

# Bangladesh's path forward in nanotechnology

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**A**BILITY to manipulate matter at the nano-scale, fuelled by discoveries of fullerenes and carbon nanotubes, has established the field of nanoscience and nanotechnology during early 1990's. Scientists, engineers, and policymakers alike recognised the promises of this technology and its applicability to a vast array of disciplines. Initiatives thus were undertaken to move it forward from something merely cutting-edge to a transformative new technology 'wave'. The efforts were led by the United States' strategic nanotechnology initiative, which started since 1998's Nano-scale Science, Engineering, and Technology subcommittee and culminated in the year 2000 via 'National Nanotechnology Initiative, NNI', a co-operative of 26 federal agencies to foster nano-related research.

Three years later, the US Congress signed the '21st Century Nanotechnology Research and Development Act' to further institutionalise federal focus on nano-related research. In parallel, national initiatives were taken up by Japan and the Western European Countries; while India and Brazil joined in the bandwagon in 2002.

It is anticipated that by 2020, nano-related businesses will reach the trillion-dollar mark, with a potential global employment of 2 million.

In the last decade, when countries like China, South Korea, Russia, Iran, Philippines, Sri Lanka, Pakistan, Indonesia, Malaysia, Taiwan, Singapore, Turkey, Australia, and even African nations began their efforts on nanotechnology research, education, and commercialisation, Bangladesh has been left out of this journey. This article aspires to briefly pres-

ent global initiatives and attempts to outline possible strategies for Bangladesh strictly based on this author's opinion that can be followed for establishing a successful nano-initiative.

There is no universal model of technological progress. So, there should not be a misperception that Bangladesh, or any other emerging country, must walk on the footsteps of countries/regions of the advanced world.

Such impressions result in immature conclusions as: pursuance of advanced technologies, e.g., biotechnology or nanotechnology, is inappropriate for developing countries like Bangladesh. The list of apprehensions typically includes: high research expenditure, inefficient use of equipment, failed market transfer, unachieved milestones, etc.

Technological development, however, does not require following the prescribed models of advanced (or any other) economies. Technology develops as per the strength of a society and fiscal ability of a country or sometimes gains impetus via a national crisis.

Thus technological development can occur anywhere as long as it follows a paved path of the host country; such was outlined in Piore and Sabel's "The second industrial divide: possibilities for prosperity".

In the subsequent paragraphs the article will discuss different models that were followed globally to aspire or attain growth in nanotechnology.

Though nanotechnology development was not pursued following a specific growth model, there are a few overall strategies that can be identified. The three nano-leaders, namely: USA, Japan, and Western Europe, invested hundreds of millions, expedited market transfer, and embarked on a comprehensive nanotechnology development. Later, China and South



Korea followed a similar path and have been successful.

Such a model might reinforce common apprehension that this is not for us. Here is where some of the other efforts need to be highlighted; Brazil's structured institutionalisation, Philippines' decade long roadmap, Sri Lanka's human resource development, or India's focused research and education initiatives are all unique and tailored to their national capacities and national priorities.

Similarly, Bangladesh can and should design its own nano-initiative, evaluating the strengths and needs of the nation. When countries like Pakistan, Indonesia, Vietnam, and regions like Africa are getting involved in nano-related research, education, or industries, it is imperative that we proceed toward this journey immediately.

Two of the leading nations among the BRICS, i.e., Brazil and India, adopted distinctly different paths toward nanotechnology. Brazil was

very cautious and took gradual and structured measures. Initially it funded four proposals, followed by establishment of national centres of excellence.

The centres networked existing research facilities, involved more than 250 researchers within the first three years (by 2005), and pursued international regional collaboration, particularly with Argentina.

Research funding for Brazilian nano-initiatives grew since then and expanded to more than 40 institutions with greater than 6,000 publications, as an outcome of an investment of \$100 million.

India on the other hand established a two-pronged approach for nanotechnology. The first was development of human resources via technical training, academic programmes, and establishment of nano-institutes, producing expert labour force for their future nano-industries.

In parallel, India identified three areas of focus, namely: health,

energy, and environment. They also formed a three-tiered structure

where academic institutes served as 'knowledge generation bodies', incubator and technology clusters served as 'knowledge transfer bodies', and industry and professional associations served as 'knowledge application bodies'.

It is safe to assume that following either a co-operative and step-by-step approach or structured two-pronged path; Brazil and India had been propelled to the top of the list of the BRICS emerging countries.

Philippines surprisingly jumped into the technological race using nanotechnology as a vehicle. Their Department of Science and Technology announced a decade-long nanotechnology roadmap for Philippines in 2009.

The roadmap outlined a three-level development that includes: assessment of global need; identification of national academic; technical, and financial strengths; and pursue nano-related research and commercialization in five specific areas, i.e., information and communications technologies, food and agriculture, energy, health, and environment.

Such a roadmap reminds Israel's initial nation building efforts, when a long-term technological roadmap was laid out to guide the countries future development. Establishment of Technion served as a cornerstone of one of the most technologically influential countries in the world.

Bangladesh doesn't necessarily need to emulate Philippines' effort in nanotechnology, however, will be tremendously benefited from a planned technological roadmap that it lacked since its birth.

As we know and recognise that technology has always been an after thought for our development; digging up any of the five-year plans will

serve as a testament to this statement.

A well thought-out and appropriate roadmap for Bangladesh is badly needed.

What should be the strategy for Bangladesh? How should we develop such a strategy? How can lessons from global initiatives help curve our own path? The author believes that Bangladesh should pursue a hybrid strategy: combining human resource development with commercial ventures of nano-enabled products.

The reasons are simple: extraordinarily talented younger generation and highly energetic and able industrial sector.

Due to the precedence of unsuccessful technological ventures, Bangladesh should also adopt a long-term road map with achievable milestones and opportunities for change of direction. We can learn from Philippines on how to design a successful roadmap.

The academic training programme can follow either India's multi-tiered approach -- high school, university, and professional levels -- or can adopt Sri Lanka's concentrated academic training approach.

The commercialisation strategies should also be focused on a few industries; can be agriculture, garment, or pharmaceuticals. These are mere suggestions from a singular point of view of a scientist and should not be perceived as a comprehensive and most appropriate strategy that will suit Bangladesh.

What we need is a whole-hearted effort from technocrats, economists, academicians, business community, and government officials to come together and device a path forward for nanotechnological development in Bangladesh.

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# No respite for euro zone in long rebalancing slog

Reuters, London

**T**HE euro zone crisis is entering a new, treacherous phase for governments, which can only cross their fingers that slow-burn reforms will pay off before voters get fed up with austerity and high unemployment.

On the face of it, 2013 should be a much less traumatic year than 2012 for the 17-nation single-currency area.

Financial conditions have improved enormously since the European Central Bank promised to do whatever it takes to preserve the euro. Yields on the bonds of highly indebted peripheral countries have fallen sharply, bank funding strains have eased and stock markets have rallied.

Countries on the southern rim of the euro zone have made big strides in reducing their budget and trade deficits. They are no longer living way beyond their means. They have also introduced politically touchy structural reforms, notably to make their labour markets more flexible.

But demand is likely to remain weak, while unemployment, already at a record 11.8 percent, is forecast to rise further before it comes down. Recovery will be slow.

"They've taken the medicine, but they're not going to jump out of bed straight away," said Sebastian Barnes at the Organisation for Economic Cooperation and Development in Paris.

"The problem is bridging the gap over the next two or three years when you're putting in place the right policies but they're not quite bearing fruit. So it's a question of managing public expectations," Barnes, adviser to the rich-country forum's chief economist, added.

Berenberg Bank said all forward-looking indicators point to a resumption of growth this spring, which should further reduce the euro zone's aggregate fiscal deficit to below 2.5 percent of GDP in 2013. It stood around 3.4 percent last year, down from 4.1 percent in 2011.

What's more, Italy, Spain, Portugal, Ireland and Greece shrank their combined current account deficit to an estimated 1.5 percent of GDP in 2012 from 7 percent in 2008 and look set to balance their external accounts this year.

But Holger Schmieding, the bank's chief economist, said the single currency was not out of the woods yet.

"Despite impressive progress, serious risks remain. The euro zone needs growth in its



**A German, French and an EU flag flutter over the German lower house of parliament in Berlin yesterday, during a day of celebrations marking the 50th anniversary of the Elysee Treaty.**

major markets abroad and the political patience to stay the course at home," he said in a note.

A nagging worry is that the euro zone is making up for its economic mistakes through what Barnes calls "bad rebalancing".

So, while rising exports have played a role, the improvement in the periphery's current account has been achieved mainly by slashing imports.

And the reduction in relative wage costs needed to bring about 'internal devaluation' -- the only devaluation available in the absence of exchange rate flexibility -- has so far been engineered disproportionately through a rise in unemployment rather than wage moderation.

Ireland is a notable exception -- as is Britain outside the euro zone -- and Barnes said there were encouraging signs elsewhere, for example in Spain.

Italy, however, has barely touched its wage bargaining system. "The problem there is that wages have run ahead of productivity," he said.

Gilles Moec, an economist with Deutsche Bank in London, also frets about Italy. Italy has its government deficit under control, but Moec sees signs of a growing 'employment overhang', linked to what he says is extremely

slow financial rebalancing by the private sector since the onset of the crisis.

This is reflected in a rise in employee compensation in Italy as a percentage of corporate value-added to 57.7 percent from 52.5 percent in 2007.

By contrast, in Spain, where unemployment of 25 percent is more than twice as high as Italy's, the wage share dropped over the same period to 55.9 percent from 64.7 percent.

Rebalancing, in short, is far from complete. That is true for creditor countries, too. Germany's current account surplus is stuck at a stubbornly high 6 percent of GDP, reflecting weak investment and consumption.

Goldman Sachs has attempted to measure the progress being made in ironing out the imbalances by updating its estimates of the real exchange rate changes needed to bring countries' net debt positions -- the result of accumulated annual current account deficits and surpluses -- back into broad equilibrium.

In keeping with improvements in their current accounts, Greece, Portugal and Spain now require an inflation-adjusted depreciation that is about eight to 10 percentage points lower than two years ago, Goldman reckons.

# Airlines turn profit from EU freeze on carbon tax: environmentalists

AFP, Brussels

**A**IRLINES made up to half a billion euros in windfall profits last year by passing on a carbon surcharge to travellers despite an EU decision to freeze its controversial carbon tax, environmentalists said on Tuesday.

Green group Transport and Environment said airlines chalked up extra revenues estimated at 486 million euros (\$650 million) even though EU climate commissioner Connie Hedegaard in November decided to "stop the clock" on an EU carbon tax angering the global aviation industry.

She offered to freeze the measure for a year on flights to and from non-European nations amid hopes of negotiating a global CO2 emissions in the framework of the International Civil Aviation Organization (ICAO).

But Transport and Environment said that airlines throughout the year had

passed on the cost of their permits to pollute to passengers even though 85 percent of the permits were allotted free, enabling carriers to make up to 1.3 billion euros in windfall profits in 2012.

And the EU freeze had enabled them to make extra profits, the group said.

"The 'stopping of the clock' proposal turns revenues raised by airlines to cover the costs of their CO2 permits into additional windfalls," it said.

Asked for comment, Hedegaard's spokesman said "all we can do is ask for greater transparency in tariffs," said Isaac Valero, spokesman for Hedegaard.

The EU imposed the scheme on January 1 last year, but 26 of ICAO's 36 members, including India, Russia, China and the United States, opposed the move, saying it violates international law.

The EU tax forces airlines operating in the bloc, whatever their flag, to buy 15 percent of their carbon emissions, or 32 million tonnes, to help battle global warming.

# New Dutch Eurogroup boss is austere bridge-builder

AFP, The Hague

**D**UTCH Finance Minister Jeroen Dijsselbloem's reputation as an austere bridge-builder will serve him well as the new head of the Eurogroup, coordinating deficit-busting policies in the crisis-hit eurozone.

But Dijsselbloem, 46, had just 11 weeks of ministerial experience on Monday, when the relative unknown was elected to lead the battle against the 17-member eurozone's worst crisis yet.

"A staggering strategist," according to Dutch financial daily the Financieele Dagblad, Dijsselbloem -- pronounced 'day-sell-bloom' -- is also, says the centre-left De Volkskrant, "a little stuffy and as loyal as a guide dog".

Protestant daily Trouw describes the curly haired minister with a slightly pinched face as "a likeable man behind a mask of rigidity".

"He's an affable man in private but

always very serious when you talk about work," said Staf Depla, who along with Dijsselbloem and current Labour leader Diederick Samsom was part of the so-called "Red Engineers".

The three men took their name from their scientific backgrounds -- Dijsselbloem studied agricultural economics in the Netherlands and business economics in Ireland -- and campaigned for 2003 elections by visiting low-income neighbourhoods and calling for better integration of Muslim immigrants.

Campaigning in appropriately red jumpsuits, the trio shocked the Labour (PvdA) party's old guard by suggesting that immigrants had duties and should be educated about Dutch society -- ideas more usually associated with the far-right.

Dijsselbloem acquired a reputation as a strategist, quietly working away from the limelight, and for years held planning roles within the Labour party