

Open Government: Innovative Practices

Dustin McGlinchey

Florida State University: Department of Urban and Regional Planning

URP 5910: Directed Individual Research

Chair: Dr. William Butler, Co-Chair: Dr. John Felkner

December 19, 2016

OPEN GOVERNMENT: INNOVATIVE PRACTICES

Abstract

This research analyzed the history of open government policy in the United States and open government tools, infrastructure, concepts, and practices to understand the current state and trending future of open government and to aid in the development of future open government platforms and initiatives. The study of open government policy within the United States contributed to this research by examining the origins and evolution of OGD and open government policy and how changes have been initiated. The research findings highlight the roles of the President, the legislative branch, the Attorney General, and the Office of Management and Budget (OMB) in shaping open government policy and their potential future impact. An analysis of open government history also reveals an ongoing struggle between the public's "right to know" and national security and privacy concerns. The larger trend of the evolving relationship between government and the public that is leading towards increased levels of public involvement in government is explored throughout the text. The compiling of common open government tools are presented and categorized by the International Association of Public Participation's (IAP2) Public Participation Spectrum to better understand their potential benefits, uses, and limitations. Also, a list of identified best practices for improving open government infrastructure is compiled within. The majority of research conducted for this study was from primary source materials originating from the federal government including: public laws, executive actions, Office of Management and Budget (OMB) memorandums, Attorney General memorandums, legislative proceedings, policy documents, judicial decisions, government websites, Open Government Plans, and National Action Plans. This work frequently cites the United Nations Department of Economic and Social Affairs' (DESA) 2016 E-Government Survey for concepts and trends in open government and e-government. Also, David G. Garson's book *Public Information Technology and E-governance: Managing the Virtual State* acted as a valuable resource in tracing the early history of the Freedom of Information Act (FOIA).

Table of Contents

Table of Figures	6
Introduction	7
Open Government: History of Policy and Legislation in the United States	8
Figure 1: Open Government Timeline and Key.....	9
The United States Constitution and the Records Act of 1789	13
The New Deal and the Administrative Procedures Act of 1946 (1918-1946).....	13
The Path to the Freedom of Information Act (Late 1940s-1966)	14
Figure 2: Freedom of Information Act Exemptions	16
Attorney General Memorandums	17
House Subcommittee on Government Information 1972-1974.....	17
Vaughn Index	18
Supreme Court Decisions.....	18
Post-Watergate 1974.....	19
Presidential Recordings and Materials Preservation Act (PRMPA) of 1974	19
Freedom of Information Act (FOIA) Amendments of 1974	19
The Privacy Act of 1974, the CIA Information Act of 1984, and the Reagan Years	20
Clinton Era: Openness in Government, Electronic Information, and E-FOIA	21
George W. Bush Era: National Security, E-Government Act of 2002 and Open Government Act of 2007	22
Barack Obama’s First Day in Office: Jump-Starting Open Government	23
Open Government Directive.....	24
Open Government Working Group.....	25
Open Government Plans.....	26
Transparency.....	26
Participation.....	27
Collaboration.....	27
Data Portals and Government APIs	28
Open Government Partnership (OGP) and Open Government Declaration	29
National Action Plans (NAPs)	30
E.O. 13571 and the Digital Government Strategy.....	30

OPEN GOVERNMENT: INNOVATIVE PRACTICES

Open Data Memorandum and Open and Machine Readable Information E.O.	31
Open Government from 2014 to 2016 and the FOIA Improvement Act of 2016.....	31
Open Government History Analysis.....	32
Open Government: Tools, infrastructure, and Practices	33
Open Government Tools.....	34
• e-information	34
• e-consultation	34
• e-decision-making.....	34
Figure 3: IAP2 Spectrum.....	35
Figure 4: IAP2 Spectrum Public Participation Goals	35
Figure 5: IAP2 Spectrum Promise to the Public	36
Figure 6: IAP2 Spectrum Example Techniques.....	36
Figure 7: Open Government Tools Categorized by the IAP2 Spectrum.....	38
Open Government Infrastructure.....	39
Figure 8: Open Government Infrastructure	39
OGD: publishing standards, data management, data portals, and APIs.....	40
Linked open government data (LOGD) and the Semantic Web.....	41
Big data analytics	43
Interactive tools and data	43
The Internet of things (IoT)	43
Government as a platform (GaaP) and the people-driven model	45
Open Government in Practice	46
Improving government services with open government and e-government.....	46
Federal OGD software applications	47
Open government and e-government webpages.....	48
State GeoNode and the Humanitarian Data Exchange (HDX)	49
Collaborative internal networks: IdeaHub and Max.gov	50
Challenge.gov.....	50
GitHub and developer pages	51
Living Labs (LLs).....	51
Figure 9: Common Elements to Living Labs	52
Project Open Data.....	52
Smart City Expo World Congress (SCEWC).....	52

OPEN GOVERNMENT: INNOVATIVE PRACTICES

Open Government: Tools, Infrastructure, and Practices Analysis 53

Conclusion 54

Works Cited 57

Endnotes 62

Table of Figures

Figure 1: Open Government Timeline and Key 9

Figure 2: Freedom of Information Act Exemptions 16

Figure 3: IAP2 Spectrum 35

Figure 4: IAP2 Spectrum Public Participation Goals 35

Figure 5: IAP2 Spectrum Promise to the Public 36

Figure 6: IAP2 Spectrum Example Techniques 36

Figure 7: Open Government Tools Categorized by the IAP2 Spectrum 38

Figure 8: Open Government Infrastructure 39

Figure 9: Common Elements to Living Labs 52

Introduction

“In recent years, e-government has enabled enhanced public participation in government decisions in ways that were unthinkable in the past.”

- (Department of Economic and Social Affairs [DESA], 2016, p. 50)

Information and communications technologies (ICTs)ⁱ have revolutionized nearly every corner of our lives, and governments around the world are rapidly integrating these technologies to improve: transparency, accountability, collaboration, services, development, innovation, efficiency, and public participation in government (Department of Economic and Social Affairs [DESA], 2016). Though each has a slightly different meaning, government 2.0, e-government, open government, and open-source governance have become ambiguous terms to describe the transformational impact technology is having on the way governments can operate and serve and facilitate their constituents and stakeholders. Mobile technologies, application program interfaces (APIs)ⁱⁱ, social media, big data analytics, geographic information systems (GIS), open government data (OGD), graphical user interfaces (GUIs), enterprise data management (EDM), and consistent standards for publishing data online have become foundations for a system of informing, engaging, and empowering government stakeholders. Access to open government data (OGD)ⁱⁱⁱ, new ICTs, and favorable government policies are, also, contributing to greater levels of e-participation in government: e-voting, e-consultation, e-decision-making, crowdsourcing, and open- or co-development (DESA, 2016). Commitments to using new ICTs to create more open, accountable, transparent, and participatory governments have been made around the world from local, national, and international governments and partnerships.

This article will look at the history of open government policy in the United States and open government tools, infrastructure, concepts, and practices to better understand the current state and trending future of open government.

A long legislative and policy history has increasingly made the United States Federal Government more transparent, open, collaborative, and accountable through increased public access to information, government disclosure, and utilization of technology for public interaction with the federal government and its agencies and sub-agencies. During the course of trying to understand the current state of open government and its components, it became important to understand the legal, regulatory, and policy history of open data and open government. As such, an open government timeline has been created and a condensed history of federal open data and open government legislation and policy. Continuing debates and questions that reappear in the history of open government and open data policy are an important part of understanding the current state and future potential of open government.

OPEN GOVERNMENT: INNOVATIVE PRACTICES

The combined research and analysis of the history of open government policy in the United States and open government: tools, infrastructure, concepts, and practices act as a guide for understanding the current state and likely future of open government. By better understanding the collective trends, utility, and potential of open government, planners can be better equipped to engage in and influence this emerging realm of data, public interaction, problem solving, innovation, and decision making.

Open Government: History of Policy and Legislation in the United States

“Information is a valuable national resource and a strategic asset to the Federal Government” - (Office of Management and Budget, 2013)

“Opening up government data can lead to significant economic gains. It can help to transform every sector of the economy and to promote innovative services in order to increase employment and public value.” - (DESA, 2016, p.29)

Major, near philosophical, questions can be extracted from decades of growth in the history of open government in the United States, and many of these debates have dealt with the release of government information to the public. Things like how to balance national security concerns and the right to privacy versus the public’s right to know have continually reappeared in debates, policies, legal proceedings, and executive actions dealing with open government data (OGD), the Freedom of Information Act (FOIA), and open government. Other fluctuating policies and debates include: what should the relationship be between judicial review and decisions made by federal agencies to withhold information, when should the Department of Justice side with an agency decision to restrict access to information, and what is the default presumption of agencies in releasing or withholding information from the public. The overarching evolution and question is about what should the relationship be between government, the public, and other government stakeholders? As freedom of information policies have evolved and government information has become easier to access by the public, internal government cultures and process have had to evolve as well. The current state of open government, in the United States, was shaped by: changes in technology, public demand for better government services, and pressure for a more open and accountable government.

The term “open government” and the current state of open government owes its origins to the fight for public access to information, in the 1950s, during a post-World War 2/ Cold War atmosphere of particular government caution towards releasing sensitive information (Yu & Robinson, 2012). The phrase first appeared in early debates that eventually led to the creation and passage of, perhaps, the most important piece of open government legislation in the United States, the Freedom of Information Act (Yu & Robinson, 2012). In more recent times, the popularity of the Open Software movement and its inspired sister movements have brought the idea of open government into the era of online collaboration and information sharing.

OPEN GOVERNMENT: INNOVATIVE PRACTICES

The right of citizens to scrutinize and participate in government gained momentum during the Age of Enlightenment and, today, this basic right is recognized in nearly every democratic nation of the world (Lathrop & Ruma, 2010). Open government expands on this concept to incorporate modern technology as a practical conduit between the government and its stakeholders. Access to quality government information is a crucial foundation for understanding, engaging, and participating in government. Much of the history of open government is the tracing of the public's access to government information and the evolution of data management and government services.

Because of the long and complex history of changes in government legislation and policy, a condensed timeline table has been added for reference and future research. The condensed timeline's color coded key is described below.

- **Yellow-** Policy documents coded in yellow are directly related to the Freedom of Information Act (FOIA). This includes: foundational legislation for the FOIA, FOIA amendments, executive orders, and OMB and Attorney General Memorandums on the FOIA.
- **Blue-** Policy documents coded in blue are directly related to modern concepts of open government and open government policy. These are typically multifaceted policy documents that address issues like transparency, accountability, participation, collaboration, and strategic open government plans.
- **Purple-** Policy documents coded in purple are directly relate to the management and release of Presidential records.
- **Green-** Policy documents coded in green are directly related to the management of data and the improvement of government services.
- **Red-** Policy documents coded in red deal directly with disclosure of information. While this category is not exhaustive, these policy documents were linked to enough other government policy documents and legislation that it was deemed necessary to include.

Figure 1: Open Government Timeline and Key

Key:	Directly related to the FOIA	Open Government Specific	Presidential Records	Data and Services	Disclosure
-------------	-------------------------------------	---------------------------------	-----------------------------	--------------------------	-------------------

<i>Open Government Timeline (U.S.) (1789-2016)</i>			
Date	Year	Open Government Policy Documents	Abbreviations
September 15	1789	Records Act of 1789	1 Stat. 68 (1789)
June 11	1946	Administrative Procedure Act (APA) of 1946	Pub. L. 79-404
July 4	1966	Freedom of Information Act (Amended APA)	Pub. L 89-487

OPEN GOVERNMENT: INNOVATIVE PRACTICES

June	1967	Attorney General Memorandum: Concerning Section 3 of the Administrative Procedure Act (Clark)	NA
October 6	1972	Federal Advisory Committee Act (FOIA)	Pub. L. 92-463
November 24	1974	Freedom of Information Act (FOIA) Amendments of 1974	Pub. L. 93-502
December 19	1974	Presidential Recordings and Materials Preservation Act (PRMPA) of 1974	Pub. L. 93-526
December 31	1974	Privacy Act of 1974	Pub. L. 93-579
February	1975	Attorney General Memorandum Concerning the Amendments to the FOIA (Levi)	NA
September 13	1976	Government in the Sunshine Act (Amended FOIA)	Pub. L. 94-409
May 5	1977	Attorney General Memorandum: Freedom of Information Act (Bell)	NA
October 26	1978	Ethics in Government Act of 1978	Pub. L. 95-521
November 4	1978	Presidential Records Act (PRA) of 1978	Pub. L. 95-591
May 4	1981	Attorney General Memorandum: Freedom of Information Act (Smith)	NA
April 2	1982	National Security Information	E.O. 12356
October 27	1986	Anti-Drug Abuse Act of 1986 (Amended FOIA)	Pub. L. 99-570
June 23	1987	Predisclosure notification procedures for confidential commercial information	E.O. 12600
December	1987	Attorney General Memorandum: The 1986 Law Enforcement Amendments to the Freedom of Information Act (Meese)	NA
January 18	1989	Presidential Records	E.O. 12667
August 3	1993	Government Performance and Results Act (GPRA) of 1993	Pub. L. 103-62
September 11	1993	Setting Customer Service Standards	E. O. 12862
October 4	1993	Attorney General Memorandum: The Freedom of Information Act (Reno)	NA
	1993	Circular A-130 Revision	NA
March 22	1995	Presidential Memorandum: Improving Customer Service	NA
May 22	1995	Paperwork Reduction Act of 1995	Pub. L. 104-13
February 10	1996	Clinger-Cohen Act of 1996	Pub. L. 104-106
October 2	1996	Electronic Freedom of Information Act Amendments of 1996 (E-FOIA)	Pub. L. 104-231

OPEN GOVERNMENT: INNOVATIVE PRACTICES

March 3	1998	Presidential Memorandum: Conducting "Conversations with America" to Further Improve Customer Service	NA
December 21	2000	Information Quality Act	Pub. L. 106-554
October 12	2001	Attorney General Memorandum: The Freedom of Information Act (Ashcroft)	NA
November 1	2001	Further Implementation of the Presidential Records Act	E.O. 13233
November 27	2002	Intelligence Authorization Act for Fiscal Year 2003 (Amended FOIA)	Pub. L. 107-306
December 17	2002	E-Government Act of 2002 (Many digital service components)	Pub. L. 107-347
December 14	2005	Improving Agency Disclosure of Information (FOIA Improvement Plans)	E.O. 13392
December 16	2005	Improving Public Access to and Dissemination of Government Information and Using the Federal Enterprise Architecture Data Reference Model	M-06-02
September 26	2006	Federal Funding Accountability and Transparency Act (FFATA) of 2006	Pub. L. 109-282
September 14	2007	Honest Leadership and Open Government Act of 2007 (Also Amended FOIA)	Pub.L. 110-81
June 30	2008	Federal Funding and Transparency Act (FFATA) of 2008	Pub. L. 110-252
January 21	2009	President's Memorandum on Transparency and Open Government	NA
January 21	2009	President's Memorandum on the Freedom of Information Act	NA
January 21	2009	Presidential Records	E.O. 13489
February 24	2009	President's Memorandum on Transparency and Open Government - Interagency Collaboration	M-09-12
March 19	2009	Attorney General Memorandum: The Freedom of Information Act (Holder)	NA
October 28	2009	Department of Homeland Security Appropriations Act, 2010 (Amended FOIA)	Pub. L. 111-83
December 8	2009	Open Government Directive	M-10-06
December 29	2009	Classified National Security Information	E.O. 13526
July 21	2010	Dodd-Frank Wall Street Reform and Consumer Protection Act (FOIA Amendments)	Pub. L. 111-203

OPEN GOVERNMENT: INNOVATIVE PRACTICES

October 5	2010	A Bill to Amend the Securities Exchange Act of 1934, the Investment Company Act of... (Amended FOIA)	Pub. L. 111-257
January 4	2011	Government Performance and Results Act (GPRA) Modernization Act of 2010	Pub. L. 111-352
January 18	2011	Improving Regulation and Regulatory Review	E.O. 13563
April 27	2011	Streamlining Service Delivery and Improving Customer Service	E.O. 13571
August 17	2011	Delivering an Efficient, Effective, and Accountable Government	M-11-31
September	2011	Open Government Declaration	NA
September 20	2011	First U.S. Open Government National Action Plan	1st NAP
November 28	2011	Presidential Memorandum - Managing Government Records	NA
May 23	2012	Presidential Memorandum - Building a 21st Century Digital Government	NA
May 23	2012	Digital Government: Building a 21st Century Platform to Better Serve the American People	NA
August 24	2012	Managing Government Records Directive	M-12-18
May 9	2013	Open Data Policy-Managing Information as an Asset	M-13-13
May 9	2013	Making Open and Machine Readable the New Default for Government Information	E.O. 13642
December 5	2013	Second U.S. Open Government National Action Plan	2nd NAP
February 24	2014	OMB Memorandum: 2014 Agency Open Government Plans	NA
May 9	2014	Digital Accountability and Transparency Act of 2014 (DATA Act)	Pub. L. 113-101
November 26	2014	Presidential and Federal Records Act Amendments of 2014	Pub. L. 113-187
October 27	2015	Third U.S. Open Government National Action Plan	3rd NAP
June 30	2016	FOIA Improvement Act of 2016	Pub. L. 114-185
July 14	2016	OMB Memorandum: 2016 Agency Open Government Plans	M-16-16
July 15	2016	Foreign Aid Transparency and Accountability Act of 2016	Pub. L. 114-191
July 28	2016	Revision of OMB Circular No. A-130	NA

OPEN GOVERNMENT: INNOVATIVE PRACTICES

The United States Constitution and the Records Act of 1789

An important part of understanding the current state of open government, in the United States, is the history of public access to government information. The United States Constitution includes no specific right or process for the public to access government information (Relyea, 2005). Some arguments have tried to draw upon the 1st Amendment and the unconstitutionality of restricting speech, but these arguments haven't been very concrete with the long history of discretion given to federal agencies. The first legislation of note concerning access to information is the Housekeeping Statute of 1789, signed by George Washington and the 14th law to be passed by the first United States Congress. The law was intended to give authority for the creation of executive offices and the authority to file government documents and established a structure for record keeping, but also gave authority to cabinet secretaries to control the records of their departments (Russell, 2005). The statute would be cited well into the late 1950s as the authority to restrict the release of government information to the public (Garson, 2006).

The New Deal and the Administrative Procedures Act of 1946 (1918-1946)

At the end of World War One, on November 11, 1918, an armistice was signed with Germany that ended fighting on the Western Front. The Treaty of Versailles signed on the 28th of June 1919 and with the treaties with the eastern powers that followed, World War One was brought to a close. The postwar decade of the 1920s, the Roaring Twenties, brought a boom in wealth and economic prosperity to the United States, but towards the end of the decade the expansion of the stock market, investor speculation, and artificially high prices brought on fear of a looming economic catastrophe. On October 29, 1929, the stock market took an unprecedented collapse known as Black Tuesday and is widely considered to be the beginning of the Great Depression.

By 1933, when Franklin D. Roosevelt became President, 85% of the stock market had plummeted and disappeared, banks were being closed in all 48 states due to runs on the bank and insolvency, people were being thrown out of their homes for being unable to pay rent, unemployment was at 24.9%, and malnourishment and starvation became very real concerns, even for the middle class (Cohen, 2009; Great Depression Facts, n.d.). In the first 105 days Roosevelt was in office, 15 pieces of legislation were pushed through congress and this first wave of New Deal legislation laid the foundation for a rapid expansion of the federal government's size and authority to intervene in economic and social issues (Cohen, 2009). From 1933 through 1939, Roosevelt's administration presided over the creation of 40 new federal agencies and entities to implement the legislation that resulted from the New Deal (Great Depression Facts, n.d.).

The expansion of federal government agencies and government bureaucracy, associated with the New Deal and Roosevelt's administration, necessitated new legislation to organize and govern these new extensions of the federal government. A nearly decade long study was conducted on how to craft administrative authority, procedures, and accountability (Garson, 2006). The result was the Administrative Procedure Act (APA) of 1946. Among the many

OPEN GOVERNMENT: INNOVATIVE PRACTICES

important sections of the APA that establish general rules and procedures for federal government agencies, Section 3 of the APA was entitled Public Information.

Section 3 of the APA of 1946 instructed all federal agencies to publish information in the Federal Registrar about their agency's records, rulings, opinions, orders, available procedures, etc. Also, procedures and contact information were to be published for how the public could request access to agency records. While the APA of 1946 did create a uniform requirement for agencies to make large amounts of information available to the public on request, the legislation included many potential loopholes and significant ambiguity. One area of Section 3(c) states "matters of official record shall...be made available to person's properly and directly concerned except information held confidential for good cause found" (APA, p. 3). The requirement for public participation in the rulemaking process for agencies was also established in the act and an important step for open government (Clark T. C., 1947).

The APA sought to make all federal government matters of official record available to the public, but its vague loopholes combined with the common practices of agencies denying requests made the APA of 1946 ineffective in providing the public access to government information (Garson, 2006). The authority of government officials to deny access to information if "good cause" could be found or if it was deemed "in the public interest" was strengthened (Yu & Robinson, 2012). The practice of agencies denying requests became even more prevalent due to anti-terrorism concerns as the fear of Communism spread in the decade after World War Two (Garson, 2006). Despite the shortcomings of the APA of 1946, the law did become the foundational legislation for its important future amendment, the Freedom of Information Act.

The Path to the Freedom of Information Act (Late 1940s-1966)

Before the Freedom of Information Act was a law, it was a political movement led by newspaper editors and reporters (Garson, 2006). Strict control of information by the government during the McCarthy era fueled an already established movement into further action in their pursuit to make government information more accessible (Garson, 2006). The general attitude of the government towards releasing information, at the time, was, if there was any doubt, classify and restrict access to material by default (Lemov, 2011; Garson, 2006). In the late 1940s, the American Society of Newspaper Editors (ASNE) created a freedom-of-information committee to research and pursue access to government information (Lemov, 2011). The editors were disturbed by the lack of access to government information and saw it as the basic rights of the nation were under threat (Lemov, 2011).

In 1951, the ASNE commissioned an attorney specializing in the representation of newspapers, former New York *Herald Tribune* counsel and Columbia University lecturer Harold L. Cross, to continue the study being conducted for the creation of a "comprehensive report on customs, laws, and court decisions affecting our free access to public information..." (Botein, 1954; Kahn, 1953). The resulting, published, report by Cross, in 1953, *The People's Right to Know. Legal Access to Public Records and Proceedings* became an important go-to-guide for newspapers and its importance was acknowledged by lawyers, activists, political scientists, and

OPEN GOVERNMENT: INNOVATIVE PRACTICES

others (Yu & Robinson, 2012; Kahn, 1953; Beaney, 1953). On the book's dust cover, the publication stated to be a valuable source to civic organizations, journalists, lawyers, writers, students, and teachers (Kahn, 1953). As one example, in 1954, the report was reviewed by the Harvard Law Review and the field of law was very interested in having access to more government information such as police records, juvenile records, court proceedings, etc. (Botein, 1954; Beaney, 1953).

Around the same time, the U.S. Congress was battling with the federal government for access to information for their own purposes, and popular opinion had turned in favor of access to government or "public" information (Lemov, 2011). In 1955, a new Special Subcommittee of Government Information was formed, beneath the Committee on Government Operations and chaired by Representative John Moss from California (Lemov, 2011). The creation of the Special Subcommittee is believed to have been intended more so for access to government information for the legislative branch (Lemov, 2011). However, under the leadership of Moss, a strong rights defender for members of the civil service and with the accompaniment of broad public support and abundant media coverage, the focus of the subcommittee quickly expanded (Blanton T. , 2006; Lemov, 2011).

The Special Subcommittee did a survey of some 60 federal agencies for discovering on what authority agencies were withholding information (Garson, 2006). The most common justification was from the Housekeeping Statute of 1789 (Garson, 2006). Moss then authored and help pass an amendment to the Housekeeping Statute of 1789 saying that the cited section could not be used to justify the withholding of information (Garson, 2006). A follow-up a year later found the practices of agencies withholding information had not changed (Garson, 2006). Congressional hearings on issues concerning freedom of information continued from 1959-1966 (Garson, 2006). Moss became the key author, supporter, and champion of the Freedom of Information Act (FOIA) through its many versions and long struggle leading to its eventual passage in 1966 (Lemov, 2011).

Then presiding President Lyndon B. Johnson was not in favor of the FOIA, though he did not risk openly opposing or vetoing the legislation. Pressure from bureaucratic interests, a fear of government transparency, and Johnson's distaste for the media all contributed to LBJ's stance on the FOIA (Blanton T. , 2006). Through 1965, while the bill was being debated, testimony delivered by 27 federal agencies and departments were in opposition to the bill (Blanton, 2006). Near identical versions of the bill were being debated in the House of Representatives and the Senate during 1966. After the Senate passed their version, within the Senate, the Justice Department urged for a new House Report on Congress's version of the bill (Blanton, 2006). Afterwards, the addition of language was included in the bill for more clarity on specific types of information that could be withheld from the public and broader protection for federal agencies (Blanton, 2006). On June 20, 1966 the House version of the bill passed unanimously 307 to zero (Blanton, 2006). By the time the bill was ready to be signed into law, only one agency, the United States Department of Education, Health, and Welfare, openly recommend a veto while only three agencies were openly in favor (Blanton, 2006).

OPEN GOVERNMENT: INNOVATIVE PRACTICES

On July 4, 1966, Independence Day, President Johnson signed the FOIA into law without a signing ceremony that was characteristic of his administration (Blanton, Elias, Fuchs, & Lopez, 2004). Johnson released a signing statement with a mixed message of government openness and caution when dealing with disclosure of government information (Johnson, 1966). Johnson wrote, “I have always believed that freedom of information is so vital that only the national security, not the desire of public officials or private citizens, should determine when it must be restricted” and “I signed this measure with a deep sense of pride that the United States is an open society in which the people's right to know is cherished and guarded” (Johnson, 1966). With the passage of the FOIA the public, for the first time in the nation’s history, had a clear legal right to access information from the federal government, but the unresolved issues with the disclosure of sensitive information, vague legislative loopholes, and government agencies being legally protected for denying a FOIA request would be disputed and amended for decades.

When the FOIA was passed in 1966 it was still an ineffective piece of legislation. The FOIA set no time limits for agencies to process FOIA requests, it gave no path to appeal agency decisions for withholding information, costs to process requests could be charged to the requester and decided by the agency, and there were no penalties for agency non-compliance with FOIA processes and requests (Garson, 2006). Also, when the FOIA was originally passed it only contained three exceptions to releasing information: reasons of national security, invasion of privacy, or if prohibited by another statute. These exceptions would be expanded overtime and the current list of exemptions is provided in the Figure 2 below.

Figure 2: Freedom of Information Act Exemptions

Exemption Number	Exemption Description
1	Classified Documents
2	Internal personnel rules and practices
3	Information exempt by another federal law
4	Confidential business information
5	Privileged communications within or between agencies
5.1	Deliberative Process Privilege
5.2	Attorney-Work Product Privilege
5.3	Attorney-Client Privilege
6	Personal privacy
7	Law enforcement
7(A)	Could reasonably be expected to interfere with enforcement proceedings
7(B)	Would deprive a person of a right to a fair trial or an impartial adjudication

OPEN GOVERNMENT: INNOVATIVE PRACTICES

7(C)	Could reasonably be expected to constitute an unwarranted invasion of personal privacy
7(D)	Could reasonably be expected to disclose the identity of a confidential source
7(E)	Would disclose techniques and procedures for law enforcement investigations or prosecutions
7(F)	Could reasonably be expected to endanger the life or physical safety of any individual
8	Information that concerns the supervision of financial institutions
9	Geological information on wells
Information from FOIA.gov	

Attorney General Memorandums

The expectations for how the FOIA would be implemented has a long tradition of being clarified by the acting Attorney General of each presidential administration. The practice actually started after the passage of the APA of 1946 when a senator asked for clarification on the implementation of the APA and the Attorney General Tom C. Clark responded with a memorandum on how agencies should implement the act (Clark T. C., 1947). After the passage of the FOIA, in June of 1967, Attorney General Ramsey Clark released a memorandum to government agencies to help establish common practices and implementation of Section 3 of the APA established by the FOIA (Clark R. , 1967). Attorney Generals: Edward Levi (1975), Griffin B. Bell (1977), William Smith (1981), Janet Reno (1993), John Ashcroft (2001), and Eric Holder (2009) all released memorandums that changed the implementation and administration of the FOIA. The Reno, Ashcroft, and Holder memorandums were of particular importance to modern open government and are discussed in more detail later.

House Subcommittee on Government Information 1972-1974

During House oversight hearings between 1972-1974 by the House Subcommittee on Government Information it became clear that the FOIA did not lead to a more open and accountable government and the FOIA request process was flawed (Blanton, Elias, Fuchs, & Lopez, 2004). A number of problems with the current state of FOIA were identified by the subcommittee including:

- Excessive delays in responding to document requests
- Excessive fees for searching and copying documents
- Burdensome and costly legal remedies after exhaustion of administrative remedies
- News media opting not to use the FOIA due to excessive delays and burdensome appellate procedures

OPEN GOVERNMENT: INNOVATIVE PRACTICES

- Inappropriate and inadequate agency regulations and policies regarding the FOIA, poor administration and recordkeeping regarding FOIA processes and a failure to inform members of the public of their rights under the FOIA

-(Blanton, et al., 2004). Furthermore, it appeared agencies were adopting tactics to avoid the disclosure of information including mixing together classified and unclassified material and claiming too heavy of a burden and cost to differentiate between materials (Blanton, et al., 2004). It appeared that only through costly and time consuming litigation did the FOIA work (Blanton, et al., 2004). These hearings led to congress seeking to fix the FOIA and the end result was the Freedom of Information Act (FOIA) Amendments of 1974 (Blanton, et al., 2004).

Vaughn Index

During the same time Congress was investigating the effectiveness of the FOIA, in 1973, the Judicial Branch produced a landmark Supreme Court decision relating to the FOIA in *Vaughn v. Rosen*. A law professor, Robert G. Vaughn, was doing research into the Civil Service Commission and requested records pertaining to evaluations for personnel management programs and those records were denied by the agency (U.S. Supreme Court, 1973). The Supreme Court ruled that they did not have enough evidence to conclude if the information was exempt from disclosure and remanded the case with instructions. Notably, the court developed what is known as the *Vaughn Index* for helping to establish when a denial for a FOIA request is legally legitimate (U.S. Supreme Court, 1973). Over years of court decisions the meaning and scrutiny of the *Vaughn Index* has been clarified and most notably by *Wiener v. FBI* (1991) and *Citizens Commission on Human Rights v. Food and Drug Administration* (1995). The Vaughn Index is perhaps best explained by quotes from the decisions of each of these important cases:

...the purpose of the index is not merely to inform the requester of the agency's conclusion that a particular document is exempt from disclosure under one or more of the statutory exemptions, but to afford the requester an opportunity to intelligently advocate release of the withheld documents and to afford the court an opportunity to intelligently judge the contest (9th Cir., 1991).

A Vaughn Index must: (1) identify each document withheld; (2) state the statutory exemption claimed; and (3) explain how disclosure would damage the interests protected by the claimed exemption (9th Cir., 1995).

Supreme Court Decisions

National security and privacy exemptions were strengthened through three important Supreme Court decisions. In the 1973 Supreme Court decision *EPA v. Mink*, the court ruled that classified material was exempt from the FOIA under the national security exemption. This allowed any agency with the ability to classify materials a broad tool for withholding information (Garson, 2006). In *Chrysler Corporation v. Brown* (1979), the court upheld that corporations

OPEN GOVERNMENT: INNOVATIVE PRACTICES

could sue agencies to stop the release of information that could be potentially damaging or affect their business (Garson, 2006). These cases against government agencies were known as reverse-FOIA lawsuits (Garson, 2006). FOIA requests pertaining to personally identifiable information became even more difficult with the Supreme Court decision in 1989 with *Department of Justice v. Reporters' Committee*. The court held personally identifiable information could be withheld unless the requester could show that the disclosure was necessary to shine light on an area of government (Garson, 2006). This was particularly difficult before information was even obtained or seen by requestors (Garson, 2006).

Post-Watergate 1974

In the wake of the Watergate scandal and Nixon's resignation on August 9, 1974, the nation's legislators were emboldened with broad public support to pass meaningful legislation for government openness and disclosure. The resulting legislation included: the Freedom of Information Act Amendments of 1974 (November 24), the Presidential Recordings and Materials Preservation Act (PRMPA) of 1974 (December 19), and the Privacy Act of 1974 (December 31).

Presidential Recordings and Materials Preservation Act (PRMPA) of 1974

During the first weeks of Gerald Ford's presidency, the President and his staff struggled about what to do with mountains of presidential records inherited from the Nixon Administration (Werth, 2006). At one time, records were boxed up to be mailed to Nixon's home in Clemente California, but that plan was abandoned because of potential legal ramifications for those involved, potentially being seen to be aiding in a government cover-up, and the changes in White House staff that accompanied the nervous atmosphere after Nixon's resignation (Blanton, et al., 2004, Werth, 2006). White House advisors were even confused as to who legally owned the records of the President at the time (Werth, 2006). The Presidential Recordings and Materials Preservation Act (PRMPA) of 1974 put all Presidential records from the Nixon Administration into federal custody and laid an important foundation for future legislation and executive actions.

Freedom of Information Act (FOIA) Amendments of 1974

The FOIA Amendments of 1974 sought to address the concerns that were highlighted during the Subcommittee on Government Information's oversight hearings into the FOIA (Blanton, et al., 2004). With the resignation of President Nixon and the public backlash to government corruption and secrecy, the legislative branch was in a strong position to make meaningful changes to the FOIA. A contentious debate and power struggle within the federal government ensued while the likelihood of the bill's passage became more and more likely (Bernstein & Dubose, 2008; Blanton, Elias, Fuchs, & Lopez, 2004). At one time the Federal Bureau of Investigation even stopped participating in negotiations to perfect the bill with congress in an attempt to sabotage the legislation and encourage a veto (Blanton, Elias, Fuchs, & Lopez, 2004). President Ford was being pressured by agencies and interests to veto the bill, if it

OPEN GOVERNMENT: INNOVATIVE PRACTICES

did pass, and he contemplated the repercussions for publicly opposing the bill in his first days in office (Bernstein & Dubose, 2008; Blanton, Elias, Fuchs, & Lopez, 2004). Some of the most important additions to the FOIA, within the legislation, included:

- releasing any portion of materials that is not exempt from nondisclosure
- annual reports on FOIA requests that were denied and the costs involved and payments received relating to FOIA requests
- de novo judicial review of FOIA request appeals and inspection of classified materials to determine if proper classification and withholding is being used
- court imposed sanctions on agency employees that wrongfully withhold information
- administrative deadlines for FOIA request responses
- the ability for agencies only to charge FOIA requesters for searching and duplicating records
- successful FOIA litigants would be compensated for court costs (Blanton, Elias, Fuchs, & Lopez, 2004; Garson, 2006).

Perhaps the most powerful and worrisome for public officials of all the added provisions to the FOIA was the addition of judicial review of federal decisions to withhold information requested under the FOIA (Bernstein & Dubose, 2008). Also, as stated above, that judicial review authority came with the ability for courts to review classified material to be able to better rule on whether information that was being withheld under one of the FOIA exemptions was lawful.

The bill passed both the House and the Senate and on October 17, 1974. President Gerald Ford vetoed the bill to amend the FOIA citing concerns for national security and diplomatic relations (Ford, 1974). Ford also criticized the amount of government resources it would take for government agencies to go through thousands of pages of documents and provide justification for why information should be withheld and Ford believed the time limits were unrealistic (Ford, 1974). On November 20, 1974 the United States Congress overrode the Presidential veto. In a passionate address by the leader of the subcommittee that drafted the amendments, Massachusetts Senator Edward M. Kennedy, the President's concerns, as well as the bureaucracy's, were rebuffed (120th Cong., 1974). Senator Kennedy cited numerous admitted incidences of abuse by the executive branch and government agencies including using the claim of national security interests for government cover up and using classified designations to hide agency mistakes or negligence (120th Cong., 1974). Gerald Ford's veto was overturned and the FOIA was strengthened to give the public better recourse in the event of a denied FOIA request and a more accountable FOIA request process.

The Privacy Act of 1974, the CIA Information Act of 1984, and the Reagan Years

The same year the 1974 amendments to the FOIA were past, a new exemption was created to FOIA requests via the Privacy Act of 1974 (Garson, 2006). The Privacy Act of 1974

OPEN GOVERNMENT: INNOVATIVE PRACTICES

stipulations for not releasing federal records without consent were stated to not apply to information that fell within the FOIA, but it was used by the Ford Justice Department to mean all personnel files would be exempt (Garson, 2006). This practice continued until it was clarified by the CIA Information Act of 1984 when Congress said the Privacy Act could not be used as a FOIA exemption (Garson, 2006). The CIA Information Act also, ironically perhaps, made information and records of the CIA nearly impossible to obtain from a FOIA request (Garson, 2006). Two years later, the Freedom of Information Act Reform Act of 1986 broadened law enforcement exemptions within the FOIA that increased the ability of federal agencies to claim exemptions to FOIA requests (Garson, 2006). An important contribution of the Privacy Act of 1974 was that many agencies began sharing data and creating databases that matched information across federal agencies (Garson, 2006). In 1987, President Ronald Reagan issued Executive Order 12600 that enhanced the ability of corporations to block information being released that was “confidential commercial information” if it could be viewed to cause “substantial competitive harm” (Reagan, 1987). So if a FOIA request was made that would include commercial information, the commercial party would be notified and if they objected the agency could deny a request or withhold the related information (Reagan, 1987).

Clinton Era: Openness in Government, Electronic Information, and E-FOIA

During the 1990s the FOIA and government information were brought into the digital age. The Clinton administration encouraged agencies to operate with “the principle of openness” with all agency disclosures and promoted an Openness in Government initiative (Reno, 1993). The administration informed agencies that the Justice Department would no longer side with a government agency because there was a “substantial legal basis” to do so, but, instead, would operate on a “presumption of disclosure” (Reno, 1993). Further, agencies were instructed that FOIA requests should not be denied because they fall within an exemption unless “disclosure would be harmful to an interest protected by that exemption” (Reno, 1993). The administration recognized the large problem with FOIA request backlogs, agencies’ inability to meet the legal response times, and the lack of funding and resources needed by agencies (Reno, 1993). President Clinton’s Circular A-130, a policy document updated periodically by administrations, revised information policies and instructed agencies to no longer use third-parties for information maintenance and disclosure (Garson, 2006). Circular A-130, entitled Management of Federal Information Resources, also made the same legal protections applied to publications and audio-visual recordings to apply to “electronic information products” (Office of the Press Secretary, 1993). Circular A-130 would be updated again, by the OMB during President Obama’s administration, to define information “as any communication or representation of knowledge such as facts, data, or opinions presented in any medium or format” (Office of Management and Budget [OMB], 2009). With the addition of the Electronic Freedom of Information Act Amendments of 1996 (E-FOIA) agencies were required to publish records online.

Also, President Clinton issued an executive order in 1993 (E.O. 12862) and two memorandums (1995 and 1998) to improve the delivery of services from government agencies

OPEN GOVERNMENT: INNOVATIVE PRACTICES

and solicit public input about the quality of government services. Agencies that deliver services to the public were required, among other things, to:

- Identify and Survey Customers
- Establish service standards and Track Performance
- Track and Compare Customer Service Performance to other Organizations

These executive actions were later built upon by Obama's E.O. 13571 (2011) and the Digital Government Strategy (2012). During the time of the Presidency of Bill Clinton, many advancements in managing government information and services were achieved. These changes were fueled by the technology of the day combined with federal policies of government openness.

George W. Bush Era: National Security, E-Government Act of 2002 and Open Government Act of 2007

Shortly after the 9/11 terrorist attacks in 2001, Attorney General John Ashcroft released a memorandum on the FOIA on October 12, 2001 superseding former Attorney General Reno's 1993 memorandum instructing the presumption of disclosure. The position of the Department of Justice returned to protecting agencies in withholding information "unless they lack a sound legal basis or present an unwarranted risk of adverse impact on the ability of other agencies to protect other important records" (Ashcroft, 2001). Agencies were instructed to only disclose information "after full and deliberate consideration of the institutional, commercial, and personal privacy interests that could be implicated by disclosure of the information" (Ashcroft, 2001). On November 1, 2001, President Bush issued an Executive Order 13233 concerning presidential records. Presidential records would be allowed to be withheld by former Presidents for up to 12 years by invoking confidential privilege. The executive order also applied the Presidential Records Act of 1978 to Vice Presidential records as well. A year later, on November 27, 2002, an amendment to the FOIA signed into law, as a part of the Intelligence Authorization Act for Fiscal Year 2003, to disallow FOIA requests to be made by groups not originating within the United States or operating through an official representative.

On December 17, 2002, the E-Government Act of 2002 was signed into law and continued the trend of digitizing government information and improving and promoting government services through the use of the internet, computers, and electronic tools. The E-Government Act was a multifaceted piece of open government legislation that was before its time. The legislation, also, created the important position of Chief Technology Officer (CTO) for the Office of Management and Budget (OMB). Some of the stated purposes of the act and its provisions included:

- To promote use of the Internet and other information technologies to provide increased opportunities for citizen participation in Government.

OPEN GOVERNMENT: INNOVATIVE PRACTICES

- To promote interagency collaboration in providing electronic Government services, where this collaboration would improve the service to citizens by integrating related functions, and in the use of internal electronic Government processes, where this collaboration would improve the efficiency and effectiveness of the processes.
- To promote the use of the Internet and emerging technologies within and across government agencies to provide citizen-centric Government information and services.
- To promote better informed decision-making by policy makers.
- To promote access to high quality Government information and services across multiple channels.
- To make the Federal Government more transparent and accountable.
- To transform agency operations by utilizing, where appropriate, best practices from public and private sector organizations.
- To improve the ability of the Government to achieve agency missions and program performance goals.
- To reduce costs and burdens for businesses and other Government entities.

The legislation reads like a modern open government plan and many of the ideas and concepts written into the law promoted lasting principles and goals that continue to endure 15 years later. President Obama would echo many of these concepts throughout his policies and initiatives as president.

From 2005-2008, several more pieces of legislation passed that improved government transparency and access to government information: Federal Funding Accountability and Transparency Act (FFATA) of 2006, Honest Leadership and Open Government Act of 2007, Federal Funding and Transparency Act (FFATA) of 2008. M-06-02, Improving Public Access to and Dissemination of Government Information and Using the Federal Enterprise Architecture Data Reference, also contributed to the changes in handling and distributing government information.

The Honest Leadership and Open Government Act of 2007 also notably amended the FOIA and extended standing by news groups to make FOIA requests extend to bloggers or other new media.

Barack Obama's First Day in Office: Jump-Starting Open Government

January 21, 2009 was Barack Obama's first day in office and an important day for open government with the release of two presidential memorandums and an executive order. The first executive action to bear the President's signature was the Memorandum on Transparency and Open Government (White House, 2011). The memorandum was directed to federal agencies and departments and stated government should be transparent, participatory, and collaborative to help strengthen democracy and increase the effectiveness and efficiency of government. The memorandum also called for the coordination of efforts to draft an Open Government Directive,

OPEN GOVERNMENT: INNOVATIVE PRACTICES

within 120 days, to direct executive departments and agencies to implement the principles within the memorandum.

Also on January 21, 2009, Barack Obama issued a memorandum pertaining to the Freedom of Information Act calling for presumptive disclosure by all government agencies to resume and that agencies should use modern technology to inform the public about the workings of their agencies and release information without waiting for requests from the public (Obama, Memorandum: Freedom of Information Act, 2009). This “presumption of openness” was further outlined by Attorney General Eric Holder in December of 2009, with a memorandum released to federal government agencies (Holder, 2009).

The third important executive action taken by President Barack Obama on his first day in office, relating to open government, was Executive Order 13489 dealing with the release of presidential records. E.O. 13489 revoked E.O. 13233 signed on November 1, 2001 by President George W. Bush addressing the release of presidential records. The executive order gives 30 days for former and incumbent presidents to review presidential records before being released to the public (Ginsberg, 2014). On November 26, 2014, under the 113th Congress (2013-2014), this time frame was extended to 60 days with the passing of the Presidential and Federal Records Act Amendments of 2014 (Ginsberg, 2014).

Open Government Directive

In the Memorandum on Transparency and Open Government (2009), President Obama directed the Chief Technology Officer (CTO), the Office of Management and Budget (OMB), and the Administrator of General Services to coordinate the development of the Open Government Directive (Obama, Memorandum: Freedom of Information Act, 2009). On February 24, 2009, the CTO, OMB, and the General Services Administration (GSA) released memorandum M-09-12, entitled President’s Memorandum on Transparency and Open Government - Interagency Collaboration, calling upon federal employees, agencies, and existing interagency groups to be a part of an interagency, collaborative discussion and process for developing the Open Government Directive (Holdren, Orszag, & Prouty, 2009). Online sessions and discussions would provide the “opportunity to propose topics, strategize alternatives, and make suggestions...as well as identification of potential legal, policy, and programmatic issues that will need to be resolved” (Holdren, Orszag, & Prouty, 2009, p. 2). On December 8, 2009, the OMB Director, Peter Orszag, released the resulting important memorandum, M-10-06, the Open Government Directive.

In the Open Government Directive, federal agencies were instructed to implement several new open government initiatives that progressed the vision of transparency, participation and collaboration and stayed consistent with the policies outlined in: President Obama’s Memorandum on Transparency and Open Government, Attorney General Eric Holder’s memorandum on the implementation of the FOIA, and the policy of presumptive disclosure by government. The new requirements for federal agencies included to:

OPEN GOVERNMENT: INNOVATIVE PRACTICES

- Create and publish their own Open Government Plans
- Release and publish information online in an “open format”
- Publish at least three high-value data sets to data.gov
- Create an Open Government Webpage
- Include avenues for public feedback on Open Government pages for open government plans and published information
- Regularly respond to public feedback on Open Government webpages
- Reduce FOIA backlogs
- Improve the quality of published open data
- Appoint an agency lead for ensuring the quality of published open data
- Abide by deadlines for the completion of open government objectives
- Implement “incentive-backed strategies to find innovative or cost-effective solutions to improving open government”
- Proactively use modern technology to release information
- Create Flagship Initiatives that promote transparency, participation, or collaboration (at least one)
- Information of declassification programs and how to gain access to declassified materials
- Congressional request reports

The framework laid out in the Open Government Directive has had a transformational effect to the workings of federal government agencies and open government practices in the United States. An increase in public participation, collaboration, and transparency has indeed resulted. Agencies have embraced the directive to varying extents that will be discussed, further, later. Though the general agency requirements for open government: plans, webpages, flagship initiatives, high-quality data sets, participation with centralized federal data sites, integration of new technologies and standards, and increased public feedback and participation has led to an experimental expansion of open government.

Open Government Working Group

Beyond new agency requirements and expectations, the Open Government Directive also outlined the centralized role the OMB would play in assisting with integrating new technologies and guidelines and provide guidance on policy changes and increased openness in government (OMB, 2009). The Deputy Director for Management at the OMB, the Federal Chief Information Officer, and the Federal Chief Technology Officer were tasked with establishing an inter-agency working group to focus on collaboration, transparency, accountability, and participation within the Federal Government. The Open Government Directive instructed this working group to be composed of “senior level representation from program and management offices throughout the Government”. The functions of this working group are stated to include:

OPEN GOVERNMENT: INNOVATIVE PRACTICES

- Providing a forum to share best practices on innovative ideas to promote transparency, including system and process solutions for information collection, aggregation, validation, and dissemination
- Coordinating efforts to implement existing mandates for Federal spending transparency, including the Federal Funding Accountability Transparency Act and the American Reinvestment and Recovery Act
- Providing a forum to share best practices on innovative ideas to promote participation and collaboration, including how to experiment with new technologies, take advantage of the expertise and insight of people both inside and outside the Federal Government, and form high-impact collaborations with researchers, the private sector, and civil society.” - (Section 3c)

Observations, by the author, of this working group show it is still functioning as of 2016 and encourages agency collaboration and the opportunity to share insights and experiences between government agencies and host nongovernment guests as well. Meetings of this working group happen simultaneously via large conference calls, video conferencing, and an in person meeting as a larger collective multi-medium meeting with various interactions and presentations by agency representatives and guests.

Open Government Plans

The agencies' Open Government Plans vary greatly from agency to agency with some being very minimal to others that are extremely experimental or that harness ideas that were successful from other organizations. In the Open Government Directive (2009), agencies were instructed on how to formulate Open Government Plans and what components should be included. An agency's plan was required to include details of how agencies would increase collaboration, participation, and transparency within their agency and also detailed various requirements for publishing agency information and introducing innovative ways to increase collaboration and public participation.

In the 2009 Memorandum on Transparency and Open Government, President Obama stated that government should be transparent, participatory, and collaborative. These three terms have created a direction and foundation for federal agency open government requirements and goals. In the Open Government Directive, requirements for agencies' open government plans were outlined with a section each for transparency, public participation, and collaboration. Excerpts from the introduction of each section are included below to show the level of importance place on each topic.

Transparency- Your agency's Open Government Plan should explain in detail how your agency will improve transparency. It should describe steps the agency will take to conduct its work more openly and publish its information online, including any

OPEN GOVERNMENT: INNOVATIVE PRACTICES

proposed changes to internal management and administrative policies to improve transparency. (p. 7)

Participation- Your agency's Open Government Plan should explain in detail how your agency will improve participation, including steps your agency will take to revise its current practices to increase opportunities for public participation in and feedback on the agency's core mission activities (p. 9).

Collaboration- Your agency's Open Government Plan should explain in detail how your agency will improve collaboration, including steps the agency will take to revise its current practices to further cooperation with other Federal and non-Federal governmental agencies, the public, and non-profit and private entities in fulfilling the agency's core mission activities (p. 9).

Open Government Plans were to be created with input from senior policy, technology, and legal agency leadership within the agency as well as open government experts and the public. Agency Open Government Plans vary from 10 pages to around 100 pages. The majority of federal agencies released open government plans in: 2010, 2012, and 2014 as required by the Open Government Directive. Some agencies have released Open Government Plan updates every year and have labeled the in between years versions 1.5, 2.5, and 3.5. The department of Commerce is a good example of an agency that has used this schedule for Open Government Plan updates, beyond the every two year requirement. The OMB released updated guidelines for agencies' Open Government plans in 2014 and 2016.

Guidelines and requirements for agencies' open government plans have been updated by the OMB in 2014 and 2016. In a memorandum released on February 24, 2014, entitled 2014 Agency Open Government Plans, new guidelines were given to federal agencies for their open government: plans, initiatives, and websites.

The new and expanded initiatives to be incorporated in agencies' 2014 Open Government Plans:

- Open Data
- Proactive Disclosures
- Privacy
- Whistleblower Protection
- Websites

Ongoing initiatives to be incorporated in agencies' 2014 Open Government Plans:

- Participation in Transparency Initiatives
- Public Notice
- Records Management
- FOIA Requests
- Congressional Requests
- Declassification

OPEN GOVERNMENT: INNOVATIVE PRACTICES

- Participation
- Collaboration
- Flagship Initiative
- Public and Agency Ideas

Guidelines for agencies' 2016 Open Government Plans were delayed until the release of memorandum m-16-16, on July 15, 2016 - 2016 Agency Open Government Plans. The memorandum calls for yearly updates to agencies' Open Government Plans to be released beginning on September 15, 2016. Though, as of November 2016, some Federal Agencies do not appear to have yet published Open Government Plans after their 2014-2016 versions. Several new components for agencies' Open Government Plans were added with the OMB's 2016 guidelines. Also, previously required Open Government Plan components were expanded upon with the 2016 OMB guidelines. Additional initiative sections to be incorporated in agencies 2016 Open Government Plans included:

- Open Innovation Methods
- Access to Scientific Data and Publications
- Open Source Software
- Spending Information

The Open Government Directive (2009) also required agencies to outline at least one Flagship Initiative that focused on transparency, collaboration, and/or participation within their open government plans. The requirement for agency Flagship Initiatives has been a recurring requirement through the updated guidelines released by the OMB. Required updates on the status of previous Flagship Initiatives and new initiatives are required in new Open Government Plans.

Data Portals and Government APIs

Data portals have become powerful tools of open government and they continue to grow and evolve. In March of 2009, a new Chief Information Officer for the OMB, Vivek Kundra, was appointed and announced the creation of data.gov (Hansell, 2009). In December of 2009, M-10-06, the Open Government Directive instructed federal agencies to publish available data on data.gov and identify other potential data sources that could be published. At minimum, agencies were to publish three machine readable high-value data sets. A steady increase to the number of available data sets has resulted since the creation of data.gov, and the utility has gone far beyond accessing research data. Eurostat for the European Union and Data.gov.uk for the United Kingdom are also similar large scale government data portals.

These three sites are growing destinations for accessing government: applications, APIs, tools, data visualizations, research, records, statistics, spatial data, and more. Data.gov hosts nearly 200,000 data sets, approximately 9,000 APIs and links to 334 government applications available from 78 agencies and sub agencies of the federal government and 30 non-federal (state, city, county, tribal) sources (U. S. General Services Administration [GSA], n.d.-a). Data.gov acts

OPEN GOVERNMENT: INNOVATIVE PRACTICES

as an aggregate for information on open data resources and state, local, and tribal governments can submit data to be displayed by submitting data sets that meet the federal requirements and standards (GSA, n.d.-b). Researchers, software and application developers, entrepreneurs, journalists, nonprofits, private firms, and more all have the potential to greatly benefit from the trove of data and tools available through government data portals like data.gov, Eurostat, and data.gov.uk.

Data.gov was developed publicly on GitHub with the use of the open source platforms CKAN and WordPress (GSA, n.d.-b). The Open Data Policy - Managing Information like an Asset, released in 2013, set new data standards for metadata and metadata vocabulary through the Project Open Data Metadata Schema. The standards include required fields for all data sets published to data.gov.

Open Government Partnership (OGP) and Open Government Declaration

On September 20, 2011, at the United Nations General Assembly, President Barack Obama along with seven other heads of state and civil society leaders publicly endorsed the Open Government Declaration and formed the multilateral initiative of the Open Government Partnership (OGP) (White House, n.d.-a; United States Department of State, n.d.). The eight founding member countries of the OGP included: Brazil, Indonesia, Mexico, Norway, the Philippines, South Africa, the United Kingdom, and the United States (United States Department of State, n.d.). Today, membership to the OGP has expanded from the original eight founding nations to 70 nations around the globe and over a third of the world's population live in a nation that is a member of the OGP (White House, n.d.-a; Open Government Partnership, n.d.-a). The map below comes from the OGP and displays member countries and their various levels of progress with NAPs. The OGP releases annual reports, holds annual summits, and gives awards for innovative practices. Also of note, the hashtag on Twitter for the OGP, #ogpatun, has seen a steady stream of activity from around the world from citizens, government officials, and members of civil society.

For a country to become a member of the OGP it must take three outlined steps: achieve eligibility, submit a letter of intent, and identify a lead ministry or agency and begin developing an Action Plan (Open Government Partnership, n.d.-b). To achieve eligibility, a nation must show a level of commitment to open government principles in the areas of: fiscal transparency, access to information, income and asset disclosures, and citizen engagement. Nations must meet a minimum eligibility criteria level of 75% to be deemed eligible for admittance. In the letter of intent filed with the OGP, the applying nation must endorse the principles and commitments of the Open Government Declaration and letters of intent are published on the OGP website. Finally, in naming a lead agency or ministry and developing a National Action Plan (NAP), permanent mechanisms for public input and consultation with civil society must be established.

The Open Government Declaration, the foundational document of the OGP, is a concise document that, once endorsed, acts as a nonbinding, voluntary commitment for nations to the principles of open government in the 21st century. The document opens with an

OPEN GOVERNMENT: INNOVATIVE PRACTICES

acknowledgment that citizens from around the world are demanding more openness in government including increased: transparency, accountability, civic participation, responsiveness of government, and government effectiveness (Open Government Partnership, 2011). Further, the Open Government Declaration recognizes the value of promoting openness when engaging with citizens to manage resources, improve services, promote innovation, and create safer communities. The document highlights its natural association to promoting human rights, human dignity, better government, innovation, progress, and an increasingly interconnected world. The main titles of the four commitment sections include: 1. Increase the availability of information about governmental activities, 2. Support civic participation, 3. Implement the highest standards of professional integrity throughout our administrations, 4. Increase access to new technologies for openness and accountability.

National Action Plans (NAPs)

Also during the September 2011 United Nations General Assembly, the United States released its 1st National Action Plan entitled The Open Government Partnership: National Action Plan for the United States of America. NAPs act as a guide to current and future open government commitments, initiatives, and strategies. 23 new, federal level, open government commitments were created or expanded upon in the United States' 1st NAP. The 2nd U.S. NAP was released on December 5, 2013 and the 3rd U.S. NAP was released on October 27, 2015. Each successive plan has become longer and more in depth as the foundations of a new approach to government, on a national level, are being formulated and expanded upon.

E.O. 13571 and the Digital Government Strategy

On April 27, 2011, President Obama released Executive Order 13571 - Streamlining Service Delivery and Improving Customer Service. The executive order cited the previous executive actions by President Clinton and added that advancements in technology and service delivery in other sectors had caused the public's expectations for government to rise (Obama, Streamlining Service Delivery and Improving Customer Service, 2011). Agencies were instructed to, among other things, identify ways to streamline service delivery with innovative technologies, decrease delivery times of services, improve the customer experience, and develop Customer Service Plans. In E.O. 13571 in 2011, President Obama instructed the Federal CIO to develop a government-wide digital government strategy (Obama, Streamlining Service Delivery and Improving Customer Service, 2011).

On May 23, 2012, the CIO released Digital Government: Building a 21st Century Platform to Better Serve the American People, also known as the Digital Government Strategy. Obama stated in a memorandum released the same day, that he had instructed the CIO to create this strategy to create a "digital Government that delivers better digital services to the American people" (Obama, 2012). The Digital Government Strategy created new practices, standards, and organizations to increase inter-agency collaboration, manage digital content, better deliver

OPEN GOVERNMENT: INNOVATIVE PRACTICES

services at lower costs, and share experiences and technologies within the government (Chief Information Officer Council, 2012).

The Digital Government Strategy also called for the creation of a Digital Services Innovation Center and Advisory Group. The Advisory Group was to be assembled with leaders across government agencies to coordinate agency collaboration. The initial goals of the Advisory Group were:

- Advise the CIO on the implementation of the Digital Government Strategy
- Help prioritize shared services needs for the Digital Services Innovation Center
- Foster the sharing of existing policies and best practices
- Identify and recommend changes to help close gaps in policy and standards
- Publish deliverables online

The Innovation Center had three initial goals:

- Identify shared and open content management system (CMS) solutions and support implementation through training and best practices
- Help agencies develop web APIs and unlock valuable data
- Launch a shared mobile application development program

Open Data Memorandum and Open and Machine Readable Information E.O.

On May 9, 2013, the OMB released M-13-13, Open Data Policy-Managing Information as an Asset on the same day as President Obama released E.O. 13642, Making Open and Machine Readable the New Default for Government Information. The Open Data Policy put in place new policy requirements to better steward the collection and management of data through its life-cycle and requirements for agencies including: an enterprise data inventory of all data resources for agencies and a public data listing (Office of Management and Budget, 2013). The importance of making documents machine readable and managing data through its life cycle was a major focus of these actions.

Open Government from 2014 to 2016 and the FOIA Improvement Act of 2016

2014-2016 saw increased expansion of open government initiatives by federal agencies through the release of 3.0 Open Government Plans and the White House through the third NAP. 2014-2016 seemed to be a time of experimental practices by federal agencies trying to implement new open government tools, practices, and systems while identifying new potential directions for open government within the agency. Identifying, digitizing, standardizing, and publishing datasets became a chief priority for agencies through mandated OMB and executive requirements.

The FOIA Improvement Act of 2016 (Pub. L. 114-185) codified into law several important FOIA and OGD policies including: the Department of Justice's "foreseeable harm" standard for FOIA requests, presumptive disclosure by segregating and releasing nonexempt information not restricted by law, and notify requesters of denied FOIA requests of their right

OPEN GOVERNMENT: INNOVATIVE PRACTICES

and services to appeal decisions. Other components of the legislation include duties for Chief FOIA Officers, the creation of a Chief FOIA Officer Council, and additional FOIA report requirements.

Open Government History Analysis

Balancing national security/privacy concerns and the public's access to government information will most certainly be an ongoing issue of debate around the world. As executive administrations, technologies, and common standards change, so shall the default approaches to dealing with disclosure and OGD. Though, the infrastructure put in place to improve government services and manage government data is unlikely to be drastically reversed. As presidential administrations change, it will be interesting to watch for executive actions and memorandums from the Attorney General and the OMB on the implementation of the FOIA and the federal government's default stance on open government. Perhaps the biggest unknown is whether traditions, partnerships, and mandates on open government and public participation will be continued or eliminated. Will NAPs, agency open government plans, and open government initiatives become ingrained parts of our system or a passing fad? Will the presumption of disclosure of federal agency information continue, regardless of administration, after steps were taken to codify DOJ implementation guidance like the foreseeable harm standard? Will the Department of Justice find a way to revert back to defending federal agency decisions to withhold information and deny FOIA requests if a legal basis can be established? How will the handling and release of presidential records change by administration?

International trends and agreements seem to show open government as here to stay or a nation might risk missing out on improvements for government, private sectors, and the public in innovation, productivity, collaboration, and economic potential. The federal government stance on continuously pursuing higher levels of open government, aspired to by President Obama, will more than likely change by administration, but the cultures, systems, processes, and infrastructure implemented and embraced by agencies, over the last eight years, will have lasting impacts of varying degree.

Following the history of open government policy has highlighted how public pressure, crises, fear, and politics can lead to new open government policies. The Roaring Twenties, the Great Depression, the Cold War, the Watergate scandal, September 11th, and changes in Presidential administrations have all had transformative effects that influenced open government policies and especially in regard to public access to government information. While it is true that closing out the year of 2016 the United States enjoys the highest level of transparency and public participation in the nation's history, reviewing the history of open government reveals that it has not always been a linear progression towards greater transparency. The patterns of oscillation between greater levels of government transparency and restricting access to government information has repeated enough to be significant. With new methods and tools for collecting and distributing government data being implemented, new privacy and security concerns can be imagined. Beyond new technology created concerns, geopolitical tensions and international

OPEN GOVERNMENT: INNOVATIVE PRACTICES

relations could drastically effect access to OGD and public participation. During the Cold War and the post 9/11 Bush administration, access to information was restricted that was once made available to the public. It is not unrealistic to expect that large geopolitical events could once again be used as justification for restricting public access to government information.

Open Government: Tools, infrastructure, and Practices

“Opening up government data can be an essential measure to increase transparency and accountability, promote participation, and stimulate innovation in institutions.”

- (Department of Economic and Social Affairs [DESA], 2016, p. 47)

The quickly evolving study, design, and implementation of open government has been accompanied by several common tools, practices, and concepts. This section will explore these commonalities as well as several notable and innovative open government initiatives. By better understanding these complex topics and the current scope of engagement and transformation happening within the federal government and around the world, the hope is that new insight and inspiration can be gained to aid in the design of the open innovation, open government, and planning platforms of the future.

Open government promotes inclusiveness for the improvement of government. Looking at the tools and practices driving open government forward reveals the potential impact of a given tool is amplified by its ability to be inclusive in larger capacities. Part of this inclusion potential comes from a personal interest by a member of the public or government to be involved and the other is on the part of the government and third-party facilitators to ensure the ability to participate is present. For instance, inclusion can come in the form of allowing for the reuse of data, e-tools, software code, etc. through open data standards and open licenses, or inclusion in open government might come in the form of collaborative design, production, and innovation. The theme of inclusion spans all areas of open government in varying forms. Informing the public in a way that is efficient, reliable, timely, and useful is in the interest of government and the public and creates the foundation for more complex forms of government interaction with the public.

Depending on the objectives of an open government initiative, open government is easily scalable to an organization’s objectives. Simple web browser tools can be created with free or open software with minimal technical skills or by watching free video tutorials. On the other end of the spectrum, complex data infrastructure and collaborative platform designs can be resource intensive undertakings.

One of the most significant shifts associated with open government is the ability for government to act more as a facilitator and a force of empowerment to public problem solving, e-participation, and e-decision-making. With government acting as a regulator, moderator, and an agent of legitimacy for open government problem solving by the public, this trend is already blurring the line between government and public actions. In this shift, government acts as a medium through which problems can be solved by the public while the government supplies

OPEN GOVERNMENT: INNOVATIVE PRACTICES

information, expertise, services, and legitimacy to support the process. This type of public problem solving could take any number of forms like a value based decision like how to allocate funds or a development project to address food supply vulnerabilities.

Open Government Tools

Open government can be undertaken with varying levels of public interaction and different tools can aid in achieving the open government goals of an organization or initiative. The United Nation's 2016 E-Government Survey is a great source for tracing open government and e-government trends from across the globe. Some of the most commonly used e-participation tools and activities, from around the world, are cited as including:

- Information provision online, including Open Government Data
- E-campaigning, e-petitioning
- Co-production and collaborative e-environments
- Innovation spaces, hackathons, crowdfunding
- Public policy discourses, including crowdsourcing, online consultation and deliberation, argument mapping
- E-polling, e-voting (DESA, 2016, p. 62)

The survey also distinguishes between three components to e-participation included in the survey's E-Participation Index (EPI). The index ranks countries relative to the highest ranking nation's index score. The three components of the EPI are e-information, e-consultation, and e-decision making:

- **e-information** – provision of information on the Internet
- **e-consultation** – organizing public consultations online
- **e-decision-making** – involving citizens directly in decision processes (DESA, 2016, p. 54)

While the United Nations uses the EPI and its three components listed above to gauge levels of public participation present within nations, the research in this article utilizes the International Association of Public Participation's (IAP2) Public Participation Spectrum to categorize initiatives and tools on a spectrum of five levels of public participation.

The IAP2 spectrum is divided into five levels of public participation to help define and identify the public's role in any public participation project (International Association of Public Participation [IAP2], 2007). The five levels, in order of increasing levels of public participation, are: inform, consult, involve, collaborate, and empower and is visualized in Figure 3. The public participation goal, the promise to the public, and example techniques for each level of the spectrum are detailed in Figure 4, 5, and 6 below.

OPEN GOVERNMENT: INNOVATIVE PRACTICES

Figure 3: IAP2 Spectrum**Figure 4: IAP2 Spectrum Public Participation Goals**

Inform	Consult
To provide the public with balanced and objective information to assist them in understanding the problem, alternatives, opportunities and/or solutions.	To obtain public feedback on analysis, alternatives and/or decisions.
Involve	Collaborate
To work directly with the public throughout the process to ensure that public concerns and aspirations are consistently understood and considered.	To partner with the public in each aspect of the decision including the development of alternatives and the identification of the preferred solution.
Empower	
To place final decision making in the hands of the public.	

OPEN GOVERNMENT: INNOVATIVE PRACTICES

Figure 5: IAP2 Spectrum Promise to the Public

Inform	Consult
We will keep you informed.	We will keep you informed, listen to and acknowledge concerns and aspirations, and provide feedback on how public input influenced the decision. We will seek your feedback on drafts and proposals.
Involve	Collaborate
We will work with you to ensure that your concerns and aspirations are directly reflected in the alternatives developed and provide feedback on how public input influenced the decision.	We will work together with you to formulate solutions and incorporate your advice and recommendations into the decisions to the maximum extent possible.
Empower	
We will implement what you decide.	

Figure 6: IAP2 Spectrum Example Techniques

Inform	Consult
Fact Sheets, Web sites, Open houses	Public comment, Focus groups, Surveys, Public meetings
Involve	Collaborate
Workshops, Deliberative polling	Citizen advisory committees, Consensus-building, Participatory decision-making
Empower	
Citizen juries, Ballots, Delegated decision making	

Figure 7 below utilizes the IAP2 spectrum to categorize and organize open government tools. Often open government tools can be utilized in very different capacities to engage the public. For instance, an open government mobile application could be used to inform the public or facilitate collaborative design. For that reason, tools can occupy multiple categories. This table not only provides a way to identify tools to help accomplish open government goals, it also highlights the relationship of these tools to varying levels of public participation. Tools were

OPEN GOVERNMENT: INNOVATIVE PRACTICES

color-coded if they could be implemented to achieve multiple levels of public participation within the IAP2 Spectrum. Each color corresponds to the lowest level of the spectrum the tools can be applied to, to be reasonably achieved. Tools that are not color-coded were unique to one category. While some categorizations could be open to debate, one of the uses of this table is to better understand that tools have barriers that are either inherent or through lack of design. As an example, emailing can facilitate public participation through acquiring feedback and exchanging ideas but isn't a very reasonable medium for public decision making without the aid of other facilitation tools or concepts. On the other hand, a mobile application could be used to achieve any level of public participation but is limited by its own design and the open government infrastructure it is utilizing. For one other example, a public comment section and a collaborative e-environment could be in the exact same medium and format with only the goal of the interaction changing. By categorizing open government tools using the IAP2 Public Participation Spectrum, insights into the potential benefits, uses, and limitations of open government tools are revealed. The IAP2 spectrum also draws attention to how these open government tools correspond to higher levels of public participation. The results for the categorization of open government tools using the IAP2 Spectrum are displayed on the following page, in Figure 7.

OPEN GOVERNMENT: INNOVATIVE PRACTICES

Figure 7: Open Government Tools Categorized by the IAP2 Spectrum

Inform Tools	Consult Tools	Involve Tools	Collaboration Tools	Empower Tools
Open Government Webpages	Open Government Webpages	Open Government Webpages	Open Government Webpages	Open Government Webpages
Software Developer pages	Software Developer Pages	Software Developer Pages and Tools	Software Developer Pages and Tools	Software Developer Pages and Tools
Interactive Data and Maps	Interactive Data and Maps	Interactive Data and Maps	Interactive Data and Maps	Interactive Data and Maps
Web Browser Applications	Web Browser Applications	Web Browser Applications	Web Browser Applications	Web Browser Applications
Mobile Applications	Mobile Applications	Mobile Applications	Mobile Applications	Mobile Applications
Issue Specific e-Hubs	Issue Specific e-Hubs	Issue Specific e-Hubs	Issue Specific e-Hubs	Issue Specific e-Hubs
Collaborative Networks	Collaborative Networks	Collaborative Networks	Collaborative Networks	Collaborative Networks
Social Media	Social Media	Social Media	Social Media	
Message Boards	Message Boards	Message Boards	Message Boards	
Email Notifications	Email Feedback	Email Dialog	Email Dialog	
OGD Portals	Public Comment Sections	e-Participation Spaces	Collaborative e-environments	Collaborative e-environments
OGD APIs		e-Voting	e-Voting	e-Voting
Sensing Technologies		Crowdfunding	Crowdfunding	Crowdfunding
Data Analytics		Crowdsourcing	Crowdsourcing	Crowdsourcing
News Feeds		e-Petitioning	e-Petitioning	e-Petitioning
Rich Site Summary (RSS) Feeds		Hackathons	Hackathons	
			e-Decision-Making	e-Decision-Making
			Living Labs	Living Labs
			Innovation Spaces	Innovation Spaces
			Government Proposed Challenges	Government Proposed Challenges
			Co-production Platforms	Co-production Platforms
			Co-design Platforms	Co-design Platforms
			Incentive-based Initiatives	Incentive-based Initiatives
				Platforms for Facilitating Public Problem Solving

OPEN GOVERNMENT: INNOVATIVE PRACTICES

Open Government Infrastructure

Modern open government is built on the foundations of government data that is reusable, accessible, machine-readable, reliable, timely, and useful. Data that has these qualities is referred to as being in an “open format” or being “open data” or when produced by the government “open government data” (OGD). By following open data publishing standards and producing OGD, an organization then needs to manage and curate the data and create avenues for the information to be utilized by the public, stakeholders, researchers, and software developers. Enterprise data management systems can help organize, track, publish, and streamline the processing of large databases. OGD portals and APIs act as delivery vehicles for large amounts of data to the public and interested parties. Open data and the World Wide Web Consortium (W3C) standards can further be applied to create linked open government data (LOGD)^{iv}. Once OGD is published and made available to the public, both government and non-governmental interests can develop mobile applications, web browser applications, and enhanced government services. Furthermore, building up government social media accounts, developing open software to be integrated into other services, providing resources to software developers, and utilizing big data analytics can all build upon an organizations open government infrastructure. Figure 8 below lists some of these infrastructure components for achieving more complex forms of open government.

Figure 8: Open Government Infrastructure

Open Data Publishing Standards
Open Government Data (OGD)
Enterprise Data Management (EDM) Systems
Sensing Technologies (for data streams)
OGD Portals
OGD APIs
Linked Open Government Data (LOGD)
Open Government Webpage
Software Developer Resources
Social Media Accounts
Government Web Browser Applications
Government Mobile Applications
Remote e-Services
Big Data Analytics
Open Software and Code (for reuse and 3rd party integration)
Government as a Platform (GaaP)

OPEN GOVERNMENT: INNOVATIVE PRACTICES

The highest level of foreseeable open government infrastructure would be a combination between the concepts of government as a platform (GaaP), the internet of things (IoT), and linked open government data (LOGD). GaaP envisions a government that facilitates public problem solving and decision-making through user-centric or people-driven models of open government. The IoT envisions a world filled with smart devices and sensors that streamline information delivery. While the Semantic Web^v addresses how information can be discovered, linked, and utilized. The picture appears to be an almost singularity between electronic data and the physical world. This data network will fuel, among others, innovation, problem solving, decision making, planning, and open government.

A modern equivalent example would be weather data. We combine weather data from around states, nations, and even the world to see larger trends, create models, take precautions, plan accordingly, etc. This information comes from sensors and radar from around the planet combined with satellite data and much of it comes from government and is released to be reused by other interests. The public can now receive weather notifications and quickly digest vast amounts of weather data and weather model calculations through a condensed forecast and the utilization of data visualization tools. These same concepts and practices are expanding into other fields and changing the way policies are formed and chosen. The dropping cost barriers to implementing sensing technologies and developing e-government tools combined with the expanses of modern ICTs is fueling a technology transformation in government. Government is in a unique position to gather data that often lies outside of the private sphere or its capabilities and make it available in an open format for reuse. This is perhaps the most important role of the government in the fostering of open government practices. Much of the utility of OGD can be developed by nongovernmental interests, but the government's role as a gatherer, curator, and publisher of trusted information that exclusively falls within the domain or authority of government is paramount.

The section that follows is a closer look into the concepts and infrastructure that enables more complex forms of open government and the challenges that accompany them.

OGD: publishing standards, data management, data portals, and APIs. The sheer volume of government data and records being generated and maintained has grown at an extremely rapid pace, in the digital age, and building the structures and practices to produce and curate data archives takes time and resources. The challenge for government organizations to maintain the vast amount of information, records, and digital accounts will only grow as digital government becomes even more integrated into our lives. Enterprise data inventories became a requirement for U.S. federal agencies with the OMB's 2013 memorandum, Open Data Policy-Managing Information as an Asset. Ensuring the quality, usability, and accountability of OGD is improving but there is still much work to be done. For one example, a review of the OMB's Project Open Data Dashboard (<https://labs.data.gov/dashboard/offices>) shows several agencies that have not committed required datasets to their inventories and there are large variations in compliance between federal agencies.

OPEN GOVERNMENT: INNOVATIVE PRACTICES

Data must be closely managed through its lifecycle starting with appropriate collection methods and recording important metadata. If not already established, data must also be scrutinized for security concerns, privacy concerns, and other potential impacts. Data must also be formatted to be machine-readable and abiding by widely accepted publishing standards that promote reuse and integration into nongovernmental services and endeavors. Data can then be uploaded to a data management system and should be made available to the public in a way that is timely and useful.

Large scale open government data portals like the United States' Data.gov, the European Union's EuroStat, and the United Kingdom's Data.gov.uk act as delivery vehicles for OGD and tools related to OGD. These large data hubs are valuable assets that are improving government transparency, collaboration within government, and engagement with nongovernmental stakeholders. They are also an important resource for encouraging the reuse of data by providing tools and information for software developers and geospatial modeling.

Criticisms since the implementation of these data portals include data being published in unstructured forms, incomplete or missing data fields, and barriers to the public usefulness of the data (Shadbolt, et al., 2012). Some of the challenges and lessons learned through this process include: implementing metadata standards, enabling compatibility of data with other data sets, government retention of licensing rights to data (especially during public-private partnerships and outsourcing), data ownership or privacy concerns, and the general structure of data sets being of a uniform quality and standard (Shadbolt, et al., 2012).

The barrier that exists between published datasets and the ability for datasets to be useful to the public is an area of open government that is continuously evolving with technology, experience, the sharing of knowledge, new standards, and new government policies. The current format of datasets published to large data portals like data.gov can be very useful to researchers and programmers, but the real utility of these data troves for the public will be created by third-parties. While government agencies are releasing their own applications, maps, and services that utilize these data troves, the potential for third parties to create applications and deliver new interfaces for government services or private enterprises is in an exciting early phase.

With the creation of government Application Program Interfaces (APIs), any person, interest, or stakeholder can build applications with prepackaged government data. APIs have become a staple in fueling the mobile marketplace and application development by allowing developers to easily integrate data and services into new formats and uses. By customizing the use and combination of potential public and private APIs, an unlimited potential exists to fuel: innovation, service delivery, research, the economy, public interaction, and open government. Already there are government agencies that are integrating data and APIs from other agencies into their own services and applications. Even lower levels of government including states, counties, and cities have begun to publish their own APIs and open platforms (DC article).

Linked open government data (LOGD) and the Semantic Web. As open government data delivery tools become more refined and useful, the importance of linking OGD to other data

OPEN GOVERNMENT: INNOVATIVE PRACTICES

sources and other open government databases has grown. If OGD can be linked to other data sources to be searched, compared, combined, and easier to identify and generally utilized, the potential value and impact of OGD is increased. OGD that is published with the same standards and properties, to create LOGD, can be potentially linked and cross-referenced by spatial, temporal, ontological, and source association properties (Ding, et al., 2010). Concepts for linking data across the internet dates back to the creator of the World Wide Web and Director of the W3C, Tim Berners-Lee (Berners-Lee T. , 2006; Berners-Lee T. , 2001). Building off of the concept of semantic networks developed decades earlier, Berners-Lee (2001, 2006) first articulated the idea of the Semantic Web, or a web of interconnected data and metadata governed by standard practices for describing the relationship between things, posted online, and embedding that information in a common language that is machine readable. In theory, if these practices are widely applied, this would allow all levels of OGD (county, state, national, international) to be searched, compared, integrated, and utilized in conjunction with other forms of open data or between sources of OGD. For example, national level census data for poverty rates could be compared to state level rates and then compared to other countries through United Nations and World Bank data. That data could then be compared to data from nonprofits of NGOs. Data and statistics would be easily projected and combined into interactive graphical displays, maps, charts, etc. All this could be accomplished quickly and with confidence through a government data portal or search tool or even a third party service.

Though most are still working through challenges, various attempts are currently being undertaken to link government, private, NGO, and nonprofit data archives from all around the world into more centralized websites, applications, and services. For comparison, when a Google search is made for a person, location, business, etc., Google pulls information from trusted sources to compile images, maps, contact information, location information, addresses, relative relationships, and a condensed version of this trusted information is combined and displayed near the top of your search results. Information like this can be provided through APIs created by the originators of the content, or the information can be retrieved and referenced based upon data and metadata publishing standards that can be used to pull information from across the internet. Whether through the combination of functional government APIs or the Semantic Web style, machine-readable, data publishing standards, for data to be retrieved directly from web pages, the goal of LOGD is to create a foundation that allows anyone to find, repurpose, cross-reference and engage with OGD. OGD is only as valuable as it is useful and accessible. Linking OGD increases the usefulness and accessibility of data as well as opens up the possibility for new functions and tools to be developed that build upon this infrastructure.

Government APIs and LOGD are important contributors to future innovation, economic activity, government service delivery, public access to information, and open government services by allowing: third parties to utilize government data for the development of other services and decrease barriers to the public's utilization of OGD. The challenges of maintaining data compatibility, integrity, and quality are improving but will no doubt persist. Barriers to the public utilization of data are being bridged by private and non-governmental interests as well as

OPEN GOVERNMENT: INNOVATIVE PRACTICES

by governments themselves. We can expect to see more user friendly platforms, formats, applications, and tools being released that harness OGD, LOGD, and government APIs. The potential for these data formats to be implemented for meaningful transparency, collaboration, and public participation is inherent and will likely be strengthened by, among others, mobile applications, GIS tools, and nongovernmental services.

Big data analytics. As the size of government data and databases continue to increase, the potential role of big data analytics also increases. The ability to identify trends and harness key insights hidden within large data sets could fuel service delivery, improve government efficiency, inform decision making, and increase the speed of learning from data and evaluating alternatives (DESA, 2016). The potential role big data analytics could play in government services, decision making, and informing the public is impressive and still being realized. As more sensing technologies come online and data streams are automated at higher rates, the vast amount of data generated will need to be sifted by sophisticated programs to reveal trends and useful insights. There is a role to be played by IT, social science, and policy experts in creating and implementing these potentially powerful and influential systems.

Interactive tools and data. With the increased public access to open government data (OGD) and open government resources, the need for effective methods, standards, and tools has been persistent. A recurring complaint of open government data is that barriers still exist to its use by the general public: incomplete data, non-compatible data, and the lack of data visualization tools. Beyond making data accessible in the form of APIs for developers and raw data for researchers, data must be usable by the public in formats that are user friendly. The utilization of mobile technologies, applications, interactive maps, interactive data, graphical displays, and other interactive tools is still greatly needed to make data usable by the general public. Though, with access to quality government APIs, researchers, entrepreneurs, private-interests, nonprofits, and others have the opportunity to fill some of this gap and deliver a variety of services using OGD.

The Internet of things (IoT). The Internet of Things (IoT) is a big concept with large implications for government, the public, and private interests. In the simplest definition, IoT is the web of interconnected devices and sensors around us that send and receive information. A common term for these types of devices and sensors is “smart devices” but how we perceive smart devices in the current marketplace is only a glimpse of the direction technology is moving. The United Nation’s International Telecommunications Union defines the Internet of Things as: “a global infrastructure for the information society, enabling advanced services by interconnecting (physical and virtual) things based on existing and evolving interoperable information and communication technologies” and defined a “thing” as “an object of the physical world (physical things) or the information world (virtual things), which is capable of being identified and integrated into communication networks” (International Telecommunication Union [ITU], 2012, pp. 1-2). In short, the IoT envisions the near future where smart devices and

OPEN GOVERNMENT: INNOVATIVE PRACTICES

sensors collect data about the world around us and devices can communicate between themselves and with larger networks and systems.

A study conducted at the end of 2015 by the research and advisory firm Gartner Inc. found that increases in connected devices used in 2016 would be up 30% worldwide compared to 2015 with 6.4 billion connected “things” and forecasted 20.8 billion connected “things” by 2020 (Gartner, 2015). A 2016 study conducted by Huawei, the Chinese technology and manufacturing company, forecasted 100 billion connected devices by 2025 (Huawei, 2015). Forbes has published articles citing the industry will create trillions of dollars in GDP growth (Morgan, 2014). But, envisioning all the potential of the IoT is not easy. Imagine all smart devices and programs being able to be integrated: smart cars, smart appliances, smart bridges, smart roads, smart machinery, smart homes, self-managed buildings, smart factories, smart lights, mobile devices, wearable devices, smart dams, smart electric grids, smart warning systems, and the list goes on and on. A factory could track and manage its own inventories and logistics. A self-driving car can change routes based on traffic and weather conditions. A bridge can alert engineers when it is approaching the need of repair. A wearable or implanted device can notify your doctor of changing health conditions. And yet, these examples are still small ideas as all objects around us become interconnected through the IoT. What if the IoT and big data analytics or predictive analytics were used to monitor the environment with new precision and new policies, and what if alternatives could be identified and implemented within the larger system to mitigate risk? What if public services and processes were optimized to reduce inefficiencies? What about the potential of new warning systems and processes to detect and mitigate threats? Government has the opportunity to connect “things” to this network that lie outside of the private spheres and coordinate and regulate efforts between government bodies, the public, NGOs, and private organizations.

The open government and public policy implications for the integration of this technology are immense. The United Nations 2016 E-Government Survey says the combination of GIS technologies, big data analytics, and the IoT holds “the potential to transform the way public policy is formulated, implemented, and monitored” (DESA, 2016, p. 5). The use of these combined technologies could allow: increased precision in monitoring and reacting to changing conditions, improved and efficient service delivery, government cost saving, the ability to make better informed policy decisions, and the ability to tackle larger problems (DESA, 2016). The implications to the fields of health, environmental science, planning, public administration, political science, economics, IT, and the private sector will continue to grow as more devices or “things” come online.

As the IoT grows and matures, the hope is that big data will be available in an open cloud format and useable by the public and private spheres to innovate, inform, and repurpose, while considering all appropriate rights to privacy. Publicly available data from the IoT, originating in public and private spheres, can eventually create a near singularity between devices that interact machine to machine (M2M) and machine to user (Burrus, 2014). Principles of big data analytics, predictive analytics, and interactive data visualizations can be applied to the IoT to create

OPEN GOVERNMENT: INNOVATIVE PRACTICES

powerful tools for understanding the world around us, modeling trends, and aiding in decision-making and the formation of policy. The data that will be generated in a more matured version of the IoT will be a valuable asset for innovation, economic activity, and open government. Beyond informing the public with this vast amount of information and the government's own uses of the information, the innovations that could result from this world of data streams, sensing, M2M interactions, and machine to user interactions from nongovernmental spheres is unfathomable. The concept of the Semantic Web strengthens the vision of the IoT by adding in the ability to attach important metadata and describe relationships and definitions attributed to the data that is published using common standards to be openly usable and accessible across the web. In short, the IoT is the network of information that brings together the physical and virtual worlds while the Semantic Web concept is a standard to increase the usefulness of this information and its interconnection to other forms of information.

Government as a platform (GaaP) and the people-driven model. The transformation trends that are driving open government appear to only be the beginning. The concept of government as a platform, sometimes referred to as GaaP, envisions a new way government services are developed, integrated, connected, and utilized by the public (O'Reilly, 2011). Agencies would develop services using designs, standards, and technologies that can be integrated into public and private systems. The results could create a one-stop destination for government services, information, and interactions, a competitive private market for government service delivery, and the potential repurposing of government tools, services, records, and data by researchers, NGOs, and the private sector. GaaP sees government becoming something closer to the workings of a technology or social media company (O'Reilly, 2011). It would be a platform that engages its users to create content, request services, facilitate problem solving, engage with other users, weigh in or vote on issues, etc. (O'Reilly, 2011). One major component of the GaaP concept is it moves away from an ad hoc system of government services to more of an open development model that allows services to be integrated into other services and for other purposes publicly and privately. The other major component is how GaaP can facilitate interactives with and for the public. New user-centric and people-driven models of government are being integrated around the world and the trend seems to be gaining momentum (DESA, 2016). The United Nations Department of Economic and Social Affairs 2016 E-Government Survey describes this trend concisely in this quote below:

There is a growing trend to transform the very nature of the relationship between the general population and public authorities. This shift is from the current people-centric model, whereby governments know and anticipate people's and businesses' needs, towards a people-driven model, whereby citizens and businesses determine their own needs independently from authorities and find solutions in partnership with governments. The vast networking opportunities opened up by new media channels are replacing the traditional 'upon-request' participation model (i.e. people are asked to participate when public authorities ask them to do so) with an 'ondemand' dimension whereby citizens do

OPEN GOVERNMENT: INNOVATIVE PRACTICES

not wait for an invitation to contribute, but rather do so independently according to their own needs. This trend is already resulting in some countries in a shift of the role of government from service provider to solution enabler. There is a shift from a “government-to-you” approach to a “government-with-you” approach focusing on collaboration within and outside government. This is associated with an ever increasing demand by recipients of public services to participate in public affairs, and the need to ‘co-produce’ policy and services. Government can also be thought of as an innovation platform that links different stakeholders and partners (p. 51).

The transformational trend of public participation being undertaken ‘ondemand’ mentioned by the survey corresponds to the concept of GaaP and the larger demand for more quality interactions between the public and government expressed in the Open Government Declaration and national policy documents. This trend is also being shaped by private marketplace applications and services and reflected in the expectations of users.

It would be unrealistic and stifling to try and create a single hierarchical platform to facilitate the levels of complex interactions and the reuse of its components that this type of system will need to undertake. Instead, compartmentalized e-tools and programing structures are designed to be easily connected and repurposed into other tools. This allows a single tool to be improved, disabled, or reorganized without compromising the larger platform’s structure or the function of other tools. Furthermore, GaaP components can be developed before the larger open government platform is available using common programing standards during the creation of each tool. These programing approaches have existed for quite some time and are represented in the Linux operating system and the collaborative programming nexus of GitHub. This type of open government infrastructure lends itself well to collaborative design and public participation by allowing components of the system, if not the entire system, to be designed collaboratively while crowdsourcing expertise and services from the public.

Beyond the ideas discussed above, the creation of quality collaborative platforms and tools for innovation, design, coproduction, e-decision-making, and exploring policy alternatives appear to be one of the next big steps for open government infrastructure. Governments should look to best practices undertaken by leading electronic platforms and services, in the private marketplace, while creating the next generation of collaborative open government platforms.

Open Government in Practice

Improving government services with open government and e-government. Open government and e-government are both about improving upon government, and improving upon government services is an area that can bring added benefits to government and the public. E-government initiatives can reduce the cost of administering government services by streamlining and digitizing process. Open government can also act as a feedback mechanism for the improvement of government services to better address the needs of the public and users, which can also increase the efficiency of resource utilization (DESA, 2016). Several agency and

OPEN GOVERNMENT: INNOVATIVE PRACTICES

interagency initiatives and websites have improved upon the delivery of government services using e-government and open government initiatives.

BusinessUSA (business.usa.gov) is a one stop location for business resources, services, and guidance provided by the federal government: start a business, find financing, start exporting, learn about taxes, credits and intellectual property rights, and much more are available. BusinessUSA is a hub of information and services for existing businesses, businesses looking to expand, and even entrepreneurs looking to start a business.

Most federal government processes and services can now be explored, undertaken, and tracked online, and these digital services have resulted in saving the public and government time and money. Grant applications can be collaboratively undertaken online by multiple participants. Permitting processes can be monitored by the public and applied for online. People can apply for disability, government loans, or freedom of information requests electronically. Nearly any federal government service can be undertaken online through its corresponding webpages.

Though, these services are not without their limitations and flaws. Ad Hoc platform designs and resources that are difficult to identify and navigate are very common. Another unfortunate trend through most online federal resources is poor maintenance of website links, comment sections, outdated information, and abandoned initiatives.

Federal OGD software applications. Data.gov/applications and usa.gov/mobile-apps provide directories to software applications that utilize OGD. Usa.gov provides links to 334 federal government applications and most of which are available on android and IOS operating systems, while data.gov also shows select applications that were not developed by the federal government but use open government data. These webpages are a great resource to explore how OGD is currently being utilized by the federal government and, in some cases, other organizations as well. Some of the open government applications available are discussed below.

Climate FieldView is one of the available open government applications developed by a private firm that utilizes OGD from NASA, the National Weather Service, and the U.S. Geological Survey. The application provides farmers with in-depth models, simulations, and data for local weather as well as relevant economic conditions to plan farming processes and make informed decisions.

The FEMA app, developed by the Federal Emergency Management Agency, has several built in functions including: emergency alerts, weather related information, sharing information and images with emergency workers, locate nearby shelters, and how to locate FEMA representatives for in person interactions.

The City Data application includes OGD from the Department of Commerce, the Federal Housing Finance Agency, the National Weather Service, and the U.S. Census Bureau. The application and website provide in-depth information on cities that is so numerous they will not all be listed here but include: images of cities, maps, home sale prices, demographic data, geographic data, crime data, city government finances, political contributions, and much more. Also, much of this data is condensed and can be visualized graphically or within maps.

OPEN GOVERNMENT: INNOVATIVE PRACTICES

Open government and e-government webpages. The Open Government web pages range, by agency, from simple locations to be directed towards data and documents to impressive locations for service delivery resources, interactive tools, public participation initiatives, and other open government initiatives. The formatted web address for each agency was outlined in the Open Government Directive (2009) as [www.\[agency\].gov/open](http://www.[agency].gov/open). In the 2016 Agency Open Government Plans memorandum, it was further clarified that Open Government web pages should include “at a minimum, links to open government topics, reports, and projects described in the plans.”

Beyond the Open Government Webpages of federal agencies, several centralized websites from the federal government have improved the public’s access to information, government services, and public participation initiatives.

- Acquisition.gov
- Benefits.gov
- Business.gov
- Challenge.gov
- Code.gov
- Congress.gov
- Data.gov
- Data.gov/applications
- Digitalgov.gov
- Disability.gov
- Disasterassistance.gov
- Fedbizopps.gov
- FOIA.gov
- ForeignAssistance.gov
- Govloans.gov
- Grants.gov
- Itdashboard.gov
- Permits.performance.gov
- Project-open-data.cio.gov
- Recovery.gov
- Regulations.gov
- Supremecourt.gov
- USA.gov
- Usa.gov/mobile-apps
- Usaspending.gov
- Whitehouse.gov
- Whitehouse.gov/open

OPEN GOVERNMENT: INNOVATIVE PRACTICES

State GeoNode and the Humanitarian Data Exchange (HDX). State GeoNode was developed as a digital service by the U.S. Department of State's: Humanitarian Information Unit and Office of eDiplomacy using the open source platform for spatial information sharing and collaboration, GeoNode (United States Department of State, n.d.-b). State GeoNode provides open geographic data to the public, decision makers, and partners “on complex emergencies, natural disasters, and diplomatic activities world-wide” (United States Department of State, n.d.-b).

A related project to State GeoNode began during the 2014 Ebola outbreak in West Africa called Ebola GeoNode. Ebola GeoNode was a partnership project that included: the American Red Cross, the World Bank, the Global Facility for Disaster Reduction and Recovery (GFDRR), the U.S. Department of State's Humanitarian Information Unit, and the United Nation's Mission for Ebola Emergency Response (UNMEER) (Ebola GeoNode, n.d.). Open geospatial information and maps were provided online to help: NGOs, health workers, journalists, the public, international organizations, governments and any others that could benefit from this information to help combat the crisis. Crucial information like the location of: road networks, airports/airfields, health facilities, flood zones, schools, emergency telecommunication points, ebola treatment units, community care centers, administrative areas, global supply routes, ebola response offices, locations of confirmed Ebola cases, and more was released (Ebola GeoNode, n.d.). Also, information, analysis, and maps were made available through Ebola GeoNode to help combat the crisis and inform stakeholders (Ebola GeoNode, n.d.).

All data published on State GeoNode and Ebola GeoNode is also added to the Humanitarian Data Exchange (HDX) that was launched in 2014 and is ran by the United Nations Office for the Coordination of Humanitarian Affairs (Humanitarian Data Exchange [HDX], n.d.). The goal of the HDX is to make humanitarian data easier to find and analyze. Humanitarian data is defined as:

- Data about the context in which a humanitarian crisis is occurring (e.g., baseline/development data, damage assessments, geospatial data)
- Data about the people affected by the crisis and their needs
- Data about the response by organizations and people seeking to help those who need assistance (HDX, n.d.).

Ebola GeoNode and the HDX are great examples of how open government data can be proposed to tackle large problems. While State GeoNode was not maintained and expanded to its potential, Ebola GeoNode served as a useful tool to combat an occurring crisis and highlights the ability for government to act as a facilitator to large scale problem solving using open government tools. While Ebola GeoNode and State GeoNode have not been maintained, HDX has approximately 4,400 data sets and appears to maintain regular, active participation (HDX, n.d.). Data.gov hosts the largest trove of open government data, including geospatial data, collected and produced by the federal government and has topical categorizations and sub-categorizations to easily identify relevant data. Whether it is done by government, researchers,

OPEN GOVERNMENT: INNOVATIVE PRACTICES

nonprofits, private organizations, NGOs, innovators, or the public, repurposing open government data into new formats holds untapped potential that can: improve people's quality of life, aid in development, help inform the public and decision makers, increase the efficiency of tasks, and even be repurposed privately and commercially.

Collaborative internal networks: IdeaHub and Max.gov. Several agencies have adopted internal networks to aid in internal collaboration, innovation, suggestion gathering, sharing knowledge and expertise, and developing agency initiatives across departments. The first federal agency to incorporate an internal online community was the Department of Transportation with IdeaHub in 2010 (United States Department of Transportation, 2015). Max.gov is a similar internal network that spans across the federal government and also includes government contractors. Max.gov also provides many tools and resources to federal employees and contractors to help create structured data, conduct surveys, share virtual machines, generate reports, and more. Though these types of collaborative internal networks are more e-government or collaborative government than open government, these types of networks represent a more decentralized approach to developing ideas, policies, and initiatives that open government can benefit from.

During the conducting of this research, one challenge for these types of internal networks was expressed in a conversation with a federal employee. The U.S. Department of State maintains separate internal networks for classified and unclassified material. Employees that handled classified material were less likely to utilize the non-classified internal network due to concerns and/or habits. This was resulting in more isolated internal communities and less potential collaboration. This case is highlighted to show the difficult challenges that can undermine e-government efforts and collaborative initiatives.

Challenge.gov. Challenge.gov hosts incentive-based challenges by more than 100 agencies and over 170 congressional offices, across the federal government, with 100s of millions of dollars in prizes having already been awarded (U.S. General Services Administration, n.d.). Challenges are used to find new talent, fuel innovation, increasing collaboration, and turn ideas into a reality. The range of challenges available to participate in is extremely wide. Current challenges include: ways to physically defeat unmanned aerial systems, designing waste management systems, and a high school competition to design a superhero, among several others. 735 challenges have been hosted since its launch in 2010.

While some of the challenges are talent searches or novelties, many of the challenges represent a type of collaborative development between the federal government and the public. The public brings labor, skills, knowledge, expertise, services, capital, and other assets to aid the federal government in accomplishing a task. The people-driven model of open government discussed by the United Nations' Department of Economic and Social Affairs (2016) suggests we are seeing these types of "challenges" become more normalized into how alternatives are developed and problems are solved.

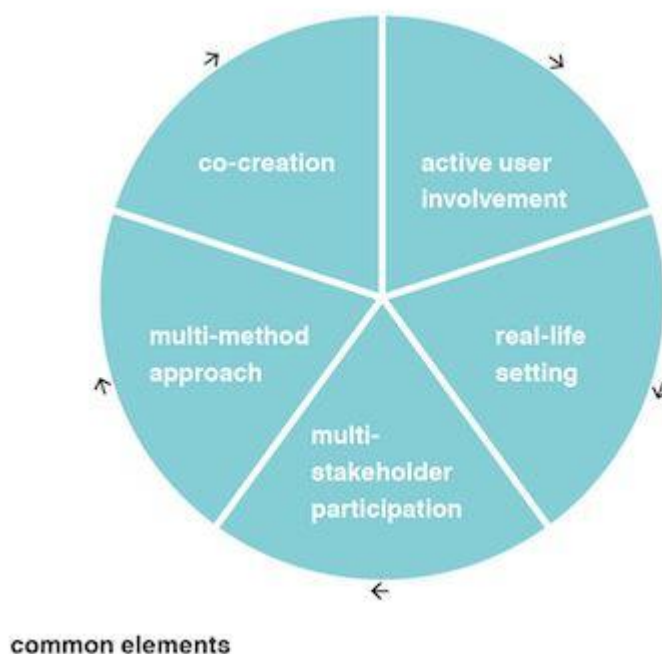
OPEN GOVERNMENT: INNOVATIVE PRACTICES

An obvious fault in current “challenge” type events is the lost potential for collaboration amongst unaffiliated members of the public. Integrating modern ICTs and the concepts of GaaP and collaborative networks lends itself to an increased ability to inform and engage the public as well as tackle larger and more complex problems. Platforms like GitHub allows for complex collaboration among people all over the world, and several government webpages and tools were openly developed on GitHub, including Data.gov. Creating a collaborative network that facilitates government-to-public and public-to-public interaction could be an ideal tool to increase innovation and efficiency while crowdsourcing: labor, knowledge, expertise, services, capital and other resources.

GitHub and developer pages. GitHub is used for collaborating on and publishing software code as well as software system version control. Through Github programming code is released, co-developed, critiqued, and even changes are requested. This might include tools, programs, software components, platforms, websites, etc. 129 official U.S. Federal Government GitHub organizations exist as well as accounts from governments around the world (GitHub, 2013-2016). Much of the open government tools, platforms, APIs, code, etc. used and developed by federal agencies are available online through GitHub and some originated from GitHub collaboration. Beyond GitHub, many agencies also have developer pages to aid software and application developers in the repurposing of RSS data feeds, OGD, APIs, and other agency open government tools. GitHub is a prime success story of the power of open data and collaboration and perhaps a model for creating systems to address complex issues collaboratively.

Code.gov allows access to software code developed by the federal government but pales in comparison to what is available from the federal government through GitHub.

Living Labs (LLs). A Living Lab is a Public-Private-People-Partnership (PPPP) for “people driven open innovation” and the concept has popped up in a variety of fields and regions around the world (DESA, 2016, p. 53). Living Labs (LLs) are engaged by producers and users of public services to co-create and co-design innovations. Living Labs have become a model of collaborative participation and involve the public in the collaborative design of new services (DESA, 2016, p. 53). Living Labs incorporate a user-centric approach to design and innovation that is often based in a specific area or region to customize the design to the specific needs of the area or group (European Network of Living Labs [ENoLL], n.d.). The European Network of Living Labs created a chart for understanding the common elements of LLs and is visualized in Figure 9.

Figure 9: Common Elements to Living Labs

The European Network of Living Labs (ENoLL) is one of the most prominent LLs with partners from around the world including the World Bank and over 170 Living Labs members (ENoLL, n.d.). ENoLL’s vision is to create an open innovation ecosystem that empowers everyone to engage in innovation and design.

Project Open Data. Project Open Data was created by the White House to help federal agencies implement the OMB’s 2013 Open Data Policy memorandum. Project Open Data’s webpage provides: implementation guidance, tools, resources, case studies, suggested open data events, and more to aid federal agencies in unlocking the potential of open data (White House, 2013). The tools and suggested practices from Project Open Data appear in the Open Government Plans of several agencies. Project Open Data shows a glimpse of advised best practices that were implemented into the creation of the 2014-2016 agency Open Government Plans.

Smart City Expo World Congress (SCEWC). The Smart City Expo World Congress (SCEWC) is an annual international summit to address the link between the “urban reality and technological revolution” in the context of urban development (Smart City Expo World Congress [SCEWC], 2016-a). The first summit was held in 2011 and boasts a long and impressive list of partners, collaborators, and supporting organizations including: the World Bank, the European Commission, the Inter-American Development Bank, Hewlett Packard, Microsoft, Amazon, and many, many more (Smart City Expo World Congress, 2016-b). The event brings together stakeholders in urban development to network, innovate, share experiences, and do internal

OPEN GOVERNMENT: INNOVATIVE PRACTICES

business deals and claims to be the “worldwide leading event for Smart Cities” (SCEWC, 2016-a).

The mission of the event is to “take advantage of the great improvements produced year by year, concerning technological advances, social achievements, urban issues, social and ecological challenges, new forms of economic development, and innovative forms of citizen governance.” (SCEWC, 2016-a).

The expo gives out yearly awards to exceptional projects from around the world in various categories and finalist projects and winners are posted online and highlight impactful, innovative strategies and projects. The 2016 winner for the Innovative Global South category was a project from Nairobi, Kenya that used digital health services to address the lack of health experts, large distances, limited health supplies, and poor public health by: connecting health experts with the public through remote videoconferencing consultations, allowing medical records to be accessed through cloud-syncing, and implementing new IT devices and software (Smart City Expo World Congress, 2016-c).

SCEWC is a great source for exploring ideas and projects from around the world that incorporate open government and e-government principles, especially in the context of urban planning.

Open Government: Tools, Infrastructure, and Practices Analysis

Many organizations and services, whether government, private, or public, rely on quality government information. Quality and accessible OGD and open government tools not only strengthens existing organizational missions and practices but also creates new potential for expanding services or organizational abilities. Beyond organizational benefits, the potential to inform, interact, engage, empower, and innovate with public, private, and nonprofit stakeholders is greatly increased by quality and accessible OGD and open government tools. While open government is scalable through cost effective or free solutions to informing and engaging stakeholders, more complex systems of OGD and collaboration require a functional and user-friendly open government infrastructure. Some of the identified best practices for improving open government infrastructure were:

- properly manage data through its lifecycle;
- abide by broadly accepted standards for open data publishing;
- create quality delivery vehicles for data;
- interconnect data to other sources and datasets;
- streamline the digital publication of data whenever possible;
- compartmentalize the creation of tools that can be interconnected and repurposed with minimal complications;
- develop quality collaboration and public participation platforms and e-environments that draw upon private marketplace best practices.

OPEN GOVERNMENT: INNOVATIVE PRACTICES

Projects highlighted by the Smart City Expo World Congress and the UN's DESA E-Government Survey show efforts already underway to revolutionize how problems are addressed and solved in the context of urban planning, health, environmental science, public administration and more. Open government isn't a future aspiration but an evolving reality. The tools to increase the benefits and impacts of open government rest in the hands of everyone, and that is perhaps the most philosophical theme of open government. The government's role in open government can be condensed to providing quality information to the public and creating opportunities for meaningful stakeholder interactions. But even if the government only provides access to open data, the potential to create positive impacts from OGD can still be achieved by public and private organizations as well as by individuals.

The role of the public and nongovernmental interests in government processes, policy making, and decision making is still evolving. Since the age of Enlightenment and the fall of divine right monarchies in Europe, the right of the people to participate in and influence their governments has grown to be recognized by nearly every democratic nation in the world. Historically, when frustrations with government have arisen, governments have incrementally transformed to implement greater levels of transparency and public influence into policy making and decision making. The modern demand by the public for improved government services and greater input into policy processes is related to increased expectations acquired using private sector services, improvements in technology, and typical frustrations with government. Open government tools, infrastructure, and practices are realistic approaches for continuing the evolution of government to a more participatory and transparent institution.

In addition, the long list of positive externalities and impacts that have been shown to accompany open government practices make not pursuing open government a liability. Enhanced problem solving, new innovation and economic activity, leveraging data and public interactions as assets, increased government efficiency, and less barriers to collaboration and public participation are just some of the immediate benefits. While this research has focused on the tangible components of open government, it should also be noted that open government has an intrinsic value for promoting a more democratic and informed government that is representative of the public's needs.

Conclusion

This research has analyzed the history of open government policy in the United States and open government tools, infrastructure, concepts, and practices. The history of open government policies in the United States federal government shows the potential for changes by presidential administrations through: executive actions, Attorney General Memorandums, and OMB memorandums. While safeguards established by the FOIA, its amendments, and similar open government legislation allow for public access to government information, with listed exemptions, how agencies implement these policies and interpret the exemptions to withhold information will continue be directly influenced by the Department of Justice and the Attorney General. The default stance for the release of agency information and data was reversed once

OPEN GOVERNMENT: INNOVATIVE PRACTICES

under President Bush to be reestablished under President Obama. Reversing presumptive disclosure of agency information and data (for the second time) or a return to the Department of Justice defending agency decisions to withhold data if a legal rationale can be found would be serious departures from international trends and a heavy blow to open government. However, the codification of many of these practices by the FOIA Improvement Act of 2016 should create a more permanent shift in DOJ policy toward accessible agency information. Progressions in government service delivery, data management, and open government accomplished by legislation will likely continue to improve the processes and services of government. Still, crucial achievements in federal open government policy rest within the authority of the President, the Attorney General, and the OMB. The pattern of government policy shifting from restricting access to government data due to privacy and security concerns to then allowing for greater levels of transparency in the spirit of the public's "right to know" seems apparent by tracking open government policy through the decades. These oscillations have historically been influenced by events with large political implications like the New Deal, the McCarthy investigations, the Cold War, Watergate, 9/11, and the changing of Presidential administrations. In relation, the detailed open government timeline provided was compiled to act as a tool for understanding and researching the changes in open government policy.

By categorizing open government tools using the IAP2 Public Participation Spectrum, insights into the potential benefits, uses, and limitations of open government tools were revealed. The IAP2 spectrum also draws attention to how these open government tools correspond to higher levels of public participation. Exploring the policies, tools, and practices involved in modern open government, led to the distinction of common infrastructure components that enable more complex forms of open government. The underlying principles of this infrastructure were condensed to the following insights:

- properly manage data through its lifecycle;
- abide by broadly accepted standards for open data publishing;
- create quality delivery vehicles for data;
- interconnect data to other sources and datasets;
- streamline the digital publication of data whenever possible;
- compartmentalize the creation of tools that can be interconnected and repurposed with minimal complications;
- develop quality collaboration and public participation platforms and e-environments that draw upon private marketplace best practices.

Open government is applicable and scalable to any level of government and holds the potential to greatly improve efforts by public, NGO, and private sectors. Open government data (OGD) is a valuable asset and the foundation of complex, emerging systems that positively impact the economy, the environment, innovation, development, public participation, efficiency, design, collaboration, public health, and public administration. International organizations, events, and partnerships like the Open Government Partnership (OGP), the World Bank, the

OPEN GOVERNMENT: INNOVATIVE PRACTICES

United Nations, and the SCEWC will continue to utilize open government and e-government practices for their identifiable benefits: efficiency, cost saving, time saving, speed of delivery, remote access, diverse stakeholder engagement, and potential impacts to productivity, commerce, and innovation through all sectors. Every level of government can benefit from some dimension of open government.

As open government continues to evolve, there is a direct role to be filled by IT, public administration, policy, emergency management, and planning experts. The field of planning is in a unique position with its interdisciplinary approach to analysis, problem solving, and program development. Also, principles expressed in the AICP's Code of Ethics of inclusiveness, educating the public, quality design, quality and timely information released to the public, educating the public on how planning affects them, and much more sound like concepts directly related to the principles of open government. The field of planning is full of applicable tools, methods, skills, and expertise that can benefit open government. A few of the areas planning can contribute are project development, public participation, collaboration, modeling, utilizing OGD, bridging divides between various fields and stakeholders, and bringing an interdisciplinary approach to problem solving and alternative identification. In many ways, open government is an extension of the field of planning facilitated by modern technologies. Planners have an immediate role to play in making OGD useful to the public, contributing planning knowledge and methods to open government, using modern ICTs to engage and empower the public, and continue the advancement of the field of planning into its increasingly digital role.

OPEN GOVERNMENT: INNOVATIVE PRACTICES

Works Cited

- 120th Cong. (1974). *Senate Action and Vote on presidential Veto*. Washington D.C.: Library of Congress.
- 9th Cir. (1991). *Wiener v. FBI*. San Francisco: United States Court of Appeals for the Ninth Circuit.
- 9th Cir. (1995). *Citizens Com'n on Human Rights v. FDA*. San Fransico: United States Court of Appeals for the Ninth Circuit.
- Ashcroft, J. (2001). *Attorney General Memorandum: The Freedom of Information Act*. Washington D.C.: Office of the Attorney General.
- Beaney, W. M. (1953). The People's Right to Know, by Harold L. Cross. *American Political Science Review*, 1176-1176.
- Berners-Lee, T. (2001). The Semantic Web. *The Scientific American*.
- Berners-Lee, T. (2006, July 27). *Linked Data*. Retrieved from World Wide Web Consortium: <https://www.w3.org/DesignIssues/LinkedData.html>
- Bernstein, J., & Dubose, L. (2008). *Vice: Dick Cheney and the hijacking of the American presidency*. New York: Random House.
- Blanton, T. (2006, July 4). *National Security Archive*. Retrieved from Freedom of Information at 40: <http://nsarchive.gwu.edu/NSAEBB/NSAEBB194/index.htm>
- Blanton, T., Elias, B., Fuchs, M., & Lopez, D. (2004, November 24). *Veto Battle 30 Years Ago Set Freedom of Information Norms*. Retrieved from The National Security Archive: <http://nsarchive.gwu.edu/NSAEBB/NSAEBB142/>
- Botein, B. (1954). Reviewed Work: The People's Right to Know. Legal Access to Public Records and Proceedings by Harold L. Cross. *Harvard Law Review*, 920-922.
- Burrus, D. (2014). *The Internet of Things Is Far Bigger Than Anyone Realizes*. Retrieved from Wired: <https://www.wired.com/insights/2014/11/the-internet-of-things-bigger/>
- Chief Information Officer Council. (2012). *Digital Government: Building a 21st Century Platform to Better Serve the American People*. Washington D.C.: Federal CIO Council.
- Clark, R. (1967). *Memorandum for the Executive Departments and Agencies Concerning Section 3 of the Administrative Procedure Act as Revised Effective July 4, 1967*. Washington D.C.: Office of the Attorney General.
- Clark, T. C. (1947). *1947 Attorney General's Manual on the Administrative Procedure Act*. Washington D.C.: Office of the Attorney General.
- Cohen, A. (2009, June 24). *Franklin D. Roosevelt: The First 100 Days*. Retrieved from TIME: http://content.time.com/time/specials/packages/article/0,28804,1906802_1906838_1906979-2,00.html
- Department of Economic and Social Affairs [DESA]. (2016). *UN E-Government Survey 2016*. United Nations.

OPEN GOVERNMENT: INNOVATIVE PRACTICES

- Department of Economic and Social Affairs. (2013). *Guidelines on Open Government Data for Citizen Engagement*. New York: United Nations.
- Ding, L., DiFranzo, D., Graves, A., Michaelis, J., Li, X., McGuinness, D., & Hendler, J. (2010). *Data-gov Wiki: Towards Linking Government Data*. Troy: Tetherless World Constellation, Rensselaer Polytechnic Institute.
- Ebola GeoNode. (n.d.). *Welcome to Ebola GeoNode*. Retrieved from Ebola GeoNode: <http://ebolageonode.org/>
- European Network of Living Labs [ENoLL]. (n.d.). *ENoLL: About Us*. Retrieved from ENoLL: <http://www.openlivinglabs.eu/aboutus>
- Ford, G. (1974). *Veto of Freedom of Information Act Amendments*. Washington D.C.: White House.
- Garson, D. G. (2006). Chapter 5: Information Access and Governmental Transparency. In D. G. Garson, *Public Information Technology and E-governance: Managing the Virtual State* (pp. 119-142). Raleigh: North Carolina State University.
- Gartner. (2015, November 10). *Gartner Says 6.4 Billion Connected "Things" Will Be in Use in 2016, Up 30 Percent From 2015*. Retrieved from Gartner: <http://www.gartner.com/newsroom/id/3165317>
- Ginsberg, W. (2014). *The Presidential Records Act: Background and Recent Issues for Congress*. Washington D.C.: Congressional Research Service.
- GitHub. (2013-2016). *Who's Using GitHub?* Retrieved from GitHub and Government: <https://government.github.com/community/>
- Great Depression Facts*. (n.d.). Retrieved from FDR Presidential Library and Museum: <https://fdrlibrary.org/great-depression-facts>
- Hansell, S. (2009, March 5). *The Nation's New Chief Information Officer Speaks*. Retrieved from New York Times: http://bits.blogs.nytimes.com/2009/03/05/the-nations-new-chief-information-officer-speaks/?_r=3
- Holder, E. (2009). *Memorandum: The Freedom of Information Act*. Washington D.C.: Office of the Attorney General.
- Holdren, J., Orszag, P., & Prouty, P. (2009). *President's memorandum on transparency and Open Government - Interagency collaboration*. Washington D.C.: Executive Office of the President of the United States, General Services Administration, & Office of Management and Budget.
- Huawei. (2015). *Global Connectivity Index*. Huawei.
- Humanitarian Data Exchange [HDX]. (n.d.). *Frequently Asked Questions*. Retrieved from HDX: <https://data.humdata.org/faq>
- International Association of Public Participation [IAP2]. (2007). *IAP2 Spectrum*. International Association of Public Participation.

OPEN GOVERNMENT: INNOVATIVE PRACTICES

- International Telecommunication Union [ITU]. (2012). *Overview of the Internet of things*. Telecommunication Standardization Sector of the ITU.
- Johnson, L. (1966, July 4). "Statement by the President Upon Signing the "Freedom of Information Act." Retrieved from The American Presidency Project: <http://www.presidency.ucsb.edu/ws/?pid=27700>
- Kahn, H. (1953). The People's Right to Know: Legal Access to Public Records and Proceedings. *The American Archivist*, 351-353.
- Lathrop, D., & Ruma, L. (2010). *Open government: Collaboration, transparency, and participation in practice*. Sebastopol: O'Reilly Media.
- Lemov, M. R. (2011). *People's Warrior: John Moss and the Fight for Freedom of Information and Consumer Rights*. Madison: Fairleigh Dickinson University Press.
- Morgan, J. (2014, May 13). A Simple Explanation Of 'The Internet Of Things'. Retrieved from Forbes: <http://www.forbes.com/sites/jacobmorgan/2014/05/13/simple-explanation-internet-things-that-anyone-can-understand/#575f05d96828>
- Obama, B. (2009). *Memorandum on Transparency and Open Government - Interagency Collaboration*. Washington D.C.: White House.
- Obama, B. (2009). *Memorandum: Freedom of Information Act*. Washington D.C.: White House.
- Obama, B. (2011). *Streamlining Service Delivery and Improving Customer Service*. Washington D.C.: Office of the Press Secretary.
- Obama, B. (2012). *Presidential Memorandum - Building a 21st Century Digital Government*. Washington D.C.: Office of the Press Secretary.
- Office of Management and Budget [OMB]. (2009). *Open Government Directive*. Washington D.C.: Executive Office of the President.
- Office of Management and Budget. (2013). *M-13-13: Open Data Policy-Managing Information as an Asset*. Washington D.C.: Executive Office of the President.
- Office of the Press Secretary. (1993). *Clinton Administration Aims for Open Information Policy*. Washington D.C.: White House.
- Open Government Partnership. (2011). *Open Government Declaration*. Retrieved from Open Government Partnership: <http://www.opengovpartnership.org/node/2727>
- Open Government Partnership. (n.d.-a). *What is the Open Government Partnership*. Retrieved from Open Government Partnership: What is the Open Government Partnership
- Open Government Partnership. (n.d.-b). *How to Join*. Retrieved from Open Government Partnership: <http://www.opengovpartnership.org/how-it-works/how-join>
- O'Reilly, T. (2011). Government as a Platform. *Innovations*, 13-40.

OPEN GOVERNMENT: INNOVATIVE PRACTICES

- Reagan, R. (1987). *Predisclosure notification procedures for confidential commercial information*. Washington D.C.: White House.
- Relyea, H. C. (2005). *Access to Government Information in the United States*. Congressional Research Service.
- Reno, J. (1993). *Attorney General Memorandum: The Freedom of Information Act*. Washington D.C.: Office of the Attorney General.
- Russell, W. B. (2005). A Convenient Blanket of Secrecy: The Oft-Cited But Nonexistent Housekeeping Privilege. *William & Mary Bill of Rights Journal*, 745-773.
- Shadbolt, N., O'Hara, K., Berners-Lee, T., Gibbins, N., Glaser, H., & Hall, W. (2012). Linked open government data: lessons from Data.gov.uk. *IEEE Intelligent Systems*, 16-24.
- Smart City Expo World Congress [SCEWC]. (2016-a). *SCEWC 2016*. Retrieved from Smart City Expo World Congress: <http://www.smartcityexpo.com/the-event>
- Smart City Expo World Congress. (2016-b). *SCEWC: Partners*. Retrieved from Smart City Expo World Congress: <http://www.smartcityexpo.com/en/partners>
- Smart City Expo World Congress. (2016-c). *Transforming healthcare through hospital and clinic digitization and telemedicine*. Retrieved from Smart City Expo World Congress: <http://www.smartcityexpo.com/en/transforming-healthcare>
- U. S. General Services Administration [GSA]. (n.d.-a). *Open Data Initiatives*. Retrieved from GSA Open Government Plan 2016 - 2018: <https://gsa.github.io/opengovplan/opendata/>
- U.S. General Services Administration [GSA]. (n.d.-b). *Data.gov: About*. Retrieved from Data.gov: <https://www.data.gov/about>
- U.S. General Services Administration. (n.d.). *Challenge.gov: About*. Retrieved from Challenge.gov: <https://www.challenge.gov/about/>
- U.S. Supreme Court. (1973). *Vaughn v. Rosen*. Washington D.C.: U.S. Supreme Court.
- United States Department of State. (n.d.). *The Open Government Partnership*. Retrieved from State.gov: <http://www.state.gov/j/ogp/>
- United States Department of State. (n.d.-b). *State GeoNode: About*. Retrieved from State GeoNode: <http://geonode.state.gov/about/>
- United States Department of Transportation. (2015, March 6). *IdeaHub*. Retrieved from Transportation.gov: <https://www.transportation.gov/cio/ideahub>
- Werth, B. (2006). *31 Days: The Crisis That Gave Us the Government We Have Today*. New York: Nan A. Talese.
- White House. (2011). *The Open Government Partnership: National Action Plan for the United States of America*. Washington D.C.: Executive Office of the President.

OPEN GOVERNMENT: INNOVATIVE PRACTICES

White House. (2013). *Project Open Data: Open Data Policy - Managing Information as an Asset*.

Retrieved from Project Open Data: <https://project-open-data.cio.gov/>

White House. (n.d.-a). *Open Government Initiative: Open Government Partnership*. Retrieved from White

House: <https://www.whitehouse.gov/open/partnership>

World Wide Web Consortium. (2015). *Semantic Web*. Retrieved from W3C:

<https://www.w3.org/standards/semanticweb/>

Yu, H., & Robinson, D. G. (2012). The New Ambiguity of "Open Government". *UCLA Law Review*, 179-208.

Endnotes

i Information and Communications Technology (ICT)

The precise definition of ICT can vary depending on the source and context. ICT describes information technology (IT) that focuses primarily on communications technologies and their secondary components. ICT is sometimes used to discuss the convergence that is happening to data streams: internet, cable, radio, phone, satellite, etc. In other ways ICT is used as a way to understand how information and communication technologies are affecting modern society and fields like health and education. ICTs are the way information is managed, processed, and stored using modern technology as well as the many ways communications are facilitated. ICTs include things like: the internet, mobile technologies and applications, Wi-Fi networks, mobile applications, satellite networks, social media, enterprise data management (EDM) systems, geographic information systems (GISs), etc. ICTs are both the hardware and software that facilitate information and communications.

ii Application Program Interfaces (APIs)

APIs act as a middle point between databases and applications to deliver an easy to use data package for software and application developers. To put another way, APIs are interfaces for software developers to integrate information from databases into other applications.

iii Open Government Data (OGD) and an Open Format for Data

An “open format” for government data or open government data (OGD) is the formatting of information and how that information must be accessible. Section 1 (b) of the Open Government Directive (2009) states:

b. To the extent practicable and subject to valid restrictions, agencies should publish information online in an open format that can be retrieved, downloaded, indexed, and searched by commonly used web search applications. An open format that can be retrieved, downloaded, indexed, and searched by commonly used web search applications. An open format is one that is platform independent, machine readable, and made available to the public without restrictions that would impede the re-use of that information (p. 2).

In a memorandum released by the Office of Management and Budget (OMB) in 2013, M-13-13, entitled Open Data Policy-Managing Information as an Asset, open data “refers to publicly available data structured in a way that enables the data to be fully discoverable and usable by end users” and “consistent with the following principles:”

- Public
- Accessible
- Described
- Reusable
- Complete
- Timely
- Managed Post-Release (p.5).

Most definitions of what an open format for government data is and how it should be useable and accessible are similar from different governments and organizations. The United Nations’ Department of Economic and Social Affairs released a report in 2013 Guidelines on Open Government Data for Citizen Engagement. Within the article is a list of four minimum requirements for open government data:

- Accessible on the Internet
- In a machine-processable format
- Openly licensed, allowing for its reuse (including commercial reuse)
- Free of charge and without any other restrictions for its reuse (Department of Economic and Social Affairs, 2013, p. 37).

A longer list of ‘Ten principles for opening up government information’ is also suggested to be aspired to when a government is able (p. 37). The W3C is also a great source for open data format standards and ICT standards in general.

^{iv} Linked Open Government Data (LOGD)

Linked open government data (LOGD) is data that follows the same principles of open government data (OGD) and the Linked Data Web. This “web of linked data,” also referred to as the Linked Data Web, has led to the growing demand for Linked Online Government Data (LOGD) that follows the same types of standards and functionality laid out by the W3C. This enables OGD to be integrated and linked to other forms of data. LOGD provides the ability for data to be searched, compared, combined, and easier to identify and generally utilize.

^v Semantic Web

The idea of the Semantic Web was first articulated by the creator of the World Wide Web Tim Berners-Lee (2001, 2006). The modern Semantic Web concept is a set of standards and practices published and developed by the World Wide Web Consortium (W3C) for linking information and data across the internet. By having common standards for data formats and information sharing across the web, data can be described, linked, and utilized by programs and users more efficiently. Vocabularies, ontologies, and metadata is shared in a way that allows machines and programs to better link, utilize, and describe data that greatly increases the data’s ability to be discovered, compared, cross-referenced, understood, integrated, and utilized. Technologies like RDF, SPARQL, OWL, SKOS and URIs are the foundational pieces that have enabled the Semantic Web to take form (World Wide Web Consortium, 2015). Data that is published with the same standards can be potentially linked and cross referenced by spatial, temporal, ontological, and source association properties (Ding, et al., 2010).