aspirations to migrate. It is therefore no coincidence that prominent emigration countries such as Mexico, Morocco and Turkey are middle-income countries. Development in the poorest countries, for instance in sub-Saharan Africa, will almost inevitably lead to more migration from those countries. Therefore, future immigrants in Europe might increasingly come from sub-Saharan Africa, instead of Turkey and North Africa."

A low-carbon economy: technologically possible, economically attractive

Jenny Bofinger-Schuster on the need for joint action on climate change – and Siemens' contribution to that effort

Climate change is real. Pacific Islands cannot get out of the way of rising waters. Arctic maritime ecosystems cannot escape warmer waters. People often cannot flee hurricanes in time. And even someone reading the news in an armchair may find it impossible to avoid reports on how a changing climate endangers the lives of us all, worldwide, every day.

While we do have a plan – the Paris Agreement's goal of limiting the global temperature rise to two degrees Celsius above pre-industrial levels – to date, international commitments towards this goal are not sufficient. Therefore, it is our obligation, and the obligation of others, to take more joint and forceful actions. For this, we do not only need international institutions and governments establishing frameworks and policies. We also need coalitions of businesses, academia and especially cities, which produce 70% of all emissions. The longer we delay

action, the more dramatic the actions that need to be taken, the more serious the consequences become. And the higher the price tag will be, as preventive actions today cost less than adaptive efforts tomorrow.

At Siemens, as we support the Paris Agreement, we consider ourselves a leading partner in this effort, serving customers, governments and society. With respect to climate change mitigation measures, we take the entire value chain of our company into account – from sustainable supply



German Chancellor Angela Merkel at Siemens' showcase "digital factory" with Professor Karl-Heinz Büttner (left), head of the plant in Amberg. Also pictured are Joe Kaeser and Ilse Aigner (CSU, Deputy Minister-President of Bavaria and Bavarian Minister for Economic Affairs, Media, Energy and Technology).

chain initiatives and our CO₂-neutral operations target to Siemens' products and solutions. The aim in these efforts is clear: enabling the transition towards an affordable, low-carbon economy that does not lower our standard of living but actually improves it. In doing so, we show our customers that there aren't just opportunities to do the right thing, but also that there is a good business case for doing so.

Siemens walks the talk

In 2015, we announced our ambition to become a carbon-neutral company by 2030. Since then, Siemens has reduced its CO₂ emissions by more than 20% by powering around 60% of German sites with 100% green energy, increasingly deploying distributed energy systems, and investing in smart e-mobility solutions. While our efforts clearly serve the environment, they also make economic sense: as part of our carbon-neutral programme, we are investing €100m in energy-efficiency projects at our production facilities and buildings, and in return expect € 20m in savings each year from 2020 onwards.

Siemens' Environmental Portfolio, representing approximately 50% of Siemens' annual revenue, is our big-gest lever towards decarbonization. It includes various technologies affecting all parts of our lives, be it smart grids, industry automation, e-mobility, better public transport or renewable energy options. In 2016 alone, this has helped our customers to save the equivalent of 60% of Germany's annual CO₂ emissions.

Sector integration is necessary

In a recent analysis, Siemens looked at Germany's ambitious climate targets for 2050 and found that reducing greenhouse gas emissions by at least 80% by 2050 relative to 1990 is technically and economically feasible. To achieve this, the share of renewables should steadily increase. Also, the transformation of the conventional electricity generation to low-carbon emitting technologies is vital and needs to be one central pillar of the next phase of the energy transition. Transforming the conventional energy sector from using coal towards low-carbon gas power plants shows a 50% CO₂ reduction potential by 2035. It also guarantees base load until renewables take over later in the century. Whilst decarbonization

“Transforming the conventional energy sector from using coal towards low-carbon gas power plants shows a 50% CO₂ reduction potential by 2035.”



JENNY BOFINGER-SCHUSTER is Senior Vice President Sustainability and Cities, Siemens AG, the largest industrial manufacturing company in Europe, operating 289 major production and manufacturing plants worldwide.

efforts on the supply side are key, they won't be enough to achieve Germany's climate goals. Another key pillar has to be “sector coupling” of the demand-side sectors – such as transport, industry and heating – on the basis of electrification, as well as synthetic fuels. Not only does this make economic sense, it ensures the energy system's security, power supply and flexibility.

Siemens partners with cities

These and other measures are not just optional but a necessity to successfully achieve the international climate goals. With the growing role of city action on climate change, Siemens has developed the City Performance Tool (CyPT) that identifies which technologies from the transport, building and energy sectors best fit a city's baseline in order to mitigate CO₂ levels, improve air quality and add new jobs in the local economy.

Siemens has partnered with a number of cities to identify not only which technologies lead to the most significant carbon reductions, but also at what scale they should be implemented. For Mexico City, which is making “green” decisions with regards to infrastructure, CyPT analysis showed that the city could accelerate its progress towards ambitious sustainability targets by adopting forty building, energy, and transport technologies. By doing so, the city could generate more than 1.3 million jobs between now and 2050.

Finally, while companies such as Siemens can accelerate the pace at which innovative low-carbon solutions are being developed, reducing greenhouse gas emissions is a team sport. It takes partners to innovate technologies, competitors to spark creative innovations, investors and the banking sector to provide financing, and cities to cooperate. Putting a price on carbon to capture the true cost associated with carbon emissions will be relevant to trigger a shift towards low-carbon technologies. And last, but not least, we need the political will of governments to provide a reliable long-term investment perspective and create a global level playing field to accelerate large-scale deployment of low-carbon technologies. With all that, we should stand at least a fighting chance of shepherding Earth towards a healthier future, for all life on the planet, ourselves included.

Petra Schwager talks about UNIDO's new assistance package, the Programme for Country Partnership, now being implemented in a third country: Peru.

Helping drive modern, competitive and inclusive industry in Peru

Since December 2015, UNIDO and the Ministry of Production of Peru have been working on a multi-disciplinary technical cooperation programme to drive modern, competitive and inclusive industry in Peru and support the national development agenda. This initiative – the Programme for Country Partnership (PCP) for Peru – seeks to generate investment, develop technical assistance portfolios and leverage funds for inclusive and sustainable industrial development in Peru.

Petra Schwager, the PCP for Peru team leader at the United Nations Industrial Development Organization (UNIDO), explains that the PCP approach is all about new ways to forge effective partnerships. It focuses on prioritized sectors and areas with high potential for economic growth, and it brings together all relevant actors in the country in a multi-stakeholder partnership so that the contribution of each partner can be coordinated and optimized.

Joining hands

“To enhance the impact and upscaling of the programme, we need strong leadership from the government and partners. Working with financial institutions and the private sector is key because investment is needed, but it is more than that. It is about joining hands, bundling technical and financial resources, and building on each other's initiatives. For example, for our sustainable industrial zones project, we will work with the Japan

International Cooperation Agency (JICA) that has projects in the same area of Callao, a credit line for small and medium enterprises, and is working with companies on energy efficiency.”

Schwager says the same approach is used in-house too. “At UNIDO, we see many complementarities in the projects and we see that there is much value added if we work together. We have excellent know-how here, but we weren't always bundling it. Now, with the PCP approach, we take advantage of what other colleagues can contribute. So, a PCP consists of projects and whenever we do a project we share it with all members of the PCP team for their comments to see how the projects can complement each other and contribute to the overall objective of the PCP.”

“[The partnership] brings together all relevant actors in the country in a multi-stakeholder partnership so that the contribution of each partner can be coordinated and optimized.”

She refers to one example when four PCP team members from different departments came together to review Peru's national network of innovation and technology centres (CITEs). “We pooled the specific technical expertise of each team member together and produced a cohesive report. This is how it works internally, and this of course also reflects what we do in the country by working with different ministers – the Ministers of Production, Commerce, Economy and Finance, Energy, Environment, and so on. And the review helped to shape an Inter-American Development Bank credit line of US\$23m and laid the foundation for improving the service portfolio and performance of CITEs.”

Advising the government

Schwager continues, “UNIDO's role is a technical advisory role. Yes, an important element of the PCP is leveraging new investment and support but there is also a big part in advising the government in molding their existing ‘policy’ instruments and investment programmes in a more efficient manner, aligned with the Sustainable Development Goals.”

The PCP Peru has three phases: identification, inception and implementation, and Schwager says that the third phase is now about to begin with five priority projects. Additional projects will follow in the coming months.

“We are working with the authorities on a new industrial development policy, which will also make it possible for us to measure our impact.”

“Second, we will work with them on a national strategy for sustainable industrial parks that brings together social, economic and environmental dimensions. Besides industrial parks, Peru needs additional instruments to support SMEs in the different regions. I think UNIDO is well-positioned to give advice on clustering, on networking and on value chain development. So, UNIDO will come into play with other instruments.”

“The third is a sustainable industrial zone project funded by the Global Environment Facility. When developing a national sustainable industrial parks strategy, you need to look at new parks and existing zones. So, we have selected one of the biggest, most polluted industrial zones – at Callao, which is the chief seaport of Peru. We will make this area more sustainable by delivering training for the local government, improving the performance of industries (working at company level) and developing policy guidelines for replication in other parts of the country.”

“The fourth one is on integrated value chain development in Peru’s aquaculture sector, and the fifth project is improving quality in the coffee and cocoa sectors. In both projects, we will work very closely with the country’s CITEs, because these are key instruments for decentralized innovation.

Cross-cutting

Schwager underlines that the PCP also provides support to the government on several cross-cutting areas. For example, the project, “Women’s economic empowerment in green industry”, combines gender and environmental elements.

For Schwager, the partnership approach is key. “We work so closely with the government because the PCP can only work if the government works with you. It has to be a team. Now, five or six people from the government will come to Vienna for one week to work with us on policy development. This makes me happy because this is the commitment that is needed.”

A portrait of Petra Schwager, a woman with dark hair pulled back, wearing a dark blazer over a grey top and a necklace with a small square pendant. She is smiling and looking slightly upwards and to the right. The background is a blurred wall of many colorful flags.

PETRA SCHWAGER is an Industrial Development Officer at the United Nations Industrial Development Organization. She joined UNIDO in 1994 as Junior Professional Officer working in the UNIDO field office in Mexico and afterwards worked for the Environment and Energy Departments.

Partnering to achieve the Sustainable Development Goals



United Nations Deputy Secretary-General, **Amina J. Mohammed**, calls for genuine and meaningful partnerships for action, finance and innovation



Illustration: Jerker Lokrantz/Azote

Two years have passed since UN Member States adopted the 2030 Agenda for Sustainable Development. This transformative framework for common progress, agreed at a time of severe political divisions, is encouraging and inspiring. The 2030 Agenda is the international community's best tool for a more prosperous and peaceful world. It is relevant to all countries and all people. And it belongs to everyone. ➤

► Since the Agenda's adoption there has been much promising momentum around the world. The 17 Sustainable Development Goals have jumped from the General Assembly Hall to communities across the globe, taking hold among policymakers and in global public awareness.

So far, 65 countries – far more than expected – have submitted their voluntary national reviews at the High-Level Political Forum on Sustainable Development (HLPF). The Forum is an annual opportunity to identify implementation challenges at the country level – and to share development solutions, knowledge and best practices.

It is clear that Member States are taking vigorous action to implement our SDGs. In many countries, Heads of State and Government are personally leading the charge, incorporating the SDGs into national plans and, in some cases, incorporating sustainable development principles into legal frameworks too. Our United Nations Development Group, of which I am the Chair, is working with Member States to integrate the SDGs into their national development plans and strategies.

Walking the talk

In line with the interlinkages of the SDGs, we see governments walking the talk in terms of national coordination, resource mobilization and budget allocation, and engaging parliaments and local authorities. Stakeholders, including businesses, non-governmental organizations and the scientific community, are also helping to lead the implementation process. At the HLPF, which attracted over 5,000 participants this year, I was pleased to see so many enthusiastic actors. Next year, the list of countries ready to engage in the voluntary review process has already reached its maximum of 44. To me, this is an unmistakable signal of commitment.

The UN Development System, too, has shown its firm commitment to implementing the 2030 Agenda, by providing country-level support. To date, 114 governments have requested support from UN Country Teams on SDG implementation. On industrialization – the subject of SDG 9 – the UNIDO-led Programme for Country Partnership provides an effective partnership model. This multi-stakeholder initiative engages national governments, UNIDO, the private sector, multilateral development banks

Illustration: Ken Robinson





Ten African countries were among the world's top 30 fastest growing nations between 2010 and 2014

and funds and other stakeholders, to formulate an inclusive and sustainable industrial development roadmap for the participating country.

Such initiatives are essential to fulfil the promise of the 2030 Agenda to leave no one behind. Nowhere is this more urgent than in Africa, the least industrialized continent. Since the turn of the century, much of Africa has achieved impressive economic growth. Ten African countries were among the world's top 30 fastest growing nations between 2010 and 2014. And, last year, the 10 fastest growing African economies posted GDP growth rates exceeding 5%.

On the other hand, continued commodity-dependence – coupled with fluctuations in commodity prices – makes African economies vulnerable to external shocks and hampers their ability to create decent jobs and effectively tackle poverty, hence the need for African countries to take further action to advance inclusive and sustainable industrial development.

Third Industrial Development Decade for Africa

This is the reason behind the proclamation by the General Assembly last year of the Third Industrial Development Decade for Africa. The Decade is not an isolated undertaking, but complements other key development initiatives, most notably the African Union's Agenda 2063 and the 2030 Agenda for Sustainable

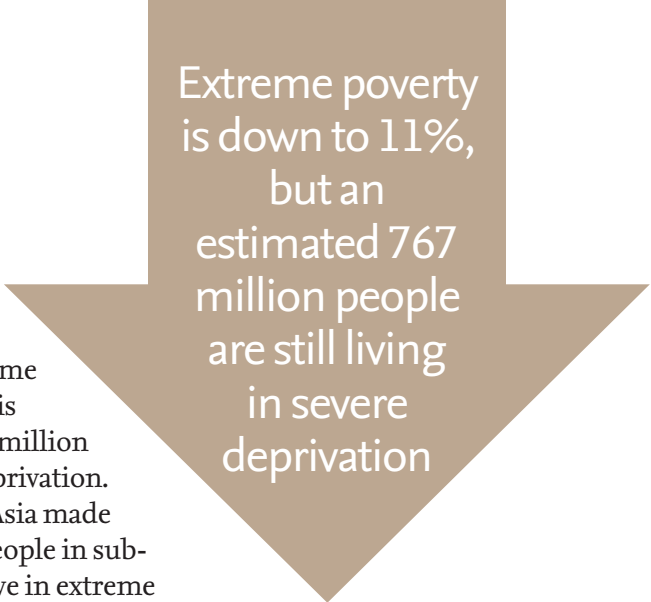
Development. It represents a global initiative in support of African industrialization. Through it, the international community acknowledges the important link between industrialization and development, and takes note of Africa being the least industrialized, poorest and the most vulnerable continent, in spite of its immense economic and social potential.

As we look ahead to the 2030 deadline for the SDGs, our assessment clearly shows that the pace of progress in Africa and elsewhere is insufficient to fully meet ambition. We see, in the unfinished business of the Millennium Development Goals, that progress has not been even across regions, between the sexes, and among people of different ages and constituencies.

Poverty and inequality remain a significant challenge, both within and among countries. Addressing poverty calls for increased focus on the poorest, most vulnerable, furthest behind and hardest to reach. And, achieving accelerated reduction in inequality requires dedicated policy focus on children and youth, women and girls, indigenous people, older people, rural workers, people with disabilities, migrants and people affected by conflict. Every day, they must be empowered if we are to be true to our commitment to leave no one behind. ➤

“Partnerships at all levels
are key to achieving the
2030 development
agenda”





Extreme poverty
is down to 11%,
but an
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million people
are still living
in severe
deprivation

► **We are challenged**

The latest data show that extreme poverty is down to 11%, but this translates to an estimated 767 million people still living in severe deprivation. Although East and Southeast Asia made significant progress, 41% of people in sub-Saharan Africa continued to live in extreme poverty.

Maternal deaths have declined around the world, but we need to double the rate of reduction to meet the target. This means a concerted effort to invest in universal health care, with a focus on primary health care and secondary referral. The environment continues to bear the brunt of man-made actions, leaving more than two billion people to confront water stress and nine out of 10 city dwellers breathing polluted air. And there has been a significant increase in violent conflicts in recent years, despite a decline in homicides and better access to justice for more citizens around the world. So, we are challenged.

To eradicate poverty, reduce inequality and exclusion, address climate change, promote sustainable industrialization and build peaceful, inclusive societies for all by 2030, key stakeholders, including governments, must drive the implementation of the SDGs at a much faster rate and at much larger scale. And, to ensure no-one is left behind, we need to monitor progress through disaggregated data, by building the capacity of national statistic systems and by improving data availability.

We must also advance on gender equality. The empowerment of women and girls is an enabler for the whole 2030 Agenda. Currently, gender inequality is

deeply entrenched. We see it in the slow progress in women's representation in political life and in decision-making within households. We see it as well in the violence, most often with impunity, that women and girls face in all societies. This also affects the mental health of women – which is also deserving of greater attention. The systematic mainstreaming of gender perspectives in the implementation of the whole 2030 Agenda is therefore crucial.

Another critical area is climate change. Implementation of the Paris Agreement is central to the success of the 2030 Agenda. The UN System supported countries in identifying and declaring their climate targets in the lead-up to the Paris Agreement. This has carried forward – through multilateral initiatives such as the Nationally Determined Contributions Partnership – with translating targets into action, coordinating support, and providing access to climate finance. The commitment to raise US\$100bn a year by 2020 and to bring the Green Climate Fund fully to life is vital to achieving the SDGs globally. The priority now must be to scale up and accelerate action to achieve country targets. The Secretary General's climate summit in 2019 will provide momentum for increased ambition. ►

► **Genuine and meaningful partnerships**

Ultimately, progress on these issues and on all the SDGs – including SDG 9 – will only be achieved through genuine and meaningful partnerships – the subject of SDG 17 – for action, for finance and for innovation.

First, partnerships at all levels are key to achieving the 2030 development agenda. This means partnerships between the UN and governments; partnerships with civil society, the private sector and, perhaps most important of all, partnerships with private citizens.

Second, SDG financing requirements are significant. Although funding the SDGs is globally achievable, it is beyond the reach of low income countries. A blended financing framework holds the key to accelerated progress on the SDGs. We need to leverage new partnerships in order to secure the financing needed. The Addis Ababa Action Agenda provides the financing framework and blueprint for global cooperation. But in many SDG priority areas, additional investments are required. We also need countries to meet

their commitments on official development assistance. In this regard, the commitments to dedicating 0.7% of gross national income (GNI) to official development assistance and 0.15-0.20% of GNI to Least Developed Countries remain pivotal to leaving no one behind by 2030.

In that latter regard, I appreciate Member States' efforts leading to the establishment of the Technology Bank for the LDCs – the first SDG target to be achieved. The innovative approach created by the International Development Association 18 Replenishment Fund, which is targeted at financing the SDGs in low income and fragile countries, is also commendable. The United Nations system and the World Bank should work together to enhance developing countries' capacity to access the fund.

Sharing experiences and lessons

Sharing experiences and lessons among countries is also a key to accelerated progress. Moving forward, we need to leverage South-South and Triangular cooperation. Domestic resource mobilization is also central to financing SDG investment needs. In this regard, tax revenues remain an important source of domestic financing. Expanding the fiscal space by increasing tax bases and putting in place fair and efficient tax systems is central to moving forward.

But public finance alone is not sufficient. We need to work in partnership with the private sector to ensure that all financing becomes sustainable and contributes to the SDGs. We need to think creatively: how can we mobilize pension funds, insurance and other large pools of private capital to help finance the SDGs. And we must make some creative breakthroughs in order to unlock these pools of capital, so they can finance pipelines of projects within countries. If we can unlock this finance, then the dividends will not only be in terms of dollars and cents, but progress on gender equality, inclusive economic growth and positive climate action.

“We must build formidable alliances across stakeholders to achieve the objective of leaving no one behind by 2030.”



Photo: UN Photo/Rick Bajoma

AMINA J. MOHAMMED was sworn in as United Nations Deputy Secretary-General on 28 February 2017. Previously she was Minister of Environment of the Federal Republic of Nigeria from November 2015 to December 2016, and prior to this, she served as Special Adviser to Secretary-General Ban Ki-moon on post-2015 development planning, where she was instrumental in bringing about the 2030 Agenda for Sustainable Development, including the Sustainable Development Goals.

Third is innovation. We need to forge partnerships that drive and deliver innovation. The United Nations and governments must work with private firms, inventors and entrepreneurs to capitalize on the latest technological advances.

The UN has a critical role to play in bringing all stakeholders together and supporting countries to achieve the Sustainable Development Goals. But the UN too must change to be an effective, accountable and responsive partner. The 2030 Agenda is a bold agenda for humanity and requires equally bold changes to the UN development system.

Matching the ambition

The UN development system has a proud history of delivering results and generating ideas and solutions to improve the lives of millions of the poorest and most vulnerable. Yet, the current model of the UN development system is insufficient to match the ambition of the new agenda. In June, the Secretary-General put forward 38 concrete ideas and actions to reposition the UN development system to deliver the integrated support needed to achieve the

Sustainable Development Goals.

Combined, these ideas offer a roadmap for change that can significantly enhance the system's effectiveness, cohesion, leadership and accountability.

The 2030 Agenda for Sustainable Development is ambitious but achievable. Individually, the capacity to achieve the SDGs varies from country to country and from one region to another. But collectively, the world has what is needed to achieve the SDGs. Its success will depend on the active engagement of all actors for people, peace, prosperity and a healthy planet. We must build formidable alliances across stakeholders, including governments, the private sector, parliamentarians, civil society, academia and citizens, to achieve the objective of leaving no one behind by 2030.

The OiER's **Kari Aina Eik** argues that better partnerships are needed to achieve results at the pace and scale need to deliver the Sustainable Development Goals by 2030

Infrastructure challenges and solutions

The world is faced with two conflicting imperatives. There is a clear need to protect the planet from climate change, to prevent and reverse threats to the health of people and to our life-support system: the environment. There is also a need to spur economic growth for inclusive development of all – indeed, the Sustainable Development Goals (SDGs) cite the need for ‘industrialization’, immediately signalling the need to build the necessary supportive sectoral infrastructure (water, energy, transport, communications, etc.).

In a sense, these dual imperatives – both required by the SDGs – do seem to conflict with each other, given the rampant development of industries, businesses and especially mass urbanization that, indisputably, directly contribute to environmental degradation and climate change.

Key challenge

The key challenge, across the board, is the massive financing gap, with governments in most cases unable to meet even 50% of current financing needs. It is no surprise that the focus has swung heavily towards the

private sector, pinning hopes on public-private-partnerships (PPPs), and increasingly turning toward further broadening infrastructure financing through commercial banks, capital markets, securitizations, and structured finance, etc.

PPPs however present major challenges: project pipelines or even projects seeking private and commercial finance, especially in the developing world, have not yet emerged



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in any consistent manner. Governments are struggling, due to massive capacity gaps – especially at lower levels of government across the developing world to develop models and balance the needs of affordability and private returns.

Meanwhile, the private sector struggles to communicate its own risks, and balance requirements for project structuring with sectorial and line ministries of government. Hence, direct private sector suggestions for structuring government projects are often seen – rightly – as leading to conflicts of interests.

Pivotal solutions

PPPs, as well as private and commercial development financing for traditionally government-funded infrastructure projects, are a pivotal solution. Indeed, well-developed projects could ensure not only sustainable financing or bankability in projects, but also build foundations for sustainable natural resource systems management, securing the long-term success of project investments, while also contributing to national commitments to combat climate change.

Information and communication technologies (ICTs) have a crucial role in smart sustainable cities, acting as the platform for the aggregation of information and data to help enable an improved understanding of how the city is functioning in terms of resource consumption and services.

Image: ITU



Smart Sustainable Cities

In the face of poor project pipelines and badly balanced risk structures, many available sources of financing remain untapped – whether from pension funds, insurance funds, capital markets and private equity, or even the growing impact investing funds.

For 70 years, the Organization for International Economic Relations (OiER) has worked to bridge the gap between the public and private sectors with a focus on development, investments and financing of infra-structure projects. OiER, through the United Smart Cities programme, is now working to develop improved and innovative models for the financing of priority sectors and to create a global city pipeline to better channel investable and sustainable infrastructure projects.

Financing city projects

The United Smart Cities (USC) programme, has been initiated by OiER and the United Nations Economic Commission for Europe (UNECE), and is implemented in cooperation with selected UN agencies, participating cities, the private sector and the finance sector. The USC is unique in using

partnerships across a variety of stakeholders to support economic development and project implementation for cities, while delivering on the SDGs and UN Agenda 2030 requirements on climate change.

The USC programme represents one of the most extensive global initiatives in the field of smart sustainable cities, serving as a multi-stakeholder platform for an active collaboration through projects of the private,

“OiER, through the United Smart Cities programme, is now working to develop improved and innovative models for the financing of priority sectors and to create a global city pipeline to better channel investable and sustainable infrastructure projects.”

public and finance sector, as well as for cities and civil society to co-enact and implement innovative smart urban solutions.

The overall strategic goal of the USC programme is to promote sustainable urban development, especially in countries with transition economies and in developing countries, through analysis of practices and policies, pilot activities, exchange of experiences and best practices, networking and capacity building. The USC participating cities are of all sizes and located in all regions of the world. All cities are welcome to participate.

At the core of the programme is a tailor-made USC investment marketplace for cities, companies, city experts and investors to ensure project information exchange, foster collaboration, identify financing models. It is essential for building transformational solutions and finance-ready projects for cities.

I would like to welcome cities from UNIDO member states to join the programme and the activities being implemented, especially in terms of highlighting infrastructure needs and their financing.

less environmental impact

sustainability

Circulate to accumulate

Lee Hui Mien on
how can we move
beyond resource
efficiency and waste
management, and
instead create a
circular economy

life-cycle processes

rent

repair

sharing economy

Sustainability is about doing more with less. It is a concept that naturally promotes efficiency and productivity. In the coming years, there will probably be a rapidly changing paradigm where sustainability gets normalized into 'business-as-usual' and gets a permanent seat in business considerations and business models. Being able to meet the needs of the consumers using physically products or convenient services is the ultimate aim of all business. To be able to deliver the same kind of value to customers with less resources and/or manpower means less cost for the companies. If brands can market their products with less packaging, it will also save on costs.

Moving towards a circular concept

In today's complex world, to be able to address the true sustainable solutions for business requires an approach that can deal with the interconnectivity between various aspects of business. One of the solutions could be to move towards a circular concept. The circular economy is the idea of regenerative and restorative economy where resources are no ➤

collaborative innovation

➤ longer moving in a linear manner and instead get circulated back to one of the life-cycle processes in order to salvage the value. The traditional linear 'make-use-dispose' model is redefined into one that considers the value of products at the end of their useful life and captures this value.

In economics, the term used is dematerialization, referring to the absolute or relative reduction in the quantity of materials required to serve economic functions in society. It is about using the current, already extracted resources to generate more value.

Interface and Fuji Xerox

There are pioneer companies who have already started their journey into the circular economy and have started a model growth strategy with circularity in mind. Two of the better-known are Interface and Fuji Xerox.

Interface is the first carpet brand in the world to offer carpet leasing, which allowed them to take back old carpets, put them back into production and recycle them into new products.

Fuji Xerox led the way in revolutionizing the copier industry with its leasing offer in which returned copiers can be re-deployed at other premises before being sent for recycling at the end of their useful life.

Uber and Airbnb

The recent disruptive business models creating the emergence of sharing economy, such as Uber and Airbnb, are a feature of circular economy too. Physical resources that previously lay idle are being utilized through sharing within the wider economy, thereby generating value

IKEA has the ambition to move towards a circular economy, to look beyond the take-make-and-dispose business model to a future where IKEA repairs, takes back and re-sells products, while offering customers a service to rent, share or recycle home furnishings.

The emergence of the circular economy is exactly a demonstration of how sustainability principles can be incorporated into business development. Putting aside the sustainability lens, everything that happens within the circular economy can be explained by classic economic or business theory.

More touchpoints

In the linear economy, a customer would typically only have one transactional touchpoint with the retailer at the point of purchase, unless they come back with voluntary feedback.

less costs

recycle

changing consumer perceptions

*model
growth
strategy*

In the circular economy, whether it is leasing, sharing or taking-back, the customer will inevitably come back to the retailer for an additional touchpoint, thereby providing more insights for the retailer which will enable offers to be better tailored.

Another benefit of the circular economy would be the case when products are being taken back to recycle into new products. Businesses would have better control over and greater knowledge of their supply of materials, therefore mitigating cost increases.

Moreover, in the ever-changing world, with the climate change threat looming, any businesses which can innovate and mitigate the effects of climate change by transforming the way the world produces and consumes will get an edge over competitors. Viewing the circular economy as an added value to deliver innovative sustainable solutions will deliver the next growth opportunity to any company.

Three elements

In order for circular economy to be successful, there are three important elements, namely: collaborative innovation

dematerialization



LEE HUI MIENN is the Head of Sustainability for IKEA Southeast Asia. She heads the sustainability department to strategize on integrating sustainability into everyday business. Prior to this, she was a research scientist working in the area of sustainable manufacturing.

generating value

partnerships, changing consumer perceptions, and the ability to enable an efficient reverse logistics.

The notion of partnerships must be fully embraced by all and must focus on solutions that benefit everyone. Collaboration to leverage each other strengths in order to tackle the complex issues of the day is the way to go in the globalized world. Companies are re-defining their supply chain to find new ways to source materials from unconventional sources such as mining from plastic pollution to support new product development, and preferably, at the same time, supporting poorer communities by providing work for them.

Non-governmental organizations will have to change the tone of their lobbying and find middle ground for collaboration with businesses. They will have to provide their expert knowledge of issues to help devise solutions and innovation for companies which have the resources to scale up.

Creating jobs

Timberland is one brand that has managed to demonstrate this with their Earthkeeper initiative, where shoe soles are made from recycled rubber. There is also the more recent success of their collaboration with Thread International (a social enterprise) where Timberland is using Thread's Ground to Good fabric, harvested from plastic bottles littering the streets and landfills of Haiti. As well as cleaning up the streets, this also creates thousands of jobs in the earthquake-devastated nation.

insights

With all efforts now being made, the consumers on the receiving end must also understand how their purchasing decisions or consumption preferences can influence development and react to the any sustainability initiatives in the right way. The customers should no longer perceive products made from recycled material as being of lower quality.

The way to go

In summary, the circular economy is the way to go as the demand for physical resources increases and supply, on the other hand, diminishes.

As the successor of the Millennium Development Goals that ended in 2015, the Sustainable Development Goals continue to define the common direction and ambition for all stakeholders in a more all-encompassing way. The Goals are more inter-linked and have more clarity and relevance to all stakeholders. With the 17 goals, government, non-governmental organizations, and companies can find way to contribute and collaborate based on their nature of work.

Sustainability today is about social progress with the least environmental impact and consumption at a feasible cost. All stakeholders need to play their part and this will be a solid basis for moving towards a circular economy.

partnerships



“Attractive, dynamic, prosperous”

Writing in the *Financial Times* newspaper in October 2017, Egypt’s finance minister Amr Al-Garhy outlined what he described as “one of the most ambitious economic transformations in our modern history.”

According to Al-Garhy, “The programme includes fiscal consolidation through a reduction of costly subsidies, the flotation of the Egyptian pound, institutional restructuring and broadening the tax base.” It is, he writes “designed to make Egypt a more attractive, dynamic, and prosperous economy.”

With the passage of a new industrial licensing law in August, the government is also seeking to stimulate a recovery in the manufacturing sector. It has been hit hard over the past few years by the effects of political and economic turbulence and, more recently, by the impact of these very same government reforms. For example, the flotation of the Egyptian pound in November 2016 sharply increased the costs of imported equipment and materials. Businesses have also had to contend with hikes in fuel prices that have come as part of the package of reforms agreed with the International Monetary Fund.

The new industrial licensing law provides enhanced powers to the Industrial Development Authority (IDA), a quasi-autonomous agency. The IDA will have sole authority to issue industrial licences, whereas previously businesses required authorization from 11 agencies. The law also

established criteria for industrial projects to be categorized as low-risk, based on health, environmental, safety and security factors, which will secure approval within one week.

One of the first actions that the government has taken since the law came into effect has been to address the problem of factories established without a licence, and therefore not paying taxes. In some sectors, such as food-processing and leather-tanning, unlicensed operators account for more than half of the total number of factories. Bringing these informal operations into the licensing regime should result in increased tax revenue for the government, as well as fostering higher standards of quality and competition.

The *Economist Intelligence Unit* reports that government officials and leading industrialists are expressing confidence that manufacturing output will rise strongly in response to the longer-term impact of government reforms and the prospects of a stable exchange rate and, eventually, a fall in interest rates.

According to official data, manufacturing (excluding oil refining) accounts for about 13% of Egypt’s total Gross Domestic Product. Egypt has a diverse industrial base, with the largest sectors including iron and steel, aluminium, cement, glass, automotive, household appliances, textiles, clothing, pharmaceuticals and food-processing.





Cairo at dusk – the metropolitan area of Egypt's capital is the largest in the Middle East and the Arab world.

Picture: www.istockphoto.com/hadyah

Interview with **Sahar Nasr**,
Minister of Investment and
International Cooperation

“We are open for business”

Empowering women is an issue that you often talk about. Is this feasible in Egypt and what is your overall take on women's empowerment in this country?

Women's empowerment is smart economics. We can only achieve sustainable and inclusive growth through giving women an equal opportunity to play an active role in the economic, social and political sphere. Egypt fully endorses gender empowerment and the President, Abdel Fattah Al Sisi, has endorsed the UN Sustainable Development Goals, where gender mainstreaming is key. I believe that, in order to achieve the Goals, gender mainstreaming is a crosscutting issue. Women and girls must have equal access to education, skills development, the labour force, political participation and all social services, if we really want to be inclusive.

How well is the Egyptian government doing?

Women in Egypt have an important role in boosting economic growth. However, only a third of jobs in Egypt are occupied by women. We believe the female employment rate should rise. Participation by women on the economic and political fronts has already started to increase. Currently, there are 89 women in parliament, almost 15% of the seats, which is the highest it has ever reached, jumping from less than 2% in 2012. So, we are on the right track. ➤

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“We are open for business”

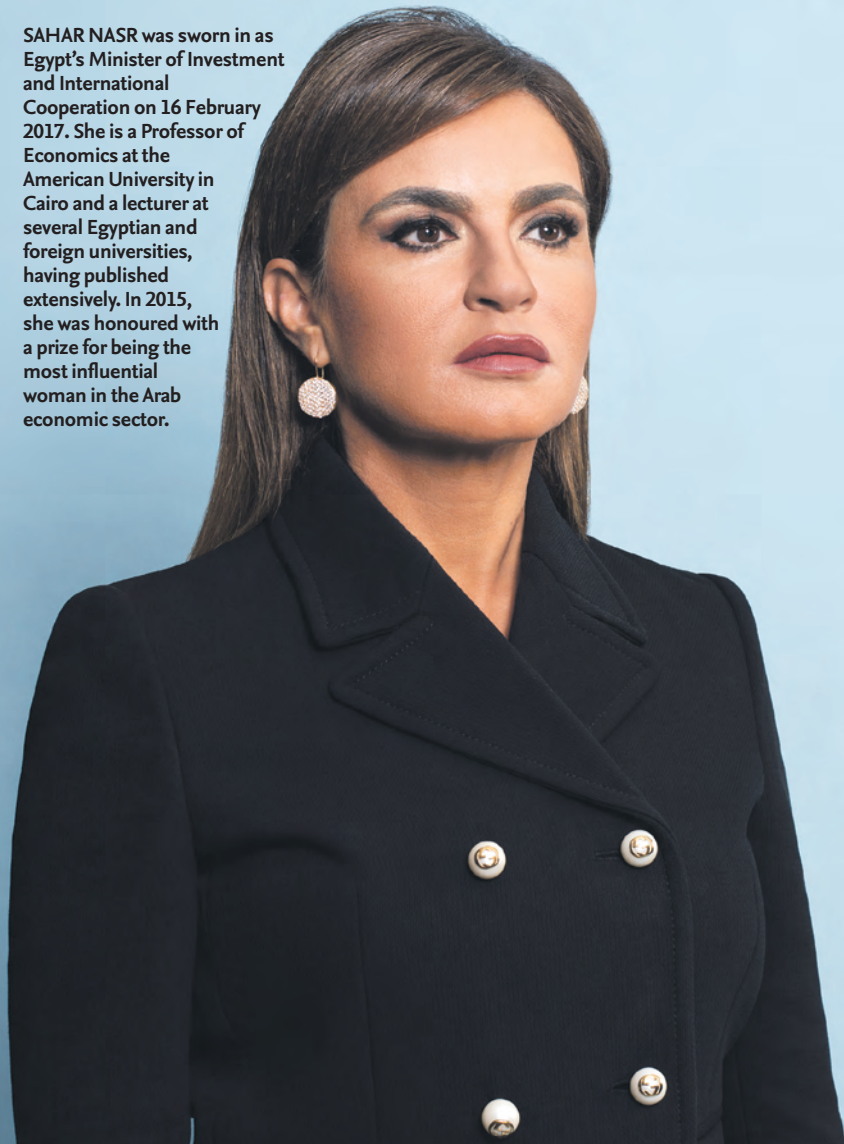
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➤ Any funding or lines of credits that we provide for small and medium or micro enterprises, we make sure that a minimum of 50% is allocated to women and young entrepreneurs. The Ministry of Investment and International Cooperation has also secured funding for small and micro projects that support female breadwinners in the villages and governorates that are most lagging behind.

And, for the first time in our history, we are also working on an investment law that includes an article that specifically states equal opportunities for men and women, with no discrimination. It gives all people equal opportunities to start and develop their own businesses, to expand

and become active entrepreneurs. We have also established a dedicated fund for the economic empowerment of women in collaboration with the World Bank and the New Partnership for Africa's Development (NEPAD), and a special window for women at the Investors Services Centre.

SAHAR NASR was sworn in as Egypt's Minister of Investment and International Cooperation on 16 February 2017. She is a Professor of Economics at the American University in Cairo and a lecturer at several Egyptian and foreign universities, having published extensively. In 2015, she was honoured with a prize for being the most influential woman in the Arab economic sector.



“Our young and talented workforce is a dynamic force for innovation and entrepreneurship.”

2017 was billed the year of harnessing the demographic dividend by the African Union. How is Egypt dealing with the issue of youth? In the same vein, as we now live in a technology and innovation-driven age, how much investment will go into encouraging youth and more young women to enter scientific fields?

Egypt's core asset and main engine of growth is its youth and we have a historical reputation as a regional net exporter of educated and skilled labour. And our young and talented workforce is a dynamic force for innovation and entrepreneurship and hence we are in a position to provide investors with access to talented young labour and entrepreneurs.

In fact, Egypt boasts a large, young, well-trained and highly competitive labour force of around 27 million (more than 30% of the total Egyptian population) with a median age of 23.8 years, compared to 37.9 in United States and 46.8 in Germany. We are also providing a lot of incentives for entrepreneur start-ups through innovative financial products such as venture capital, crowdfunding, equity financing overall.

Youth in general are not very inclined to be in debt and to take up loans and, as such, we have established an Investment Fund here at the Ministry of Investment and International Cooperation, that offers equity financing to young entrepreneurs, both girls and boys, and it is complimented by advisory and technical services which assist them on how to conduct their feasibility studies and allows for training arrangements.

We are also establishing incubators in different governorates to train young people and help build capacity.

I believe that if you build the capacity of the youth, and you give them the knowledge and the skills they need, they are an asset and a much-needed human capital.

Youth are not a burden. They only become so if you don't give them support

and they become detached from the economic sphere and unfortunately sometimes get attracted to destructive behaviours such as terrorism, or even go into illegal migration to other countries. Our youth need to be given hope and opportunities to play a positive and active role in the overall development of their countries.

If I may move to the issue of business, finance and investment, you are leading a ministry mandated with driving these tasks. How do you make the case for "Invest in Egypt"?

Egypt is open for business. A key pillar for the economic reform is improving the business environment and promoting more private sector participation. We are moving forward with major reforms to achieve a conducive investment climate, able to attract investments in all sectors: energy, agriculture, industry, tourism, education and healthcare. We are working on different fronts: legislative reforms changing the legal and regulatory framework, so that it is more friendly and conducive to investors; secondly, institutional reforms because the law alone is not sufficient.

More important is the operationalization and implementation of the law on the ground, through capacity building, automation and advanced technology. Cut red tape, streamline procedures and remove bureaucracy, because, at the end of the day, we are operating in a very competitive environment and therefore we have to ask how we can ensure a comparative advantage.

Egypt has launched a great and comprehensive governance and anti-corruption strategy, which offers better quality services by the government, holds government institutions more accountable, raised citizen satisfaction, and strongly contributed to the achievement of Egypt's development goals.

We have a clear vision, and we are keen

on enhancing private sector development and are committed to enhancing the investment environment as part of its broader macroeconomic strategy.

And how are investors reacting to these reforms?

Investments in various fields are growing as a reaction. Numbers are an excellent proof of this. In Egypt, economic growth exceeded expectations to record 4.2% in financial year 2017, marking an outstanding performance given the several shocks to the economy. As a result, unemployment inched down to below 12% in the second quarter of 2017, the lowest rate since 2011.

Although inflation has been a challenge, there has been some easing – recent figures show a declining trend. Monthly inflation in August 2017 was down to 1.1% compared to 3.2% the previous month. Also, annual inflation is decreasing rapidly, and it is expected to subside more in the coming months. So, overall macroeconomic indicators are positive, and this has been reflected and translated into Egypt's ranking in several recent international reports and ratings.

Recent trends for investment in Egypt showed an outstanding improvement. Private investment is expected to grow by 18% in FY 2017 to reach US\$15.1bn, continuing the uptrend since the 2014 financial year. FDI grew significantly in fourth quarter of FY 2017 by 29% compared to the same quarter the previous year, making total net Foreign Direct Investments (FDIs) for FY2017 grow by 14% to reach US\$7.9bn. Egypt was actually ranked the top African country attracting FDI in 2014, and one of top five countries globally attracting FDI in 2016.

The improvement in the business climate is also reflected in large improvement in the business entry rate.

● *The above is an extract from the interview by reGina Jane Jere, editor of the New African Woman magazine. © IC Publications 2017 – www.icpublications.com*



Profile of Xinzhou Bamboo, a company using innovative bamboo winding technology to produce low-carbon, long-lasting and cheaper piping

Opening the bamboo curtain

Bamboo is one of the fastest growing and most powerful plants in the world. According to Hans Friederich, Director-General of the International Network for Bamboo and Rattan (INBAR), “Bamboo has thousands of uses – from paper and packaging to furniture and flooring – and we are discovering new applications every year. We have even heard of bamboo being used for wind turbine blades! People are always surprised at the products bamboo can make. This is because of the plant’s amazing properties: it is flexible but also very resilient, and as a member of the grass family, reaches maturity far quicker than most types of tree.”

Bamboo can be fully mature in just three years, whereas hardwoods like oak take at least 40 years to mature before they can be harvested. There are about 22 million hectares of bamboo in the world, and around one third of them are in China.

China also has a lot of pipelines – some 120,000 kms of oil and gas lines alone, according to Yicai Global, the English-language news arm of Yicai Media Group, one of China’s leading financial news services.

Bamboo pipes

YE Ling put the two together. With decades of experience in research and development of composite pressure pipe and containers behind him, in 2006 Ye pioneered wound

bamboo composite pipeline technology. In the following year, he established a research and development team to test the feasibility of the concept. Today, Ye is director of the Engineering Research Centre for Bamboo Winding Composites (ERCBWC), part of the State Forestry Administration, and is chairman of the board of Zhejiang Xinzhou Bamboo-based Composites Technology Co., Ltd. (Xinzhou Bamboo).

Xinzhou Bamboo, based in Hangzhou, the capital and most populous city of Zhejiang Province in east China, concluded its research into the commercial application of



“Bamboo can be fully mature in just three years, whereas hardwoods like oak take at least 40 years to mature.”

Ye’s wound bamboo composite pipeline technology in September 2016 and now has three production centres in operation. The total production capacity is planned to reach 10 million tonnes by 2020.

The company uses bamboo as reinforced materials, processing the thin-walled and hollow bamboo into a continuous strip of sheet material. Bamboo winding pipe has the advantage of high-compression strength, doesn’t corrode and has outstanding electricity and thermal insulation performance. It can replace most welded steel pipe, polyethylene pipe, pre-stressed steel tube concrete pipe and other traditional pipes in the market, and can be widely applied to municipal water supply and drainage pipe networks, irrigation and other water transport areas. It has the potential to significantly reduce the use of plastic, steel and cement.

Unlike plastic, steel, cement and other traditional pipe materials, the wound bamboo composite pipes are environmentally friendly. Bamboo is a sustainable, low-carbon resource. As Ye proudly says, “Replacing traditional pipelines with wound bamboo composite pipelines means replacing high-polluting, high-energy-consuming, non-renewable materials with renewable resources,” adding that it also means saving money. Even conservative estimates suggest that they can reduce costs by 20%.

Saving the climate

According to WWF, “The energy consumption in whole production process of a unit length of bamboo winding pipelines only amounts to one quarter of that of welded steel pipe and one third of the polyethylene pipe. Globally, if 20% of the welded steel pipe and 10% of the polyethylene pipe could be replaced by 2025, 63 million tonnes of CO2 emissions will be avoided annually.”

At present, Xinzhou Bamboo is the only enterprise to specialize in wound bamboo composite materials, but Ye would like to see that change. He told INBAR, “Bamboo is a vital resource for combating climate change. Its unique properties allow it be used to create a range of products. With the support of the government of China, the bamboo sector is constantly evolving.”

He has the support of the Chinese government, which has listed bamboo winding composite pipe as a national key low-carbon technology, laying the foundation for large-scale promotion. Ye’s initiatives coincide with a growing demand for pipelines. It is estimated that by 2020, China’s oil and gas pipelines will reach 150,000 km and that by 2025 there will be some 240,000 km. China’s forestry administration projects that 500 large-scale production units for wound bamboo materials will be built in China by 2020.

Around the world

Ye’s promotional efforts include participating in international seminars and entering cooperation agreements with other institutions. In December 2016, Ye’s research centre signed a memorandum of understanding and cooperation with INBAR.

“INBAR will introduce and promote this innovative technology to its 42 member states,” said Director- General Friederich. “All our members, with the exception of Canada, produce bamboo. And many other



“Ye believes that the technology could also be adapted for use in high-speed railway carriages and aircraft fuselages.”

countries in Latin America, Asia and Africa have abundant bamboo resources. They will certainly be interested in this composite technology.”

Friederich is enthusiastic about the technology. “The work that the ERCBWC is doing is significant. It shows the potential of bamboo to be used in large infrastructure projects, such as China’s Belt and Road Initiative. We hope to see more and more countries and companies exploring sustainably produced bamboo products as replacements for cement, steel, and timber.”

Ye maintains that bamboo composite pipes should be the material of choice in a variety of areas: not only in the oil and gas industries, for moving water and wastewater, in the telecommunications and chemical industries. He believes that the technology could also be adapted for use in high-speed railway carriages and aircraft fuselages.

On the (continuing) importance of manufacturing

by **Nobuya Haraguchi**, Industrial Research Officer, UNIDO

In the midst of increasingly pessimistic views on industrialization in developing countries, UNIDO's research shows that the importance of manufacturing in economic development has not changed or, more likely, has increased over the last 40 years.

Manufacturing has traditionally played a key role in the economic development of developing countries. However, recently it has been argued that the importance of manufacturing has diminished over the last 20–25 years, resulting in premature deindustrialization or non-industrialization in developing countries. The argument is largely based on an analysis that shows that since 1990 the manufacturing's shares of value added in Gross Domestic Product (GDP) and of employment in total employment have declined across all income.

This analysis is based on adding the shares of developing countries together and then calculating an average. The average picture, however, does not really show whether the role of manufacturing in economic development has changed.

For example: let's say there are only two developing countries in the world: Country A with population of 1,000 and Country B with 100 people. Before 1990,

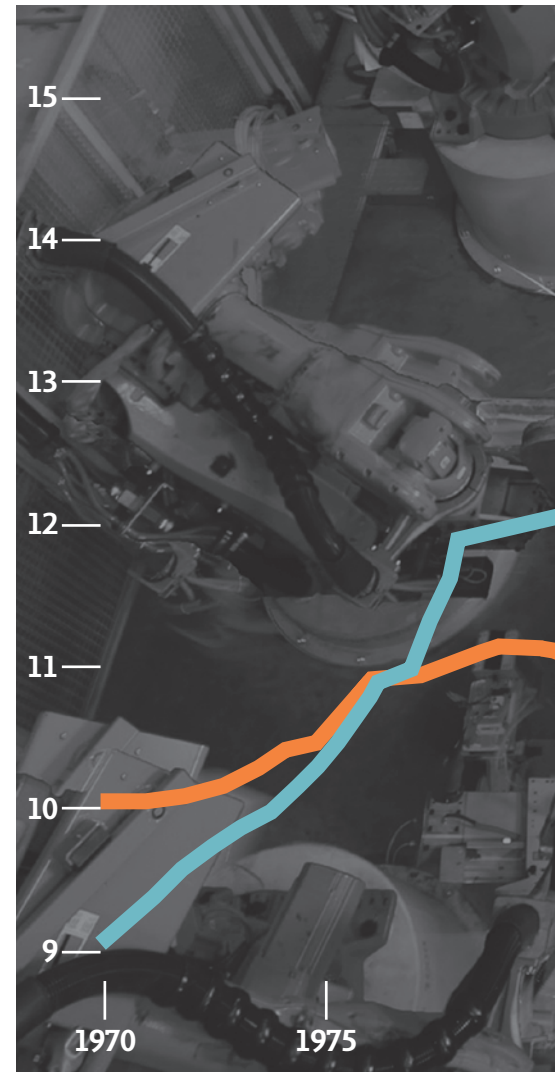
out of 1,000 people, Country A employed 230 in the manufacturing sector, and Country B employed 25 out of 100 people in the manufacturing sector. After 1990, with no change in population in either country, Country A employed 300 in the manufacturing sector, while in Country B the number declined to 15.

If we look at the average share of manufacturing employment, it declined from 24% to 22.5%. However, this does not mean that manufacturing employment has decreased relative to agriculture and services. In this example, the number of people employed in manufacturing increased from 255 to 315, representing an aggregate increase of 23% to 28.6%.

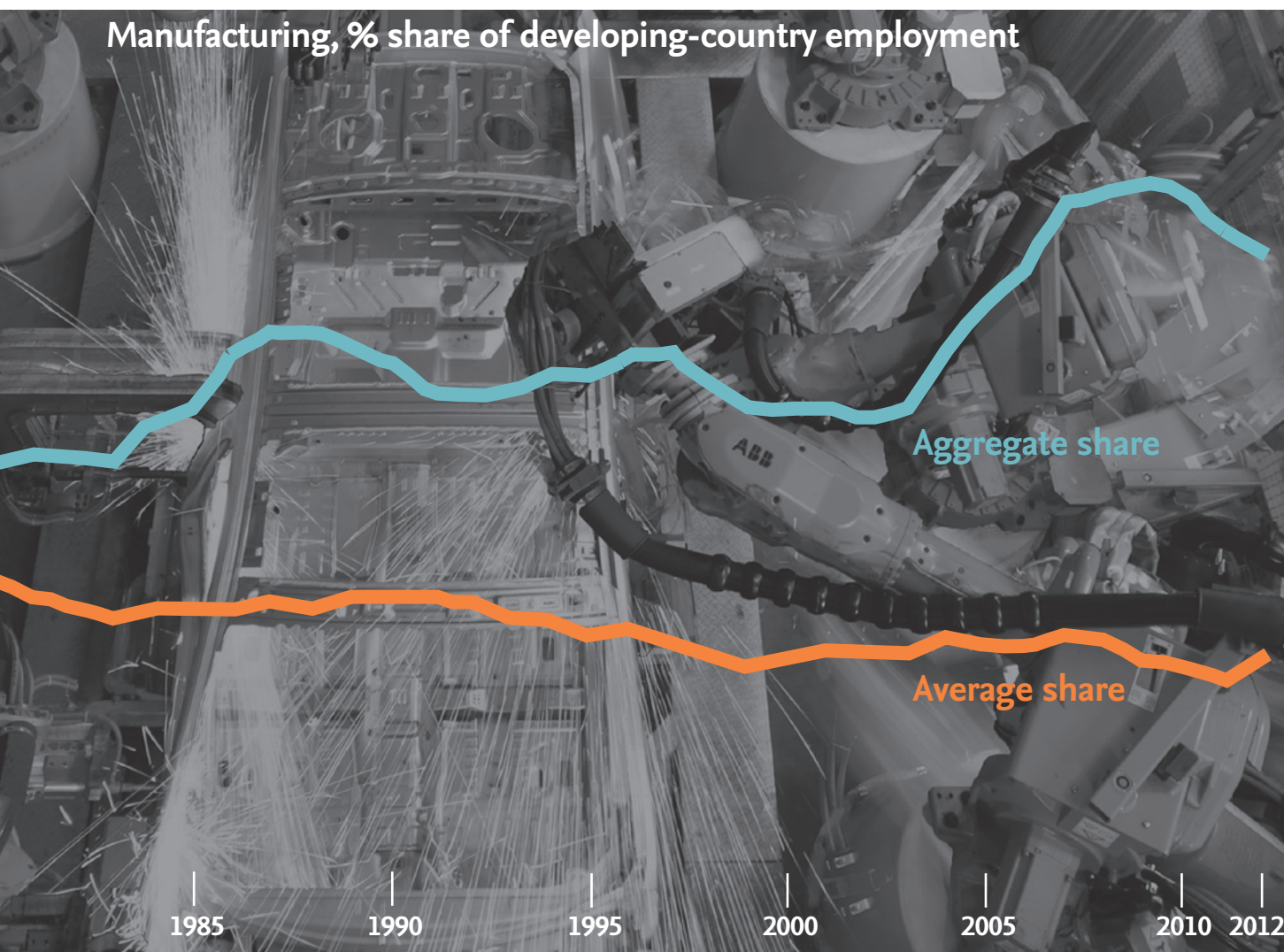
To see whether the importance of manufacturing employment has changed, we have to look at the aggregate picture. See the difference between the average and aggregate share in the real world since 1970 in the graph (right).

In the same way, the share of aggregate manufacturing value added in the total GDP of developing countries has not changed at current prices and has increased at constant prices over the last 40 years.

In short, in terms of both value added and employment, the importance of



manufacturing in economic development has not changed over the last 40 years and has, in fact, most likely increased. In the last two decades, in comparison with the previous two, populous large countries like the BRICS (Brazil, Russia, India, China and South Africa) have been particularly successful in industrial development, and hence agglomeration of manufacturing activities, relative to



smaller countries. These successful large countries are upgrading their industries, moving towards a structure typically seen in high-income countries where capital- and technology-intensive industries and services often play a more prominent role in the economy.

This industrial upgrading, in turn, leaves more space for low and lower-middle-income countries to develop

Source: 'The Importance of Manufacturing in Economic Development: Has This Changed?' by Haraguchi, Cheng and Smeets, *World Development* (93), 2017, p330.

labour-intensive industries. Manufacturing would then perhaps become more, not less, important for low and lower-middle income countries.

Thus, the recommendation for developing countries is to not turn away from manufacturing and abandon the path of economic development through industrialization, but to emulate the experience of rapid industrialization that has occurred even in recent years.

Towards a new consensus on the principles of policymaking for the contemporary world

At the end of a meeting of 13 eminent economists – including four former Chief Economists of the World Bank – on 16-17 September 2016, in Saltsjöbaden, Sweden, the group issued a statement of the consensus reached among them.

SUMMARY OF THE 'STOCKHOLM STATEMENT' (source: United Nations University – World Institute for Development Economics Research)

1. The challenge of development

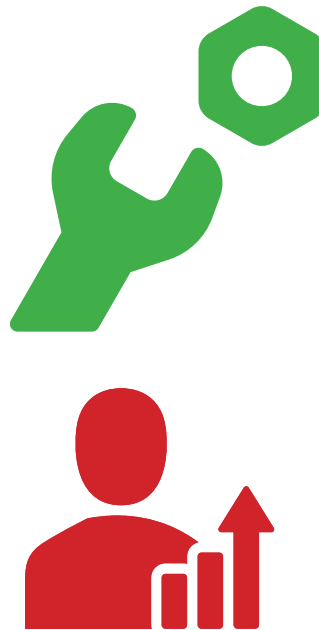
It is now evident that some of the recommendations of more traditional economics were not valid. Policymakers cannot rely on simple policy guides such as holding the fiscal balance in check, using monetary policy to control inflation, providing macroeconomic stability, and then leaving it to the market to do the rest.

2. GDP growth is not an end in itself

While policies to promote GDP growth are needed, that must not be an end in itself but a means to creating the resources needed to achieve a range of societal objectives, which include improved health, education, employment, security, as well as consumption.

3. Development has to be inclusive

Policy should help ensure that development is socially and economically inclusive, and does not leave behind groups of the population – whether identified by gender, ethnicity, or other social indicators.



● The group issuing the Stockholm Statement consisted of Sabina Alkire, Pranab Bardhan, Kaushik Basurk, Haroon Borat, Francois Bourguignon, Ashwini Deshpande, Ravi Kanbur, Justin Yifu Lin, Kalle Moene, Jean-Philippe Platteau, Jaime Saavedra, Joseph Stiglitz and Finn Tarp.

● Full statement: www.wider.unu.edu/sites/default/files/News/Documents/StockholmStatement.pdf

4. Environmental sustainability is a requirement, not an option

Development policymaking must take on environmental sustainability as a central objective.

5. The need to balance market, state, and community

Development policy has to build on a judicious balance among market, state, and community. It is important to recognize that markets are themselves social institutions which need a framework of efficient regulation to deliver on their promise of efficient economic allocation of resources.

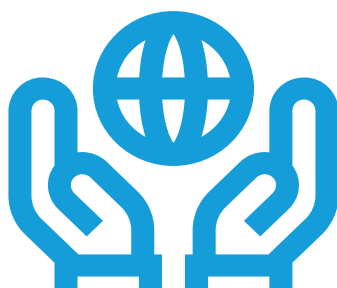
6. Providing macroeconomic stability

Economies with greater stability succeed in having greater growth, with further enhancement of wellbeing. Macroeconomic stability entails managing policies to keep the economy on an even keel and paying attention to longer-term implications of today's policy actions, notably ensuring fiscal and external financial sustainability.



7. Attending to the impact of global technology and inequality

Automation, the rise in robotics and the globalization of the labour market not only displaces labour, it replaces the earnings of workers with higher profits for corporations and the owners of machines. These consequences are a concern that must be addressed without converting this into a global labour-versus-labour tussle.



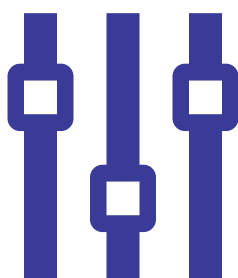
8. Social norms and mindsets matter

Our values and culture are not just important in themselves, they also affect how an economy performs. A society in which people have trust in one another does better than one in which people do not.



9. Global policies and the responsibility of the international community

Global forces increasingly frame the development policy options open to national governments. They present constraints and opportunities and are themselves, in turn, determined by actions in other countries.



10. Looking forward

If countries follow pragmatic policies of balancing market, state, and community in addressing development challenges, and if the international community works together to relieve the constraints of global forces and take advantage of the new opportunities being afforded, the technological progress the world is experiencing can be translated into progress in wellbeing for all, including the most deprived.



The digital industrial revolution: will African countries sink or swim?

by **KARISHMA BANGA**, Senior Research Officer at the Overseas Development Institute (ODI)

The digital economy is here, and is rapidly growing, ushering in the Fourth Industrial Revolution. Though definitions have evolved over time, it is broadly agreed that the digital economy describes a worldwide network of economic and social activities enabled by digital technologies, including mobile and communication networks, 'cloud computing', artificial intelligence, 'machine learning', 'internet of things' and 'big data'. Such new and cutting-edge technologies have led to creation of 'smart machines', such as driverless vehicles and cognitive robots, as well as widespread adoption of 'smart platforms' like Google, Amazon, Apple, Facebook and Alibaba.

Digitalization of the economy, through the increasing use of digital technologies, is changing the global landscape of manufacturing, presenting both challenges and opportunities in less-developed countries. Often an alarmist approach is taken while discussing the future of manufacturing-led development in African economies, which have traditionally used manufacturing as a first step towards economic transformation and employment generation. However, considering that many African countries

are yet to industrialize, digitalization may not directly impact them to the same extent as their developed counterparts. At the same time, it is important to not underestimate the power of technology to bring about disruptive change. It is essential for African countries to not only boost manufacturing but also adapt to the changing nature of manufacturing and prepare for the digital future.

How big is the digital divide?

Internet penetration – that is, the share of population with access to the internet – is often used as a proxy for digitalization, based on the assumption that internet is the basic and necessary condition to digitalize. Internet penetration has grown by 5% in developed countries, compared to 15-20% in developing countries (World Economic Forum, 2015), and some sub-Saharan African economies have witnessed remarkable growth in internet

“It is essential for African countries to not only boost manufacturing but also adapt to the changing nature of manufacturing and prepare for the digital future.”

penetration, particularly Ghana, Nigeria, Rwanda and Uganda. Yet developed countries still dominate the internet economy, with a staggering 78% share overall. In fact, the internet economy's contribution to GDP in developed countries (3.4%) is more than three times the internet economy's contribution to GDP in African countries. Moreover, of those countries with less than 10% internet penetration, most are African. These statistics suggest that the capability of African economies to be competitive in digitalised trade is low.

Globally, there is vast disparity in country shares in e-commerce across developed and developing countries: just six countries – China, France, Germany, Japan, the UK and the US – occupy 85% of cross-border e-commerce trade, of which all except China are developed nations. Developing economies are also lagging behind in deployment of 'smart machines' – devices with machine-to-machine and/or cognitive computing technologies. Data from the International Federation of Robotics shows that in 2015, around 75% of robot sales were concentrated in just five markets: China, Germany, Japan, the Republic of Korea and the US. Africa's share in global robot sales was just 0.2% in 2014.

Challenges for developing countries

In the race to digitalize, many developing countries (with the exception of China) are clearly falling behind. This is likely due to prohibitive costs of capital in these countries and low 'digital-readiness' in terms of infrastructure and skills. Many African countries are still struggling to industrialize, and in some cases lack even basic infrastructure – for instance, a reliable power supply, roads, ports and telecommunication – showing the need to primarily invest in these areas.

While this suggests that the direct

impact of the growing digital economy on African countries may be limited, digitalization can indirectly impact them by affecting global competition and changing the criteria of what constitutes an attractive manufacturing location. The emerging digital technologies may lower the costs of coordination and trading, thereby strengthening global value chains and enabling smaller firms to access international markets.

But there are also risks of manufacturing activities being re-shored back to the developed world, as was the case with Phillips shavers and Adidas shoes. Moreover, goods in the digital economy are much more advanced and may require good infrastructure, research and development, and skilled labour at all points along the global value chain, leading to concentration of manufacturing in developed countries, and pressure on wages in less developed economies.

A central concern in the debate on digitalization is that of a 'jobless future'. The International Federation of Robotics estimates that more than 2.5 million robots will be at work by 2019, indicating a 12% growth in deployment of robots between 2016 and 2019. *McKinsey's* 2017 report estimates high percentages of jobs in African countries that will be automated away— 52% in Kenya, 46% in Nigeria and 50% in Ethiopia. However, recent case studies suggest that low- and middle-income economies need not be alarmed; if we break down occupations into tasks, with distinct levels of automatability, then the share of jobs that can be automated away falls to 2-8%. That said, these estimates do not account for the 'potential' jobs that may be lost by never being created, and the sizeable number of informal jobs in many developing and less developed countries.

Adapting to the changing nature of manufacturing

1. Boost manufacturing

Using the window of opportunity in less-automated sectors

The impact of technology depends on the type of technology employed, and varies across countries and sectors. There are some sub-sectors in which technological change has been slow until now – such as food, beverage and tobacco products, basic metals, wood and wood products, paper and paper products, and other non-metallic minerals. These sectors present opportunities for LDCs to undertake local production and regional trade.

Using a dual-track approach to industrialization

Countries should look to develop agro-processing and attract investment in higher value-added export-based manufacturing activities. A move towards services can also serve as an alternate path to development. Beyond improving the investment climate, effective policies include improving firm capabilities, innovations systems and direct financing opportunities.

2. Digitalize manufacturing

Become digitally-ready

Analysis by the Supporting Economic Transformation programme on the future of manufacturing in sub-Saharan African countries suggests that both technological progress and digitalization increases labour productivity. But, while the impact of technological progress is higher in low-income and sub-Saharan African countries, rendering support to convergence, the impact of digitalization is lower in these economies. Moreover, the impact of technological progress on

productivity increases as a country digitalizes, but this impact is also lower for low-income countries and sub-Saharan African countries. These findings may indicate a significant difference between low-income countries and high-income countries in 'digital-readiness'. Further results confirm that the impact of both technological progress and digitalization increases as the work-force becomes more skilled, highlighting the importance of becoming digitally-ready by investing in skills development.

Skills for the future

Data is key to examining the sectors into which the labour force should move in the next few years. Previously, skill development strategies focused on moving from agriculture to manufacturing in less developed countries, and from manufacturing to services in more developed economies. On the future of work, the Graduate Institute's Prof. Richard Baldwin suggests that with the rise of digitalization and consequently 'tele-migrants' and robots, soft-skills such as managerial skills, team-building skills and teaching will become more important. Although the pace of change in adoption of 3D printers has been relatively slow, as 3D printers become more affordable, design capabilities will become important. This can create important opportunities for developing economies to leverage their design and creative skills in the growing digital economy. The spread of 3D printers to developing economies can also lead to de-centralization of manufacturing and customized production on demand.

With an expansion of the 'digital labour-force', work may become increasingly precarious. To ensure that workers are not treated as digital commodities, it is important to re-orient social protection in the digital economy to follow people, rather than companies.

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