

THE DATA ACT OF 2014: DATA TRANSPARENCY
IN THE FEDERAL GOVERNMENT'S
FINANCIAL REPORTING SYSTEM

by

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ABSTRACT

Congress enacted the Digital Accountability and Transparency (DATA) Act in 2014 for the purpose of improving the information available to the public in regards to spending by the Federal government. Specifically, the DATA Act called for the establishment of data standardization of financial reporting within government agencies in order to provide “reliable and searchable Government-wide spending data that is displayed accurately...on USASpending.gov” (Digital Accountability and Transparency Act). The United States Department of Treasury (“the Treasury”), the federal agency tasked with the collection and publication of consolidated federal spending information, redeveloped the USASpending.gov website from its original format established in 2006 in compliance with the Federal Funding Accountability and Transparency Act. In meeting the DATA Act’s goal of providing reliable and searchable government spending data, the Treasury collected feedback from public users and government financial managers on how to improve the USASpending.gov website. Ostensibly, access to better data on a user-friendly website enables more effective decision-making by Federal government constituents, including government financial managers, taxpayers, and others. In this paper, I directly explore that conjecture, namely: Did the enhanced streamlining of data systems and additional sharing of Federal spending data with the public change users’ perceptions of the reliability and searchability of said data published on the improved USASpending.gov website?

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Introduction

The United States government spent \$3.98 trillion in 2017. Given that significant amount, it is only natural for taxpayers to express concern about how and where these funds are spent. As policies change and new programs are developed, taxpayers want to ensure that their money is being used appropriately and effectively.

Congress passed the Digital Accountability and Transparency (DATA) Act in 2014 to expand on the existing Federal Funding and Accounting Transparency Act (FFATA) of 2006 and to address growing concerns from the public surrounding government data transparency. In this paper, I directly explore those changes, namely: Did the enhanced streamlining of data systems and additional sharing of Federal spending data with the public change a user's perception of the reliability and searchability of said data published on the USASpending.gov website?

Specifically, the five purposes of the Act are to:

- 1) expand the Federal Funding Accountability and Transparency Act of 2006 (31 U.S.C. 6101) by disclosing direct Federal agency expenditures and linking Federal contract, loan, and grant spending information to programs of Federal agencies to enable taxpayers and policy makers to track Federal spending more effectively;
- 2) establish Government-wide data standards for financial data and provide consistent, reliable, and searchable Government-wide spending data that are displayed accurately for taxpayers and policy makers on USASpending.gov (or a successor system that displays the data);
- 3) simplify reporting for entities receiving Federal funds by streamlining reporting requirements and reducing compliance costs while improving transparency;

- 4) improve the quality of data submitted to USASpending.gov by holding Federal agencies accountable for the completeness and accuracy of the data submitted; and
- 5) apply approaches developed by the Recovery Accountability and Transparency Board to spending across the Federal Government. (Digital Accountability and Transparency Act 2014).

When the original USASpending.gov website was developed in 2006 in accordance with the FFATA, it was the first consolidated, searchable government spending website of its kind. However, ownership of the site was not explicitly given, which caused miscommunication between agencies and the untimely publication of spending information. Now, the United States Department of the Treasury (“the Treasury”) is responsible for the collection and publication of government spending data on the improved USASpending.gov website. Using the newly-designed USASpending.gov website, the Treasury plans to address issues of taxpayer trust and understandability as it relates to information publicized by the government by providing reliable and searchable data. To meet the demands of users, the Treasury sought to “avoid top-down assumptions about the best way to collect and display data” by publishing an online forum that requested feedback from the public (Ho 2016). In taking this approach, the Treasury Department hopes to improve on the USASpending.gov website’s goal of providing reliable and searchable government spending information to the public.

The DATA Act really has two parts: an overhaul of the existing internal financial reporting systems in the United States government and the publication of the data produced by those systems. However, what makes that data transparent is its ability to be accessed by the public. So, while data standardization will improve the efficiency and consistency of financial

information, those changes are in support of the ultimate goal of providing reliable and searchable information to the public.

Literature Review

Data transparency and the notion of “open government” have long been hot topics in the United States. Given the changing political climate in the country over the last decade, the Obama administration advocated for the DATA Act in response to growing concerns from the public. Prior to my investigation of the effectiveness of the DATA Act, I define modern data transparency and open government, examine the history of data transparency in the United States, compare our country’s efforts to those abroad, outline the benefits and challenges associated with the implementation of this law.

Open Government and Data Transparency

The term “open government” is derived from a statement made by Wallace Parks in his article *The Open Government Principle: Applying the Right to Know Under the Constitution* which reads:

From the standpoint of the principles of good government under accepted American political ideals, there can be little question but that open government and information availability should be the general rule from which exceptions should be made only where there are substantial rights, interests, and considerations requiring secrecy or confidentiality and these are held by competent authority to overbalance the general public interest in openness and availability (Parks 1957).

Open government is a democratic ideal that is ultimately achieved, in part, through data transparency, or open data. What makes data “open” is its ability to enhance the usefulness and availability of said information (Robinson 2011). In the government data context, the level of data transparency gives citizens a sense of accountability of their respective governments and the confidence to question the validity of that information. The initiatives being taken in the DATA Act directly address this fundamental right.

History of Data Transparency in the United States

The data transparency movement in the United States gained momentum in the 1960s with the passing of the Freedom of Information Act (FOIA). This act required executive-level agencies to release federal documents formally requested by the public. However, if the information meets any of the following nine exemptions, it may remain concealed: information relating to national security, the internal practices of a government agency, trade secrets, an individual’s personal privacy, privileged communication between two federal agencies, information that is prohibited from disclosure by another federal law, concerning the supervision of financial institutions, or the geological information on wells (United States Department of Justice). For example, exact locations of and operations at military bases around the world may be concealed for the safety of those on site and in surrounding areas.

The FOIA was met with mixed reactions: many citizens praised the government for recognizing that information-sharing was an inherent right to our democracy while others maintained an attitude of indifference to the spending of the federal government. It is important to note that while the FOIA does not directly address government *financial* information, it is the first time that “government transparency” is explicitly stated in law.

The data transparency topic resurfaced once more with the passing of the Federal Funding Accountability and Transparency Act in September of 2006 by the George W. Bush administration. This new law required “full disclosure of federal entities receiving funding” and sought to hold the government accountable for unnecessary expenditures by the people (Federal Funding Accountability and Transparency Act 2006). It was with this law that the original USASpending.gov website was created. This searchable website required federal agencies to disclose the recipient, amount, and location of each award granted during a fiscal year. Critics were quick to note that the law did not require federal agencies to retroactively disclose spending information but rather implement the new standards beginning in 2007. This new law also named the United States Department of the Treasury a responsible party to the success of data transparency initiatives whereas, under FOIA laws, data transparency and data sharing were under the jurisdiction of the Office of Management and Budget (OMB).

As technologies continue to evolve, so does the conversation surrounding government data transparency. United States citizens have more accessibility to information, thanks to the Internet, which allows them to be more involved in the ultimate decision-making of Congress. The DATA Act was enacted to address these issues.

Data Transparency in Foreign Governments

Following the Obama administration’s announcement to expand data transparency in the United States, many large nations have followed suit. A study conducted by Noor Huijboom and Tijs Van den Broek, for the European Journal of ePractice, analyzed open government strategies in Australia, Denmark, Spain, the United Kingdom, and the United States and discovered three different motivations for this change and four different instruments of implementation: to

increase democratic control and political participation, to foster service and product innovation, and to strengthen law enforcement. Overall, the greatest motivation for open data in government is for an increase in democratic control and political participation, specifically empowering a country's citizens to express their democratic rights, such as the right to vote. Other motivations include fostering service and product innovation in the hope that, with the release of spending information, someone will be inspired to find a more efficient use of the funds, and to strengthen law enforcement and security.

The four implementation strategies are: education and training, voluntary approaches, economic instruments, and legislation and control. The United States primarily engages in voluntary approaches and making their open government initiatives known. It is argued that these are not the most effective methods in educating citizens about the availability of data. In time, the United States may need to turn to its foreign counterparts as inspiration in the continued fight for data transparency (Huijboom 2011).

Another study conducted by Rui Lourenco of Portugal examined all existing open government portals (e.g. USASpending.gov) from around the world and found eight qualities of open data portals that corresponded to the most effective open government strategies: quality, completeness, access and visibility, usability and comprehensibility, timeliness, value and usefulness, granularity, and comparability (Lourenco 2015). Interestingly, the DATA Act addresses every one of these characteristics in its purpose statement. The study recommends the implementation of data.gov sites, like the one prescribed by the DATA Act, because it is expected to have the greatest effect on a user's perception of accountability. However, the façade

of a website can be misleading. If the provided information is determined to be incomplete, a country may experience the adverse effects of mistrust in one's government.

Data Standardization

The DATA Act established government-wide data standards to address issues of consistency, completeness, and accuracy in government financial reporting. The implementation and supervision of these standards is the responsibility of the United States Department of the Treasury (Treasury) and the Office of Management and Budget (OMB). Data standardization is expected to improve data-sharing between government agencies and make inter-governmental communication more efficient.

In May 2016, the OMB issued a memorandum to the heads of federal departments and agencies that directly addressed a data standardization initiative that would improve the efficiency of information reporting from an agency to the Treasury for disclosure on USASpending.gov. Specifically, the OMB mandated that award transactions be assigned a unique award identification number (Award ID) in the agency's financial system to link the details of that transaction to the Treasury Department (Office of Management and Budget 2016). This change is just one of many actions being made to meet the DATA Act's goal of establishing government-wide data standards that improve the efficiency and consistency of data.

Steve Ballmer and the "State of the Facts"

Steve Ballmer, former CEO of Microsoft, Inc. and advocate for government transparency, invested personal funds to develop the USAFacts.org website after discovering a gap in the kind of information published by the federal government (Large 2017). This website is the non-

partisan answer to the government's USASpending.gov website and serves as a single source for government spending data at the federal, state, and local level.

In July 2017, Ballmer released a poll titled "State of the Facts" through the HarrisPoll system. Ballmer's survey found that:

- 88% of users prefer data presented in facts and figures as opposed to anecdotes.
- 76% of users feel that information about government expenditures and outcomes is biased.
- 80% of users agree that learning financial spending facts can change their beliefs.
- 90% of users see data as critical to believing information (USAFacts.org).

Developers tasked with the re-development of the USASpending.gov website, as prescribed by the DATA Act, drew inspiration from the HarrisPoll results and the presentation layout of USAFacts.org and incorporated similar visualizations and drill-down features.

Potential Benefits of the DATA Act of 2014

There are many benefits associated with an open government and data transparency strategy. If implementation is smooth, the federal government can expect to see changes in data quality, inter- and intra- agency communications, citizen engagement, global competitiveness, and predictive analysis (Eder 2015).

According to Ann Eberts, Chief Executive Officer (CEO) of the Association of Government Accountants (AGA), the following four items are the greatest benefits of the DATA Act:

- Federal agencies will have a greater picture of their true financial position.

- Comparability between federal agencies will improve.
- State and local governments will have greater access to spending information which will give them the ability to plan ahead and make more informed decisions.
- Taxpayers have a greater idea of how tax dollars are spent (Eberts 2015).

Of those potential benefits listed, the one most aligned with this study is that “taxpayers have a greater idea of how tax dollars are spent.” Specifically, I examine how taxpayers view the spending information presented on USASpending.gov.

Challenges to Implementation

Naturally, there are challenges that must be overcome when implementing new policy. The DATA Act is forcing a change in not only the physical reporting of government financial information but also attitudes surrounding financial disclosures in the government, which is proving to be the most difficult to adjust. The United States Government Accountability Office (GAO) conducted a study in conjunction with the implementation of the DATA Act and found four areas for improvement:

1. Existing internal control weaknesses pose risks to data quality. Internal control deficiencies that have been identified in prior year reports could affect the timeliness and quality of data submitted by federal agencies to the Department of Treasury for disclosure on the USASpending.gov website.
2. Challenges with guidance impact data quality. Up to this point, agencies have disclosed transaction data differently, which may lead to missing or incomplete data sets on the implementation date.
3. Limitations exist in the data quality assurance processes.

4. Efforts to establish a data governance structure are still at an early stage. (United States Government Accountability Office).

Other Elements of the Literature Review

In this section of the literature review I introduce the Technology Acceptance Model (TAM), a theoretical model that proposes a relationship between a system's ease of use, usability, and future usage intention. I will provide an example of how this model has been applied in prior studies, present expansions to the model, and apply the framework to my examination of the reliability and searchability of the improved USASpending.gov website.

Technology Acceptance Model

Fred Davis developed the Technology Acceptance Model (TAM) in 1989 to measure users' acceptance of computers and information systems. This theoretical model suggests that two independent elements, perceived usefulness and perceived ease of use, affect a user's ultimate attitude towards a particular system and can predict whether or not that user will continue to use the system. Perceived usefulness (U) is defined as "the prospective user's subjective probability that using a specific application system will increase his or her job performance within an organizational context" and perceived ease of use (EOU) is defined as "the degree to which the prospective user expects the target system to be free of effort" (Davis 1989). The EOU variable most closely resembles the searchability variable in this study.

While this model was developed based on the use of physical computers and computer systems, the general framework can be applied to other technology sources, such as websites.

Utilizing the TAM in Redeveloping Websites

A study conducted in 2016 and published in the International Journal of Human-Computer Interaction evaluated the change in ease of use (EOU) of a healthcare website that underwent redevelopment. Specifically, the study examined the changes made to the presentation and granularity of data presented on the website in relation to a user's future use of the website. The changes made to the website that returned positive results are: a simple Home page with minimal text, a clearly-stated value proposition, and visualizations that presented high-level data and allowed users to expand that data into detailed information (Chan 2016).

In applying the results of this study to my own, I begin by defining searchability as it relates to the DATA Act: "the ability to enter relevant terms into a search tool and electronically retrieve data" (Brewer 2001). The USASpending.gov website is easy to use, as defined by the TAM, so long as it is searchable and provides the user with the desired result. In order to achieve this goal, the Treasury Department enlisted the help of the public and federal agencies to make changes to the USASpending.gov that mirror those made to the healthcare website in Dr. Chan's study. Specifically, the USASpending.gov developers overhauled the Home page to present the user with a greeting and instructions on how to search the website, created visualizations that present federal spending information in relation to other agencies, and installed drill-down features to promote data-mining (USASpending.gov 2016). Because of the positive response to those changes made in Dr. Chan's study, I expect similar results from the redevelopment of USASpending.gov.

Screenshots of USASpending.gov features can be found in Appendix I. As of April 1, 2018, the old USASpending.gov website was disabled so screenshots cannot be provided.

Perceived Reliability in the Technology Acceptance Model (TAM)

In 2015, researchers at Dongguk University proposed an extension to the TAM: a third factor, perceived reliability, that has a “positive effect on usage intention” (Choi 2015). The expanded model hypothesizes that the three elements, perceived usefulness, perceived ease of use, and perceived reliability, independently are affected by presented media and have an effect on a user’s future intention to use the system. In addition, the model proposes a relationship between a system’s perceived ease of use and its perceived reliability. Statistical testing, performed over results from a survey conducted using a South Korean government media source, supported each hypothesis at a p-value < 0.01.

The goal of the DATA Act, in presenting “reliable” data on USASpending.gov, is for users to eventually use that information in some form of decision-making. Naturally, if the information that is presented on the website is more accurate and timely thanks to the implementation of data standards within federal agencies, I expect the level of reliability between the old and new USASpending.gov websites to increase. This study will test the relationship between data presented to a user and the resulting perception of reliability, however, the idea that perceived searchability (ease of use) and perceived reliability are reliant on each other warrants further research.

A comparison of the TAM models developed by Davis and expanded by Choi can be found in Appendix II.

Information Overload

Information overload is defined as “having access to more information than is conducive to human well-being” (Himma 2007). I do not directly test the concept of information overload

in this experiment, but it is a crucial element to consider when examining the usefulness of published data. A study conducted by Drs. Malhotra, Jain, and Lagakos in the *Journal of Marketing* found that while consumers have a large capacity to consume and absorb information, there comes a point where the user's effective decision-making process is compromised (Jain 1982). As the USASpending.gov website is redeveloped and improved, developers will need to ensure that the right amount of information is provided.

This study directly tests users' perceptions of reliability of the disclosed financial spending data, which could be used to determine whether or not the user is experiencing information overload. A poor perception of reliability could indicate too little or too much information.

Hypotheses

In this study, I directly test participants' perception of reliability and searchability of data on the USASpending.gov website. During the course of my experiment, I had access to the pre-DATA Act USASpending.gov website as well as the new USASpending.gov website and familiarized myself with the differences and changes being made in its redevelopment. The new USASpending.gov website presented data in a more visual format and allowed the user to take a high-level, government-wide perspective or drill down into details of transactions while the old USASpending.gov website was very text heavy and did not allow the user to manipulate the data in any way. Based on my experience with the two data presentations and literature review, I formulated two hypotheses:

- Hypothesis 1 (H₁): Participants will perceive the data presented on USASpending.gov to be more reliable than data presented on the pre-DATA Act USASpending.gov website.

- Hypothesis 2 (H₂): Participants will perceive the data presented on USASpending.gov to be more searchable than data presented on the pre-DATA Act USASpending.gov website.

Methodology

Experiment Design

The experiment was designed with one independent variable, presentation of government spending data, and two dependent variables, perception of reliability and perception of searchability. The independent variable, the presentation of government spending data, was delivered in two separate treatments: the old USASpending.gov website, as prescribed by the Federal Funding Accountability and Transparency Act, and the new USASpending.gov website, updated by the DATA Act of 2014.

Experiment Instrument

I constructed and administered the survey using Qualtrics and distributed it using Amazon's Mechanical Turk (MTurk) website. I chose MTurk for the following reasons:

1. The researcher can impose participant criteria (Borden 2012). This survey required users to be English-speaking taxpayers in the United States.
2. MTurk "Masters" can be selected as participants. MTurk grants users "Master" status once they have completed at least 1000 surveys and have an approval rating of 99.0%. Responses by "Masters" are regarded as more reliable.
3. Data is collected very quickly. I collected and accepted my 305 responses in 72 hours.

The survey contains four parts. First, participants are presented with a consent document. Second, after agreeing to the terms of the survey, participants will answer demographic questions relating to gender, age, and annual income.

Third, the survey randomly assigns the participant to one of two treatments: USASpending.gov (pre-DATA Act presentation of data) or beta.USASpending.gov (post-DATA Act presentation of data) where they are asked to answer three questions in relation to government spending. Those three questions can only be answered by navigating to the given website. MTurk randomly assigned 137 users treatment 1 (USASpending.gov) and 168 users treatment 2 (beta.USASpending.gov).

Finally, the survey asks participants questions relating to their experience with the site. Specifically, the participant is asked to rank, on a scale of 1-10, where 10 represents “Extremely Reliable”, their perception of reliability and searchability of the data on their assigned site. A scale of 1-10, as opposed to 1-5 was chosen so that respondents could provide a more realistic and reliable answer (Bayer 1994).

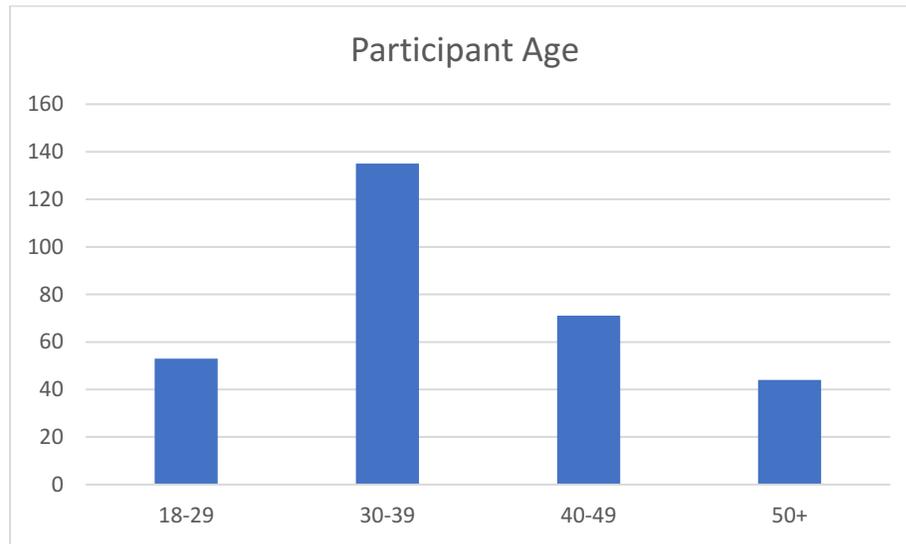
A copy of the consent document can be found in Appendix III and a copy of the experiment instrument can be found in Appendix IV.

Sample

The study’s sample consists of 305 English-speaking taxpayers who are residents of the United States. Participation in the study was voluntary and no personally identifiable information was collected. The sample consists of 155 female respondents and 150 male respondents. Participant age ranges from 18 years old to 50+ years old and annual income ranges from less

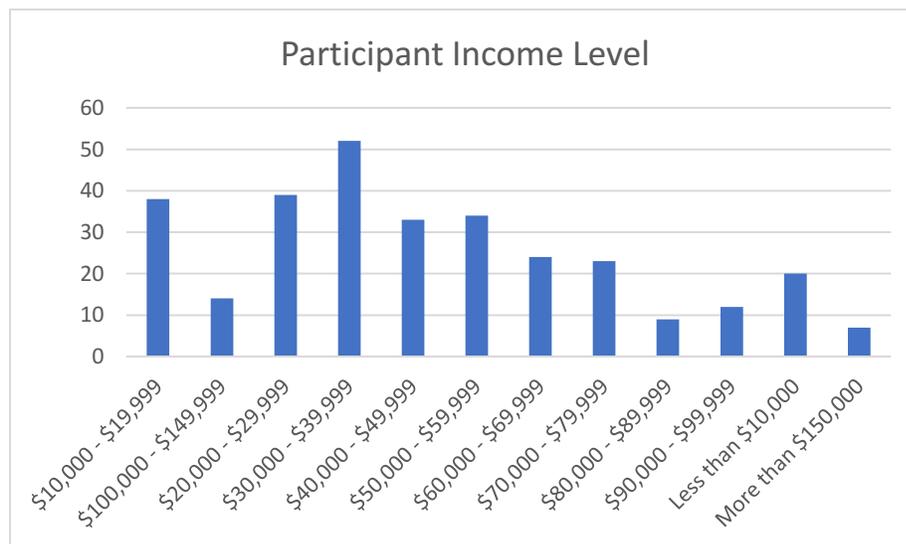
than \$10,000 to over \$150,000. Figure 1 and Figure 2 display the distribution of age and annual income.

Figure 1: Participant Age



The distribution of participant age is fairly representative of the population of United States taxpayers and reflects my expectation.

Figure 2: Participant Annual Income Level



The distribution of participant income level is fairly representative of the population of United States taxpayers and reflects my expectation.

Results

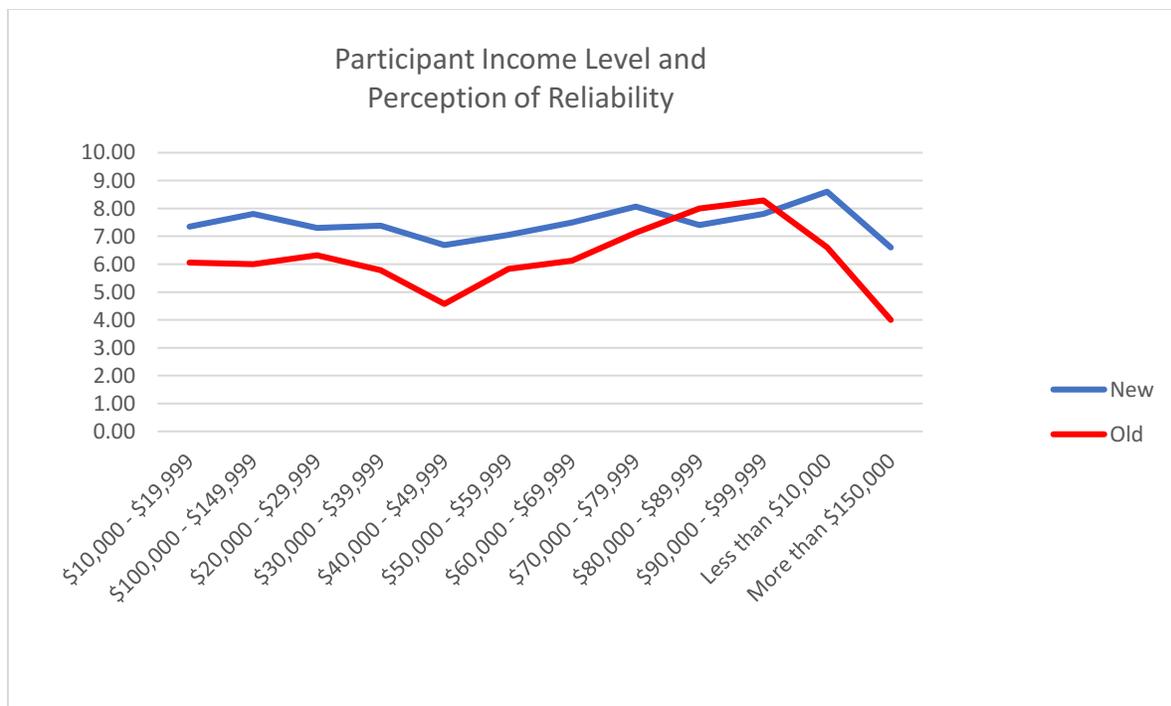
In this section, I discuss the results of my experiment. I begin with my evaluation of participants' perceptions of reliability followed by their perceptions of searchability.

Perception of Reliability

To assess user perceptions of reliability, the survey asked participants to rank, on a scale of 1-10, how reliable the information presented by their assigned website is perceived to be.

Figure 3 displays the distribution of mean levels of reliability for each income level.

Figure 3: Participant Income Level and Perception of Reliability



The distribution in Figure 3 somewhat reflects my expectation for these results. For the most part, users perceived the new USASpending.gov website to be more reliable than the old USASpending.gov website. However, for users with annual incomes ranging from \$80,000 to \$99,000, it appears that the old website is perceived to be more reliable than the new. I explore the significance of this inconsistency in Table 2.

While the distribution is consistent with my hypothesis, I was surprised to see how close the mean levels of reliability for the new and old USASpending.gov website are to each other. The website developers did a complete overhaul of the website design, changed how data was presented, and included significantly more transaction details, so I did expect to see a greater difference.

Statistical Significance: Perception of Reliability

The distribution in Figure 3 shows that, for the most part, the new USASpending.gov website is perceived to be more reliable than the old regardless of income level. However, it is necessary to perform a statistical test of significance before drawing a conclusion.

I performed a two-sample t-test of equal variances at a significance level (alpha) of 0.05 over the entire population of participants. I chose this test because the two groups of data had nearly equal standards deviations: 2.26 (new) and 2.75 (old). Table 1 displays the hypotheses and inputs used in the testing of significance.

Table 1: Statistical Significance: Perception of Reliability

Table 1 t-Test: Two Sample Assuming Equal Variances		
Null Hypothesis:	$\mu_{\text{new}} = \mu_{\text{old}}$	
H₁:	$\mu_{\text{new}} > \mu_{\text{old}}$	
alpha	0.05	
Value	Group 2 (new)	Group 1 (old)
Mean	7.399	6.124
Variance	5.103	7.565
Observations	168	137
df	303	
t Stat	4.444	
t Critical one-tail	1.650	
P(T<=t) one-tail	6.195E-06	
t Critical two-tail	1.968	
P(T<=t) two-tail	1.239E-05**	
Notes: **: The new USASpending.gov website is perceived to be significantly more reliable than the old USASpending.gov website. While this test uses a directional hypothesis, a conservative approach was taken in using the p-value from the two-tail test to draw a conclusion.		

Given $p < 0.01$, the results of this test are significant and it is reasonable to conclude that the new USASpending.gov website is perceived to be more reliable than the old USASpending.gov website.

I performed the same two-sample t-test with equal variances over the subset of the population of participants with income levels ranging from \$80,000 to \$99,999. Figure 3 shows that, within this relevant range, the old website appears to be perceived as more reliable than the new. Because of this inconsistency, I wanted to further explore the relationship between the two variables.

For this smaller population, a two-sample t-test with unequal variances is the appropriate significance test because the variances are far different from each other at 5.600 for Group 2 and 2.164 for Group 1.

Table 2: Statistical Significance: Perception of Reliability for Users with Annual Income Ranging from \$80,000 to \$99,000

Table 2		
t-Test: Two Sample Assuming Unequal Variances		
Null Hypothesis:	$\mu_{\text{new}} = \mu_{\text{old}}$	
H₁:	$\mu_{\text{new}} > \mu_{\text{old}}$	
alpha	0.05	
Value	Group 2 (new)	Group 1 (old)
Mean	7.600	8.182
Variance	5.600	2.164
Observations	10	11
df	19	
t Stat	-0.669	
t Critical one-tail	1.753	
P(T<=t) one-tail	0.257	
t Critical two-tail	2.131	
P(T<=t) two-tail	0.513***	
Notes:		
***: The perception of reliability between the new USASpending.gov website and the old USASpending.gov website is indistinguishable. While this test uses a directional hypothesis, a conservative approach was taken in using the p-value from the two-tail test to draw a conclusion.		

For users with annual income ranging from \$80,000 to \$99,000, the difference in perception of reliability between the old USASpending.gov website and the new USASpending.gov website is indistinguishable. This means that, while over the entire population

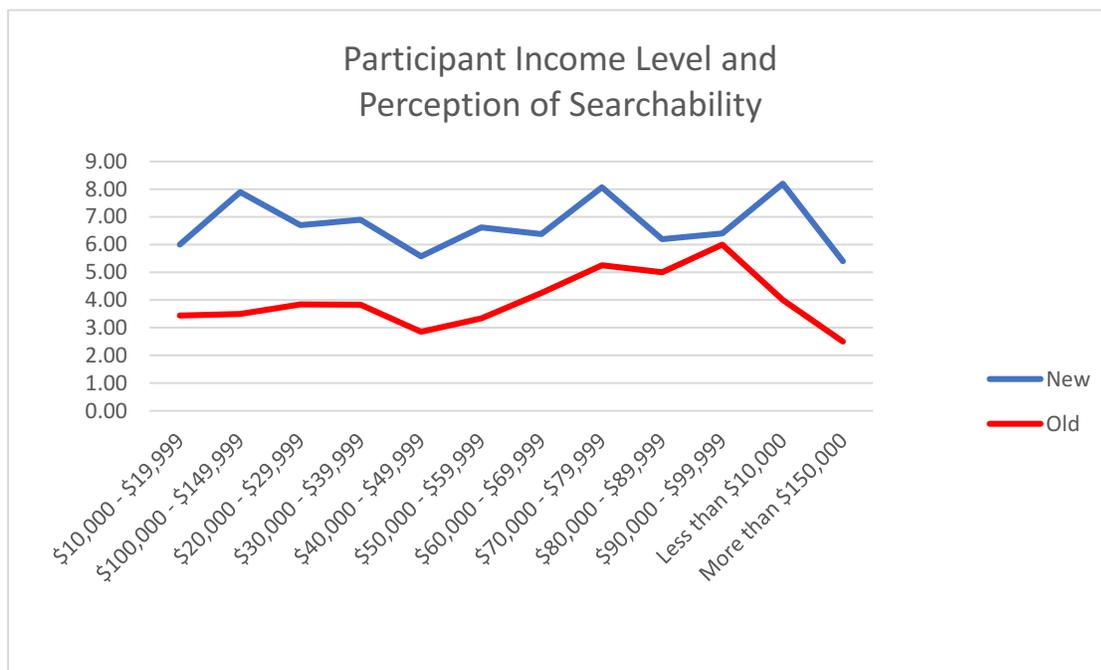
my hypothesis is true, for consumers falling within this relevant range, the results are statistically equal and the null hypothesis cannot be rejected.

I did not directly explore the cause of this inconsistency but I can speculate on how the difference arose. First, the difference could be due to randomness. I believe that if the same study were conducted over a larger population of users with an annual income between \$80,000 and \$99,000, the results would be consistent with those for my complete population. Second, there is potentially a shift in user perception at a certain income level, which I believe is an interesting topic for further research. For example, a user earning \$90,000 may be indifferent to the information presented on USASpending.gov because they do not deem it relevant to their decision-making.

Perception of Searchability

To assess user perception of searchability, the survey asked participants to rank, on a scale of 1-10, how searchable the information presented on their assigned website was. Figure 4 displays the distribution of mean levels of searchability for each income level.

Figure 4: Participant Income Level and Perception of Searchability



The distribution in Figure 4 accurately reflects my expectations for these results and is consistent with my hypothesis. The graph shows that, across the entire population, users perceived the new USASpending.gov website to be more searchable than the old USASpending.gov website. It is interesting that the smallest difference between users' perceptions of searchability of the new and old USASpending.gov website occurs within the \$80,000 to \$99,000 range, the same range that appeared to show the old USASpending.gov website as more reliable than the new.

Statistical Significance: Perception of Searchability

The distribution in Figure 4 shows that the new USASpending.gov website is perceived to be more searchable than the old USASpending.gov website across all income levels. But, just like for the perception of reliability variable, it is necessary to test the significance of these results before drawing a conclusion.

I performed a two-sample t-test over the entire population of participants at a significance level (alpha) of 0.05. Table 3 displays the hypotheses and inputs used in the testing of significance.

Table 3: Statistical Significance: Perception of Searchability

Table 3		
t-Test: Two Sample Assuming Equal Variances		
Null Hypothesis (H₀):	$\mu_{\text{new}} = \mu_{\text{old}}$	
H₂:	$\mu_{\text{new}} > \mu_{\text{old}}$	
alpha:	0.05	
Value	Group 2 (new)	Group 1 (old)
Mean	6.719	3.898
Variance	7.143	8.019
Observations	168	137
df	302	
t Stat	8.913	
t Critical one-tail	1.650	
P(T<=t) one-tail	2.404E-17	
t Critical two-tail	1.967	
P(T<=t) two-tail	4.807E-17**	
Notes:		
**: The new USASpending.gov website is perceived to be significantly more searchable than the old USASpending.gov website. While this test uses a directional hypothesis, a conservative approach was taken in using the p-value from the two-tail t-test to draw a conclusion.		

Given that $p < 0.01$, it is reasonable to conclude that the new USASpending.gov website is perceived to be significantly more searchable than the old USASpending.gov website.

Conclusion

This study sought to test the effectiveness of the Digital Accountability and Transparency Act in meeting two of its primary goals - providing reliable and searchable federal spending information to the public through an improved USASpending.gov website. Specifically, I sought to shed light on this question: Did the enhanced streamlining of data systems and additional sharing of Federal spending data with the public change a user's perception of the reliability and searchability of said data published on the USASpending.gov website?

I tested changes in users' perception of reliability and searchability given one of two presentations of federal spending information: the pre-DATA Act USASpending.gov website and the post-DATA Act USASpending.gov website. To do this, I distributed a survey to 305 English-speaking, United States taxpayers. The survey asked the participant to navigate to one of the two websites and answer three questions using the information presented on that website. These questions were used to get the participant familiar with their assigned site and how that site presented information. To measure changes in the two dependent variables, the participant returned to the survey to rate, on a scale of 1-10, their perception of reliability and searchability of the data presented to them on the website.

The null hypothesis (H_0) regarding reliability is that users' perceptions of reliability of the data presented on the new USASpending.gov website would be equal to data presented on the old USASpending.gov website. Results show that, when the population is taken as a whole, users consider the data presented on the new USASpending.gov website to be significantly more reliable than data presented on the old USASpending.gov website. However, for users with annual incomes ranging from \$80,000 to \$99,000, the level of reliability between the new

USASpending.gov website and the old USASpending.gov website is perceived as statistically equal, meaning that, within this relevant range, the null hypothesis cannot be rejected.

The null hypothesis (H_0) regarding searchability is that users' perceptions of searchability of the data presented on the new USASpending.gov website would be equal to data presented on the old USASpending.gov website. My data suggests that users consider the data presented on the new USASpending.gov website to be significantly more searchable than data presented on the old USASpending.gov website.

However, this study is subject to several limitations, the primary being that respondents did not access their assigned website in a controlled environment and their "clicks" were not tracked. It is assumed that all users did what was asked of them, but that cannot be assured. Second, for the duration of my study, the old USASpending.gov and the new USASpending.gov websites were both live. However, since collecting my data, the old site has been deactivated and the new site has been fully instated. Because of this, my experiment cannot be replicated.

Implications and Further Research

From this study, I offer a few implications for policy makers and independent auditors. This law was enacted with the goal of providing reliable and searchable data to public users through the USASpending.gov website. To ensure that this goal is met, the DATA Act Program Management Office (DAP) was created. Policy makers and members of the DAP can emulate this study in their testing of effectiveness. I suggest that they gather feedback from users in conjunction with the full implementation of the new USASpending.gov website to ensure that users' perceptions of data reliability and searchability are maximized.

In addition, it is important for the public to know that this website even exists. It does not matter whether the information presented on USASpending.gov is reliable and searchable if no one is using it. Finally, for independent auditors tasked with providing assurance over the financial information presented in federal agencies' financial statements, it is probable that elements of the DATA Act, such as changes to financial reporting internal controls or expansion of disclosure requirements, affect how a financial audit over a government agency is performed. I suggest that auditors put an emphasis on understanding these changes during walk-throughs so that, when performing substantive test-work over information produced by those controls, they have a comprehensive understanding of how the information was determined.

Finally, this study lends itself to countless further studies on the effectiveness of the DATA Act. For example, it may be useful going forward to understand how different age groups approach government data and how they prefer to receive that information or what kind of decisions are ultimately made by taxpayers given access to this level of information. In addition, while this study focused on one specific goal of the DATA Act, there are many more elements that warrant exploration. For example, are the new data standardization controls over financial reporting effective or how do the changes to disclosure requirements affecting the timeliness of an agency's financial reports?

APPENDIX I

USASpending.gov – Home page

USASpending.gov | Data Lab An official website of the U.S. government

USASPENDING.gov Spending Explorer Award Search Profiles Download Center Glossary

In 2017, the government spent \$3.98 trillion.⁹

Curious to see how this money was spent? We hope so — we've opened the conversation around federal spending and provide the tools to help you navigate the budget from top to bottom.

A big-picture view of the federal spending landscape

The Spending Explorer lets you explore the entire federal budget in increasing granularity, illustrating how awards derive from federal accounts.

Interactive visualizations provide help building context, and multiple breakdowns clarify the relationships between federal-spending components.

USASpending.gov – Federal Spending Visualization

USASpending.gov | Data Lab An official website of the U.S. government

USASPENDING.gov Spending Explorer Award Search Profiles Download Center Glossary

Spending Explorer

You are viewing FY 2018 spending by Agency
Choose an agency below to start your exploration.

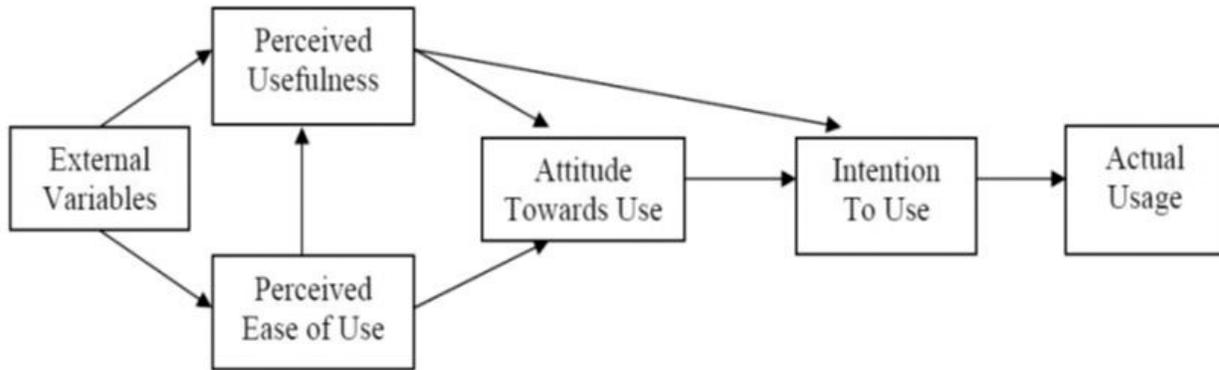
FY 2018 OBLIGATED AMOUNT
\$1.1 Trillion
Data as of December 31, 2017

See the breakdown by: **Agency**

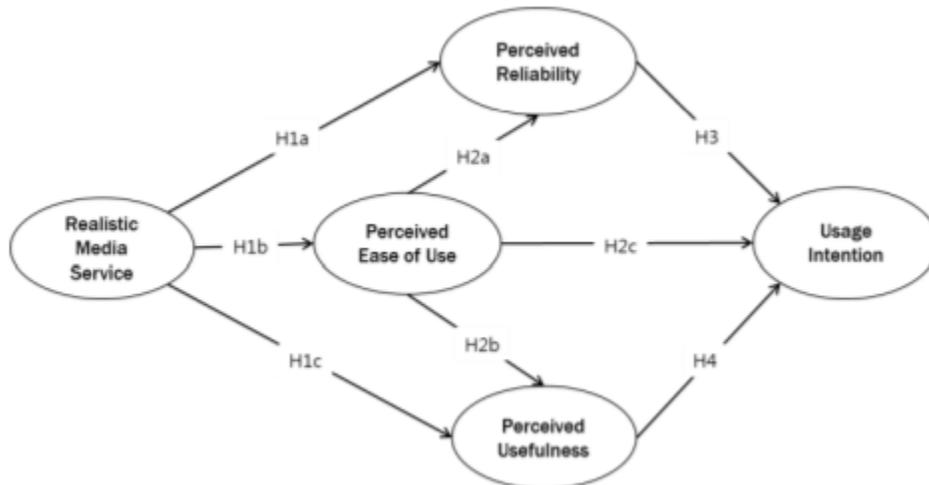
Agency	Percentage
Department of Health and Human Services	31.9%
Social Security Administration	23.5%
Department of the Treasury	18.2%
Department of Veterans Affairs	4.4%
Office of Personnel Management	4.2%
Department of Housing and Urban Development	2.9%
Department of Justice	2.2%
Department of Education	0.7%
Department of State	0.7%
Department of Commerce	1.1%
Department of Energy	1%

APPENDIX II

Technology Acceptance Model – (Davis 1989)



Technology Acceptance Model – (Choi 2015)



APPENDIX III

Consent Document



CONSENT TO PARTICIPATE IN RESEARCH

Title of Research: Data Transparency in the United States Government

Funding Agency/Sponsor: John V. Roach Honors College, Neeley School of Business

Study Investigators: Mary D'Alise, Dr. Ray Pfeiffer

What is the purpose of the research?

The purpose of this research is to test the effectiveness of the newly enacted Digital Accountability and Transparency Act, specifically the participant's perception of reliability and search ability of the information.

How many people will participate in this study?

We estimate that 300 individuals will participate in the study.

What is my involvement for participating in this study?

- Participants will be asked to complete an online survey that can be taken on any device with Internet access.
- The survey will ask participants to provide demographic information then answer three questions using a given treatment. Following the task, participants will be asked to answer 8 questions regarding his or her experience with the site.
- You must be an English-speaking United States taxpayer to participate in this study.

How long am I expected to be in this study for and how much of my time is required?

We estimate that the study will take no longer than 15 minutes to complete.

What are the risks of participating in this study and how will they be minimized?

Participants will incur no more risk than they would on any given day. Participants may become bored, but the survey was designed to prevent this from occurring.

What are the benefits for participating in this study?

The greatest benefit provided to participants of the study is increased knowledge of available resources that have been provided to the public by the federal government.

Will I be compensated for participating in this study?

Participants will be compensated \$1 for completion of the study.

What is an alternate procedure(s) that I can choose instead of participating in this study?

There are no alternate procedures. You may choose not to participate in the study or stop taking the survey at any time.

How will my confidentiality be protected?

We are not collecting any personally identifiable information. All data will be stored on a password-protected computer.

Is my participation voluntary?

Participating in this survey is completely voluntary.

Can I stop taking part in this research?

You may stop taking the survey at any point.

What are the procedures for withdrawal?

To withdraw from the study, you can close the web browser or delete the tab containing the survey link. Any records will be deleted.

Will I be given a copy of the consent document to keep?

The consent document should be printed for your records.

Who should I contact if I have questions regarding the study?

If you have questions, complaints, or concerns please contact Mary D'Alise at mary.dalise@tcu.edu or Dr. Ray Pfeiffer at r.pfeiffer@tcu.edu.

Who should I contact if I have concerns regarding my rights as a study participant?

Dr. Cathy R. Cox, Chair, TCU Institutional Review Board, (817) 257-6418, c.cox@tcu.edu.
Dr. Bonnie Melhart, TCU Research Integrity Office, (817) 257-7104, b.melhart@tcu.edu.

Your signature below indicates that you have read or been read the information provided above, you have received answers to all of your questions and have been told who to call if you have any more questions, you have freely decided to participate in this research, and you understand that you are not giving up any of your legal rights.

APPENDIX IV

Survey Instrument

Select your age

18-29

30-39

40-49

50+

Select your gender

Male

Female

Prefer not to say

Select your annual income

Less than \$10,000

\$10,000 - \$19,999

\$20,000 - \$29,999

\$30,000 - \$39,999

\$40,000 - \$49,999

\$50,000 - \$59,999

\$60,000 - \$69,999

\$70,000 - \$79,999

\$80,000 - \$89,999

\$90,000 - \$99,999

\$100,000 - \$149,999

More than \$150,000

How much money was spent by the Department of Health and Human Services during the fiscal year 2017?

How much of that total was awarded to Medicaid and Medicare services?

What is the total amount of spending for fiscal year 2017?

On a scale of 0-10, how easy was it for you to navigate the website?

Not at all satisfied Extremely satisfied

0 1 2 3 4 5 6 7 8 9 10

On a scale of 0-10, how reliable do you perceive this spending data to be?

Not at all reliable Extremely likely

0 1 2 3 4 5 6 7 8 9 10

On a scale of 0-10, how complete do you perceive this data to be? (i.e. is all of the information provided?)

Not at all complete Extremely likely

0 1 2 3 4 5 6 7 8 9 10

On a scale of 0-10, how satisfied are you with the amount of information provided to you on the site?

Not at all satisfied Extremely satisfied

0 1 2 3 4 5 6 7 8 9 10

Treatment 1

Copy and paste the following link into a new tab in your web browser. On the following page you will be asked three questions that should be answered using the provided website.

<https://beta.usaspending.gov/#/>

Treatment 2

Copy and paste the following link into a new tab in your web browser. On the following page you will be asked three questions that should be answered using the provided website.

<https://www.usaspending.gov/Pages/Default.aspx>

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