

Introduction

Theoretical and Comparative Perspectives on Innovation and Diffusion

LESLIE C. ELIASON AND EMILY O. GOLDMAN

Pursuing the Revolution in Military Affairs: The Policy Challenge

The idea of a revolution in military affairs, or RMA, has been discussed since the late 1970s, when Soviet General Nikolai Ogarkov argued that a range of recent innovations would become as important to waging war as nuclear weapons.¹ U.S. high-tech weapons in the 1991 Persian Gulf War—particularly the unprecedented integration of precision-guided munitions, C³I (command, control, communications, computers, and information) and RSTA (reconnaissance, surveillance, targeting, and acquisition)—seemed to confirm that this transformation in warfare was well underway. The current RMA promises to link advances in precision weapons, surveillance satellites, and computer-based information processing to organizational changes that “network” military units to support a new way of war. Proponents of this information technology RMA (IT-RMA) argue that the United States must embrace emerging technologies and rapidly transform its armed forces to guarantee its military superiority for the foreseeable future. The current technological lead, if preserved, would increase our military strength while cutting costs (weapon systems and overseas deployments) and reducing the risk to U.S. troops. Advocates promote the RMA as the solution to the post-Cold

¹These included new kinds of explosives, precision-guided weaponry, advances in C³I (command, control, communications and information), sensor technology and automated control systems, and weapons based on new physical principles (e.g., particle beams and lasers). Leon Gouré and Michael Deane, “The Soviet Strategic View,” *Strategic Review* 12, no. 3 (summer 1984): 80–94.

War paradox of ill-defined threats, growing operational demands, and limited resources.

The RMA poses a set of challenges for decision-makers. At what point does it make sense to invest in new innovations, given that the costs (financial as well as organizational, doctrinal, and political) may be high and the payoff uncertain? Leader states need to know whether, when, and how to attempt to control or encourage the spread of innovations. Follower states must decide whether, when, and how to respond. Innovation and transformation are inextricably linked with diffusion. All three processes shape the strategic environment.

Decisions about pursuing the RMA depend on accurately assessing its potential. If revolutionary transformation is politically desirable, can the United States preserve its lead with competitors striving to emulate or counter the U.S. model? Are RMA technologies vulnerable to skillful hackers and terrorists? How long will the United States enjoy the benefits of the RMA?

So far, the RMA debate has focused on whether (1) a revolution is really underway, (2) its technological underpinnings are feasible, and (3) a presumed military advantage can be translated into political influence. Our study takes up the question of how others are likely to respond to U.S. innovations and how this will affect America's position. The answer depends on whether and how others assimilate and exploit innovations. Anticipating the diffusion trajectories that are likely to accompany military innovation and transformation, and developing strategic responses, are core aspects of the RMA challenge. This requires understanding the process by which innovations diffuse to other states and contexts.

Consequences of Pursuing the IT-RMA

Our central analytical concern in this volume is not how RMAs begin, but how they spread, to whom, how quickly, and with what consequences for U.S. national security and the global balance of military power. Thus, at the heart of our comparison of historical and contemporary cases is a concern with understanding the dynamics of the diffusion process. This has been a key aspect of the RMA debate ever since Michael Roberts's seminal 1956 lecture on "The Military Revolution, 1560–1660."² Military historians and planners disagree about the nature and consequences of military revolutions, both in general and in specific cases. The Persian Gulf War reinvigorated this debate.

Not surprisingly, scholars and practitioners also diverge in their estimates of the likely consequences of the current RMA. The most dramatic version of twenty-first-century conflict envisions improvements in existing core technolo-

²Michael Roberts, "The Military Revolution, 1560–1660," reprinted in Clifford J. Rogers, ed., *The Military Revolution Debate* (Boulder, CO: Westview, 1995), pp. 13–35.

gies constituting the foundation for a fundamentally new way of war. These technologies include precision-guided munitions, surveillance satellites, and remote sensing (many of which were available in the 1970s) combined with advances in the speed, memory capacity, and networking capabilities of computers.³ The significant U.S. edge in information technology, proponents of the RMA argue, can help us retain our military superiority for a significant period, allowing us to promote one of our key national objectives: “shaping” the international system.⁴

For supporters of further investment in the RMA, the revolution is an inevitable outgrowth of fundamental societal, economic, and political changes marking the information age.⁵ Technically feasible, the RMA is the best way for the United States to maintain its leadership in international politics. Champions believe that the policy implications of an impending RMA are clear: the United States must take the lead or suffer the consequences. The technological “building blocks” of an RMA exist; this is not a U.S. choice. If the United States continues to invest in “legacy systems,” others will leap ahead. The most benign consequence will be the need to “catch up” in circumstances of someone else’s choosing. The United States should therefore take advantage of “a time of relative peace and reduced threats by radically changing the US military to capitalize on revolutionary technological advances and thereby be better prepared for the conflicts of the future—and within current spending levels.”⁶ Among the advantages of this approach are greater efficiency and flexibility achieved with fewer but more highly skilled troops, and the use of “smart” and automated technologies that will place fewer lives at risk.

Proponents marshal a variety of arguments to support their view that pursuing the RMA will sustain America’s military lead as well as its political influence. Other states will tend to join with, rather than balance against, the United

³Equally important advances in genetic engineering and the biological sciences may revolutionize biological warfare, an area that had been a low priority until the anthrax incidents during the fall of 2001.

⁴Joseph S. Nye and William A. Owens, “America’s Information Edge,” *Foreign Affairs* 75, no. 2 (Mar.–Apr. 1996): 20–36.

⁵Alvin Toffler and Heidi Toffler, *War and Anti-War: Survival at the Dawn of the 21st Century* (Boston: Little, Brown, 1993); Andrew F. Krepinevich, “Cavalry to Computer: The Pattern of Military Revolutions,” *National Interest* (fall 1994): 30–42; Eliot A. Cohen, “A Revolution in Warfare,” *Foreign Affairs* 75, no. 2 (Mar.–Apr. 1996): 37–54; Nye and Owens, “America’s Information Edge”; John Arquilla and David Ronfeldt, “Cyberwar Is Coming!” *Comparative Strategy* 12, no. 2 (1993): 141–65; Dan Goure, “Is There a Military-Technical Revolution in America’s Future?” *Washington Quarterly* 16, no. 4 (autumn 1993): 175–91; *National Defense Panel, Transforming Defense Report: National Security in the 21st Century*, Report of the National Defense Panel (Dec. 1997), pp. 57–86.

⁶Council on Foreign Relations, *Future Visions for U.S. Defense Policy: Four Alternatives Presented as Presidential Speeches*, A Council Policy Initiative, John Hillen, Project Director (New York: Council on Foreign Relations, 1998), p. 35.

States—a benign hegemon. The spread of democratic institutions and norms has created a growing zone of peace that dampens international competition. Furthermore, organizational research has shown that assimilating new models from abroad is not easy, so it may be difficult for other countries to adopt IT-RMA innovations.⁷

Skeptics of the RMA challenge some of the proponents' key assumptions. They find little empirical evidence of a stable "third wave" economy. For them, the promise of technology assumed by RMA champions is exaggerated,⁸ and translating uncontested military superiority into political influence is not automatic.⁹ Aggressive transformation may in fact undermine U.S. power and influence. The U.S. policy of "enlargement" pursued via "shaping" is not viewed as a benign policy by more than a few states, to say nothing of nonstate actors and terrorist organizations. The fact that it is the U.S. Department of Defense seeking to "shape" the international environment leads some to claim that U.S. intentions are not benign.

Opponents of transforming the U.S. military are also quick to point out that U.S. technological superiority has its drawbacks. The further we pull ahead, the more difficult it becomes for us to coordinate our military efforts with those of our allies, because our equipment is not compatible with theirs. The post-Cold War situation increasingly has required U.S. forces to engage in peacemaking and peacekeeping operations with our allies and other friendly nations in multinational formations.

Operations in the Kosovo conflict revealed a significant gap between U.S. and European allied military capabilities. Interoperability problems have led to friction over sharing defense burdens. In more than a dozen interviews, a *Washington Post* reporter found evidence that the success of the air campaign "was tempered at NATO headquarters by the stark realization that Europe has fallen so far behind the United States in the use of precision-guided weapons, satellite recon-

⁷D. Eleanor Westney, *Imitation and Innovation: The Transfer of Western Organizational Patterns to Meiji Japan* (Cambridge: Harvard University Press, 1987); Everett M. Rogers, *Diffusion of Innovations*, 4th ed. (New York: Free Press, 1995).

⁸Michael O'Hanlon, "Can High Technology Bring U.S. Troops Home?" *Foreign Policy* 113 (winter 1998-99): 72-86.

⁹A. J. Bacevich, "Preserving the Well-Bred Horse," *National Interest* (fall 1994): 43-49; Stephen Biddle, "Assessing Theories of Future Warfare," *Security Studies* 8, no. 1 (autumn 1998): 1-74; Brian R. Sullivan, "What Distinguishes a Revolution in Military Affairs from a Military-Technical Revolution?" Paper presented at the Joint Center for International and Security Studies-Security Studies Conference on the Revolution in Military Affairs, Monterey, CA (26-29 Aug. 1996); Alex Roland, "Comparing Military Revolutions," Paper presented at the Joint Center for International and Security Studies-Security Studies Conference on the Revolution in Military Affairs, Monterey, CA (26-29 Aug. 1996); Colin S. Gray, "The Changing Nature of Warfare?" *Naval War College Review* 49, no. 2 (spring 1996): 7-22; Paul F. Herman, Jr., "The Military-Technical Revolution," *Defense Analysis* 10, no. 1 (Apr. 1994): 91-95.

naissance and other modern technologies that the allies are no longer equipped to fight the same way.”¹⁰ To date, the United States has been less than successful in transferring military innovations to allies and other countries undertaking combined missions. European and Canadian NATO members have little political will to adopt military innovations when defense spending is not only inadequate but declining. While ministries of defense are eager to obtain these capabilities, national governments refuse to fund them, as illustrated by the stalled “Defense Capabilities Initiative.”

Lack of interoperability can create serious problems on the battlefield—with repercussions in the political realm. The difficulties of forging political consensus about how to execute military operations were all too evident during the war in Kosovo.¹¹ The linkages between allied technology investments and political divisiveness are not new. In the 1980s, West European governments viewed U.S. proposals for new conventional technologies as an unwelcome harbinger of U.S. disengagement,¹² while their publics marched in the streets to oppose new missiles. A persistent criticism was the U.S. tendency to make decisions first and consult later. More recently in Bosnia, the United States was perceived as “advising, and even pressuring, allies to take certain risks with their forces that it is not prepared to take with its own.”¹³ Freedman continues, “Given the centralizing nature of the ‘system of systems,’ there could be concern that Washington was in effective charge, even when its own liabilities in a situation were strictly limited. Nor would the allies relish the role of ‘spear-carriers,’ helping to create the appearance of a coalition to demonstrate that the US is acting on behalf of more than unilateral interest, yet deemed inadequate when it comes to participating in the most technologically demanding roles.”¹⁴

Skeptics doubt that any decisive advantage can be realized. They contend that military leaders rarely sustain their lead without a challenge; a leader’s very existence invites challengers.¹⁵ An underlying assumption of some skeptics is that challengers arise because innovative military practices spread easily. Competition creates a powerful incentive for states to emulate the military practices of the most successful states in the system. States, like firms, “emulate successful inno-

¹⁰William Drozdiak, “In the Balkans, a Lopsided Division of Labor,” *Washington Post National Weekly Edition* (5 July 1999): 16.

¹¹Dana Priest, “A Decisive Battle that Never Was,” *Washington Post* (19 Sept. 1999): A01; Dana Priest, “Bombing by Committee,” *Washington Post* (20 Sept. 1999): A01; Dana Priest, “The Battle inside Headquarters,” *Washington Post* (21 Sept. 1999): A01.

¹²Lawrence Freedman, *The Revolution in Strategic Affairs*. Adelphi Paper 318 (New York: Oxford University Press, 1998), p. 24.

¹³*Ibid.*, p. 72.

¹⁴*Ibid.*

¹⁵Christopher Layne, “The Unipolar Illusion: Why New Great Powers Will Rise,” *International Security* 17, no. 4 (spring 1993): 5–51.

vations of others out of fear of the disadvantages that arise from being less competitively organized and equipped. These disadvantages are particularly dangerous where military capabilities are concerned, and so improvements in military organizations and technology are quickly imitated.”¹⁶ In this respect, skeptics share the neorealist perspective in which the process of diffusion is seen as uncomplicated, and new technologies are readily acquired and unproblematically integrated into existing structures and practices.

RMA proponents and skeptics alike assume that innovations will spread. They differ in their assessment of the ease and speed with which this will occur. Proponents doubt that others can easily emulate the U.S. information technology-based military model in the foreseeable future, and so the United States will be able to enjoy a considerable advantage. Skeptics counter that military superiority has never remained uncontested for long. The United States is only encouraging competitors to challenge our lead, accelerating the pace at which the technological gap will close.

To understand the extent to which the United States is likely to be able to maintain its military lead, practitioners need to examine how the military knowledge and practices associated with the current RMA—technologies, doctrine, organizational forms, and behavioral practices—are likely to spread. Are all military organizations equal in their desire and ability to assimilate new technologies and forms? Will the United States have adequate time and resources to anticipate and adapt to these changes? Moreover, while U.S. leaders no doubt want to prevent or slow diffusion to potential adversaries, the need to ensure interoperability requires finding ways to encourage diffusion of innovations to our allies. How leading-edge military technologies, forms, and practices do—and do not—spread are questions of central importance to U.S. defense policy at the turn of the millennium.

The Policy Impact of Diffusion Research

By all accounts, the RMA debate is more than strictly academic: its outcome will have lasting consequences for U.S. budgets and military readiness, for R&D investment and U.S. leadership in international affairs. Recent events—both before and after September 11—emphasize how important controlling the diffusion of innovation is to national security. The Cox Report details a wide spectrum of Chinese government-sponsored activities to acquire U.S. technology with military applications in high-performance computing, missile and satellite technology, and

¹⁶Joao Resende-Santos, “Anarchy and Emulation of Military Systems: Military Organizations and Technology in South America, 1870–1930,” *Security Studies* 5, no. 3 (spring 1996): 196.

thermonuclear warhead design.¹⁷ Neither internal security at U.S. weapons laboratories nor export-licensing regulations have prevented the Chinese from acquiring sensitive security information and technologies. Advocates of “dual-use” technologies once favored their potential to spur economic growth via commercial applications that reach beyond their original government-contracted purpose. But demonstrated difficulties in controlling their spread to foreign competitors, both commercial and military, have dampened their enthusiasm. A better understanding of the dynamics of the diffusion process will inform policy choices in a wide range of domains, including not only defense and security but also trade, technology transfer, and cross-national collaboration in research and development.

Despite the vital concerns at stake, academics are just beginning to investigate the process of diffusion: how military knowledge, broadly defined to include hardware (e.g., technology) and software (e.g., doctrine, tactics, organizational form, etc.), diffuses throughout the international system, or what factors enhance or inhibit incorporating innovations into defense structures. The history of warfare has been marked by periods defined by certain innovations. Ross, Bracken, and others emphasize the importance of military innovations. How they diffuse can restructure power relations in the international system.¹⁸ Despite the large body of scholarship on military innovation,¹⁹ remarkably few studies explore either historical or contemporary processes of diffusion of military innovations.²⁰

Part of the answer to the mystery about why international relations specialists have failed to take up the study of the process of diffusion of military innovation

¹⁷HR 105-851, Report of the Select Committee on U.S. National Security and Military/Commercial Concerns with the People's Republic of China.

¹⁸Andrew L. Ross, “The Dynamics of Military Technology,” in David Dewitt, David Haglund, and John Kirton, eds., *Building a New Global Order: Emerging Trends in International Security* (New York: Oxford University Press, 1993); Paul Bracken, “Non-Standard Models of the Diffusion of Military Technologies,” *Defense Analysis* 14, no. 2 (1998): 101-14.

¹⁹Barry R. Posen, *The Sources of Military Doctrine: France, Britain, and Germany between the World Wars* (Ithaca: Cornell University Press, 1984); Stephen Peter Rosen, *Winning the Next War: Innovation and the Modern Military* (Ithaca: Cornell University Press, 1991); Kimberly Martin Zisk, *Engaging the Enemy: Organization Theory and Soviet Military Innovation, 1955-1991* (Princeton: Princeton University Press, 1993); Leonard A. Humphreys, *The Way of the Heavenly Sword: The Japanese Army in the 1920s* (Stanford: Stanford University Press, 1995); Williamson Murray and Allan R. Millett, eds., *Military Innovation in the Interwar Period* (New York: Cambridge University Press, 1996); Emily O. Goldman, “The U.S. Military in Uncertain Times: Organizations, Ambiguity, and Strategic Adjustment,” *Journal of Strategic Studies* 20, no. 2 (spring 1997): 31-74.

²⁰Interestingly, Rogers's extensive bibliography drawing on the previous three editions of this work (dating back to 1962) includes very few of the contributions from political science or policy studies on the diffusion of innovations. Nevertheless, he makes the claim that the “trend toward a more unified cross-disciplinary viewpoint in diffusion research continues today; every diffusion scholar is fully aware of the parallel methodologies and results in other traditions” (Rogers, *Diffusion of Innovation*, p. 39).

lies in the implicit realist and neorealist assumptions that dominate current research. Neorealist theory holds that competition among states inevitably causes pioneering military methods to diffuse rapidly among states. When militaries confront new weapons and practices on the battlefield, they emulate them. Competitor nations observe the successes and failures of other states and act accordingly, drawing the hard-learned lessons of others. The inherently competitive nature of international politics, therefore, leads to the rapid spread of the most successful organizational forms, practices, and technologies. As Waltz puts it, "The possibility that conflict will be conducted by force leads to competition in the arts and instruments of force. Competition produces a tendency toward the sameness of competitors."²¹ In this view, diffusion is a uniform and efficient process driven by the threat of defeat by a superior power.

A look at the historical record reveals far more variation in adoption and emulation across states and cultures than conventional international relations theory assumes. The process of diffusion appears far less deterministic and much more vulnerable to local conditions than the systemic view suggests. For example, Gustavian tactical systems spread relatively quickly across Europe and into Russia. But it took nearly a century of military disaster before the Ottomans adopted modern European training methods. Asian regimes lagged well behind their European counterparts in making the market-oriented transformation crucial to the industrial expansion that helped stimulate the development of highly effective armed forces in Europe. Chinese commercial behavior and their particular approach to the pursuit of wealth operated within limits defined by political authorities educated in Confucian traditions hostile to the ethos of the (Western) marketplace. Why did Manchu China and nineteenth-century Ottoman Turkey fail to emulate superior Western military practices, while Meiji Japan made the transition? Why did Mongol practices, used so successfully in the thirteenth century to dominate the largest geographical area before or since, fail to spread to European armies? These puzzles demonstrate the contingent nature of the diffusion process and suggest the need to search for factors that explain the remarkably wide range of responses to innovation across societies, organizations, cultures, contexts, and historical epochs.

Technologies and innovations have two important facets: "hardware" and "software." Hardware refers to the artifacts, or *techne*, involved, while software is used to describe the organizational or human application component of an innovation or technology. New inventions can be put to use in various ways and often lead to changes in human behavior as their advantages become clear through use.

²¹Kenneth N. Waltz, *Theory of International Politics* (Reading, MA: Addison-Wesley, 1979), p. 128.

This vital distinction points to the fundamental issue of the organizational, cultural, and societal basis for the introduction, application, and institutionalization of new technologies and practices.

One clue in the search for explanations of the variation in responses to innovation lies in the fact that new technologies do not exist in a cultural or organizational vacuum. They are not neutral instruments utilized uniformly anywhere, anytime, by anyone. Many of the case studies presented in this volume demonstrate that military innovations requiring significant changes in sociocultural values and behavioral patterns spread more slowly, less uniformly, and with more unpredictable outcomes. The rate of adoption may depend on how compatible the innovation is with existing values and practices, as well as past experience and current needs of the adopting state, society, or organization.

Furthermore, states may use innovations in novel ways. The utilization aspect of diffusion—whether and how an innovation is integrated into an acquiring state’s organizational structures—is of central importance to contemporary defense practitioners. A conference sponsored by the Office of the Secretary of Defense/Net Assessment took as its point of departure the observation that “[often] during these periods of RMAs there is a realignment of power based on which nation or nations can best adapt new technologies to military uses.”²² Conference participants sought to identify criteria that could be applied to nations to determine their ability to successfully assimilate and implement key technologies associated with the current RMA. In particular, conference participants repeatedly pointed to the importance of organizational and cultural factors in inhibiting and promoting exploitation of military technologies, while observing that relatively little research on the diffusion of military innovations has systematically explored these dimensions. Studying the diffusion of military innovations involves examining not only how states and nonstate actors interact to acquire new ideas, practices, and hardware but also how they adapt and utilize new knowledge.

A repeated theme in discussions of the diffusion of innovation is the need for more empirical studies using qualitative approaches that can capture the subtleties of the processes involved in the spread of innovations. This approach might reveal how different contexts shape—and in turn are reshaped by—the introduction of new practices and technologies adopted or adapted from other places. The qualitative case studies of the diffusion of military innovations presented in this volume extend our theoretical understanding of various aspects of the diffusion process and also are profoundly important for current defense and foreign policy decisions.

²²Ron St. Martin and Linda McCabe, *Final Report: Implications of Culture and History on Military Development* (McLean, VA: SAIC, Prepared for OSD/Net Assessment, 1996), p. i.

Goals of the Study

This volume seeks to remedy gaps in diffusion research by bringing together scholarship from a variety of disciplines—military history, strategic studies, political science, sociology, public policy, and international relations. The chapters encompass historical as well as contemporary cases of the diffusion of important military innovations. Early in the collaboration, we recognized that such a comparative study would require attention not only to characteristics of the new technologies and practices but also to the organizational, cultural, societal, and political contexts required to leverage the new technologies. Given the crucial importance of this subject to current policy debates, we also wanted to make our research useful both to scholars and (perhaps more importantly) to the policy community. Our goals therefore are twofold: to generate a set of hypotheses to guide future research on the diffusion of military innovations, and to provide insights useful to policy-makers during a period of military transformation.

Military innovations have been studied before. Missiles and weapons of mass destruction (WMD)—particularly nuclear weapons—are the most significant technologies to have been the subject of intense analysis in order to manage the diffusion process. Nonproliferation efforts provide useful insights for understanding the dynamics of the spread of the cluster of technologies and practices that undergird the current RMA. Inhibiting proliferation of WMD has involved negotiations among states of widely varying economic and conventional military power. Nonproliferation regimes have also addressed concerns about the spread of these technologies to nonstate actors. No study of the diffusion of military innovations would be complete without an examination of the WMD case, but conversely the study of diffusion of innovation must go beyond the special case of WMD proliferation. Accordingly, several of our case studies examine important innovations that have already been extensively analyzed (e.g., Napoleonic and Prussian warfare, carrier power, armored warfare). Other chapters explore less celebrated innovations or the diffusion of certain practices to less studied places (e.g., new technologies developed in the periphery, or Soviet battle techniques adopted by Arab states). Additional chapters focus on what enhances or impedes diffusion to friends and allies (e.g., the sepoy of India, cooperation among the post-World War II Anglo-Saxon nations). We also include several case studies of direct relevance to the IT-RMA.

The remainder of this introductory chapter has three objectives: a literature review, a presentation of our methodology, and a brief chapter overview. First we review the wide-ranging research literature on diffusion. Examining the current state of research on diffusion of innovation in other fields provides working hypotheses and conceptual clarification. Many of the debates in the diffusion lit-

erature informed the way we structured this study. They also influenced the questions that case study authors were asked to answer. The case studies address key debates in the diffusion literature. The literature review that follows is intended for the academic audience interested in this volume's contribution to theory development. We have aimed at producing a volume that speaks to both practitioners and scholars. Those with more practical concerns may wish to proceed directly to the overview of the section on methodology and the overview of the themes and cases covered in the book's four main sections.

Diffusion of Innovation Research

Three key debates emerge from diffusion research. The first debate concerns how one defines the diffusion process, which is critical for identifying whether or not diffusion has occurred. The key question here is whether the communication of information is sufficient to conclude that diffusion has taken place. How do we rule out independent discovery of an innovation? The second debate concerns the causes of diffusion. What motivates states to adopt innovations from abroad, and what is the mechanism by which knowledge is transferred? While scholars advance various typologies, three distinct processes—competition, socialization, and coercion—drive the spread of policies across societies, with different implications for what is modeled. The third debate concerns the patterns and effects of diffusion. Existing research supports our view that diffusion is a contingent process shaped by historical, institutional, and cultural factors.

What Is Diffusion? Access to Information vs. Adoption and Utilization

Webster's dictionary defines *diffusion* as "the spread of cultural elements from one area or group of people to others by contact."²³ A common definition therefore implies that an idea, thing, or practice is transmitted from one social group to another and that some kind of interaction must occur between these groups in order to constitute a process of diffusion. Much of the early research on the diffusion of innovation emphasized the transmission of information about a new practice or technology. This research was then challenged by researchers focusing on how receiving states adopt and utilize the knowledge that was transmitted. Empirical research dating back to the 1960s analyzed diffusion as a process of transnational communication.²⁴ Gray defined diffusion as "the communication of

²³Merriam Webster's *Collegiate Dictionary*, 10th ed. (Springfield, MA: Merriam Webster, 1994), p. 323.

²⁴Karl W. Deutsch, *The Nerves of Government* (New York: The Free Press, 1963).

a new idea in a social system over time."²⁵ Rogers defined diffusion as "the processes by which an innovation is communicated through certain channels over time among the members of a social system."²⁶ Many of the basic arguments in diffusion analysis were offsprings of Torsten Hägerstrand's spatial diffusion theory, which isolated a single aspect of the underlying process: the communication of information about an innovation.²⁷

More recently, Bennett in a series of articles distinguishes communication of information from adoption of an innovation.²⁸ He argues that "the words 'learning,' 'diffusion,' 'emulation,' and 'lesson-drawing' have all appeared in the literature to describe virtually the same phenomenon."²⁹ But a pattern of successive adoptions of a policy innovation does not mean that later adopters are necessarily using information from early adopters, that policy adoption in one place is attributable to similar actions elsewhere. Empirical evidence must demonstrate conscious copying, lesson-drawing, or adaptation. Otherwise, "there is no way to distinguish genuine learning from convergence determined by shared macro-level social and economic characteristics."³⁰

To confirm the emulation hypothesis, Bennett argues, "requires the satisfaction of a number of conditions: a clear exemplar (a state that has adopted an innovative stance); evidence of awareness and utilization of policy evidence from that exemplar; and a similarity in the goals, content or instruments of public policy."³¹ Bennett distinguishes between "*knowledge* of a foreign program, *utilization* of that knowledge, and the *adoption* of the same program."³² Awareness, utilization, and adoption are conceptually distinct. Wilensky and Turner also emphasize that just observing that diffusion has occurred "does not specify the path of causality running from the appearance of an idea or policy proposal to its adoption and implementation. Much intervenes between awareness and action, and diffusion accounts only for awareness."³³

²⁵Virginia Gray, "Innovation in the States: A Diffusion Study," *American Political Science Review* 67, no. 4 (Dec. 1973): 1175.

²⁶Rogers, *The Military Revolution Debate*, p. 5.

²⁷James M. Blaut, "Two Views of Diffusion," *Annals of the Association of American Geographers* 67, no. 3 (Sept. 1997): 343.

²⁸Colin J. Bennett, "How States Utilize Foreign Evidence," *Journal of Public Policy* 11, no. 1 (Jan.-Mar. 1991): 31-54; Colin J. Bennett, "Review Article: What Is Policy Convergence and What Causes It?" *British Journal of Political Science* 21, no. 2 (1991): 215-33; Colin J. Bennett, "Understanding Ripple Effects: The Cross-National Adoption of Policy Instruments for Bureaucratic Accountability," *Governance: An International Journal of Policy and Administration* 10, no. 3 (July 1997): 213-33.

²⁹Bennett, "How States Utilize Foreign Evidence," p. 32.

³⁰*Ibid.*

³¹Bennett, "Review Article," p. 223.

³²Bennett, "How States Utilize Foreign Evidence," pp. 32-33.

³³Harold L. Wilensky and Lowell Turner, *Democratic Corporatism and Policy Linkages: The*