International Political Science Review

http://ips.sagepub.com

E-Research: An Introduction to On-line Political Science Sources for Beginners (and Skeptics)

Mauro Calise and Rosanna De Rosa

International Political Science Review 2008; 29; 595
DOI: 10.1177/0192512108098879

The online version of this article can be found at:
http://ips.sagepub.com/cgi/content/abstract/29/5/595

Published by:
SAGE
http://www.sagepublications.com

On behalf of:
International Political Science Association (IPSA)

International Political Science Review (2008), Vol. 29, No. 5, 595–618

E-Research: An Introduction to On-Line Political Science Sources for Beginners (and Skeptics)

Mauro Calise and Rosanna De Rosa

Abstract. The purpose of this review article is to contribute to monitoring and debating changes in the electronic research environment. We shall present an overview (mainly tailored to cyberspace neophytes) of some of the best electronic resources currently available on-line for political science, drawing from our experience as editors of IPSAPortal, the International Political Science Association's website dedicated to selecting and reviewing the top e-hubs in our discipline. However, in venturing into political science cyberspace, we will try to offer a more general understanding of the major trends now impacting upon the internet galaxy. Much as we may be tempted just to stick to our little planet, we must be aware that it is part of, and emerges from, a much larger system.

Keywords: • Political science electronic environment • On-line scientific communication • E-science • Electronic sources • Digital libraries

---

> I wonder at times if we are not like the dinosaurs, looking up at the sky at the approaching asteroid and wondering whether it has an implication for our future.[1]

Through its past two-and-a-half millennia of glorious progress and diffusion, text has suffered from two major limitations: accumulation and access. Written text was bulky – despite the great improvements as we moved from ancient scrolls to modern paperbacks, the amount of written culture available to individual readers had strong space constraints. However, in the new reading environment created by the World Wide Web, the limitations of accumulation and access are disappearing. On a screen we now have immediately available the whole world of electronic publishing, which is fast outgrowing the volume of all text written or printed throughout the previous 25 centuries.

DOI: 10.1177/0192512108098879
Sage Publications (Los Angeles, London, New Delhi, Singapore and Washington DC)

This universal library without walls can be browsed at the speed of light through any of the latest generation of all-powerful search engines. The new electronic Alexandrias are making books, articles, official documents, and research reports accessible to larger and larger sections of the world's population. This is a tremendous chance for mass intellectual progress which can be compared only to the birth and diffusion of printed books. At the same time, the new electronic format of scholarly knowledge is redefining research, writing, and thinking altogether, in ways that we are now only beginning to grasp. Academic publishing is undergoing a major transformation, with authorship (the sanctuary of scientific communication) facing the challenges of open access and open culture (Lessig, 2004; Willinsky, 2005). While the death of the book, as the bulwark of traditional knowledge, may be one of those apocalyptic forecasts that never takes place, the circulation of ideas is nonetheless taking unprecedented forms and channels.

With such momentous changes, political science (PS) seems to show little if any awareness of the implications of the internet revolution upon the discipline's trends and prospects. While a vast majority of PS practitioners makes intensive use of all sorts of internet facilities to carry on everyday intellectual work, speculations on this topic remain extremely limited. At a symposium organized among the 12 most recent presidents of the American Political Science Association (APSA) on the major, lasting changes in the discipline, there was only one cursory mention of the web.[2] Furthermore, in browsing through all major PS journals, both scholarly and professional, one finds very few articles monitoring and debating e-changes in the research environment. This is all the more surprising in consideration of the extraordinary booming of a vibrant, new epistemic community, eagerly redefining knowledge and science in light of the web breakthroughs.

The purpose of this article is to contribute to bridging this gap. We shall present a brief overview (mainly tailored to cyberspace neophytes) of some of the best electronic resources currently available on-line for scholarly research. Our focus will be on political science, and we shall mainly draw from our experience as editors of IPSAPortal, the International Political Science Association's website specializing in selecting and reviewing the top e-hubs in our discipline.[3] However, in venturing into political science cyberspace, we will try to offer a more general understanding of the major trends now impacting upon the internet galaxy. Much as we may be tempted just to stick to our little planet, we must be aware that it is part of, and emerges from, a much larger system.

Integration

In the following section, we subdivide our review into four main blocks, largely based on the classification structure chosen for IPSAPortal: catalogues, texts, data banks, and open networks. These blocks reflect the daily routine of intellectual work: browsing through a library catalogue to search for information and all sorts of bibliographical references; reading various kinds of texts, from newspapers to essays and books; accessing numerical or textual data banks, from collections of official records to statistical archives; and connecting with people interested in our research topic and discussing it with them. Keeping these four blocks separate in our classification will certainly help most readers in finding their way through traditional categories and habits. It also represents, to a large extent, the

best method to draw a clear picture of the electronic bonanza available at our fingertips. However, the dominant trend in cyberspace is one of breaking partitions and merging the various streams of cultural information. The crucial force sweeping the web with respect to electronic sources is integration – integration among various formats and channels and between authors and users.

This tendency is best exemplified by Google, the search engine that in a few years has imposed new standards and redefined the logic of web surfing. When "googling" through the internet, queries are not limited to specific locations or formats, covering instead the whole cybersphere accessible to the search engine's indexing algorithms. This revolution certainly accounts for the immense power of information retrieval as well as for the tremendous popularity Google enjoys among almost all internet users (Vise and Malseed, 2005). It also has greatly contributed to establishing the dominant cultural attitude, especially among younger generations, that information exists, and can be accessed, without any limitations of space and location, let alone any time constraints (Meyrowitz, 1985). According to Google standards, we now expect to look up a title or an author, find all links to the related texts (whether articles, books, or just transcripts from a conference or a video), freely read this material on screen and possibly get a printout, access the text's primary sources (statistical figures, survey reports, governmental publications, and so on), browse a Wikipedia entry, and eventually set up a chat or forum to share our opinions and remarks with any interested party.

While this is a typical Google environment, and one that today most youngsters tend to take for granted,[4] it is not the situation that we find when navigating across a specialized disciplinary domain – or perhaps we should say, not yet. The trend toward integration is spreading into every cultural sub-galaxy, though at different speeds depending on the types of barrier it needs to overcome. We may distinguish three main types of barrier to the process of integration.

The first and foremost barrier is an old social science acquaintance, the public-versus-private divide. On the web "public" has gained, in the last few years, as wide as possible a territory. It is at the very core of the overall internet vision, with open circulation and open access as its two basic tenets. This has led to a growing expectation that everything on the web should be in the public domain. This is all the more true as technical progress has made the digitization and circulation of all sorts of material available to every desktop. With respect to the academic market, there are two persisting limitations to full-fledged public access: copyright law for books and corporate property law for journals. In both cases, infringements of these limitations are becoming more and more widespread. Books prior to copyright protection are being extensively digitized by the millions, and are made freely accessible to on-line users worldwide. Many recent books can also be read at no charge, either in part or as a whole, through a variety of channels, from authors' personal websites to special marketing policies by individual publishers. Journals are much harder to reach from outside the individual or institutional subscription procedure; this poses a problem, considering that journals nowadays account for a larger portion of scholarly access to secondary sources.[5] However, the open-access movement is gaining (some) momentum, through its own direct contribution via the growing number of journals freely available on-line, but also thanks to some unexpected contributions from within the citadel of the "big three" journal publishers.[6] Partly as a result of heavy criticism of its oligopolistic control, one of the largest publishing conglomerates is now offering free access to some sections of its electronic collection.[7]

The second kind of barrier is that between the surface web and the deep web, one cutting across the boundaries between public and private domains. In the beginning, everything was "deep" – information was secluded within each proprietary archive. Whether a company's payroll or a journal's subscriber list, the database of all students or books at a small college or a large university, these electronic records would be stored on separate servers and according to different indexing methods and categories across the planet. They could be retrieved only on the spot, by those who had the legal right and technical key to enter the system. Then the internet arrived, and all sorts of material started being made accessible through hypertext pages and links crawling all over cyberspace. At first it looked like chaos, with information overload the curse of early cybernauts.

Soon, however, some kind of order was (re)introduced thanks to all-powerful search engines. Through Yahoo's and Google's algorithms and spiders, anything published on the web could be instantly located and accessed. The amount of resources available at a mouse click was such an unprecedented bonanza that it seemed as if any information anywhere now belonged to our desktop. Yet, we were (and are) only starting to scratch the surface of the web: "most of the internet by far remains uncatalogued ... Many database sites and other sites with high quality and reliable information that would be of interest to the academic user fall within the deep web, including those that do not charge a fee for their content" (Selcher, 2005: 182). Tentative as they may be, estimates of the surface web amount to little more than 1 percent of all the terabytes of information still buried in the vertical archives organizing and running most of our daily life (Bergman, 2001). The deep web remains, to a very large extent, a world of its own, inaccessible to Google's automatic indexing power.

Exceptions, however, are becoming more numerous, and are trendsetting. The road to integration between the deep and surface web can be either indirect or direct. Most governmental archives and university library catalogues and collections keep their doors open to any on-line visitor. Besides, in many instances, the query interface is abandoning the complex syntax and partitions of specialized databases, adopting the same search-as-you-speak (SAYS) logic popularized by Google. This does not yet make for the seamless research environment we have become accustomed to with the surface web, but does contribute to much easier and user-friendly navigation through an extraordinary, rich galaxy of once inaccessible data. Needless to say, direct integration is a much tougher accomplishment. On sheer technical grounds, it requires that a search engine, through its spiders and cookies, simulates multitrillion human-like queries to dig all the bits of information out of each archive and make them readily accessible to any standard surface web request – an operation which has to be endlessly repeated in order to keep information constantly updated. Several high-tech start-ups have been trying to develop a solution to break through this ultimate digital wall, and recent progress by the internet giant Yahoo seems to push in the right direction (Wright, 2004).

Apart from cutting-edge technological innovation, the merging of the surface and deep web also requires painstaking bureaucratic engineering. In order for separate archives to become part of a common platform, streamlining red tape plays no lesser role than managing silicon chips. The last but not the least barrier is cultural and linguistic. Given the strategic leeway of American corporations in the global information and communications technology (ICT) environment and the size of the US internet market, one should not be surprised that the

web is at last succeeding where all sorts of Esperantos have failed, by making English the lingua franca of contemporary worldwide communication. However, this web integration is slowed down whenever it has to cope with context-specific resources. Buying music through the internet in English is easy, as it reflects, to a large extent, the actual music being listened to in most countries on all continents. But being interested in reading a French book requires linguistic skills available only to the francophone world, not to mention the myriad languages identifying much smaller nations or ethnic groups (Laponce, 2001). The risk is that the digitalization of, and access to, the world's cultural heritage will bear a strong Anglo-American bias, thus becoming one more powerful factor in spreading the US hegemony over current scientific discourse. This may not be a problem for those disciplinary domains which have already become integrated into a one-language system of scholarly communication, as has long been the case for the majority of the hard sciences. But it does raise serious issues for most research in the humanities, especially when dealing with historical repositories. In the introduction to the most outspoken manifesto for the preservation of cultural diversity (Jeanneney, 2007), it is argued that "the issue was not just the whole work but also the cultural context and language in which the work was conceived, written, published, read, understood, and maintained. Information has many contexts and receives its full meaning within these contexts. How a search engine selects, organizes, and presents information can destroy or invisibly distort the context" (Wilson, 2007: xi). One can only hope that the danger of becoming an "electronic colony" will spur national governments and international organizations to increase their efforts and investments to meet the challenge of the global web – as is already the case with several outstanding projects we shall review in the following section.

Electronic Stacks

In the universe of soft sciences, disciplines other than political science have paid more attention to the changes in theorizing as well as to the empirical investigations brought about by the new on-line environment. Literary studies has been the front-runner in discussing the epistemological implications of scholarly work that, to a growing extent, is being carried on through the associative patterns of hypertextual links (Bolter, 2001; Landow, 1997, 2006). Sociology has been offering fresh insights into the enormous potential of research communities networking outside the traditional channels of the academic world (Bohlin, 2004; Castells, 1996, 2000; DiMaggio et al., 2001). History has been the first expressly to take advantage of the unlimited expansion of sources made available on the individual desktop (Cohen and Rosenzweig, 2006; Rosenzweig, 2001). With a few relevant exceptions (Burnham et al., 2008; Choucri, 2000; Giles, 1996; Kaase, 2000; Nentwich, 2008), political science seems to devote much less energy to defining the implications (and prospects) of e-research.

This is not to say that the use of electronic resources is not widespread and massive. A quick look at JSTOR's figures, with an average of 50 million monthly accesses ("hits"), shows that work on back-issue articles is now mainly carried out on-line. Moreover, many in the profession certainly share Arendt Lijphart's experience that "the availability of data for research on electoral systems and on political institutions more generally has improved by leaps and bounds" during

the past 20 years.[8] Yet, it remains difficult to assess how fully aware political scientists have become of the extraordinary resources the web is at last offering them. This is all the more true if we move from the use of a few key archives for article retrieval and data searching to a more systematic understanding of the complexity of the web environment. This task is made more difficult by the fact that the web is, by definition, a moving frontier. New websites are added every day and old ones continuously undergo substantial modifications in content, interface, and access. A rough measure of this tremendous growth results from comparing the early snapshots of PS sources (Deibert, 1998; Spang, 1997; Walker, 1998) with the more recent ones (Quinn, 2007; Selcher, 2005).

To keep as accurate track as possible of the expanding e-research cyberspace, IPSA has launched IPSAPortal, an entry point to a selection of the most valuable sites for political scientists,[9] thereby joining a number of pathbreaking initiatives serving as a guide and a gateway through the maze of internet sources, such as the Librarians' Index to the Internet[10] or Intute: Social Sciences.[11] Through these portals, one can enjoy the complexity of the web's scholarly environment while finding authoritative guidance to finalize queries for individual research agendas.

The websites we review in this article thus cannot possibly substitute for the extreme richness and variety of electronic resources available. However, with an eye to the different skills (and attitudes) in our profession, we hope they help illustrate the new opportunities the internet is offering in the various segments of our research routine. The use of electronic resources depends, to a very large extent, upon the mix of intellectual and technical training as well as on the time each of us is willing to devote to some often rather complex tasks. Differences become all the wider as we move toward the more sophisticated environments of cooperative e-research, with a change in the balance between junior and senior scholars. In fact, the former "lack the interpersonal network that supports information-seeking and lack senior scholars' complex heuristic knowledge of the literature. This group is much more dependent on catalogs, indexes, abstracts, and search engines to locate information on a topic of interest" (Borgman, 2003: 113). Similar differences in learning patterns apply to the student population (Bond et al., 2006; Robinson and Schlegl, 2005).

Much as we may thus be tempted to consider cyberspace as a uniform galaxy, it takes very different shapes and directions according to one's own use of one's desktop.

Catalogues

Research always begins with a library catalogue, and this is indeed the place where integration has perhaps grown fastest over the past few years. The early decades of the library-automation process was not without hurdles: repositories and archives were hosted in different university locations, with frequent incompatibility of indexing systems, and data-management software was often noncompliant and proprietary based, according to the specific needs of each cultural institution. Then the merging of index-automation systems and new ICTs, particularly internet penetration within the academic community, opened up new opportunities for developing information-retrieval services. The standardization of metadata with their gradual convergence and centralization within unified catalogues, the diffusion of on-line databases, and the deployment of a new interface for

data inquiry (from text only to graphical user interface) all contributed to the development of on-line browsing services for On-line Public Access Catalogue (OPAC) systems covering both single and associated libraries (Besser, 2002). Based on new archive rationalization and search-optimization strategies, the dawn of the new century witnessed the integration of university-based, statewide, and national-level catalogues with a clear convergence of different formats.

The latest technological innovations address the management of cooperation systems aimed at hybrid catalogue integration, for example museum databases and historical archives, optical scanning of rare manuscripts, and specific data overviews. This trend has led to the development of unified and interlibrary search services, the creation of a deeper indexing level for book and journal scientific reports, and the improvement of primary search options with full-text and advanced search preferences.[12] On-line public access to bibliographical resources remains the basic service provided by most libraries, now expanded with a series of more advanced options. Such basic service is usually free, thus enabling internet users to access an unprecedented pool of scientific information. Each OPAC stands for a relational collection of indexed archives and records, with a search-based interface and a consistent field structure generally shared by all libraries. The record framework underwent an international standardization process leading to an electronic catalogue design naturally based on the bibliographical card's logical organization already established by the International Standard Bibliographic Description (ISBD). Today's OPACs provide cross-searching in more than one catalogue, several options to refine search results, interface customization and personalization, email alerts, and updates. Some more advanced OPACs even allow for combined usage of RefWork, EndNote, and other citation-management programs, enhancing the search process by easily inserting and editing bibliographical reference fields.

To get a full picture of the figures and complexity of the library's transformation from a physical to a virtual space, there is no better place than the US Library of Congress (LoC).[13] Today, the LoC provides on-line search options for more than 14 million records,[14] thus offering the most comprehensive bibliographical Who's Who of Anglo-American production, with an extremely rich coverage of books in other languages as well. While most scholars or graduate students working in a US library may take this result for granted, free access worldwide to the accurate and exhaustive listing of scholarly book production constitutes an extraordinary achievement, the more so in light of the international competition it is stirring. A project of the Conference of European National Librarians, The European Library[15] now groups 47 national libraries, providing unified access to all catalogues – a great chance to experience both the beauty and the thorns of multiculturalism. When users look for a book across all European countries, they can get a vivid picture of the extreme variety of such regional holdings – especially since it takes some time to complete the cross-national search and numbers pop up slowly one after the other, rather than in a few nanoseconds as in a typical Google search. To make results more reliable, there is "The Virtual Keyboard," an editing tool enabling the use of each language's special characters and accented letters or the use of different alphabets, such as the Cyrillic or Greek alphabets, to search within national libraries' catalogues or special collections.

The LoC and The European Library are but two outstanding prototypes of a process which has generated the same transformations in all major research

libraries.[16] For the on-line user, the basic bibliographical information is no longer what differentiates one location from another: a virtual search at Cornell or Harvard for a title or an author is most likely to bring up quite similar results. What now makes the real difference is whether those texts we are looking for are directly available on-line. The acquisition of electronic books and the digitalization of special collections are the new frontier where libraries are investing both human and financial resources, at different speeds and with more or less successful strategies (Brown et al., 2007).

Books and Articles

There are two main highways for the journey through this digital material. The first option is to follow the libraries' traditional path, through a wide array of electronic material clustered on a specific historical, disciplinary, or cultural theme. In this case, libraries have just turned into electronic files a more or less large set of documents already stored as separate collections.[17]

Let us take a look, for example, at some of the most renowned pioneer projects. Launched in 1990 and revamped in 1994 with the web explosion, the American Memory Project at the LoC[18] stores historical maps, photos, audio, and video about general American history and culture. Digital reproductions and descriptions of rare works (manuscripts, maps, and so on) are freely available as well, while some kinds of records require an institutional affiliation. Launched in January 1995, Thomas[19] is the official entry point to legislative information and a primary resource covering the US Congress since its 101st term. It includes legislation, Congressional records, committee reports, presidential nominations, and treaties. Through this digital service, full texts of a huge amount of material are freely available in various formats, and the whole is easily searchable through an interface with excellent capabilities for sorting results and refining searches. Chronicling America,[20] sponsored jointly by the National Endowment for the Humanities and the Library of Congress as part of the National Digital Newspaper Program, allows users to search and view newspaper pages from 1897 to 1910 and to find information about US newspapers published from 1690 to the present.

A sharp picture of the impact of these major digital projects comes from a trendsetter, The Making of America.[21] This joint venture between Michigan and Cornell universities, which is funded by the Andrew W. Mellon Foundation, scans primary and secondary sources from 1850 to 1876. A collection of material "that previously had been used intermittently by a campus of 40,000 ... was soon logging up to one million web hits a month" from all over the world (Courant, 2006: 8).

Flying over the Alps while sitting at the same desktop, we can browse Gallica,[22] a digitized selection of the French national library. This fast-growing on-line repository offers free access to more than 215,000 documents and 100,000 images, providing a rare collection of French and francophone works, special dossiers, and journals on different subjects (history, law, economics, political science, philosophy, and literature) from the 14th to the 20th century. An extraordinary possibility for historical research is given by a selection of administrative and political science dictionaries published since the 18th century.[23] Citing merely five projects, however, does a deep injustice to the wealth and

variety of places to browse. The traditional path of special collections, either pre-existing or collated for the purpose of digitalization, has been pursued by all major world libraries in their shift to the electronic format, and this is an extraordinary opportunity for any researcher with a clear topic in mind.

Also developing rapidly is a second and more recent highway that aims to make accessible on-line the largest number of books possible and without specific selection criteria – the dream of a universal library with unlimited access and use. This goal is pursued, for example, by the One Million Books Project,[24] whose mission is explicitly stated to be "to create the Universal Library with a free-to-read, searchable collection of one million books, available to everyone over the internet. Within 10 years, it is our expectation that the collection will grow to 10 million books. The result will be a unique resource accessible to anyone in the world, without regard to nationality or socioeconomic background."[25] This international project is managed by Carnegie Mellon University and co-sponsored by major institutions (including the US National Science Foundation), with China's Zhejiang University, the Indian Institute of Science, and the Library at Alexandria in Egypt launching the digitalization of an unprecedented quantity of volumes in 50 scanning centers all over the world: at present, about 1.5 million books were made available on-line. Such a collection includes a large number of rare and orphan books in more than 20 languages.

The project's overall goal is to reduce the current access disparity to cultural resources by protecting and circulating works in other languages while enabling people worldwide to discover hard-to-find works. More recent mainstream texts are however a relevant part of this collection. The politics section includes in excess of 20,000 books, with a substantial sample of modern classics, such as those by Theodore J. Lowi, David Easton, and Giovanni Sartori.

The One Million Books Project was already well on its way, along with other trendsetters such as Project Gutenberg,[26] when Google decided to jump in with its tremendous financial power and technical know-how. This move promised to change the overall electronic landscape, stirring extraordinary enthusiasm as well as concern. Was Google Book eventually going to bring about the often heralded and always postponed "end of the book" era (Hillesund, 2007; Kurzweil, 1992; Nunberg, 1993; Thompson, 2005)? The status and size of the universities and publishers that have become partners in the Google Book Project[27] indicate that, this time, the critical barriers to integration may be overcome to the benefit of the open-access philosophy. Public and private, surface and deep, and English and non-English elements are all merging into one gigantic effort to make as many books as possible accessible from any electronic corner of the world.

Among all the prestigious libraries that are scanning their repositories through Google's innovative formula and technique, the University of Michigan has announced that it has already passed the 1 million threshold of books available on-line. However, due to the limitations imposed by the current copyright law (at least in the USA), the project allows only for public-domain works and other out-of-copyright material to be downloaded. This initiative thus reveals one critical disciplinary distinction about the benefits to be gained by access to digitized books. For all historical purposes, the change is a revolutionary one, both in the quantity and quality of available information, not to mention the speed and variety of its possible usage.

But if a query is targeted on more recent literature, Google Books[28] and similar websites still offer limited results. As the website's statement warns: "The aim of Google Book Search is to help you discover books and learn where to buy or borrow them, not read them on-line from start to finish. It's like going to a bookstore and browsing – with a Google twist." This sounds, however, a bit less generous than the reality. The number of pages available varies according to publishers' policies and marketing strategies but, in many cases, a substantial part of recent books can be read on screen – a fatiguing, yet rewarding task for those who may have no ready alternative at hand.[29] The bottom line, however, remains that "The cost of getting permissions and finding rights holders for the vast quantity of material that is neither current nor very old can be prohibitive" (Courant, 2006: 4). Furthermore, this still holds as the main divide in the search for secondary sources, making journal articles a lot easier to retrieve than books. Searching on-line for a specific essay or article is indeed a quite different story. Here the cleavage between private and public access still makes a difference. Most journals are now stored in electronic format,[30] but their access is limited to users with some kind of privileges – as private subscribers to a journal or archive, on a pay-per-view basis, or more commonly, as someone with an institutional affiliation. This electronic transformation has led to a number of controversial consequences, namely, the concentration of the ownership structure in the publishing sector and a steep rise in the average subscription prices of scholarly journals.[31] As a result, many libraries have been forced to discontinue their paper subscriptions and, in some cases, have moved to take direct action to combat the oligopoly of the e-publishing conglomerates.[32]

On the positive side, however, the on-line journal environment offers a higher degree of integration. Searching results for an article in most cases provides immediate access to its abstract and a direct link to the article's full-text in PDF format.[33] This is all the more important considering that, in recent years, there has been a rise in the use of journal articles versus books in the scholarly community, especially among the younger generations. By far the most important and widely used archive in this category is JSTOR[34] – a Mellon Foundation effort to help libraries by converting back issues of paper journals into electronic format and to improve access to journal content (Schonfeld, 2003; Taylor, 2001). Operating as a not-for-profit organization, JSTOR offers access to journals' back issues, with a "moving wall" to the present of three to five years. With an average of 50 million access hits per month and almost 13 million articles downloaded during the past three months, JSTOR covers the distribution of more than 770 scientific journals through 4000 institutions all over the world. Browsing through the complete collection of the *American Political Science Review* (as well as many other key journals in the discipline) is a totally unprecedented intellectual experience. Along with immediate access and the ability to search through any article, JSTOR offers a comprehensive presentation of the discipline's most relevant books through queries to the extraordinarily rich book review section. As with Google Books and the Library of Congress, JSTOR also provides the permalink feature[35] as a precious opportunity for further personalizing the research desktop.

Project MUSE[36] is, to some extent, a complement to the JSTOR archive. Its focus is on journals' recent issues and it has a wider humanities coverage, with nearly 380 journal titles from 40 scholarly publishers in the fields of literature and criticism, history, the visual and performing arts, and cultural studies as well as education,

political science, gender studies, economics, and other social science disciplines. While access to the articles' full text is restricted to subscribing institutions, Project MUSE allows for free search in its archives and provides links to JSTOR's back issues whenever a journal is available at both locations.

Much as JSTOR and Project MUSE represent landmark resources in the field of on-line scholarly research, there are access limitations reflecting the costs of archive production and maintenance as well as the financial constraints of the publishing sector. These factors may play a lesser role in countries which are latecomers to the world of scientific communication, as they may more freely profit from the opportunities of the web environment.

Launched in 2002 as a methodology for the implementation of digital libraries for scholarly journals, the Scientific Electronic Library On-line (SciELO)[37] is a successful model for the cooperative electronic publishing of scientific journals on the internet. With the aim of enhancing scientific production and communication in Latin American and Caribbean countries, SciELO provides efficient accessibility to their scientific literature. It enables many services, from the on-line publication of complete editions of scientific journals to the organization of searchable bibliographical and full-text databases and from the preservation of electronic archives to the production of statistical indicators of the usage and impact of Spanish-American scientific literature. Full texts are enriched with dynamic hypertext links to national and international databases, and direct links to electronic journals. Covering many disciplines, SciELO includes about 540 indexed journals, more than 170,000 articles and 3 million references, with more than 70 journals in the social science domain. One of SciELO's key assets is its special Social Sciences English Edition for the international public, trying to counteract the fact that

> nearly all are published in Spanish and Portuguese, which deters many researchers in the English-language countries – and also in countries where the second language (particularly of research) is English. This not only prevents access and use of the published content in other regions, but also even discovery of the journals within the Latin American indexes, which – naturally – are also in Spanish and Portuguese. (Babini and Smart, 2006: 108)

In the non-anglophone world, we should also mention the Cairn project.[38] Launched in 2001 by a group of French publishers and supported by the Bibliothèque Nationale de France, Cairn is an access and dissemination service for French scientific journals covering the social sciences and humanities, and offers several free search features. Last but not least in the domain of secondary sources is the growing role of PhD theses and dissertations. With submission in electronic form as the general rule in this category, various interuniversity initiatives have led to easy internet access to dissertations worldwide. ProQuest Dissertation, the largest database, can be accessed via an institutional subscription and holds almost 2 million titles, numbering 550,000 in the social sciences (of which 65,000 are in political science). Given the high percentage of theses having been published as books, this area represents a hot segment in the electronic evolution of secondary sources, offering a top-quality entry point into a quasi-book domain. This may, however, bring bad news for many faculties. Facing a soaring financial crisis, many libraries "may think twice about spending scarce resources on books when they know that they can access the original dissertations" through an on-line provider (Thatcher, 2007: 131).

Data Banks

If the integration of books and articles into a seamless and more or less freely accessible electronic environment is transforming the traditional library into a desktop entry point, no less a revolutionary change is occurring in the collection of statistical data and official documents (Lazer and Mayer-Schönberger, 2007). What was once the painstaking task of knocking at bureaucratic doors and peering into dust-covered registers has now been turned into express on-line access to millions of public records. This has by no means been an easy achievement.[39] The effort toward digitization and on-line migration has been hampered by the huge amount of data involved, their specific and extremely varied categories, and the need for large financial support. Yet, the results are extraordinary. The National Archive of Australia[40] provides on-line access to more than 6 million records and 18 million images (just about 10 percent of its total holdings), and these numbers are multiplied many times if we move to the United States National Archives and Records Administration (NARA).[41] The main NARA repository is the Access Archival Database (ARC),[42] developed under the Electronic Records Archives Strategic Initiative and aimed at preserving and providing easy access to a huge amount of documents and data. Today, NARA's website comprises 85 million full-text records – according to NARA's statements, only a small percentage of about 10 billion records included in its on-site archives and not (yet) available on-line. Given the extraordinary figures and scope of its historical holdings, a search query in the NARA database is a somewhat complex activity, with several data layers and a large series of fields enabling users to define their own "default fields." Luckily, the NARA data bank also provides users with predefined paths based on specific search tips and orientation data. The NARA database also operates as an official registry and, along with the Government Printing Office (GPO),[43] indexes and publishes federal legislative acts, presidential documents, administrative regulations, and federal organizations' programs. Thus, users can easily access the weekly compilation of presidential documents, presidents' public papers, executive orders disposition, and so on.

Targeted at a more generalist audience, the Digital Vaults[44] is a multimedia and interactive presentation of major documents and images from American history. Launched in February 2008, the Digital Vaults has already been nominated for the 2008 Best Cultural Institution Website Awards and acts as a gateway to NARA's huge information assets.[45]

In moving from official documents to data for empirical research, the number one on-line entry point is the Inter-University Consortium for Political and Social Research (ICPSR),[46] a network of more than 500 institutions all over the world. The ICPSR acts as a data repository gathering historical content, information clusters, and raw data deriving from research projects, census figures, and administrative records that can be reutilized for further research activities. Established in 1962 at the University of Michigan to acquire and preserve social science data, the ICPSR is unique in its depth and breadth. Its data holdings encompass a wide range of disciplines: political science, sociology, demography, economics, history, education, and public policy. It provides both qualitative and quantitative material for further research and sharing, such as primary and secondary data, census figures, research reports, and so on – a total of 500,000 files.

The Bibliography of Data-Related Literature[47] is another important search function included within the ICPSR's Instructional Resources. It covers ICPSR-based journals through a searchable database that contains in excess of 41,000 quotations of known published and unpublished works, resulting from data analysis related to the ICPSR archive. Each record is enriched by a detailed search outline, optional downloading of raw data in different formats (spss, ascii, and sas) and processing through an on-line analysis tool (with restricted access), or a browsing option for literature related to the same topic.

On the European front, the Council of European Social Science Data Archive (CESSDA)[48] works as an umbrella organization and has operated since 1970 to improve access to and distribution of data. Sociological surveys, election studies, longitudinal studies, and census data are made available by a network of more than 20 member organizations across Europe, such as the German Central Archive for Empirical Social Research (ZA)[49] and the French Centre de données socio-politique (CDSP)[50] based at Sciences Po in Paris. Among more than 50,000 data collections, connections to the European Social Survey,[51] Eurobarometer,[52] the International Survey Program,[53] and the European Values Survey[54] are available too. The Council of European Social Science's portal is easily browsable by topic, while a basic search feature allows users efficiently to locate any item, linking it to a very text-rich description and to the final destination.

An outstanding example of cross-national and cross-institutional cooperation is offered by the Inter-Parliamentary Union (IPU),[55] with more than 140 participating legislatures and covering several key areas, such as representative democracy, international peace and security, sustainable development, human rights and humanitarian law, women in politics, education, science, and culture.[56] Among its most valuable products are three databases. Parlit[57] provides documentation on national parliaments, electoral systems, constitutional law, history and political science, parliamentary law, and legislative elections throughout the world, covering 7000 or more books and studies as well as 30,000 articles from 160 periodicals.

The other two IPU databases (regularly updated) are Parline[58] and Women in Politics.[59] The first provides general information on each parliament's chambers, descriptions of the electoral system, the results of the most recent elections, and data, charts, and information on the presidency and composition of each chamber. The latter gives bibliographic references (abstracts included) on books and articles dealing with women's participation in political life. Links to parliaments worldwide and to topic-related websites are also available for each database, thus serving as an entry point for more in-depth investigations.

Open Networks

Based on a new philosophy inspired by the "not-market economy" (Benkler, 2006), open-access archives have been spreading through cyberspace, gathering scientific content and "gray literature" (papers, proceedings, pre-prints, dissertations, and not-peer-reviewed works). First launched in 1991 by Paul Ginsparg, a physicist at Cornell University widely known for his development of the ArXiv.org e-print archive,[60] such e-repositories have gained strength in the past decade under the auspices of the Scholarly Publishing and Academic Resources Coalition (Sparc), an international alliance of academic and research libraries.[61]

A key role in the universe of open-access activities is played by well-established institutions, either in their individual capacity or as a network of organizations fostering the dissemination of scholarly material through so-called institutional e-repositories, that is, "general-purpose infrastructures within the context of changing scholarly practice ... [a] response to concerns about the existing scholarly publishing system, the cost of journals, and the open access movement" (Lynch and Lippincott, 2005: 2). Major open-access hubs include the Social Science Research Network (SSRN),[62] a project cohosted by Stanford Law School and the European Corporate Governance Institute that involves a large number of universities and research networks in the social sciences and related fields (economics, law, social insurance, and management). The website provides access to thousands of full-text articles and abstracts from journals, publishers, and institutions through the SSRN's e-library. It also offers a database of abstracts, with about 180,000 summaries of scholarly working papers and forthcoming papers, and an electronic paper collection, with more than 147,000 freely downloadable full-text documents in PDF format.

On the other shore of the Atlantic, Spire[63] is the institutional repository of the National Foundation for Political Science,[64] which features one of the richest European social science collections on political science.[65] It contains a growing collection of working papers, reports, journal pre-prints, peer-reviewed journal reprints, and full-text digital theses. A wide collection of free material is also offered by the London School of Economics (LSE).[66] Articles, working papers, book chapters, conference papers, and more can be searched and downloaded through LSE Research On-line.[67] Searchable and browsable by year, department, research center, and group, LSE Research On-line provides thousands of articles, as well as book chapters, working papers, and theses. Any item is downloadable in PDF format and presented in an informative metadata structure, thus making it possible to cite correctly an unpublished work such as "Is Duverger's Law Based on a Mistake?" by Patrick Dunleavy et al. (2008).

A closer picture of the political science resources hosted at open-access archives begins with Political Research On-line (PROL),[68] a project promoted by the American Political Science Association in cooperation with several international and national associations and research institutes.[69] Sponsored by the Mellon Foundation, PROL has gathered the conference and meeting proceedings of those professional associations and institutions participating in the project from 2002 to the present. Membership is free of charge and a valid email address is the only requirement needed to access abstracts, references, and full-text documents – more than 25,000 articles are currently available in PDF format and are easily searchable by keywords in context, author, and title fields. Political Research On-line is also an excellent tool for the promotion and circulation of scholarly information worldwide. Each article provides a "more info" option with direct links to related papers and proper references in Museums, Libraries and Archives Council (MLA) and American Psychological Association (APA) style, thus enabling a deeper research strategy. While visiting the APSA website,[70] one should not miss a gem – and an outstanding example of what open access can mean for new insights into the discipline. Though far less visible than it deserves to be (the best path is Governance/President and Council/Past Presidents[71]), there is a webpage hosting a list of links to the full text of the Association's presidential addresses, perhaps the most encompassing and vivid presentation of the

evolution of political science across a full century of theoretical debate among many of its most illustrious representatives.

Perhaps the most comprehensive picture of the brand-new e-environment represented by institutional repositories is offered by OAIster,[72] a metasearch service based at the Michigan University Library covering hundreds of open-access archives through a single entry point and a gateway providing access to in excess of 15 million academically oriented digital resources, including gray material, images, text, audio, movies, and datasets from more than 944 different repositories. Thanks to metadata harvesting, this database acts as an entry point for open-access resources as indexed in the Open Archives Initiative Protocol for Metadata Harvesting.[73]

The growing number of academic repositories attests to the greater level of sharing, editing, and updating of gray material, as well as a more interactive and free use of the web of knowledge. However, along with institutional promotion, open access is also greatly enhanced by a growing network of individual efforts, which constitute the new frontier of scholarly dissemination. The basic framework is represented by the on-line communication services each university provides to its faculty members, including an institutional webpage with general information and a publications list particularly suitable for students and colleagues. Yet, a large number of scholars have moved beyond this stage, transforming their websites into an in-depth presentation of their past and present research activity. Many years at the forefront of academic on-line dissemination, Pippa Norris[74] presents perhaps the most comprehensive free access to a scholar's personal production. Her website hosts published material as well as ongoing research and in-progress books, providing synopses, general outlines, and chapter drafts – thus opening up a collaborative process. Taking advantage of Google Books Search, Norris also provides a citation analysis with a long list of books that have references to her works and direct links to their excerpts available on Google Books.

Peter J. Katzenstein[75] offers an extended publication list (arranged by date and subject), with a number of articles freely available in PDF format. We can also find his course syllabi, including direct links to access e-learning modules or to upload student material. Among the articles ready to be freely downloaded from his website, Katzenstein offers also some papers which can be easily shared with other people via applications such as Google Docs. This site thus also attests to the growing use of so-called web 2.0 applications, enabling a greater level of sharing, editing, and updating, as well as a more interactive and creative use of any personal material. To the same site typology belongs Gary King's website,[76] which provides an impressive number of abstracts, articles, metadata references (including the King Dataverse Project[77] for data-citation standards and statistical methods), and course materials through a clearly organized and easily searchable directory.

Other individual websites may have a more clear-cut research focus. Ron Inglehart,[78] as the coordinator of an international project on the evolution and transformation of people's values and behavior, manages an independent website (the World Values Survey[79]) with a network of social scientists working under the World Values Survey Association. The data, gathered in 80 countries and divided into four waves, provide a comprehensive picture of the relationship between political culture and democratic institutions. This is a quite sophisticated site: along with data-file downloading, it also provides country-related

on-line data analysis, synopses of material published by the Association, as well as papers and presentations available in full text.

Also focused on research and teaching activities is the Political Communication Lab[80] at the Department of Communication at Stanford University, led by Shanto Iyengar. The Lab publishes its experimental works, papers, teaching material, talks, and readings, as well as a large multimedia collection of records related to US elections: issue positions, campaign advertisements, commercials, speeches, debates, interviews, and media content are available on-line. Recent entries include a collection of 2008 presidential campaign advertisements and a booklet entitled *Media Politics: A Citizen's Guide*, along with interviews, multimedia advertisements, and more content related to US presidential and state elections.

Connecting Plato

All technological revolutions begin as new means to achieve old ends: more accessible reading material, less expensive wool, quicker transportation, or improved lighting. It is only after more or less prolonged usage that it becomes clear, to use McLuhan's (1962) metaphor, that "the media is the message." Our mind, as well as our body, undergoes a deep transformation to which we assign in retrospect the tag of a new evolutionary stage. In a few, most notable cases, the change is so dramatic as to imply a "brainframe" shift (De Kerckhove, 1991). This is probably what is happening with the penetration of the internet into our daily routines.

Yet, we still show little, if any awareness of this impact and its consequences, especially as we move closer to the epicenter of change, the transformation of scholarly knowledge. A few seminal studies are at last breaking new ground (Borgman, 2007; Nentwich, 2003), but the mainstream orientation remains a distant and skeptical one. This is an odd attitude, indeed, considering that, as professional intellectuals, we belong to that segment of the web which makes the most intensive and complex use of the new electric language (Heim, 1987). While many people may spend even more time than a scholar in front of a computer, they tend to do repetitive and simple tasks. Academics, to the contrary, have entered into a quasi-symbiotic relation with the cyber-environment through a variety of highly sophisticated functions. From emails to word processing and desktop publishing, from reading books or articles on-line and disseminating our writings through the web, we are not just modifying our working habits, we are changing our thinking patterns. Ever since Harnad's (1991) visionary anticipation, the analogy with the Gutenberg revolution is the one commonly used to indicate the scope of changes brought about by the internet's penetration into every household. Yet, the analogy goes further and deeper than the extraordinary mass of cultural material made so easily accessible to hundreds of millions of users via the web's electronic channel of communication. There is more than a quantum leap in the amount of knowledge being disseminated worldwide. Two major quality breakthroughs need to be taken into account to get a full picture of the electronic Gutenberg sea change.

In her seminal study of the printing press as an agent of change, Elizabeth Eisenstein (1979) pointed out that all through the first century of printing, the major break with the past did not consist in the output of new literature, but in

the fact that readers "for the first time could see multiple texts together and compare them" (Duffy, 2000: 1). This methodological change brought about a new mentality, open and keen to examine and discuss carefully various aspects of a complex argument. This is, in Eisenstein's view, the common strand uniting the Renaissance, the Protestant Reformation, and the Scientific Revolution, the three major cultural upheavals in the wake of the advent of printing. In this respect, the history of book publication turned into a watershed for the more general history of ideas. We have not yet seen (or recognized) the fruits in our civilization of the advent of a new e-science (Jankowski, 2007; Schroeder and Fry, 2007). Yet we may need to prepare ourselves for a momentous harvest.

A second link between Gutenberg and the web concerns the fact that "the printing press had its greatest scientific impact on those working outside of the universities, rather than on the scholars within. The universities were not early champions of the printed book" (Willinsky, 2005: 192). It would not be fair to say that universities are not playing a leading role in the use and promotion of the internet as an agent of cultural change. Yet, an extraordinary (and still largely unknown) component of the web revolution consists of the millions of amateur and self-promoting intellectuals flocking to the internet Eldorado as a new frontier of opportunities for education, inspiration, invention, and interaction. This opening of the citadel of higher learning is bound to redesign the cultural and scientific map within the western hemisphere and, even more, in its relationship with the emerging nations and their densely interconnected populations.[81]

In the end (or in the new beginning), the most precious and unique fruits of the latest technological wave seem to bear directly upon changes in human conduct or, more precisely, in "information-related behavior" (Borgman, 2003). After spending more than 50 years in all sorts of pioneer experiments in the development of artificial intelligence, we are probably reaching the goal through an indirect and unexpected course. Rather than the result of laboratory and robotics research, a new intelligence seems to be developing out of the convergence and integration of human understanding through the web. We are all, to some degree, contributing to and partaking of the emerging "intelligent web" (Alesso and Smith, 2006). Wikipedia is but one unprecedented example of how fast the combination of diffused knowledge and open access can coalesce into new cultural products which immediately become a standard and a sine qua non for the literate world at large (Shirky, 2008; Sunstein, 2006; Tapscott and Williams, 2006).

In his pathbreaking study of the Greek mind, Eric Havelock (1963) explained that the overarching influence of Plato on the evolution of western thought derived from the fact that his theories appeared at a time when written language was taking the place of the oral tradition as the dominant form for concept development. In fact, the Platonic dialogues became the first and by far most influential expression of written language as a new way of thinking. We are probably about to witness the advent of a new Plato – a collective and connected Plato, whose "brainframe" will substitute for the old one we have been using for the past 500 years. In presenting a brief overview of the electronic resources available for scholarly investigation and interaction worldwide, we have only begun to map a new journey into knowledge to which political science can make a great contribution. To both enthusiasts and skeptics, "Welcome aboard." As Edward R. Murrow might say were he alive today, "Good morning, and good luck."

Notes

1. Frank Rhodes, President Emeritus, Cornell University, quoted in Duderstadt (2001: 56).
2. This cursory mention referred to the role of electronic archives in facilitating the acquisition of empirical data (Hochschild, 2005: 323). More recently, Robert Axelrod (2008: 7), in his presidential address, emphasized as a "particularly promising domain for political science exports ... the new field of web-based institutions, particularly web-based institutions that use largely bottom-up forms of organization and governance."
3. IPSAPortal is an on-line publication of the International Political Science Association, launched at the IPSA 20th World Congress in Fukuoka, Japan. IPSAPortal aims at fostering on-line research in political science by selecting, reviewing, and evaluating the best websites providing data, materials, and sources for scholarly research. The portal (http://www.ipsaportal.net) offers free access to a review of the top 300 PS websites, while a printed version is distributed at IPSA world congresses.
4. Contrasting the "Amazoogle" factor (that is, "the enormous impact of the information giants on the way faculty and students find and use information") is one of the primary goals of the 2006–09 strategic plan of Columbia University Library (2006: 3) in its drive toward "designing services for a self[-]service age."
5. For an accurate state-of-the-art overview, see Mark Ware Consulting (2006: 7), which reports that "there are about 23,000 scholarly peer-reviewed journals, collectively publishing about 1.4 million articles a year. An important subset is the 8700 journals included in the ISI Journal Citation database, of which 5900 are in the Science Edition, 1700 in the Social Sciences and 1130 in the Art & Humanities Editions), which collectively publish about 1 million articles annually. This subset is important because it contains the most cited journals, that is, by this measure at least the core literature."
6. Mergers in the publishing industry are moving so fast that is getting more and more difficult to keep an accurate count of them. Willinsky (2005: 18), quoting from a 2003 source, reports that Elsevier with 1800 journals, Taylor and Francis with 1000, and Springer with more than 500 account for 60 percent of the materials indexed in the ISI Web of Science. Within three years, according to Mark Ware Consulting (2006: 11), the concentration had moved far ahead as "the distribution of journals by publisher is highly skewed, with two publishers (Elsevier and Springer) having around 2000 journals each. The top 2% (11 publishers) produce more than 70% of the journals in this group, that is, about 35% of all journals." One year later, "in February 2007 John Wiley & Sons, Inc. completed an acquisition of Blackwell Publishing (Holdings) Ltd. The merged companies publish approximately 1,250 scholarly journals and hundreds of scholarly books every year, making them the third largest scholarly journals publisher in the world (after Elsevier and Springer)."
7. Reed Elsevier has recently agreed "to allow its authors [to] post the final versions of their papers to open access e-print archives [and] its portal ScienceDirect provides free access to bibliographic information and abstracts for its 1,800 journals" (Willinsky, 2005: 28).
8. Quoted in Hochschild (2005: 323). Compare this with the unsatisfactory results reported only 10 years ago by Shaw et al. (1996: 501–4) with respect to their findings on presidential documents: "The on-line resources surely will accelerate and expand the scope of research and information gathering, but these relatively mechanical efforts have not yet replaced the time-honored detective work learned in the past off-line in the library."
9. Ipsaportal.net, in its four years of activity, has monitored more than 1000 websites, selecting a cluster of 300 of the most authoritative, stable, and generous in terms of open access. Selection is carried out according to very detailed policy guidelines reflecting three main criteria: content, access, and usability.

10. The Librarians' Index to the Internet (http://lii.org/) is an extraordinary effort to monitor the expanding internet universe, providing links to open-access sites selected with rigorous and transparent criteria. It is a searchable, annotated subject directory of more than 20,000 internet resources selected and evaluated by librarians.
11. With more than 30,000 selected web sources, the Intute: Social Sciences (http://www.intute.ac.uk/socialsciences/) is both a catalogue and a search engine covering internet resources in the field of social sciences education and research, with some extensions in business and law and in sport and tourism.
12. To get a rough measure of the expansion of the world of digital libraries during the past decade, one may note that a search in the Amazon bookstore for publications with "digital library" or "digital libraries" in the title returns 600 books – twice as many as the same query two years ago. As for the key trends (and visions) leading this process, compare the pathbreaking work by Dowler (1997) with the in-depth, state-of-the-art analysis by Brown et al. (2007).
13. URL: http://www.loc.gov.
14. In choosing to indicate figures about catalogues, collections, holdings, and various databases, we are aware that they are extremely tentative and bound to become rapidly obsolete. They help, however, the less experienced reader to get a better feeling of the phenomenon we are describing.
15. URL: http://www.theeuropeanlibrary.org.
16. This process of integration and convergence operates also at a meta-organizational level. The development of collective catalogues (Union Catalogs) is a result of the metadata standardization process and the greater interoperability of different indexing systems, as well as an indicator of the penetration of the globalization process into the deep web. The largest among such catalogues is WorldCat (http://www.worldcat.org/), developed by the On-line Computer Library Center and providing access (restricted to affiliated libraries only) to more than 100 million records.
17. Clifford Lynch (2003: 5) makes a critical distinction between "digital collections as things close to raw content ... and digital libraries as the systems that make digital collections come alive, make them usefully accessible."
18. URL: http://memory.loc.gov/ammem/index.html.
19. URL: http://thomas.loc.gov.
20. URL: http://www.loc.gov/chroniclingamerica/index.html.
21. URL: http://quod.lib.umich.edu/m/moagrp.
22. URL: http://gallica.bnf.fr.
23. URL: http://gallica.bnf.fr/dicos/dictlisteK.htm.
24. URL: http://www.ulib.org.
25. URL: http://www.ulib.org/ULIBAboutUs.htm.
26. Founded in 1971 by Michael Hart, Project Gutenberg (http://www.gutenberg.org/) represented the first digitization project and the first collection of free electronic books. From its growing archive, 25,000 e-books in the USA and more than 100,000 books hosted in other countries – all copyright free –are downloadable in full text formats, with a global e-book community working to sustain the initiative.
27. URL: http://books.google.com/googlebooks/partners.html.
28. URL: http://books.google.com.
29. Some publishing companies and writers' groups have criticized the project's inclusion of snippets of copyrighted works as an infringement of existing regulation. However, through a variety of access limitations and security measures, some based on user tracking, Google limits the number of viewable pages and seeks to prevent page printing and text copying of material under copyright protection.
30. According to a recent survey (Mark Ware Consulting, 2006: 8), in 2005 "90% of all journals were on-line, with 93% of STM (Scientific, Technical and Medical) and 84% of Arts & Humanities journals." Due to the financial pinch, many libraries are now

discontinuing their paper subscriptions, with relevant consequences for the structure and plurality of the publishing business.

31. Much as it is perhaps the driving force in the process of libraries' digital reorganization, the increasing cost of journal subscriptions is, however, the object of spirited controversy as to its actual dimensions and causes (Mark Ware Consulting, 2006: 12–13; Willinsky, 2005: 17–20).
32. Harvard University library, for example, recently decided "to reduce the number of Elsevier titles to which Harvard subscribed" (Willinsky, 2006: 25) in order to "reassert control over [the library's] collections" (Verba, 2004). For a comprehensive strategy to contrast "current models for scholarly publishing [which] are no longer economically sustainable," see the program and actions of the University of California libraries at http://libraries.universityofcalifornia.edu/scholarly.
33. The most comprehensive professional collection of political science article abstracts is offered by the International Political Science Abstracts, which provides more than 100,000 such abstracts from articles published in journals and yearbooks worldwide from 1989 to the present, and is available through subscription, either individual or institutional. Started in 1951 as a printed journal, it covers nowadays articles from more than 900 journals.
34. URL: http://www.JSTOR.org.
35. A permanent link is a URL resulting from a search query. It is usually used to improve the linking system between database-based webpages or to give more stability to web sources' citation processes.
36. URL: http://muse.jhu.edu.
37. The SciELO project (http://www.scielo.br/) is the product of a partnership between Fundação de Amparo à Pesquisa do Estado de São Paulo (FAPESP or the State of São Paulo Science Foundation) and the Latin America and Caribbean Center on Health Sciences Information (BIREME). Since 2002, the project has also received support from the Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq).
38. URL: http://www.cairn.info.
39. According to Dunleavy et al. (2006: 4), "The early development of IT systems by the 1930s did no more than index (at first) large or (later) vast paper documentation stores. The 1980s development of structured relational databases and later the breakthrough to fully electronic storage and accessing capability in the 1990s made a decisive change from this pattern and the advent of the web as a universal route to knowledge completed the transformation."
40. URL: http://www.naa.gov.au.
41. URL: http://www.archives.gov.
42. URL: http://www.archives.gov/research/arc.
43. URL: http://www.gpo.gov.
44. URL: http://www.digitalvaults.org.
45. In 2007, NARA also launched a digitalization project, in partnership with the Footnote Company, to convert 4.5 million documents already available on microfilm. While currently only Footnote can exploit (partially free of charge) such material, after five years it will be reintroduced within the NARA holdings. Footnote has thus adopted the same marketing strategy applied by Google: financial support versus content.
46. URL: http://www.icpsr.umich.edu.
47. URL: http://www.icpsr.umich.edu/ICPSR/citations/index.html.
48. URL: http://www.nsd.uib.no/cessda/home.html.
49. URL: http://www.gesis.org/en/ZA.
50. URL: http://cdsp.sciences-po.fr.
51. URL: http://www.europeansocialsurvey.org.
52. URL: http://www.gesis.org/en/data_service/eurobarometer/standard_eb/index.htm.
53. URL: http://www.issp.org.

54. URL: http://www.europeanvalues.nl.
55. URL: http://www.ipu.org.
56. URL: http://www.ipu.org/iss-e/issues.htm.
57. URL: http://www.ipu.org/parlit-e/parlitsearch.asp.
58. URL: http://www.ipu.org/parline-e/parlinesearch.asp.
59. URL: http://www.ipu.org/bdf-e/BDFsearch.asp.
60. URL: http://arxiv.org.
61. URL: http://www.arl.org/sparc.
62. URL: http://www.ssrn.com.
63. URL: http://spire.sciences-po.fr/spire.
64. URL: http://bibliotheque.sciences-po.fr.
65. It also features economics, history, geography, law, international relations, and sociology, with more than 900,000 books, 200,000 indexed articles, and 18,000 press files from 1946 to 2005 freely accessible as abstracts.
66. URL: http://www.lse.ac.uk/library.
67. URL: http://eprints.lse.ac.uk.
68. URL: http://www.politicalscience.org.
69. These include the International Studies Association, Midwest Political Science Association, New England Political Science Association, Northeastern Political Science Association, Political Studies Association (UK), Southwestern Political Science Association, Southern Political Science Association, and Western Political Science Association.
70. URL: http://www.apsanet.org.
71. URL: http://www.apsanet.org/content_2936.cfm.
72. URL: http://www.oaister.org.
73. URL: http://www.openarchives.org/pmh.
74. URL: http://www.pippanorris.com.
75. URL: http://falcon.arts.cornell.edu/Govt/faculty/katzenstein/index.html.
76. URL: http://gking.harvard.edu/homepage.html.
77. URL: http://thedata.org.
78. URL: http://polisci.lsa.umich.edu/faculty/ringlehart.html.
79. URL: http://www.worldvaluessurvey.org.
80. URL: http://pcl.stanford.edu.
81. According to a report by the China Internet Network Information Center (2008: 9), "by December 2007, the total number of netizens in China had increased to 210 million, with a sharp increase of 73 million in the year of 2007, at an annual growth rate of 53.3% ... In view of access methods, broadband netizens have reached 163 million and mobile phone netizens 50.4 million, both of which have been in rapid growth."

References

Alesso, H.P. and Smith, C.F. (2006). *Thinking on the Web: Berners-Lee, Gödel and Turing*. Hoboken, NJ: Wiley.

Axelrod, R. (2008). "Political Science and Beyond: Presidential Address to the American Political Science Association," *Perspectives on Politics* 6(1): 3–9.

Babini, D. and Smart, P. (2006). "Using Digital Libraries to Provide Online Access to Social Science Journals in Latin America," *Learned Publishing* 19(2): 107–13.

Benkler, Y. (2006). *The Wealth of Networks: How Social Production Transforms Markets and Freedom*. New Haven, CT: Yale University Press.

Bergman, M.K. (2001). *The Deep Web: Surfacing Hidden Value*, URL: http://www.brightplanet.com/images/stories/pdf/deepwebwhitepaper.pdf.BrightPlanet.

Besser, H. (2002). "The Next Stage: Moving from Isolated Digital Collections to Interoperable Digital Libraries," *First Monday* 7(6), URL: http://www.firstmonday.org/issues/issue7_6/besser.

Bohlin, I. (2004). "Communication Regimes in Competition: The Current Transition in Scholarly Communication Seen through the Lens of the Sociology of Technology," *Social Studies of Science* 34: 365–91.
Bolter, J.D. (2001). *Writing Space: Computers, Hypertext, and the Remediation of Print*. Philadelphia, PA: Lawrence Erlbaum Associates.
Bond, C.S., Fevyer, D. and Pitt, C. (2006). "Learning to Use the Internet as a Study Tool: A Review of Available Resources and Exploration of Students' Priorities," *Health Information and Libraries Journal* 23: 189–96.
Borgman, C.L. (2003). *From Gutenberg to the Global Information Infrastructure*. Cambridge, MA: MIT Press.
Borgman, C.L. (2007). *Scholarship in the Digital Age: Information, Infrastructure, and the Internet*. Cambridge, MA: MIT Press.
Brown, L., Griffiths, R. and Rascoff, M. (2007). "University Publishing in a Digital Age," *Ithaca Report*. Ithaka.org.
Burnham, P., Grant, W. and Gilland, K. (2008). *Research Methods in Politics*. Basing Stoke: Palgrave Macmillan.
Castells, M. (1996). *The Rise of the Network Society*. Oxford: Blackwell.
Castells, M. (2000). "Toward a Sociology of the Network Society," *Contemporary Sociology* 29(5): 693–9.
China Internet Network Information Center (2008). *Statistical Survey Report on the Internet Development in China*, URL: http://www.cnnic.net.cn/en/index/0O/index.htm.
Choucri, N. (2000). "Cyberpolitics in International Relations," *International Political Science Review* 21(3): 243–63.
Cohen, D.J. and Rosenzweig, R. (2006). *Digital History: A Guide to Gathering, Preserving, and Presenting the Past on the Web*. Philadelphia: University of Pennsylvania Press.
Columbia University Library (2006). "Columbia University Library Strategic Plan 2006–2009," URL: www.columbia.edu/cu/lweb/img/assets/6675/strategicplan_2002–2009.pdf. New York: Columbia University.
Courant, P.N. (2006). "Scholarship and Academic Libraries (and their Kin) in the World of Google," *First Monday* 11(8), URL: http://www.firstmonday.org/ISSUES/issue11_8/courant/index.html.
Deibert, R.J. (1998). "Virtual Resources: International Relations Research Resources on the Web," *International Organization* 52(1): 211–21.
De Kerckhove, D. (1991). *Brainframes: Technology, Mind and Business*. Utrecht: Bosch & Keuning.
DiMaggio, P., Hargittai, E., Neuman, W.R. and Robinson, J.P. (2001). "The Social Implication of the Internet," *Annual Review of Sociology* 27: 307–36.
Dowler, L. (1997). *Gateways to Knowledge: The Role of Academic Libraries in Teaching, Learning, and Research*. Cambridge, MA: MIT Press.
Duderstadt, J.J. (2001). "The Future of the University in the Digital Age," *Proceedings of the American Philosophical Society* 145: 54–72.
Duffy, S.E. (2000). "The Unacknowledged Revolution," URL: http://www.h-net.org/reviews/showrev.cgi?path=24899962821867.
Dunleavy, P., Margetts, H., Bastow, S. and Tinkler, J. (2006). *Digital Era Governance: IT Corporations, the State and E-government*. Oxford: Oxford University Press.
Dunleavy, P. et al. (2008). "Is Duverger's Law Based on a Mistake?" Paper presented at the Political Studies Association Annual Conference, 2008.
Eisenstein, E.L. (1979). *The Printing Press as an Agent of Change: Communications and Cultural Transformations in Early-Modern Europe*. Cambridge and New York: Cambridge University.
Giles, M. (1996). "From Gutenberg to Gigabytes: Scholarly Communication in the Age of Cyberspace," *Journal of Politics* 1(58): 613–26.
Harnad, S. (1991). "Post-Gutenberg Galaxy: The Fourth Revolution in the Means of Production of Knowledge," *Public-Access Computer Systems Review* 2(1): 39–53.

Havelock, E. (1963). *Preface to Plato.* Cambridge, MA: Belknap Press.
Heim, M. (1987). *Electric Language.* London: Yale University Press.
Hillesund, T. (2007). "Reading Books in the Digital Age Subsequent to Amazon, Google and the Long Tail," *First Monday* 12(9), URL: http://www.firstmonday.org/issues/issue6_10/hillesund.
Hochschild, J.L. (2005). "APSA Presidents Reflect on Political Science: Who Knows What, When, and How?" *Perspectives on Politics* 3(2): 309–34.
Jankowski, N.W. (2007). "Exploring E-science: An Introduction," *Journal of Computer-Mediated Communication* 12: 549–62.
Jeanneney, J-N. (2007). *Google and the Myth of Universal Knowledge: A View from Europe.* Chicago, IL: University of Chicago Press.
Kaase, M. (2000). "Political Science and the Internet," *International Political Science Review* 21(3): 265–82.
Kurzweil, R. (1992). "The End of the Book," *Library Journal*, February 15: 140–1.
Landow, G.P. (1997). *Hypertext 2.0: The Convergence of Contemporary Literary Theory and Technology.* Baltimore, MD: Johns Hopkins University Press.
Landow, G.P. (2006). *Hypertext 3.0: Critical Theory and New Media in an Era of Globalization.* Baltimore, MD: Johns Hopkins University Press.
Laponce, J. (2001). "Politics and the Law of Babel," *Social Science Information* 40: 179–94.
Lazer, V. and Mayer-Schönberger, D., eds (2007). *Governance and Information Technology: From Electronic Government to Information Government.* Cambridge, MA: MIT Press.
Lessig, L. (2004). *Free Culture: How Big Media Uses Technology and the Law to Lock Down Culture.* New York: Penguin Books.
Lynch, C. (2003). "Institutional Repositories: Essential Infrastructure for Scholarship in the Digital Age," *ARL* 226: 1–7, URL: http://www.arl.org/resources/pubs/br/br226/br226ir.shtml.
Lynch, C. and Lippincott, J.K. (2005). "Institutional Repository Deployment in the United States as of Early 2005," *D-Lib Magazine* 11: 1–9, URL: http://www.dlib.org/dlib/september05/lynch/09lynch.html.
McLuhan, M. (1962). *The Gutenberg Galaxy: The Making of Typographic Man.* Toronto: University of Toronto Press.
Mark Ware Consulting (2006). "Scientific Publishing in Transition: An Overview of Current Developments," URL: www.markwareconsulting.com.
Meyrowitz, J. (1985). *No Sense of Place: The Impact of Electronic Media on Social Behavior.* Oxford: Oxford University Press.
Nentwich, M. (2003). *Cyberscience: Research in the Age of the Internet.* Vienna: Austrian Academy of Sciences Press.
Nentwich, M. (2008) "Political Science on the Web: Prospects and Challenge," *European Political Science,* 7: 220–29.
Nunberg, G. (1993). "The Place of Books in the Age of Electronic Reproduction," *Representations* 42: 13–37.
Quinn, B.A. (2007). "Web-Based Reference Resources for the Social Sciences," URL: http://esr.lib.ttu.edu/lib fac research/3.
Robinson. A.M and Schlegl, K. (2005). "Student Use of the Internet for Research Projects: A Problem? Our Problem? What Can We Do About It?" *PS,* April: 311–15.
Rosenzweig, R. (2001). "The Road to Xanadu: Public and Private Pathways on the History Web," *Journal of American History* 88: 548–79.
Schonfeld, R.C. (2003). *JSTOR: A History.* Princeton, NJ: Princeton University Press.
Schroeder, R. and Fry, J. (2007). "Social Science Approaches to E-science: Framing an Agenda," *Journal of Computer-Mediated Communication* 12: 563–82.
Selcher, W.A. (2005). "Use of Internet Sources in International Studies Teaching and Research," *International Studies Perspectives* 6: 174–89.
Shaw, G.M., Shapiro, R.Y. and Jacobs, L.R. (1996). "Searching Presidential Documents On-Line: Advantages and Limitations," *PS: Political Science and Politics* 29: 501–4.

Shirky, C. (2008). *Here Comes Everybody: The Power of Organizing Without Organizations*. New York: Penguin.
Spang, B.N. (1997). "Political Science and Global Computer Networks," *European Journal of Political Research* 31: 35–45.
Sunstein, C. (2006). *Infotopia: How Many Minds Produce Knowledge*. New York: Oxford University Press.
Tapscott, D. and Williams, A.D. (2006). *Wikinomics: How Mass Collaboration Changes Everything*. New York: Portfolio.
Taylor, J. (2001). "JSTOR: An Electronic Archive from 1665," *Notes and Records of the Royal Society of London* 55: 179–81.
Thatcher, S.G. (2007). "The Future of Scholarly Book Publishing in Political Theory," *PS Online*, January: 129–32, URL: www.apsanet.org.
Thompson, J.B. (2005). *Books in the Digital Age: The Transformation of Academic and Higher Education Publishing in Britain and the United States*. Cambridge: Polity.
Verba, S. (2004). "A Letter from Sydney Verba," Library Notes, Harvard University, Number 1317, URL: http://hul.harvard.edu/publications/hul_notes_1317/verba.html.
Vise, D. and Malseed, M. (2005). *The Google Story*. New York: Bentam Dell.
Walker, M. (1998). "Netting the Future: International Relations Online," *International Affairs* 74(2): 409–13.
Willinsky, J. (2005). *The Access Principle: The Case for Open Access to Research and Scholarship*. Cambridge, MA: MIT Press.
Wilson, I.E. (2007). "Introduction," in J-N. Jeanneney, *Google and the Myth of Universal Knowledge: A View from Europe*. Chicago, IL: University of Chicago Press.
Wright, A. (2004). "In Search of the Deep Web," *Salon*, May 23, URL: http://dir.salon.com/story/tech/feature/2004/03/09/deep_web.

Biographical Notes

Mauro Calise is Professor of Political Science, University of Naples Federico II and President of the Italian Political Science Association (2008–10). He has published books, journal articles, and newspaper columns in several areas, including state theory, political parties, executive elites, political communication, and concept analysis. His recent interests focus on internet epistemology and culture. He is coauthor, with Theodore J. Lowi, of *Hyperpolitics: An Interactive Dictionary of Political Science,* University of Chicago Press (forthcoming). Address: [email: calise@unina.it].

Rosanna De Rosa is Assistant Professor at the Department of Sociology, University of Naples Federico II, where she teaches Political Communication. Her publications are mainly devoted to analyzing the impact of new technologies on politics. She is Assistant Editor of Ipsaportal.net, the International Political Science Association Web Portal for Electronic Sources. Address: [email: rderosa@unina.it].