

APEX STANDARDS

Global Economies: Distinct Standardization Approaches

Qin Shi Huang's unification of China in 220 BCE established the foundation for the country's modern technological advancements through the implementation of standardizations, such as units of measurement, currency, writing, and axle lengths. China's dedication to internal R&D and self-reliance is evident in initiatives like "Made in China 2025," aimed at transforming the nation into a high-tech powerhouse. Comprehending the differences between China's approach to standardization and that of the West is essential for an effective collaboration in science and technology. China's deep history is marked by contributions to technological advancements, shaping the world in profound ways. Innovations during the Tang Dynasty (618-907 CE), such as papermaking, printing, and gunpowder, transformed communication, knowledge dissemination, and warfare. Similarly, the Song Dynasty (960-1279 CE) saw the development of the compass, which revolutionized navigation and trade. These milestones underscore China's enduring commitment to innovation and standard development. In modern times, China continues to excel in pivotal technologies, including high-speed rail, 5G networks, electric vehicles, and clean energy, further solidifying its status as a global leader.

Chinese policymakers and businesses are known for their long-term thinking. This is in contrast to Western businesses, which are more focused on near-term profits. This contrast can be traced back to China's centuries of economic instability caused by the rise and fall of dynasties, and its current government's emphasis on long-term economic development.

For example, in 2020, China's State Council unveiled the "New Energy Vehicle Industry Development Plan (2021-2035)," aiming to advance high-quality growth in the new energy vehicle sector over 15 years. The plan delineates strategic tasks such as enhancing technological innovation, standardizing infrastructure systems and fostering cross-sector collaboration. Additionally, it incorporates measures for establishing an efficient power battery recycling system, implementing extended producer responsibility schemes and supporting power battery cascade product development. State-led initiatives have spurred companies to secure key resources, such as lithium, nickel, and cobalt, and standardized EV infrastructure—both software and hardware—which has catapulted China's global EV market share ahead of major competitors [Chart](#).

In contrast, BASF, the largest chemical producer globally and headquartered in Germany, exemplifies this difference in thinking. In November 2022, BASF CEO Martin Brudermueller maintained that the company's expansion plans in China, where it is constructing a 10-billion-euro chemical complex, had not changed. He stated that costs at BASF's European sites must be reduced permanently due to sluggish growth, high energy costs, and over-regulation. These challenging conditions force BASF to adapt their cost structures quickly.

Despite national security concerns, Brudermueller decided that maintaining business relations is important for the German economy, as it has an extremely profitable China business. He added that the firm had asked "critical questions" about its Chinese investment and concluded that it was "a good opportunity."

The divergent thinking between Chinese and Western businesses will likely have a significant impact on the global economy in the coming years. Chinese businesses, characterized by their long-term focus and risk-taking propensity, are well-equipped to capitalize on opportunities within the global market. Conversely, Western businesses would benefit from considering these differences, enabling them to adapt and thrive in an competitive landscape.

Top innovative economies: the United States, China, Europe, Japan, and South Korea each have distinct approaches to standardization in order to foster interoperability and drive new applications and business opportunities. Europe's diverse cultures, languages, and political systems necessitate a collaborative and consensus-driven approach, while the US's pioneering spirit fosters a market-driven and entrepreneurial approach. Japan's extensive technological heritage has encouraged a culture that prioritizes the creation and exportation of premium goods and services based on agreed standards. This emphasis became apparent since the 1970s when Japan's

Aspect	US	EU	China	Japan	South Korea
Historical Roots	An immigration-based land of opportunities boasting a youthful history marked by trailblazing spirits, a modern innovation powerhouse driven by both corporate R&D and entrepreneurial success	A multifaceted continent made of smaller nations, with rich history in foundational physics and math, pioneering discoveries from the Age of Reconnaissance and the industrial revolution laying groundwork for modern technology	Ancient civilization with a deep history in science and engineering with roots since the ancient standardization efforts in 220 BCE, a centralized state for 2000 years with an emphasis on Confucianism and social stability	Renowned for its craftsmanship, aesthetics and spiritual values leading to top electronics innovations between 1970-1990s, with a commitment to quality, precision, and continuous improvement across various industries	Longstanding ability to synthesize and adapt ideas from other civilizations while maintaining its own unique characteristics, leading to rapid industrialization and economic growth after the Korean War
Philosophy	Focus on market-driven innovation and individual entrepreneurship	Collaborative approach due to diverse cultures, political systems, and economies	Emphasis on centralized planning and state-led industrial policies	Emphasis on continuous improvement and group-oriented innovation	A balance between market-driven innovation and government-led initiatives
Education System	Decentralized system with emphasis on liberal arts and critical thinking, diverse schools, college focus	Nation-specific systems, vocational paths, multilingual education, free-flow cost tertiary education, emphasis on internationalization	Centralized, rigorous, exam-driven, focus on rote learning, competitive, Confucian principles, emphasis on math and science	Uniform curriculum, high academic standards, strong group work and discipline, entrance exam culture, emphasis on social harmony	Intensive, competitive, exam-focused, private tutoring (hagwon), high parental involvement, pressure for top university placements
Standardization Process	Cooperative and consensus-based process, with private industries holding significant influence in shaping guidelines	Collaborative, consensus-driven approach, with a balance between competition, innovation, and social welfare concerns	Strong government involvement in setting standards and guiding technology development	Consensus-driven approach, with strong involvement of industry and government agencies	A hybrid approach that combines elements of both market-driven and government-led standardization
Innovation	Encouragement of private-sector innovation, risk-taking and startup culture with strong IP protections to foster R&D	Collaboration among diverse nations, promoting R&D through private-sector involvement and robust IP protections	Pursuit of indigenous innovation and self-reliance to reduce dependence on foreign technology	Focus on industry-driven innovation with support from government and academic institutions	Government-chaebol supported innovation with a focus on strategic industries and willingness to take risks
Decision Making	Fast decision-making; driven by market competition, innovation, and private enterprise; risk of monopolies and resource inequality	Slower decision-making; consensus-driven; diverse and collaborative; multiple perspectives considered	Fast decision-making; strongly hierarchical, top-down governance, centralized government, with a long history of centralized governance and planning	Medium-paced decision-making; a blend of top-down and bottom-up consensus approaches; balanced decisions; varied stakeholder inputs	Rapid military-style decision making under a top-down hierarchy aided by bottom-up contribution from private sector and academia
Geopolitical Context	Capitalism and democracy shaping market-driven approach	Diverse political systems and economies necessitating a more collaborative approach to standardization	Unified nation and top-down governance, with a long history of centralized governance and planning	Homogeneous society with strong group identity and focus on harmony and professional dedication	Strategic geography, military strength, family conglomerates, high competition
Collaboration	Separation of government, academia, and industry in research and development	Similar separation to that of the US but with an emphasis on cross-sector partnerships and inter-country cooperation	Close collaboration between government, academia, and industry; willingness to use market power to influence standards	Greater collaboration between industry, government, and academia in research and development	Strong government-chaebol-academia collaboration; cultural soft power; innovation driven by internal contests
Advantage	Rapid innovation, corporate investments, venture capital and entrepreneurship fostering competition and global influence. Strong protection of IP rights	Adaptability and ability to accommodate diverse needs and preferences, encouraging intellectual property protection	Strong government support and resources allocated to strategic industries; large domestic market	Strong work ethic, rigorous quality control, attention to detail and precision leading to high-quality, reliable and long-lasting products	Highly skilled workforce and strong government support for innovation, fast to adopt new technologies
Risk	Fiduciary responsibilities leading to prioritization of near-term gains; potential for monopolies and intellectual property disputes	Possible duplication of efforts and wasted resources outside of agreed areas; slow consensus-building due to diverse interests	Risk of over-reliance on state-led initiatives and potential for inefficiency, concerns over IP protection	Dependence on export markets and vulnerability to global economic downturns; risk-averse culture due to respect for harmony and authority	Sharing heavily militarized border with North Korea; dependence on exports increases vulnerability to external shocks

Table: a comparative analysis of standardization and innovation approaches in the US, EU, China, Japan, and South Korea. Grasping these differences is vital for excelling in international competition and fostering strategic collaboration in technology.

than the other governments. This is partly because China wants to ensure that its companies have a level playing field in the global market. It is also because the Chinese government wants to control the development of new strategic technologies that could have a national security impact.

This difference in foundational thinking has implications for businesses globally. Chinese businesses are more likely to invest in research and development, take risks on new products and services, and weather economic downturns. In contrast, Western businesses are more focused on quarterly earnings and more likely to be influenced by the latest trends.

Organizations such as 3GPP, JEDEC, and IEEE play crucial roles in shaping global communication, semiconductor, and technology standards. By participating in and contributing to these organizations, China has been able to advance its technological innovations and establish itself as a global leader in various industries. A notable example is Huawei, which, despite severe trade restrictions due to US sanctions, has demonstrated remarkable resilience and adaptability by investing heavily in R&D, seeking to reduce its dependence on foreign technology, and maintaining its position as a dominant player in the global 5G infrastructure market. Zoomed out, China's technological advancements and global impact throughout history further include:

- The Four Great Inventions: The compass, gunpowder, papermaking, and printing are four ancient Chinese inventions that significantly impacted the world. These innovations facilitated navigation, warfare, communication, and the spread of knowledge, shaping the course of history.
- High-speed rail network: China has developed the world's largest and fastest high-speed rail network, showcasing its prowess in infrastructure development and transportation technology. This feat has positioned China as a leader and inspired other nations to invest in similar projects.
- The launch of BeiDou Navigation Satellite System: As an alternative to the US-owned Global Positioning System (GPS), China developed and launched its own satellite navigation system, BeiDou. This achievement underscores China's ambition to reduce its reliance on foreign technologies and highlights its capabilities in the space industry.

As China's economic growth continues, its businesses are becoming increasingly influential, making impacts on the global economy. It is essential for Western businesses to appreciate and understand the differences in history, culture, and perspectives. Collaboration from both sides can be achieved by identifying effective synergies that drive innovation and progress for the global community.

Adopting a balanced view allows for a comprehensive understanding of the competitive landscape and enables more accurate predictions of future developments. This approach not only dispels stereotypes and misconceptions but also promotes global stability and encourages innovation. Additionally, it helps distinguish between strategic and superfluous trade barriers. Keeping human welfare in focus, it is crucial to remember that trade is preferable to war. By embracing this balanced perspective, countries can collaborate to develop policies that encourage innovation while effectively protecting national security and intellectual property rights.

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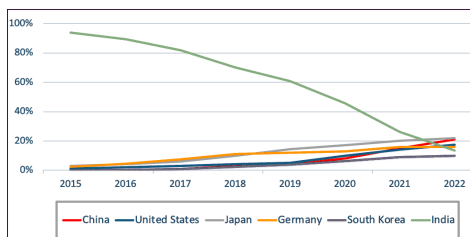


Chart Global pure EV market share (unit: vehicles sold). India's early entry into the EV market with Tata shows a strong understanding of domestic demand. China's domination in EV production is reflected mainly by BYD, NIO, and Xpeng, while Germany's focus on luxury is reflected by VW, BMW, and Mercedes-Benz. The US and Japan have each prioritized high-quality and innovation with brands like Tesla, Toyota, and Honda. South Korea's mid-range EVs are supplied by Hyundai and Kia. As of 2022, China's rapid EV production growth has overtaken Germany and the US, placing them just behind Japan.