SMT PROSPECTS & PERSPECTIVES

New Year Outlook: China's Five Year Plan

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Once again, it is time to look at the year ahead. This relished tradition puts me on the spot to think more intensely about the coming year. In this first column of the New Year, I usually take a long view on market thrusts in the anticipated global economic landscape, as well as mega-technological trends, which include: the highlights of macro-economy outlook, China factor, oil dynamics, cyber security, and grand challenges in technology and the path forward.

Reflecting on 2015, China was under an unusual light as the world watched its economic slowdown and other unprecedented and/or unexpected events unfold. Moreover, 2016 bears new milestones for China. Beijing will reveal a new Five-Year Plan (FYP) for 2016–2020, which is the very first FYP under the Xi Jinping administration. The yuan has also been added to the IMF's Special Drawing Rights (SDR) currency basket. Therefore, this time around I will use this limited space to focus only on the China factor, specifically addressing the new FYP, notable events in 2015, anticipated key strategies, innovation as an emblem, and anticipated economic landscape.

China is not just a factor, but it's becoming a pivotal factor! As the world's second largest economy and the world's most populous country with huge upside potential, China plays an increasingly important role to the global economic growth, as well as to corporate business.

However, against the backdrop of slower growth, what is China's latest vision for its country?

Five-Year Plan (2016–2020)

Every five years, China's National People's Congress (NPC) approves a Five-Year Plan, which dictates China's economic and social policy. The FYP is a luminous blueprint for

China's economic trajectory and serves as the holistic strategy behind it.

The country has been diligently and intensively working on its 13th FYP for national economic and social development, dubbed 13.5. This all-encompassing product is the result of comprehensive, disciplined, and systematic effort, serving not only as the guiding principle, but in fact the implementable practice. More importantly, the Plan is truly put into work.

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In preparation for drafting the 13th FYP, the National Development and Reform Commission (NDRC) solicits applications from large corporations, industry associations, universities, research institutions, and international organizations to participate in the initial research phase. The previous FYP is evaluated for what worked and what still needs more work. Information, ideas, opinions and data are collected from all elements of society, including policy analysts, scientists, engineers, local governments, advisory bodies and the public. After the NPC approval, China's Central Government implements the Plan and passes it to local provincial and city governments for implementation.

Considering a slowing economy, the plan will build on the 12th FYP and will serve as a framework to advance key national reforms introduced under Xi Jinping's administration and to adjust China's economic growth model, in order to maintain stable growth. The goal of this first plan under the Xi administration is to promote China's transition to a consumption-driven, sustainable economy, and moderately prosperous society. The Plan emphasizes quality of economic growth instead of numerical GDP growth.

Beijing's broader strategic target—to double the size of China's economy and the people's average income from 2010 to 2020—is expected to be maintained. To meet the target, GDP growth is believed to need to be around a 6.5% average annually.

Notable Events in 2015

What notable events have occurred in 2015 which exerted substantive or psychological impact on the economy and the way to do business?

The stock market summer meltdown and the yuan's devaluation versus the dollar are the most prominent. The stock market meltdown was felt globally and the plunge created worldwide jitters. Its meltdown prompted Beijing's crackdown on financial irregularities. Yet, it should be noted that the stock market represents only a small portion of its capital funding and that it dropped after a huge jump (150%) before coming down (40%).

In an effort to put a floor under a slowdown, China's central bank has started a series of stimulus measures including cutting interest rates and reducing the reserve requirement for banks. It has also furthered a liberalizing path in its financial system and currency, albeit conservatively and cautiously. Its government also exercised other options by approving many infrastructure projects worth more than $283 billon (WSJ, October 19, 2015). The massive stimulus program has caused its debt levels to climb.

China's goal to make the yuan a more global currency has gotten a boost by establishing the collaboration with the U.K. and the addition of the yuan to the IMF SDR currency bas-

ket of reserve currencies (the decision was announced on November 30, 2015). A panel led by Michael Bloomberg was formed to bring the trading of China's currency to Wall Street—to build a framework for the trading and clearing of China's yuan in the U.S. The panel expressed that bringing trading and clearing services for the Chinese currency to the U.S. would lower costs for domestic companies buying goods and services from the Asian nation (WSJ, November 30, 2015).

The state-owned enterprises were going through an overhaul—separating transportation and services from other industries. Strategic industries will now enjoy preferential support and non-strategic companies will be more open to private and foreign investors. The share of state-owned enterprises in industrial output has continued to drop steadily.

Socially, a symbolically significant move was made as China decided to abandon its one-child policy and all Chinese couples will be allowed to have two children. The housing market problem persisted. Politically, a historic meeting between Xi Jinping and the leader of Taiwan, held in Singapore, was, to many, a surprise.

Another highly impactful initiative was that China stepped up its anticorruption drive, imposing a monumental shock on businesses. The consequence of that is much more acute and pervasive than what is obvious.

Anticipated Key Strategies

The details of the FYP will not be released until the National People's Congress approves it in March. Meanwhile, we must consider which sectors are likely to be favored over the next five years.

Environmental protection will be a priority. Controlling the emission of small particulate matters of 2.5 microns or less is a key remediating measure. The nation's Airborne Pollution Prevention and Control Action Plan—mandating reductions in coal use and emissions—has earmarked an estimated $277 billion to target regions with the heaviest pollution. This is one of several policy efforts to limit coal's dominance in the economy and to encourage cleaner energy supplies.

Reportedly, an environmental tax is likely to be imposed over the next few years to help cut carbon emissions in half by 2030. Heavy energy-consumption industries, the top emitters, will take a hit, and cleaner energy companies like solar panel and wind turbine makers are expected to benefit. Under this thrust, cleaner vehicle development and deployment, like electric cars, is expected to prosper. So deploying electric vehicles in China could be faster than the United States.

In addition, China will steer traditional manufacturing along an environmentally friendly path to establish a low-carbon production system and encourage businesses to upgrade technology. It is reported that the government plans to set up a Green Development Fund to promote clean industry and sustainable growth.

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Strategic industries, which are deemed a key element in delivering higher quality growth, will be strongly supported by the government. This cluster includes new energy, biotechnology, environmental protection, new generation information technology and the underlying foundation technologies (e.g., a new generation of advanced materials). Automobile electronics sectors are to thrive under the upcoming FYP. Education, health and infrastructure development, including charging stations for electric vehicles, are also in the plan.

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Leveraging on the power of the Internet to boost the productivity of traditional sectors such as manufacturing and to garner smarter processes and better technology is another priority.

The government will continue its effort in modernizing its underdeveloped capital market. As committed, it will allow market forces to play a more important role in setting the yuan exchange rate in the 13th Five-Year Plan and continue reforms in its financial system. The inclusion of the yuan in the IMF reserved currencies, effective October 2016, reflects the recognition of China's place in global finance. But it imposes challenges in managing the yuan and in communicating with investors with clarity and transparency. Its central bank is expected to continue facing market pressure by allowing modest depreciation of the currency in the coming year. However, keeping the yuan's stability should be the number one priority. To achieve Beijing's goal to make the yuan a convertible and freely usable global currency, domestic pushback and significant challenges are in sight.

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Innovation as an Emblem

Spurring innovation will need to be front and center to move China's economy up the value chain.

China has made heavy investments in R&D in recent years; China ranks number two globally in overall R&D spending (OECD 2014)—$350B (2.1% GDP) vs. U.S. $465B (2.8% GDP). Considering the spending growth rate, China's R&D spending is expected to surpass that of the U.S. by the early 2020s.

Heightened emphasis on innovation and technology is embedded throughout the Plan. The government intends to encourage innovation by supporting scientific research and corporate R&D and continue to encourage mass entrepreneurship through major scientific and technological projects. Building national laboratories in the hope that it will lead to new technology is also part of the plan. Over a million science and engineering graduates each year are helping to establish important beachheads in science- and engineering-based innovation.

Anticipated Economic Landscape

Contributing to approximately 38% of the global growth (2014) and more than 15% of the global GDP, China's stability and stabilizing growth will be essential to the world economy.

The inclusion as the third largest component of the IMF lending basket elevates the yuan's status, an uplift to China's economic leverage. In response, its central bank has announced to accelerate efforts to overhaul the country's financial system, further opening its market and keeping the yuan stable.

China's economy with double-digit growth rates as demonstrated in last two decades is the way of the past. However, even slowing down, China is expected to continue to grow at a pace that other major economies envy. A higher percentage does not necessarily translate into a more robust and stable economy. Maintaining the growth in the range of 6–7% (6.5% plus or minus 0.5%) over the next few years is a pragmatic target. In the event that the target lands below 6.5%, the fear factor may rule the market. The market could view it unfavorably, which would especially weigh on commodities.

To foreign companies, the new FYP bears a plethora of business implications. I see specific opportunities in individual areas and industry sectors. China continues to be the world's biggest consumer of semiconductor products, mo-

bile devices, smart phones, LEDs, solar panels, medical devices, home appliances, and construction, among others. The demand of various industrial, consumer, medical, energy and information technology-related products and services will continue to increase, which will require new materials, advanced manufacturing infrastructure, as well as high performance electronics.

For Chinese companies, iconic branding is the dream to come true. Many have gained understanding on what it takes to globalize through the thoroughly planned strategy executed relentlessly over sustainable years. As more indigenous companies aspire to be a global brand, more global competition in all industry sectors intensifies.

As the concept map as well as the roadmap, the new FYP, again, will flex its muscle and exert its power in every sector of the industry.

China's president Xi expressed that China has been and will continue to be both "engine and stabilizer" for the world's economy. Between the United States and China, competition and cooperation is expected to co-exist. There will be many areas of competition and many areas of cooperation.

Upcoming Appearances

Dr. Hwang will present a lecture on "Preventing Manufacturing Defects and Product Failures" at IPC APEX EXPO on March 17, 2016, in Las Vegas. SMT

Dr. Hwang, an international businesswoman, speaker, and business and technology advisor, is a pioneer and long-standing contributor to SMT manufacturing since its inception, as well as to the lead-free electronics implementation. Among her many awards and honors, she is inducted to the WIT International Hall of Fame, elected to the National Academy of Engineering, and named an R&D-Stars-to-Watch. Having held senior executive positions with Lockheed Martin Corp., Sherwin Williams Co., SCM Corp, and IEM Corp., she is currently CEO of H-Technologies Group, providing business, technology and manufacturing solutions. She serves as Chairman of Assessment Board of DoD Army Research Laboratory, Commerce Department's Export Council, various national panels/committees, international leadership positions, and the board of Fortune 500 NYSE companies and civic and university boards. She is the author of 450+ publications and several textbooks, and an international speaker and author on trade, business, education, and social issues. Her formal education includes four academic degrees as well as Harvard Business School Executive Program and Columbia University Corporate Governance Program. For further info, visit JennieHwang.com. To read past columns, click here.

LCE Material to Pave Way for Advanced Sensors

Peter Palffy-Muhoray, PhD, associate director of the Glenn H. Brown Liquid Crystal Institute and professor of chemical physics in the College of Arts and Sciences at Kent State University, his graduate assistant, Andrii Varanytsia, and Kenji Urayama and Hama Nagai from the Kyoto Institute of Technology in Japan developed the first type of cholesteric liquid crystal elastomers (LCEs) with special properties that enable it to precisely emit laser light, without the use of mirrors, while being stretched.

"We can use the information learned as the basis for moving toward applications – such as remote sensors, which can be interrogated from a distance using optic fibers, and as precisely tunable light sources, which are very difficult to produce," Palffy-Muhoray said.

The liquid crystal acts as both the distributed cavity host and the active medium. Simple optical pumping of such a sample results in low-threshold, mirrorless lasing at the band edges. LCEs can change their shape when the orientational order of the constituents is changed – by changing the temperature, applying a field or introducing impurities.