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## Innovation Design: “Made in China 2025”

By Sylvia Xihui Liu

As one of the major countries in the world and the leading developing country, China is regularly criticized for its “imitation” products and low-quality manufacturing. The innovation strategy of introduction-digestion-absorption-innovation leads to a weak basis for manufacturing. Because of the lack of key basic materials, reliance on exported core components, limited key technologies, lack of research on advanced basic processes, limitations in application, and an underdeveloped service system,<sup>1</sup> China’s manufacturers only compete on cost and speed of production. The solution, National Chairman Jinping Xi put it best, in terms of three transitions, “from China’s speed to China’s quality; from China’s products to China’s brands; and from ‘made in China’ to ‘created by China.’”<sup>2</sup> In it, transforming manufacturing giant focusing on speed with low-quality outcomes is the first step, which will support to build brand and develop creation.

At the same time, some Chinese companies have found plenty of success on the world’s stage—think Alibaba, Tencent Holdings, Lenovo, and Xiaomi. In these companies, design is essential to new product development (NPD) and is integrated into the business strategy. With this new view of design, China could transform the challenges of the new era into opportunities.

As a consequence of the progress of the knowledge economy and the changing economic paradigm, China is implementing a new national design policy. As result from initial study of improving innovation capability in manufacturing, the contribution of design is redefined in the new paradigm. To study it further, in August 2013, the Chinese Academy of Engineering undertook a consultancy project with the title “Strategy of Innovation Design,” led by Dr. Lu Yongxiang and Dr. Yunhe Pan.<sup>3</sup> The project focused on the new role of design in the emerging knowledge economy, and the research team consisted of various experts, including design leaders, engineering specialists, and policy makers in various positions in the central government of China. They interviewed 153 firms in 32 cities, organized more than 50 seminars with local governments and design organizations, and delivered a dozen academic lectures. After two years of research, a proposal for a new design policy in China was submitted in January 2015. It is approved by central government and “innovation design” **is confirmed as** the core solution to enhancing innovative capacity in “Made in China 2025”—a 10-year action plan designed to build a solid base for three transitions.

*Innovation design* is defined as an integrated form of innovation for product and service creation in the new knowledge economy. It includes green technologies, integrates science and technology, and includes arts and cultural considerations. Innovation design can be brought into all facets of design,

<sup>1</sup> The problems were firstly mentioned in the work meeting and were defined as three bases (basic part, basic manufacturing process and basic material). The meeting was organized by China Machinery Industry Federation, CMIF on 19 Jun, 2011. They were redefined in 2015 into four bases, including key basic material, core basic parts (components), advanced basic process and basis for industrial technologies (abbreviation: Four Bases).

<sup>2</sup> National Chairman Jinping Xi, in a speech given in Henan province, May 2014.

<sup>3</sup> Respectively: Vice Chairman of the National People’s Congress Standing Committee (2003-2013) and President of the Chinese Academy of Engineering (2004-2016); and Vice President of the Chinese Academy of Engineering (2006-2014).

including engineering as well as industrial and service design. Chinese policy-makers see it as key to transforming technological achievements into productive power.

## **Made in China 2025**

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“The New Normal” is current economic background in China. In it, China’s manufacturing sector has been suffered issues like rising labor costs, environmental and resource challenges and an exports slowdown. Against this economic background, "Made in China 2025" will use mandates, subsidies and other methods to persuade manufacturers to upgrade their factories to more competitive, innovative and efficient and a high-end, pioneering manufacturing power. In an executive meeting held in March 2015 to discuss implementation of the new guidelines, Premier Li Keqiang explained the target of the plan. “We will implement the Made in China 2025 strategy, seek innovation-driven development, apply smart technologies, strengthen foundations, pursue green development and redouble our efforts to upgrade China from a manufacturer of quantity to one of quality.” The plan documented the research results of *Powerful Manufacturing Nation* funded by the Chinese Academy of Engineering, and its initial stage ran three years before the research of innovation design. Within the initial study, the contribution of design in enhancing manufacturing capability is explored. This directly led to the innovation design project in 2013. The two projects developed concurrently in the past two years to draft the “Made in China 2025” and explore methods and solutions for the transformation. Now, “Made in China 2025,” “Internet +” and “Massive Entrepreneurship and Innovation by All” are the three bounded strategies for innovation in industries. This will finally lead to enhanced quality of manufacturing, high-quality products for branding and design thinking leading to “Created by China.”

## **Challenges faced**

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China’s path to modern design has been unique due to its political, economic, and cultural history. Until the 1950s, the country essentially had no modern industries; although Western nations recuperated technologically between the two world wars, this was not the case for China. It has been stated that China did not have a really modern design movement until 1979, which was the year Deng Xiaoping launched the economic reforms now known as the Open Policy.

Despite the rapid progress of manufacturing in terms of quantity, Chinese manufacturers have been unable to break the bottleneck of quality because of limited key basic materials and technologies, reliance on imported core components, lack of research on advanced basic processes, limitations in application, and an underdeveloped service system. China’s manufacturers are thus limited to competing on the basis of cost and speed of production, rather than through improving the quality of products, building brands, or enhancing capability for independent innovation.

The current knowledge economy is characterized by a new mindset in both users and businesses, in which users are looking for self-actualization through creation while businesses endeavor to build knowledge platform to enable creativity. The juxtaposition of challenges and opportunities requires new thinking on the subject of design to lead product development. This is an opportunity for China to compete with developed countries. When compared with these countries, China has the significant

advantage of existing, large-scale local markets. The number of internet users in China surpassed that of the US in July 2008; it has since become the largest in the world, at 667 million, with a total internet penetration rate of 48.8 percent.

### Design context in China

Innovation in China’s manufacturing industry, as Jinping Xi explained, would straddle three economic paradigms by improving industry’s competitive advantage from its current reliance on low costs, bringing Chinese branding to the experience economy, and creating an entirely new business model in the knowledge economy. In China, the three paradigms exist concurrently (Figure 1), and this is typical of a rapidly developing economy. As John Heskett said, “All these phases are part of the history of design and in innumerable ways still constitute living elements of it. It is important to stress that the evolution of one stage does not entirely replace what has gone before in some sequence of linear progression. Instead, new phases become layered on the old. The older phases may be changed or marginalized, but never entirely die out.”<sup>4</sup> It is the mindset that defines the position of a business in an economic paradigm rather than its performance, delivery, business model, or operation. To ascend to an upper level of paradigm, the company should clarify its position according to its values first, and then decide upon the path of improvement.

<b>BUSINESS AND DESIGN IN CHINA: THREE ECONOMIC PARADIGMS</b>			
	<b>Industry Economy</b>	<b>Experience Economy</b>	<b>Knowledge Economy</b>
<b>Timeline</b>	1980s	1990s	2000s
<b>Cultural mindset</b>	Proud of ownership	Target customer experiences	Enable creativity
<b>Business focus</b>	Goods	Brands	Open platform
<b>Business type</b>	OEM	ODM/OBM	OSM
<b>Role of design</b>	No design	From design as styling to design as process	Design as strategy
<b>Design in NPD</b>	Design as specialization; design as profession	Design as brand; design as sub-process of NPD	NPD process leader

Figure 1. Typical of a developing country, the three economic paradigms coexist concurrently in many ways in modern China.

Throughout the whole value chain, innovation plays a pivotal role and in fact brings more opportunities for value creation. This totally changes the role of design in both business and the economy. In a typical industrial economy, industrial design may be said to simply take a supplementary role in the task of adding value (Figure 2).

<sup>4</sup> John Heskett, "Past, Present, and Future in Design for Industry," *Design Issues* 17 (2001): 25.

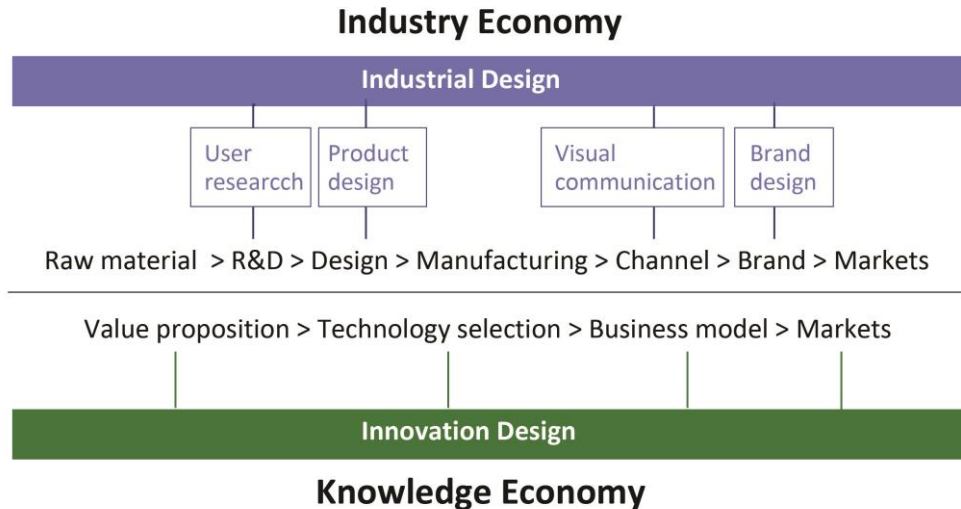


Figure 2. Comparison of design's role in two economies

China's new innovation-driven strategy leans heavily on computing and the internet. It is actually based on cyber physical system (CPS), the seamless integration of computational algorithms and physical components. Advances in CPS will enable capability, adaptability, scalability, resiliency, safety, security, and usability that will far exceed the simple embedded systems of today. Innovation design will enhance our innovation capability through melting into product ideas, creation, production, service, and system formulation. It's also critical to pushing innovation into the areas of technology, culture, human needs, arts, and business—promoting both a harmonious society and a sustainable economy.

In the context of China, innovation design is worthy of special interpretation. Most of the advanced countries have entered the knowledge economy, while China is still at the turning point of economic transformation. Some areas of industry, particularly those that involve the internet and information technology, have developed rapidly, whereas others, especially in the manufacturing sector, are still in the experience or industry economy stages. From the traditional manufacturer's standpoint, new technologies create more business opportunities in the value chain and thus can be an efficient way of transforming and upgrading their business. Some typical trends from software technology are:

- *Changes in how we work.* Traditional working styles focused on creating value based on labor-intensive activities. These are being replaced with software, systematic engineering design, service design, and consulting. Mediators become obsolete, because consumers and producers can contact each other online. As a consequence, the boundaries between them are blurred.
- *From information to knowledge.* The cost and convenience of obtaining information has facilitated business transactions. Computer software as well as hardware plays a decisive role in developing people's abilities and skills in selecting and applying information. Information can be transformed into knowledge and applied in technology development as a result of improved abilities involved in dealing with code. Tacit knowledge can be into explicit **knowledge** databases

as well as expert knowledge systems. Software development can foster creativity, innovation, and design thinking. Complementarily, hardware development focuses on data mining, image building, and voice signal.

- *Enhanced computing.* Computing engineering plays a critical role in product design, manufacturing, production planning, service, and market analysis. Computer-aided design (CAD) is becoming more and more common and serves as a complement to experience with complex equipment. CAD is often linked with computer-aided manufacturing (CAM), computer-aided engineering (CAE), virtual design and proto-typeing, and Multi-Disciplinary Optimization (MDO) design. Computing design has also developed in mathematical model and numerical model for simulation and verification.

## **Innovation design and Made in China 2025**

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Unlike industrial design, which serves only certain stages of the supply chain, innovation design is crucial to strategic business planning—defining value proposition, selecting appropriate technologies, formulating business models, and ensuring that new products fit the markets they are intended for. Its scope can be divided into four levels: process innovation, product innovation, policy innovation, and ecosystem innovation.

Made in China 2025 relies on innovation design as a core solution for improving the innovation capability of the national manufacturing industry. It will do this in four ways:

- *Enhancing innovation design capability:* promoting advanced design, characterized with green, intelligent and collaborative, through sample projects in traditional manufacturing industries as well as strategic new industries and the modern service industry.
- *Enhancing R&D of common and key technologies for design:* emphasizing development of information design, integrated process design, and complex process and systemic design; developing design software with intellectual property to build a better ecosystem for innovation.
- *Building several clusters of innovation design with great impact on the world:* cultivating professional industrial design firms; encouraging manufacturers to build research and design centers to lead a transformation from original design manufacturer (ODM) to original brand manufacturer (OBM).
- *Developing education about innovation design:* establishing national industrial design awards to actively stimulate and inspire innovation design across the country.

## **Innovation Design Alliance of China (IDAC)**

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Over the past two years, these new design concepts have been introduced to the public as well as to industry and design professionals through new design organizations, publications, design awards, and other events. The Innovation Design Alliance of China (IDAC) was established with support from the national government in Oct 2014 as a basis for promoting the new concepts with help from universities, research institutes, the media, finance, users, and industry. As an open platform with a flat structure, it consists of both regional and professional alliances focusing on topics of common interest. Unlike

existing traditional design organizations, the IDAC has developed a new structure for open innovation and efficiently integrated various resources to achieve its target.

<i>Type of Design</i>	<b>Industrial Design</b>		<b>Innovation Design</b>
<i>Economic Paradigm</i>	<b>Industry Economy</b>	<b>Experience Economy</b>	<b>Knowledge Economy</b>
<i>Role of design</i>	Design for production; form follows function	Design for consumer; styling follows lifestyle	Design to enable consumer; co-creation
<i>Role of designer</i>	Styling worker	Styling differentiator; system communicator	System planner
<i>Design for what</i>	Product styling	Product design; service design; brand design	Value proposition; business model; ecosystem; user
<i>Design method</i>	Inside-out	Outside-in	Inside-out <i>and</i> outside-in

Figure 3. Function and role of design in the three economic paradigms.

In keeping with National Chairman Jinping Xi’s hopes, the IDAC’s mission is to enhance innovation design capabilities, promote a transformation from “Made in China” to “Created by China,” expedite the shift from Chinese speed to Chinese quality and from Chinese products to Chinese brands, integrate resources, and build a diversified platform. In addition, the IDAC will boost the whole society’s awareness of the value of design and, hopefully, construct a design culture that will create a better life for the Chinese people and share their sustainable material and spiritual civilization with the world.

Whereas traditional design organizations usually focus on integrating industry, university, and research institute or government resources, the IDAC emphasizes commercialization and user requirements in order to bridge the gap between invention and commercialization. The organization involves individuals and entities from six representative sectors—universities, research institutes, the media, finance, users, and industry—in promoting the new role of design (Figure 4). In the IDAC, ideas and inventions will be commercialized through defining user needs, integrating industrial resources, investment, communication, and supporting policy to create value in existing or new markets.

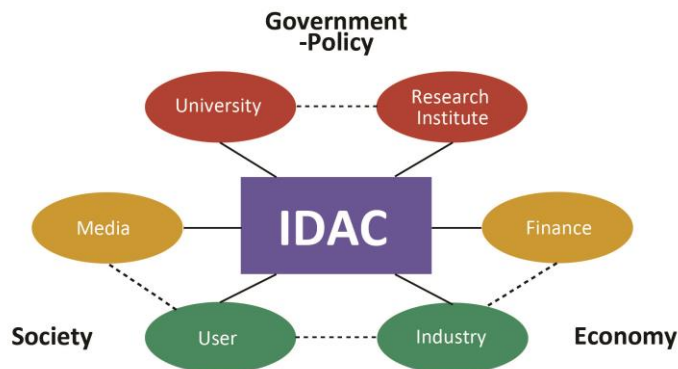


Figure 4. IDAC as a platform for open innovation.

One of IDAC's first activities was to produce 146 case studies as good examples to show the value of innovation in product-system, process, management, and business model design. In 2015, these cases were published in a series of books entitled *China Good Design*. The IDAC also selected 30 of the best cases for a first-ever China Good Design Award.

## **Conclusion**

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Disruptive technology sweeps old industries away and replaces them with new ones in a process of “creative destruction.” Each wave of technology results in investment and the provision of new jobs to replace those lost. Currently, the world is facing another stage of change, whether you call it “Industry 4.0”, “advanced manufacturing,” “intelligent manufacturing,” or “the Internet of Things.” As a general field of activity, or an action, or a plan/intention, or a final outcome, design has the capability to change methods, processes, and thinking.

Every nation contends with its own mix of industries, cultures, mindsets, and awareness, and each nation evolves a strategy to employ its own resources adequately. Unlike the “developed countries” with which it competes, China is facing a particular turning point: It must explore solutions for upgrading its current industries, while at the same time promoting startups that can take advantage of new technologies and innovations. Indeed, other developing countries may consequently come to recognize the importance of design at industrial, social, and national levels.

## **Acknowledgement**

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## **Author bio**

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Research assistant professor, School of Design, The Hong Kong Polytechnic University, where she obtained PhD degree in 2011. Before that, she is design manager of Nova Design (Shanghai). Her research areas are design capability in Chinese firms and national design policy. She has drafted the proposal of developing innovation design, which is listed in Made in China 2025, new national strategy of enhancing manufacturing power.