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Andrew Marshall's Lines of Thinking Toward a Better Understanding of the U.S. Position in the World: One Person's View



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In the mid-20th century, an effort began at the highest levels of the executive branch to improve our understanding of how the United States compared militarily to opposing nations. What President Dwight D. Eisenhower initiated, Henry Kissinger later pursued, James Schlesinger established organizationally, and Andrew Marshall implemented was a much broader focus than was found in most analyses and thinking in the 1950s and 1960s. It was labeled "net assessment." While the initial focus was primarily military comparisons, the scope expanded over the subsequent six decades, as did the complexity of America's relationships in the world.²

Andrew Marshall ("Andy")—both by the strength of his intellect and by holding firmly to developing the art of thought in national security—largely established this new, broader form of analysis. It was not that various elements of net assessment did not exist beforehand. What Andy did was to integrate various existing paths of thinking, add new ones, hold all such thinking to high standards, and tap the virtual explosion in science, technology, and analytical methods in the last half of the 20th century. He institutionalized an improved form of objective thought about comparing nations, groups, individuals, cultures,

1 Mr. Pickett worked for Andy Marshall formally in the National Security Council (NSC) and in the Office of the Secretary of Defense (OSD) (1972-1976). He was one of the first two hires by Mr. Marshall. His work at the NSC focused on intelligence support to Kissinger and the President. For example, that included analyzing why the White House did not receive advanced warning of the outbreak of the October 1973 Middle East War. He continued working for Mr. Marshall at OSD/NA. His projects involved comparisons of U.S. and USSR ground forces, analyses of U.S. Army combat training, and studies of USSR ground weapons. Afterwards—for over thirty years—he worked for Mr. Marshall almost annually on various committees, study groups, and research projects. His work in companies and his personal research included history and concepts in business strategy and operations, systems engineering architectures, management tactics for implementing major innovations, and alliances of national and non-national groups.

2 As Marshall wrote in 1972: "National policymakers want to know how the U.S. stands in various types of international competitions ... our relative positioning and any trends that may affect it ... There is a high premium on thoughtful and inventive approaches to defense problem solution ... To make this work we must have a very clear description of the comparative situation of ourselves and our rivals...a comprehensive description of the forces, operational doctrines and practices, training regime, logistics...The use of net assessment is intended to be diagnostic...It is not intended to provide recommendations as to force levels or force structures." (Andrew W. Marshall, "The Nature and Scope of Net Assessments," Memorandum for Record, August 16, 1972.)

and alliances. One of the more important aspects of this was developing the thinking about how the U.S.—no longer the clear master among nations—could compete in these environments.

This paper is about the approach to thinking about complex issues in national security that it nurtured. The history of net assessment and many aspects of its thought processes have been described in an excellent book edited by Jeff McKittrick and Robert Angevine, who put into print the extensive interviews with Marshall, and who added their own insights from the years of working with him. Other books, articles, and records have contributed to the history of work and thinking. The titles of these projects alone demonstrate the diversity and depth of analysis that Marshall pursued.

What Andy did was to integrate various existing paths of thinking, add new ones, hold all such thinking to high standards, and tap the virtual explosion in science, technology, and analytical methods in the last half of the 20th century.

Over the period from the 1970s to the 2020s, the attention to “net assessment” by senior government leaders varied. For many reasons, their attention to developing a broader understanding of U.S. competitive conditions in the world fluctuated with the changes in the world, the demands on their attention, their styles, and their individual agendas. While the small office maintained its attention to developing sophisticated understandings of the world, support for pursuing such thinking fluctuated.

In 2025, after five decades, that office was moved out of the Pentagon. The Secretary of Defense initially disbanded the office, terminated contracts, and reassigned its staff members to the military and elsewhere. He then re-established the office, but at an offsite. While it still reported to senior leaders, its capacity to be heard was diminished. That certainly was in keeping with the varying levels of interest and focus over the decades by senior political leaders. Whether this complex line of thinking would be sustained was unclear.

Marshall's Involvement in Net Assessment

The history of Marshall as a person and of net assessment are well described in the McKittrick/Angevine book. Of particular note is that Marshall was not brought to Washington to work on net assessment. He was hired by Kissinger to improve intelligence support to senior leaders. Net assessment was tacked onto the assignment. The origins of that addition remain unknown. Absent that assignment, the course of Marshall's career and that of net assessment would have been very different.

In the 1950s, Andy's experience at Rand showed that even in leading think tanks the conduct of very comprehensive analyses was difficult. There were major gaps in knowledge of other states (particularly the USSR). At Rand, one central focus was on strategic nuclear forces. Best estimates tended to apply theories from academic disciplines to substitute for data, and even the best thinking was shaped by the experiences and predispositions of people and organizations.

By the 1960s, however, various analytical methods were appearing. One aspect was a major focus on quantitative methods and costs. These tended to become inward looking. Such analyses were more likely to focus on analyzing the details of U.S. defense investments and U.S. military forces than on

contrasts between the U.S. and USSR.³ In the absence of better data, analysts were also affected by having far more knowledge of the U.S. In some cases, they were consequently more likely to infer that opponents were like the U.S. rather than being very different (nicknamed “mirror imaging”). They were also more inclined to believe opponents were more logical in their actions (in part because analytical methodologies demanded logic in the absence of actual data).⁴

In 1972, in the NSC, Marshall’s net assessment focus was initially on issues in the size, capability, location, cost, trends, and intentions of the USSR’s military (in both strategic and conventional forces). From the beginning, he encountered bureaucratic difficulties even when working directly for Kissinger and the White House. Net assessment projects and tasks were delayed by intelligence agencies, the military, and OSD. In late 1973, he was moved to OSD and placed directly under the Secretary of Defense. This unique direct path reduced the resistance of the four military services and competing OSD staffs. The services also came to see Marshall’s office as a means to bypass their own staffs, Joint Chiefs of Staff, agencies, and OSD staffs to reach the Secretary of Defense.

The bureaucratic position of net assessment essentially protected the office from attempts to disband it. Over the years, the intellectual quality of its work and Andy’s personal contributions gave him an elevated status as a unique defense thinker. His own personal involvement built a Rolodex of impressive reach.⁵ He maintained a small staff, which avoided being easily targeted by other staffs and agencies in competition for budgets. He became the Secretary of Defense’s personal think tank in some situations. He used various outreaches to build a wide set of participants. He built analytical talents in think tanks. He tapped scholars for projects in universities. In the late 1980s, he began annual summer work sessions at the Naval War College, inviting an expanding set of public and private sector participants. In the 1990s, he created a Fellows program in which military officers worked in corporations on one-year assignments.

It is a mistake to assume “net assessment” was thoroughly defined in the 1970s or even the 1980s. One indication is that at least every five to ten years, Andy published a think piece and convened groups to ask about the course of net assessment. One reason for that was to reaffirm the commitment to comprehensive thinking. Another was to explore the breadth of topics needing attention.

3 At Rand, Marshall saw the differences in conclusions based on different academic disciplines and the differences between such conclusions and occasional facts. Economists and statisticians using their methodologies, for example, concluded that USSR bomber bases would be positioned along major roadways. Marshall and several others, however, had been cleared for sensitive intelligence. It showed the bases were where they had been in WWII (i.e., past behavioral patterns were being followed).

4 Marshall at one point challenged the intelligence agencies to explain why the USSR would not have encountered problems similar to that of the U.S. military in selecting, designing, building, and implementing weapons and forces (e.g., incurring cost increases, schedule delays, technical surprises, and operational difficulties). The response he received was that the Soviets would see those problems and fix them.

5 Finding, recruiting, and retaining (or pruning) diverse thinkers was one of Marshall’s (and his small staff’s) great core talents. Indeed, the progress in sophisticated thought in net assessments owed much to the small size of the office, its central position in the Department of Defense bureaucracy, its uniqueness as a new line of thinking, and Marshall’s intensely personal involvement in thinking. In the long-term, that led to the growth of complex thought in the military services and defense agencies. That core talent may disappear with the closure of the office. It is unclear who (if anyone) will provide the intellectual energy as “assessment” is dispersed throughout the government.

Marshall initially focused assessments on military subjects important to the White House, senior defense leaders, and the military services. He addressed several broader topics such as the contrasting cultures of foreign states and the impact on adversaries of the economic costs of defense.⁶ In the subsequent decades the assessment approach widened as changes occurred among nations, in U.S. national security interests, in the supply of “thinking” institutions, and in the growth of methods of thought. By the 1990s, with the fall of the USSR, he became more and more interested in exploring the future.⁷

Of great importance is that Marshall himself remained first and foremost a thinker. People who worked around Andy, even in his last years in Net Assessment, inevitably observed that his office was characterized by stacks of studies and shelves of books. That is the clearest physical evidence that Marshall remained, all his life, a thinker and analyst. An indication of this is the numerous memos he personally wrote about net assessment as a discipline even after 40 years in the job. He never took his hands off the wheel or allowed himself to be diverted to management and bureaucracy (in this he was well served by existing and past members of his own staff).⁸

The Shaping of Thinking in the 20th Century

Marshall succeeded in part because he had been—and continued to be—bureaucratically positioned for it. He reported directly to the Secretary of Defense. His staff remained small. His work did not result in recommended choices among military services, force designs, or specific programs, which would have threatened organizations. Instead, he remained focused on improving the understanding of complex subjects important to the shaping of national security. That line of thinking was to become increasingly important because of major changes that occurred in the last half of the 20th century.

First, the period of U.S. world leadership from the 1940s to the mid-1970s came from the mix of U.S. strengths and from the fact that much of the world had been crippled by World War II. The only serious national security threat was from the USSR, which chose to focus on military capability and to isolate itself from a broader economic competition. Economic progress in Europe and Asia presented the more

6 Andrew W. Marshall, “The Character of Future Net Assessment,” Memorandum for Record, June 10, 1996: “The goal of Net Assessment remains essentially the same; that is, to provide diagnostic assessments that surface for the top-level decision makers emerging or already existing problems, or more importantly opportunities, that they might wish to focus on and, if need be, organize efforts to develop strategies to counter or exploit.”

7 Andrew W. Marshall, “The Character of Future Net Assessment,” Memorandum for Record, June 10, 1996: “There is of course a new geopolitical situation. The collapse of the Soviet Union means there is no large immediate competitor. There may be in the future. Also, the geographic focus of attention may shift to Asia...the possibility that there may be major changes in warfare ... probably be more proliferation of weaponry... Therefore, the context of the situation that the United States finds itself in could be very different ... Really big problems lie farther in the future than they did during the initial period of the development of Net Assessment.”

8 Somewhat ironic is that Marshall did not envision his work at DoD to be a career-long event. He rented an apartment and even the furniture, while retaining the home he and Mary had in LA. He faced various semi-comic homeowner challenges, such as the use of wines in his cellar in LA that were aging, and what to do with the classic Morris Garages (MG) in storage there. None of his followers were much help, although the MG did have magnetic attraction. Cort Furniture wondered how to account for the rented items after several decades (they had been fully depreciated but still on its books).

visible challenges to U.S. economic positions beginning in the 1960s.⁹ Clear U.S. military leadership was to begin diminishing in the 1980s. Following the collapse of the USSR in the 1990s, the changes and challenges to U.S. military leadership continued. Net assessment expanded in both the content of military issues and the impact of commercial competition on U.S. security.

Second, the collection and analysis of information dramatically increased. The more notable advances were in satellite photo collections that grew in the 1960s from photo buckets captured by aircraft in the Pacific every few months to electronic transmission from satellites in the 1980s to ground stations. And photo accuracies moved from feet to inches. As one interpreter remarked, no longer was the question of whether it was a tank or a truck. It became what vintage of tank it was. Greater accuracies increased demands for knowledge (not the reverse). Similar advances occurred as commercial data collection (including space reconnaissance) grew. And there were parallel improvements in government and private sector data processing and dissemination. These advances both supported and increased the inherent demands of net assessment for detail and precision in digging into broader concepts and comparisons.¹⁰

Third, gathering information from non-government sources also grew substantially. This was the natural byproduct of the growth in international trade, in cross-border combinations of companies, in universities and research institutions, in journalism, and in other fields. Private sector entities—e.g., in finance, manufacturing, logistics, and technologies—had unique insights into topical areas (e.g., foreign financial capabilities and foreign organizations and decision-making). Those who engaged directly with decision makers, agencies, and companies in other nations provided insights into existing and future developments. This was particularly important because assessments often dug deeply into understanding how nations operated internally. Marshall and his staff developed contacts in these diverse arenas to identify or clarify issues.¹¹

Fourth, the sixty years after WWII were decades of huge advances in human thought and knowledge, far beyond just net assessment but into which net assessment could tap. Major advances were made in such fields as mathematics, material sciences, biology, chemistry, solid-state electronics, anthropology, archeology, geology, astrophysics, organizational behavior, and business operations. Such disciplines also benefited from advances in techniques for collection, measurement, and analysis. As one scholar remarked, in her discipline, the tools of searching and analyzing moved her field from being like stamp collecting to being a scientific discipline. These great advances provided net assessment with capabilities to explore topics not only through new disciplines (e.g., organizational behavior and solid-state

9 Japan's emergence in the 1970s in auto manufacturing, the oil crises of the period, and Europe's return to producing high-quality products were a few of the major indicators of the world advancing and the shifting dominance of U.S. economic power. The inability of American automakers to match product quality and changes was one example of the inability of the older branches of the economy to handle the new world. While new industries were to spring up in the U.S. (computers, communications, software, medicine), the U.S. dominance was beginning its permanent conversion from clear leadership to variations in competitive advantage.

10 At one point, for example, it was hard to make intelligence agencies understand that Presidents and Secretaries of Defense had their own personal network of intelligence sources in CEOs, VPs, scholars, scientists, and journalists. Those sources also became increasingly skilled as nongovernment collection and analysis achieved levels only held in classified operations several decades earlier.

11 How nations—or subgroups, regions, and alliances—operated internally was (and is) far more critical than abstract theories of politics, economics, statistics, or history. It is inside such places that choices and reactions take place. The challenge is understanding how a condition or situation may be perceived and treated and identifying various possible current and future behaviors. Because the question is not how the U.S. would perceive and act if encountering a condition, but how another nation or group would. "Mirror imaging" was, and still is, a potential weakness of U.S. national security thinking.

electronics) but also through advances in existing disciplines (e.g., cultural anthropology and economics). In many cases they provided insights into societies, raw materials, and humans as a species not even available before the 1945-1950 period.

Fifth, the economic and political power of the U.S. in the world underwent major changes. Its internal economic strength shifted under the impact of international trade; foreign economies; migration of manufacturing overseas; dependencies on foreign energy; and regional, political, and economic entities. America had built an economic powerhouse through the century from 1900 to the 1970s. It centered on major private companies, a labor force with high skill levels, major manufacturing, and an economic structure that paid high wages and benefits because the U.S. market was the dominant world market. By the 1970s, lower cost labor combined with the spread of manufacturing and technology resulted in a U.S. economy increasingly focused on services, financial activities, and niche product manufacturing. The dominant questions for the U.S. became how to participate and compete in the world, not how to prosper by dictating. Competition became a major element of the U.S. international environment. Competition and rates of change became an increasing consideration in the details of assessment.¹²

Sixth, there emerged an entirely new industry in analysis. First was commercial consulting, which essentially exploded following WWII in major firms such as McKinsey, Boston Consulting Group (BCG), Bain, and Booz Allen. They were fed by a similar major growth in graduate business education. Second, was a major growth in the field of national security. Rand in the 1950s, for example, was one of a few analytical companies. By the 1980s, there was an industry of BDMs, SAICs, Hudsons, and CSISs. These produced a major growth in papers, reports, and books. They created an enlarged and distinct career field of “analyst.”¹³

Net assessment as an enterprise underwent continuing long-term shifts in topical areas, key questions, issues, and approaches as the six major trends evolved. The challenges of just engaging different sources demanded time, multiple studies, and long-term interchanges to make progress. Over a period of decades, Marshall expanded the reach of net assessment by building a population of organizations and individuals to grapple with the complexities. One can argue that Andy found the best organizational formula for developing this new type of analysis. He would not have been as successful if he had allowed his enterprise to grow and had internalized more of the research. His personal focus on analysis, and on tapping sources for that, was of lasting importance to developing the field of net assessment.

The Key is Thinking, Not Labels

Marshall the person may have become inextricably branded or tied to the words “Net Assessment.” The underlying analytical thinking may also be embedded in the term. That is unfortunate. What Marshall brought to the field of sophisticated analysis was more than a term, which itself over the years has been

12 It also removed much of the ability to disconnect comparisons of military capability from economics, politics, and other aspects of cross-border relationships.

13 For example, graduates with MBA degrees numbered less than 10,000 in 1960. By 1990 it was 100,000. The creation of new business schools also spawned the growth of graduates with doctorates to provide the faculties to staff them. To some extent, the quality of MBA graduates and professors declined. Similar effects could be seen in political analysis. “Political Science” was as new a discipline in 1960. By the 1990s, the proliferation of universities offering the degree produced an entire culture of “political analysts,” but the best thinkers were still a smaller percentage of the population.

subject to any number of interpretations and reasons for following or not following it. The term “net assessment” may be (probably will be) lost in a dustbin of past fashionable lines of thinking. What should be harder to avoid is the underlying importance—especially in today’s world—of what Andy Marshall believed in and pioneered.¹⁴

Marshall wanted analysis that was comprehensive (or complete if one prefers a different word), candid (nothing is set aside for personal or other reasons), pertinent (related to the subject at hand), and balanced (neither ignoring nor overplaying factors or participants).

He focused broadly on topics in national security, because that breadth was essential to understanding the world.

He tasked or led work on the expansion, clarification, and even correction of existing analyses of major subjects (e.g., why did the Soviets build so many ICBMs? How could CIA conclude USSR military costs were so much less than the costs of U.S. defense?).

He examined topics or issues likely to be overlooked (e.g., what kind of allegiances could emerge among Muslim states?).

He probed thinking about possibilities others might overlook (e.g., could China and India exchange nuclear fires in the mountains?).

He sought to understand what factors affected the pace and direction of change (e.g., why did the German military make so much more progress after World War I than the U.S. military? What did corporations do to adopt and accelerate major changes—and could those approaches be used in the government?).

He searched for new ways of thinking to apply to national security (e.g., how might business concepts like the portfolio method, delivery chain, or core competencies be applied?)

He dug into understanding the underlying reasons for the actions of nations (e.g., how did organizational structures, practices, and incentives affect the behavior of China toward Taiwan? How did defending eleven time zones affect the direction of USSR defense spending and their predictions about possible war with the West?).

Such issues have always been the objectives of first-rate analyses, particularly of topics of major consequence for nations when thinking about their future and the future of the world of which they are a part. Today, a major challenge for the government is the preservation of those lines of study and the variety of methodologies that underpin them. Unlike the post WWII period, today the U.S. position in the

¹⁴ To some extent the problem in net assessment is that it does not have a singular discipline of thinking from which it springs. It is not like economics, demographics, logistics, physics, or numerous other disciplines that one can find repositories of theories and methods in universities, think tanks, companies, or government agencies. It is an amalgamation of these disciplines in different sets that are defined by the conditions or issues being examined. That makes net assessment somewhat similar to systems engineering. The latter also focuses on conditions and selects different disciplines of engineering, physics, science, etc. to understand what underpins a particular situation.

world depends far more on American leaders understanding the complexity and details of an advanced, diverse, competitive, and divided world.

Marshall's greatest contribution was not establishing the new set of words, "net assessment." His greatest contribution was expanding the range of topics that needed to be examined and the types of analytical methods that should be pursued. A major challenge today is not letting that disappear as leaders and followers, when confronted with the world's complexity, make major assumptions, slip back into old methods of thought, or fall into generalizations about how the United States should act.

Marshall's Focus on Subject Matter, Not Theories

A major point across most of his work was that Marshall focused on problems, situations, and conditions. He did not focus on major theories about interstate relations, or views of the best types of governance, the presumed role of governments, or political ideologies. He might tap these like any other discipline for their value in understanding situations. For example, while his personal views were strong, in net assessment he set aside debates about democracy, socialism, and communism. It was not that they were unimportant; it depended on how they—along with many other factors—influenced particular situations or conditions. The condition or situation was always the overarching topic of work.

He focused on diagnosis and not on recommended actions. Recommended actions inherently undermined objectivity among participating organizations by creating winners and losers.

Early work also showed that building good assessments required disciplined study of the details underpinning them. Understanding the organization and practices of Soviet strategic forces, for example, was as important as counting weapons, particularly for arms control. Rates of change and innovation were essential to analyzing long-term force evolution and how combat might occur. Military experiences, doctrine, and operational experiences combined with existing and emerging technologies exerted major impacts on military capabilities in addition to the numbers. At an even broader level, societal trends, geography, histories, etc. affected national military, political, and economic strengths.¹⁵

From work by his followers, and Marshall's own writings and speeches, one can group much of what was defined as "net assessment" into nine topical areas. These certainly overlap, but they were also individually important. They grew over decades as Marshall and others recognized that understanding other nations (or groups), comparing them, and developing competitive analyses required studying mul-

¹⁵ The devil was in the details (and still is) when it comes to understanding a situation. Understanding was a fundamental aspect of assessments. What might be observed—or believed to be seen—had to be probed in greater and greater detail to understand what was being observed, how it came about, and what it might mean.

multiple underlying dimensions. “Net assessment” was not a singular product, but the result of diagnosing an opponent from multiple perspectives.

These nine topical areas were:

- Comparisons of military capabilities (e.g., the Balances—Strategic, Central Front, Naval, C3I, Long Range Strike, Space, Logistics).¹⁶
- Comparisons of enduring national level capabilities (e.g., natural resources, demography, geography, sociology, history, economics, government, technology, industrial capabilities).¹⁷
- Understanding an opponent’s knowledge, perspective, and approaches (e.g., in their views of deterrence and warfighting, in using tactical nuclear weapons, in investing in their national air defenses, in how their actions toward the U.S. reflected their own perspectives).¹⁸
- Analyzing systems for insights into national implications (e.g., in ballistic missiles, combat aircraft, submarines, air defenses, armor, tactical air defenses).¹⁹
- Studying international confrontations that demonstrate actual capabilities (e.g., Arab Israeli crises, India-China, India-Pakistan, China-Taiwan).²⁰
- Considering alliances and unusual combinations among nations and/or subnational actors (e.g., ME states and terrorist ties, Muslim state alliances embracing Asian nations).²¹

16 “One of our biggest contributions was in providing a better way of thinking about the military balance in particular areas providing an analysis of the long-term trends and asymmetries that impacted the military balance ... as well as ... how to measure ourselves against the Soviet Union” MFR Further Thoughts of Future Net Assessments A.W. Marshall Sep 2000.

17 For example, the U.S. had an inherent advantage for much of the 20th century in the protection of distance afforded by two great oceans. The nations of Europe faced, and were influenced, by their immediate proximity to their presumed enemy. The USSR’s great size protected it from any easy invasion. Other means had to be used to make it feel vulnerable.

18 Described later, a difference in technical testing of silos led the USSR to conclude that Minutemen—intended by the U.S. as a weapon to survive attack and be a deterrent—was concluded by the USSR to be a first-strike surprise attack system. It changed the USSR’s doctrine and system investments over a period of decades.

19 Of great importance was objectively looking at such systems in both the U.S. and other nations. Marshall recognized that foreign states could have weapons at least as good as, if not better than, the U.S. (e.g., air defense guns, small arms like AK-47, and tactical rockets), just as he accepted U.S. weapons could be equal or superior (e.g., fighter aircraft, bombers, nuclear submarines, carriers). He did not give U.S. systems a “break.” The questions for both sides were what underpinned the system and how they could be used. Evidence showed that apparent disadvantages could be offset by operational practices, but also apparent advantages could be offset by operational practices.

20 Monitoring confrontations without U.S. involvement was important for understanding how other forces performed, how they interacted, and what defined “winning.” That, in turn, challenged U.S. intelligence on collection and analysis.

21 A key analytical challenge was to avoid focusing primarily on the routine alliance concerns such as those involving the USSR or China as the key participant. Unique temporary or enduring alliances could also emerge among national and subnational entities (e.g., terrorists, ethnic groups, religions, sub-cultures, gangs). And the goals of such combinations could be very different from conventional thinking.

- Exploring competitive techniques for building advantages (e.g., cost imposing strategies, surprises, deceptions, exploiting weaknesses, affecting force choice practices).²²
- Identifying disruptive factors that reshape national strengths (e.g., revolution in military affairs, innovation, frequency and speed of change, impact of science and technology).²³
- Examining techniques of analysis that affect the conclusions of assessments (e.g., measures of effectiveness, evaluating doctrine and operational concepts, Bayesian probabilities, war-games, understanding sources of defeat).²⁴

Marshall's projects had a number of similarities. He focused on diagnosis and not on recommended actions. Recommended actions inherently undermined objectivity among participating organizations by creating winners and losers. He focused on providing information to help senior decision makers, recognizing that their perspectives could be fundamentally different from the organizations feeding them. He wanted exploration of varieties of futures, since none were predictably certain. He sought objectivity and the questioning of conclusions. He wanted to avoid the trap of mirror imaging or the unquestioned belief that history repeats itself. Finally, he searched for competitive advantages, and he wanted explicit understanding of strengths, weaknesses, risks, threats, and opportunities.

Understanding the scope of future possibilities attracted more and more of Marshall's attention following the collapse of the USSR. He wanted more informative understanding about possible futures and how those futures could evolve over time. For example, this included how to detect when and how fast major changes could occur in key technologies or an opponent's national resources. It included how to predict the range of an opponent's reactions, possible responses to outside events, and how to incorporate the possible changes as opponents made their own choices.

Marshall recognized—as did others—that opponents, competitors, and others had a vote on any particular path into the future. One could try to shape an opponent's response, but that was never guaranteed. It was, therefore, extraordinarily important to monitor competitors, to detect the indications of an opponent's future and his responses in a competition, and to maintain the capability to adjust the path to the future to deal with those responses.

22 Recognizing that the USSR (and Russia?) was extremely concerned about defending its extensive border is one reason for building a long-range air-breathing offensive force (e.g., B-1B, B-52, B-2). It incentivized the Soviets to spend defense budgets on air defenses. That reduced its military spending on power projection. The same effect is being seen today in the U.S. drawing spending from overseas power projecting capabilities in order to build a complex continental air defense system. That tradeoff between air defense and sustaining global military power is an interesting issue with long-run strategic implications.

23 As recounted by Steve Rosen, Germany after WWI embarked on a major redefinition of military organization, types of weapons and operational practices, and by the 1930s was superior to the U.S. military. It took several years of war for the U.S. to close that gap. Marshall captured a key line of thought in the Russian MTR in the 1980s. Innovation today is even more a centerpiece of national security thinking than in the Cold War.

24 An early challenge in assessments was to deal with statistical rules of thumb used by the U.S. military to evaluate its effectiveness in wars. These include, for example, ratios of friendly to enemy forces, nuclear weapon survival rates, targets destroyed, rates of change on battlefield lines of contact, and studies of when enemy forces surrender. A popular form in the 1960s was "cost-benefit analysis," which focused on the cost of a U.S. weapon vs. its impact; that tended to become focused on internal U.S. force choices, not on whether the comparison to enemy forces was important. Such rules of thumb gained so much prominence that the Army in the 1960s created a new special career field. Many of the early methods were largely replaced or deemphasized. Current approaches incorporate more attention to insights from activities such as war-games, exercises, field tests, and major training effects.

Methodologies and Branches of Thought in Net Assessment

Early work by Marshall showed that building good assessments required very disciplined study. Generalizations about the behavior and capabilities of other nations gave too little attention to important elements such as observed daily practices, backgrounds of major individuals, competing demands for resources and responses to previous situations. At an even broader level, societal trends affected long-term national, political, and economic strengths.²⁵ For example, while the overall size of USSR forces was impressive, how many units were full-sized, fully equipped, backed up by logistics, and trained in different types of warfighting? What ethnic groups populated units and how did that affect capabilities? Counting weapons and identifying practices in Soviet strategic forces was important, but understanding the differences among key Soviet institutions and individuals responsible for those weapons was essential for negotiating arms control. The Russian failures in its initial attack on Ukraine were a vivid contemporary example.

The devil was in the details (and still is) when it comes to understanding a situation. Understanding was a fundamental aspect of assessments.

A major message from looking at his work is that Marshall was all about “how to think,” not “what to think.” In each of the nine areas, and in assessments overall, he sought a far better understanding of existing conditions, what underpinned them, and what that might mean for the future. One analytic methodology did not provide that. Marshall sought to tap a wide range of thinking. Not all of them were of equal import for each project, but he did not want an analytical approach to be immediately set aside just because at first glance it seemed unimportant.

Some lines of thinking are obvious, such as nuclear forces, force structures, leader behavior, and economics. Others are more subtle or not commonly addressed, such as geography, geology, business concepts, and organizational behavior. Several examples of lines of thinking used in assessments are briefly described in subsequent paragraphs.

Nuclear Capabilities and Employment

Marshall considered nuclear weapons, their possible use, and deterrence to be potentially a major point of analysis. In the early days at Rand the major focus was on conceptual aspects of their use, the numbers of weapons, delivery means, location of opponent forces, and their link to conventional war. It took subsequent decades for the U.S. and USSR to achieve some shared clarity as to their devastating effects, and to gradually develop relationships to avoid their use. Risk did not disappear, but understand-

²⁵ The devil was (and still is) in the details when it comes to understanding a situation. “Understanding” was a fundamental aspect of assessments. What might be observed—or believed to be seen—had to be probed in greater and greater detail to understand what was being observed, how it came about, and what it might mean.

ing their implications grew substantially, as did cautions in how they were discussed, deployed, and emphasized (e.g., as a political tool to communicate the importance of a national security concern).²⁶

By the turn of the 21st century, the role of nuclear weapons had become far more complicated. Few nations and individuals had seen their destructive power in over a half century (even in testing) and understood their devastating effects. Their ownership had become measures in achieving actual or semi-great power status (e.g., North Korea). They had become linked to cultural status (e.g., the Arab bomb). New nations having the weapons exhibited little understanding of their impact on warfare. Possession was seen as political tools (as when India and Pakistan exploded nuclear weapons over several weeks back and forth to impress each other).

Analyses, even today, occasionally seem to be self-limited to types, numbers, and delivery means. This is then followed by speculations on their use and future development. Overlooked but of equal or greater importance are questions of what might cause their use and how they might be used. Some questions are subtle: What did each owning nation believe was the capability of others? What did each believe were the manners in which other powers would use weapons or react to their use, including targets and goals? What were the types of attacks that would provoke counterattacks? What if a nation used its weapons on its own territory to defeat an opponent? How did nations with only a few weapons or delivery means think about their use? What was the tie between conventional weaponry and forces and the use of nuclear weapons?²⁷

Marshall's interests in nuclear weapons and war were not ones of advocacy. It was about understanding this major new dimension of potential conflict that had emerged following WWII. At the broadest level, do the original concepts of deterrence need to undergo major revisions as more nations have concerns about ownership? Could unusual alliances develop? How would even accidental use reshape developments across nations and regions? How could the policies and behaviors of owners of such weapons affect the desires of other states to own them?

History

Marshall believed in history, but he was not bound by it. He used the past and the present to the extent they yielded understanding. His thinking was more about how history might outline the range of an opponent's possible paths, not how history guaranteed a specific vector. Indeed, futures on the extremes or fringes (not the center) of a nation's past presumed sets of causes required different investment paths, challenged existing institutions, demanded actions by leaders, and involved consistency of effort

26 For example, the Soviets' deployment to Cuba in the 1962 crisis and their movement into the Mediterranean in the 1973 Middle East War.

27 Consider the announced threat by the Russians that they might use tactical nuclear weapons in Ukraine (leaving also the open question "or elsewhere").

over time. Such major shifts from history signaled a need for careful analysis of the actual futures that might result. Using history to think about the future is about breadth, not singularity.²⁸

Misinterpreting or overemphasis on history can mislead judgements. For example, in the rise of “end of history” beliefs at the collapse of the USSR, analysts were ignoring the much longer history of humans as a species. In the optimism about democratic governments in Iraq and in Afghanistan, people overlooked the long history of warlords and fighting among local clans. On a more positive note, the explosive growth of China in the past five decades and its thousands of years of recorded history contain messages about an enduring presence in the global environment.

History counts, but it does not dominate the future.

Economics

Economics involved much of Marshall’s thinking. It had two major directions. One was at the highest level of national or regional capabilities: GDP and its components; a nation’s international economic role; a nation’s capital levels, sources, and flows; and the impacts of the public and private sector. These provided some brackets in forecasting futures and what might shape those futures (e.g., how trade flows could affect regional development). The second direction was analyzing at a more specific level the factors that shape a nation’s economic power. That includes not just raw materials, but also labor, infrastructures, engineering, manufacturing, tacit learning (e.g., experience curve), logistics, and transportation. What risks and opportunities did these singularly or collectively provide?²⁹

Early in his career, Marshall’s economic focus was most evident in his decades-long confrontation with intelligence agencies over Soviet defense spending. The agencies in the 1960s held that USSR spending was about 4% of its GDP. However, it had a far larger force structure than the U.S. and would have had to achieve that on a much smaller GDP. The U.S. intelligence agencies could not adequately explain how this was accomplished. It took several decades for Marshall to move the agencies from 4%, to assessing a larger single digit, then to a 12-15% estimate of the GDP. After the collapse of the USSR, the U.S. gained access to USSR internal data, and the percentage estimate was raised to as much as a third of its economy.

Marshall’s concern about the discipline was also that economists could focus on creating and defining quantitative measurements and could become so captured by the art of measurement that they overlooked the role of the underlying resources. For example, economics over the decades tended to ignore how the behaviors of individuals and groups affected core economic principles. People did not make choices as economic theory prescribed. Behavioral economics eventually began to emerge in the

28 For example, Marshall sponsored the study of the Soviet campaign into Manchuria in 1944-1945. It suggested a far more mobile approach to USSR combat operations than what had been observed on the Western Front and what the U.S. and European states seemed to be assuming about a war.

29 Nations with established industrial and product capability in an area can dominate the emergence of new competitors, as commercial aviation is dominated by two manufacturers. Decades can be needed for a new entrant to be successful. On the other hand, such dominance can lead a national industry to have an extensive manufacturing, supply chain, distribution, technology orientation, and labor force that resist major change. New entrants without those anchors may succeed and undermine the former’s dominance (e.g., the success of Japan in undermining the dominant U.S. market share of Big Three Automakers). Consider today the impact on various nations’ economic strength of rare earths, processing rare earths, other minerals important to electronics, and capabilities in electric power generation.

1970s and 1980s as a branch of the discipline to more closely link economic actions to how people and organizations actually behave. The first Nobel Prize in Behavioral Economics was awarded in the 1990s.

Changes in macroeconomic measures—such as GDP—are important to governments, universities, companies, and banks. The measures influence decision-making, even though politics affect their presumed objectivity. Moreover, in forecasting a nation's future economic direction, a substantial departure from historical and existing growth requires identifying the changes needed in specific parts of the economy. Indeed, it is at the extreme departures from nominal measures that details are particularly interesting. China provides an obvious example of how much its departures from its recent past were critical to its huge growth after Mao.

Anthropology and Sociology

Marshall believed an analysis should not ignore deeply-rooted attitudes and values in a nation, sub-nation, cultures, ethnic groups, religions, regions, or humans as a species.³⁰

Marshall had read Robert Ardrey's *The Territorial Imperative* when at Rand. This fed his interest in human behavior, and aspects that affected humans as individuals and groups. It was a branch of thought particularly important in crises and similar major challenges. In those situations, people could be overwhelmed with the flow of events, partial pieces of information, inaccurate knowledge, the timing of information arriving, conflicting views, and the urgency to make choices. They could easily fall back onto so-called "gut" judgments. Even in more routine conditions, a person's elemental behaviors (e.g., fight or flight) can govern. Over the subsequent decades Marshall developed ties with people who explored these lines of thought: anthropologists, psychologists, sociologists, demographers, political scientists, business analysts, and historians.

A major example was the division of opinions about the future of the world after the collapse of the USSR. The de-emphasis on national security led the U.S. to substantially reduce expenditures for defense. In part this was a logical step following the diminished threat of general war that had marked the previous four decades. As described in articles and books in the 1990s, however, some believed it marked the end of a history of major conflicts. Some people—following the view of an end of history—believed at a much deeper level that man as a creature was not combative by nature. His institutions and historical experiences caused behaviors that resulted in combat.

Others—including anthropologists and sociologists—believed the combative or warlike nature of humans was embedded in a million years of struggle for survival. The Soviet collapse did not end that nature. Controls of human behavior could succeed to a point, but an assertion of a peaceful human nature was unwarrantedly optimistic. Organizations and practices could—as they had—exert control over that nature. But self-protection, aggression, and retribution could not be completely set aside.

³⁰ For example, consider claims of achieving peaceful end to a conflict only to have it restart; or being convinced that no war would occur, as in October 1973 in the Middle East and 2022 in Ukraine. In October 1973, western governments, including Israel, were convinced that Egypt would not initiate a war because it had been thoroughly defeated in 1967 and would be again. What was overlooked was that Sadat believed that the Arabs could not face Israel in negotiations unless it demonstrated a continuing willingness to fight.

The challenge of analysis, however, was not to be dissuaded from considering both points of view. The risk of potential conflict was embedded in major military powers, groups of military powers, the appearance of lesser forms of combat, and other forms of conflict than war (e.g., trade wars). In the 1990s, this was one factor that led to more studies by net assessment into China's potential global role and behaviors.³¹

Culture

Marshall recognized that cultures—the shared views and actions of a large body of people—were powerful tools that affect behaviors. Those cultural differences could be subtle and deeply embedded. The more obvious contemporary examples are the differences in the role of women in societies, of the acceptability of different ethnic and racial groups, of how children are raised, of who can express public opinions, and of the acceptance of caste-like structures. The size and reach of some thinly followed cultures have been increased in recent decades by communications providing the ability to recruit followers on a nearly worldwide basis.

These powerful inclinations of humans and their groups are not immune to being held in check, but they cannot be ignored. A major example is the second war in Iraq, when the U.S. and its allies went against Saddam Hussein. A contingent of U.S. thinkers believed Saddam was the singular obstacle to the blossoming of democracy. What was not recognized, however, was that Iraq was a geographic collection of fundamentally competing cultural subgroups and warlords. Hussein had kept these in check through a variety of means (e.g., money, forces in place, violent suppression). When he disappeared, democracy did not break out. Civil war, however, did, as warlords and followers fought over jurisdictions. Understanding the cultural divisions in Iraq's societies would have led to a more sophisticated approach by the U.S. to the post-Hussein Iraq.³²

Culture can affect how groups interpret events, what they consider appropriate behaviors by themselves and by other groups, and what they choose as actions. Particularly important is not to assume another nation's behavior will be similar to the U.S. or the West in general. Believing that an opponent or ally to the U.S. would see and weigh data, signals, the patterns of signals, and judgments in the same manner as the U.S. poses significant risks in American international relations.³³

Geography

Considerations of geography can be embedded, if not explicitly addressed, in analyses. Modern military forces are particularly attentive to considering the impact of geography in conducting operations. Even

31 China had been a focus of attention long before the collapse of the USSR. The collapse, however, substantially altered the focus of study, just as the collapse led China itself to alter its own approaches to the world.

32 A military aspect of not considering Iraq's society was that the U.S. Army was tasked to remove Hussein and neutralize his military. It was not tasked—and did not size its deployment—to control Iraq's social evolution and warlord structure following the U.S. political decision to disband the government and political structure. It was not the Army's fault. It was that of the policy decisions made in the course of the war that were not thought through.

33 One aspect is how the U.S. defines victory and how that compares to its opponents. An enemy is not defeated until the enemy either admits defeat or stops fighting. As the current Iran war points out, the various groups in Iran have different views of this from the United States. Indeed, a problem facing the U.S. and others is that each side may have war-fighting tools that are diverse and difficult to neutralize. Choking logistic paths (e.g., Hormuz or the Yellow Sea) may be as effective as troops in contact.

corporations consider geography in their operations and investments (e.g., proximity to major customers, suppliers, energy sources, raw materials, and transportation).

At a broader level, geography exerts strategic-level impacts among nations. Ocean bottlenecks (e.g., the Persian Gulf, the Suez Canal, the Strait of Malacca, and the Panama Canal) obviously get attention. Russia's 2014 seizure of Crimea was based in part on assured major access to the Black Sea, as Russia has limited access to the world's oceans. Embedded in Taiwan's future is its position with China on the Taiwan Straits, a major trade pathway to Korea and Japan. Consider the confrontations between China and India in controlling access to the tributaries of the few rivers that feed both nations; the potential confrontation between Russia and China over Siberia, an underpopulated, harsh landmass that holds vast resources important to China; and the potential confrontations involving Kazakhstan, one of the world's leading sources of uranium.³⁴

The impact of geography can be traced back thousands of years. A variety of cultures, economic orientations, and approaches to military force have been shaped by the presence of vast flat lands (e.g., central Asia), mountains and rivers (e.g., Europe), and access to major waters (Britain or Japan). In more contemporary and local environments, such geography shapes investment in infrastructure. It leads to different emphasis on internal vs. international focus for economic development. It can protect groups from attack (e.g., deserts in Africa) and enable their unique cultural development. Social groups can hold values generated over centuries by the terrain and environment in which they evolved.³⁵

All of this indicates that geography broadly affects people and groups and exerts major impact on international issues. It can provide a major shift in comparative military advantages (e.g., the Strait of Hormuz). It can substantially limit resolutions of differences and take decades to resolve (e.g., China vs. U.S. interest in Taiwan). It can pose seemingly impossible conflicts of interest (e.g., Brazil's exploitation of the Amazon vs. world climate effects).

Geology

In the decades following WWII, geology didn't seem to have major impacts on national security analyses. Geology had some subtle military effects, as in the variations in gravitation affecting fine navigation for precision weapons on intercontinental strikes, but much of the notable advances in the 20th century were in two areas. First was in locating sources of natural resources and exploiting them. One major consequence was the discovery of huge oil fields in the Middle East that redefined economic and political power. Second was in understanding the earth itself: plate tectonics and the great extinctions in

34 The Eurasian land mass may become a heated arena of competition and conflict in the future. In Mongolia, China covets the oil, coal, uranium, and other strategic minerals and rich, empty grasslands of its former Qing-Manchu possession. China is the world's leading consumer of aluminum, copper, coal, lead, nickel, zinc, tin, and iron ore, all of which Mongolia has in abundance. Kazakhstan may become the world's largest producer of uranium. It has the world's second largest chromium, lead, and zinc reserves, the third largest manganese reserves, the fifth largest copper reserves, and ranks in the top ten for coal, iron, and gold.

35 Historically, for example, those tribes evolving in the largely flat land mass of central Eurasia were different from those evolving in Europe's geography of mountains and rivers. In Europe, the presence of clearly defined or impassable obstacles affected the emergence of separate states. Absence of such geologic barriers or removing their impact by industrial progress lessened the physical separations and increased the feasibility of invasions and wars to build empires.

the past 550 million years. This led to constant efforts to refine predictions of crises: earthquakes, tidal effects, volcanic eruptions.

Over recent decades, the impact of geology and national or subnational power has become more central. Perhaps the clearest example is demand for rare-earth minerals, which are difficult to find, hard to extract, and needed for electronics. Less noticeable are sources of copper, aluminum, and other metals, important to industrial development. Also obvious is water as a source of electrical power (as well as wind). Africa, for example, has begun to achieve increasing importance because of its unexploited resources. That may reshape competitions among nations in the coming decades.

Understanding the geological aspects of potential competitors on occasion can have significant implications. One current example—as seen in the U.S. bombing of Iran’s nuclear facilities—is in underground bunkers, storage, command centers, and weapon protection. A historical example is how USSR strategic nuclear strategy was affected by misunderstanding geology. The Soviets tested missile silo hardness by setting off major conventional explosions. They concluded that the U.S. silos were built in geologic structures that would carry shocks that jam silo doors from opening. The Soviets concluded the U.S. must know the silos were too close together and were thus vulnerable to takeout. They concluded the U.S. intended to use Minutemen as a surprise first-strike weapon, exactly the opposite of U.S. intentions. Because of interpretations of geology, the two superpowers had entirely different interpretations of one leg of the triad.

Psychology and Decision-Making

Advances in psychology—much like the advances in sociology—in the past half-century have revealed how subjective (not objective) the choices people make are. Research shows that people tend to interpret current choices by drawing parallels to previous conditions and choices, even when current decisions have almost no similarity to the past. Their decisions can be shaped by the sequence with which data and opinions arrive, and not by how data fits with existing information. Their choices can be shaped by the status or verbal skills of others, and by the degree to which that conforms to their own preferences. They tend to ignore or give less attention to data and views that conflict with their existing opinions. The simple repetition of false information can be accepted eventually as facts. Giving individuals major facts that show their views are wrong can even result in them holding more firmly to their original views.

One characterization of individual psychology is a view that individuals (including leaders) form personal views of how the world works and the people within it. That “personal model” is the filter through which information (accurate, inaccurate, etc.) is screened. The model can become the major driver of choices as the pressures of time, conflicting ideas, opponent’s actions, etc. compress a leader’s sense of control. “Gut” choices are made because they fit the “personal model.”

In periods of crises, when choices have to be made quickly in the absence of time to think through the possible options and results, the beliefs of decisionmakers can become dominant. In the Cuban missile crisis, for example, President John F. Kennedy demanded direct communication with destroyer captains in the blockade. He worried that Navy leaders would act by following their operational practices and not appreciate the potential stakes. When Kissinger was in the NSC, he tasked Marshall to ensure the CIA continued psychological assessments of foreign leaders. It reflected his strong belief that senior

leaders could hold views very different from those of their subordinate organizations and junior leaders. He wanted to understand their core beliefs, sensitivities, and willingness to act outside the limits of their formal roles and the preferences of their own organizations. He also wanted as much knowledge as possible to understand when he was being misled.³⁶

Of particular importance to Marshall's net assessment efforts was to investigate how leaders and other key personnel might behave. Why were some soldiers and combat units more effective than others? Why did leaders and followers hold to points of view and take actions that undermined their success? How could an individual's beliefs and behaviors be shaped by those around them, by the specific conditions, and by the flow of knowledge to them? And, most importantly, how did the approaches of individuals change in crises where the pace of events undermined even modest reflective thinking? In conducting assessments, questions such as these could lead to insights into the range of steps foreign leaders could choose.

Organizational Behavior

Organizational behavior became a central line of Marshall's thinking in strategic analysis starting with his work at Rand. He saw repeatedly how predictions and current beliefs rested on the characteristics of organizations. The economics staff would interpret events differently from the staff of mathematicians or historians. Those differences increased in conditions where basic data was limited. For example, as Marshall described, the location of Soviet bomber bases was a major question between 1945 and 1960. Some analysts concluded that rationally, the bases would be along major lines of transportation. Marshall and others believed the locations would be determined by many factors, of which the location of existing bases would be important. That turned out to be correct.

Organizational behavior exploded as an analytical approach beginning in the 1960s in the theoretical work of Richard Cyert, James March, Herbert Simon, Roger Kaufman, and others. Marshall noted that like many emerging disciplines, the initial thoughtful work was developed in universities before gaining wider exposure. By the 1970s, major business schools had concluded organizational behavior was an inseparably essential element in determining business strategies. Studies of organizational behavior proliferated in the private sector beginning in the 1980s. It shaped the manner in which analysis and conclusions were drawn. It then shaped the manner in which strategic choices were implemented.³⁷

Marshall specifically focused on the effects of organizations in national defense. For example, the Navy's success in SSBNs is owed in part to clever institutional actions, such as not subordinating the

36 The CIA tried to discontinue preparing psycho-biographical analyses for Kissinger, even though they were among the few agency documents often read. When asked to continue producing them, one response was that this was not an acceptable type of analysis for a national intelligence agency. Overlooked was that for leaders it was important to understand a foreign leader's personal views, personal willingness to act, sensitivity to how they're being treated, etc.

37 In 1960s and 1970s, Professor Ernie May at Harvard led a study group that Marshall joined to look at the discipline. It included historians, economists, defense analysts, and behaviorists. One outcome was a book, *The Cuban Missile Crisis* by Graham Allison, who was a graduate student and recorder. It was an early thoughtful discussion of organizational behavior in national defense.

program to either its traditional ship or submarine organizations.³⁸ The USSR air defense arm—Pro-tivovozdushnaya Oborona (PVO)—had equal status to major branches such as the Navy and Army. It was, therefore, in the U.S. interest to present bomber and cruise missile threats to reinforce PVO demands for funding for continental air defense. Marshall studied the impact of organization on American and German military advances in the 1920s and 1930s, and on U.S. and USSR military advances from the 1960s to the 1980s. He even sponsored a comparison of how organizational practices affected the speed of system development between 1980 and 1990 compared to between 1945 and 1965.

Analyzing the role of organizational behavior involved numerous questions. For example, how were the choices and subsequent actions affected by the structure of organizations, the assignment of tasks, and the sequence of making choices? How many different organizations had a voice in choices, and how strong was their comparative influence? What was the impact of incentives on organizational behavior? What were the means by which differences were encountered and resolved? How could actions have been implemented in a dysfunctional manner because of the way they were subdivided and assigned within organizations? How could such problems be based on deeply embedded past experiences, highly valued skills, and other sources of success and failure?

Business Strategy Concepts

Business strategy began to emerge as a new major line of thinking and analysis in the 1960s. Companies in the late 19th and early 20th centuries grew largely in specific businesses, often largely local in their operations. After 1945, companies began seeking growth by a number of different approaches. Some remained in their historical industries but expanded their scale (e.g., in automobiles, radio, TV, nationwide retail stores, or shopping centers). Some diversified by entering unrelated businesses (e.g., forming conglomerates). Some created entirely new industries (e.g., Xerography or business computers). As firms became larger and more complex—occasionally beyond the grasp of top-level managers—there was a need for new management approaches (including analytical tools) that facilitated handling the scale, diversity, internal control, and even physical distribution of facilities. Founders of major companies began retiring, and post-WWII saw the rise of professional managers.³⁹

Business education had provided instruction in the standard skills of marketing, finance, accounting, and operations. But by the 1960s, it was apparent that understanding these functions did not develop the needed skills in linking them, analyzing their existing and future interactions, and supporting ties and relationships with suppliers, competitors, and government. Some firms did evolve the means to accomplish this integration, and major consulting companies (e.g., McKinsey) assisted efforts. But not

38 Harvey M. Sapolsky, *The Polaris System Development: Bureaucratic and Programmatic Success in Government*. One of the unique organizational challenges in SSBN development was how many missiles could be carried. System analysis indicated 24 tubes, but the design selected 16. A reason was that submarine captains were already disturbed by the idea of any hole that was 3 to 4 feet in diameter. A compromise was 16. Years later, the number of tubes in SSBNs was increased to 24.

39 The original founders of major firms began retiring or dying by mid-century. New managers often did not have the years of growth in manufacturing that often were a core strength of owners (e.g., Henry Ford). While the new managers brought an objectivity to decisions about a company, they also lacked the deeper understanding of the details of how the company operated. That challenge was multiplied by the huge size, geographic spread, complex supply chain, and competitive structures.

until the 1960s did business schools start developing formal instruction and concepts in what became labeled as “business strategy.”⁴⁰

Marshall's interest was sparked by his associations with Harvard dating back to the 1960s, probably through his interest and involvement in organizational behavior. Harvard Business School was regarded as an initial stimulus for developing the strategy discipline, and its academic staff was becoming convinced that business strategy was unbreakably linked to organizational structures, processes, and experiences. Marshall's participation in Professor May's organizational study groups involved associations with professors from the HBS. Over subsequent decades, Marshall worked with scholars such as Joseph L. Bower and C. Roland (“Chris”) Christensen at Harvard, and Richard P. Rumelt from UCLA.

Marshall came to believe that insights embedded in business strategy could contribute substantially to defense strategy. The private sector was an almost unlimited supply of diverse approaches to dealing with competitors, governments, supply chains, changing customer tastes, and underlying technologies. Like national defense, it confronted internal problems of integration and control. Unlike national defense, however, new ideas were more frequent and applied, successes and failures were more numerous, the time spans were shorter, and the lessons were clearer. Concepts and management approaches tested in the private sector could be useful in the public sector if sensibly applied.⁴¹

Marshall tapped leading thinkers in business strategy for ideas gained from the actual experience of individual companies and research. For example, in the 1970s and 1980s, he picked up ideas in the portfolio management approach developed by Boston Consulting Group and other consulting firms. These provided a means to compare the importance of different strategic initiatives by the risk or probability of success, the investment of people and resources needed, and the resulting long-term benefits. In the 1990s, he introduced the strategic concepts of core competencies (also called core capabilities). This held the view that firms are in numerous businesses, all of which can consume and divert the limited supply of skilled people, plants and tools, competent suppliers, financial resources, and management attention. The diversions can lead to underinvesting in the enterprises that were most essential to long-term company success. The strategic challenge, therefore, was to concentrate sufficient resources in key enterprises.⁴²

Business strategy provided Marshall's assessments with a flow of powerful ideas and actions to consider in developing a greater understanding of topics. They contained alternative ways to view existing situations away from traditional defense analysis. Of particular importance may be their contribution to competitive strategy and cost imposition. Their broader acceptance in national security planning has

40 The evolution is well described in books such as Walter Kiechel's *The Lords of Strategy: The Secret Intellectual History of the New Corporate World*.

41 Certainly, national defense was different if only for the political aspects of initial decision-making and political and organizational limits on actions to alter operations and investments. Moreover, companies could and did make bad strategic choices, for which being closed was a penalty. National defense did not have options to be shut down. Perhaps one of the greater contrasts in strategy was that in business, the emphasis was on action over elegant or public statements of strategy concepts. In national security strategy, the attention to implementation was often a distant second to dramatic statements and decisions.

42 Andrew W. Marshall, “Further Thoughts on Future Net Assessments,” MFR, September 2000. Marshall launched efforts, for example, to probe the potential of focusing on core competences. “A core competency-based strategy ... would have to be further developed to state the sources of advantage that a specific core competency was based on. The assessment would focus on the set of core competencies of the strategy and assess their current state, and their future likely sustainability ... we would want to measure the rate at which this core competency was being eroded or becoming irrelevant.”

been weak. Military and government leaders and their followers have decades of training in the standard conceptual tools of military and civilian education. Nonetheless, business strategy ideas remain a valuable analytical tool for understanding complex net assessments.⁴³

Quantitative Analysis

Marshall paid close attention to the role of data and quantitative analysis. He saw its importance in RAND analyses of Soviet nuclear forces in the 1950s. He encountered it in Kissinger's concerns about whether the Soviets were deceiving him and in attempts to precisely understand ceasefire violations between Egypt and Israel. A major first step in P186 was getting better tabulation of Soviet and U.S. weapons. Understanding the variations in counts and the implications of variations was essential elements of balances in naval forces, strategic forces, air defenses, and other fields.

Major changes occurred in the last half of the 20th century in the quality and amount of data and in techniques of analysis. First was the growth in the timeliness, accuracy, and detail that came from the advances in sensors, processing, and reconnaissance capabilities. Most obvious was in the use of space. Initially based on buckets retrieved in the Pacific and accuracies measured in meters, by the early 1990s the results were electronically sent to the ground, and images were visible, infrared, and radar waveforms. Accuracies were measured in inches, and data was provided to senior leaders—even units in contact with an enemy—within minutes to a few hours.⁴⁴

A second major change was in the development of quantitative methods for evaluating forces. In the 1960s, Robert S. McNamara brought the techniques of cost-benefit analysis developed at Rand to the Department of Defense. He emphasized it to reduce duplication among projects (e.g., multiple IRBM projects); resolve inter-service rivalries; promote unique joint weapons programs (e.g., F-111); and subject thinking about war to more disciplined analyses. None of this was necessarily bad, but it gave rise to enduring second-order consequences. Measures of cost focused more on how a U.S. weapon performed for dollars spent, rather than on how the weapon affected an opponent. It created new bureaucracies that transferred more bureaucratic power from the military to experts in measurement tools. Effectively, it created a small industry in cost and force analysis.

In the midst of the various methods of quantitative analysis, Marshall essentially placed several demands on data in net assessments. First, the data had to be accurate, or at least its range of variation had to be sensible. Second, its relevance had to be weighed appropriately. Determining the military effectiveness of enemy air forces or ground divisions could not be based largely on equipment counts and comparisons. It had to be related to the skills of pilots and soldiers, their operational practices and doctrine, the underlying manufacturing and logistics of the force, and a host of related factors. Third, the strategic limits of quantitative analysis had to be cautiously considered. For example, the opportunity in innovation and its importance at a strategic level were beyond most cost analyses. Fourth, assessments

43 One needs to separate the analytical use from the actual development of defense strategy. In national defense, the relatively standard sequence of thoughts and documentation has remained largely unchanged for over a half-century. New ideas and planned actions about war, national security, force structure, etc. are all carried out within the standard historical framework of a series of documents, coordination efforts, political practices, and financial documents. Business strategy's value in assessments is alternative points of view; it has virtually no role in strategy development.

44 One result of the advances was to create more demand. As one photo interpreter said, the question was no longer whether it was a tank or a truck; it was the specific type and generation of tank.

had to distinguish between what the U.S. might conclude about such analysis and what an opponent might conclude.

Innovation

Modern militaries had increasingly understood the importance of advanced systems, new technologies, and new warfighting practices since early in the 20th century. For example, between the two world wars, the U.S. displaced Britain in aircraft carriers and implemented engineering and operational practices that changed the nature of war at sea. The Army Air Corps created strategic bombing. Army ground forces unfortunately did not keep pace with the advances in ground combat, while the Germans had introduced advances in such major weapons (e.g., tanks) and ground force training and organization. Germany essentially made more sweeping advances in combat operational practices than other western nations (e.g., wolfpack submarine operations, armored ground operations, and multi-service joint operations).⁴⁵

The importance of innovation was to some extent crystallized in the 1980s by the USSR's description of Military Technology Revolution (MTR). The core view was that occasionally major innovations in systems and concepts would change the basis of warfare and thus military strategy. Moreover, these periods were not continuous, so advantages could fall to nations that early-on recognized the emergence of a new MTR. The Soviets in the 1980s believed the appearance of advanced sensors, precision-guided munitions, and C2 networks were reshaping combat.

Marshall studied and freely borrowed from the Soviet idea of MTR. Over the course of years, he changed the term to the Revolution in Military Affairs (RMA). His view was that revolution was like an industrial revolution, an event spread over decades, and touching numerous areas. It was not like a political coup that suddenly occurred. Like the industrial revolutions, it could mix military and private sector changes. It affected far more than military hardware and military operations. The term "Affairs" embraced that broader reach. Retaining the term "Military" acknowledged that the effect on military power was a key aspect from a net assessment view.⁴⁶

Incorporating innovation into assessments can be a challenging analytical task. It involves identifying major vectors in innovation, understanding their implications for military forces, predicting how fast they could evolve, and how they could shift the actual capabilities of nations. Moreover, "capabilities" are not just military-specific in nature. It includes the underlying commercial industrial enterprises of nations and

45 Advances before the war did not uniformly place one nation ahead of others. The Army Air Corps' development of long-range bombing was not accompanied by escort fighters and led to the 8th AF's disastrous losses in 1943 over Europe; its famous P-51 fighter rebalanced that when the airplane used British engines and newly invented drop fuel tanks. German tanks were superior to allied tanks, but Germany did not commit to long standard production runs, and Russian tanks were both superior and produced in volume. Britain ended WWI with the world's largest carrier fleet. Several U.S. admirals pushed carriers over the battleship dominance of the Navy leadership; the carriers were not in Pearl Harbor on the day of the attack. The British also assigned carrier aviation to its aviation arm, which focused on land-based fighters and bombers; its carrier aircraft were inferior in design, as were their shipboard operational skills in storage, arming, launching, and recovery.

46 In the decades following the 1980s, Marshall pursued research into the Revolution in Military Affairs (RMA). Studies probed both successes and failures and analyzed the underlying reasons for such outcomes. Subject areas included the development of strategic bombing; carrier warfare; amphibious operations; mechanized ground combat; SSBNs; the impact of leadership; and the effect of organizational structure and incentives. He also sponsored research into innovations in the private sector. That included microelectronics; general-purpose and personal computers; the appearance of commercial jet aviation; and the reshaping of the entire shipping industry through containers. Marshall's interests centered on understanding the basic reasons for success and failure, not just in technologies but also in organization, in practices, in leadership, and in recognizing and changing.

groups of nations (e.g., the global banking system, global movement of commodities and goods, and uniqueness of some national skills).

Competitive Strategies

As far back as his first work in net assessment, Marshall believed leaders needed to see the comparisons between the U.S. to other nations in a specific subject area (e.g., ground combat, innovation, technologies, and C3I). It may indeed have been the central theme of net assessment in his mind. He wanted to improve understanding of the reasons for differences and what they could mean for peacetime competition and for actual conflicts.⁴⁷

In some instances, the paths of a nation's forces were independent of any particular opponent and focused more on internal traditions, geographic situations, and general perceptions of the needs for defense. At other times, it was closely targeted on other states. A competition thus existed, sometimes subtle and sometimes obvious. When such competitions existed, Marshall believed that the U.S. should consider influencing how other nations invested in capabilities and prepared for and conducted military operations. The U.S. could, to some extent, "shape" other nations' actions. For example, Marshall saw the Soviets' Moscow Mayday Parade as a marketing exercise to shape the West.⁴⁸

His continuing contact with businesses, consultants, historical examples, and business scholarship seems to have strengthened his sense that "shaping" was central to strategy. The merits of competitive strategies gained greater prominence in his mind over the subsequent decades after 1972. That reflected various factors: the decline of broad dominance of U.S. military capabilities; the increasing importance of innovation and change; the strengths and impediments of U.S. organizations and practices in responding to change; and the technologies that were giving greater weapons capabilities to minor nations and groups. It led him to the view that the U.S. needed to think harder about confrontations with other states as a competition, a condition in which advantages could shift over time.

Competitive strategy had several components. First, it should be an essential and specific component of strategy, addressed at the outset of any strategy development. Second, it demanded a sober but not cynical analysis of a competitor and how the U.S. compared. Third, the peacetime aspect was at least as important as the wartime component, because that shaped wartime capabilities. Fourth, a competitive analysis embraced far more than weapon-to-weapon physical characteristics. It moved up the analytical chain to affecting the actions of combat units, to how combat organizations worked together, to the

47 A. W. Marshall, "The Nature and Scope of Net Assessments," MFR, August 16, 1972: "National policymakers want to know how the U.S. stands in various types of international competitions ... our relative positioning and any trends that may affect it ... There is a high premium on thoughtful and inventive approaches to defense problem solution ... To make this work we must have a very clear description of the comparative situation of ourselves and our rivals...a comprehensive description of the forces, operational doctrines and practices, training regime, logistics...The use of net assessment is intended to be diagnostic...It is not intended to provide recommendations as to force levels or force structures."

48 It was in the parade one year that the Russians flew the same bombers in a wide circular pattern over the festivities to lead Western leaders to conclude the USSR strategic air arm was much larger than reality.

underlying logistics, to how training occurred, and to lessons from past experiences. Finally, it should guide how senior leaders, both military and civilian, interact and react to foreign states.⁴⁹

The path of “competitive strategies” can lead to perceptions or actions that might be overlooked. “Cost-Imposing Strategies,” for example, have demonstrated the multi-decade impact of U.S. strategic bombing on USSR air defense investments, regardless of calculations of wartime success or failure. Resources were not shifted to more threatening types of Soviet ground and air forces. That apparently was not as conscious a part of strategy as it should have been. In Reagan’s Star Wars missile defense commitment, the Soviet leadership reportedly did not consider it achievable, but Soviet perceptions were ones of fearing second-order advances and believing the USSR could not keep apace.

Thinking about competitive strategy in national security has been less well developed than in the private sector. In businesses—and thus in business academic research—affecting competitors and reacting to competitors are essential to virtually all functions (i.e., marketing, manufacturing, sourcing, finance, etc.) and to strategy determination.

Were it to be more prominent in government thinking it could provide more leverage over opponents. It is already somewhat influential in areas such as electronic warfare, detecting and tracking submarines, defeating radars, and deceiving satellite monitoring. This could be expanded in thinking in strategic-level investing. For example, DoD might invest in a classified project, releasing (or leaking) enough knowledge to cause an opponent to substantially invest to catchup or counter (e.g., develop an electronic countermeasure). Then—after several years of the opponent’s developing and deploying his countermeasure system—DoD could change to a new technical approach that makes the opponent’s original investment far less effective. A troublesome potential effect, however, is the opponent might divert resources to even greater threats.⁵⁰

A Final Note

This paper has tried to look at Marshall’s work from one perspective: the analytical approaches. It classified the different types of issues he pursued, the topical areas of study, the underlying principles he set for projects, and some of the different methods of thinking he sought to tap.

Net Assessment succeeded over decades for many reasons. Like any successful innovation it received top-level support and use. It benefited from its newness. Its organization remained small and avoided direct attacks by other established organizations. It probed issues important to defense institutions as well as those unique to top leadership. It reached into disciplines of thinking and integrated the thinking. It benefited from major and broad advances in thought and methods in the last half of the 20th century. It selected people well and created followers widely. It focused on understanding, not on picking solutions. Finally, its principal analyst was Marshall himself, and for five decades he remained committed

49 Framing a response to a foreign state’s actions can be as important as the physical reaction itself.

50 Much of the competitive aspect in U.S. national security today appear to be in the interaction between specific systems, and often in their physical or performance aspects. Less attention (if any) is given to steps that begin by targeting an opponent’s particular strategy, long-term investments, force developments, or technologies. In such approaches the value of U.S. investment would not be in improvements in U.S. capabilities. The value would be in how much it diminishes an opponent’s capabilities.

to thinking about issues and lines of thought, seldom being pulled away to other roles.

Andy Marshall was fortunate at the outset. He actually thought his coming to D.C. for Kissinger was just a short assignment (e.g., he rented furniture). Kissinger and Schlesinger gave him huge bureaucratic power, and a huge tie to leadership, two important capabilities that he did not have to generate. He added his own intellect, and he personally built contacts in various disciplines (e.g., organizational behavior and individual businesses). He avoided positioning OSD/NA against major DoD institutions (e.g., acquisition communities, system analysts, and controllers). By the time Schlesinger left, OSD/NA was established well enough to continue.

The real challenge of ‘net assessment’ is knowledge integration and management. It is the ability to search out and develop ties to discipline experts, to educate them in the topics and questions, to guide their contributions, and to integrate and adjust their inputs...

Setting aside the term “net assessments,” the major question is how to sustain the characteristics of analysis it embodies. It means reaching across vast arrays of methods or disciplines of thought to probe issues. That means identifying key topics, determining the important questions to seek to answer, searching the array of analytical approaches to explore the questions, and then applying those approaches individually and collectively. The first steps can be developed with some success by a few individuals, as Marshall and his staff demonstrated. It is in the latter steps—which require breadth and depth across varieties of thought—that the assemblage of individuals must be larger. For example, the individuals with insight into deep cultural effects of geography are unlikely to be the same as those who understand the way international fund flows affect regional wealth.

For these reasons, one can conclude that the real challenge of “net assessment” is knowledge integration and management. It is the ability to search out and develop ties to discipline experts, to educate them in the topics and questions, to guide their contributions, and to integrate and adjust their inputs as understanding of the topics and questions develop. Marshall is not seen as a manager in the traditional definition of the term. But in the framework of assessments, he was an example of a great knowledge manager and integrator. He had personal knowledge (and curiosity) about topics like organizational behavior, cultural effects, history, and strategy; but his rolodex and daily contacts were with people

whose lifetime of research and experience marked them as substantive experts. One key was his ability to engage, tap, and apply their expertise to improve “understanding” of major issues for leaders.

A problem for continuing the net assessment approach is that it lacks a well-understood label of traditional disciplines like geography, economics, sociology, or psychology. Such labels lend perceptions of intellectual authority to its “experts.” People can then claim the label of “assessment” without the broader knowledge of disciplines that it requires. Moreover, the need for access across a wide range of private and public domains means that the organization doing net assessments needs to be small; its job is tapping, not doing. Its leverage is reach into disciplines, bureaucratic position, and access to money. Money enables it to pay for work. Position enables it to understand and characterize the major issues facing leaders.

Marshall brought to the leadership of the DoD—and to the government at large—a new level of sophisticated thinking. In this highly competitive world, U.S. success requires far greater understanding of how the world and parts of the world may evolve and adjusting to opportunities and risks that occur.

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