

Digital & Analytic Literacy To Bridge the Skills Gap

2019 APPAM Spring Conference

PRESENTERS:

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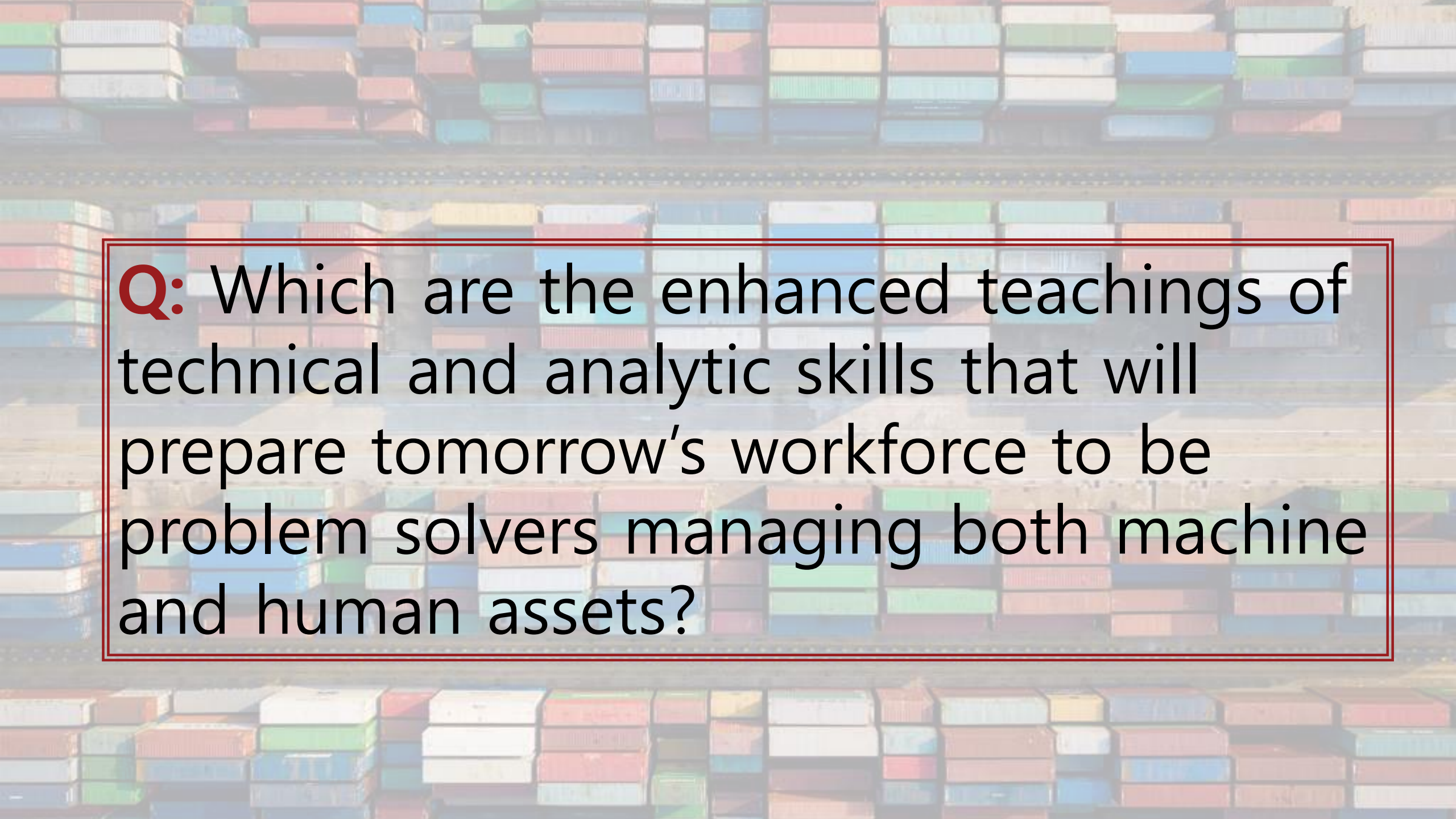
Heather Campbell, Claremont University

Rob Seidner, Office of Management and Budget, EOP

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Q: Which are the enhanced teachings of technical and analytic skills that will prepare tomorrow's workforce to be problem solvers managing both machine and human assets?

Agenda

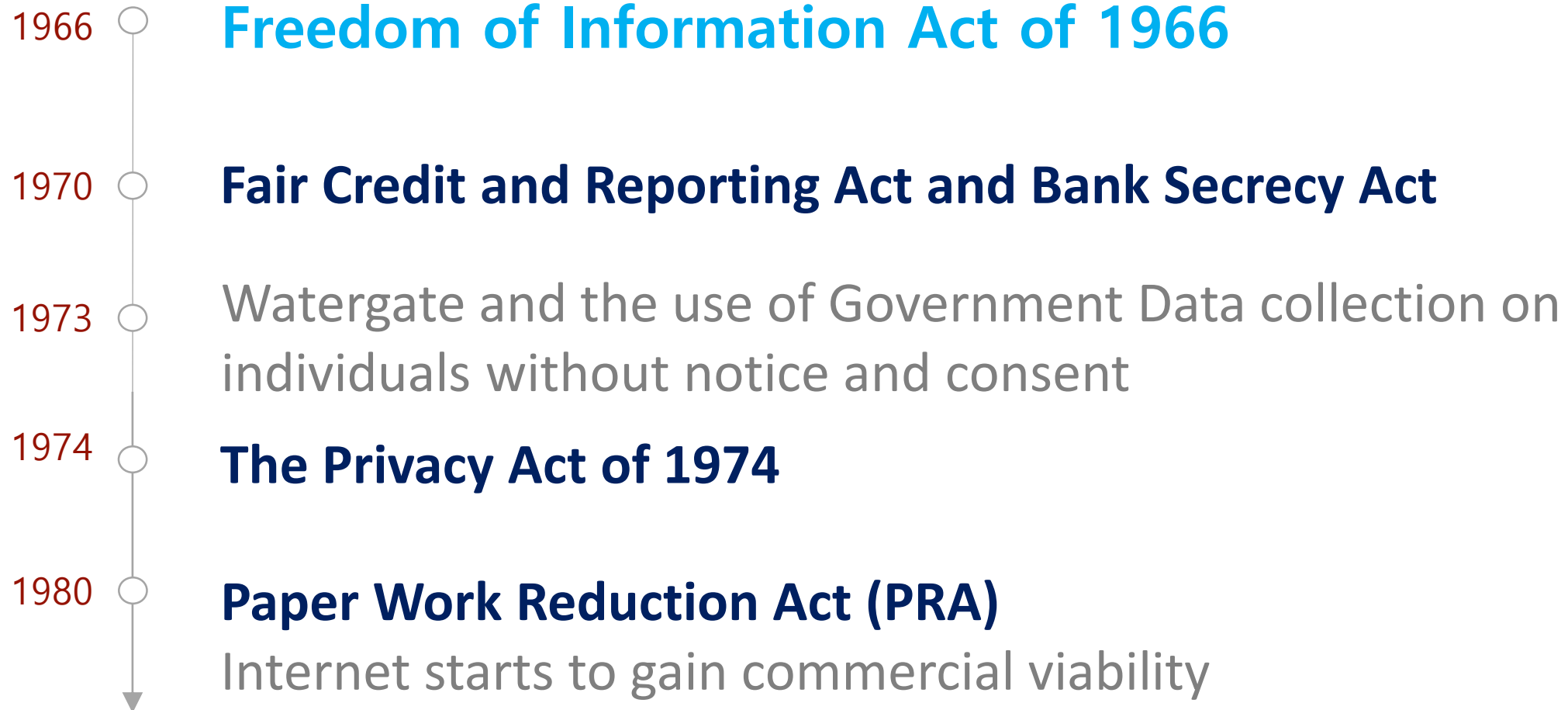
1. Brief History of Data Laws in the United States
2. Changes in the Data Sphere
3. Gaps in the Acquisition of Skills to address data trends



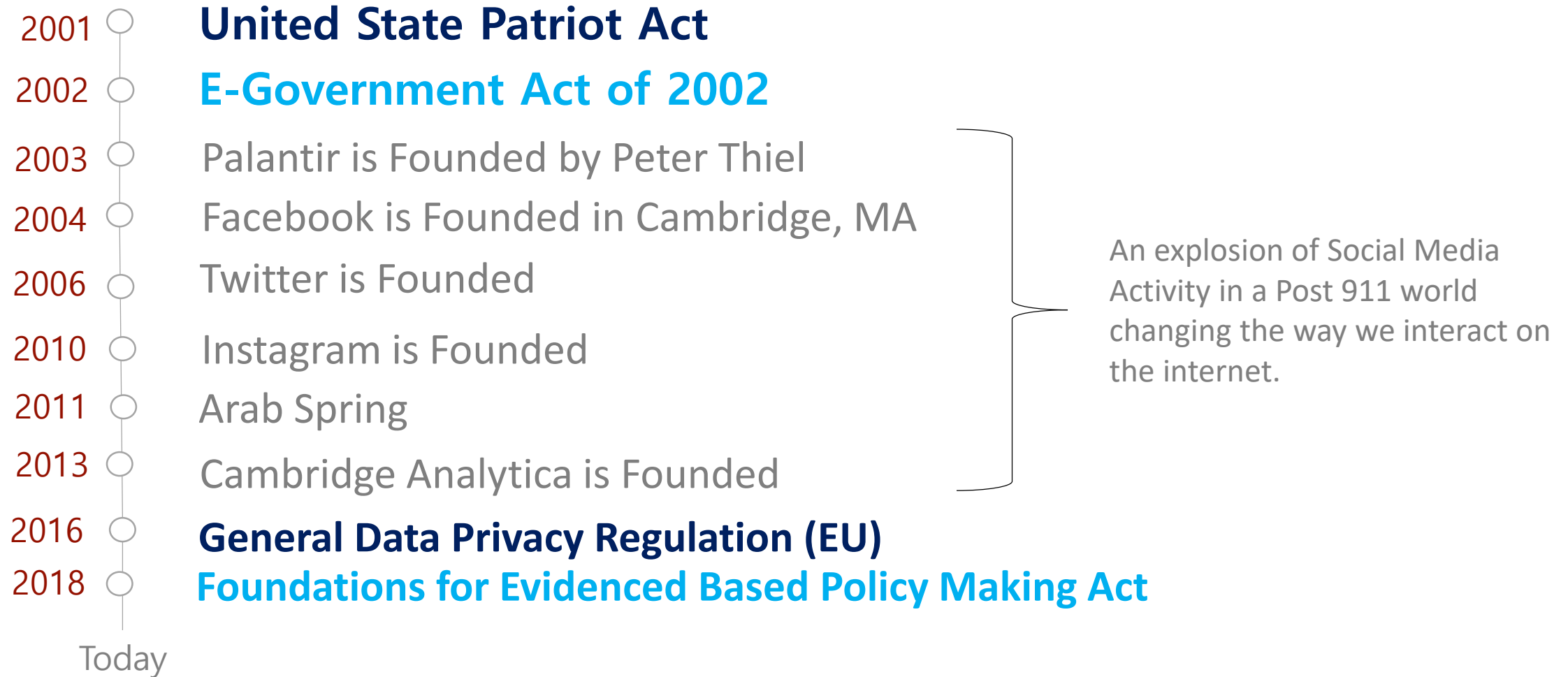
Overview of Modern U.S. of Data Laws from 1966 to 2018.

Starting with the Freedom of Information Act of 1966 and concluding with the Foundations for Evidence Based Policy Making Act of 2018.

Rise of the “Secure Data” View



Emerging of a New “Open Data” View



Distinctions between "Secure Data" and "Open Data"

"Secure Data" First Policy

- Focus on maximization of value.
- Data is an asset and can be capitalized.
- Reports on the aggregate and research focused to protect data.
- View data as a public good.

"Open Data" First Policy

- Focus on minimization of risk to sensitive data.
- Need only Access.
- Works well for National Security, personal records, and more.
- View data as a private good with notice and consent requirements.



Changes in the Data Sphere.

An exploration of the emerging challenges that are upending the social and political norms around the use and function of data, commerce, and political communication.



1. Artificial Intelligence
and Automation

2. Civic Data Aggregation
and Data Mining

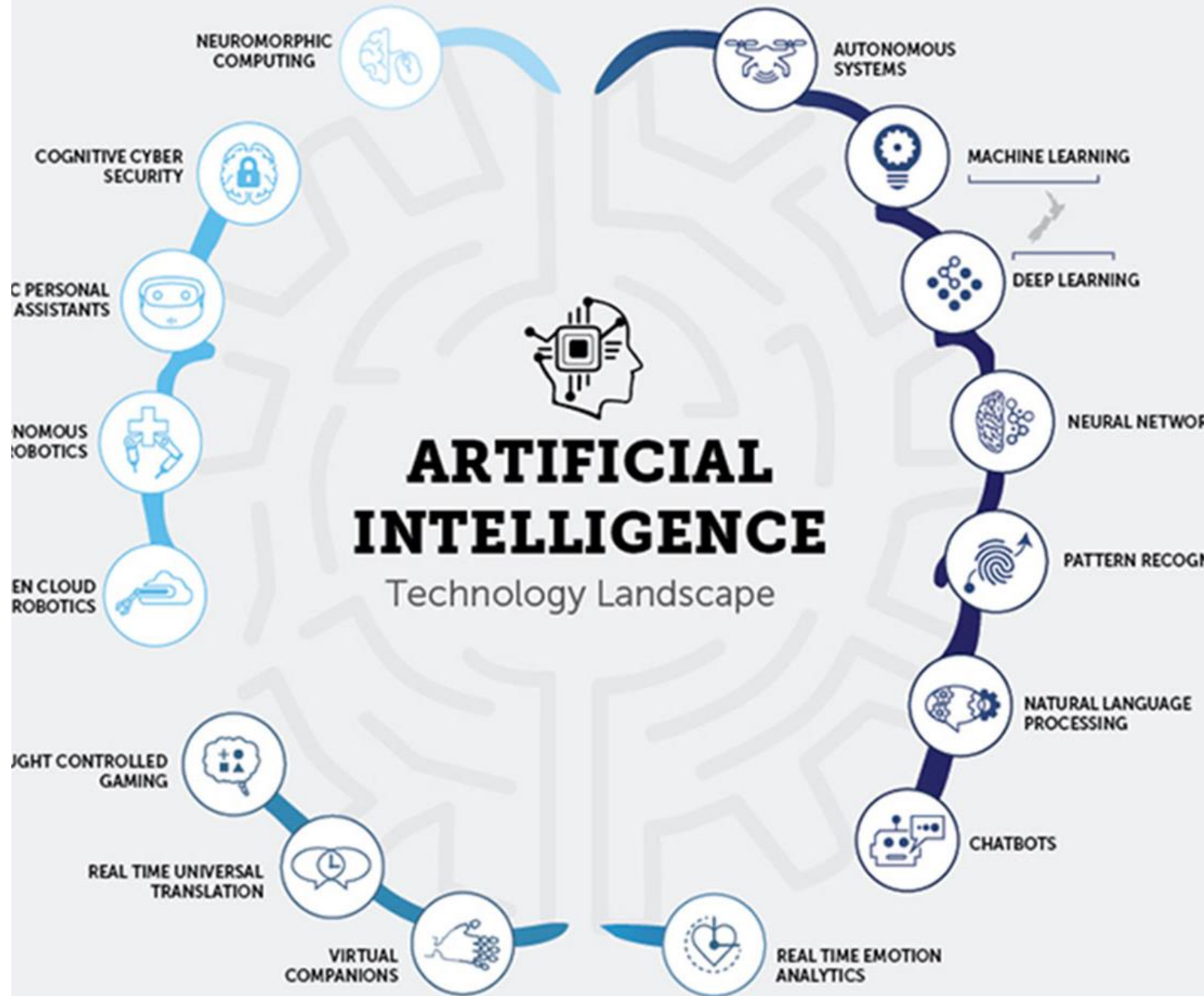
Four Trends in
E-Government

3. Balkanization of Data
Science (Division of Labor)

4. Data Privacy (Notice
and Disclosure)

Trend #1: Artificial Intelligence and Automation of Human Centered Tasks

- Facebook Artificial Intelligence is a quasi independent firm using Facebook's social media data sets to perfect advanced neural network structures and new chip sets.
- Nvidia, Google, Microsoft, and Twitter, and Open AI are developing a variety of new chip sets to power a new generation of social data AI.
- A PwC study shows Global Investment will have a 10.7 Trillion dollar impact by 2030 (USD 2016).



Trend #2: Civic Data Aggregation & Mining

Table 1. Characteristics of a digitally maturing organization

	Early	Developing	Maturing
Strategy	Aimed at cost reduction	Aimed at improving customer experience and decision making	Aimed at fundamental transformation of processes
Leadership	Lacks awareness and skills	Digitally aware	Digitally sophisticated
Workforce development	Insufficient investment	Moderate investment	Adequate investment
User focus	Absent	Gaining traction	"Central" to digital transformation
Culture	Risk averse; disintegrated	Risk tolerant; accommodates innovation and collaboration	Risk receptive; fosters innovation and collaboration

Source: Deloitte University Press, *"The Journey to Digital Transformation"*, October, 2015

Trend #3: Balkanization of Data Science



Trend #4: Data Privacy

- Open data platforms essentially allow for identification of protected data classes when combined with social media data (Cambridge Analytica).
- Citizens lack of notice for data usage.
- Citizens' undervaluation of protected data classes.



A Significant Nexus of Views and Trends

	Secure View	Open View
Trend #1: AI	Limit AI capacity to Routine non inferential tasks	No limits on AI "roaming" in the Data Sphere allowing for cross walking.
Trend #2: Civic Data	Create protected centralized portals for citizens to access data	Fragmented consumer profiles disaggregated
Trend #3: Division of Data Science	Limit access to data to "sworn agents" and experts with identifiable missions.	Open access, everyone can with the right skills create and use data to generate value.
Trend #4: Data Privacy	Minimization of commercial access and maximization of citizen notice.	Maximizing Consumer utility and minimizes market asymmetry.



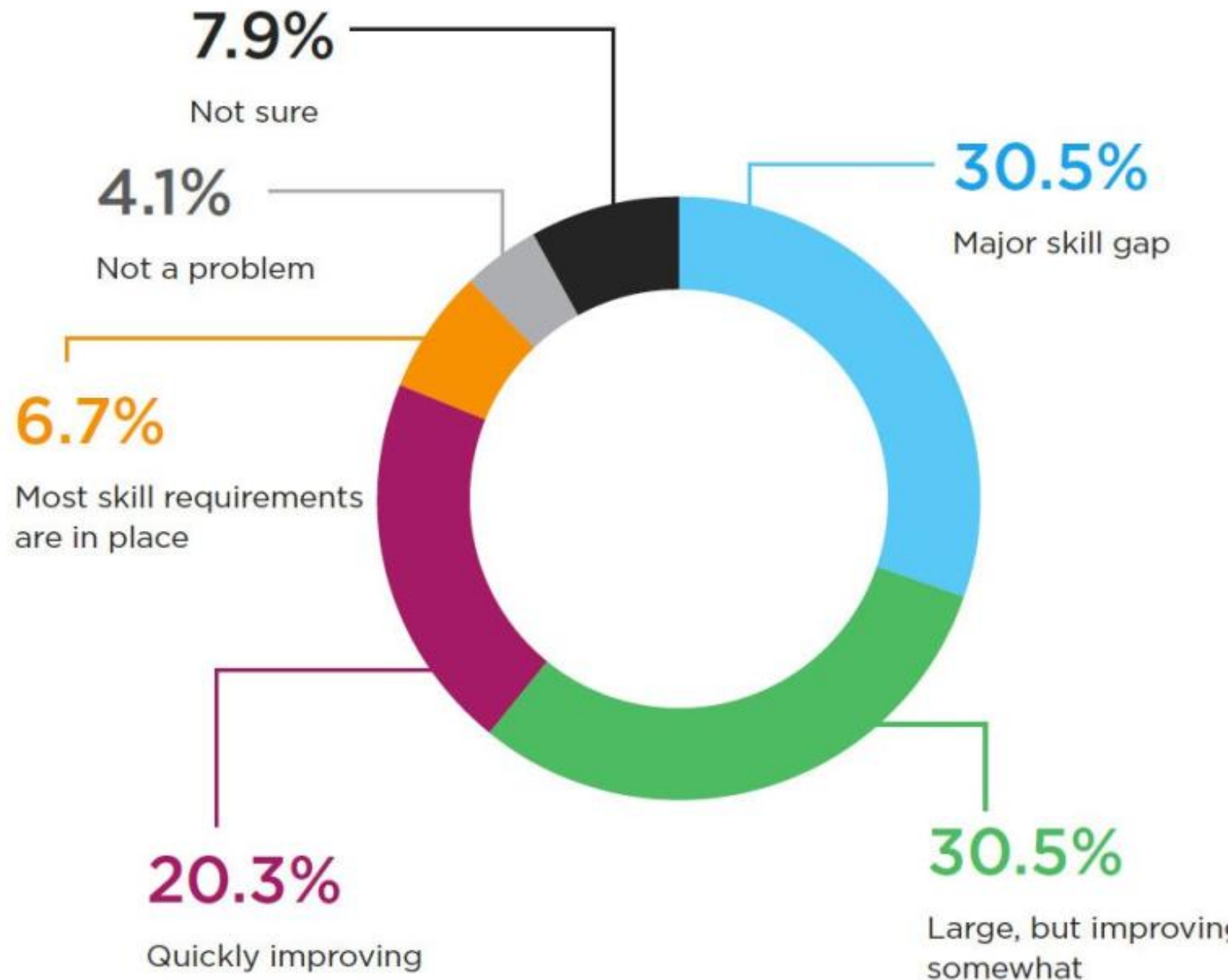
Gaps in the Acquisition of Skills to Address Data Trends

The emergence of technology and how citizens and governments are responding today to the change in the use of data technology is creating gaps which new teaching can address.

Data as a Strategic Asset

For Participant Stakeholders:

- The Digital Divide
- Lack of digital literacy skills
- Lack of access to useable data
- Corporate dominated by incentives
- Capacity to exclude by inner-tract
- Legibility of city systems
- Complex governance processes
- Absence of urban qualities



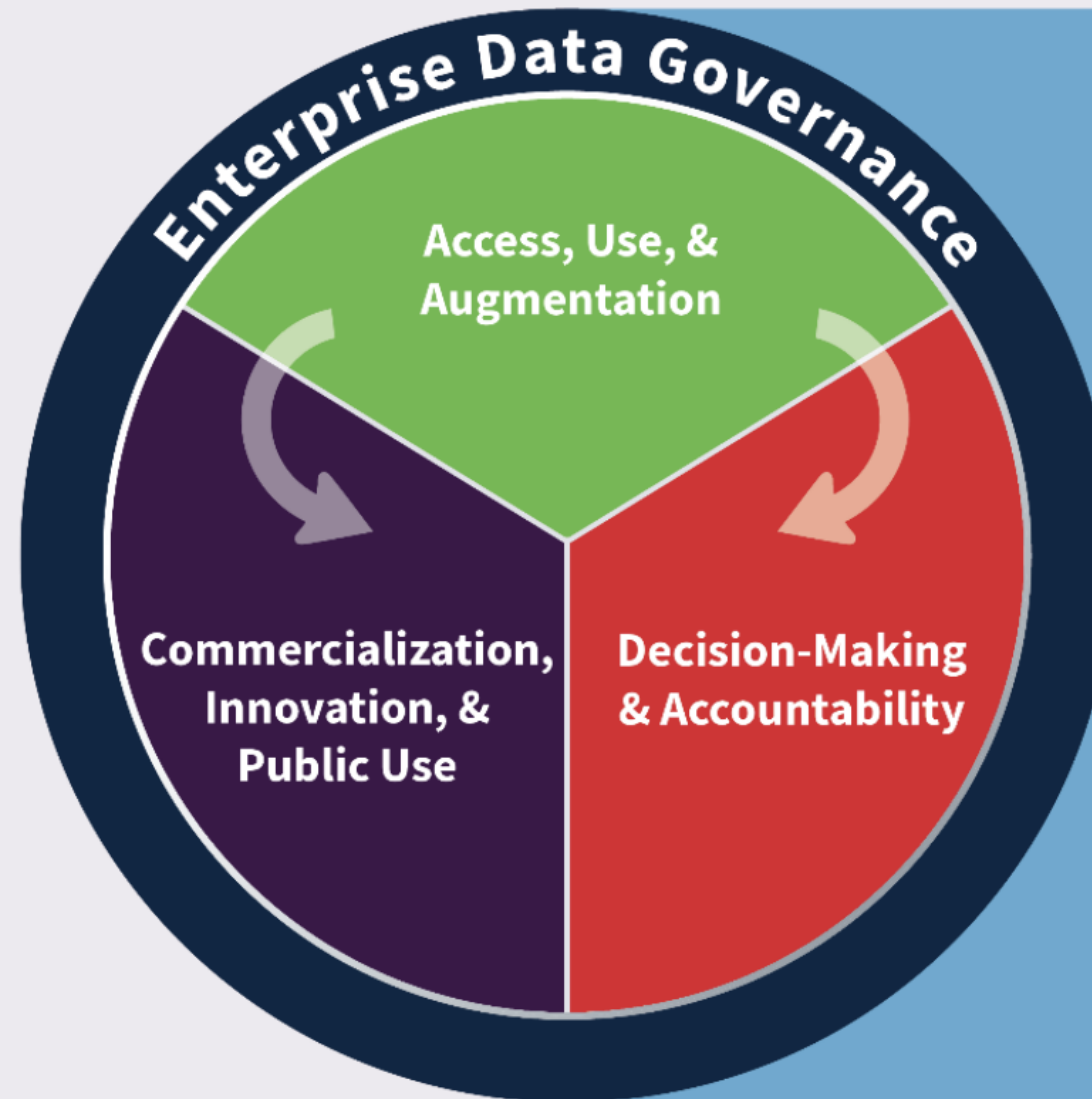
Graphic Source: Digital literacy Survey Pew Research Polls with McKenzie Community Survey.

A Federal Data Strategy for Today's Work Environment

Data as a Strategic Asset

For Governments:

- Rigidity and detachment in the Top-down mindset
- Lack of trust between citizens & government
- Bureaucracy of government
- Lack of implementation resources
- Lack of follow through on values system
- Overwhelming scale of critical issues
- Massive fragmentation



4 Crosscutting Drivers of Change

- Policy
- People
- Process
- Platform



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We Need Complexity Thinking and Computational Methods in Policy Analysis

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May 15, 2019

 Claremont Graduate University

Outline

- **The Dominant Approach**
- **Warning Signs**
- **Useful Concepts**
- **Can we Predict?**
- **Conclusion**

The Dominant Approach to Policy and Evaluation

- **Ceteris Paribus**
 - Linear Regression
 - Experimental methods

Warning Sign: Wicked Problems

Wicked Problems constantly plague policy and program evaluation

Wicked problems are those for which causes and effects are difficult, if not impossible, to establish and model, given their ..., *inescapable and numerous connections to other policy problems....* Their complexity is such that wicked problems are characterized by a relentlessness and fluidity in which they are never “solved” once and for all, because *resolving one part of the puzzle generally creates new, unexpected issues....* (Weber, Lach and Steel, 2017, p. 13).

Warning Sign: Non-transferability of Policies and Programs

We often find that programs and policies that work well in one setting do not

- Transfer to other settings
- Scale up

Useful Concepts: Systems of Systems

Wicked Problems are often thought to arise from systems of systems

- **Systems of systems create nonlinear responses as the interface between systems leads to “jerks”**
- Baumgartner et al., Punctuated Equilibrium Theory and the tectonic plate analogy
- **Cities**
- **Health**
- **Etc.**

Useful Concepts: Elinor Ostrom's Concept of Configurational Behavior

No more ceteris paribus

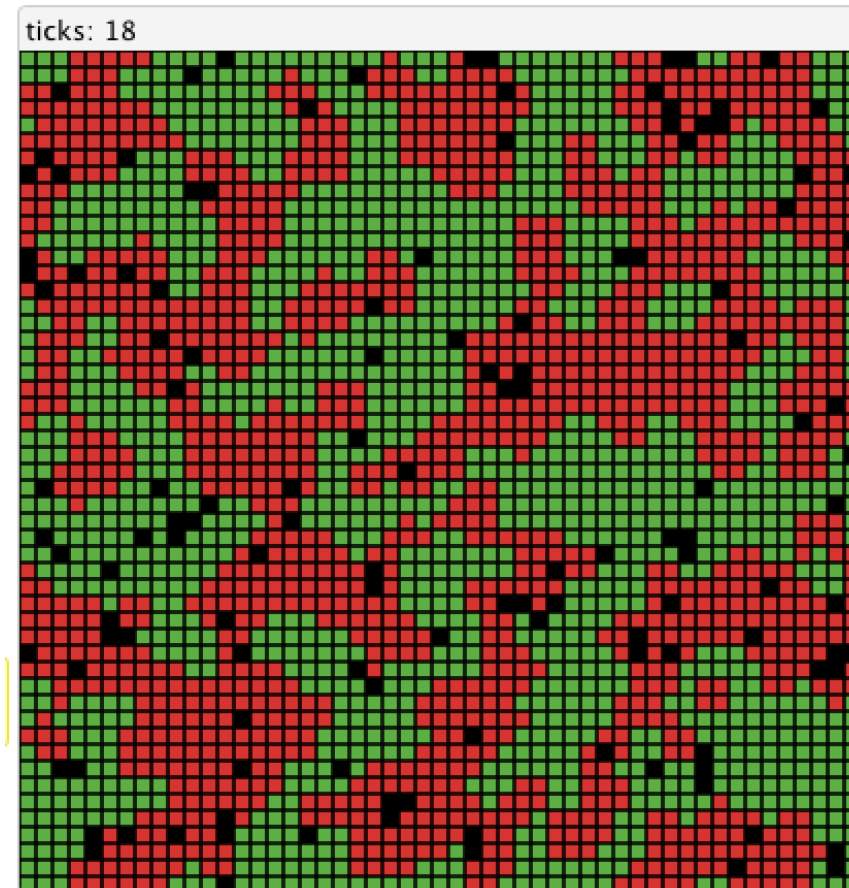
- The effect of a change in one variable depends on the configuration of other variables within which it changes
- Logit/Probit analysis may model this—but not the way we customarily use it

Useful Concepts: Thomas Schelling's Finding of Unintended Emergence

Schelling's Segregation Model

- *Goal 30% similarity, Outcome 77%*

Traffic Jams

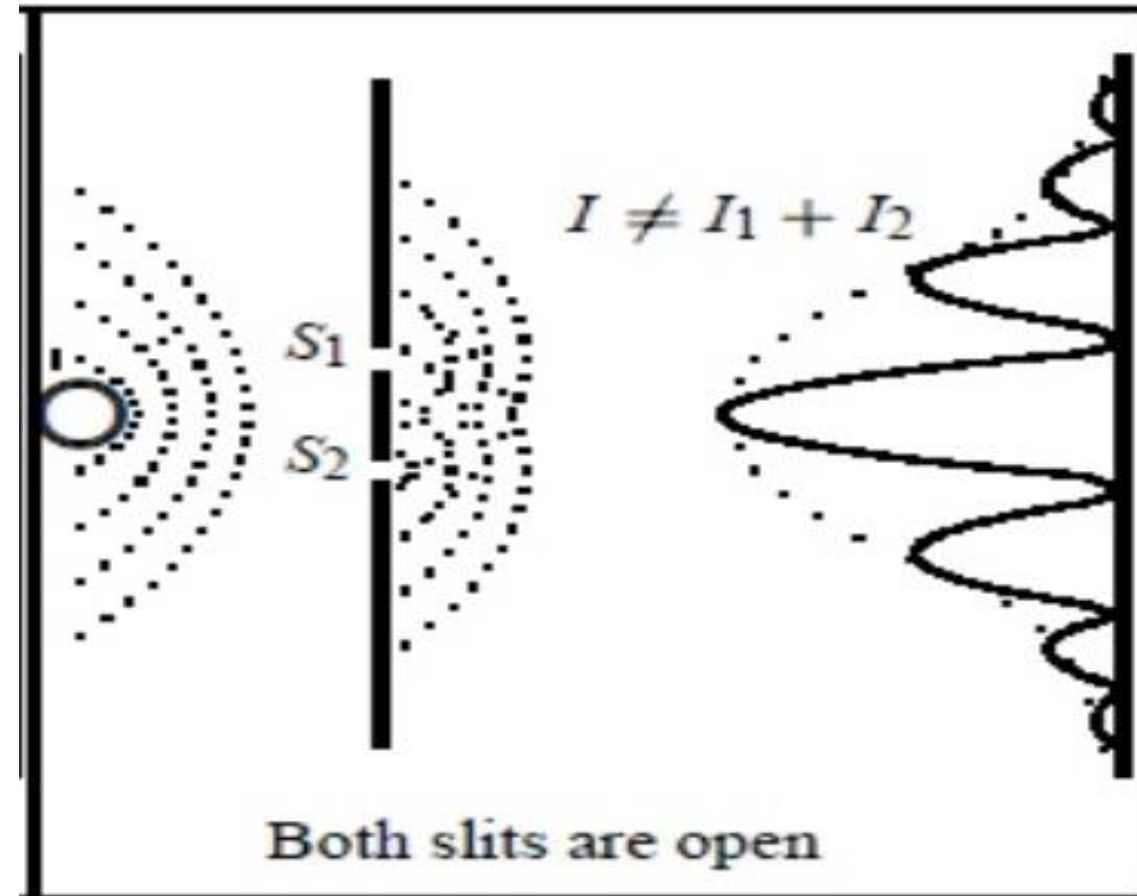


Can we Predict?

Double-slit experiment with electrons

- We can predict patterns and probabilities

Campbell, Kim & Eckerd:
Gentrification Displacement



Conclusion

To understand many types of policy issues we care about, we need complexity thinking

For complexity-based analysis, computational methods are a primary tool

Sources

- **Cover Image from Global Cities Research Institute:**
- <http://global-cities.info/content/program/urban-decision-making-and-complex-systems>
- **Weber, Lach & Steele, eds. (2017). *New Strategies for Wicked Problems: Science and Solutions in the 21st Century*. OSU Press: Corvallis. (In quote, italics are added)**
- **Baumgartner, Jones & Mortensen, in Ch. 2 in Weible & Sabatier (2018), *Theories of the Policy Process*, 4th ed. Routledge: New York.**
- **Schlager & Cox, in Ch. 6 in Weible & Sabatier (2018), *Theories of the Policy Process*, 4th ed. Routledge: New York.**
- **NetLogo ABM image from Campbell & Jewett (working). “What if Revealed Preference Isn’t So Revealing?” Presented at Society for Risk Analysis conference, 2016.**
- **Slit diffraction image from Physics Stack Exchange:**
<https://physics.stackexchange.com/questions/214779/in-the-double-slit-experiment-with-electrons-why-the-single-slit-case-is-not-dif>

Training Students For Effective Federal Careers

May 15, 2019



ROB SEIDNER

OFFICE OF PERFORMANCE
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MANAGEMENT

OFFICE OF MANAGEMENT
AND BUDGET



Teaching Today's Public Administration Students for Tomorrow's Civil Service

- Writing a Concise Bottom Line Up Front (BLUF):
 - memo
 - analysis
 - report
 - email
 - presentation
- Working with
 - Multiple stakeholders
 - Teams
- Taking Accountability for Own Performance



Public Administration Curriculum

- Teaches how to be:
 - Agile
 - Multidiscipline
 - Business-savvy
 - Tech-aware
 - Cyber
 - AI as it relates to work processes
 - Data consumption and translation
- Most Opportunity:
 - See above
 - Core Management (Contracting, HR, Logistics, etc.)
 - Emerging fields



Public Administration in Practice

- Policy Officials Rarely Use:
 - Public administration theory
 - Works cites/academic articles
 - Regression analysis
 - Historic reviews
- Policy Officials Do Use:
 - Novel approaches
 - Political Savviness
 - Spot Opportunities
 - Subject Matter Expertise/Trust



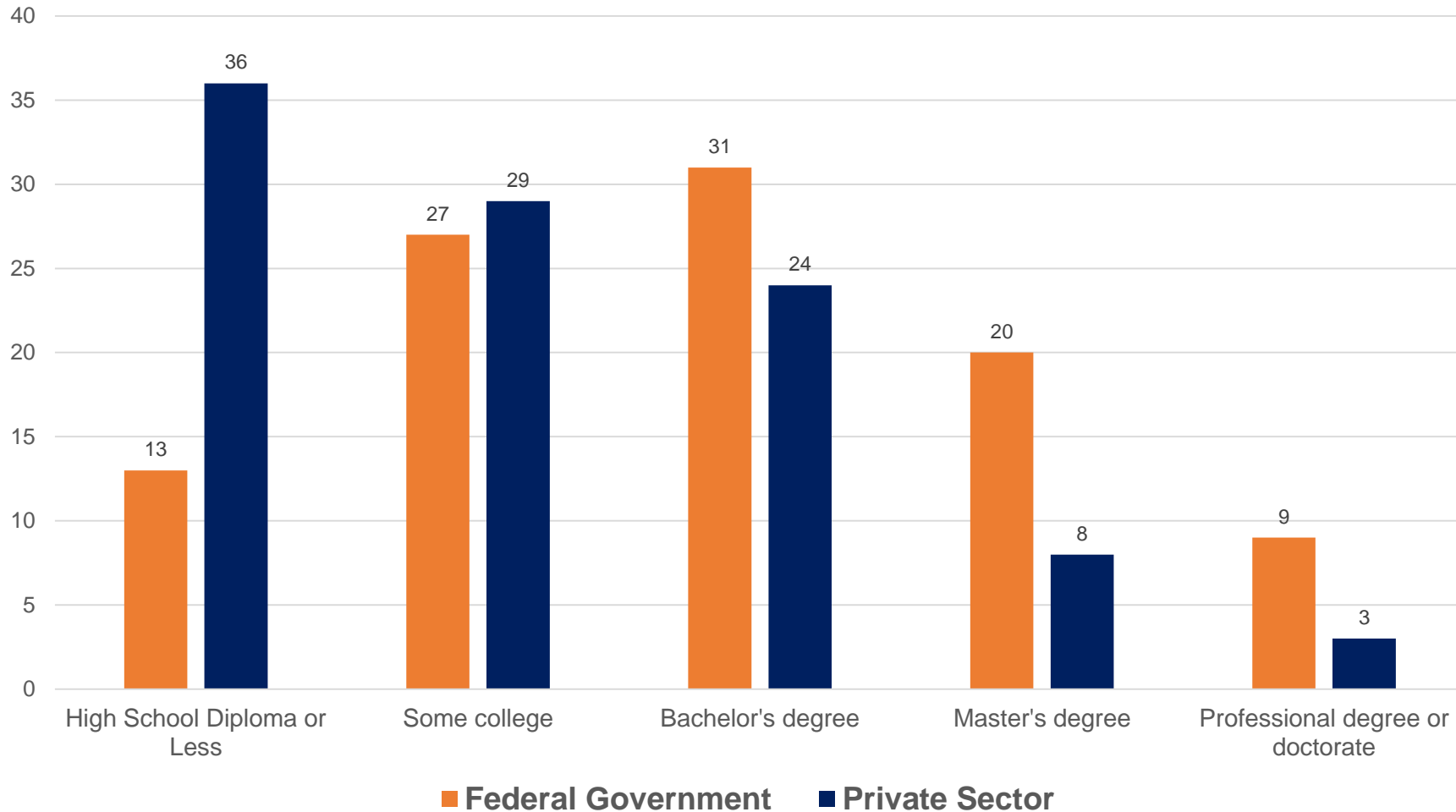
U.S. Civil Service Snapshot

- 2.1 million Federal employees (same as mid-1960s)
 - 2/3 of employees are security-related fields (Defense, veterans affairs, homeland security)
 - 85% of employees work outside Washington, DC
 - Large contractor workforce beginning in late-1990s
 - 7,000 career members of the Senior Executive Service
 - 3,000 political appointees
 - Plus, 1.4 millions uniformed services and 600,000 postal workers
- Approximately 1,600 programs
- Does not include local, city, or state government or functions like police, teachers, or transportation



Federal Workforce/Private Sector Comparison – Education

WORKFORCE COMPOSITION BY EDUCATION (%)

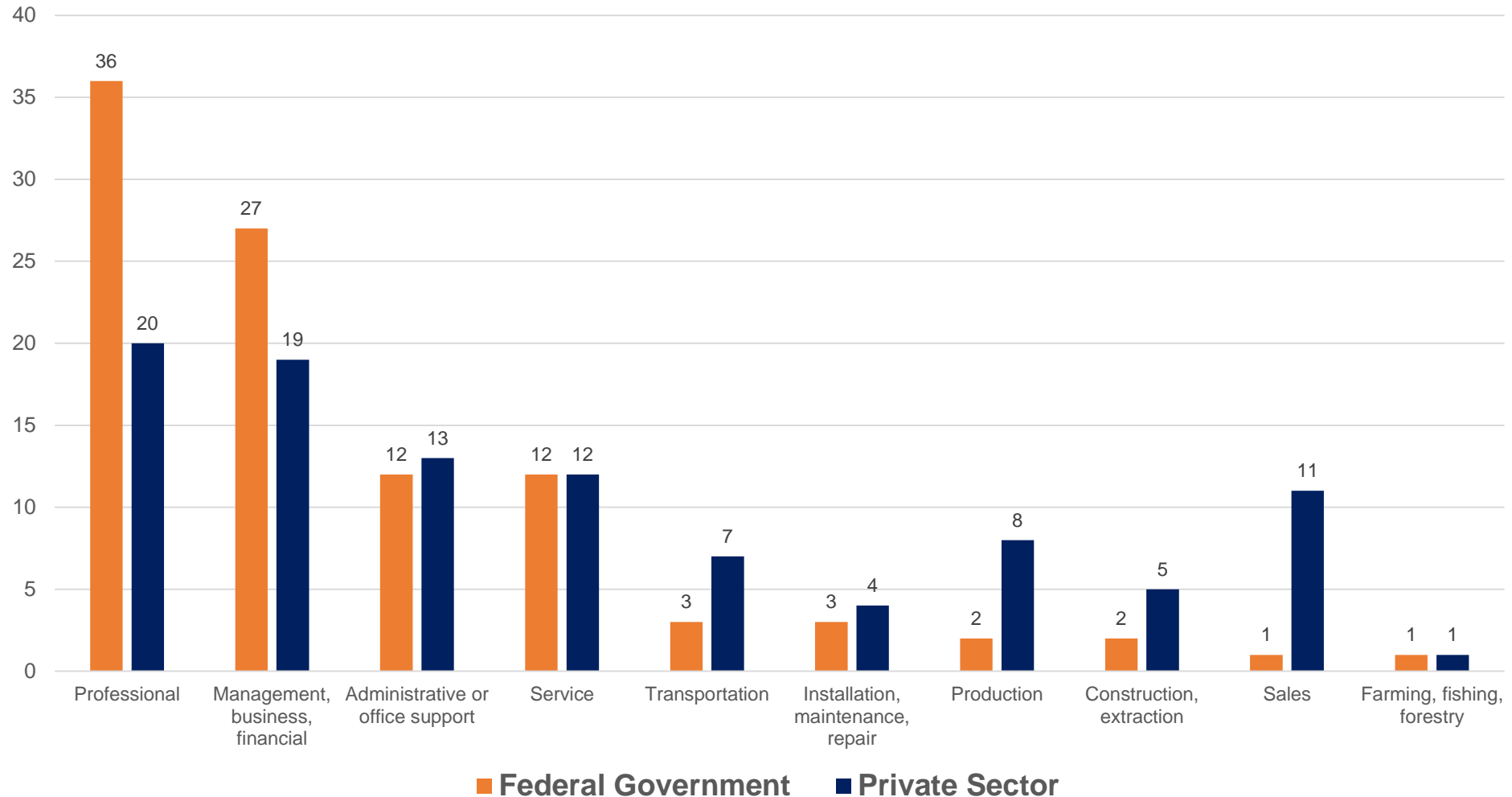


Source: Congressional Budget Office, "Comparing the Compensation of Federal and Private-Sector Employees, 2011 to 2015." April 25, 2017.



Federal Workforce/Private Sector Comparison – Occupation Type

WORKFORCE COMPOSITION BY OCCUPATION TYPE (%)

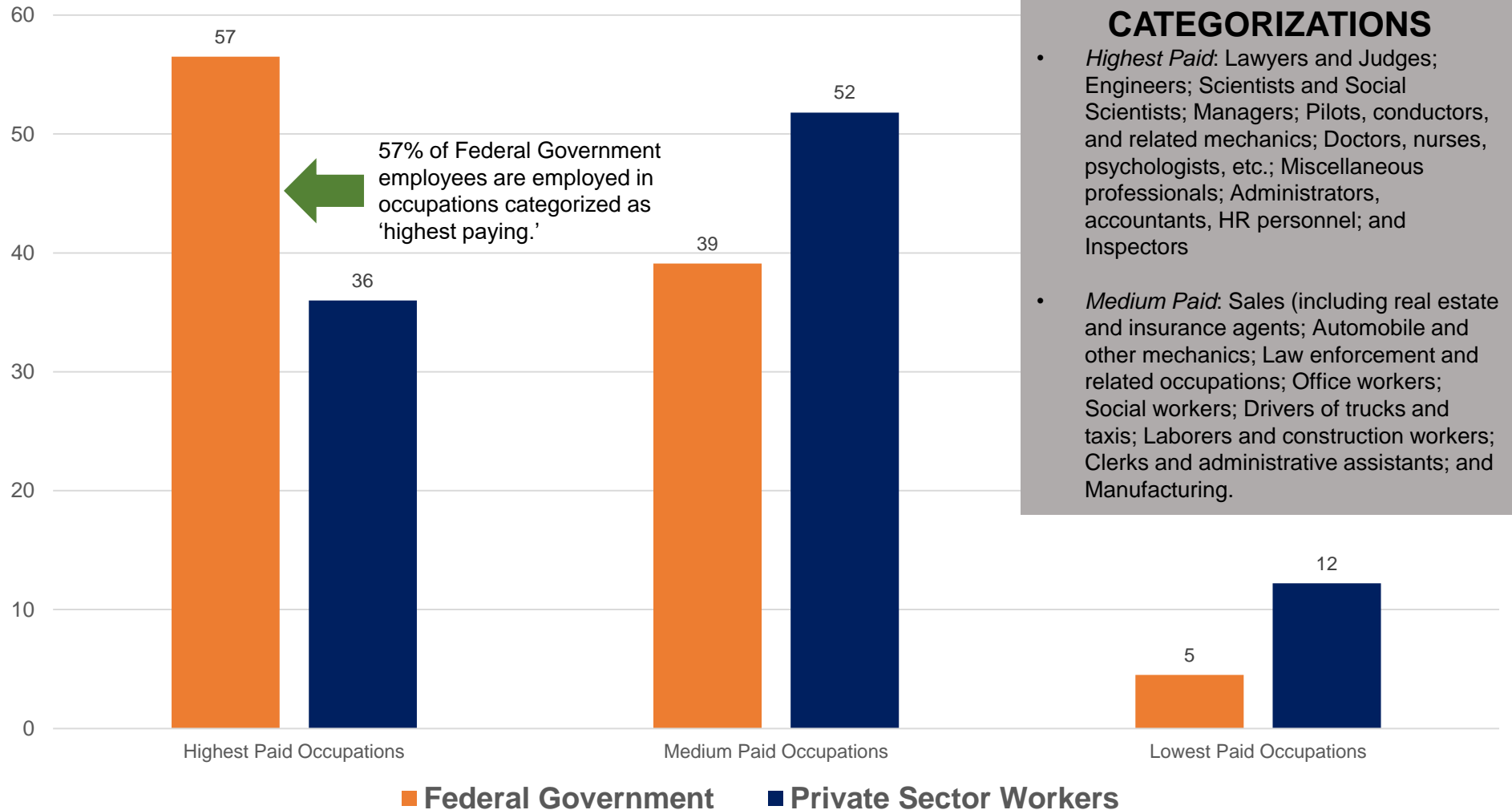


Source: Congressional Budget Office, "Comparing the Compensation of Federal and Private-Sector Employees, 2011 to 2015." April 25, 2017.



Federal Workforce/Private Sector Comparison – Occupational Salary Type

WORKFORCE COMPOSITION BY OCCUPATIONAL SALARY GROUPINGS (%)



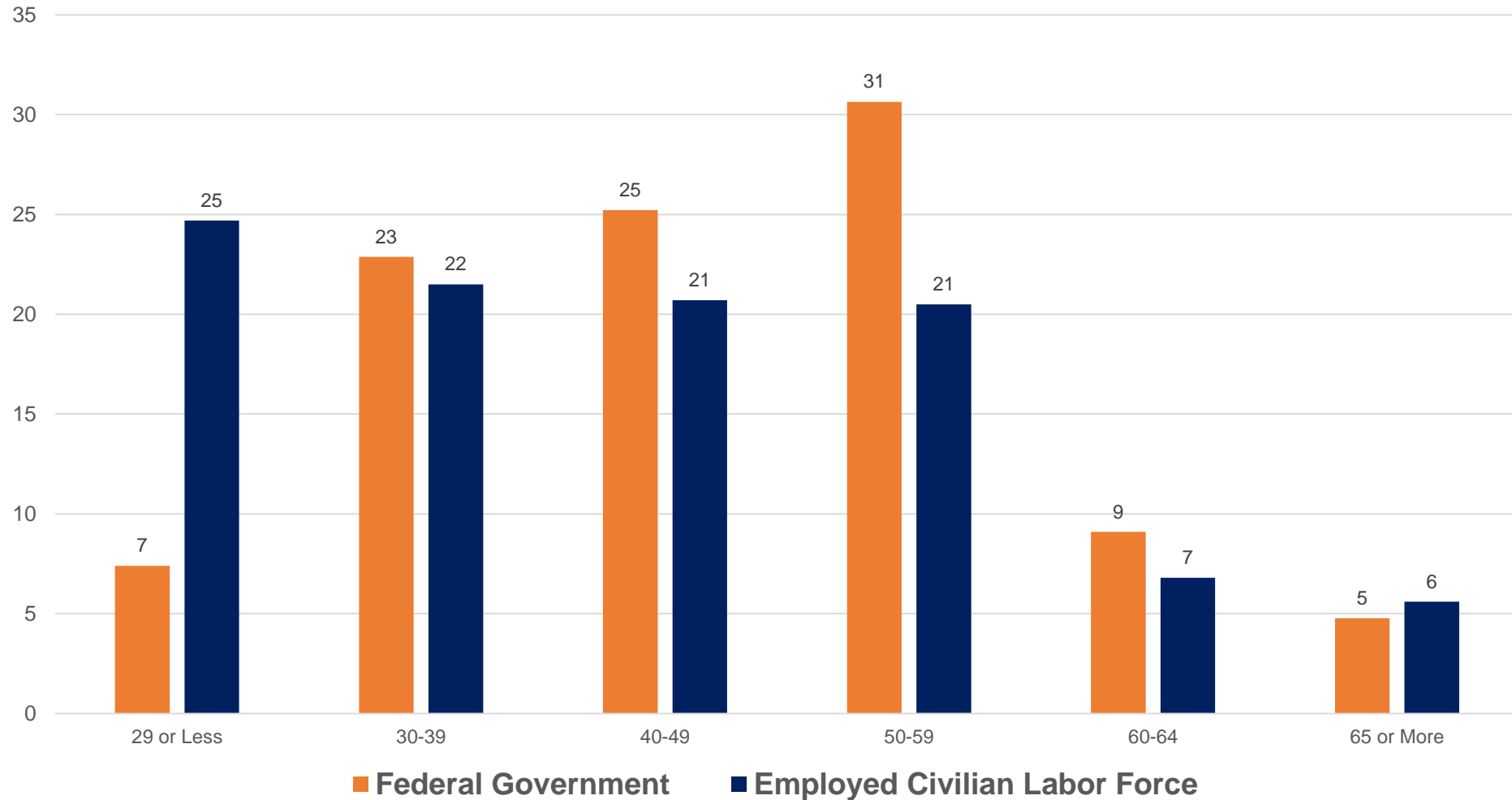
Source: 2012-2016 Current Population Survey, Integrated Public Use Microdata Series.

NOTE: Federal workers exclude the military and Postal Service, but include all other Federal workers in the Executive, Legislative, and Judicial Branches. However, the vast majority of these employees are civil servants in the Executive Branch. Private sector workers exclude the self-employed. Neither category includes state and local government workers. This analysis is limited to full-time, full-year workers, i.e. those with at least 1,500 annual hours of work.



Federal Workforce/Civilian Labor Force Comparison - Age

WORKFORCE COMPOSITION BY AGE (%)



Source: Office of Personnel Management FedScope Data (2017) and the Bureau of Labor Statistics Labor Force Statistics from the Current Population Survey (2016).

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Privacy: A Profession Well-suited for Public Administration Students

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Privacy and Civil Liberties Oversight Board (PCLOB)

*This presentation and my accompanying remarks are made in my personal capacity and do not state or reflect an official or unofficial position, policy, or opinion of the Privacy and Civil Liberties Oversight Board (PCLOB) or any of its individual Board members.

A [Very Brief] History of Problem: Technology vs. Information Privacy



- Warren and Brandies, *The Right to Privacy* (1890)
 - Individuals have the right “to be left alone.”

A [Very Brief] History of the Problem: Privacy becomes a Business Imperative

- Increase in the number of laws pertaining to privacy.
 - Criminal law, constitutional law, and lots of state laws (to name a few).
 - Reaction to Advances in Technology
- Increased use of computers and the rapid creation of lots and lots and lots and lots and lots and lots of data.
 - Social media platforms and other goods and services.
- Data becomes “digital currency” for businesses and government agencies and can lead to harms for the individual (e.g., data breaches).

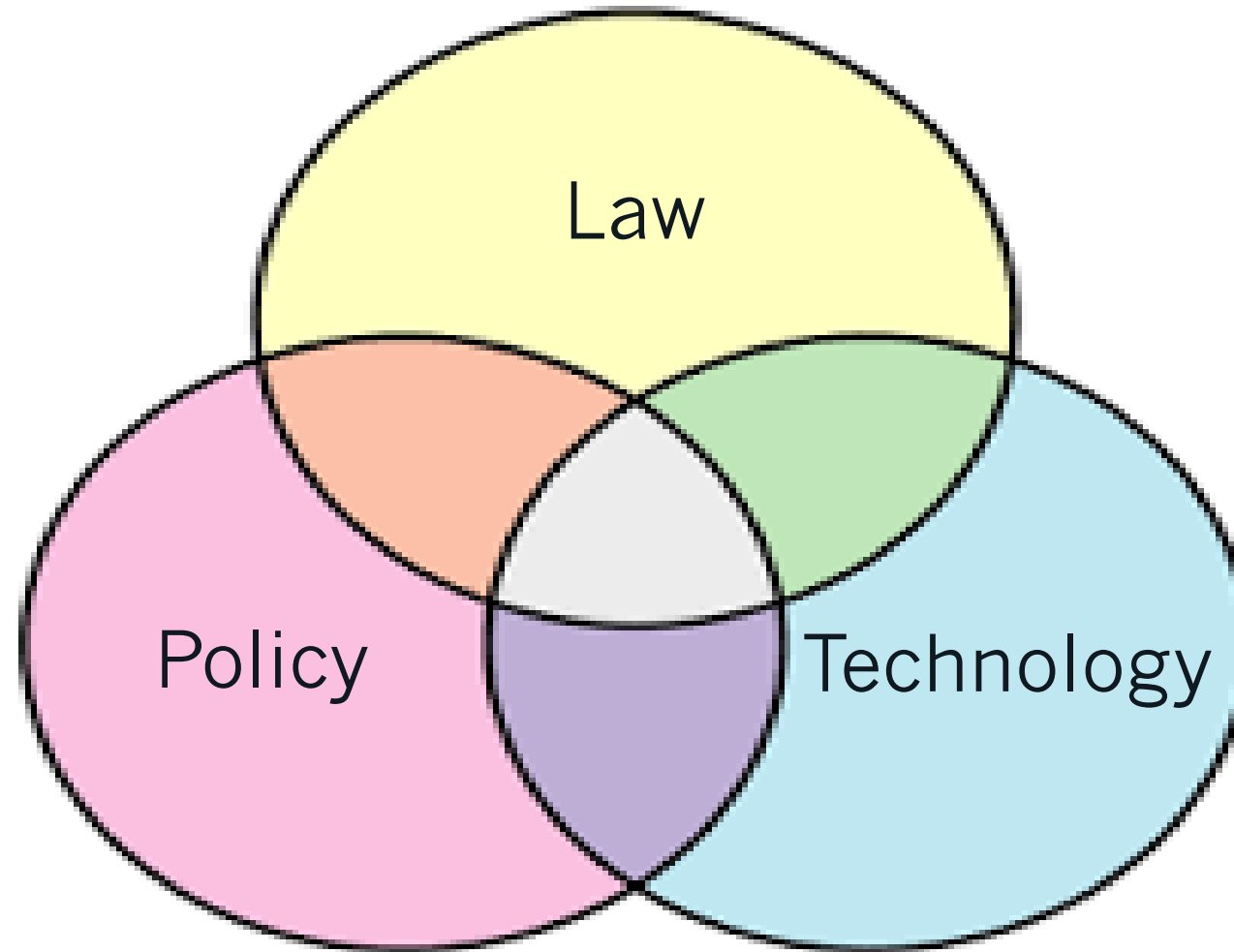
A [Very Brief] History of the Problem: Privacy becomes a Business Imperative

- Risks of harm to individuals give rise to Omnibus privacy solutions (GDPR and CCPA)
 - Laws that also provide operational frameworks for how data must be handled by businesses.



Information Privacy becomes a business imperative, not just a legal obligation.

Privacy as a Profession



Privacy Outlook: Lookin' Good as a Profession

TECH • DATA PRIVACY

Hot Job Alert: Anything With 'Privacy' In the Title



Source: *Fortune.com* (Feb. 20, 2019)

- U.S. Government
 - “Privacy Analyst,” “Information Security Specialist,” “Government Information Specialist,” “Technologist,” “Privacy Policy Analyst.”
- Contractor workforce
- Private Sector Businesses

Public Administration Curriculum: Unique for Privacy Profession

- The curriculum in public administration programs is well suited for students.
 - Agile
 - Work with a diverse set of stakeholders.
 - Business-savvy
 - Opinions that are well reasoned
- Writing that is clear and communicates to groups across organizations.

Prediction: “Empirical Privacy” will lead to innovative advancements in privacy that will be beneficial for individuals.

Contact Information

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Key Themes and Questions:

Bridging the Skills Gap in an Age of Complexity



Sources of Complexity

- **Multi-sectoral problems**
- **A tidal wave of imperfect data**
- **Artificial intelligence; machine learning; bots**
- **Institutional challenges and constraints: politics; legal mandates and restrictions**
- **Advanced technology subject to misunderstanding and abuse**

Prioritizing Skill Sets?

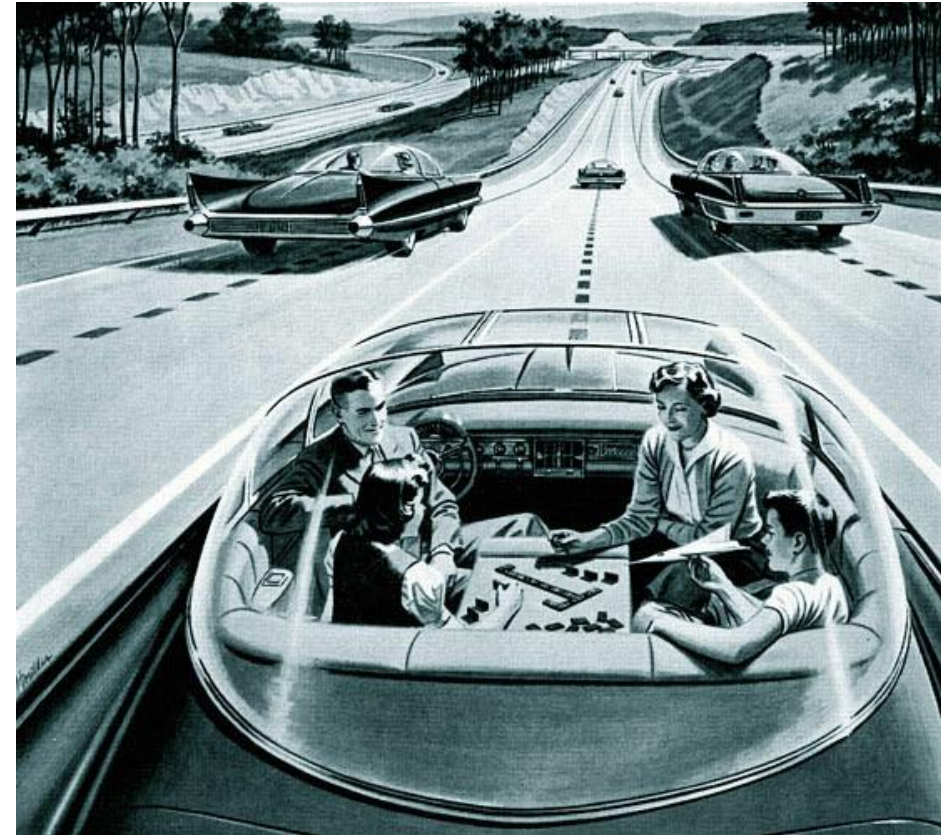


Image: *America's Power Companies' advertisement from 1956 depicting a future with autonomous cars,*
<https://www.engineering.com/DesignerEdge/DesignerEdgeArticles/ArticleID/12665/The-Road-to-Driverless-Cars-1925--2025.aspx>

Packaging Data Analytic Skill Sets?

- **Do we ditch multivariate methods and experiments?**
- **Appropriate pedagogical balance between traditional stats and computational methods?**
- **Programming; relational data bases; Python?**
- **Data analytics?**
- **Configurational comparative methods? Qualitative approaches?**

Ensuring Digital Fundamentals?

- How to school screenagers?
- Moving beyond mere search to synthesis, integration, and application
- Moving along Bloom's Taxonomy from "understanding" to "creating" digital content

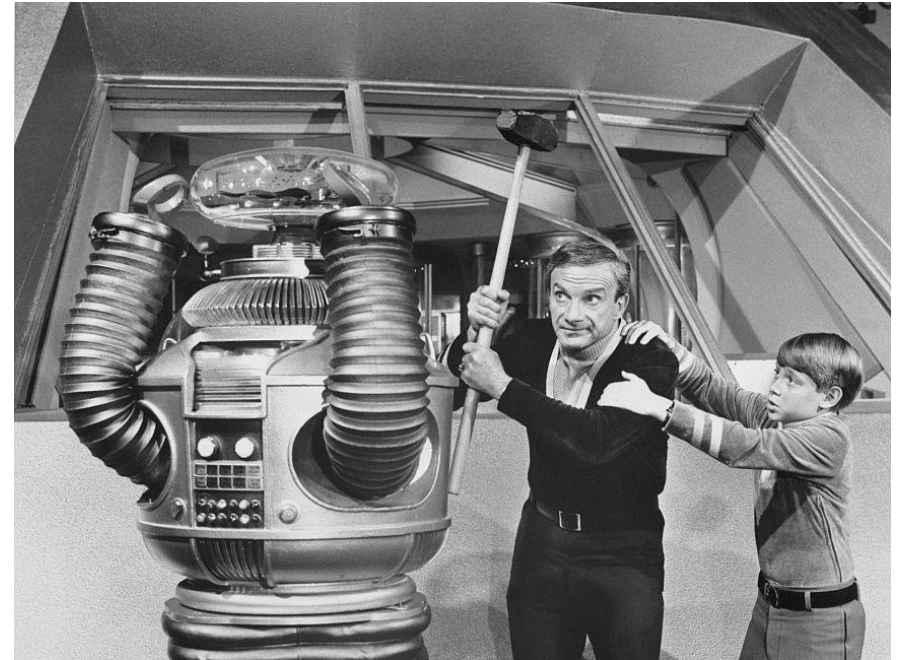


Image: Lost in Space,
<https://www.waaa.org/post/ai-more-aieeee-first-time-robot-can-feel-pain#stream/o>