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Source: *Foreign Affairs*, Sep. - Oct., 1998, Vol. 77, No. 5 (Sep. - Oct., 1998), pp. 81-94

Published by: Council on Foreign Relations

Stable URL: <https://www.jstor.org/stable/20049052>

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# Power and Interdependence in the Information Age

*Robert O. Keohane and Joseph S. Nye, Jr.*

## THE RESILIENCE OF STATES

THROUGHOUT THE twentieth century, modernists have been proclaiming that technology would transform world politics. In 1910 Norman Angell declared that economic interdependence rendered wars irrational and looked forward to the day when they would become obsolete. Modernists in the 1970s saw telecommunications and jet travel as creating a global village, and believed that the territorial state, which has dominated world politics since the feudal age, was being eclipsed by nonterritorial actors such as multinational corporations, transnational social movements, and international organizations. Likewise, prophets such as Peter Drucker, Alvin and Heidi Toffler, and Esther Dyson argue that today's information revolution is ending hierarchical bureaucracies and leading to a new electronic feudalism with overlapping communities and jurisdictions laying claim to multiple layers of citizens' identities and loyalties.

The modernists of past generations were partly right. Angell's understanding of the impact of war on interdependence was insightful: World War I wrought unprecedented destruction, not only on the battlefield but also on the social and political systems that had thrived during the relatively peaceful years since 1815. As the modernists of the 1970s predicted, multinational corporations, nongovernmental

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organizations (NGOs), and global financial markets have become immensely more significant. But the state has been more resilient than modernists anticipated. States continue to command the loyalties of the vast majority of the world's people, and their control over material resources in most wealthy countries has stayed at a third to half of GDP.

The modernists of 1910 and the 1970s were right about the direction of change but simplistic about its consequences. Like pundits on the information revolution, they moved too directly from technology to political consequences without sufficiently considering the continuity of beliefs, the persistence of institutions, or the strategic options available to statesmen. They failed to analyze how holders of power could wield that power to shape or distort patterns of interdependence that cut across national boundaries.

Twenty years ago, in our book *Power and Interdependence* (1977), we analyzed the politics of such transnational issues as trade, monetary relations, and oceans policy, writing that "modernists point correctly to the fundamental changes now taking place, but they often assume without sufficient analysis that advances in technology and increases in social and economic transactions will lead to a new world in which states, and their control of force, will no longer be important. Traditionalists are adept at showing flaws in the modernist vision by pointing out how military interdependence continues, but find it very difficult accurately to interpret today's multidimensional economic, social, and ecological interdependence." This is still true for the information age in which cyberspace is itself a "place," everywhere and nowhere.

Prophets of a new cyberworld, like modernists before them, often overlook how much the new world overlaps and rests on the traditional world in which power depends on geographically based institutions. In 1998, 100 million people use the Internet. Even if this number reaches a billion in 2005, as some experts predict, a large portion of the world's people will not participate. Moreover, globalization is far from universal. Three-quarters of the world's population does not own a telephone, much less a modem and computer. Rules will be necessary to govern cyberspace, not only protecting lawful users from criminals but ensuring intellectual property rights. Rules require authority, whether in the form of public government or private or community governance. Classic

issues of politics—who governs and on what terms—are as relevant to cyberspace as to the real world.

#### THE EARLY DAYS OF THE REVOLUTION

INTERDEPENDENCE AMONG societies is not new. What is new is the virtual erasing of costs of communicating over distance as a result of the information revolution. The actual transmission costs have become negligible; hence the amount of information that can be transmitted is effectively infinite. Computing power has doubled every 18 months for the last 30 years. It now costs less than one percent of what it did in the early 1970s. Similarly, growth of the Internet and the World Wide Web has been exponential. Internet traffic doubles every 100 days. Communications bandwidths are expanding rapidly, and communications costs continue to fall. As late as 1980, phone calls over copper wire could carry one page of information per second; today a thin strand of optical fiber can transmit 90,000 volumes in a second. As with steam at the end of the eighteenth century and electricity at the end of the nineteenth, productivity growth has lagged as society learns to utilize the new technologies. Although many industries and firms have undergone rapid structural changes since the 1980s, the economic transformation is far from complete. We are still in the early stages of the information revolution.

That revolution has dramatically changed one feature of what we described in *Power and Interdependence* as “complex interdependence”—a world in which security and force matter less and countries are connected by multiple social and political relationships. Now anyone with a computer can be a desktop publisher, and anyone with a modem can communicate with distant parts of the globe at a trivial cost. Earlier transnational flows were heavily controlled by large bureaucracies like multinational corporations or the Catholic Church. Such organizations remain important, but the dramatic cheapening of information transmission has opened the field to loosely structured network organizations and even individuals. These NGOs and networks are particularly effective in penetrating states without regard to borders and using domestic constituencies to force political leaders to focus on their preferred agendas. The information revolution

has vastly increased the number of channels of contact between societies, one of our three dimensions of complex interdependence.

However, the information revolution has not made dramatic changes in the two other conditions of complex interdependence. Military force still plays a significant role in relations between states, and in a crunch, security still outranks other issues in foreign policy.

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We are still in the early stages of the information revolution.

One reason that the information revolution has not transformed world politics to a new politics of complete complex interdependence is that information does not flow in a vacuum but in political space that is already occupied. Another is that outside the democratic zone of peace, the world of states is not a world of complex interdependence. In many areas, realist assumptions about the dominance of military force and security issues remain valid. For the last four centuries states have established the political structure within which information flows across borders. Indeed, the information revolution itself can be understood only within the context of the globalization of the world economy, which itself was deliberately fostered by U.S. policy and international institutions for half a century after the end of World War II. In the late 1940s the United States sought to create an open international economy to forestall another depression and contain communism. The resulting international institutions, formed on the basis of multilateral principles, put a premium on markets and information and deemphasized military rivalry. It has become increasingly costly for states to turn away from these patterns of interdependence.

The quantity of information available in cyberspace means little by itself. The quality of information and distinctions between types of information are probably more important. Information does not just exist; it is created. When one considers the incentives to create information, three different types of information that are sources of power become apparent.

*Free information* is information that actors are willing to create and distribute without financial compensation. The sender benefits from the receiver believing the information and hence has incentives to produce it. Motives may vary. Scientific information is a public good,

but persuasive messages, such as political ones, are more self-serving. Marketing, broadcasting, and propaganda are all examples of free information. The explosion in the quantity of free information is perhaps the most dramatic effect of the information revolution.

*Commercial information* is information that people are willing to create and send at a price. Senders neither gain nor lose by others believing the information, apart from the compensation they receive.

For such information to be available on the Internet, issues of property rights must be resolved so that producers of information can be compensated by users. Creating commercial information before one's competitors can—assuming that intellectual property rights can be enforced—generates enormous profits, especially for pioneers, as the history of Microsoft demonstrates. The rapid growth of electronic commerce and the increase in global competition will be other important effects of the information revolution.

*Strategic information*, as old as espionage, confers great advantage on actors only if their competitors do not possess it. One enormous advantage the United States had in World War II was that, unbeknown to Tokyo, the United States had broken the Japanese codes. The quantity of such information is often not particularly important. For example, the strategic information available to the United States about the nuclear weapons programs of North Korea, Pakistan, or Iraq depends more on having reliable satellites or spies than on vast flows of electronic mail.

The information revolution alters patterns of complex interdependence by exponentially increasing the number of channels of communication in world politics—between individuals in networks, not just individuals within bureaucracies. But it exists in the context of an existing political structure, and its effects on the flows of different types of information vary vastly. Free information will flow faster without regulation. Strategic information will be protected as much as possible—for example, by encryption technologies. The flow of commercial information will depend on whether property rights are established in cyberspace. Politics will shape the information revolution as much as vice versa.

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Politics will affect the  
information revolution  
as much as vice versa.



THE NATURE OF POWER

KNOWLEDGE IS power, but what is power? A basic distinction can be drawn between behavioral power—the ability to obtain outcomes you want—and resource power—the possession of resources that are usually associated with the ability to reach outcomes you want. Behavioral power, in turn, can be divided into hard and soft power. Hard power is the ability to get others to do what they otherwise would not do through threats or rewards. Whether by economic carrots or military sticks, the ability to coax or coerce has long been the central element of power. As we pointed out two decades ago, the ability of the less vulnerable to manipulate or escape the constraints of an interdependent relationship at low cost is an important source of power. For example, in 1971 the United States halted the convertibility of dollars into gold and increased its influence over the international monetary system. In 1973, Arab states temporarily gained power from an oil embargo.

Soft power, on the other hand, is the ability to get desired outcomes because others want what you want. It is the ability to achieve goals through attraction rather than coercion. It works by convincing others to follow or getting them to agree to norms and institutions that produce the desired behavior. Soft power can rest on the appeal of one's ideas or culture or the ability to set the agenda through standards and institutions that shape the preferences of others. It depends largely on the persuasiveness of the free information that an actor seeks to transmit. If a state can make its power legitimate in the eyes of others and establish international institutions that encourage others to define their interests in compatible ways, it may not need to expend as many costly traditional economic or military resources.

Hard and soft power are related, but they are not the same. The political scientist Samuel P. Huntington is correct when he says that material success makes a culture and ideology attractive, and that economic and military failure lead to self-doubt and crises of identity. He is wrong, however, when he argues that soft power rests solely on a foundation of hard power. The soft power of the Vatican did not wane because the size of the papal states diminished. Canada, Sweden, and the Netherlands have more influence than some other states with equivalent economic or military capabilities. The Soviet Union had

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considerable soft power in Europe after World War II but squandered it by invading Hungary and Czechoslovakia even when Soviet economic and military power continued to grow. Soft power varies over time and different domains. America's popular culture, with its libertarian and egalitarian currents, dominates film, television, and electronic communications. Not all aspects of that culture are attractive to everyone, for example conservative Muslims. Nonetheless, the spread of information and American popular culture has generally increased global awareness of and openness to American ideas and values. To some extent this reflects deliberate policies, but more often soft power is an inadvertent byproduct.

The information revolution is also affecting power measured in terms of resources rather than behavior. In the eighteenth-century European balance of power, territory, population, and agriculture provided the basis for infantry, and France was a principal beneficiary. In the nineteenth century, industrial capacity provided the resources that enabled Britain and, later, Germany to gain dominance. By the mid-twentieth century, science and particularly nuclear physics contributed crucial power resources to the United States and the Soviet Union. In the next century, information technology, broadly defined, is likely to be the most important power resource.

### THE SMALL VERSUS THE LARGE

THE NEW conventional wisdom is that the information revolution has a leveling effect. As it reduces costs, economies of scale, and barriers of entry to markets, it should reduce the power of large states and enhance the power of small states and nonstate actors. In practice, however, international relations are more complex than the technological determinism this view suggests. Some aspects of the information revolution help the small, but some help the already large and powerful. There are several reasons.

First, important barriers to entry and economies of scale remain in some information-related aspects of power. For example, soft power is strongly affected by the cultural content of movies and television programs. Large, established entertainment industries often enjoy considerable economies of scale in content production and distribution.



The dominant American market share in films and television programs in world markets is therefore likely to continue.

Second, even where it is now cheap to disseminate existing information, the collection and production of new information often requires costly investments. In many competitive situations, the newness of information at the margin counts more than the average cost of all information. Intelligence is a good example. States like the United States, Britain, and France have capabilities for collecting intelligence that dwarf those of other nations. In some commercial situations, a fast follower can do better than a first mover, but in terms of power among states, it is usually better to be first.

Third, first movers are often the creators of the standards and architecture of information systems. The use of the English language and the pattern of top-level domain names on the Internet is a case in point. Partly because of the transformation of the American economy in the 1980s and partly because of large investments driven by the Cold War military competition, the United States was often first on the scene and still enjoys a lead in the application of a wide variety of information technologies.

Fourth, military power remains important in some critical domains of international relations. Information technology has some effects on the use of force that benefit the small and some that favor the powerful. The off-the-shelf commercial availability of what used to be costly military technologies benefits small states and nonstate actors and increases the vulnerability of large states. Information systems add lucrative targets for terrorist groups. Other trends, however, strengthen the already powerful. Many military analysts refer to a "revolution in military affairs" caused by the application of information technology. Space-based sensors, direct broadcasting, high-speed computers, and complex software provide the ability to gather, sort, process, transfer, and disseminate information about complex events that occur over a wide geographic area. This dominant battlespace awareness combined with precision force produces a powerful advantage. As the Gulf War showed, traditional assessments of balances of weapons platforms such as tanks or planes become irrelevant unless they include the ability to integrate information with those weapons. Many of the relevant technologies are available in commercial markets,

and weaker states can be expected to have many of them. The key, however, will not be possession of fancy hardware or advanced systems but the ability to integrate a system of systems. In this dimension, the United States is likely to keep its lead. In information warfare, a small edge makes all the difference. Contrary to the expectations of some theorists, the information revolution has not greatly decentralized or equalized power among states. If anything, it has had the opposite effect.

#### THE POLITICS OF CREDIBILITY

WHAT ABOUT reducing the role of governments and the power of all states? Here the changes are more likely to be along the lines the modernists predicted. But to understand the effect of free information on power, one must first understand the paradox of plenty. A plenitude of information leads to a poverty of attention. Attention becomes the scarce resource, and those who can distinguish valuable signals from white noise gain power. Editors, filters, interpreters, and cue-givers become more in demand, and this is a source of power. There will be an imperfect market for evaluators. Brand names and the ability to bestow an international seal of approval will become more important.

But power does not necessarily flow to those who can withhold information. Under some circumstances private information can cripple the credibility of those who have it. For instance, economists point out that sellers of used cars know more about their defects than potential buyers. Moreover, owners of bad cars are more likely to sell than owners of good ones. Thus potential buyers discount the price they are willing to pay to adjust for unknown defects. Hence the superior information of sellers does not improve the average price they receive, but instead makes them unable to sell good used cars for their real value. Unlike asymmetrical interdependence in trade, where power goes to those who can afford to hold back or break trade ties, information power flows to those who can edit and credibly validate information to sort out what is both correct and important.

Hence, among editors and cue-givers, credibility is the crucial resource, and asymmetrical credibility is a key source of power. Establishing credibility means developing a reputation for providing correct information, even when it may reflect badly on the information

provider's own country. The BBC, for example, has earned a reputation for credibility, while state-controlled radio stations in Baghdad, Beijing, and Havana have not. Reputation has always mattered in world politics, and it has become even more important because of the paradox of plenty. The low cost of transmitting data means that the ability to transmit it is much less important than it used to be, but the ability to filter information is more so. Political struggles focus less on control over the ability to transmit information than over the creation and destruction of credibility.

Three types of state action illustrate the value of credibility. Much of the traditional conduct of foreign policy occurs through the exchange of promises, which can be valuable only insofar as they are credible. Hence, governments that can credibly assure potential partners that they will not act opportunistically will gain advantages over competitors whose promises are less credible. During the Cold War, for example, the United States was a more credible ally for Western European countries than the Soviet Union because as a democracy the United States could more credibly promise not to seek to exploit or dominate its allies. Second, to borrow from capital markets at competitive interest rates requires credible information about one's financial situation. Finally, the exercise of soft power requires credibility in order to be persuasive. For instance, as long as the United States condoned racial segregation it could not be a credible advocate of universal human rights. But in June 1998, President Clinton could preach human rights to the Chinese—and in answer to a question at Beijing University about American shortcomings, could frankly admit that the United States needed to make further progress to realize its ideal of equality.

One implication of the abundance of free information sources and the role of credibility is that soft power is likely to become less a function of material resources. Hard power may be necessary—for instance, using force to take over a radio station—to generate soft power. Propaganda as a form of free information is not new. Hitler and Stalin used it effectively in the 1930s. Slobodan Milošević's control of television was crucial to his power in Serbia. In Moscow in 1993, a battle for power was fought at a TV station. In Rwanda, Hutu-controlled radio stations encouraged genocide. The power of

broadcasting persists but will be increasingly supplemented by the Internet, with its multiple channels of communication controlled by multiple actors who cannot control one another by force. The issue is not only which actors own television networks, radio stations, or web sites—once a plethora of such sources exist—but who pays attention to which fountains of information and misinformation.

In the case of worldwide television, wealth can also lead to soft power. For instance, CNN was based in Atlanta rather than Amman or Cairo because of America's leading position in the industry and technology. When Iraq invaded Kuwait in 1990, the fact that CNN was an American company helped to frame the issue, worldwide, as aggression. Had an Arab company been the world's dominant TV channel, perhaps the issue would have been framed as a justified attempt to reverse colonial humiliation.

Broadcasting is a type of free information that has long had an impact on public opinion. By focusing on certain conflicts and human rights problems, broadcasters have pressed politicians to respond to some foreign conflicts rather than others—say Somalia rather than southern Sudan. Not surprisingly, governments have sought to manipulate television and radio stations and have met with considerable success, since a relatively small number of broadcasting sites have been used to reach many people with the same message. However, the shift from broadcasting to narrowcasting has major political implications. Cable television and the Internet enable senders to segment and target audiences. Even more important politically, the Internet not only focuses attention but helps coordinate action across borders. Interactivity at low cost allows for the development of new virtual communities: people who imagine themselves as part of a single group regardless of how far apart they are physically from one another.

These technologies create new opportunities for NGOs. Advocacy networks' potential impact is vastly expanded by the information revolution, since the fax machine and the Internet enable them to send messages from the rain forests of Brazil or the sweatshops of

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The shift from broadcasting to narrowcasting has major political implications.

Southeast Asia. The recent Landmine Conference resulted from the activities of a coalition of network organizations working with middle-power governments like Canada, individual politicians like Senator Patrick Leahy (D-Vt.), and celebrities like Princess Diana to capture attention, set the agenda, and put pressure on political leaders. The role of NGOs was also an important channel of communication across delegations in the global warming discussions at Kyoto in December 1997. Environmental groups and industry competed in Kyoto for the attention of the media from major countries, basing their arguments in part on the findings of nongovernmental scientists.

There are substantial opportunities for a flowering of issue advocacy networks and virtual communities, but the credibility of these networks is fragile. Greenpeace, for instance, imposed large costs on Royal Dutch Shell by criticizing its planned disposal of its Brentspar drilling rig in the North Sea, but Greenpeace itself lost credibility when it later had to admit the inaccuracy of some of its claims. Atmospheric scientists' findings about climate change have gained credibility, not just from the prestige of science but from the procedures developed in the Intergovernmental Panel on Climate Change for extensive and careful peer review of scientific papers and intergovernmental vetting of executive summaries. The IPCC is an example of an information-legitimizing institution whose major function is to give coherence and credibility to masses of scientific information about climate change.

As the IPCC example shows, the significance of credibility is giving increasing importance to transnational networks of like-minded experts. By framing issues where knowledge is important, such professional communities become important actors in forming coalitions and in bargaining processes. By creating knowledge, they can provide the basis for effective cooperation. But to be effective, the procedures by which this information is produced must appear unbiased. Scientific information is increasingly recognized as in part socially constructed. To be credible, the information must be produced through a process that is in accordance with professional norms and characterized by transparency and procedural fairness.



THE DEMOCRATIC ADVANTAGE

NOT ALL democracies are leaders in the information revolution, but many are. This is no accident. Their societies are familiar with the free exchange of information, and their institutions of governance are not threatened by it. They can shape information because they can also take it. Authoritarian states, typically among the laggards, have more trouble. Governments such as China's can still limit their citizens' access to the Internet by controlling service providers and monitoring the relatively small number of users. Singapore has thus far been able to reconcile its political controls with an increasing role for the Internet. But as societies like Singapore reach higher levels of development where more citizens want fewer restrictions on access to the Internet, Singapore runs the risk of losing the people who are its key resource for competing in the information economy. Thus Singapore is wrestling with the dilemma of reshaping its educational system to encourage the individual creativity that the information economy will demand while maintaining social controls over the flow of information.

Another reason that closed systems have become more costly is that it is risky for foreigners to invest funds in a country where the key decisions are made in an opaque fashion. Transparency is becoming a key asset for countries seeking investments. The ability to hoard information, which once seemed so valuable to authoritarian states, undermines the credibility and transparency necessary to attract investment on globally competitive terms. Geographical communities still matter most, but governments that want rapid development will have to give up some of the barriers to information flows that protected officials from outside scrutiny. No longer will governments that want high levels of development be able to afford the luxury of keeping their financial and political situations a secret.

From a business standpoint, the information revolution has vastly increased the marketability and value of commercial information by reducing costs of transmission and the transaction costs of charging information users. As Adam Smith would have recognized, the value of information increases when the costs of transmitting it decline, just as the value of a good increases when transportation costs fall, increasing demand by giving its makers a larger market. Politically, however, the



most important shift has concerned free information. The ability to disseminate free information increases the potential for persuasion in world politics. NGOs and states can more readily influence the beliefs of people in other jurisdictions. If one actor can persuade others to adopt similar values and policies, whether it possesses hard power and strategic information may become less important. Soft power and free information can, if sufficiently persuasive, change perceptions of self-interest and thereby alter how hard power and strategic information are used. If governments or NGOs are to take advantage of the information revolution, they will have to establish reputations for credibility amid the white noise of the information revolution.

Cheap flows of information have enormously expanded the number and depth of transnational channels of contact. Nongovernmental actors have much greater opportunities to organize and propagate their views. States are more easily penetrated and less like black boxes. As a result, political leaders will find it more difficult to maintain a coherent ordering of foreign policy issues. Yet states are resilient, and some countries, especially large ones with democratic societies, are well-placed to benefit from an information society. Although the coherence of government policies may diminish in these pluralistic and penetrated states, their institutions will be attractive and their pronouncements will be credible. They will therefore be able to wield soft power to achieve many of their objectives. The future lies neither exclusively with the state nor with transnational relations: geographically based states will continue to structure politics in an information age, but they will rely less on material resources and more on their ability to remain credible to a public with increasingly diverse sources of information. 🌐