23 November 2010

Executive Summary

China has turned more assertive and threatening in its foreign and security policies over the past couple of years. Concurrently, the country’s economic and technology policies, in both the civilian and defense spheres, have become more nationalistic, state-centered, and inward-looking. The reasons behind this discontinuity from a previously accommodating posture, why it has occurred across different policy areas, and whether it is a temporary phenomenon or the beginning of a far more ominous strategic shift are though not yet well understood.

A number of important drivers were identified that might shed light on these changes. Surging nationalistic sentiment, leadership competition ahead of the 18th Chinese Communist Party (CCP) Congress in 2012, and a more confident policy elite seeking to accelerate China’s relative rise in the international order in the wake of the 2008 global economic crisis are some of the political and policy dynamics at play. More structural explanations point to weak authority at the top of the leadership that allow powerful bureaucracies such as the military and science and technology (S&T) apparatus to pursue their own interests that may not always align with national priorities.

It will take sometime before the overall nature and direction of change in China’s grand strategy can be determined. In the defense technological realm, the development path is clearer. China’s defense economy has set its sights on catching up with the West by 2020 and is making steady progress in building up its innovation capabilities, although this is presently in the form of incremental and sustaining types of activities. More high-end disruptive forms of innovation that would lead to major breakthroughs are likely to be beyond China’s reach for another 5-10 years, although there may be exceptions in high-priority areas such as space or aviation that enjoy access to ample funding, foreign knowledge and technologies, and leadership support.

1 The Minerva project on “The Evolving Relationship Between Technology and National Security in China” held a two-day workshop on the “Military and Geo-Strategic Implications of China’s Rise as a Global Technological Power” in Washington D.C. in November 2010. Presentations were given by leading academic experts that included Susan Shirk, Barry Naughton, Tai Ming Cheung and David Meyer (all from University of California, San Diego), Alice Miller (Stanford University), Bates Gill (Stockholm Peace Research Institute), and Thomas Mahnken (Naval War College).
The Interplay Between Domestic Politics and Foreign and Security Policies

After 15 years of pursuing a neo-Bismarkian strategy of preventing the development of a counter-coalition by seeking to reassure the U.S. and its neighbors that its intentions are benign, China recently has turned more assertive in its statements, and is making public threats. Expanding the category of "core interests" that will be defended at all costs to include Tibet and Xinjiang can be explained by the same kind of nationalist public emotion mobilized by the Internet and commercial media towards dealing with Japan and Taiwan. Misperceptions about the relative power between China and the U.S. are widespread and stem from how the 2008-2009 global financial crisis affected the two countries. China recovered first while the U.S. is still struggling to overcome a crisis that it was largely responsible for causing because of its own systemic failures. This narrative is likely to have fuelled popular demand in China for a more assertive foreign policy.

But many of China's actions and threats, such as choosing to side with North Korea over South Korea in the attack on the Cheonan warship and the tough public line on the South China Sea and West Sea are more puzzling and suggest the need to look for an explanation at the level of elite decision-making in China. It appears that domestic Chinese political institutions are making it difficult for Beijing to sustain its "peaceful rise" strategy. Competition for power two years in advance of the next leadership transition at the 18th CCP Congress appears to be stimulating officials to take hawkish public stances. Weak authority in the collective leadership of the Politburo Standing Committee is allowing organized interests in the CCP that benefit from exaggerating foreign threats -- the military, internal security and propaganda bureaucracies -- to go their own way without effective monitoring and discipline from above.

The robust responses from the U.S. and China's Asian neighbors are intended to cause Beijing to recalibrate its policy and return to its "peaceful rise." This is because China’s worst nightmare is the formation of a U.S.-centered coalition to check its development. If Beijing returns to its neo-Bismarkian strategy soon, then we can conclude that the CCP leadership has sufficient authority to sustain the foreign policies that reduce China's domestic and international risks. If the Chinese leadership returns to that grand strategy in 2013 after the leadership changes, then we can conclude that China, like the U.S., can now expect to have its foreign policy buffeted at home by periodic campaigns for political power. But if no return to the “peaceful rise” strategy occurs after 2013, then we may be forced to conclude that China's domestic political system is taking it down the same dangerous path that Germany and Japan followed as rising powers.

China’s Discontinuous Economic and Technology Policies

China's position in the global technological order has been relatively well understood, until recently. As a low-income country, China was far behind the frontier in nearly all significant areas. But with global integration, low cost labor, and an industrious and increasingly skilled labor force, it has been catching up steadily and at a rapid rate. Within the past few years, however, there has been a significant discontinuity in
policy as the Chinese government has revealed itself to be dissatisfied with the existing rate of catch-up, or at least eager to push for acceleration.

China has been throwing huge amounts of money increasingly at technological development. Moreover, the new components of the approach to technological development have been increasingly centralizing, monopolistic, and bureaucratic. This is exemplified by the re-merging of the two state-owned aviation firms to re-create a monopoly in the aviation industry and the organization of national engineering mega-projects into teams coordinated from the top. The beginnings of this approach are evident as early as 2006, but the response intensified with the global financial crisis. The crisis greatly increased Chinese government self-confidence (the failure of the US system combined with China’s success in containing the crisis) and the funding available for industrial and technological policies in the wake of a large Chinese stimulus program.

The approach has substantial risks for China. The approach essentially assumes that the gains from marketization are now hard-wired into the Chinese economy, and so the benefits from resource mobilization will simply be added to the improved productivity that has been produced by pervasive market orientation. This is extremely unlikely to be true. Moreover, there are multiple-overlapping programs, meaning that incentives are hard to disentangle and there are no strong priorities to guide development. The history of the CCP reveals many instances of excessive mobilization of resources leading to negative outcomes. Overall economic policy has some parallels to technology policy in recent years, and is also leading to some negative outcomes such as economic imbalances and inflation.

**China’s Shifting Grand Strategy of Technology Development**

China’s grand strategy of technological development over the past 20 years has been a pragmatic and balanced vision that incorporates techno-nationalist (indigenous innovation) and techno-globalist elements. But China’s S&T community has been steadily leaning towards a more inward-looking, protectionist, state-centered framework in the past couple of years.

This is evidenced by various initiatives advocating indigenous innovation such as government technology procurement policies and a greater willingness of the government to provide state support for key ‘strategic’ and ‘emerging strategic’ sectors. This includes clean energy, environmental technology, bio-technology, pharmaceuticals, and digital manufacturing equipment. But the Chinese authorities are still sensitive to foreign reactions and have recalibrated when faced with strong objections. This suggests that the debate over the long-term nature of Chinese technological grand strategy is still being decided.

**Assessing China’s Defense Science, Technology and Innovation Potential**

The Chinese defense science, technology and innovation system is making a concerted effort to build a strong and capable indigenous innovation capacity, but progress is at an early stage and focused predominantly on incremental and sustaining types of activities.
Architectural and disruptive forms of innovation that would lead to important defense technological breakthroughs are likely to be beyond China’s reach for another 5-10 years, although there may be exceptions in select high-priority areas that enjoy access to ample funding, foreign knowledge and technologies, and leadership support.

China has demonstrated that it can engage in radical defense innovation leading to significant technological breakthroughs if the country’s security is considered to be in acute danger. This was achieved in the 1960s and 1970s with the development of nuclear weapons and strategic missiles. If China’s leaders were to become as seriously alarmed again, this could see another concerted drive to attain breakthroughs in critical defense technological capabilities. This may have occurred since the 1990s with the development of long-range precision ballistic missile capabilities.

China’s present approach appears to be the selective targeting of a few critical areas for accelerated development while the rest of the defense economy pursues a more moderate pace of transformation. But as the country grows more prosperous, more technologically capable, and its security interests become more global and complex, this focused strategy is likely to be broadened. The defense electronics, aviation, shipbuilding and select portions of the space industries are leading the way in the Chinese defense economy’s transformation, especially in civil-military integration, access and linkages with global production and innovation networks, the building of innovation capabilities, and ability to adapt to market competition.

To fully understand China’s defense innovation potential requires the examination of a broad range of tangible and intangible science, technology and innovation indicators. This includes not only hard performance measures such as research and development (R&D) budgets, corporate investment, the output of patent, publications, and products, and the size of the science and technology workforce, but also soft process-related factors such as leadership, organizational flexibility, marketing, entrepreneurial skills, risk cultures, and governance factors.

The Chinese defense economy has been investing heavily in the construction of a comprehensive and high-quality innovation apparatus since the late 1990s that is intended to nurture the ability to conduct disruptive technological innovation R&D. This involves the establishment of large numbers of research laboratories, training a large pool of new generations of scientists and engineers, and forging a robust regulatory regime of standards, regulations, and rules designed to impose discipline, oversight, and raise quality control in a previously haphazardly run system. These structural and process reforms are likely to bear fruit over the next decade and will play an influential role in advancing the defense economy’s innovation performance.