REUTERS/Denis Balibouse

Avoiding a Bridge to Nowhere
Crossing the chasm between policy making and evidence

Daniel Duguay, Senior Director, Thomson Reuters
Presented October 17, 2016 | Carleton University Institute for Data Sciences

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OBVIOUS to many of you here today…

"The ability to take data—to be able to understand it, to process it, to extract value from it, to visualize it, to communicate it—that's going to be a hugely important skill in the next decades".

- Mike Loukides. What Is Data Science? O'Reilly Media, Inc, 2011

So how do you apply this skill to public policy?

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What is Evidence-based Decision Making?

- Evidence Based Decision-Making is a process for making decisions about a program, practice, or policy that is grounded in the best available research evidence and informed by experiential evidence from the field and relevant contextual evidence.

  - *Centre for Disease Control (www.cdc.org)*

What is Evidence?

- Best available research evidence

- Experiential evidence from the field

- Relevant contextual evidence

- And…other sources of validated information, intelligence & insights

What is Evidence?

Forms of Evidence may include…

- Statistics/ Facts
- Personal experience
- Analogy
- Judgment of experts
- Examples
- Others forms…?

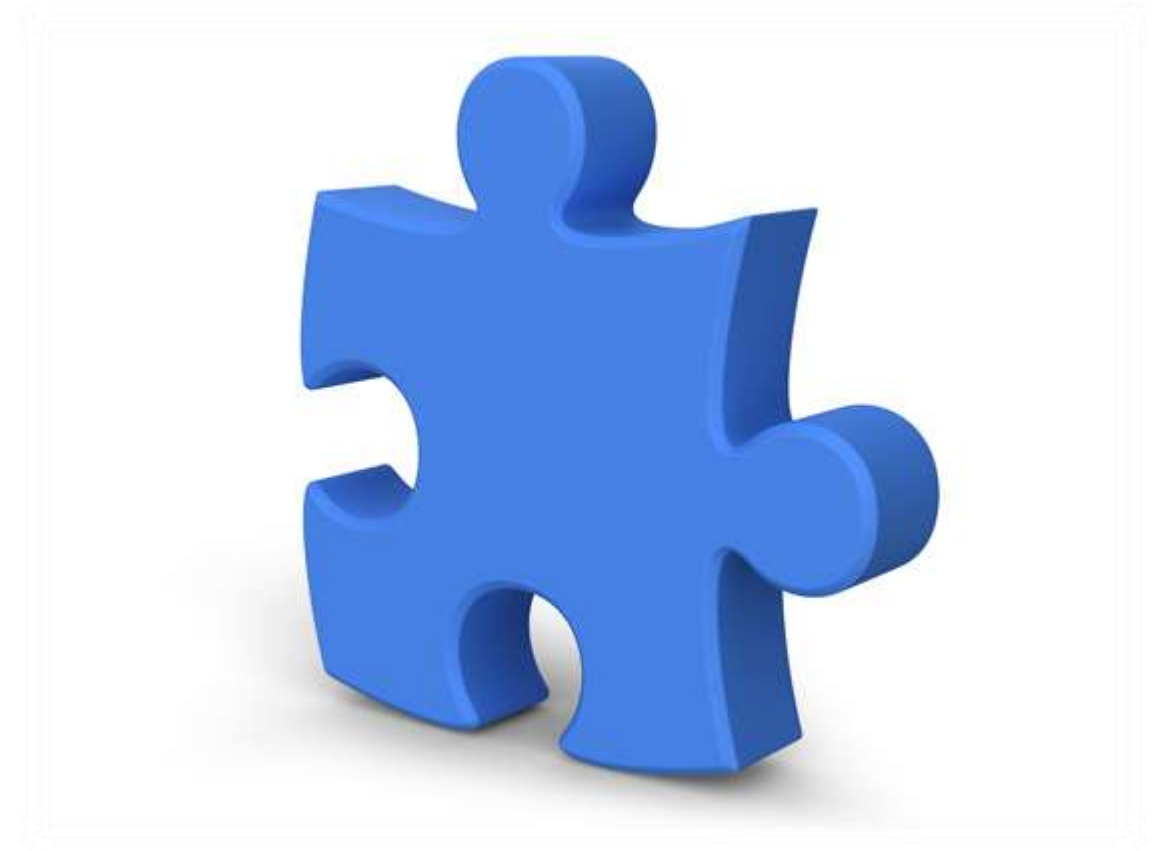 - http://westsidetoastmasters.com/resources/talk_your_way/lib0010.html

From where does the evidence arise?

Sectoral

- Core
  - Scientific
  - Social
  - Economic
  - others
- Related vs. <u>currently</u> unrelated

Temporal

- Past: Historical
- Future: predictive

Scale

- Local

- Regional

- National

- Global

- Connective & relational

- What is the "scale and relativity" of the evidence?

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Evidence-based decision making in the corporate sector

Significant gains as a result of EBDM

- statistical process control
- experiment design methodologies

Regulatory compliance requires EBDM

- Financial & risk compliance
- Due diligence

Liability & litigation

Evidence-based management is conducted best not by know-it-alls but by managers who profoundly appreciate how much they do not know.

- Evidence-Based Management, Pfeffer and Sutton, HBR, 2006

Analytical cultures and processes are appearing not only in professional sports teams, but in any business that can harness extensive data, complex statistical processing, and fact-based decision making.

- Davenport et al, Competing on Analytics Babson Report, May 2005

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But what of evidence-based decision making in the public sector?

Evidence-based decision making in the public sector

"Evidence-based, evidence-informed or knowledge-based policy development refers to an approach that levers the best available objective evidence from research to identify and understand issues so that policies can be crafted by decision makers that will deliver desired outcomes effectively, with a minimal margin of error and reduced risk of unintended consequences…"

- The Case for Evidence-Based Policy, Policy Horizons Canada (http://www.horizons.gc.ca/eng/content/case-evidence-based-policy)

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Some historical application of EBDM

- Justice

- Health Care
  - Drug approval
  - Medical device use
  - Treatment and prevention

- Regulations & Enforcement

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The application of Evidence-Based Decision Making is NOT guaranteed…

"…unfortunately, physicians don't use much of it. Recent studies show that only about 15% of their decisions are evidence based…"

"For the most part, here's what doctors rely on instead: obsolete knowledge gained in school, long-standing but never proven traditions, patterns gleaned from experience, the methods they believe in and are most skilled in applying, and information from hordes of vendors with products and services to sell…"

- Evidence-Based Management, Jeffrey Pfeffer and Robert I. Sutton, Harvard Business Review, January 2006.

Evidence-based Decision Making – a re-emerging discussion in Canada

- *"…Trudeau hires decision-making expert to aid Prime Minister's Office…"* – The Globe and Mail

- *"…the challenge for public servants is the escalating pace, technological change and complexity of issues being wrestled…"* – M. Wernick, Clerk of the Privy Council

- *"…we lack the data … the federal government still has not connected the dots between major social expenditure and the information required to guide and evaluate social policy…"* – Policy Options

- *"…use money to provide the support that our analysts need, to produce the right policy advice so that decisions are made, based on evidence…"* –CAPE President

Evidence-based Decision Making – a re-emerging discussion in Canada

DATA

"…Ottawa should invest in an arm's-length agency to collect data on the well-being of Canadians and measure the outcomes of government policies…"

- http://policyoptions.irpp.org/magazines/march-2016/building-the-information-infrastructure-for-evidence-based-social-policy-making/

PROCESSES

"…created a new secretariat in the Privy Council Office tasked with managing the government's Delivery and Results agenda, and supporting the Agenda, Results and Communications Cabinet Committee…"

- https://mowatcentre.ca/how-can-delivery-units-work-in-a-federation-like-canada/

LEADERSHIP

"…'Deliverology' guru schools Trudeau government for 2nd time at cabinet retreat…"

- http://www.cbc.ca/news/politics/deliverology-liberal-cabinet-retreat-1.3553024

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Five key components to implementing evidence-based policymaking

- **Program assessment**. Systematically review available evidence on the effectiveness of public programs.

- **Budget development**. Incorporate evidence of program effectiveness into budget and policy decisions, giving funding priority to those that deliver a high return on investment of public funds.

- **Implementation oversight**. Ensure that programs are effectively delivered and are faithful to their intended design.

- **Outcome monitoring**. Routinely measure and report outcome data to determine whether programs are achieving desired results.

- **Targeted evaluation**. Conduct rigorous evaluations of new and untested programs to ensure that they warrant continued funding.

- Evidence-Based Policymaking - A guide for effective government. PEW Foundation, 2014.

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Characteristics of the decision-making process?

- Transparency
- Inclusiveness
- Explicitness
- Skilled Leadership and Facilitation
- Defined Process

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Evidence-based decision making

- **Implies evidence is primordial** consideration for decision making

An alternative term: Evidence-Informed Decision Making

- Reflects the importance of evidence in decision making
- Accounts for the importance of other *non-evidential factors* in public policy
- "…a policy is a decision among a choice of options…"

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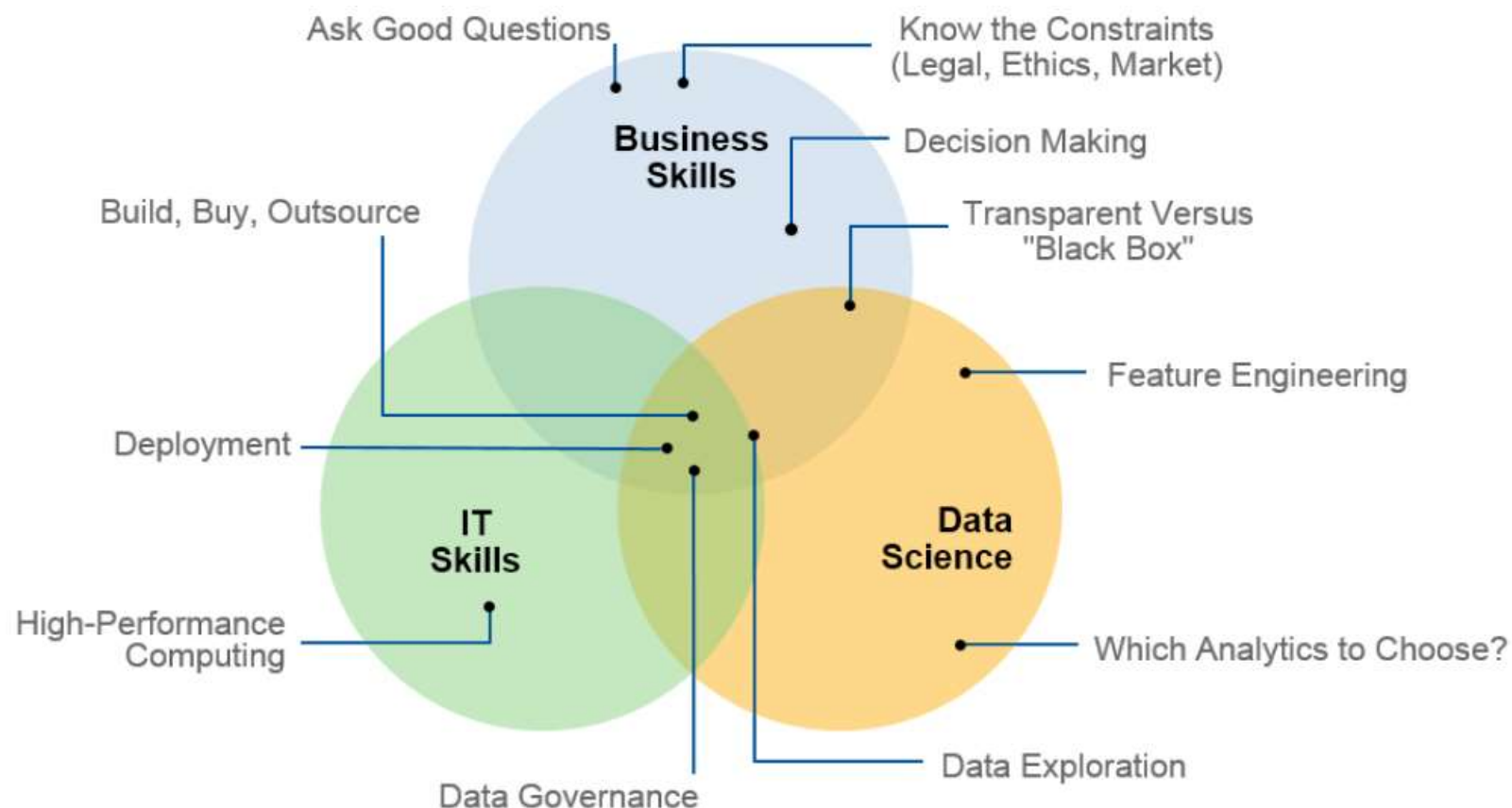# What are the key components of a data-centric evidence-based decision making environment?

Key components of an EIDM environment?

Three key components

- Data Science
- Information Technology
- Business Skills (a.k.a., "the science of decision making")

Critical to develop three key components as a set of interdependent capabilities
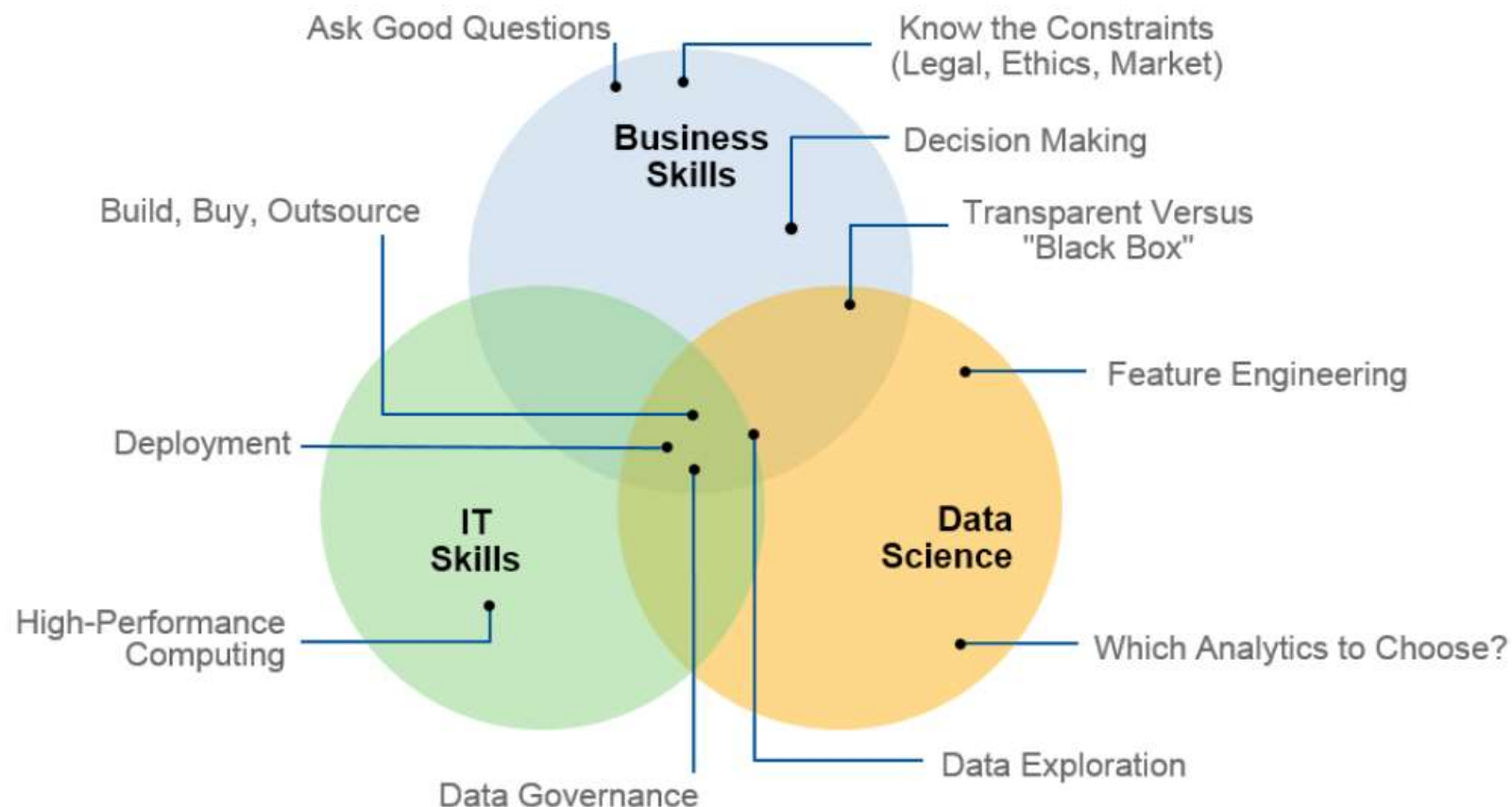
EIDM & "Advanced Analytics" – interchangeable terms?

Source: Gartner (2015)

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Which analytics to choose?

Data exploration

Data governance

Ask Good Questions

Know the Constraints (Legal, Ethics, Market)

Business Skills

Decision Making

Build, Buy, Outsource

Transparent Versus "Black Box"

Feature Engineering

Deployment

IT Skills

Data Science

High-Performance Computing

Which Analytics to Choose?

Data Governance

Data Exploration

Source: Gartner (2015)

"Fundamental questions about privacy, property, global governance, human rights – essentially around who should benefit from the products and services built upon digital data – are major uncertainties…"

- Data and the Fourth Industrial Revolution – Alan Marcus, Head of ICT Agenda, Member of the Executive Committee, World Economic Forum (https://www.weforum.org/agenda/2015/12/data-and-the-fourth-industrial-revolution/)

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Is "Big Data" part of the public policy EIDM solution?

"Big data refers to the use of a massive amount of data to conduct analyses so that the data patterns and relationships can be used for classification, clustering, anomaly detection, prediction and other needs in decision making."

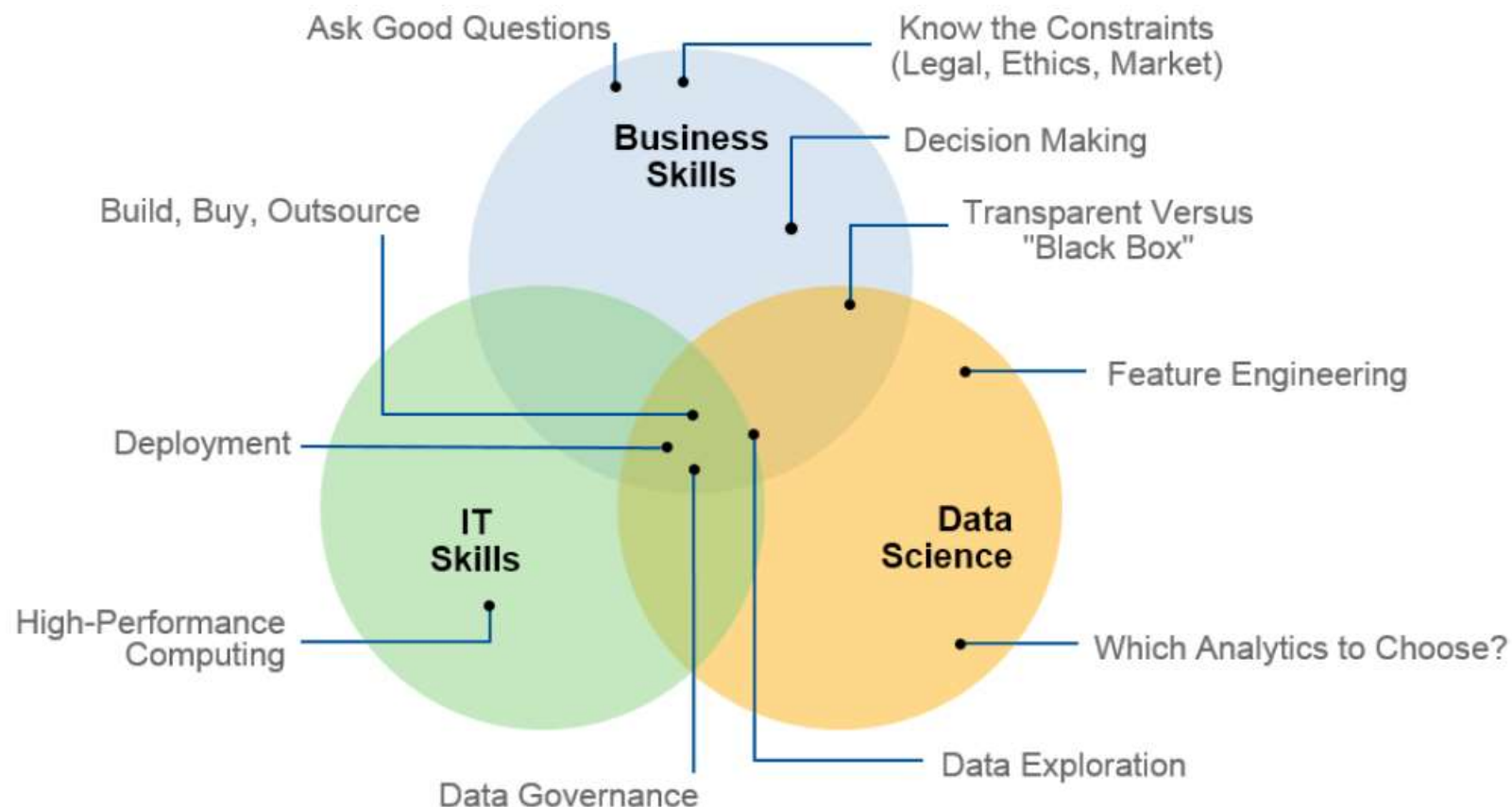- Alfred Ho, University of Kansas (http://www.govexec.com/excellence/promising-practices/2016/10/why-big-data-big-deal-government-leaders/132304/)

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High-performance computing design

Build, buy, or outsource

Deployment and operations

Source: Gartner (2015)

New Internet Protocol

Software Defined Networking

Security

Mobility

Machine Learning

DevOps

Acquisition

Source:Federal Forum eBook 2016

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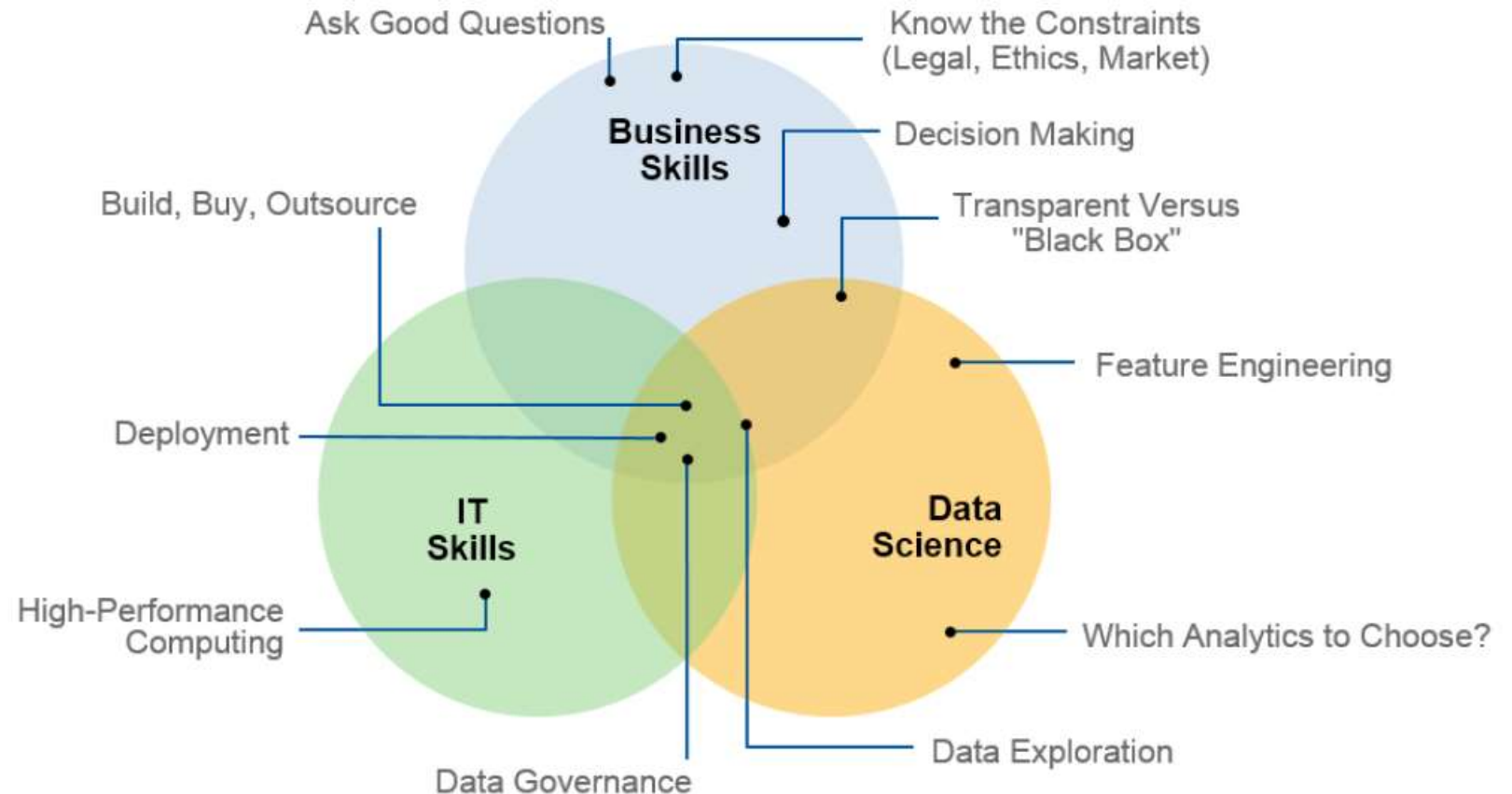**THOMSON REUTERS**®

Business Skills | A Decision - The End Product

What questions are being asked?

Constraints?

Taking the decision – ultimately a human activity?

Ask Good Questions
Know the Constraints (Legal, Ethics, Market)
Business Skills
Decision Making
Build, Buy, Outsource
Transparent Versus "Black Box"
Feature Engineering
Deployment
IT Skills
Data Science
High-Performance Computing
Which Analytics to Choose?
Data Governance
Data Exploration

Source: Gartner (2015)

Business Skills as the "science of decision making"

- a black art?

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"…supplement the use of evidence to reduce policy maker uncertainty … with persuasion to reduce *ambiguity* by establishing a dominant way to frame policy problems…"

- Cairney et al, To Bridge the Divide between Evidence and Policy: Reduce Ambiguity as Much as Uncertainty. Public Administration Review, Vol. 76, Iss. 3, 2016.

"Models of complex systems can capture much useful information but can be difficult to apply to real-world decision-making because the type of information they contain is often inconsistent with that required for traditional decision analysis."

- Robert J. Lempert, A new decision sciences for complex systems. *PNAS* 2002;99;7309-7313

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What risk is associated with the decision in question?

What is the cost of inaction?

What are the probabilities being considered?

- We measure our beliefs about uncertain possibilities we care about using probabilities.

- Those probabilities are based on our current state of information and from life experience, expert opinions, and observation.

- The possibilities are distinctions we impose on the world. We define them with enough clarity that the uncertainty arises from our lack of knowledge, rather than from ambiguity.

- Source: Ross D. Shachter, Management Science and Engineering, Stanford University

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"…executives typically have a default style of decision making that lands them in one of five distinct categories…"

- Charismatics
- Thinkers
- Skeptics
- Followers
- Controllers

Source: Gary A. Williams and Robert B. Miller
Change the Way You Persuade
Harvard Business Review, 2002

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"…System 1 refers to our intuitive system, which is typically fast, automatic, effortless, implicit, and emotional. System 2 refers to reasoning that is slower, conscious, effortful, explicit, and logical…"

- How Can Decision Making Be Improved? Katherine L. Milkman et al, Perspectives on Psychological Science, Vol 4, No 4, 2009.

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"…as one participant put it, "STEM thinking" is not aligned with "human thinking" and in some ways is antithetical to human psychology, which wants to grasp at a quick solution that has the "feeling of truth..."

- Round Table Report: Making Better Use of Science and Technology in Policy-Making. Institute for Research in Public Policy, March 2016

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"…scientists like to constantly challenge evidence to ensure it is robust; policymakers feel a need to create policy certainty and "reconcile evidence with well established beliefs…"

"…policymakers often balance evidence, emotions, and beliefs in making a decision…"

"…constituent opinion is a strong voice and will certainly be a part of any legislative arena. But how well informed is that voice?"

- John Kamensky, When Solid Data Isn't Enough. Government Executive Magazine, 2016 (http://www.govexec.com/excellence/promisingpractices/2016/07/whensoliddataisntenough/129874/)

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So what are the challenges of applying EIDM to the public sector?

The lack of EBDM in the public sector

"…Based on our rough calculations, less than $1 out of every $100 of government spending is backed by even the most basic evidence that the money is being spent wisely…"

"…In other types of American enterprise, spending decisions are usually quite sophisticated, and are rapidly becoming more so: baseball's transformation into "moneyball" is one example…"

"…But the federal government—where spending decisions are largely based on good intentions, inertia, hunches, partisan politics, and personal relationships—has missed this wave…"

- Bridgeland & Orszag, The Atlantic (2013) (http://www.theatlantic.com/magazine/archive/2013/07/can-government-play-moneyball/309389/)

The limits of EBDM in public policy

- "…the idea is to select among candidate policies or programs in a rational manner using the scientific method. Sometimes this view goes by the name of evidence-based policy making…"

- "…In response, my first inclination is to discount if not dismiss the argument by simply asserting that in real life things are not so simple and grumble about the hubris of scientists…"

- "…policy making should not be reduced to rational problem solving…"

- "…most of the truly interesting and non-trivial policy issues do not lend themselves to rational decision-making…"

  - Patrick Fafard, Graduate School of Public and International Affairs, University of Ottawa (http://policyoptions.irpp.org/2015/03/20/on-the-limits-of-evidence-for-policy/)

What limits EBDM in the arena of public policy?

- There may not be enough data to decide the issue.
  - …limited experiment that does not map well to the new setting and larger scale represented by the proposed legislation..
- The process of passing a law is long and complex.
  - Often, there is no point where evidence is reviewed in a disciplined and independent way.
- Members of Parliament are "of course" partisans, and have convictions that lead them to process evidence through motivated reasoning
  - *Motivated Reasoning:* the unconscious tendency of individuals to process information in a manner that suits some end or goal extrinsic to the formation of accurate beliefs (http://www.culturalcognition.net/blog/2013/5/15/motivated-reasoning-its-cognates.html)

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Barriers to an evidence-based culture

- Too much evidence
- Not enough good evidence
- Evidence doesn't quite apply
- People trying to mislead you
- You are trying to mislead you
- Side effects outweigh the cure
- Stories are more persuasive anyways

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Factors influencing policy making

"Evidence is necessary, but not sufficient, to achieve a policy decision"

Source: Davies, P. (2005). "Evidence-Based Policy at the Cabinet Office,"
presentation given at the *Impact and Insight Seminar,*
Overseas Development Institute, London, October 17, 2005.
http://www.odi.org.uk/rapid/events/impact_insight/presentation_1/davies.html
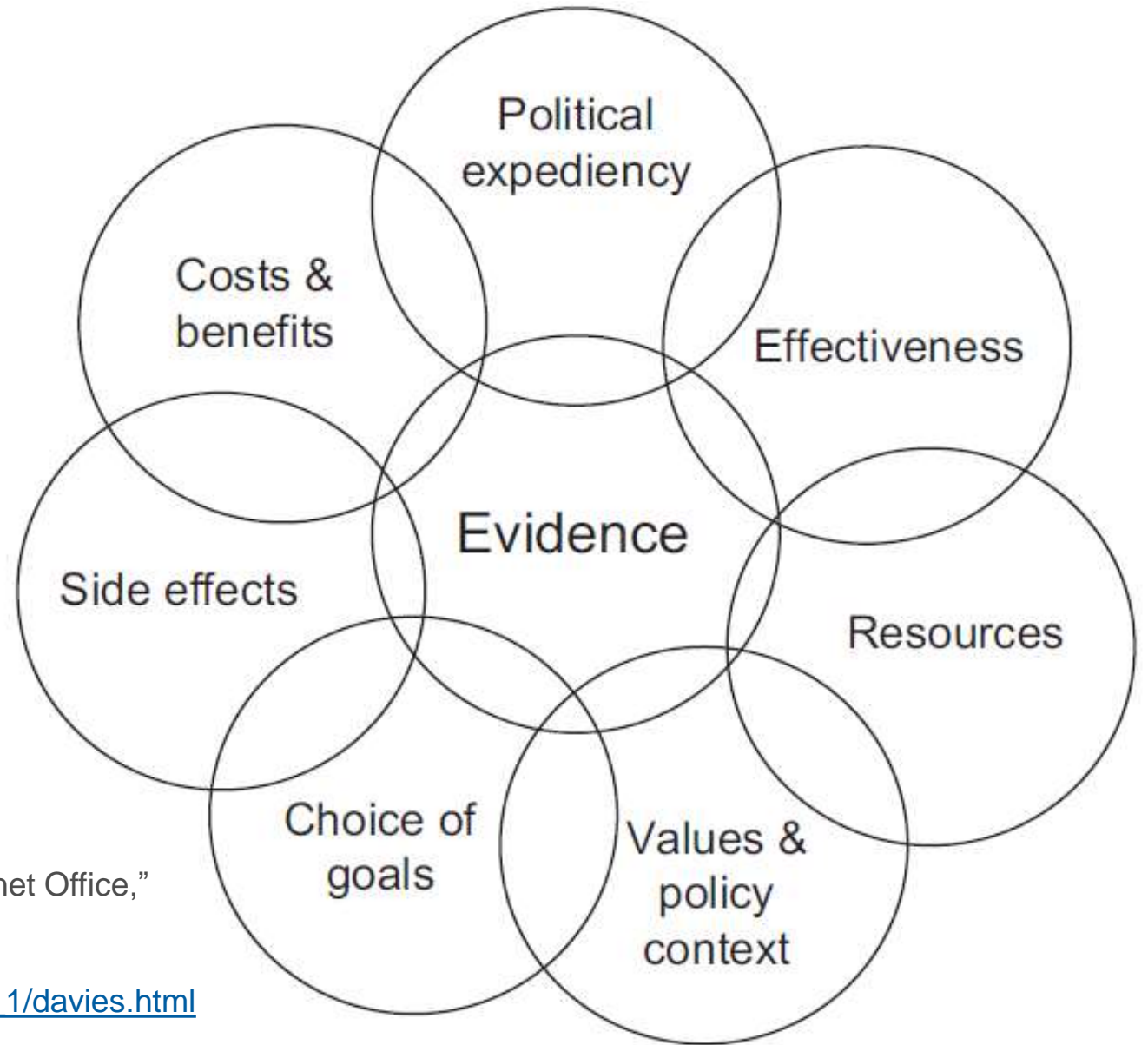
"The pessimist in me — and this won't surprise you in the least — (says) that decisions, even when there is evidence, quite often are heavily influenced by political considerations."

- Shaun Young, University of Toronto (http://www.huffingtonpost.ca/2016/06/22/liberals-evidence-based-decisions-data-deficit_n_10613814.html)

Counter Argument:

- Critics of EBDM in the public sector frequently generalize decision making within the public sector –

- Public sector decision making is diverse. Public sector-based EIDM must account for the different types of decisions.

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EIDM is central to a working democracy - and an "Enabling Society"

Enabling Society?

- "…the purpose of the enabling society is to make social policy more effective in enabling individuals to pursue their goals and achieve their full potential in life…"

"…the essential feature of the enabling society, once it matures, is a system of "big statistics" that will deliver detailed information to policy-makers, service providers and citizens about the kinds of interventions that will work best for each individual, given his or her particular needs, circumstances or preferences…"

- Peter Hicks, The Enabling Society, IRPP Policy Horizons Essay, 2015

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So how should we consider the decision making environment and process in the public sector?

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Account for changes in relative scale and weight of evidence

Account for varying levels and complexities of risk

Account for non-evidential considerations

Recognize the relationship between "information providers" and "decision makers"

"…the role of "science" in policy development is to do the following:

- Provide an evidence base for decisions;

- Confirm the soundness of a policy in areas in which the evidence is conclusive;

- Define the contours of uncertainty and trade-offs when the likely outcomes cannot be known for sure; and

- Inform the decision-making process while allowing for other considerations…"

- Round Table Report: Making Better Use of Science and Technology in Policy-Making. Institute for Research in Public Policy, March 2016

Evidence-Informed Decision Making Framework | A Decision Making Continuum
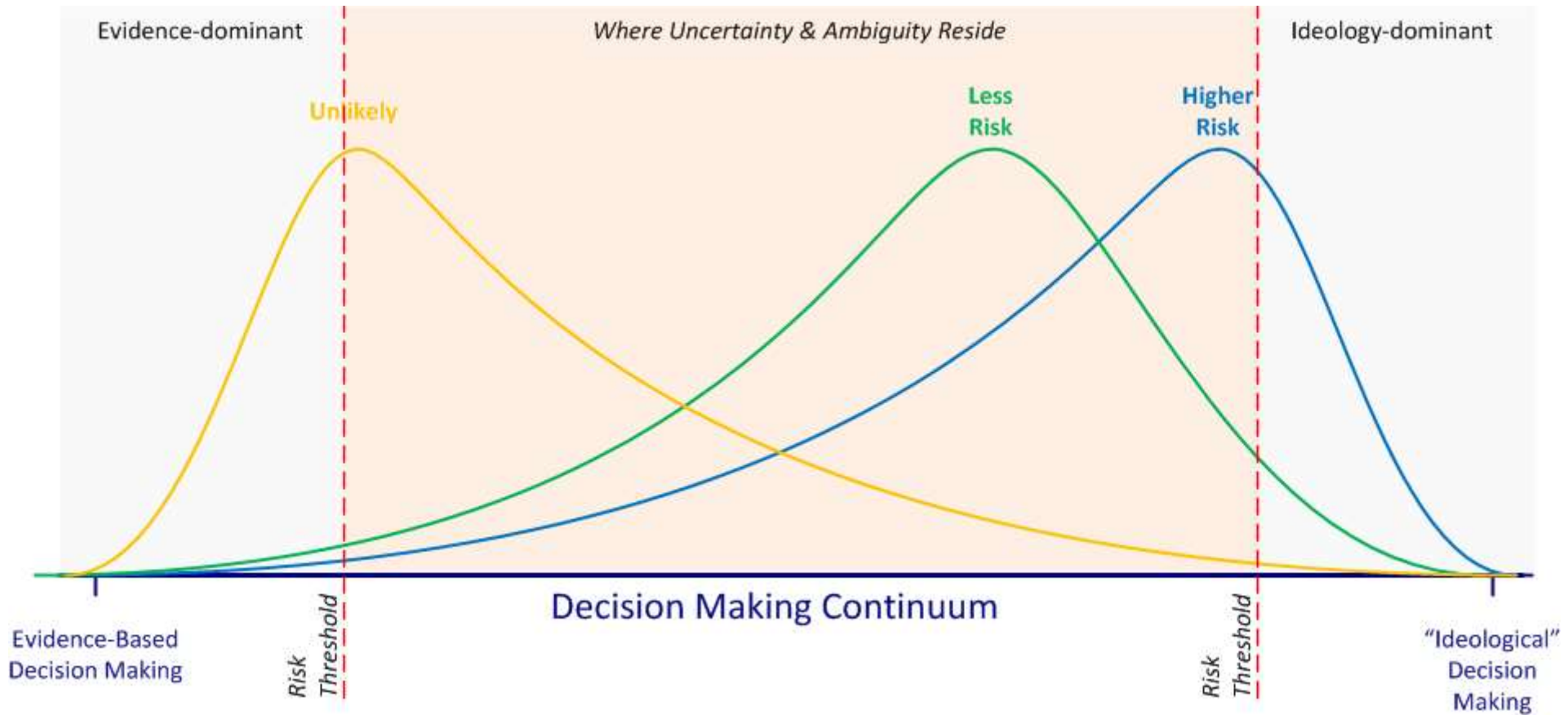
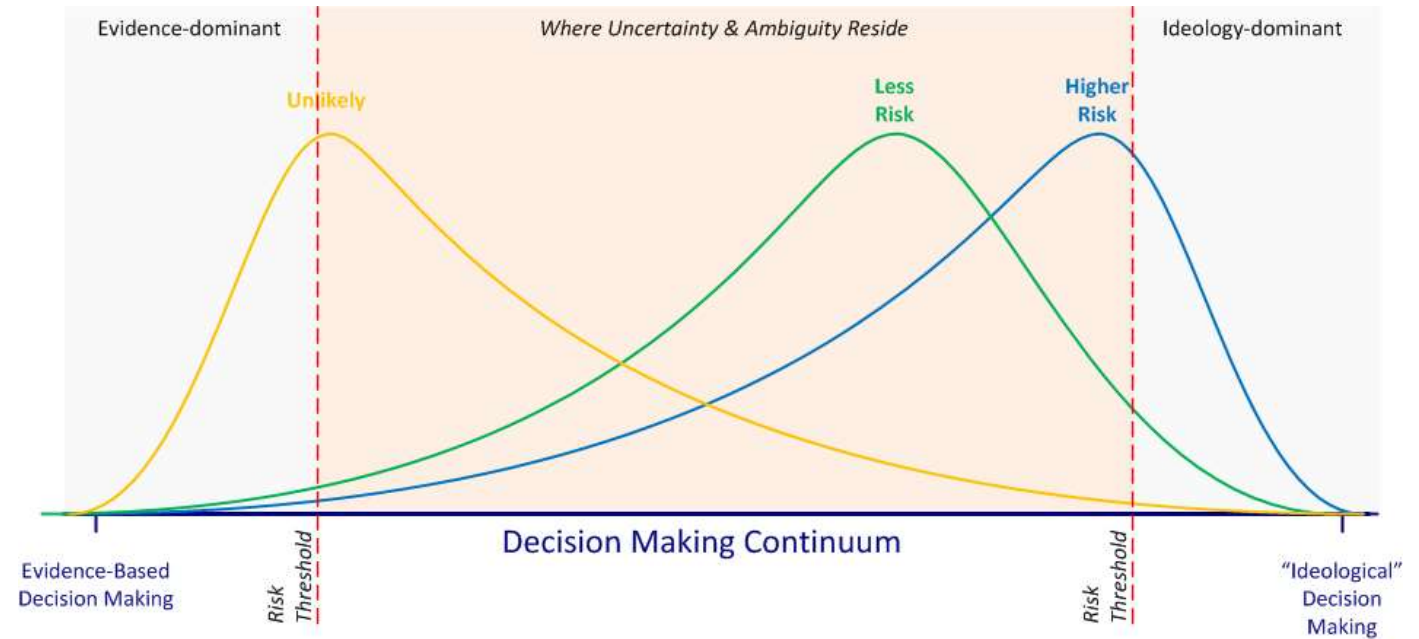# Evidence-Informed Decision Making Framework | Risk Threshold Considerations

DATA

- Rigorous
- Relevant
- Actionable

IT

- Validated (systems & tools)
- Transparent
- Trust

Business Skills

- Uncertainty
- Ambiguity
- Risk tolerance

Application of the EIDM Framework

EIDM Framework Use Case | Wireless Device Regulation

DATA

- Highly codified requirements
- Standards-based measurement methodologies
- Statistical methodologies for monitoring

IT

- Validated (systems & tools), Transparent and Trusted

Business Skills

- Clear regulatory authorities and procedures
- Duty-of-care responsibility
- Effective multi-stakeholder relationships

Goal: Decide on the certification of wireless devices seeking distribution and sale in Canada; Subsequent monitoring for ongoing compliance.
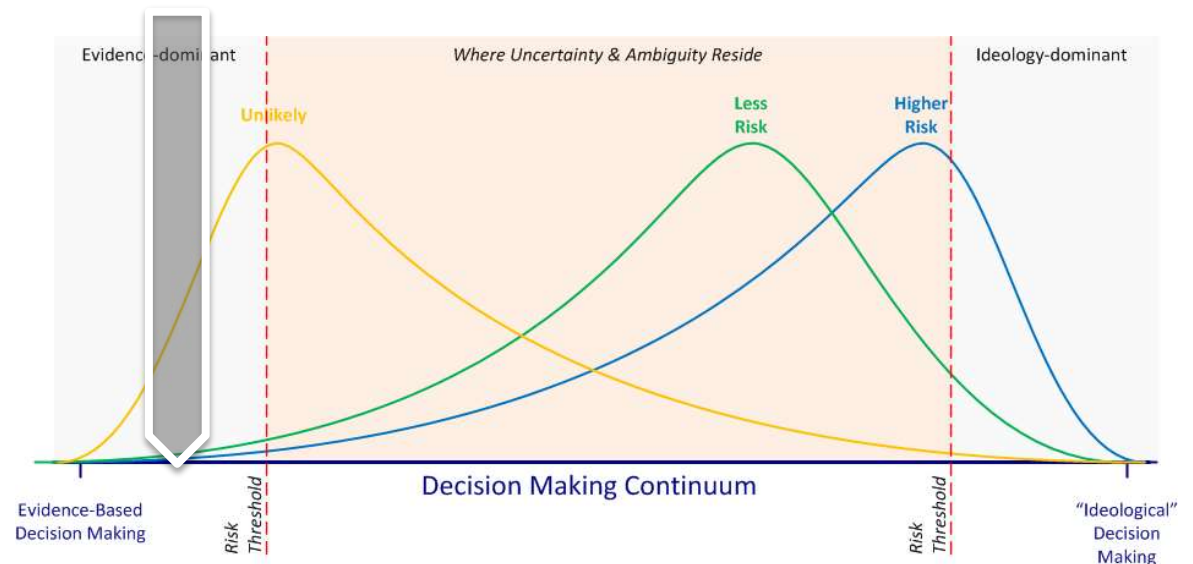
EIDM Framework Use Case | Energy Technology Priorities

DATA

- Localized information and data
- Lack of systems-relevant information

IT

- Validated (systems & tools), Transparent and Trusted
- Decision-making aids (e.g., subjective to objective scoring)

Business Skills

- Multi-disciplinary, holistic mindset
- Adaptive to shifting policy context
- Clarify of "objective function"

Goal: Select the priority energy technology sectors to best serve Canada into the 21st century.
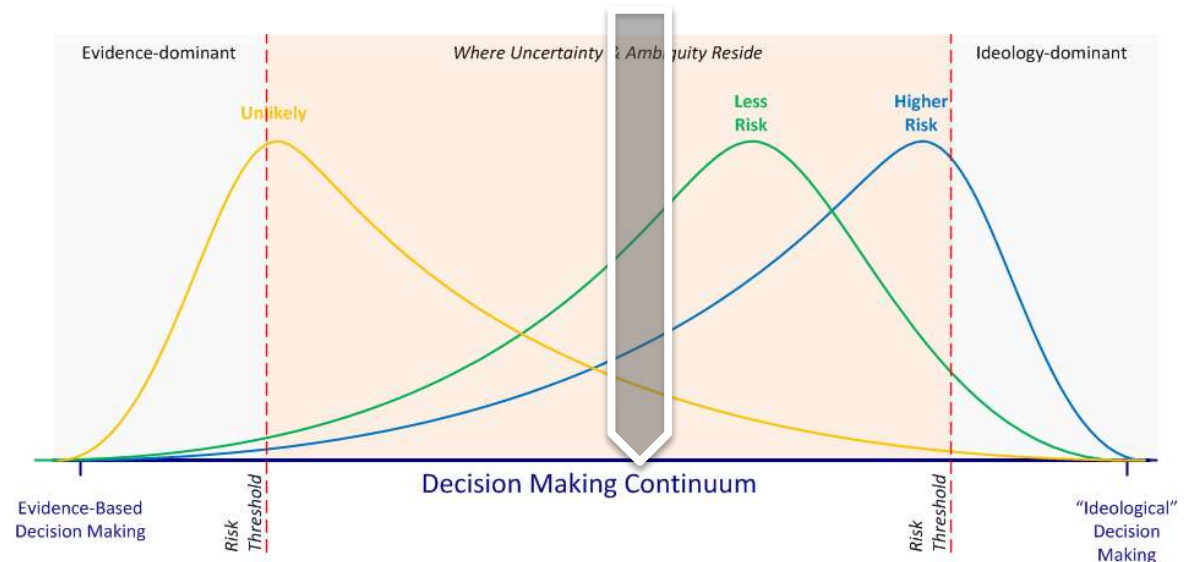
EIDM Framework Use Case | Defence Procurement Policy Changes

DATA

- Historical data of investment in Canada
- Thorough international benchmarking
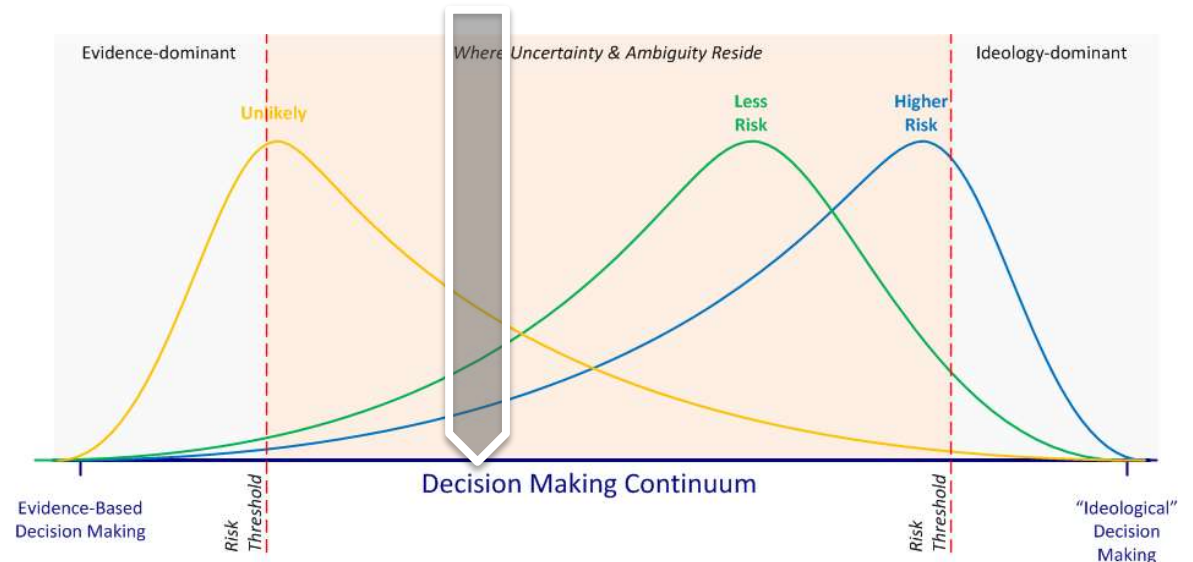- Innovation-based framework

IT

- Validated (systems & tools), Transparent and Trusted
- Proprietary and sensitive business information

Business Skills

- Highly effective stakeholder engagement ("interface expertise")
- Leverage extensive private sector experience
- Seasoned public policy development expertise

Goal: Select the best possible set of policy changes to increase the effectiveness of the government's defence offset regime.

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EIDM Framework Use Case | R&D Priorities

DATA

- Established monitoring of R&D outputs

- Limited data on socio-economic outcomes (e.g., commercialization)

- Poor attribution of investment onto outcomes
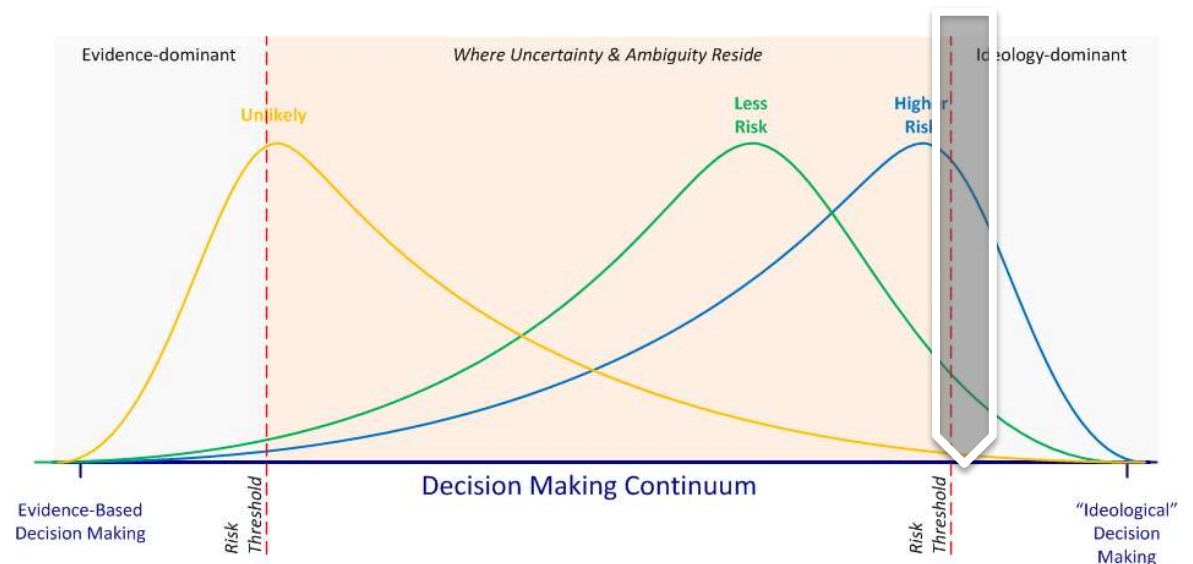
- Poor innovation ecosystem-related data

IT

- Decentralized information systems

- Proprietary information (e.g., emerging IP)

Business Skills

- Legacy of investment into "supply-side" R&D

- Lack of innovation ecosystem knowledge

- Overarching policy priorities

Goal: select priority R&D activities for investment.

CONCLUSIONS

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Advancements in analytics is fundamentally changing how decisions will be made in the public sector

Corporate decision making is fundamentally different than public policy making

- Explicitly account for the political environment

- Do not assume that "better" evidence guarantees "better" decisions

- Take note of the who is involved when in the "decision path"

"When somebody on staff asks what we should do to address a problem, the first questions I now ask are 'What does the research say? What is the evidence base? What information can we gather to determine if it will fit in different contexts?' It's become a way of life."

– Jim Hmurovich, BA, MS Ed,

President & CEO, Prevent Child Abuse America

The above is increasingly emerging…but a tension will remain between…

Evidence-Based Policy Making **vs.** "*Policy-based Evidence Making*"

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"…all stakeholders need to engage to shape an environment where the demand for evidence becomes part of the policymaking culture…"

- John Kamensky, Senior Research Fellow for the IBM Center for the Business of Government (http://www.govexec.com/excellence/promising-practices/2016/07/when-solid-data-isnt-enough/129874/)

Fifty years ago, historians advised politicians and policy-makers. They helped chart the future of nations by helping leaders learn from past mistakes in history. But then something changed, and we began making decisions based on economic principles rather than historical ones. The results were catastrophic.

- Annalee Newitz, Journalist & Author

How will {Big-Data + Advanced Analytics = Evidence}-informed policy decisions improve society?

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A closing thought…

"Policy makers, like most people, normally feel that they already know all …they are likely to need for their decisions. I don't think they are right, but that's the way it is".

- Daniel Kahneman, Nobel Prize in Economic Sciences (2002)

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Thank You!

Contact Info:

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Senior Director, Thomson Reuters
dan.duguay@thomsonreuters.com

"We combine industry expertise with innovative technology to deliver critical information to leading decision makers in professional markets."

- ThomsonReuters.com

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you need to find trusted answers.

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ANNEX

Additional Use Cases

EIDM Framework Use Case | Medical Device Development

DATA

- Rigorous, Relevant & Actionable
- Innovative energy ecosystems-relevant information

IT

- Validated (systems & tools), Transparent and Trusted

Business Skills

- Deep localized expertise
- Multi-disciplinary; Integrating leadership style
- Highly regulated sector

Goal: Select the best materials to construct a degradation-resistant left-ventricular assist device, based on best evidence regarding mechanisms for degradation.
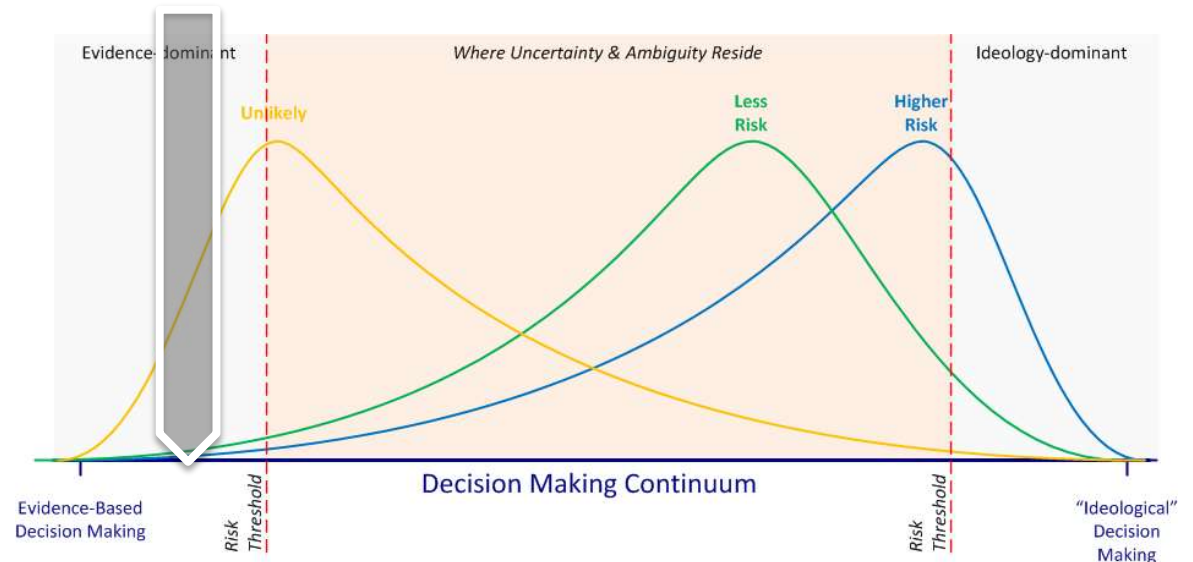
ANNEX

Thomson Reuters Background

The Answer Company

Thomson Reuters provides professionals with the intelligence, technology and human expertise they need to find trusted answers.

We enable professionals in the financial and risk, legal, tax and accounting, intellectual property and science, and media markets to make the decisions that matter most.

We're powered by the world's most trusted news organization.

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Our Businesses: Financial and Risk

Customers

- Trading professionals, sales professionals, brokers and financial analysts
- Investment banks, asset managers, custodians, hedge funds, prime brokers and proprietary traders

- Portfolio managers, buy-side research analysts, investment bankers, consultants, private equity professionals, wealth management professionals
- Tax and accounting professionals and lawyers

- FX and money market traders
- Sales desks, hedge funds and voice brokers
- Institutional fixed-income traders

- Banking and corporate compliance officers
- Audit and risk management professionals
- Law firms

Key Products

- Eikon
- Elektron
- Enterprise Platform
- Eikon Messenger

- DataScope
- Starmine
- Eikon
- Lipper

- FX Trading
- FXall
- Tradeweb

- World-Check
- Org ID
- Compliance Learning
- Regulatory Intelligence

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Our Businesses: Legal

Customers

Large and Medium Law Firms:
- Lawyers
- Law librarians
- CMOs, CTOs, CIOs (and staff)
- Paralegals and other legal professionals

Small Law Firms:
- Lawyers
- Law firm management professionals
- Paralegals and other legal professionals

Corporate Segment:
- General Counsel
- Corporate legal professionals – investigators, risk, compliance, security

Government:
- Government agencies
- National, state and local courts
- Law enforcement

Key Products

- Westlaw
- Practical Law
- Legal Managed Services
- ProView and print titles
- Aranzadi, Aranzadi Fusión and Lawtel: Europe
- La Ley, Legal One and Revista dos Tribunais: Latin America

- Practice Point
- Elite 3E, Mattersphere
- eDiscovery Point
- Business Development Premier
- Monitor Suite and Peer Monitor

- Firm Central
- FindLaw
- ProLaw
- Practice Point
- eDiscovery Point

- Practice Point
- eDiscovery Point
- Legal Tracker
- CLEAR

- CLEAR
- PeopleMap
- C-Track
- Legal Tracker
- Drafting Assistant

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Our Businesses: Tax & Accounting

Segments and Customers

Professional:
- Solutions for accounting firms

Corporate:
- Corporate tax departments
- Banks and trusts
- Large accounting firms

Government:
- National, state and local governments responsible for property registration, tax generation and collection

Knowledge Solutions (all segments and customers):

- Accounting firms
- Corporate tax departments
- Finance and accounting departments
- Law firms and government agencies

Key Products

- Onvio (global)
- CS Professional Suite (U.S.), DT Professional Suite (Canada), Digita Professional Suite (UK), Software Assistant (Australia), Dominio (Brazil), Sistemas Bejerman (Argentina), etc.

- ONESOURCE

- Aumentum

- Checkpoint
- Checkpoint Catalyst
- Checkpoint World

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Our Businesses: Reuters

Segments and Customers

News agencies and brands:
- Broadcasters
- Publishers
- Brands
- Agencies

Professionals:
- Financial professionals
- Legal professionals
- Tax and accounting professionals

Consumers

Key Products

- Newswires
- Digital news services
- Pictures
- Graphics
- Videos
- Archives
- Reuters Content Solutions

- Reuters news delivered via Thomson Reuters products (e.g., Eikon, Westlaw)

- Reuters.com
- Reuters TV
- The Wider Image

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Thomson Reuters is positioned to respond to public sector demands for enhanced evidence-based decision making

- *"…Smith [TR CEO] is driving the organisation by stepping up its <u>data-driven innovation initiatives</u> to invest in new ideas that can be leveraged across the entire business…"*

- "…TR collaborating with MIT IDSS to <u>advance innovation in data science, finance & risk analytics</u>…"

- "…TR Labs provide capabilities across the many disciplines that constitute data science and <u>deliver tools, analyses, dashboards, visualizations and proof-of-concept applications</u>..."

- "…Thomson Reuters has long been the preeminent provider of intelligent information for businesses worldwide, and <u>its massive collection of proprietary data and technology solutions are also directly applicable to the needs of government agencies</u>…"

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