

THE EMERALD HANDBOOK OF
MODERN INFORMATION
MANAGEMENT

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THE EMERALD HANDBOOK OF MODERN INFORMATION MANAGEMENT

EDITED BY

JAMES M. MATARAZZO

Simmons College, Boston, MA, USA

TOBY PEARLSTEIN

Director, Global Information Services Bain & Company, Inc.

(Retired)



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INVESTOR IN PEOPLE

*For Alice,
Whose support helps make this work possible*

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As information professionals, we are constantly renewing how we define and value our roles. This handbook provides info pros at all levels with thoughtful chapters on strategies to address our most challenging issues. This is truly a resource to return to regularly rather than the one that is read once and put on the shelf.

– *Mary Ellen Bates, Principal, Bates Information Services Inc.*

This is a very useful and innovative book for anyone seriously involved in the management of information. There have been other such books but this one is very up to date, candid, and curated by two highly experienced practitioners and scholars of the subject. I highly recommend it!

– *Laurence Prusak, Knowledge Strategies LLC.*

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ABOUT THE EDITORS

James M. Matarazzo is Dean and Professor Emeritus, School of Library and Information Science, Simmons College. His expertise has led to consulting engagements on the creation of corporate libraries and information centers, and the management of information for many corporations. Jim is an SLA Fellow, and inductee of the SLA Hall of Fame and recipient of the SLA Professional Award and the SLA President's Award. In 2016, he was the recipient of SLA's John Cotton Dana Award for lifelong work through writing, speaking, and teaching about the value of information services. He has a Bachelor's and Master's degree from Boston College and a Master's Degree from Simmons College and a PhD from University of Pittsburgh. With Toby Pearlstein he is the coauthor of numerous articles as well as the book *Special Libraries: A Survival Guide*, ABC-CLIO/Libraries Unlimited, 2013.

Toby Pearlstein is retired Director, Global Information Services Bain & Company, Inc., the global management consulting firm. Her expertise is globalization of corporate information services and vendor portfolio management. She has served as Chair of SLA's Business & Finance Division and the Transportation Division, and as a member of many SLA Committees including Professional Development, Research, and Finance. Toby is an SLA Fellow and inductee of the SLA Hall of Fame. In 2016, she was the recipient of SLA's John Cotton Dana Award recognizing lifelong work through writing and speaking about the value of information services. She holds a BA from UMass/Boston, a Master's Degree from University of New Hampshire, and an MLS and Doctorate from Simmons College. With James M. Matarazzo, she is the coauthor of numerous articles as well as the book *Special Libraries: A Survival Guide*, ABC-CLIO/Libraries Unlimited, 2013.

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ABOUT THE AUTHORS

Amy Affelt is Director, Database Research Worldwide, at Compass Lexecon, conducting research and analysis for PhD economists who testify as experts in litigation. She authored a book, *The Accidental Data Scientist: Big Data Applications and Opportunities for Librarians and Information Professionals* (Information Today, 2015), writes the Big Data column for *EContent Magazine*, and presents frequently on topics such as Big Data, Internet of Things, and information evaluation, integrity, and marketing. She has a BA in history, Phi Beta Kappa, from the University of Illinois at Chicago and an MLIS from Dominican University. She is a Fellow of the Special Libraries Association.

Constance Ard is an information professional with 20 years of experience. She offers business information and content management solutions through her consulting practice Answer Maven. She received her MSLIS from the University of Kentucky in 1995.

Throughout her career, Constance has worked to develop expertise in management and library service solutions. She specializes in working with organizations to assess information problems and user requirements to create solutions that leverages company expertise and improves services.

Constance's work with corporate libraries is centered on the best methods for measuring and communicating the value of the library. Recent work includes research into how advanced analytics technologies impact libraries and information services.

Michele L. Ayers is Senior Manager, Educational Services, Copyright Clearance Center (CCC) and leads CCC's education department and programs from development to delivery. Through CCC's courses, webinars, and events, thousands worldwide have improved their understanding of copyright, best practices, and compliance. Michele is an invited speaker and educator on copyright law at companies, academic institutions, and events around the world. She has developed a deep appreciation of the concerns and needs of content users and copyright holders since joining CCC in 1999.

Tamika Barnes is Department Head for Perimeter Library Services at Georgia State University. Previously she was the Library Director at Georgia Perimeter College, Dunwoody Campus. Tamika has worked in a variety of library

settings including the U.S. Environmental Protection Agency as a contractor, North Carolina A&T State University, and North Carolina State University. She received her MLS from NCCU in 1999 and her BA in biology from UNC-Chapel Hill in 1997. Tamika stays active in the profession and has served in a variety of positions for the Special Libraries Association, the North Carolina Chapter of SLA, American Library Association, the North Carolina Chapter of ALA, and the Georgia Library Association.

Chris Bednar is Global Records Manager for Bain & Company, Inc., a management strategy consulting firm based in Boston with over 50 offices worldwide, and has over 30 years of experience in information management. He manages the records and information governance program for Bain's global consulting and administrative functions strategizing with legal, IT, and customer-facing business leaders to govern risk and improve use of information assets. He manages the legal hold process, subpoena/document productions, and vendor and outside counsel relationships. He manages all legal technical projects; advises on firm-wide IT projects and priorities; and tracks, audits and reports on proper disposition of client project material.

Mr. Bednar has a BS in Music Education from Berklee College of Music, has a Masters of Library and Information Sciences from Simmons College, and is a Certified Records Manager. He has been a member of ARMA International for over 20 years and has served at the chapter and regional levels. As of 2017 he is incoming region director for ARMA's Northeast region.

Linda Berube is Senior Research Associate in the School of Art, Media, and American Studies at University of East Anglia, UK. Starting her career in the United States as an academic and public librarian, her work in the United Kingdom, following a Fulbright Fellowship, has been in project and research management in the areas of ebooks, digital reference services, the legal deposit of digital publications, and information management. She is the author of *Do You Web 2.0?* and *Information Management: Mission Critical*.

Larisa Brigevich is Director of Franklin Templeton Global Research Library. She joined Franklin Templeton Investments in 1996 and transformed a primarily paper-based document repository in Fort Lauderdale into a state-of-the-art global research library. Larisa leads a global team of professional research librarians and data visualization specialists who support investment professionals around the world with relevant information and data.

Larisa was a 2006 recipient of the prestigious Karen J. Switt Leadership Award for her pioneering work in global information management. She won the SLA Best Conference Paper Award in 2008 for innovative approach to and successful implementation of a library global sourcing initiative in India. Prior to Franklin Templeton, Larisa worked as the first Head of Reference & Information Services at the largest, one-of-a-kind, combined public and

academic library in Broward County, Florida, where she established a Reference Department and implemented a number of innovative programs to support the college curriculum. Her other accomplishments during a 20-year career in the library field include building a private school library in Miami and the implementation of a collaborative library network in St. Petersburg, Russia. Larisa has a Master of Library Science Degree from Leningrad State Institute of Culture and a Bachelor of Library Science from Leningrad Library College. She also holds a Certificate in Competitive Intelligence from Drexel University and a Certificate in Creative Writing from Institute of Children's Literature. She is a Certified Idea Mapping Instructor.

John Buschman is Dean of University Libraries at Seton Hall University. He was previously Associate University Librarian for Scholarly Resources and Services at Georgetown University and prior to that he was at Rider University for 19 years. Buschman is the author of *Dismantling the Public Sphere: Situating and Sustaining Libraries in the Age of the New Public Philosophy* (2003). His most recent book is *Libraries, Classrooms and the Interests of Democracy: Marking the Limits of Neoliberalism* (2012). He holds a BS in history and sociology and an MLS from Ball State University, an MA in American Studies from St. Joseph's University, and a Doctor of Liberal Studies from Georgetown University.

Jack Cahill has worked at Wellington Management and Fidelity Investments for over 20 years with a focus on finance and investments and management of research and market data services. For the past 8 years, he has managed Research and Instruction for the Babson College Library as well as the Cutler Center for Investments and Finance. With deep curriculum and research faculty project involvement in finance, entrepreneurship, business analytics, marketing – both blended and standard, grad and undergrad – Jack is always looking for best practices to implement and share.

Cynthia Cheng Correia helps professionals and organizations enhance what they do. For over two decades, she has helped managers and companies develop their competitive intelligence (CI), critical foresight, and strategic capabilities through advising, training, improving processes and practices, and applying effective tools and methods. Her expertise extends into the combined disciplines of CI and knowledge management (CIKM). Cynthia's practice includes intelligence defense; open source intelligence (OSINT); and identifying and minimizing cognitive biases, silos, and other barriers to research, analysis, collaboration, problem-solving, knowledge, and intelligence generation, and decision-making. A member of the Council of Competitive Intelligence Fellows, Cynthia is a distinguished leader in the CI field and has committed herself to advancing sound intelligence practices through advising, championing, mentoring, and educating. She is a frequent speaker and has appeared in leading publications, including *Super Searchers on Competitive Intelligence*, *The*

New York Times, and *Information Outlook*. A recipient of SCIP's 2011 Catalyst Award and the 2012 and 2015 WISE Faculty of the Year awards, Cynthia teaches a graduate-level course in competitive intelligence at the Simmons College School of Library and Information Science. She authored the "In the Know Column" for *Competitive Intelligence Magazine* and she was founding Editor of *Intelligence Insights*.

Helen Clegg was formerly Text Analytics Manager in the data science lab at A.T. Kearney, where she conducted text analytics with special emphasis on social media analytics. Helen holds a Master's degree in Library Science and an undergraduate degree in French and German. She is a qualified Marketer with the UK's Chartered Institute of Marketing (CIM).

Helen has presented at conferences including Taxonomy Boot Camp and Text Analytics World. She has published widely on knowledge management, business research, and text analytics. Publications include *Robust Text Analytics Require a Human Element* (Mighty Guides, 2016), "Insider Knowledge – Working as a Text Analytics Manager" (JInfo, 2016), and *Establishing a Successful Knowledge-Driven Culture* (Ark, 2013).

Kaia L. Densch, as the outreach and education manager at Cargill InfoCenter, goes all out to drive awareness of the InfoCenter's capabilities and resources, while helping individuals become better at using the tools and data available. She also works with many businesses on innovation and ideation, and spreads the word about copyright wherever she goes. Kaia has a diverse background with extensive global experience. Before joining Cargill in 2010, she worked at Thomson Reuters for 10 years where she established and managed corporate libraries in 11 countries around the world, led the learning technologies group, and worked as a library customer relations manager. Kaia also has experience in library systems development and customer support from two ILS companies (automated library systems) in Chicago, and she began her career as the assistant archivist of Northwestern University. She holds a Master's degree in Library and Information Science from Dominican University.

Ulla de Stricker, with experience since the late 1970s in the information industry and in information-related operations, focuses her consulting practice on strategic planning for an organization's information and knowledge management policies, practices, and delivery mechanisms (including, where relevant, specialized information/knowledge centers). Engagements involve modernizing existing information operations or developing plans for new information services and relationships tuned to the activities and requirements of today's intellectual workers. She is known for her experience and expertise in examining "how an organization works" and in devising practical strategies for enabling employees to find, capture, share, and protect the knowledge they apply to the task of delivering value for stakeholders.

A well respected authority in the information field for decades, Ms. de Stricker has written and presented extensively on topics related to knowledge management and the organizational cultures driving the associated decision making. One of her books is entitled *Business Cases for Info Pros: Here's Why, Here's How* (Information Today), and she is the editor and co-author of *Knowledge Management Practice in Organizations: The View from Inside* (IGI Global).

Prior to establishing her practice (www.destricker.com) in 1992, Ms. de Stricker held senior customer facing roles in the information industry. She earned an MA and an MLS from McGill University in Montreal.

Susan S. DiMattia is a consultant and educator headquartered in Stamford, CT. She has taught on the adjunct faculties of four library schools, specializing in Special Library Management, Marketing, Leadership and Management, and Communication Skills for Information Professionals. Her consulting projects have involved working on products with business information content, conducting staff training sessions, and evaluating library collections in business and finance fields. She holds the MLIS from Simmons School of Library and Information Science and an MBA from the University of Connecticut. In addition to appointed and elected offices in the American Library Association and the Special Libraries Association, she is a Past President of the Special Libraries Association. She volunteers with several non-profit organizations in children's services, music programs, and Friends of Libraries groups.

Hugo Evans has been with A.T. Kearney since 2000. He serves as the Vice President of Data Science working to apply A.I. and advanced analytics to solve complex business problems. He runs A.T. Kearney's data science lab where his team works with clients to incubate, innovate, and co-create solutions to previously unsolved problems. Additionally, he provides subject matter expertise on A.I. to help clients plan for the next generation machine learning intelligence solutions. Previously, he led the development and deployment of various supply chain management tools for use as part of consulting engagements and direct to clients. Hugo was a lead author on the "IT's Challenge: Bringing Structure to the Unstructured World of Big Data" (A.T. Kearney Whitepaper, October 2014) and a contributing author to "Big Data and the Creative Destruction of Today's Business Models" (A.T. Kearney Whitepaper, January 2013). He also co-authored the articles "Building an Effective Knowledge Management Programme" and "iCPO, We've Got an App for That!."

Chris Flegg was Bodleian Business Librarian, responsible for ensuring that the Sainsbury Library as a well-functioning and appropriate working environment for the many library users that use the facility either as their main library of choice or as occasional visitors.

She was also responsible for building the collection, both print and digital, that best support the reading requirements of Saïd Business School's programmes and the broader research data needs of faculty and researchers of the University of Oxford, working in the fields of management, business and finance. Prior to working at Saïd Business School, Chris was the Librarian in Charge of the McLennan Library, Melbourne Business School, and prior to that, the Assistant Information Services Librarian at the Baillieu Library, the University of Melbourne, Australia.

Chris has a BA from The University of Melbourne, a Graduate Diploma in Information Science from RMIT University, Melbourne, and a Post-Graduate qualification in Editing. While in Australia, Chris was the co-ordinator of the APBSLG (Asia-Pacific Business Schools Librarians' Group) and is now Secretary of the EBSLG (European Business Schools Librarians' Group), a group of the Library managers of the top ranked business schools in Europe.

In addition to speaking at conferences Chris has published on the future of business school libraries of the 21st century and on the growing need to nurture the business and societal impacts of academic research by providing ongoing alumni access to deep, broad, and quality information as a lifelong learning tool. Chris retired from the University of Oxford in September 2017.

Laura Garza joined Praxair in 2008 as a HR Director for Mexico, leading all Human Resources, Communications, and Social Responsibility activities for all Mexico and Central America. In 2012, she was appointed Director of Global Training and Development where she led globally all corporate-development programs and employee-development activities. In 2014, Laura was appointed Executive Director, Talent Development and Human Resources, where she is performing a dual role: leading all talent development succession planning, performance management, and employee engagement initiatives corporate-wide and also is lead HR for Praxair Surface Technology, a Praxair subsidiary of approximately \$1B revenue with presence in 17 countries. Laura had lived in the United States and Mexico and has had temporary assignments in China and Portugal performing HR responsibilities in critical startups and acquisitions. Laura was mentioned among the 100 most influential women in Mexico by *CNNExpansion*. A native of Monterrey, Mexico, Laura earned a degree in Mechanical Engineering and an MBA at DUKE University in North Carolina, USA. Praxair is the largest industrial gases company in North and South America, and one of the largest worldwide, with 2014 sales of \$12 billion.

Mary Glendinning is Deputy Chief of NPR's Research, Archives & Data Strategy (RAD) group. Together with RAD Chief Laura Soto-Barra, she plans, directs, and coordinates all RAD activities, projects, and products. Glendinning coaches and ensures that her RAD colleagues have the skill sets necessary to navigate an ever-changing and expanding universe of sources, technologies,

tools, and methods. She works with a creative team of researchers, developers, taxonomists, archivists, historians, product owners, and interns. She manages RAD's research and fact-checking initiatives, metadata creation and tagging, audio archives, and transcription and information vendor relationships. Throughout all of RAD's work, Glendinning instills in her team a commitment to accuracy and excellence, putting a premium on visibility and transparency. The RAD team is responsible for the development, stewardship, and deployment of Artemis, NPR's digital archive of radio audio, transcripts, and metadata dating back to 1971. Glendinning is working with the Artemis team as they expand the archive to include NPR stories in all formats and as they strengthen NPR's unique taxonomy. An important component of RAD's portfolio is training and outreach, and she directs those activities as well as guides RAD's burgeoning social media presence. Before she joined NPR in 2004 as a reference librarian, Glendinning worked in librarian and researcher positions at the Freedom Forum, *ABC News*, LexisNexis, and the Association of American Medical Colleges. She also served as a VISTA volunteer with an adult literacy program in Baltimore. Glendinning earned her degrees from the University of Pittsburgh and Johns Hopkins University.

Barbara Gray is Chief Librarian and Associate Professor at the City University of New York Graduate School of Journalism, where she teaches news research methods and oversees the School's Research Center. She is the former director of news research at *The New York Times* and is currently writing a biography of a 19th-century woman criminal.

Susan E. Green is Director of Lone Star College-CyFair Branch Library, a joint library with Harris County Public Library, where she has worked since the library opened in 2003. She has an undergraduate degree in Business from Washington University in St. Louis, an MBA from the University of Texas in Arlington, and a Master's in Library Science from the University of North Texas.

Claire B. Gunnels is founding faculty and assistant director of the Lone Star College-CyFair Branch Library, a joint library with Harris County Public Library in Houston, Texas. She is the co-author of *Joint Libraries: Models That Work* (ALA, 2012) with Susan Green and Patricia Butler and writes occasionally for the journal *Community & Junior College Libraries*. Gunnels earned her Bachelor's degree in history cum distinction from Mount Holyoke College and her Master's in Library Science from Simmons College in Boston.

Susan Henczel has held management and operational positions in government, corporate, public, and academic libraries and for an academic library consortium providing services to libraries in all sectors. She is a Fellow of the Special Libraries Association (SLA) and was the inaugural President of SLA's Australia and New Zealand Chapter. Susan is a member of the Library

Management (Emerald) Editorial Advisory Board, has held the position of Director on the Board of Public Libraries Australia, and has taught in the Masters of Information Management program at RMIT University in Melbourne. She holds a Bachelor's degree in Library and Information Management, a Master's degree in Information Technology, and a PhD in Business. Susan's primary interests are information audit, impact assessment, and professional associations. She currently resides in New York, USA.

Christian F. Henning is Research Manager for Microsoft Corporation's Global Executive Talent Acquisition Team. He leads the team's shared-service research function to inform and guide all market and client-aligned executive recruiting activities around the globe. Mr. Henning and his team deliver consumable and actionable market, and talent intelligence for day-to-day executive search, succession planning, and talent mapping. He also manages research vendors and the team's custom talent database. Mr. Henning is the recipient of Microsoft HR Awards for Growth Mindset, Talent Scouting, and Diversity Recruiting Initiatives. Before joining Microsoft in February 2005, Mr. Henning served as Director of Research and Practice Specialist with Egon Zehnder International, one of the world's premier retained executive search firms. He was the Dallas, Texas, office head of research and a core member of the firm's Global High Technology and Telecommunications Practice, where he led the North American team of high-tech research associates. Mr. Henning also headed up Knowledge Management efforts for that practice. In addition, he was a member of the firm's Consumer Goods Practice Group. Prior to joining Egon Zehnder International in January 2000, Mr. Henning was a Senior Information Specialist and Practice Coordinator with McKinsey & Company in Dallas, one of the world's leading strategic management consultancies. He helped develop McKinsey's Texas Consumer Practice from the ground up while serving the North American Retail Practice. In this role, Mr. Henning coordinated all knowledge management and competitive intelligence activities. He joined McKinsey in Zurich, Switzerland, focusing on the Transportation Industry before moving to Dallas in 1993. Earlier in his career, Mr. Henning worked for Switzerland's national airline Swissair in Flight Services. He began his career as a journalist for a major Swiss newspaper.

Mr. Henning earned his bachelor's degree in Journalism from the University of Fribourg, Switzerland. He resides in Berkshire County, UK.

Nanci Milone Hill is Director of the M.G. Parker Memorial Library in Dracut, Massachusetts. She has served on numerous committees for the American Library Association, the Public Library Association, and is the current President of the Massachusetts Library Association. Hill is the author of *Reading Women: A Book Club Guide for Women's Fiction* [Libraries Unlimited, 2012]. She reviews fiction for both *Library Journal* and *Booklist* and is a regular contributor to NoveList.

Barbara Hirsh currently is Director of Information Resources & Knowledge Management at NERA Economic Consulting. She is responsible for global research, resources, and services that are provided by her global team and are available via the firm's desktop. Her present and past experience includes: Managing research and knowledge management services within professional and financial services, coordinating/negotiating global contracts and developing strong vendor partnerships, developing a knowledge management system, designing and developing end-user training programs, desktop solutions, and intranets. Ms. Hirsh has been invited to speak at domestic and global information-related conferences, and managed her own consulting firm. Ms. Hirsh has worked at PwC, Bankers Trust, GE Investments, and Yankelovich Partners. Prior to joining the corporate world, Ms. Hirsh spent 12 years in academia as a tenured faculty member. She has a Master's in Library & Information Science (Rutgers University), a Master's in Music from Hartt College of Music (University of Hartford), and a Bachelors's degree in Music from Douglass College (Rutgers University).

Lynne C. Howarth is a current Professor and former Dean at the Faculty of Information (iSchool), University of Toronto, Canada. She completed her PhD in 1990 and was appointed to the Faculty of Information Studies the same year, becoming Dean in 1996. She served in that position until 2003. Between 2011 and 2013, Howarth completed a two-year affiliation as Distinguished Researcher in Information Organization at the University of Wisconsin–Milwaukee iSchool. She was honored with the Distinguished Scholar Lectio Magistralis in Biblioteconomia, Florence University, Italy, in 2011, and presented with the ALISE/Connie Van Fleet Award for Research Excellence in Public Library Services to Adults in 2016. She conducts research, publishes, and teaches in the areas of knowledge organization, metadata standards, and the provision of information to marginalized populations. She continues to serve on international standards committees for metadata, Semantic Web, and linked data applications. She has been a member of the IFLA Cataloguing Section, and currently of the Subject Analysis and Access Section. She has served on the ISBD Review Group, the IFLA Namespaces Task Group, the ISBD Linked Data Study Group, and the Study Group on Future Directions of the ISBDs, among others. She has also been a voting member of the Canadian Committee on Cataloguing, and the American Library Association Committee on Cataloging: Description and Access. As a beekeeper-in-training, she is hoping to learn why honeybees are so successful in organizing and sharing the knowledge of the hive.

Sylvia James has worked in information management for over 40 years. Most of her work has been as a business researcher and consultant advising on projects in all kinds of information services, libraries and archives, and to information providers and publishers. Her specialty is in finance and investment. She

was Head of Information, Library and Archive at Credit Suisse First Boston, a UK investment bank, for most of the 1980s. She formed her own consulting business in 1989 and has worked on research projects and training on research methods all over the world for major corporations. She has also consulted for many years as an archivist, who specializes in advising on, retention, reviewing, and cataloguing private archives in many different types of organizations as well as for families and individuals. Major projects have included working on the Macmillan family and company archive, especially focusing on the papers of former UK Prime Minister, Harold Macmillan; for the Government of Mauritius advising on the country's public and private archives; and for the Nuffield Trust, a health think tank in the United Kingdom.

Sylvia James has also written extensively on research and information with many papers in journals such as *Real Business* (UK), *Business Information Alert*, *Legal Information Alert*, *Business & Finance Bulletin* – SLA Business & Finance Division newsletter, *Business Information Review*, *Journal of Business & Finance Librarianship*, and *Freepint VIP*. She resides in the United Kingdom.

Rebecca Jones is Director of Branch & Neighbourhood Services at Brampton Library, responsible for neighborhood branches in one of Canada's fastest growing multicultural cities. Rebecca came to libraries through a corporate route, starting her career as a librarian at the Royal Bank of Canada and then as a Manager in information services, records management, and technology training at Imperial Oil Ltd. Founder and partner of Dysart & Jones Associates since 1992, she managed more than 100 cross-functional projects in strategic and business planning, performance measures, organizational design, service reshaping, and management projects, and was also Director Professional Learning Centre at University of Toronto's iSchool. A Fellow of the Special Libraries Association (SLA), a recipient of SLA's Leadership Award and LMD's Mentoring Award, she was delighted to be named Ontario's Public Librarian of the Year, and to receive Canada's Outstanding Service to Librarianship Award. She considers herself as incredibly lucky to have gone from being a kid who knew nothing of libraries to now having colleagues and friends throughout Canada and the United States who make her laugh, think, change her opinion, learn, and continue to work in a sector that spans industries and positively impacts thousands of lives.

Mary Lee Kennedy is Principal of The Kennedy Group. She is committed to initiatives that create systemic change so that communities can leverage credible information and gain knowledge to achieve educational and economic aspirations. As Senior Associate Provost for the Harvard Library, Chief Library Officer of The New York Public Library, Director of the Knowledge Network Group for Microsoft, and 14 years as a consultant, she has significant leadership experience transforming global information and knowledge-based institutions to deliver on their mission in a world in which physical and digital lines

are blurring, expertise in creating innovation communities that deliver substantive results in local and global settings, and a background in activating policy development that empowers people in a networked world. She contributes to thought leadership bodies such as the Social Science Research Council, the Aspen Institute, and the Cyberlearning community at the National Science Foundation, in order to advance scholarship, open access, a lifetime of learning, and “smart” and connected communities for today and for the future. Fluent in Spanish and conversational French, Mary Lee has worked in every continent except Africa, including nine years living and working in Mexico.

Marian Krupicka began as a volunteer with the Darien Volunteer Library in 1980. She then served as a trustee with the Darien Public Library from 1982 until 1984. Marian worked on the merger of the Willowbrook and Darien Public Libraries and has served on the Indian Prairie Public Board of Trustees from 1984 to the present, currently holding the office of Treasurer. Marian taught Reading and Language Arts for 35 years at Eisenhower Junior High School, Darien, Illinois.

David Leonard, President of the Boston Public Library, leads the 170-year-old institution, one of Boston’s great educational, cultural, and civic treasures. David began working at the BPL in 2009, bringing a wealth of experience from the technology, management, and consulting fields. Appointed president by the Library’s Board of Trustees and Mayor Martin J. Walsh in June 2016, David’s focus is on developing the BPL as a twenty-first century institution providing dynamic library experiences to the residents of Boston, of Massachusetts, and beyond.

Boston Public Library has a Central Library in Copley Square, has 24 neighborhood branches, has an archival center, and also serves as the “Library for the Commonwealth” of Massachusetts. In his role David oversees a collection of more than 23 million books, maps, manuscripts, prints, and an expanding digital collection.

Prior to his appointment as President, David served as Interim President for one year. During that time he focused on the completion of the \$78 million renovation of the Central Library in Copley Square, which opened in July 2016, as well as a significant number of branch and collections management improvement projects, enhancing access and the customer experience; collaborating with city departments and with local cultural institutions; and supporting Mayor Walsh’s arts and culture vision.

During his time at the Boston Public Library, David has also served as Director of Administration & Technology, acting Director of Administration & Finance, acting Chief Financial Officer, and Chief Technology Officer. He led the Library’s capital improvement project for the Norman B. Leventhal Map Center, worked to modernize the library’s technology infrastructure –

including the migration to the new Integrated Library System, and deployment of new Pay-for-Print Systems system-wide – and oversaw master planning and design for the renovation of the Central Library in Copley Square.

David initially pursued an academic career, transitioned to the non-profit sector, and then spent 10 years in the private IT consulting world in roles that spanned business development, management, and technology consulting, working on both strategic and tactical projects and services. David is currently enrolled in a PhD program in Library Information Science at Simmons College. He holds a Bachelor's Degree in Philosophy and Mathematics and a Master's Degree in Philosophy from the University College Dublin.

Crystal Megaridis is Manager, Library Services, at Praxair Inc., a global Fortune 300 industrial gas company. Crystal has been involved in the world of libraries for over 25 years. In addition to managing a special library, she has served on the Board of Trustees for the Indian Prairie Public Library District in Darien, Illinois, for the past 12 years. She is also a lecturer for the iSchool at San Jose State University in California. She holds her MLS from Dominican University in River Forest, Illinois.

Christopher Moffat is a native of Atlanta, Georgia. He received a Bachelor of Science from Georgia State University and received a Master of Library and Information Science from Valdosta State University. He joined Georgia State University Libraries in 2016, and currently serves as Associate Department Head for the Clarkston Campus Library. His previous job was serving in a variety of roles within Gwinnett County Public Library. Hobbies include hiking, cooking, and reading about business, investing, behavioral economics, and finance.

Leigh Montgomery has been a special librarian for 20 years. She is currently Electronic Resources Librarian for the Massachusetts Trial Court Law Libraries, a public, state-wide law library system that provides access to legal information for Massachusetts citizens. She is the former librarian at The Christian Science Monitor.

Robin Neidorf is Director of Research for Jinfo Limited, an analyst firm that tracks and consults on changes in information management, strategy, and operations. In this role, Robin has worked with information managers in such diverse fields as banking, professional services, insurance, manufacturing, technology, and government. Most projects involve helping the information team position themselves, their skills, and resources at the strategic center of the business. Prior to joining Jinfo in 2006, Robin ran a research and communications consulting firm for 10 years. She is an in-demand speaker and workshop facilitator for information-focused events in North America and Europe.

Willem C. Noorlander is Partner at BST America and has over 30 years' experience in financial services, including 12 years as a senior Market Data executive at a major global bank. He has taken this experience and knowledge to set up, along with other partners, an Information and Market Data Consulting and Outsourcing firm, BST America, where he has been responsible for the Market Data Consultancy Practice of the New York office for the last 15 years. Bill is skilled at analyzing vendor content, understanding supplier/product nuances and usage requirements and rights, and strategizing with clients on negotiation tactics aimed at cost reduction and maximizing the value of client's agreements with the data suppliers. Prior work experience includes the management of financial, operational, mid- and back functions at several global banks. Bill's career and focus has been global including several overseas assignments.

Stephen Phillips is Executive Director and Global Head of Business Information Services, Morgan Stanley. He believes that effective information management (IM) is essential if the modern organization is to optimize its operations and differentiate its offer from its competitors. With over 30 years' experience in the information industry, Stephen is a member of the Chartered Institute of Librarians and Information Professionals, where he served on the IM Steering Group and is Vice Chair of the Knowledge and IM Special Interest Group. He is a Fellow of the Special Libraries Association, where he served as Chapter President of SLA Europe and represents SLA on the board of the UK IM Alliance. He chaired the Perfect Information Conference on several occasions, facilitated a number of industry events, and spoken at the European Business Information and CILIP Conferences. He is a passionate advocate for the profession in the private sector, encouraging professionals to take a commercial, entrepreneurial approach to their operations in order to ensure their continued relevance to the organization. He and his management team at Morgan Stanley developed a highly commercial approach to resourcing the IM function. This strategy has evolved into a blended model that seamlessly combines employees and third party providers to deliver a global, 24-hour service 6 days a week from 8 locations, from Tokyo to California. His experiences have defined the strategies detailed in his chapter.

Anne E. Rogers, trained as a chemist and an information professional, has been in the knowledge and information business for more than 30 years. She spent 20 years with The Dow Chemical Company where she held many different information-related positions, including management of a number of proprietary R&D information collections. Coming to Cargill in 2004, Anne was responsible for leading knowledge management (KM) initiatives for R&D and establishing a new enterprise idea management system. In 2012, she added responsibility for the InfoCenter Research & Knowledge Services, which provide expert information research to the businesses, acquire the best information

resources for Cargill, and help the businesses integrate that information into their work processes. In 2016, Anne became the leader of the global Cargill InfoCenter team.

Laura Saunders is Associate Professor at Simmons College Graduate School of Library and Information Science, teaching and conducting research in the areas of reference and instruction, information literacy, and academic libraries. She also has a strong interest in social justice issues related to libraries. Recently, she has been involved in a series of international collaborative studies on topics such as reference competencies and information behaviors. Her articles have appeared in a variety of journals including *College & Research Libraries*, *The Journal of Academic Librarianship*, and *Reference & User Services Quarterly*. She has written two books: *Information Literacy as a Student Learning Outcome: The Perspective of Institutional Accreditation* and *Repositioning Reference: New Methods and New Services for a New Age* co-authored with Lily Rozaklis and Eileen Abels. Laura has a PhD and a Master's of Library and Information Science, both from Simmons College, and a Bachelor of Arts in English Literature from Boston University.

Eva Semertzaki is Head of the Library and Deputy Director of the Centre for Culture, Research, and Documentation at Bank of Greece. She holds a Master's degree in Library and Information Science from Simmons College, Boston, USA, as a recipient of a Fulbright scholarship.

She is the author of the book *Special Libraries as Knowledge Management Centres* by Chandos Publishing, 2011. She is the author of the chapter "Why special libraries are the right places to host a knowledge management centre" in *Knowledge Management in Libraries and Organizations* edited by L. Bultrini, S. McCallum, W. Newman and J. Sempéré, 2016 as IFLA Publications, v.173. She is Chair of IFLA Knowledge Management Section (2017–2019) and a Standing Committee member of the same Section (2013–2017, 2017–2021). She has been the IFLA Knowledge Management Satellite Program chair in Cape Town 2015 and is a co-chair for the IFLA Knowledge Management Satellite Program in Wrocław, Poland in 2017. She was the editor of *Synergasia*, an online library journal published by the Committee for the Support of Libraries in Athens (2006–2015). Since 2005, she is an Editorial Advisory Board member of the journal *The Electronic Library*. Eva is a founding member and a steering committee member of the Central Bank Librarians Group (established in 2003) which organizes biennial workshops in different parts of the world starting in 2009. For the years 2013–2015, she was the chairperson of the annual seminar for central bank librarians organized by Central Banking Events/Incisive Media at Cambridge University, UK. She was co-chair of the 7th ESCB/SSM Information Management Network Meeting in Athens, in 2016. She is a founding member (established in 2013) of the Hellenic Economic Libraries Network (HELIN) which has organized its 1st conference

in March 2015 in Athens, a series of lectures in 2016 and a mixture of lectures and library visits in 2017. She is member of the Greek Host Society for the candidacy of Athens as the hosting city for the IFLA World Library and Information Congress 2019.

She has published articles and has translated books on library topics. She has delivered several lectures in Greece and abroad. Her professional interests include knowledge management, librarians' competencies, e-books, technological developments in libraries, library management systems, history of Greek libraries etc. Member of: International Federation of Library Associations and Institutions (IFLA), American Library Association (ALA), Association of Greek Librarians and Information Scientists (EEBEP).

Gary Shaffer, PhD, is the former CEO of the Tulsa City-County Library a 24 location and 405 employee-strong independent library district and associated 501(c)(3) located in northeastern Oklahoma. He currently serves as the Director of the Library and Information Management Program at the University of Southern California's Marshall School of Business and as Assistant Dean/Director of the USC Libraries' Center for Library Leadership and Management. His book *Creating Sustainable Public Libraries: The Triple Bottom Line Approach* will be available for purchase or checkout in early 2018.

Cindy Shamel, since founding her consulting practice (<http://shamelinfo.com>) in 1998, has adapted to the changing information industry scene by always seeking to assist her clients in making the best business decisions and effectively managing their information landscape. In addition to delivering actionable information through research and analysis, she provides strategic guidance in change management and knowledge audits. Recently, Ms. Shamel has aided clients in developing the business case for increased library staffing, knowledge management services to widely dispersed staff in the hospitality industry, and right-sizing the resources available to the information management function in a prestigious arts institution. With almost 20 years of experience on projects such as these, she has developed a reputation for listening to the stakeholders, distilling the information, and effectively communicating recommended courses of action. Ms. Shamel continues to explore the intersection of knowledge audits with developing the business case. In addition to the work in her consulting practice, she contributed the chapter "Planning for Knowledge Management: Conducting a Knowledge Assessment" to *Knowledge Management Practice in Organizations: The View from Inside*.

Iyanna Sims is currently the head of Bibliographic, Metadata and Discovery Services at North Carolina A&T State University's F.D. Bluford Library. She received her Masters of Library Science from Clark Atlanta University and a Bachelor of Arts in English from Elon University. She has experience in special and academic libraries. Iyanna's professional interests include library

technology, scholarly communication, and a new found passion for recruitment and retention in the field of librarianship.

Niloufer Sohrabji is Associate Professor and Chair of Economics at Simmons College. Dr. Sohrabji received her PhD in Economics from Boston College. Her research has focused on rising financial instability due to globalization in emerging markets and developing countries. Dr. Sohrabji has published various articles on current account sustainability, debt sustainability, foreign investment flows, and exchange rate misalignment in India, Turkey, and countries in sub-Saharan Africa. More recently her research has shifted to global health with a focus on India's pharmaceutical sector. Her current project examines the implications of India's revised patent act that brings the country in line with global intellectual property rights laws.

Laura Soto-Barra leads a team of innovative information professionals in her role as NPR's Chief of Research, Archives & Data Strategy (RAD). Soto-Barra has designed and led the transformation of the NPR libraries into the RAD group, advocating an embedded approach to creating and delivering research services, data analysis, and digital tools to NPR.

As RAD Chief, Soto-Barra has transformed the RAD team to meet NPR's need for digital information and innovation. She is responsible for the continuous evolution of the systems that steward data about all the stories NPR has ever told – and much of the music used in NPR's editorial work. She has led the development of archival products and services for revenues, and as product owner, she has overseen the development of business plans to help maximize the value of NPR data. Over the past decade Soto-Barra and her team, co-managed by RAD Deputy Mary Glendinning, originated and built a robust internal database called Artemis, which has been recognized nationally. Recently, they guided the recoding, restructuring, and integration of Artemis into NPR's core digital workflow systems. Soto-Barra oversaw the creation of the NPR Historical Archive and directs NPR's audio digitization and reformatting project to protect, preserve, and provide online accessibility to more than 100,000 hours of NPR's audio legacy, formerly stored in obsolete physical formats. Soto-Barra's efforts to digitize content and develop strategic plans for protecting and sustaining data has enabled the RAD group to build a world-class, digitally enabled and nimble archive that supports and mirrors NPR's growth as a highly respected media institution. Currently, her team is pioneering efforts in voice-enabled search for NPR. Soto-Barra joined NPR in 2005 as Senior Librarian and became Chief Librarian in 2012. In 2014, she was promoted to RAD Chief, the first to hold that role at NPR. During her tenure, the RAD team has been recognized with numerous major industry awards including the ALA's Library of the Future Award, Dow Jones' Leadership Award, SLA's Rising Stars, and Library Journal's Movers & Shakers. Throughout her career, Soto-Barra's strategic projects have been significant and enduring.

Originally from Chile, she began her career as a chemical and mining engineering librarian at the Universidad de Chile. She and her family later moved to Canada where she earned degrees from the University of Toronto. In 1997, she came to the United States to work for *The Florida Times-Union/Morris newspapers*, which led to an association with the Poynter Institute for Media Studies, and later joined *The Post-Standard/Advance Newspapers*.

Jill Strand is Senior Manager of Library and Knowledge Information Systems for Fish & Richardson, a top intellectual property law firm. Prior to that she was Director of the Knowledge Management Library at Maslon LLP, a Research Librarian at Faegre & Benson, and started a library for a division of Target Corporation in her first job out of library school. Jill earned her MLIS from Dominican University and her BS in Journalism from the Honors Tutorial College at Ohio University. She has been an active member of SLA since 2000, was named an SLA Fellow in 2010, and served on the Board of Directors as President in 2015. Her honors include the SLA Legal Division Career Achievement Award in 2016, SLA Membership Achievement Award in 2013 as well as the Ohio University Honors Tutorial College Outstanding Alumnus Award in 2017.

Cindy Sullivan lives in Boston metro area and graduated from Simmons College with an MSLIS. She managed special libraries for over 30 years at a global investment company and speaks as an evidence-based practitioner. During this time, Cindy hired more than 30 interns and mentored them in the start of their information profession.

Cindy has consulted and developed workshops that she has offered to various Special Library Association events and chapters. Cindy is now moving into her next chapter. She currently serves as a trustee of the Kingston Public Library in Kingston, MA. Recently she accepted a position as the Head of Adult Services for the Osterville Village Library on Cape Cod.

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PREFACE

WHY A HANDBOOK NOW?

The advent of relatively easy access to technological devices and the rise of the Internet have changed everything about the role of the information professional – or have they? When S.R. Ranganathan (1931) promulgated his Five Laws of Library Science the quantity and quality of information available in the 21st Century and the technology used to manage and access it were not even a spark on the horizon. Yet these Five Laws continue to be the theoretical and operating principles (however the wording might be updated to reflect modern tools and semantics) to which information professionals remain committed.

1. Books are for use
2. Every reader his (or her) book
3. Every book its reader
4. Save the time of the user
5. The library is a growing organism¹

The tenet arising out of these laws – “the right information, to the right person, at the right time” – is as familiar to special librarians as it is to all types of information professionals. After all, how easy is it to substitute the word “information” for “book” and the phrase “information professional” for “librarian?” The challenge has always been, and continues to be twofold; how to convey this tenet to decision makers who cannot always hear or see its wisdom and how to be as nimble as we must be to enhance and sustain the skill set and expertise we as information professionals have to offer. The danger arises and paralysis sets in when we forget the value of our core skill set and our expertise and do not recognize the opportunities new tools afford us to align this core with the goals of our organization, thus contributing to their (and our own) sustainability.²

Between 1955 and 2001 eight editions of this Handbook were published by Aslib-IMI under various titles, including *Handbook of Special Librarianship and Information Work* and *Handbook of Information Management*; the latter title change intended to recognize “a broader spectrum of managed information services and structures than merely the management of a physical collection of material.”³ It was considered a “flagship” reference work and the “seminal text on modern information theories, procedures and practices.”

This is not a new edition of the previous Handbook. While still aiming to be an integral text for MLS students and a ready-reference for information professional practitioners, it is by no means meant to encompass all modern information theories, procedures, and practices. The variety of settings in which information professionals apply their skills and expertise today makes that a fool's errand. Whether read sequentially or in topical combinations around common themes, the chapters here are meant to provide a construct through which both the student and the practitioner may learn about the major challenges facing them in the early part of the 21st century and also find guidance in how to approach tackling these challenges regardless of the type of organization in which they work.

So why does this matter? It matters because no one can hope to achieve their full potential, personally or professionally, without acquiring the best information they can to inform their choices. Whether pushed out to them or pulled in by them, the average person will, on a daily basis, need some type of data, information, knowledge, or wisdom to help their decision-making processes. It is just all too overwhelming. Some intervention is needed to help enable the best choice; and that's where information professionals become invaluable.

The chapter authors here run the gamut from independent information professionals providing contract services to those with significant experience in public, academic, and special library settings at a variety of levels of responsibility. One is an economist in a business school, others are professors in MLS programs, one or two have had long careers and have taken the opportunity to share their copious experience with the reader, many are practitioners, themselves grappling with many of the topics discussed. We also endeavored for this not to be a U.S.-centric undertaking and believe we have succeeded with authors from several countries.

Finally, we have also included a few short essays from "the bosses." These are non-IS professionals who manage the information service, library, etc. within their organizations. How they value what we contribute should never be far from our thoughts and deeds.

The editors would like to acknowledge that the Simmons College Fund for Research and the Emily Hollowell Fund for Research provided grants to assist with this publication.

James M. Matarazzo
Toby Pearlstein
Editors

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PART I
THE CONTEXT

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INTRODUCTION

GOOGLE – THE GREAT DISRUPTOR

Part I of this Handbook – The Context – explores the world within which information professionals work, regardless of who employs them. The reality is one of almost continuous turbulence driven by a confluence of economic, social, and technological forces. On the economic side, the impetus for revenue growth, cost reduction, and increased profitability (i.e., productivity) must be recognized as ultimately and directly affecting both the budgets and focus of information services in a private for-profit company, a government agency, a public library, etc. On the societal front, the speed with which information is being created and shared, with little regard for its veracity, let alone with any regard for intellectual property rights, has created an environment in which there is a dwindling distinction between what is private and what is public, the ownership of information, and the accessibility of trusted information that can help us make good decisions in both our business and our personal lives.

What part does Google play in this turbulence? Google is either the savior of information professionals or their nemesis – or both – and hence deserves the label The Great Disruptor. Before Google came on the scene in 1999 and before the near ubiquitous availability of personal computers, the models of service in the information world were fairly clear. Your library/information center and you as an information professional were either a “guardian at the gate,” “an intermediary,” or a “gateway” to the myriad information resources (primarily in print) needed by your clients. Usually, all three roles came into play.

The volume of information assaulting our senses – seemingly by the nano-second – continues to increase exponentially. The speed with which it is created and shared boggles the mind. We are knee-deep in questions about its origins, veracity, usefulness, and usability. The opportunities for information services’ (IS) expertise to address this situation abound, yet in a world where everyone fancies themselves a “researcher,” where organizations balk at investing in vetted and often expensive information resources asking “can’t you just Google-it?,” information professionals continue, generally, to be undervalued.

In 2017, it was estimated that Google held the largest market share of searches served, by far. *StatCounter* (March 2017) reported that as of August 2016, Google had an almost 80% market share of the top 5 search engines

in the United States (Bing was the next closest at a mere 9.9%). *Internet Live Stats 2017* estimated that Google processed over 40,000 search queries every second on average or over 3.5 billion searches per day and 1.2 trillion per year worldwide. By the time you are reading this, no doubt several zeros will have been added to these numbers. “Just Google it” has become as much a part of our everyday lexicon as has “Xerox it” or “Use a Kleenex.” Brand has become behavior.

Each of these initial chapters attempts to address these challenges through examining the information profession and our role in it from the broadest context of issues confronting all information professionals regardless of where they work. Whether understanding why it’s important to know about the economy at large, to how to make a business case to anticipate and navigate through the impacts of that economy, to understanding the political acumen necessary for that navigation, to figuring out where to position yourself and your services and the strategy needed to lead that kind of positioning, to recognizing 21st century challenges to organizing this new world of information, to deepening your knowledge of how to mitigate the risks around using this information and, finally to creating long-term professional sustainability, Part I provides both a theoretical underpinning and a practical approach for the student and practitioner alike.

THE ECONOMY AT LARGE AND WHY YOU SHOULD CARE

Niloufer Sohrabji

Keywords: Great Recession; information sector and services; productivity; technology diffusion

INTRODUCTION

Information services are an integral part of any organization. Information professionals are responsible for managing and using data and information. This requires expertise of various information tools and systems, an ability to access and analyze data and information (in all its formats), and have facility with current and emerging technologies. As technology improves, the demand for professionals with these skills rises. Information professionals are necessary for companies and countries to prosper, especially in this globally competitive environment.

The U.S. Bureau of Labor Statistics (BLS) characterizes the information sector as one of the seven *supersectors* within service-providing industries¹ including trade, transportation, and utilities; financial activities; professional and business services; education and health services; leisure and hospitality; and other. According to the North American Industry Classification System (NAICS), the information sector includes “three types of establishments: (1) those engaged in producing and distributing information and cultural products; (2) those that provide the means to transmit or distribute these products as well as data or communications; and (3) those that process data” (BLS website).

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The information sector is further divided into six subsectors (BLS website). They are *publishing* industries; *motion picture and sound recording (MPSR)* industries; *broadcasting*; *telecommunications*; *data processing* industries; and *other information services (OIS)*, which include archiving, library services, and internet publishing. Although the specific industries differ, all subsectors have some occupations in common such as art and media; business and finance, computer and mathematical occupations; management; and office and administrative staff. Employment is the highest in arts and media occupations for *publishing*, *MPSR* and *broadcasting* subsectors, while computer and mathematical occupations are the biggest employers in *telecommunications*, *data processing*, and *OIS* (Table 1). These occupations are related to the creation of data, information, and cultural products. Office and administrative support occupations are significant for most of these subsectors (Table 1) and together with management occupations are critical in the use of data and information. Sales and related occupations are important in *telecommunications* (Table 1) and are necessary for spreading the use of innovations in the larger economy.

The information sector is a leader in innovation and technology. Innovation is booming in information technology and telecommunications with more than 40% of the 1.2 million patents related to these industries in 2014 (Friedman, 2015). Technological progress promotes efficiency which can have both positive and negative impacts on employment. One adverse impact is seen in the loss of jobs due to the move to web publishing and digital subscriptions (Henderson, 2015). Employment in publishing especially in newspapers, periodicals, and books has been falling for decades. From 1990 to 2016, employment in newspapers declined from 455,000 to 184,000 workers, periodicals from 146,000 to less than 94,000, and books from 86,000 to 61,000 (BLS, 2016). Some publishing (and broadcasting) has shifted to the internet, which is part of the *OIS* subsector with employment rising from 29,000 to 198,000 (BLS, 2016) but overall these industries have seen declines in employment.

On the other hand, innovation has led to a greater demand for information services professionals to incorporate these new products, systems, and tools in various industries and organizations. It also emphasizes the need for libraries and librarians which are a smaller but important part of *OIS* (Table 1). Library professionals are important in disseminating data and information to individuals and small businesses. Also, access to libraries (and museums) is an important factor in improving student achievement (Reardon, Kalogrides, & Shores, 2016). By providing resources (books and technology) and programs related to health, education, and professional development, libraries are correctly labeled the cornerstone of a healthy community.

The information sector is one of the fastest growing sectors. Output is predicted to grow by 2.9% from \$1.5 trillion to over \$2 trillion between 2014 and 2024 (Henderson, 2015). The report also forecasts a slight decline in employment in the sector (by 0.1%) in that same period which makes working in the sector ever more competitive. Thus, understanding the opportunities and

Table 1: Employment Data for Information Industry Subsectors (2016).

Subsector/Occupations	Employment
<i>Publishing</i>	719,090
Arts, design, entertainment, sports, media	120,440
Business and financial operations occupations	62,710
Management occupations	64,910
Office and administrative support occupations	112,570
Production occupations	28,560
Sales and related occupations	88,710
<i>Motion picture and sound recording</i>	439,590
Arts, design, entertainment, sports, media	176,930
Business and financial operations occupations	15,790
Management occupations	16,350
Office and administrative support occupations	42,100
<i>Broadcasting</i>	276,310
Arts, design, entertainment, sports, media	133,860
Business and financial operations occupations	14,370
Computer and mathematical occupations	11,480
Management occupations	23,120
Office and administrative support occupations	38,040
Sales and related occupations	36,110
<i>Telecommunications</i>	775,420
Architecture and engineering occupations	31,450
Business and financial operations occupations	66,330
Computer and mathematical occupations	130,650
Installation, maintenance, and repair occupations	231,180
Management occupations	35,970
Office and administrative support occupations	153,090
Sales and related occupations	114,540
<i>Data processing and hosting</i>	295,990
Business and financial operations occupations	30,440
Computer and mathematical occupations	121,970
Management occupations	28,160
Office and administrative support occupations	78,560
<i>Other information services</i>	255,690
Business and financial operations occupations	27,610
Computer and mathematical occupations	78,280
Education, training, and library occupations	28,910
Management occupations	13,960
Office and administrative support occupations	40,170

Source: Bureau of Labor Statistics.

Note: Data is reported for major occupations in each subsector only.

challenges facing the United States and global economy is critical in starting and navigating one’s professional life in this sector.

This chapter provides a snapshot of the economy, understanding the long-term economic challenges facing the United States, followed by an examination of the factors that affect the information sector, and some concluding thoughts.

THE CURRENT STATE OF THE ECONOMY AND HOW WE GOT HERE

The standard statistic for measuring the health of the economy is the real gross domestic product (GDP).² The United States faced a major recession,³ referred to as the Great Recession,⁴ beginning at the end of 2007. Real GDP plummeted at the end of 2007 when the housing market collapsed and started the recession with negative growth rates for all quarters between the end of 2007 and mid-2009 except for the second quarter of 2008 (Figure 1).

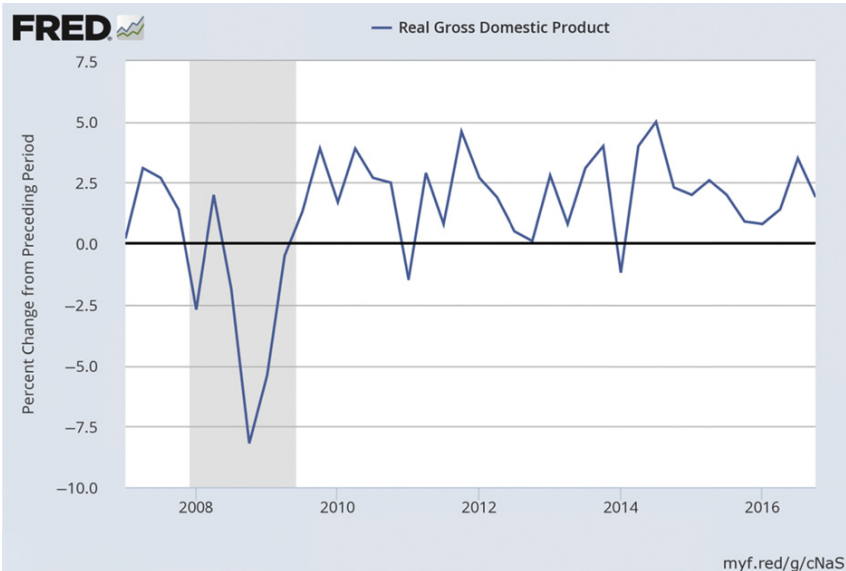


Figure 1: Real GDP Growth (Annualized Quarterly). Note: The shaded area indicates the period of the Great Recession. Source: U.S. Bureau of Economic Analysis, Real Gross Domestic Product (GDPC1). Retrieved from FRED, Federal Reserve Bank of St. Louis; <https://fred.stlouisfed.org/series/GDPC1> Accessed on April 20, 2017.

Loose monetary policy (low interest rates) during the early 2000s played a prominent role in the housing market crisis. First, low interest rates boosted demand and led to a booming housing market. Also, these low interest rates had created an incentive for investors to seek higher returns which in turn led to the creation of risky financial instruments ([Origins of the financial crisis, 2013](#)). Loans were granted to borrowers with poor credit ratings (subprime loans) with the intent of bundling these loans with others, to create low-risk securities. These securities were in turn used to back other assets (collateralized debt obligations or CDOs). Although, these financial instruments were designed to diminish risk, they encouraged risky, irresponsible, and in some cases fraudulent behavior.

This risky behavior was “tolerated” by regulators because of healthy growth and low inflation which was dubbed as “The Great Moderation” ([Origins of the financial crisis, 2013](#)). Moreover, lax regulations encouraged the excesses of the financial sector. For example, the repeal of the Glass–Steagall Act⁵ in 1999 enabled leveraging (borrowing in order to invest). This was further complicated by the “complex chains of debt between counterparties [*that*] were vulnerable to just one link breaking” ([Origins of the financial crisis, 2013](#)). Once the housing market collapsed, the value of CDOs and other financial instruments slumped, leading to the collapse of Lehman Brothers and a devastated financial sector.

Through contagion (spread of crisis from one country to another), the U.S. recession became a global crisis. This was dubbed the “worst financial crisis since the 1930s” by then Fed Chair, Ben Bernanke, with a world growth rate of -2.1% in 2009 ([Deal & McCann, 2013](#)). With less access to credit, global consumption, investment, and trade collapsed.

The U.S. recession officially ended in June 2009. Other countries, especially emerging markets, had also begun recovering. However, members of the European Union (EU) and the Eurozone⁶ continued to struggle. Starting with Greece, the PIIGS (Portugal, Ireland, Italy, Greece, and Spain) crisis began unfolding in 2009–2010. By 2011, the crisis was moving from the PIIGS to the rest of the Eurozone and there were talks of Greece having to leave the Eurozone (dubbed Grexit). The concerns for the Eurozone breaking up subsided by 2012 but vulnerabilities have continued to plague both the Eurozone and the EU, including UK’s 2016 referendum vote to leave the EU (labeled Brexit). As a major trading partner, the United States is inevitably impacted by the economic uncertainty in Europe.

The domestic and global recession and the resulting decline in investment had important implications for the U.S. labor market. Unemployment⁷ rose sharply during this period and continued to rise even after the recession had officially ended ([Figure 2](#)). By the end of 2009, the unemployment rate had reached a peak of 10% ([Figure 2](#)) and 8.8 million jobs were lost ([Financial crisis response, 2012](#)).

The information sector lost over 320,000 jobs during this recession. The biggest declines in employment were in *publishing* and *telecommunications*, which

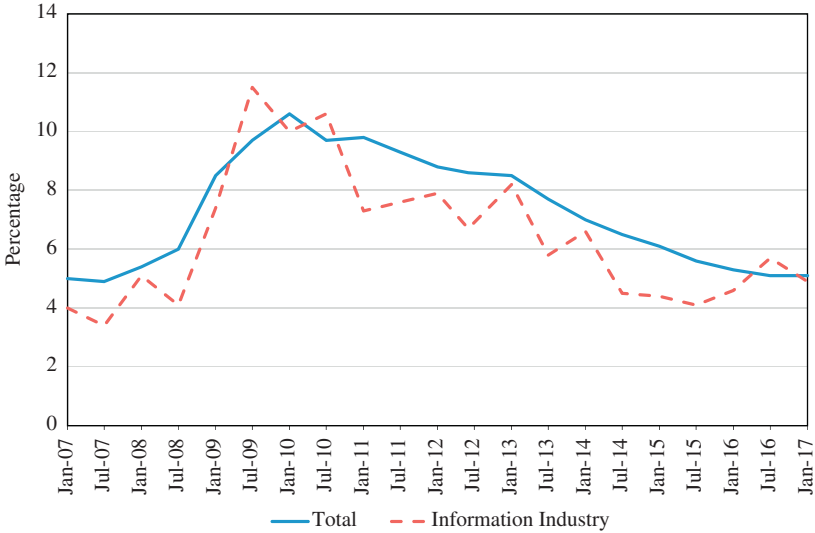


Figure 2: Unemployment Rate. Source: Data from Bureau of Labor Statistics; Author’s graph.

are also the biggest employers in information sector. *Publishing* dropped from a little over 900,000 to about 760,000 by the end of the recession while *telecommunications* declined by 100,000 in that same period (Figure 3). By 2016, *publishing* and *telecommunications* had lost 170,000 and 200,000 jobs, respectively, which represents a drop in the combined employment share of these two subsectors from 64% in 2007 to 55% in 2016 (Figure 3). On the other hand, *OIS* which had the fewest workers of this sector increased employment each year since the recession and doubled employment from 126,000 in 2007 to 260,000 in 2016 (Figure 3). *MPSR* and *data processing* dropped initially but have recovered while *broadcasting* has less employment at 269,000 in 2016 compared with 325,000 in 2007 (Figure 3).

The rate of unemployment rose for all subsectors during the Great Recession with the *MPSR* and *publishing* subsectors seeing the biggest increases (Figure 4). *MPSR* also had a second bout of increases in 2012 but declined to lower levels of unemployment than before the start of the recession, while *publishing* declined after 2010 but has remained higher than pre-recession unemployment (Figure 4). Importantly, unemployment in all subsectors and the industry as a whole rose between 2015 and 2016 (Figure 4).

Does this suggest a negative trend in unemployment in the information sector? The following section discusses the long-term challenges of the U.S. economy which sheds light on the health of information sector.

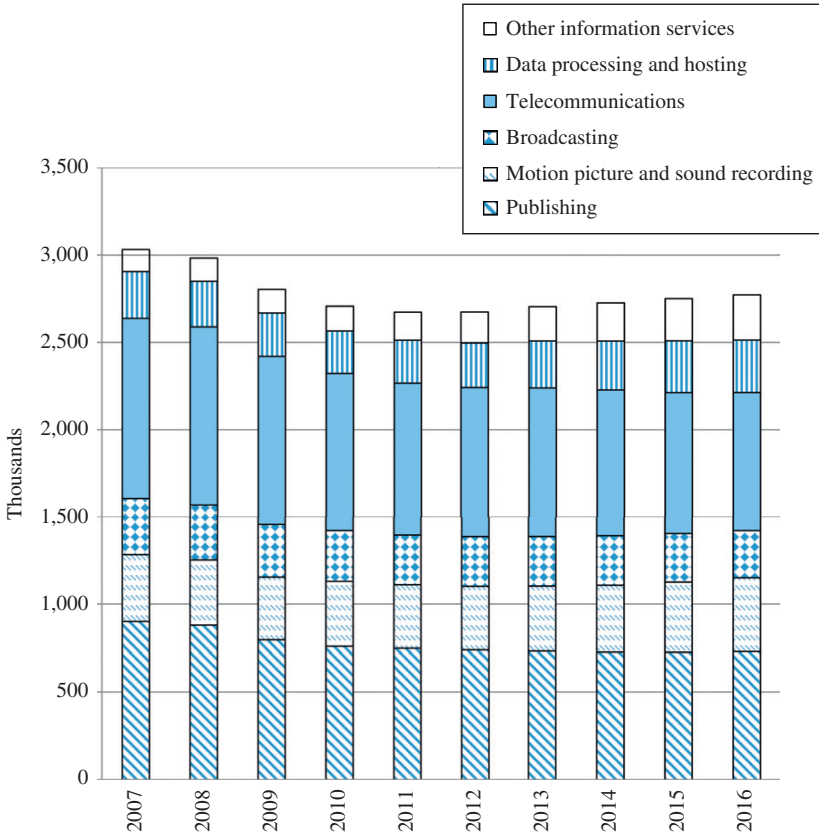


Figure 3: Average Annual Employment in Information Sector. Source: Data from Bureau of Labor Statistics; Author’s graph.

LONG-TERM ECONOMIC CHALLENGES

Even in 2017, the economy continues to suffer from the after-effects of the Great Recession and the global crisis. In addition, there are structural changes taking place in the economy, some of which pose immense challenges for the labor market in general and the information sector in particular. These challenges are discussed below.

The response to the Great Recession was expansionary fiscal and monetary policy.⁸ By the end of 2008, the Federal Reserve (Fed) had cut its target federal funds rate from 5.25% to 0.25%. Traditional tools proved ineffective so the Fed also implemented non-traditional policies such as quantitative easing (QE).⁹ There were several rounds of QE and related policies and the effectiveness of these unconventional tools has been debated.

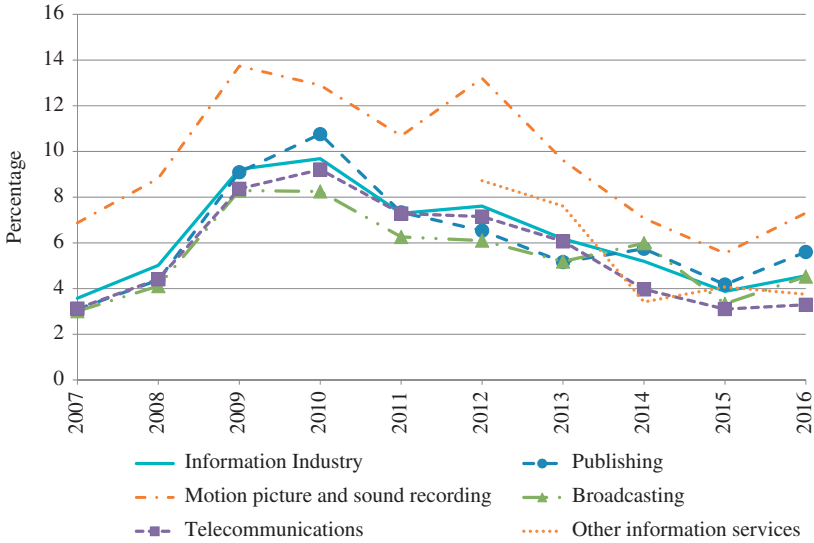


Figure 4: Average Annual Unemployment Rate (Information Sector and Subsectors). *Note:* There is no information on the data processing and hosting subsector and the series for other information services has data beginning 2012 only. *Source:* Data from Bureau of Labor Statistics; Author's graph.

Loose fiscal policy in the form of tax cuts and large-scale increases in government spending were also implemented. Two notable programs were the Trouble Assets Relief Program (TARP)¹⁰ to bail out the financial sector with the goal to get credit flowing into the economy and the American Recovery and Reinvestment Act (ARRA) to promote investment in the economy. Together these two programs cost about \$1.5 trillion over a 10-year period.

Was the high fiscal cost worth it? [Blinder and Zandi \(2010\)](#) used a simulation model to show that the recession was brought to an end due to this fiscal activism (TARP and ARRA). Other studies that have focused only on ARRA have also shown the stimulus package to be effective either in reducing unemployment or in keeping it from growing ([CBO, 2011](#); [Wilson, 2012](#)). However, [Taylor \(2011\)](#) argues that one problem with these conclusions is the assumptions of the studies. In particular, the multiplier¹¹ used in these models predetermine the impact of the economic stimulus, meaning a model with a higher multiplier built into the system will generate a better result ([Taylor, 2011](#)).

Whether or not these fiscal policies were successful in ending the recession the impact on budgets (state and federal) were clear. Expansionary fiscal policy that followed the Great Recession led to rising budget deficits with over trillion dollar deficits annually from 2009 through 2012 which declined but stayed around half a trillion over the next few years ([FRED database](#)). In turn, high

deficits contributed to rising national debt. Federal debt was \$9.4 trillion at the beginning of 2008 and currently stands at \$19.6 trillion in 2016 (FRED database). These fiscal and debt pressures have important implications for investment and thus, employment opportunities.

Increases in deficits and debt gave rise to the debt ceiling standoff in 2011,¹² concerns of the United States falling off the “fiscal cliff,”¹³ and debates over debt sustainability. The uncertainty that arose because of these fiscal pressures affected investment and threatened to plunge the United States back into a recession. Policy uncertainty was not restricted to the United States. The problems with Euro crisis during this period was also causing anxiety among investors because of the paralysis of policy-makers on the continent in addressing rising deficits and banking crises ([Dithering in the dark](#), 2012).

The global nature of the crisis also led to the rise of anti-globalization sentiments. The glut in savings in Asia and the internal trade imbalances in Europe played role in the crisis ([Origins of the financial crisis](#), 2013). Moreover, through contagion, the crisis spread across the globe. The resulting globalization backlash is thus not surprising, although it is of concern. Increased global integration (trade and foreign investment) expands markets and facilitates sharing of technology. A move toward protectionism¹⁴ can thus hurt investment and innovation.

Aside from policy concerns, the Great Recession has had other lingering adverse effects, notably a weak recovery. Since the U.S. recession ended, growth of real GDP has been positive except for the first quarter of 2011 and the first quarter of 2014 ([Figure 1](#)). However, growth has been anemic with an average annual real GDP growth rate from 2008 to 2016 of 1.3% (FRED database). Real GDP only reached its pre-recession level in 2011 (FRED database), two years after the recession ended. [Mankiw \(2016\)](#) notes that real GDP per capita¹⁵ growth in the last decade (0.44%) is much lower than the “historical norm of 2.0 percent.” This indicates that it would take 160 years for incomes to double compared with 35 years if growth were 2% ([Mankiw, 2016](#)).

While some may argue that this anemic or weak growth is related to the severity of the Great Recession, others believe that the problem started earlier, around 2000 ([Blecker, 2016](#); [Brooks, 2017](#); [Irwin, 2016](#)). This problem has been dubbed secular stagnation which is defined as “long-term tendency toward chronically slow average growth” ([Blecker, 2016](#)) that afflicts advanced countries because of declining investment opportunities ([Mankiw, 2016](#)). [Brooks \(2017\)](#) highlights the strain that weak growth has caused by resulting in lesser opportunities and lesser optimism.

One main factor according to [Blecker \(2016\)](#) for this secular stagnation is rising inequality brought in by falling wages which affects consumption, a major component of GDP ([Figure 5](#)). Although inequality was a concern even before the Great Recession, consumption was bolstered by rising household debt in the 1990s and early 2000s ([Blecker, 2016](#)). This could no longer be sustained after the Great Recession.

In turn, low consumption causes investment to fall. Although investment is a smaller share of GDP at just under 17% compared with consumption at over

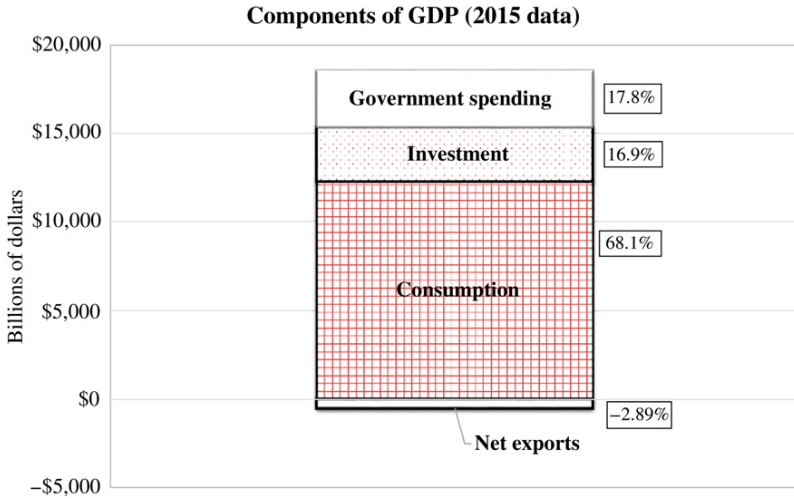


Figure 5: GDP Components. *Source:* Data from FRED database; Author's graph.

68% (Figure 5), it is the engine of growth and is considered a leading indicator of the state of the economy. Unfortunately, the share of investment in GDP has been declining since 2000 (Blecker, 2016).

A related but separate factor for low growth is declining productivity. Productivity measures the efficiency of a worker by calculating output produced per unit of work (which could be defined as an hour or a day). Productivity growth is key in improving living standards and reducing inequality. Adler et al. (2017) note that productivity growth (United States and globally) fell dramatically after the global crisis. Understanding the causes of this decline in productivity is necessary to reverse this trend because if this slump in productivity continues it would hurt living standards, debt (government and household) sustainability, and the effectiveness of policy responses to future crises (Adler et al., 2017).

Whether we are struggling with the after-effects of the Great Recession or secular stagnation, the United States (and the global economy) is in trouble. This in turn has important implications for the labor market in general and the information sector in particular which are discussed in the next section.

FACTORS AFFECTING THE HEALTH AND SUSTAINABILITY OF THE INFORMATION SECTOR

The impact of the Great Recession and its weak recovery has had a profound impact on the labor market. Just as growth has been described as anemic, the

labor market has been characterized as sluggish. Unemployment has declined slowly and only reached its pre-recession levels in 2015, five years after the recession officially ended.

Another concern for the labor market is long-term unemployment (defined as those who are unemployed for over 27 weeks). This group is particularly vulnerable because not only do they cease to receive unemployment compensation¹⁶ but also they are at risk of becoming discouraged workers.¹⁷ It becomes ever more difficult for this group to join the ranks of the employed because as Holzer, Chief Economist of the Labor Department during Clinton's administration, explains when people have been unemployed for a long time they are "stigmatized in the eyes of employers" and "their skills are probably rusty," especially in fields where skills keep changing (Adams, 2014).

Long-term unemployment rose rapidly during the Great Recession reaching a high of over 6.7 million and was approximately 45% of total unemployed (FRED database). While long-term unemployment has been declining, there is still a significant share of total unemployed at 23.3% in March 2017 (FRED database). The labor force participation rate¹⁸ fell from a little under 66% in October 2007 to 63% in March 2017 (FRED database) which suggests that people are leaving the labor market, meaning they are becoming discouraged workers.

The increase in unemployment in the information sector during the Great Recession was more severe and has been more volatile since the end of the Great Recession than unemployment in the labor market as a whole (Figure 2). Moreover, the unemployment rate for the information sector has yet to reach pre-recession levels (Figure 2). On the other hand, long-term unemployment is a lesser problem in this sector. Mitchell (2013) calculates that in 2012 only 2.4% of the total long-term unemployed previously worked in the information sector and this has declined from 2.8% in 2009 and 2.7% in 2007. It is important to note, however, that the weak recovery may take a toll on the quality of new jobs and salaries and benefits (Cook, 2015).

Two lingering effects of the recession are an uncertain policy environment (related to fiscal pressures) and the globalization backlash. The global crisis has resulted in a rise in protectionism. Trade restrictions constrain markets and reduce incentives to invest. It also hurts innovation. There is evidence that innovative activity such as spending on research and development and applying for patents increases when firms compete in global markets (Bloom, Draca, & Van Reenen, 2016). Such firms, called global frontier firms,¹⁹ are far more productive than other firms (advanced domestic firms and laggard firms)²⁰ (Adalet McGowan, Andrews, Criscuolo, & Nicoletti, 2015). The globalization backlash due to the global crisis hurts innovative activity and thus, productivity.

Another factor affecting investment is the policy environment. Rising deficit and debt has led to conflicts between those who support increased government intervention to promote growth and those who see rising deficits and debt as unsustainable and damaging to growth. The impact is an uncertain policy

environment which hurts investment. Investors are more likely to adopt a wait-and-see approach and delay investment projects in this climate. Moreover, [Adler et al. \(2017\)](#) summarize various studies that show that policy uncertainty can lead to a shift from “higher-risk, higher-return” investment and “bias business investment toward more liquid, low-risk/low-return projects.” Innovation is risky investment with potentially big pay-offs. The shift to low-risk investing hurts innovation and productivity.

Rising deficits have also led to an increased focus on cutting government programs including cuts on library funding. Libraries are supported through a combination of federal, local, and state funding. The Great Recession not only impacted the federal budget but also put state and local budgets in turmoil. [O’Kelly \(2014\)](#) notes the widespread concerns from cuts in New York City public libraries since 2008, in Dallas since 2010, elimination of state funding in California in 2011, Louisiana in 2012, and Massachusetts which in 2014 had state funding “at 1994 levels.”

Libraries perform a myriad of important functions for communities. They are even more critical in this economic climate of stagnation and long-term unemployment. Among the many resources offered by libraries are professional programs such as resume writing and jobs skills workshops which are ever more necessary. Thus, the loss of funding has important implications not just for information professionals, but for the labor force at large. While the public at large remains supportive of funding libraries, current budgetary challenges are a concern, and new problems have arisen. For example, President Trump’s FY 2018 budget has proposed the elimination of the Institute of Museum and Library Services (IMLS) which is responsible for distributing federal funds to states.

The longer term challenges to the economy of stagnation may not be as big a concern for the information sector as for the rest of the economy. Output in the information sector grew at a far higher rate (3.4%) compared with all sectors as a whole (1%) between 2004 and 2014 ([Henderson, 2015](#)). Not only is the information sector an outlier in this stagnating trend, but also it is a leader in productivity gains. The information sector saw increases in labor productivity for the entire decade (2000–2010) and although there was a slowdown in productivity during the Great Recession, it recovered rapidly in 2009–2010 ([Brill & Rowe, 2013](#)). This is not surprising since the sector is at the forefront of innovation with information technology and telecommunications being among the top innovating industries ([Friedman, 2015](#)).

Whether these innovations can help the broader economy is under debate. [Gordon \(2016\)](#) is concerned that current innovations are not as groundbreaking as earlier innovations which included electricity and indoor plumbing among others. Reduced technological diffusion is another concern. [Andrews, Criscuolo, and Gal \(2015\)](#) find that technology diffusion is uneven across the economy and laggard firms take much longer to adopt new technology.

Brynjolfsson and McAfee (2014) disagree with Gordon's (2016) concerns and argue that breakthroughs in artificial intelligence can significantly improve productivity. Semuels (2016) also notes that we may be underestimating technological advances and output of the information sector since a lot of inventions in Silicon Valley are free and thus do not get captured by GDP. There is evidence of mismeasurement of the digital economy although its significance is still being debated (Adler et al., 2017). However, even if these innovations are not as ground-breaking, they have helped improve efficiency and productivity and are thus a solution for global stagnation. For these benefits to be more broadly shared, technology diffusion is necessary. Here again, the information sector through information services professionals have an important role.

The future challenges and opportunities for the role of information services professionals in the economy are discussed in the conclusion.

CONCLUSION

Unemployment has fallen to the lowest level in over a decade at 4.5% in March 2017 (BLS website). Forecasts of global growth in 2017 and 2018 at 3.4% and 3.6%, respectively, are better than the 3% growth in 2016 (WEO Update, 2017). It is no wonder then that executives are more optimistic about the global economy (McKinsey & Company, 2017).

However, the U.S. economy grew only at 0.7% in the first quarter of 2017, the lowest in three years and much lower than the predicted 2% (Schwarz, 2017). Rising inequality, the lingering effects of the Great Recession, and secular stagnation remain major concerns. The downward trend in investment in general (Blecker, 2016) and in the high-tech sector (Haltiwanger, Hathaway, & Miranda, 2014) is cause for concern.

This problem is exacerbated by policy uncertainty and rising protectionism. Deferred investment due to uncertainty translates into job loss, weak growth, and a decline in innovation and productivity. Similarly, protectionism reduces innovative activity as well as technological diffusion. As Muro (2016) notes, productivity growth is taking place at the frontier firms, the concern is the "drift elsewhere." Without large-scale technological diffusion across all sectors, productivity will continue to wane. The success of technological diffusion is heavily dependent on overall investment as well as on the expertise of information services professionals who are essential for the adoption of new technologies across sectors.

Innovation and technology diffusion also requires governmental support. As Adalet McGowan et al. (2015) note, jumpstarting²¹ the "diffusion engine" will require reversing the trend of falling investment by governments, universities, and firms in basic research. Investment in education and skills training is also

necessary, not just for current skills but also for the capacity to learn new ones. Thus, support for schools, colleges, universities, and libraries is critical.

In conclusion, the information sector has a key role to play in promoting innovation, productivity, and growth. For information services professionals to be effective, it requires greater trade liberalization and increased government investment.

NOTES

1. Industries are divided into goods-producing or service-providing industries.
2. GDP is the value of all final goods and services produced within the country in a given period of time. Real GDP is GDP adjusted for prices and is measured in constant prices (prices of a base year).
3. A recession is defined as two consecutive quarters of negative growth of real GDP.
4. Given the severity of this recession, it has been labeled the Great Recession.
5. In response to the Great Depression, the Glass–Steagall Act of 1933 was enacted with the intent to separate banking institutions from investment institutions. The idea was that if banks merged with investment institutions made investments that failed then depositors could lose their money or if they were insured (which was another Depression era reform) the government would have to bail them out.
6. The European Union is an economic and political union consisting of 28 member countries. On March 29, 2017, the United Kingdom started the two-year process of leaving the EU. The Eurozone or euro area is a monetary union consisting of 19 of the 28 members of the EU that use a common currency, the euro.
7. The unemployment rate is the official unemployment statistic referred to as the U3 unemployment rate. This statistic is measured as the share of unemployed persons (those who are able and willing to work but don't have jobs) in the labor force. This statistic is flawed in that it does not include discouraged workers (those without jobs that have given up seeking employment) and other marginally attached workers (e.g., those that don't have jobs because they are taking care of family members). Also, this statistic categorizes involuntary part-time workers as employed. The *actual* unemployment rate is thus larger than the U3 rate reported. These problems are corrected in the U6 measure but estimates are based on surveys and thus may also be subject to some inaccuracy.
8. Expansionary or loose fiscal policy includes increased government spending and/or declining taxes while expansionary monetary policy refers to reducing interest rates.
9. QE refers to the purchase of assets such as mortgage-backed securities to improve the financial system.
10. The Fed supervised TARP.
11. According to Keynesian multiplier model, an increase in investment (either private or public) will lead to an increase in output because initial increases in spending will lead to jobs, higher incomes and spending, and thus incentivize investment. This virtuous cycle of job growth, spending, and investing leads to a multiple impact on GDP, hence the multiplier model.
12. The debt ceiling is the legal borrowing limit for the U.S. treasury. Congress has to approve increases in the debt ceiling to enable the government to borrow more. While the debt ceiling is typically raised, this was not the case in 2011. Rather it was heavily debated which led to fears of a default. Just two days before the legal borrowing limit was to be reached, Congress negotiated a deal with the Obama administration agreeing

to raise the limit if cuts in government spending were put in place. The result of this debt ceiling standoff was a rise in borrowing costs and uncertainty among investors.

13. The fiscal cliff coined by then Fed Chair, Ben Bernanke, refers to expiration of tax cuts and enactment of spending cuts which was expected to damage economic growth.

14. Protectionism refers to restrictions on international trade.

15. Real GDP per capita is Real GDP divided by the population and is one way of measuring standard of living.

16. Unemployment compensation is typically for 26 weeks, although it was extended to a year or more during the Great Recession. The exact length of time varies by states.

17. Which means they drop out of the official unemployment statistic.

18. The labor force participation rate is the sum of those in the labor force (employed and unemployed but looking for a job) as a percentage of the population aged 16 years and over.

19. These are global firms that are leaders of technological infusion.

20. Advanced domestic firms as the name suggests are domestic firms that have higher levels of technological infusion while laggard firms are lagging in technological infusion.

21. Adalet McGowan et al. (2015) focus their work on OECD countries although their findings are applicable to others as well. *Note:* OECD refers to the Organization for Economic Cooperation and Development that includes 35 countries with a stated mission of promoting “policies that will improve the economic and social well-being of people around the world” (OECD website).

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