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# A Systematic Method for Technology Assessment: Illustrated for Big Data Analytics


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# Part 1 Introduction



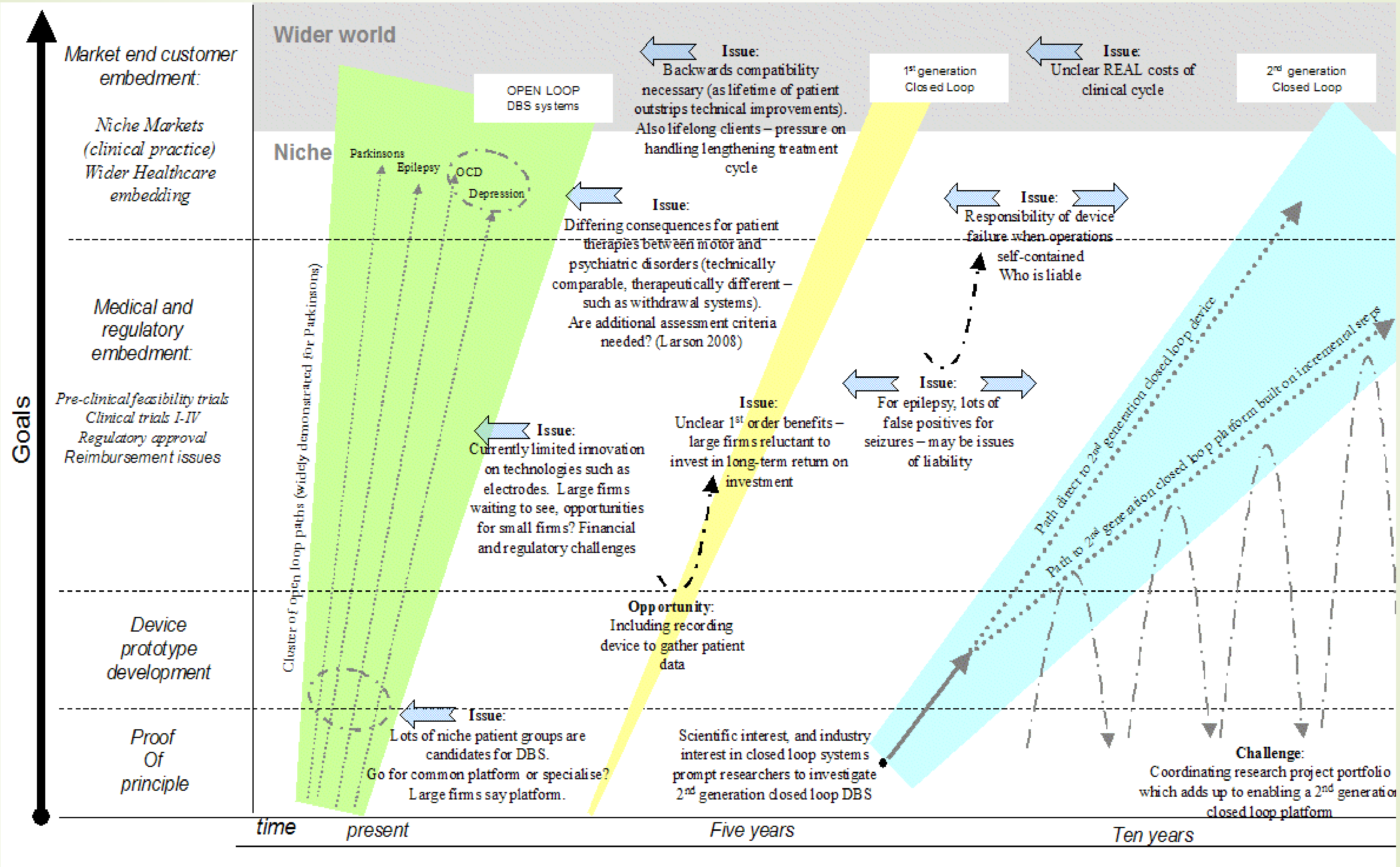
**Forecasting Innovation Pathways (FIP)**

**10 Steps (non-linear!) to Forecast Newly Emerging Science/Technology (NEST) Innovation Pathways**

| | |
|---|---|
| 1. Understand the NEST and its TDS (Technology Delivery System) | Step A: Characterize the technology's nature |
| | Step B: Model the TDS |
| 2. Tech Mine | Step C: Profile R&D |
| | Step D: Profile innovation actors & activities |
| | Step E: Determine potential applications |
| | Step J: Engage experts |
| 3. Forecast likely innovation paths | Step F: Lay out alternative innovation pathways |
| | Step G: Explore innovation components |
| | Step H: Perform Technology Assessment |
| 4. Synthesize & report | Step I: Synthesize and Report |

**Part 2** Background

# Innovation Pathways for Deep Brain Stimulation



## Part 2 Background

| | |
|---|---|
| 1. Understand the NEST and its TDS (Technology Delivery System) | Step A: Characterize the technology's nature |
| | Step B: Model the TDS |
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# Tech Mining for ‘Big Data’



## Various Data on Big Data

Our initial focus is on R&D data:

- ◆*INSPEC, EI Compendex* – treat the strong computer science core
- ◆*Derwent Innovation Index* – patents
- ◆*Research awards* – NSF, NSFC
- ◆**Web of Science** – fundamental research; include conference proceedings [focus here]

\+ Social Innovation facets:

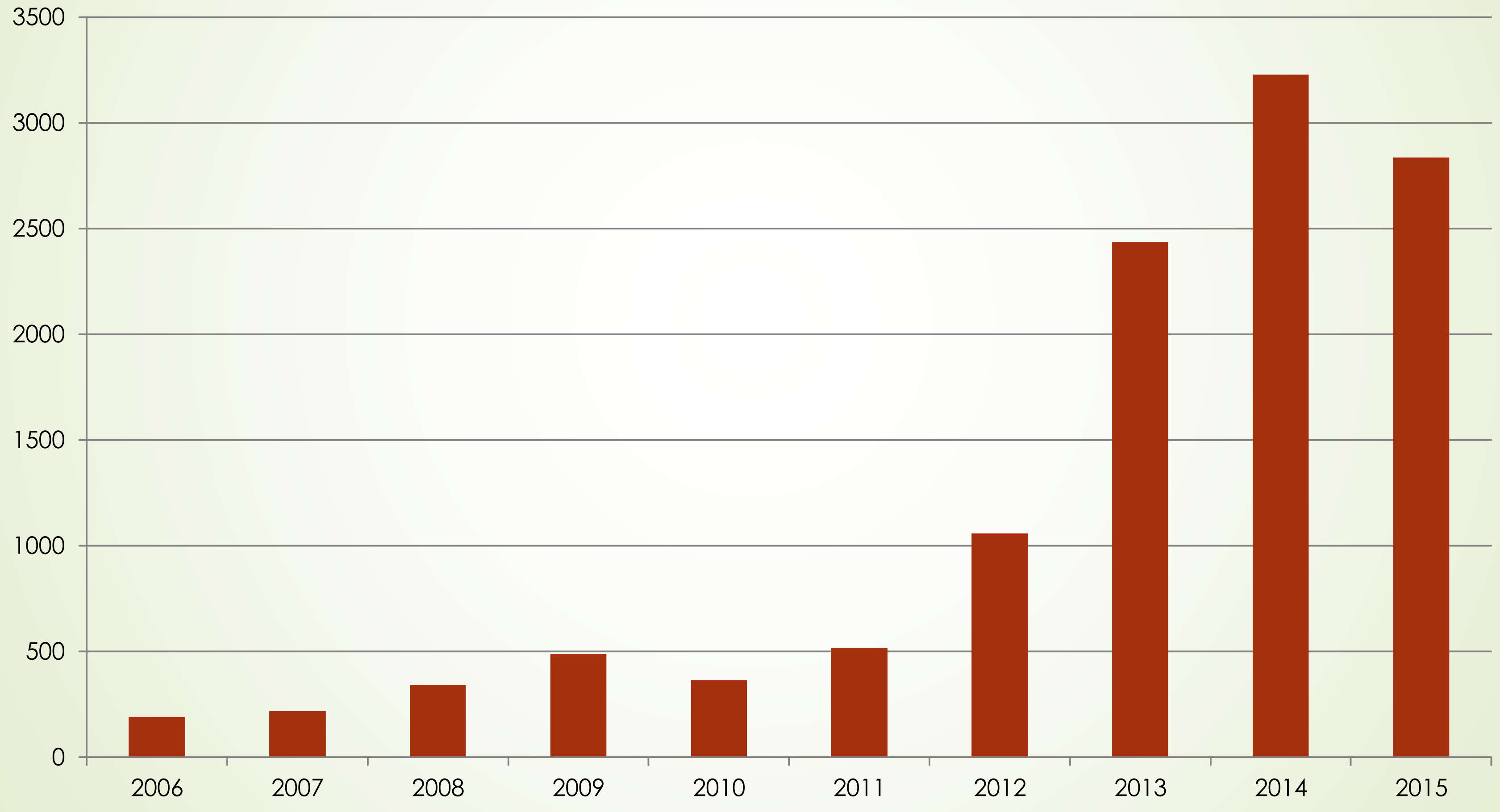
- ◆Commercial activity (databases like ABI/Inform)
  - Databases like Lexis Nexis ~10,000
- ◆Popular attention
  - Google hits ~> 274 million (as of 7/31/2016)

| No. | Search Strategy | Search Terms |
|---|---|---|
| 1 | Core Lexical Query | TS= ("Big Data" or Bigdata or "Map Reduce" or MapReduce or Hadoop or Hbase or Nosql or Newsql) |
| 2 | Expanded Lexical Query | TS=((Big Near/1 Data or Huge Near/1 Data) or "Massive Data" or "Data Lake" or "Massive Information" or "Huge Information" or "Big Information" or "Large-scale Data" or Petabyte or Exabyte or Zettabyte or "Semi-Structured Data" or "Semistructured Data" or "Unstructured Data") |
| | | TS=("Cloud Comput*" or "Data Min*" or "Analytic*" or "Privacy" or "Data Manag*" or "Social Media*" or "Machine Learning" or "Social Network*" or "Security" or "Twitter*" or "Predict*" or "Stream*" or "Architect*" or "Distributed Comput*" or "Business Intelligence" or "GPU" or "Innovat*" or "GIS" or "Real-Time" or "Sensor Network*" or "Smart Grid*" or "Complex Network*" or "Genomics" or "Parallel Comput*" or "Support Vector Machine" or "SVM" or "Distributed" or "Scalab*" or "Time Serie*" or "Data Science" or "Informatics*" or "OLAP") |
| 3 | Specialized Journals | The papers published in these specialized journals are not indexed by WOS |

# Tech Mining for ‘Big Data’



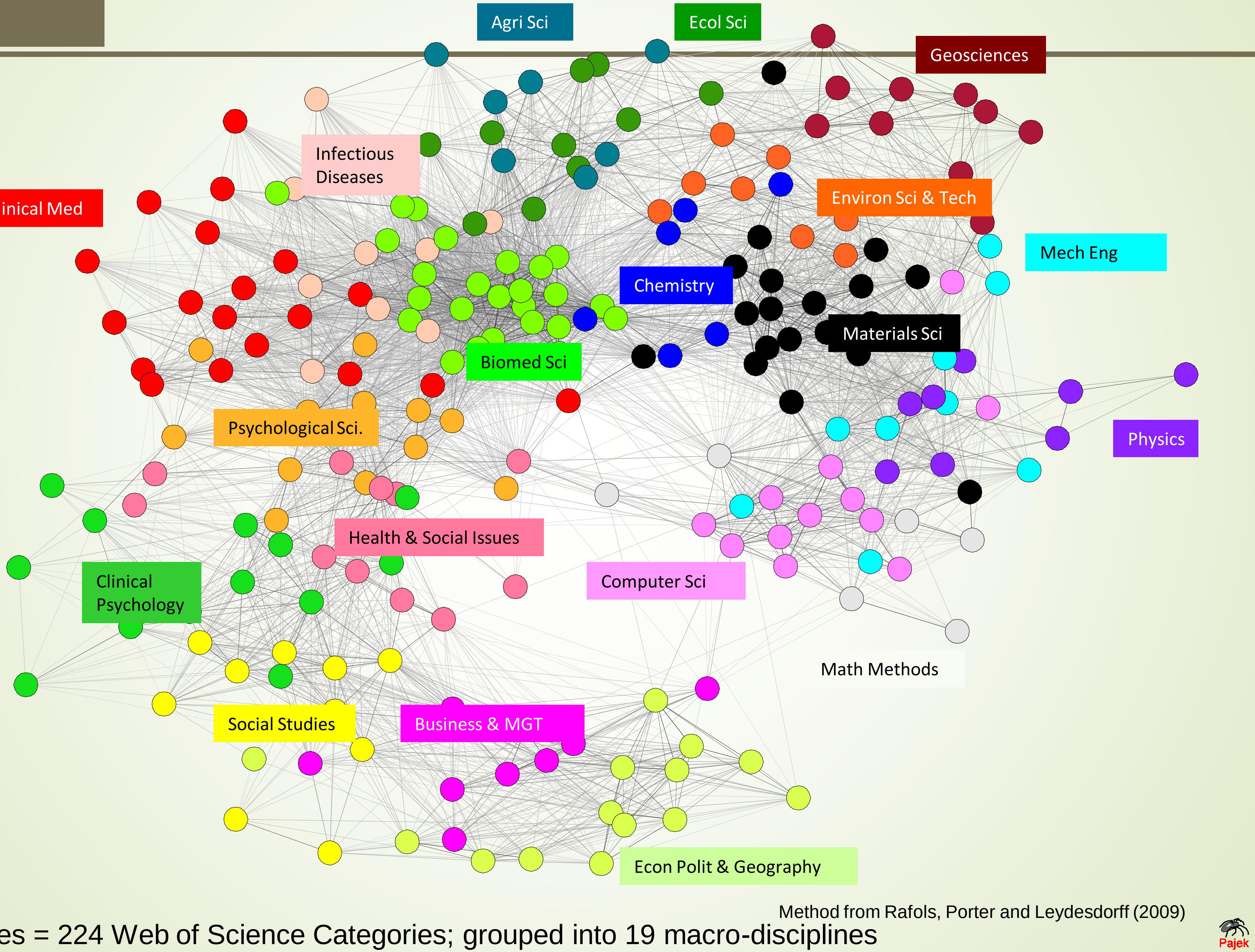
## Research Trend: “Big Data” [Web of Science]



# “Who Is doing Big Data Research?
# Top 10 Organizations publishing

| Author Organization | Records |
|---|---|
| Chinese Acad Sci | 293 |
| Tsinghua Univ | 151 |
| IBM | 101 |
| Harvard Univ | 95 |
| MIT | 93 |
| Beijing Univ Posts & Telecommun | 90 |
| Univ Calif Berkeley | 87 |
| Stanford Univ | 86 |
| Univ Illinois | 86 |
| Huazhong Univ Sci & Technol | 85 |

Of Top 30 -- 17 American, 13 Chinese;
Of 11684 WoS papers, 3656 with US author; 3022 with Chinese author
[trailed by UK (672) & Germany (594)

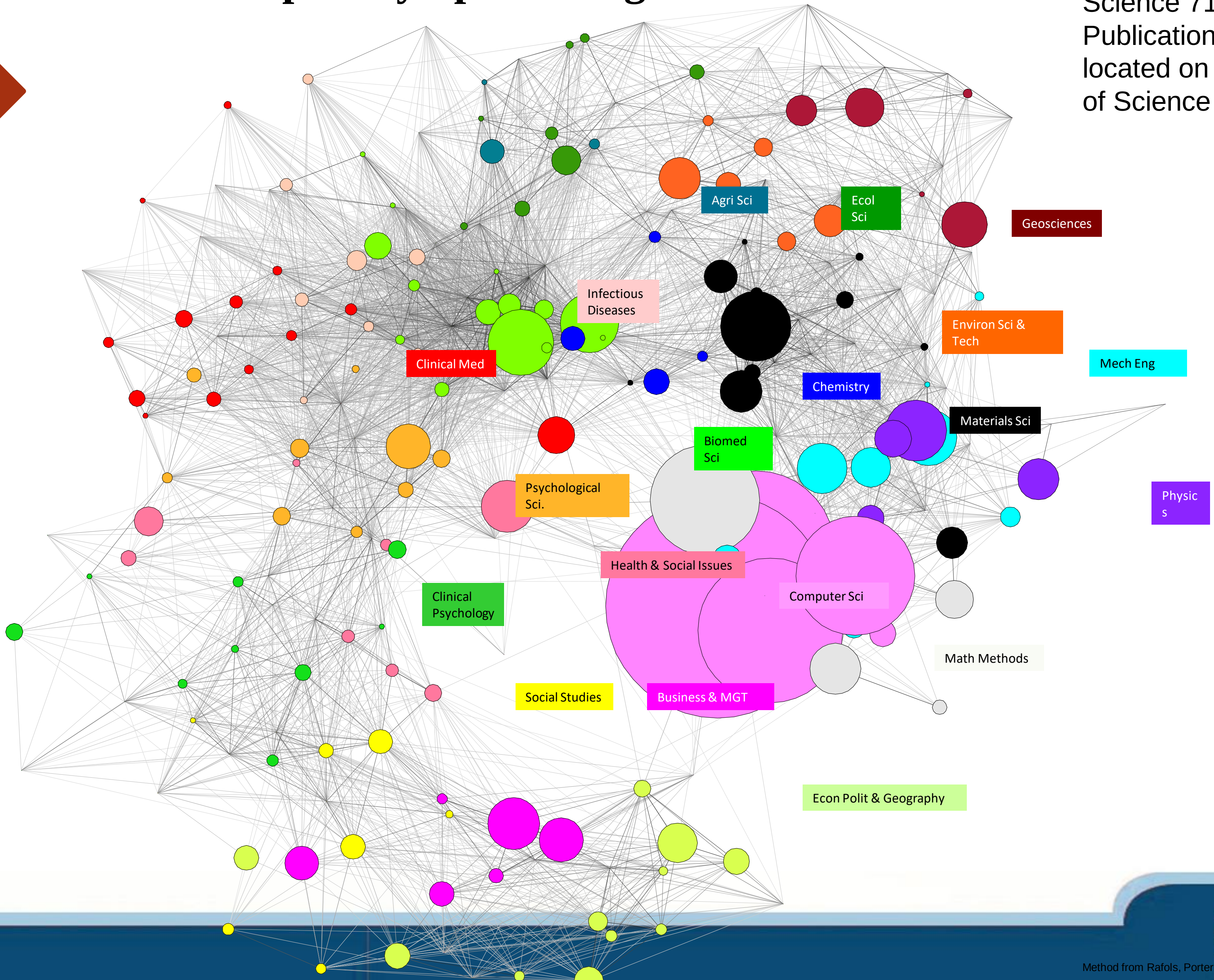



Method from Rafols, Porter and Leydesdorff (2009)

Global Map of Science, Nodes = 224 Web of Science Categories; grouped into 19 macro-disciplines

# Disciplinary Span of Big Data Research

Big Data Web of Science 7186 Publications thru 2014 located on a Global Map of Science






Method from Rafols, Porter and Leydesdorff (2009)

# Part 4 Tech Assessment:Big Data Analytics

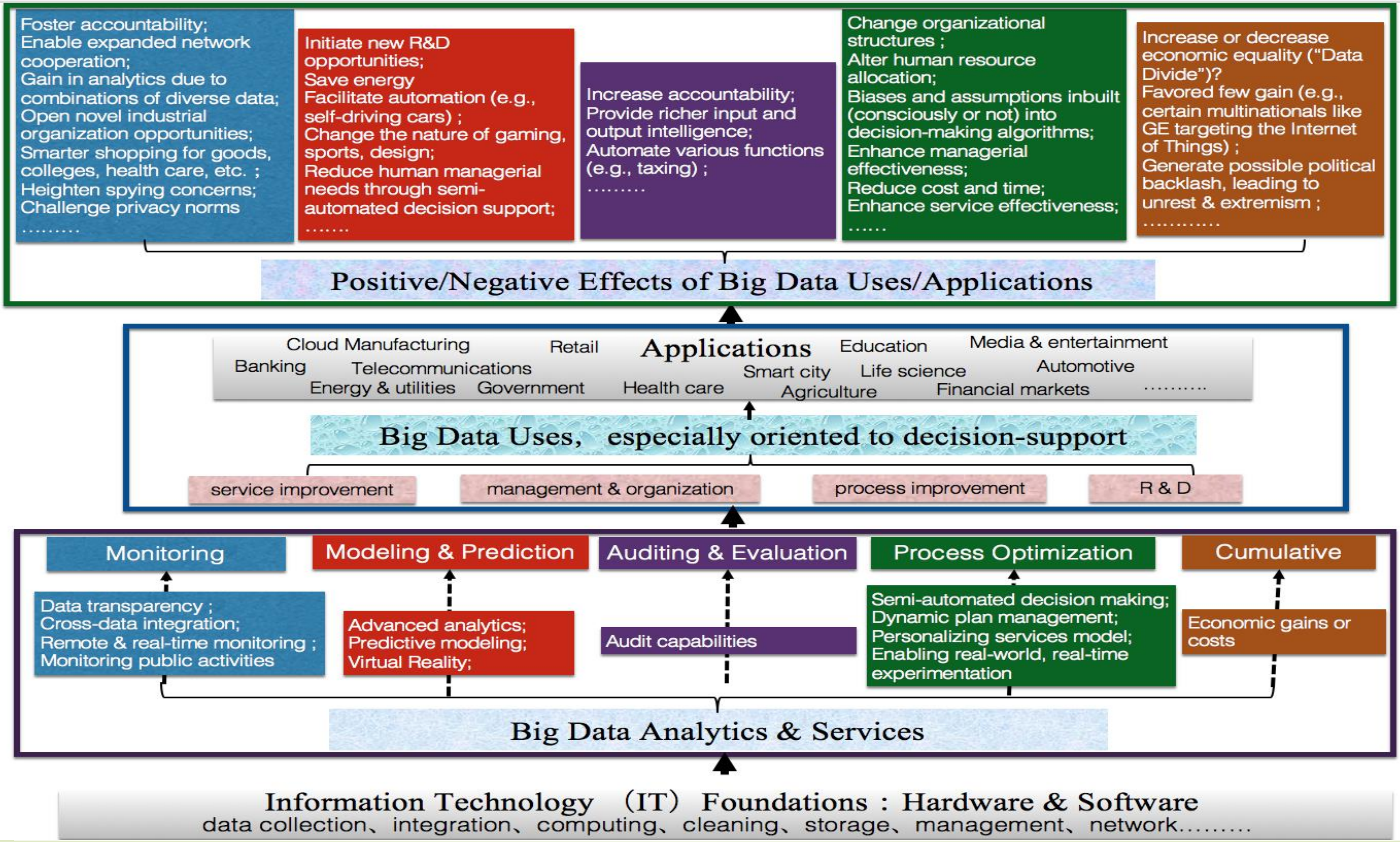


- To implement  the systematic examination of the effects on or of new developments,  we propose to experiment with our methodology on this ***"Big Data & Analytics"*** assessment.
  - **Stage A: Understand the technology**
  - **Stage B: Identify the potential impacts**
  - **Stage C: Assess the potential impacts**
  - **Stage D: Further analysis & assessment of the potential impacts**

- Thus, the main contributions of this paper are twofold:
  - to advance our FIP methodology to identify potential impacts of an emerging technology and to gauge their likelihood and magnitude of importance for further study;
  - to estimate of the likelihood and importance of potential impacts of Big Data Analytics.

Stage A

# Understand the technology


Foster accountability;
Enable expanded network cooperation;
Gain in analytics due to combinations of diverse data;
Open novel industrial organization opportunities;
Smarter shopping for goods, colleges, health care, etc. ;
Heighten spying concerns;
Challenge privacy norms
………
Initiate new R&D opportunities;
Save energy
Facilitate automation (e.g., self-driving cars) ;
Change the nature of gaming, sports, design;
Reduce human managerial needs through semi-automated decision support;
…….
Increase accountability;
Provide richer input and output intelligence;
Automate various functions (e.g., taxing) ;
………
Change organizational structures ;
Alter human resource allocation;
Biases and assumptions inbuilt (consciously or not) into decision-making algorithms;
Enhance managerial effectiveness;
Reduce cost and time;
Enhance service effectiveness;
……
Increase or decrease economic equality ("Data Divide")?
Favored few gain (e.g., certain multinationals like GE targeting the Internet of Things) ;
Generate possible political backlash, leading to unrest & extremism ;
…………
Positive/Negative Effects of Big Data Uses/Applications
Cloud Manufacturing
Retail
Applications
Education
Media & entertainment
Banking
Telecommunications
Smart city
Life science
Automotive
Energy & utilities
Government
Health care
Agriculture
Financial markets
……….
Big Data Uses, especially oriented to decision-support
service improvement
management & organization
process improvement
R & D
Monitoring
Modeling & Prediction
Auditing & Evaluation
Process Optimization
Cumulative
Data transparency ;
Cross-data integration;
Remote & real-time monitoring ;
Monitoring public activities
Advanced analytics;
Predictive modeling;
Virtual Reality;
Audit capabilities
Semi-automated decision making;
Dynamic plan management;
Personalizing services model;
Enabling real-world, real-time experimentation
Economic gains or costs
Big Data Analytics & Services
Information Technology （IT） Foundations : Hardware & Software
data collection、integration、computing、cleaning、storage、management、network………

# Stage B Identify the potential impacts



- Here we are emphasizing search results on Big Data from the **ProQuest Business** database for 2010-2014.
- We use the terms -- ***Problem/ risk/ challenge/ impact/ effect/ burden/ benefit*** -- to reduce the 9696 Big Data records to **620** that appear to consider ***impacts***.
- We review **topical term** lists and read selected abstracts to bolster our candidate Big Data impacts set.
- Besides, we read more than 60 selected articles to widen and deepen our understanding of potential impacts of the development, application, and uses of Big Data.
- We have identified some **20 major application areas**, pursuing in-depth analyses of select ones (e.g., Electronic Health Records -- EHR).

Our focus is on the U.S., with an eye toward potential Federal policy actions to promote beneficial development while reducing potential risks and costs. The attachment in the supplement to the general BD e-mail invitation note

| Analytics-based Functionality | Operational Level | Explanations & Example Uses | Example "Effects of effects" [potential "indirect, delayed, or unintended" impacts of Big Data Analytics & Uses, both good & bad] |
|---|---|---|---|
| **Monitoring** | Data transparency | Sharing data among different sectors, organizations and even countries -- enabling organizations & individuals to affirm accuracy & completeness;<br>Open government Data (OGD) | ✧ Foster accountability;<br>✧ Enable expanded network cooperation;<br>✧ Pose privacy & security threats<br>✧ Enable earlier detection of events<br>✧ Pave the way for further correlation |
| | Cross-data integration | Combining multiple sources to enable new forms of inquiry, new analytics (e.g., in agriculture -- soil, weather, chemical monitoring to boost agricultural yields);<br>requiring organizational coordination | ✧ Gain in analytics due to combinations of diverse data;<br>✧ Pose extreme privacy & security threats (even when no single source of data reveals identity, correlation across multiple sources can)<br>✧ Reduce world hunger (via increased agricultural productivity)<br>✧ In general, solve major world problems<br>✧ Induce jurisdictional fights ("power" in data control)<br>✧ Require data reformatting<br>✧ able to connect a patient's complete medical history with prescription drug and treatment options;<br>✧ Lead to potential mis-understandings if semantics are not identical or understood |
| | Remote & real-time monitoring | Collecting information on country, organization and individual behaviors<br>✧ Tracking individual behaviors for personalized services.<br>✧ Geo-tracking to expedite services;<br>✧ Supply chain management (aided by comprehensive, real-time analytics to dynamically adjust)<br>✧ Environmental sensors<br>✧ Health sensors | ✧ Open novel industrial organization opportunities;<br>✧ Heighten spying concerns;<br>✧ Enable behavior modification, for better or worse, e.g., for better health<br>✧ Provide data that can lead to new solutions to major challenges<br>✧ Challenge privacy norms (but must distinguish between consensual and non-consensual monitoring – e.g., auto insurance plug-ins)<br>✧ Secondary use of collected data (who pays, who benefits? Who controls?)<br>✧ Politicize; volatile stakeholder attitudes, subject to media manipulation<br>✧ Smarter shopping for goods, colleges, health care, etc.<br>✧ Potential to reduce moral hazard (real time monitoring may create positive changes in behavior)<br>✧ More accurate risk pricing as can be based on actual behavior rather than correlated attributes or outcomes<br>✧ Can reduce adverse selection, as agreement to be monitored serves as a credible signal of lower risk type.<br>✧ give education officials the tools they need to continuously improve the educational experience of their students |
| | Monitoring public activities | Collecting online social media and physical public spaces surveillance -- enabling network analyses, enhanced security, crime control, etc. | ✧ Raise 'Big Brother' concerns<br>✧ Increase sense of security<br>✧ Reduce terrorism and crime in general<br>✧ Negative impacts of surveillance-driven behavioral changes? |
| **Modeling & Prediction** | Advanced analytics | Using statistical tools and Artificial Intelligence to generate evidence-based interpretations | ✧ Initiate new R&D opportunities;<br>✧ Save energy<br>✧ Better diagnostics – for health, for industrial systems, etc.<br>✧ Protect individuals and businesses by, e.g., predicting extreme weather events, crime, …<br>✧ Economic benefits from increased efficiency due to analysis<br>✧ manage the most efficient transportation patterns |
| | Predictive modeling | Opportunities to model for different purposes, such as global warming or epidemiological prediction (Google Flu Trends);<br>natural disaster prediction, market demand prediction, etc.<br>Opportunities for predictions around credit, insurance, and labor markets | ✧ Reduce human managerial needs through semi-automated decision support;<br>✧ Facilitate automation (e.g., self-driving cars)<br>✧ Enable "expert" help in regions or situations where there is no expertise – e.g., AIDS treatment in poorer regions with the quality of experts, etc.<br>✧ More granular and accurate predictions can lead to more efficient pricing and matching → promote separation over pooling equilibria, which increase welfare by making the market larger.<br>✧ Have to be careful to distinguish privacy demands that stem from strategic rationales vs. intrinsic demands for privacy.<br>■ Privacy concerns stemming from one's true type being revealed (e.g., high risk driver or unproductive worker) are strategic.<br>■ Privacy concerns stemming from analytics predicting something sensitive, and potentially embarrassing (e.g., sexual preference) are intrinsic.<br>■ Some privacy demands are mixed (e.g., sensitive health conditions). There are strategic reasons for wanting, e.g., drug addiction or depression, concealed, but revelation also violates intrinsic privacy demands.<br>✧ Want to discourage resources used on analytics to effect distribution rather than production.<br>■ E.g., Using big data to predict a counter party's willingness to pay merely to get a larger share of surplus is dissipative if the transaction would have taken place regardless; expending resources to effect a transfer is wasteful.<br>✧ But, using analytics to predict willingness to pay so that offers can be extended to those who otherwise would be left out of the market is efficient, as it increases surplus.<br>✧ track anonymous cell phone user data to quickly identify accidents and other traffic challenges<br>✧ apply weather models to residential population databases to quickly alert affected people |
| | Virtual Reality | Processing vast data resources with real-time speed | ✧ Change the nature of gaming, sports, design<br>✧ Increase the number of couch potatoes |

| | | | |
|---|---|---|---|
| | | | ✧ Enable better medicine<br>✧ Increase isolation of individuals by reducing face to face human interaction |
| | Reporting tools | Allow the linkage of multiple data sets as if you were reporting from one data source. | |
| **Auditing & Evaluation** | Audit capabilities; Regulatory & Compliance | Detection of misuse of funds, fraud, and abuses of power; Improved customer experiences through loyalty programs and such | ✧ Increase accountability;<br>✧ Provide richer input and output intelligence;<br>✧ Automate various functions (e.g., taxing)<br>✧ Reduce human oversight and understanding |
| **Process Optimization** | Semi-automated decision making | Faster emergency response;<br>Improving workflow re-design (enhance organization effectiveness) | ✧ Change organizational structures<br>✧ Alter human resource allocation (may lead to new departments and new jobs, but loss of others);<br>✧ Biases and assumptions inbuilt (consciously or not) into decision-making algorithms<br>✧ Possible errors/oversights from imperfect learning/rules<br>✧ Reduced attention from humans |
| | Dynamic plan management | Based on real-time monitoring, people could manage various plans dynamically; multi-organizational production systems; logistics | ✧ Enhance managerial effectiveness;<br>✧ Reduce cost and time;<br>✧ Reduce managerial and analyst labor needs |
| | Personalizing services model | Promoting personalized services such as personalized medicine; Customer 360 understanding of needs & tailoring of services<br>Targeted advertising | ✧ Enhance service effectiveness;<br>✧ Improve health (and other sector functions)<br>✧ Increased consumption<br>✧ provide more personalized or individualized care for a patient's specific case |
| | Enabling real-world, real-time experimentation | Analyzing "natural experiments" (comparative data), such as probing comprehensive patient and outcome data to compare the effectiveness of various interventions | ✧ Lead to accelerating science, technology & innovation<br>✧ Transform to smart cities<br>✧ Potential for abuse<br>✧ Improve social & welfare services<br>✧ Improve national security & public safety<br>✧ Save a significant number of lives |
| **Cumulative** | Economic gains or costs<br>Internet of Things (IoT) | Power shifts;<br>who owns what data?<br>Ubiquitousness of data collection;<br>Automated analyses of Big Data combinations | ✧ Increase or decrease economic equality ("Data Divide")?<br>✧ Favored few gain (e.g., GE targeting the Internet of Things)<br>✧ Generate possible political backlash, leading to unrest & extremism<br>✧ Reasons to belief that poor may gain from big data:<br>  ○ Rich already have access to credit. But, in many cases little information on poor, so they are pooled with others in similar circumstances despite true ability to pay back. Big data using alternative scoring factors can detect most creditworthy within a pool of high-risk borrowers. Empirical evidence of credit scoring supports the notion that poor will gain the most as they have been excluded from markets.<br>  ○ Big data used for price discrimination means that lower prices can be targeted at poor.<br>✧ Big data used in hiring could obviate the need to get a four-year degree to signal abilities. This will open the door to poor to get jobs that only college educated could obtain before, which could decrease income equality (which is driven primarily by returns to education).<br>✧ Strengthen collaboration among countries<br>✧ Extending new market development from enhancing customer experience<br>✧ Foreign policy hazards (e.g., Snowdon release of intelligence data)<br>✧ Extensive displacement of human white collar workers |

# Stage B Identify the potential impacts



## Exchange ideas & Renew the impacts

- **1st round**
  - ✓ To renew our potential impact list, we sent e-mails in February, 2016, to 38 colleagues (mainly American researchers) whom we identified from our literature mining as having published research on Big Data. We sent them the impacts table in general level to illustrate how we understand BDA, and welcomed their refinements to any of that content. We also welcomed ideas on possible policy and mitigation options to deter undesirable effects. We sent a reminder 10 days after the 1st round e-mails. We digested what we received to update impacts table, constituting our initial "impact identification." We sent a similar note to 13 additional colleagues identified as having published research pertinent to BD research focusing on EHR.
  - ✓ Response rate was poor (about 10%). But we received some very useful updating suggestion.

## Definitions of the 18 Potential BDA Impacts

### Impacts on General, National Levels

A: Massive data collections combined with increasingly powerful computing and Big Data algorithms improve prediction significantly (e.g., weather, crime)

B: Data-based understanding of "grand challenges" leads to substantial improvements (e.g., energy)

C: Multiple BDA applications greatly reduce terrorism.

D: As resources are deployed more effectively, new sectors open, providing new jobs on a large scale.

E: Widespread use of BDA leads to substantial wealth redistribution.

F: Overconfidence in data-based analyses leads to critical errors.

G: Data compiled for one purpose are misinterpreted in analyses for other purposes to a significant degree.

H: Substantial automation via BDA processes reduces analyst and managerial jobs.

I: Popular/political backlash against Big Data Analytics leads to major, extremist actions.

### Impacts on Organizational Level

J: Extensive data sharing by organizations greatly expands inter-organization cooperation (networking).

K: Organizations use more extensive and accurate modeling and prediction to meet market wants better (and major profits).

L: Organizations must deal with increased security threats due to Big Data & Analytics.

M: Organizations compete rather intensely to control data access and use.

### Impacts on Individual Level

N: Individual consumers use more data and better analyses to enrich their market options.

O: Effective monitoring detects threats earlier, thereby protecting individuals effectively.

P: Richer data availability leads to better individual decisions on a wide scale (e.g., smarter shopping, education, and health choices).

Q: Privacy abuses escalate substantially.

R: As automated BDA processes take over much decision-making, face-to-face human engagement diminishes.

# Assess the potential impacts



## Assess the potential impacts

- **2nd round**
  - ✓ To assess the potential impacts, we summed up 20 candidate BDA impacts based on the 1st round survey results. Besides, we used WordPress to construct a website for our projects (http://bigdatagt.org) and post our survey on potential impacts. We try to present those for estimation, rather than go with an open-ended nomination plus estimation process. According to a preliminary round of feedback on the web-based survey from close colleagues, we consolidated a few of initial impacts set (form 18 impacts finally) and change the classify of impacts (from positive/negative→ national/organizational/individual).
  - ✓ For the assessment, we want to
    - ✓ track inputs from various invitees vs. those from open comment to check for discrepant estimates and valuations.
    - ✓ have 3 responses for each impact:
      - ✓ 1) % (likelihood): how likely each effect is to occur to a significant degree in the U.S. by 2026
      - ✓ 2) Importance (magnitude): how important for the U.S. Government to consider policy actions to address this effect
      - ✓ 3) Policy action suggestions.

Drawing on literature, discussion, and knowledgeable feedback, we have identified 18 potential effects (i.e., outcomes, impacts) of widening uses of Big Data Analytics (BDA). Quoting the White House Big Data initiative, by BDA we mean improving our ability to extract knowledge and insights from large and complex collections of digital data.

We seek your view on these effects taking place in 10 years, focusing on the United States. We organize these in three parts: A) effects mainly on general, national levels, moving toward B) those mainly affecting organizations, and then c) those primarily on individuals (but recognize overlaps).

For more information about our BDA Effects research and our intended visualization of survey results, see: Big Data Analytics (BDA) Outcomes!

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While we recognize potential interactions, please estimate each effect separately:

·**Likelihood** — how likely each effect is to occur to a significant degree in the U.S. by 2026 – on a scale from 1 (highly unlikely) to 5 (highly likely);

·**Importance** – how important for the U.S. Government to consider policy actions to address this effect – on a scale from 1 (not important) to 5 (highly important).

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**1. Massive data collections combined with increasingly powerful computing and Big Data algorithms improve prediction significantly (e.g., weather, crime).**

| | 1 | 2 | 3 | 4 | 5 | don't know |
|---|---|---|---|---|---|---|
| Likelihood | ○ | ○ | ○ | ○ | ○ | ○ |
| Importance | ○ | ○ | ○ | ○ | ○ | ○ |

**2.Data-based understanding of "grand challenges" leads to substantial improvements (e.g., energy).**

| | 1 | 2 | 3 | 4 | 5 | don't know |
|---|---|---|---|---|---|---|
| Likelihood | ○ | ○ | ○ | ○ | ○ | ○ |
| Importance | ○ | ○ | ○ | ○ | ○ | ○ |

**3. Multiple BDA applications greatly reduce terrorism.**

# Stage D Further analysis & assessment of the potential impacts

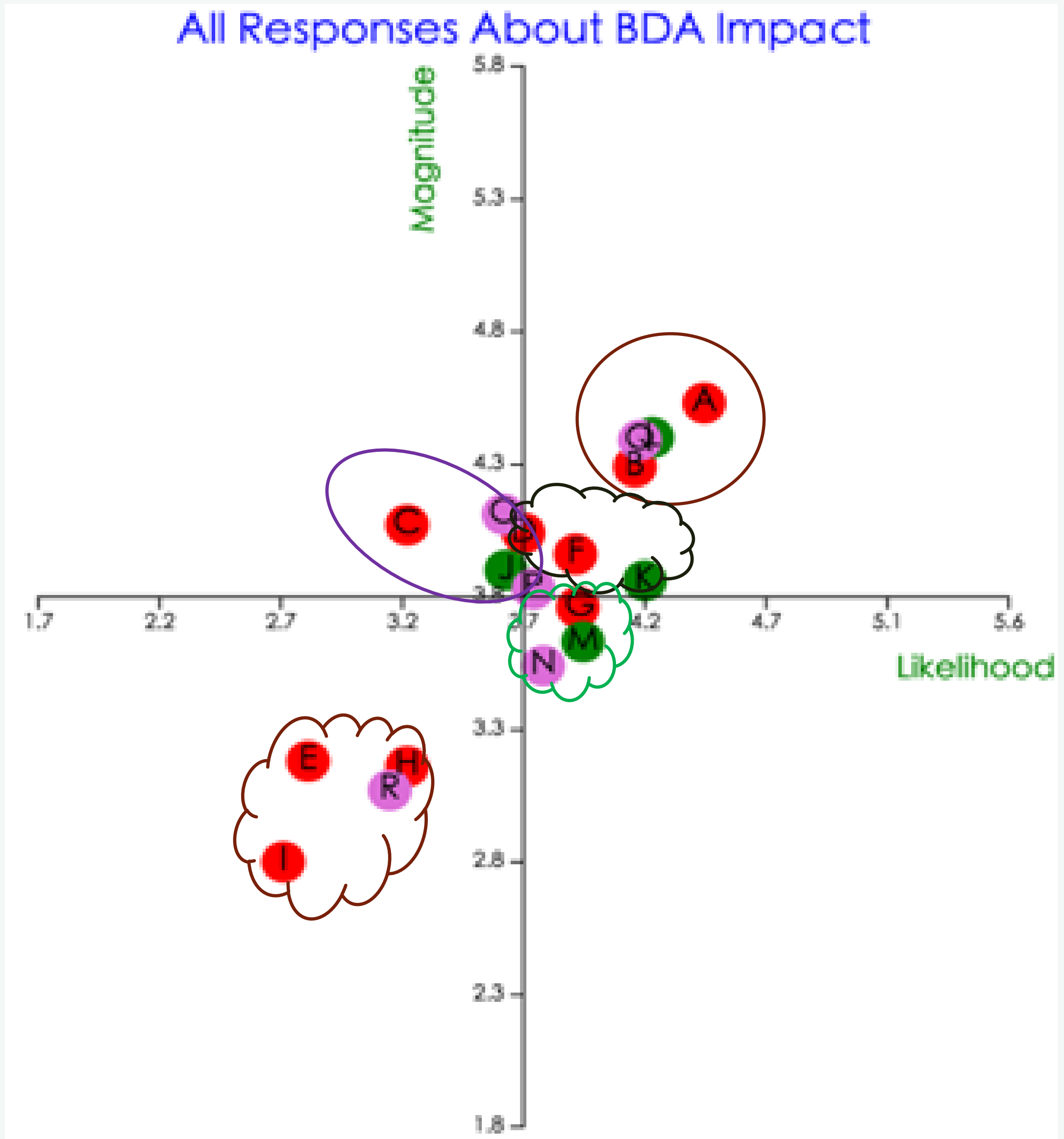
- Basic survey results
  - Invited e-mail: we invited 622 researchers who publish in Big Data or BDA-related areas to participate in our online survey. We extracted the researchers e-mail addresses mainly from U.S National Science Foundation Projects (PIs with support from NSF), and from papers about BDA from WoS (mainly Chinese authors).
  - Responses: we received a total of 65 responses, and excluded 7 responses with extreme values (Average and Standard Deviation of each person's feedback). Finally, we obtained 58 useful responses.

| Survey group | Description | Number of Invitations | Number of Responses | Number of Useful Responses |
|---|---|---|---|---|
| PIs of U.S NSF Projects about Big Data | | 154 | 23 | 23 |
| Authors of papers about Big Data | Chinese Authors | 407 | 22 | 18 |
| | American Authors | 36 | 5 | 4 |
| | Other countries | 15 | 5 | 5 |
| Colleagues in a Big Data area | | 10 | 10 | 8 |

Responses from Different Big Data Researcher Groups

# Stage D

# Further analysis impacts




**Note:** Nodes in red, green, and purple refer to impacts at national, organizational, and individual level, respectively.

**Impacts on General, National Levels**

A: Massive data collections combined with increasingly powerful computing and Big Data algorithms improve prediction significantly (e.g., weather, crime)

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K: Organizations use more extensive and accurate modeling and prediction to meet market wants better (and major profits).

L: Organizations must deal with increased security threats due to Big Data & Analytics.

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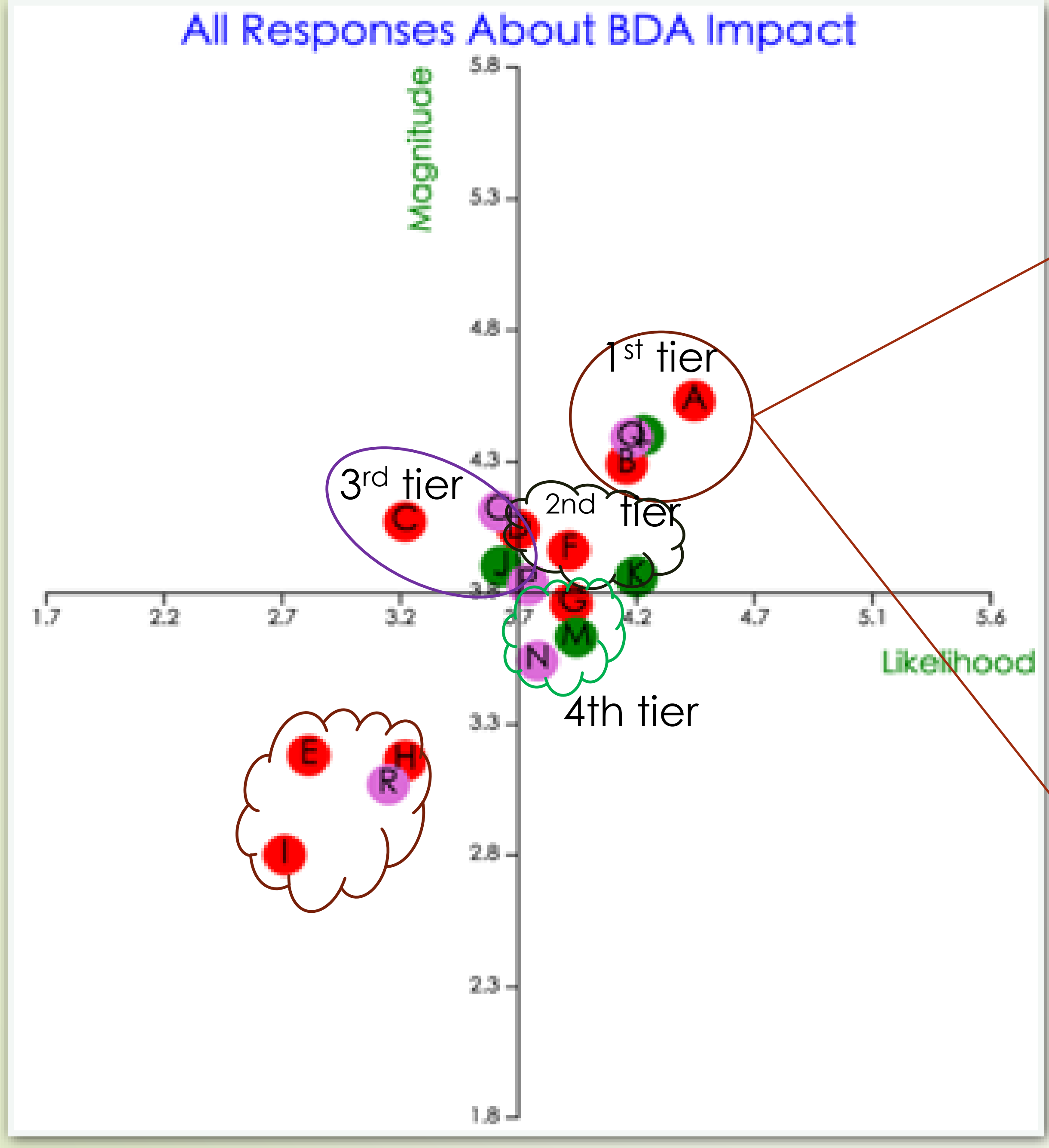
Q: Privacy abuses escalate substantially.

R: As automated BDA processes take over much decision-making, face-to-face human engagement diminishes.




Suggestions to government about impact A、B

(1) U.S. government should introduce policies to improve data sharing among different government sectors and to the public, and put more funds into scientific research of BDA and pilot applications in critical areas.

(2) U.S government should partner with the private and not-for-profit sectors to ensure that resources are available for public programs and not-for-profit ventures that yield broad societal benefit.

(3) U.S government should support research, education and quality improvement to move big data from empirical methods to more rigorous scientific methods, which are reproducible.

(4) Government Data should be made available in order to allow organizations to reach up-to-date and verified input for analysis

Suggestions to government about impact L、Q（about big data security and privacy）

（1）U.S government should be forward leaning on the development of policies relating to the use and protection of big data.

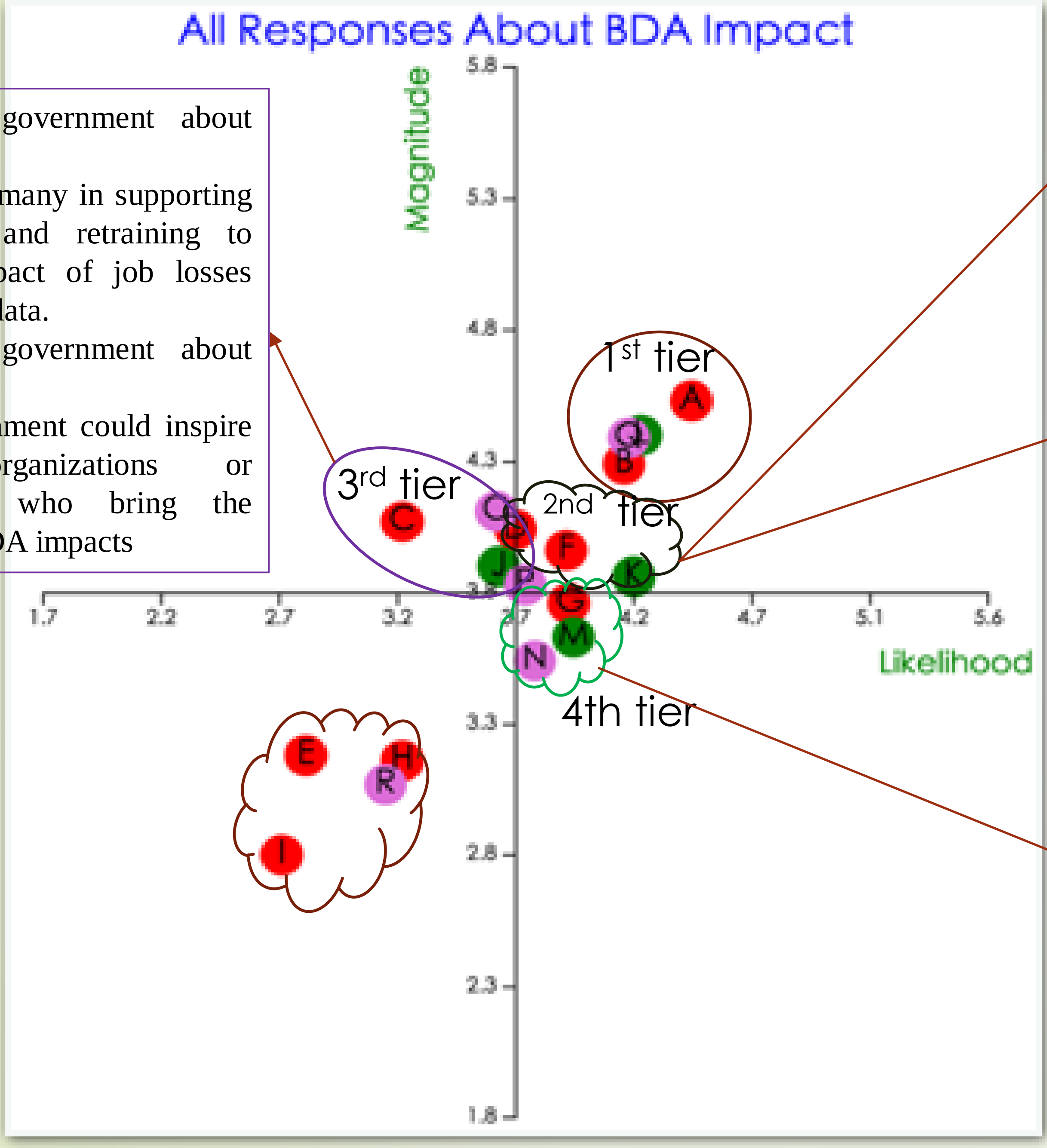
（2）Some Standards or common necessary measures should be put in place to ensure data security.

（3）U.S government could fund ethics of data use.

（4）U.S government could provide public education, and let the public be made more aware of the misuse of data, data ethics, and privacy/security.

（5）U.S government or certain organizations could develop data compliance policies and software tools to enforce such data usage compliance.

- Suggestions to government about impact D:
  - Mimic Germany in supporting education and retraining to reduce impact of job losses due to big data.
- Suggestions to government about impact C\J\O:
  - U.S government could inspire those organizations or individual who bring the positive BDA impacts




Suggestions to government about impact F:
(1)U.S government could provide more funding and opportunities to develop data scientists, expertise in BDA, as well as public education and job training in BDA.
(2)U.S government or organizations could help improve or improve industry access standards, especially in some very important application area. BDA should be applied in very scientific ways by real BDA experts.

Suggestions to government about impact K、P:
U.S government could inspire those organizations or individual who bring the positive BDA impacts

- Suggestions to government about impact G:
  - U.S government could not rely on BDA as the truth if it doesn‘t triangulate with knowledge developed through other vehicles. Basically, BDA needs to be part of a mixed methods approach to be perceived as credible.
- Suggestions to government about impact M:
  - U.S government should strengthen the guide role in specification of big data usage.

# Discussion



- Our goal is to identify and assess the ***unintended, indirect, and delayed impacts*** through this system.
- This approach combines ***quantitative and qualitative*** analyses.
- By inviting people to join the impact analysis discussion, such work could bolster development of technology itself.
- This type of information interchange could actively contribute to that development by helping to coalesce visions of innovation targets, to identify obstacles to be overcome and assets upon which to draw, and to perform impact assessment to identify potential beneficial and harmful effects.

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**Thanks you for your attention!**
**Question & Comments**

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