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China's Economy 1

RMB-denominated bond issuances by Japanese issuers

News from the China Advisory Division 5

Future Directions for the Development of China's Strategic Emerging Industries and its Hopes for Expanded Technical Collaboration with International Partners within the Timeframe of the Latest Five-Year Plan

—Towards broad-based industrial development and open innovation—

March 2017 Edition

- Executive Summary -

China's Economy	RMB-denominated bond issuances by Japanese issuers
Corporate demand for the RMB looks set to increase as China's economy expands and more firms do business over there. With the RMB-denominated bond market expanding at a fast pace, bond issuances will become a fundraising method for Japanese fissuers too. This report looks at examples of bond issuances, mainly RMB-denominated bonds issued by Japanese issuers or their subsidiaries.	
Industrial and Regional Policies	**Future Directions for the Development of China's Strategic Emerging Industries and its Hopes for Expanded Technical Collaboration with International Partners within the Timeframe of the Latest Five-Year Plan**
This report presents the key contents of China's plans for the development of strategic emerging industries within the timeframe of the latest five-year plan and offers an overview of the relevant development trends, the current state of strategic emerging industry development in China and the issues that it needs to address to further the growth of these industries. With China targeting broad-based development of its strategic emerging industries and favoring strategies that focus on globally synchronized development and open innovation, it further examines the prospective economic effects of these industries and the prospects for expanded technical collaboration between China and its international partners during the relevant five-year plan period.	

RMB-denominated bond issuances by Japanese issuers[1]

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Corporate demand for the RMB looks set to increase as China's economy expands and more firms do business over there. Utilization of the RMB could also increase within China and overseas as the currency is internationalized. China sits next to Japan and many Japanese companies are viewing China as a manufacturing hub or a consumer market. RMB usage also looks set to rise sharply in East Asia, a region strongly impacted by the RMB's internationalization. RMB procurement may become a challenge for Japanese firms going forward. This report based on publicly-available information to introduce cases where Japanese issuers or their subsidiaries have issued RMB-denominated bonds and so on. Please note that the opinions expressed in this report are those of the author alone and are not the opinions of the organization the author belongs to.

1. Offshore RMB bond issuances (dim sum bonds)

Offshore RMB bonds are RMB-denominated bonds issued off the Chinese mainland. Those issued in Hong Kong are known as 'dim sum bonds.'

The financial services company ORIX was the first Japaneseissuer to issue a dim sum bond. Since 2011, the dim sum bond market has expanded rapidly on the internationalization and strong RMB, with Japanese issuers also using dim sum markets to issue offshore RMB bonds from 2011 onwards (Fig. 1).

Fig. 1: Major issuances of dim sum bonds by Japanese issuers

Issuer	Date	Amount (billion RMB)	Period (year)	Interest rate (%)
ORIX	Mar. 24, 2011	0.4	3	2.00
Mitsubishi UFJ Lease & Finance	Apr. 8, 2011	0.2	2	1.65
Tokyo Century	Apr. 28, 2011	0.2	3	2.70
Sumitomo Mitsui Finance and Leasing	Sep. 12, 2011	0.2	2	2.50
	Sep. 12, 2011	0.3	3	3.00
ORIX	Nov. 29, 2011	0.5	3	4.00
Mitsui	Mar. 1, 2012	0.5	5	4.25
Hitachi Capital	Mar. 22, 2012	0.5	3	3.75
Sumitomo Mitsui Finance and Leasing	Aug. 3, 2012	0.6	3	4.00
Mitsubishi UFJ Lease & Finance	Feb. 24, 2014	0.5	3	3.28
Bank of Tokyo-Mitsubishi UFJ (China)	May 26, 2014	1	3	3.05

Source: Compiled by the author from press releases

There are two main schemes for issuing dim sum bonds: (1) A scheme that uses Hong Kong's domestic

[1] This report is based on Mizuho Financial Group's 'Chinese Bond Trading Business' (Kinzai Institute for Financial Affairs, Inc. (2017)).

central securities depository Central Moneymarkets Unit (CMU) as the central securities depository (the CMU scheme); and (2) a scheme that uses international central securities depositories (ICSD) like Euroclear or Clearstream as the central securities depository (the ICSD scheme). Chinese or local issuers often use CMU schemes. However, it seems many Japanese issuers utilize ICSD schemes from the perspective of responding to Japan's tax laws.

2. Bond issuances on the Chinese mainland

The first debt issuance on the Chinese mainland by a Japanese company was the CP issued by Mitsubishi Corporation (China), the Chinese subsidiary of Mitsubishi Corporation. This was a pioneering case involving the first corporate bond issuance by a foreign-affiliated non-financial company (Fig. 2). CP is a short-term debt instrument with a maturity of one year or less in China. It is issued in accordance with the same system/framework for regular bonds, so it is recognized as a type of corporate bond in China.

Fig. 2: Debt issued by Mitsubishi Corporation (China)

Issuer	Mitsubishi Corporation (China)
Type	CP
Currency	CNY
Term	1 year
Amount	0.5 billion RMB (Approx. 6 billion JPY)
Interest rate	6.73%
Par value	100 RMB
Issuer rating	AA (CCXI)
Issuance rating	A-1 (CCXI)
Lead underwriter	Bank of China
Advisor	Bank of Tokyo-Mitsubishi UFJ (China),
Date	2012.1.15

Source: Compiled by the author from press releases

The corporate bond had a maturity of one year. The Bank of China served as the lead underwriter, with the Chinese subsidiary of the Bank of Tokyo-Mitsubishi UFJ acting in an advisory role. Mitsubishi Corporation (China) has issued CP on several occasions since then.

Other examples of Japanese issuers issuing bond in China include debentures issued by Toyota Motor Finance China, the Toyota Group's Chinese auto loan company. The issuance date was 18 October, 2013 and the amount was 1.3 billion RMB, with a maturity of three years and an interest rate of 5.60%.

Japan's big three banks also issued bank debentures from 2010 to 2013 (Fig. 3).

Fig. 3: Bank debentures issued by Japan's big three banks

Issuer	Bank of Tokyo-Mitsubishi UFJ (China)	Mizuho Bank (China)	Sumitomo Mitsui Banking Corporation (China)
Amount (billion RMB)	1	1	1
Date	May 21, 2010	Apr. 23, 2012	Apr. 29, 2014
Maturity (year)	2	2	2
Interest rate	3-month SIBOR+0.48%	4.55%	5.80%
Rating	AAA	AAA	AAA

Source: Compiled by the author from press releases

Debt issued by commercial banks in China fit the description of bank debentures, but these bank debentures are similar in nature to the straight bonds issued by banks in Japan.

In China, there are few ways for firms to raise mid-to long-term funding. Bank debentures are one of the few mid- to long-term financing instruments. However, with the debt structure of China's commercial banks centered around liquid deposits, bank debentures are unlikely to become a major financing instrument for financial institutions in China, particularly given the comparatively high cost of raising funds this way.

3. ABS issuances by auto loan companies

As previously covered in *Latest Trends in the Chinese Bond Market*, a report published in the December 29, 2016 edition of *Mizuho China Monthly*, since 2012, China has seen an explosion in issuances of Asset-Backed Securities (ABS) as a result of deregulation, with Japanese auto loan companies also issuing ABS (Fig 4).

Fig. 4: Major ABS issuances by auto loan companies in China

Originator	Amount (billion RMB)	Date of issuance	Underlying asset	FA
GMAC-SAIC Automotive Finance (GMAC)	Total 1.9 (2 tranches)	Oct. 25, 2012	Auto loans	SAIC Motor CITIC Securities
Toyota Motor Finance China (TOYOTA)	Total 0.7 (2 tranches)	May 23, 2014	Auto loans	BTMU (CHINA) Mizuho (China) SMBC (CHINA)
Dongfeng Nissan Auto Finance(NISSAN)	0.7	Jun. 6, 2014	Auto loans	Mizuho (China)

Source: Compiled by the author from news reports, etc.

As once happened in Japan, a sense of crisis about the financial structures of indirect financing center (bank lending) is pushing the Chinese authorities to build a regulatory system that positions fundraising via securitization as an extension of indirect financing while also incentivizing financial institution initiatives. Though ABS issuances by Japanese firms have been limited to the automobile sector so far, this means of financing is likely to be used by more Japanese firms in other industries going forward.

4. Panda bonds

The last section of this report will examine panda bonds, a fundraising method yet to be adopted by Japanese firms. A panda bond is an RMB-denominated bond issued on the Chinese mainland by a non-resident. The first Panda bond issued by a private enterprise was one issued by Daimler in March, 2014. The issuance was for RMB 500 million, with a one-year maturity and a rate of 5.2%. At the time, this rate was below the average paid on bonds issued by major state-owned enterprises, a sign perhaps of the comparative superiority of Daimler's finances. The main investors were China's big five banks (Industrial And Commercial Bank of China, China Construction Bank, Bank of China, Agricultural Bank of China and Bank of Communications), which suggests the issuance had political support.

The central government probably hoped the Daimler Panda bond offering would open up China's bond markets to more sophisticated non-resident participants and thus prompt the maturation of China's mainland bond markets and an expansion of financial business. Chinese President Xi Jinping's trip to Germany at the end of March that year also probably played a key role here.

At the same time, though, Daimler also faced several issues with its Panda bond issuance. From the perspective of Japanese issuers using this method, the key issues here are (1) accounting standards and (2) the administration of external debt.

The Chinese authorities are setting great store on Panda bonds as they seek to internationalize the RMB. During the debate on whether the RMB should be included in the Special Drawing Rights (SDR) basket of the International Monetary Fund (IMF), the Hong Kong and Shanghai Banking Corporation and the Hong Kong subsidiary of the Bank of China both issued Panda bonds from September 2015 onwards, with several more institutions following suit thereafter. There have been no such issuances by Japanese issuers, but as outlined above, Panda bonds are being positioned as key instruments in the internationalization of the RMB. Though there are various hurdles to overcome, Japanese issuers should also consider using Panda bonds from here on.

Future Directions for the Development of China's Strategic Emerging Industries and its Hopes for Expanded Technical Collaboration with International Partners within the Timeframe of the Latest Five-Year Plan

–Towards broad-based industrial development and open innovation–

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1. Introduction (China's Policy Development Process)

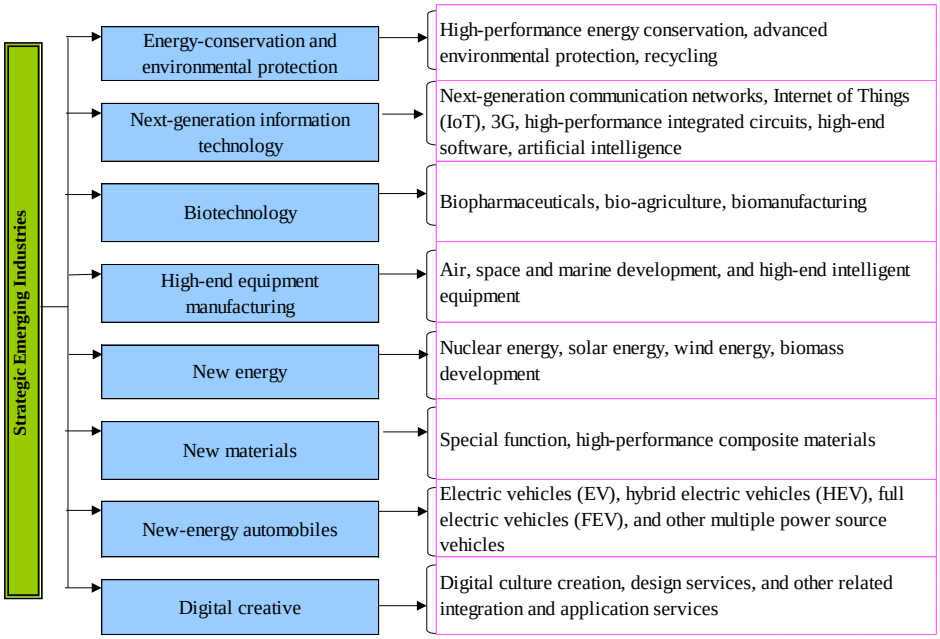
China's strategic emerging industries are a powerful driver of growth in the economy and play an important role in its socioeconomic development, but these industries are still in an embryonic stage and the potential for future growth is seen as substantial. Many are grounded in the development of key cutting-edge technologies, reflect near-future advances in science and technology and new directions in industrial development, and are seen as being consistent with the current global tide of development in knowledge economies, circular economies, and low-carbon economies. The selection of strategic emerging industries and the strategy for their development were first outlined in the State Council's *Decision on Accelerating the Fostering and Development of Strategic Emerging Industries* of October 2010, but were formally established in the *12th Five-Year Plan for the Development of Strategic Emerging Industries (2011-2015)*[2], which was issued in July 2012, two years into China's 12th Five-Year Plan (on National Economic and Social Development). Against a backdrop of global economic stagnation and a Chinese economic slowdown, the job security and market demand that is being generated through the nurturing and promotion of emerging industries is becoming increasingly important, and China recognizes the necessity of policy aimed at achieving the "structural adjustments" and "secure growth" provided for in the 2009 *Plan for Restructuring and Revitalizing Ten Key Industries*, and the importance and significance of the relevant plans[3].

On December 19, 2016, the State Council issued the *13th National Five-Year Plan for the Development of Strategic Emerging Industries* ("the Plan", hereunder), adding one industry (the digital creative industry) to the list of seven key industries previously identified (the energy-conservation and environmental protection industry, the next-generation information technology industry, the biotechnology industry, the high-end equipment manufacturing industry, the new energy industry, the new materials industry, and the new-energy automobile industry) (**Fig. 1**), and establishing the direction and scale of China's strategic emerging industries within the timeframe of the 13th Five-Year Plan, as well as growth strategies and priority projects to be undertaken during this period. This report provides an introduction to the key contents of the Plan, together with the direction of the development strategies identified therein and its main growth targets, and highlights its characteristics on the basis of a comparison with the earlier (12th) five-year plan

[2] The *12th Five-Year Plan for the Development of Strategic Emerging Industries (2010-2015)* was discussed in the September 2012 issue of Mizuho China Monthly.
[3] Yongyu Shao, Research on Urbanization and Industrialization in China: Historical and Spatial Developments against a Backdrop of Resource and Environmental Constraints (in Japanese), Taga Shuppan, 2012.

so as to provide an overview of the current state of development in China's strategic emerging industries (including achievements made to date and outstanding issues that will need to be addressed in order to promote further growth), before discussing the significance of the Plan's formulation and examining the prospects for the implementation of its strategies and their effect on the national economy.

Fig. 1: The Eight Key Strategic Emerging Sectors and their Principal Supporting Industries



Sources: *Decision of the State Council on Accelerating the Fostering and Development of Strategic Emerging Industries* (October 10, 2010) and the *13th National Five-Year Plan for the Development of Strategic Emerging Industries (2016-2020)*

2. Key Content and Characteristics of the 13th National Five-Year Plan for the Development of Strategic Emerging Industries

The primary policy objective of the Plan is to have the added value of strategic emerging industries account for 15 percent of China's gross domestic product (GDP) by 2020 (increasing from approximately 8 percent – the target set for 2015, which has been reached). It names five pillar industries: new-generation IT, high-end equipment manufacturing, biotechnology, green and low carbon emissions, and the digital creation industry, and sets an output value of 10 trillion yuan by 2020 for each. The Plan further calls for the creation of one million jobs through the formation of new growth points spanning a wide range of sectors, promoting the optimization of industry structures, and giving industrial innovation capabilities and the competitiveness of Chinese innovations a major boost as means of elevating global industry growth to new heights.

The Plan incorporates a number of key policy goals, including: (1) promoting the integration of information technology industries across all sectors so as to create new space for the Internet economy; (2) working to accelerate growth in the high-end equipment and new materials industries to facilitate further strides in Chinese manufacturing; (3) accelerating the pace of innovation in the biotechnology industry with a view to making the bio-economy a new engine for growth; (4) the rapid expansion of the renewable energy vehicles and the renewable energy, energy conservation and environmental protection industries towards the creation

of a new model for sustainable development; and (5) encouraging the vigorous development of digital creative industries as a means of boosting innovation and stimulating more consumption.

The main "development goals" for China's strategic emerging industries as set forth in the Plan are as follows: (1) A significant increase in innovation capabilities, including a major increase in the aggregation and conversion capabilities of the results of major corporate R&D projects, the establishment of globally competitive emergent platforms, a significant increase in invention patent quality and quantity, R&D spending of at least 5 percent of revenue at key enterprises, the elevation of a cluster of key technologies to globally competitive levels. (2) Further improvements in the environment for innovation and entrepreneurship, including rapid promotion of innovation in priority fields and relating to major milestones, establishing terms for entry into new business categories, and conspicuous improvements in the policy environments for public finance incentives, an investment and loan system, technical standards, intellectual property rights protection, and human resource development. (3) A stable increase in China's standing in the international division of labor, including gaining control of core technologies, establishing indigenous brands, establishing a considerable presence for Chinese companies with high level development capabilities in the international division of labor, affecting a substantive increase in China's share of the global market for technologies, products and services utilizing key intellectual property, establishing China as a global base for major R&D and manufacturing in certain fields of industry. (4) A significant enhancement in guided and spillover effects, including maintaining an average annual growth rate of at least 20 percent for strategic emerging industries, cultivating a cluster of leading companies with powerful indigenous emergent innovation and technology driver capabilities, and the formation of numerous innovative and distinctive industry value chains and industry clusters.

The Plan also spells out support measures for six areas, namely the construction of new systems for industrial innovation, enhanced protection of intellectual property rights, deeper military and civilian integration, financial assistance, human resource development, and incentives. In addition, 21 priority projects are highlighted for implementation during the timeframe of the Plan, including the promotion of device innovation using integrated circuits (IC) and artificial intelligence (AI), biotechnology, renewable energy and digital creativity (**Table 1**).

Table 1: A Comparison of Priority Projects for Strategic Emerging Industries in China's 12th and 13th Five-Year Plans

[I] The 21 Priority Projects given in the 13th Five-year Plan for Strategic Emerging Industries	**[II] The 20 Priority Projects given in the 12th Five-year Plan for Strategic Emerging Industries**
(1) Broadband village pilot project	(1) Key energy-saving technology and equipment industrialization project
(2) "Internet Plus" project	(2) Pilot project for equipment relating to key environmental protection technology and product industrialization
(3) Big data development project	(3) Important resource recycling project
(4) Integrated circuits (IC) development project	(4) Broadband China project
(5) Artificial intelligence (AI) innovation project	(5) High-performance integrated circuits project
(6) Pilot project for smart factory (factory automation) application in key sectors	(6) New-type flat panel display project
(7) New-generation civilian aircraft innovation project	(7) Internet of things (IOT) and cloud computing technology project
(8) Spatial information and intelligence detection project	(8) "Beneficial Information for the People" project
(9) Marine operation and equipment innovation development project	(9) Protein-based biomedical products and vaccine project

[I] The 21 Priority Projects given in the 13th Five-year Plan for Strategic Emerging Industries	[II] The 20 Priority Projects given in the 12th Five-year Plan for Strategic Emerging Industries
(10) New materials quality improvement and collaborative application project	(10) High-performance medical treatment equipment project
(11) New drug development and industrialization project	(11) Bio-breeding project
(12) Nationally beneficial biotechnology project	(12) Bio-based material project
(13) Bioindustry innovation development platform construction project	(13) Aviation equipment project
(14) New energy vehicle power cell upgrade project	(14) Spatial infrastructure construction project
(15) New energy ratio improvement project	(15) Advanced rail transport equipment and its key assemblies project
(16) Energy-saving technology and equipment development project	(16) Marine engineering equipment project
(17) Pilot project for comprehensive green and low-carbon innovation	(17) Intelligent equipment-manufacturing project
(18) Pilot project for alternative recycling systems	(18) New energy integrated application project
(19) Digital creative technology and equipment innovation upgrade project	(19) Key material upgradation project
(20) Contents innovation development project	(20) New energy auto project
(21) Innovative design development project	(Blank)

Source: Left-hand column: *13th National Five-Year Plan for the Development of Strategic Emerging Industries*; right-hand column: *12th National Five-Year Plan for the Development of Strategic Emerging Industries*

The Plan concludes with a list comprising some 69 articles of "Key Functional Divisions of Cabinet-Level Departments" (**Table 2**), which clarifies the sharing of responsibilities and segregation of duties in respect of key project implementation among the various branches of government, and suggests that clearly articulated responsibility for administrative guidance and policy integrity, alongside the expansion to wider areas of industry, are key features of the current plan.

Table 2: Key Functional Divisions of Cabinet-level Departments in the 13th Five-Year Plan for the Development of Strategic Emerging Industries (excerpt)

No.	Major Duties (Project Responsibilities)	Responsible Government Department
1	Construction of the infrastructure that will make China an Internet powerhouse; guidance on the implementation of the model broadband village project	MIIT, NDRC, MOFCOM, MOA, MOF, SARFT, etc.
4	Implementation of big data strategy; direction of the implementation of the big data development project	NDRC, MIIT, CAC, MOST, etc.
5	Strengthening of core IT industries as a means of directing and promoting the IC development project	NDRC, MIIT, MOST, MOF, CAC, AQSIQ, etc.
6	Development of artificial intelligence as a means of directing and promoting the AI development project	NDRC, MIIT, MOST, MOF, CAC, etc.
8	Cultivation of smart-manufactured high-end brands; direction of the implementation of the pilot project for smart factory (FA) application in key sectors	MIIT, NDRC, MOST, MOF, AQSIQ, etc.
9	Realization of new breakthroughs in the aeronautics industry as a means of directing and promoting the new-generation civilian aircraft innovation project	MIIT, NDRC, MOST, MOF, AQSIQ, CAAC, etc.
13	Raising the level of foundation support capabilities in the new materials industry; directing and promoting the new materials quality improvement and collaborative application project	MIIT, NDRC, MOST, MOF, AQSIQ, SOA, etc.
15	Raising development standards in the biopharmaceuticals industry; directing and promoting the nationally beneficial biotechnology project	NDRC, MIIT, NHFPC, SFDA, MOF, SATCM, SOA, etc.
17	Directing the application and penetration of biomanufacturing technologies in the processing, materials, energy, and other sectors	NDRC, MIIT, MOST, etc.

No.	Major Duties (Project Responsibilities)	Responsible Government Department
21	Directing and promoting the new energy vehicle power cell upgrade project with the aim of realizing large-scale use of renewable energy vehicles	MIIT, NDRC, MOST, MOF, AQSIQ, NEA, etc.
22	Directing and promoting the new energy ratio improvement project towards the development of new energy industries	NEA, NDRC, MOST, MIIT, MOF, etc.
23	Development of sophisticated energy-saving industries; directing and promoting the energy-saving technology and equipment development project	NDRC, MIIT, MOF, MOFCOM, AQSIQ, etc.
25	Directing the implementation of the pilot project for comprehensive green and low-carbon innovation	NDRC, MOST, MIIT, NEA, MOF, MEP, MOHURD, MOA, AQSIQ, etc.
29	Directing the implementation of the innovative design development project towards improvements in innovative design levels	MIIT, NDRC, MOST, MCPRC, MOHURD, MOF, etc.
32	Actively promoting the establishment of a system for international cooperation, a cooperative agreement for intergovernmental emerging industries and innovation, promoting mutual bilateral recognition of personnel qualifications, industry standards and accreditation results, participation in multinational approval systems	MOFCOM, NDRC, FMPRC, MOST, MIIT, AQSIQ, SOA, etc.
33	Construction of a bilateral zone for the promotion of industries with local character and promoting improvements in the level of cooperation in the opening up of key sectors with a focus on advanced nations and countries along the "One Belt, One Road" route	MOFCOM, NDRC, MIIT, etc.
34	Construction of a network for global innovation and development	NDRC, FMPRC, MOFCOM, MOST, MIIT, etc.
48	Priority use of government funds in sectors relating to emerging industries to facilitate construction of a system for the time-limited transfer of science and technology findings	MOST, MOF, NDRC, MOE, MIIT, etc.
52	Construction of a system for utilizing foreign intellectual property rights services, construction of an alert system for foreign intellectual property rights risk, assistance to Chinese companies on M&A deals and rights protection involving foreign intellectual property	MOFCOM, SIPO, FMPRC, NDRC, MIIT, SAIC, etc.
60	Encouraging the establishment of strategic emerging industry development funds in qualifying areas, guiding the establishment of interindustry investment fund and internationalization investment fund using private capital	NDRC, MOF, CSRC, MIIT, etc.

Source: Excerpted from the Ministry of Industry and Information Technology's *13th Five-Year Plan for the Development of Strategic Emerging Industries*.

Note: The List of Key Functional Divisions includes a total 69 primary duties and the names of the government organs responsible for filling said duties, however, the above table enumerates the 20 items (numbered as per the original document) involving domestic and foreign efforts in the promotion of industry development.

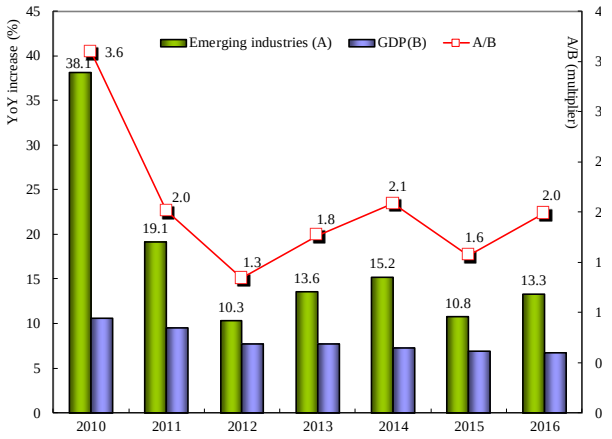
3. China's Achievements in the Development of Strategic Emerging Industries and Outstanding Issues

Whilst China's strategic emerging industries are, by definition, embryonic industries, as a response to the demand for social and economic development the pace of their growth outstrips that of all other industries. **Fig. 2** gives a comparison of strategic emerging industry and GDP growth rates for the period spanning 2010 to 2016, and shows that there has been no significant decrease in strategic emerging industry output, which has been growing at an average rate of 15 percent or more annually, maintaining a velocity more than double the GDP growth rate in all years. The fact that these are emerging industries mean that industry organizations and statistics remain inadequate and it is thus difficult to gain an accurate picture of their current status, but a look at trends in the evolution of China's high-tech industry, which bears the closest resemblance to its strategic emerging industries, should shed some light on the situation in the latter industries, albeit indirect, and this section thus draws primarily on macro data for the high-tech industry (*China's Industrial Development Report, 2013*, which is edited and issued by the Chinese Academy of

Social Sciences' Institute of Industrial Economics, also uses data on the high-tech industry in its research and analysis of the strategic emerging industries sector).

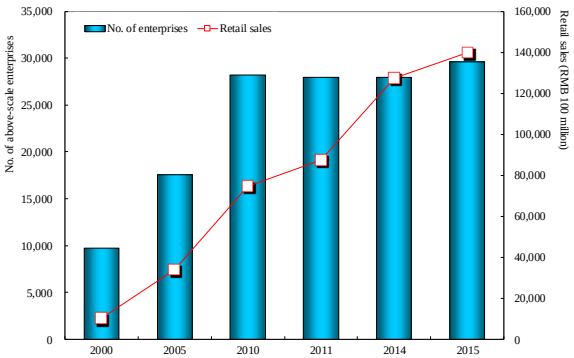
Fig. 3 shows the status of enterprises above a designated scale in China's high-tech industry. Whilst the changes in the statistical standards on enterprise scale that were introduced in 2011 (since when only enterprises with annual sales exceeding RMB 200 billion are counted as above-scale) result in a certain shift in enterprise numbers, retail sales have continued to grow. Again, there has likely been merger and acquisition activity within the industry, which would account for the leveling off in enterprise numbers since 2014, but it seems unlikely that there is significant start-up and/or entrepreneurial activity going on (by contrast, though not included in the statistics, new small-and-medium sized enterprises, including venture capital start-ups, appear to be thriving).

Fig. 2: A Comparison of Strategic Emerging Industry Output and GDP Growth Rates in China since 2010



Source: National Bureau of Statistics of China, Ministry of Industry and Information Technology, and official industry association statistics. The 2016 growth rate for strategic emerging industries is for the first ten months of the year.

Fig. 3: Trends in Chinese High-Tech Company Numbers and Retail Sales



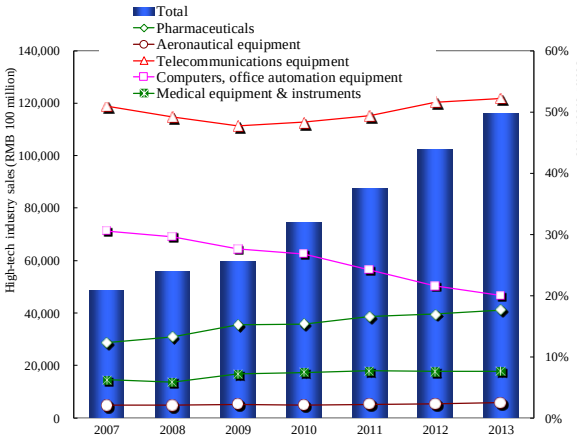
Source: China Statistical Yearbook and Statistical Data Book on China's High Technology Industry

Fig. 4 gives a sector-based breakdown of retail sales in the high-tech industry as a whole, where the telecommunications equipment sector accounts for the largest percentage of overall sales, a share that has continued to increase at a moderate pace of around a percentage point in recent years despite losing some ground in 2009-2010. Computers and office automation equipment, which are closely linked to telecommunications equipment, are next in line, though growth in demand for tablet commuters, smart phones and other similar devices has resulted in a noticeable decline in this sector's share of the market in recent years, which is now approaching that of the pharmaceuticals industry, in third place at around 20 percent. The medical equipment and instruments sector and the aeronautical equipment sector rank in fourth and fifth place, respectively, with their share of the market continuing to hover below 10 percent.

It is common knowledge that numerous foreign companies have entered China's high-tech industry and the industry is critically important to China's foreign trade. **Fig. 5** shows import, export and trade surplus

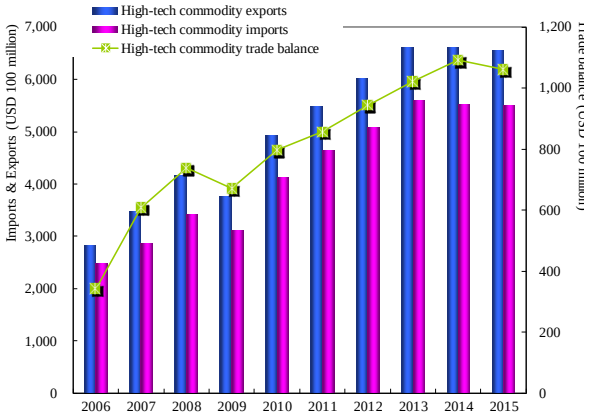
(balance) figures for the ten-year period spanning 2006-2015. With the exclusion of 2009, where China felt the impact of the global financial crisis (and posted a negative balance of trade), its trade surplus increased steadily until 2014, but the surplus turned negative year-on-year in 2015, marking a first for the industry.

Fig. 4: Trends in High-Tech Industry Sales with Sector-based Ratios



Source: Statistical Data Book on China's High Technology Industry (2014), Ministry of Science and Technology

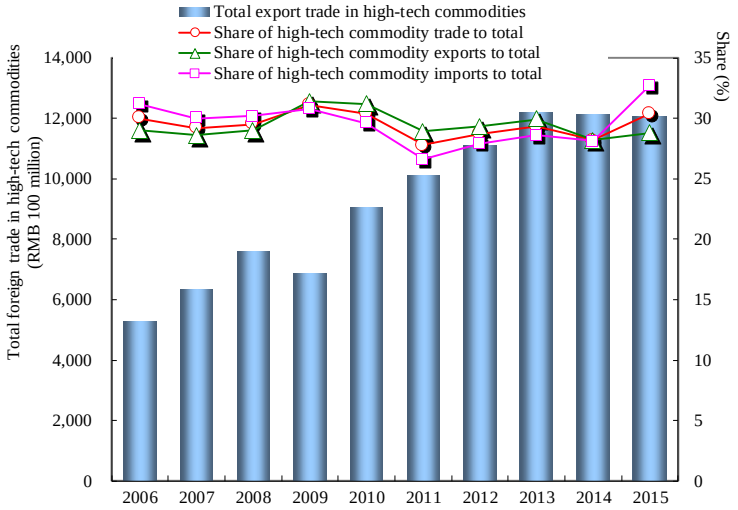
Fig. 5: Trends in China's Imports and Exports of High-Tech Commodities (200**6**-2015)



Source: National Data, National Bureau of Statistics of China

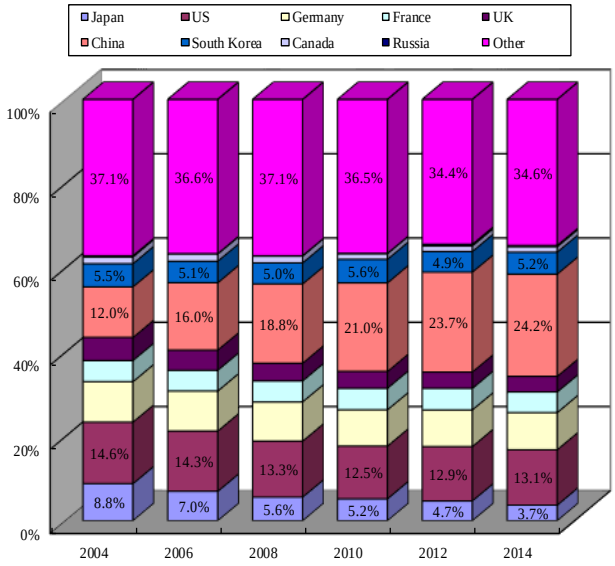
This is connected to the downturn in external demand that has come with the slowdown in the global economy. China's overall trade balance began decreasing slightly in 2015, when the share of high-tech commodity imports and exports shifted, too, with imports exceeding exports by a wide margin for the first time that year (**Fig. 6**). This is a natural enough development when considered in terms of the structure of foreign trade. China's accession to the World Trade Organization (WTO) in 2001 marked a rapid increase in its foreign trade with the rest of the world, primarily the processing trade. Initially, the majority of this trade was in light industry products, textiles, and other products manufactured using general, labor-intensive processing technologies, but recent years have seen a shift towards transport machinery and equipment and other more capital and/or technology-intensive products and sectors. China's share of global high-tech commodity exports doubled from 12 percent in 2004 to 24.2 percent in 2014, a rate of expansion that is almost double that of the United States, that world's second largest exporter of high-tech commodities (**Fig. 7**).

Fig. 6: Transitions in High-tech Commodities Trade as a Percentage of Total Goods Trade in China



Source: National Data, National Bureau of Statistics of China

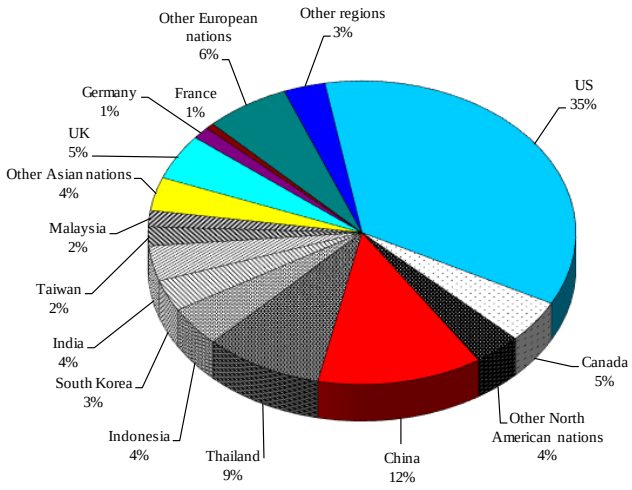
Fig. 7: Trends in the Export Shares of High-Tech Industries in Major Countries



Source: Indicators of Science and Technology 2016, Ministry of Education, Culture, Sports, Science and Technology, Science and Technology Policy Bureau

Nonetheless, whilst machinery and transport equipment account for the largest share of Chinese imports, the majority of these are materials, parts and components (intermediate goods) for use in the manufacture of high-tech products. In other words, these items are imported into China for processing and/or fabrication and then exported, but China has remained at the low end (i.e. has served as the downstream element) of the global value chain for many years now, meaning that it is only to able to skim off low-level profits and it explains China's inability to raise the level of its industry to a globally acknowledged high standard. This is, moreover, clearly born out by trends in Chinese tech trade with Japan. In 2014, China accounted for 12 percent of Japanese technology exports, putting it in second place behind the United States (**Fig. 8**), whilst Japanese technology imports from China were included in the 3.5 percent from "other regions".

Fig. 8: Breakdown of Japan's Technology Export Destinations by Country / Region



Source: As for Fig. 7. The data are for 2014.

Accordingly, the most pressing issues for China's strategic emerging industries are essentially the issues that have been confronting China's manufacturing industry for many years now, namely, how to raise the level of product processing and upgrade the industry as a whole, or how to effect the transition from a "manufacturing powerhouse" to a "product giant"[4].

4. Links between and Hopes for China's Strategic Emerging Industries and "Made in China 2025"

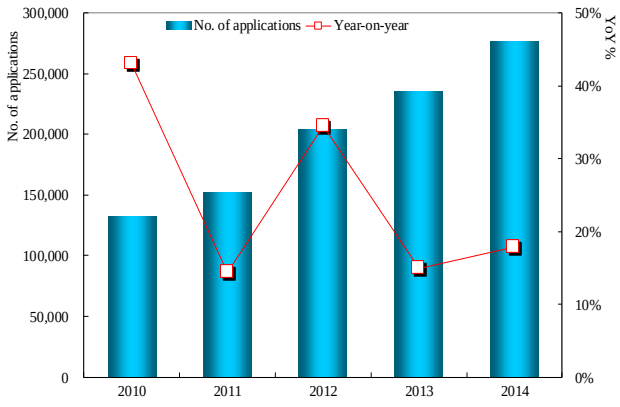
Since the "Made in China 2025" strategy, China's version of Germany's "Industry 4.0" plan, was published in 2015, numerous policies have been issued and put into effect, but the positioning of its strategic emerging industries appears to be comparatively low. However, with the series of policies that have been formulated under the so-called "1+X" initiative (where the "1" stands for "Made in China 2025" and the "X" refers to guidelines for eleven subsectors), the Chinese government is declaring that it has broken the back of the job. Achieving policy goals is no easy matter, but the new five-year plan for the development of strategic emerging industries dealt with at the beginning of this report and the "Made in China 2025" strategy are closely linked, with the former essentially constituting a concrete program for the realization of "Made in China 2025", and suggesting that Chinese government officials were strongly conscious of the philosophical construct of Germany's "Industry 4.0" plan when formulating their own strategy. The latest *Strategic Emerging Industries Key Products and Services Catalogue* (2016 edition) (Draft for comment), which was released in January this year, just one month after publication of the Plan, by the National Development and Reform Commission, adds nine sectors featured "high-tech services" (including R&D, intellectual property rights, tests and measurements, start-up and innovation services) to the list, bringing the total number of business categories up to thirty (most of which are consistent with "Made in China

[4] Space constraints prevent a detailed discussion of the issues in question, but a report carried in Volume 18 of the "Engineering Sciences China" (published in the fourth term of 2016), a bimonthly technical research journal, entitled "Study on the Innovation in Government Guidance of Strategic Emerging Industries", cites "a lack of core technologies, uneven resource distribution, inadequate systems and system maintenance, and delays in the construction of relevant infrastructure" as the major problems confronting China's strategic emerging industries, which have grown rapidly over the course of the nation's last five-year plan, and calls for improvements to be made in these areas within the timeframe of the new five-year plan.

2025") and underscoring the government's goal of nurturing a wide range of sectors whilst simultaneously seeking to bring the development of these industries in line with their global counterparts and strengthening the degree of international competition therein.

The prospects for the Plan's fulfillment will, in large part, be dependent upon the efforts and actions of the Chinese government and China's strategic emerging industries going forward, as well as upon economic conditions both within at home and abroad, in terms of strategic measures for its implementation, the government's written commitment to focusing on efforts to promote the transfer and application of the outcomes of technological development as well as open innovation is worthy of note. The weaknesses in China's manufacturing technologies are linked to its failure to adequately redeploy and utilize technologies and personnel that have been developed and/or trained within the industry. China is also acutely aware of the fact that its R&D systems have yet to reach a standard that would allow for open innovation, and this is clearly reflected in recent policy measures (**Table 2**, left column). China's strategic emerging industries in fact file the largest number of patent applications (i.e. are patent application-intensive sectors) (**Fig. 9**), and given that the average annual growth rate of patent-intensive industries during the periodcovered by the last five-year plan (2011-2015) was extremely high (**Table 3**), there seems little doubt that, with the government placing a high premium on these industries and its commitment to new, unprecedented actions, they will again prove to be the fastest growing sector of China's economy during the period of the new five-year plan (2016-2020).

Fig. 9: Numbers of Invention Patents filed by China's Strategic Emerging Industries in Recent Years



Source: "Report on the Statistical Analysis of Strategic Emerging Industry Invention Patents" (2013 and 2015 editions), Ministry of Science and Technology

Table 3: Average Annual Growth Rates in Patent-intensive Industries (2011-2015)

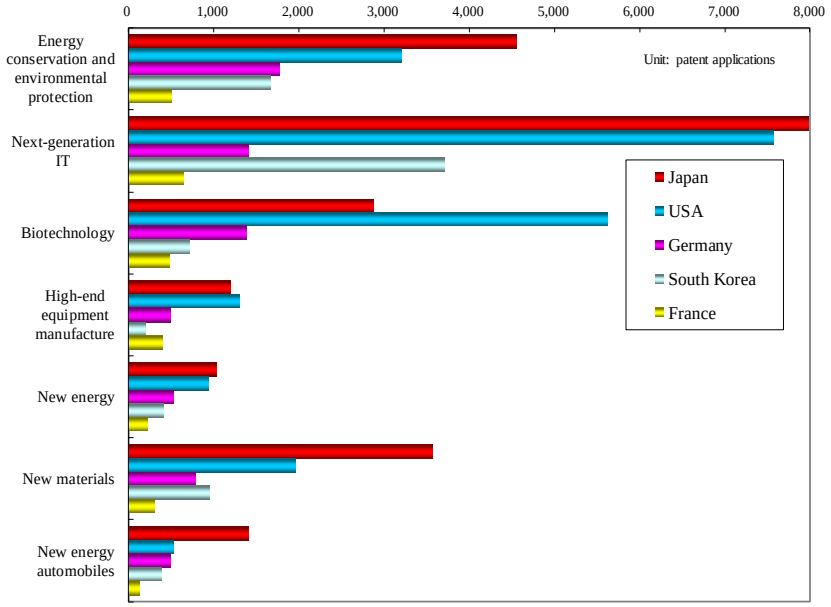
Name of industry	Value added	R&D personnel	R&D spending	New product sales
Basic information	12.85	10.72	18.44	18.90
Software and IT services	18.53	-	-	-
Modern public transport infrastructure	47.32	44.49	50.02	46.50
Smart manufacturing equipment	8.40	21.99	21.11	14.06
Biopharmaceuticals	15.83	25.86	33.76	25.52
New functional materials	10.15	26.75	33.70	34.35
Advanced energy conservation and environmental protection	10.62	25.63	29.79	23.22
Resource recycling	7.56	63.28	58.81	62.69
Patent-intensive	16.61	24.18	29.55	26.70
Non patent-intensive	7.06	16.86	18.82	13.21
All industries in the nation's economy	8.04	20.25	23.67	19.23

Source: "Major Statistical Data on China's Patent-intensive Industries (2015)", State Intellectual Property Office of the PRC, June 2016. All figures are percentages.

Again, the government cites open innovation and cooperation and synthesis of policy direction among government departments as key tasks, which suggests that there will be further increases in the number of technical cooperation projects involving China and other countries. For Japanese companies, which currently file the largest number of strategic emerging industry patents in China (**Fig. 10**), this represents

an opportunity for further investment and for expansion of technology alliances with Chinese companies. The Chinese economy has entered a period of structural adjustment following the advent of the "New Normal", but with the world embarked on a fourth industrial revolution this offers both a challenge and a chance to transform and upgrade the economic growth pattern in China, the heart of the world's manufacturing industry.

Fig. 10: Top 5 Strategic Emerging Industries in China in terms of Invention Patent Applications



[Appended chart] Top 5 Countries filing Invention Patents in China by Sector (2013)

Rank	Energy conservation and environmental protection	Next-generation IT	Biotechnology	High-end equipment manufacture	New energy	New materials	New energy automobiles
1	Japan	Japan	USA	USA	Japan	Japan	Japan
2	USA	USA	Japan	Japan	USA	USA	USA
3	Germany	South Korea	Germany	Germany	Germany	Germany	South Korea
4	South Korea	Germany	Switzerland	France	South Korea	South Korea	Germany
5	France	France	Netherlands	South Korea	France	France	France

Source: All data taken from "Report on the Statistical Analysis of Strategic Emerging Industry Invention Patents", State Intellectual Property Office of the PRC

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