Operationalizing analytics to drive value

How leading organizations are tapping into the value of analytics and making it sustainable
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**Presentation:** Operationalizing analytics to drive value
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In the community, Patrick is on several boards and committees, including: the Dovercourt Recreation Association (Board position); the United Way of Ottawa (Community Impact Committee); and the Innovation Centre at Bayview Yards (Operations Sub-Committee).

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Big Data and Analytics: A data explosion unleashing a new wave of opportunities

There are 500 Million tweets per day

Internet users worldwide equal 3.2 Billion

There are 1.5 Billion Facebook users

“There was five exabytes of information created between the dawn of civilization through 2003, but that much information is now created every two days, and the pace is increasing”. —Eric Schmidt, former CEO of Google, 2010.

According to IBM, 2.5 exabytes was generated every day in 2012.

By 2020 the digital universe - the data we create and copy annually - will reach 44 zettabytes, or 44 trillion gigabytes (IDC, 2014)
Definitions
What is Big Data?

- Big data is a general term for the massive amount of digital data being collected from all sorts of sources.
- It includes data generated by machines such as sensors, machine logs, mobile devices, GPS signals, as well as transactional records.
- It is too large, raw, or unstructured for analysis through conventional relational database techniques.
- Big Data is typically characterized by the four “V’s. However, there are at least 8 additional characteristics being discussed -
  - Value; Variability, Viscosity, Virality, Validity, Venue, Vocabulary, Vagueness...

“Data of high Variety, Velocity, Veracity or Volume which pushes limits of traditional tools and infrastructure that demand cost effective methods to process or extract “Value” out of data” (Shared Services Canada)
Big Data and Analytics: Why Now?

► Access to advanced computing power for the analysis of large quantities of data is now more readily available.
► The emergence of powerful and cost-effective analytical tools, storage, and processing capacity removes the cost barriers to big data.
► One of the most popular open software frameworks for Big Data analytics is Hadoop, which enables applications to scale up to thousands of nodes and petabytes of data.

Hadoop was created by Doug Cutting and Mike Cafarella in 2005. Cutting, who was working at Yahoo! at the time, named it after his son’s toy elephant. It was originally developed to support distribution for the Nutch search engine project.

Source: Joel Gurin, senior adviser at New York University’s Governance Lab
Big Data and Analytics: The Impact of Big Data (example – movie rentals)

► To understand the impact of how data has transformed our daily lives, look no further than how the movie rental experience has changed.

► When movies were rented from independent neighborhood stores (e.g. Blockbuster), the rental agent would base their recommendations on which movies the customer said they liked and a large amount of their own opinion.

► Today, movie rental companies and content delivery services can utilize a vast array of data points to generate recommendations.

► By analyzing what was viewed, when, on what device (and even whether the content was fast forwarded, rewound or paused),... recommendations can be tailored for millions of customers in real time.

► Approximately 75% of views at a leading provider are now driven by these recommendations.
Yet these massive amounts of data will drive value only when organized and analyzed in a manner that supports decision-making.

Governments are just beginning to meaningfully incorporate data analytics into their operations, but the results so far have been highly promising:

- Predictive algorithms allow police departments to anticipate future crime hotspots and pre-emptively deploy officers
- Detecting fraud
- Conducting health related research
- Enhancing teaching and learning
- Improving customer satisfaction
- Enhance innovation
- Enabling Business
- …

With Big Data they are now trying to predict crime. The LAPD started with a pilot project in applying the mathematical model of Moher to predict the areas where crime is likely to occur. Together with among others the University of California and the company PredPol they managed to improve the software and the algorithm.

Nowadays they identify crime hotspots where crime is likely to happen on a given day and it is used by Police Officers in their daily job.

Getting the police officers to start trusting and using the software, however, was not an easy task however.

Big Data and Analytics: Improving and Optimizing Cities

- Big data is being used to improve many aspect of cities.
- For example, it allows cities to optimize traffic flows based on real time traffic information as well as social media and weather data.
- A number of cities are currently using big data analytics to join up the transport infrastructure.
- Where a bus would wait for a delayed train and where traffic signals predict traffic volumes and operate to minimize traffic jams.

Source: Libelium
The Government of Canada, through Shared Services Canada, has established an Architecture Framework Advisory Committee (AFAC) to look at Big Data.

SSC has also initiated discussions with partners leading big data-related initiatives, including:
- Agriculture and Agri-Foods Canada;
- Royal Canadian Mounted Police (RCMP);
- Health Canada;
- Public Works and Government Services Canada;
- Statistics Canada; and
- Treasury Board Secretariat

SSC is developing a Shared Services Big Data GoC vision / roadmap / model / reference architecture; building new core competencies – data scientists / information technology administrators; among other things

The GoC is also looking to increase learning through the identification and initiation of a number of big data analytic pilot/proof of concept projects.

These pilots/PoC projects will help to showcase the potential for big data analytics to improve the way government operates and deliver tangible value to individuals.
RCMP in-car digital video system project
- Provides a nationally standardized tool to all officers
- Assists with Evidence Collection: front-end - includes in-car and on-body collection of data
- Assists with Evidence Management: back-end - includes storage, backup and access to data
- Saskatoon alone - ~1.2 petabytes (PB)* of storage
- 1,156 hours of video per day

- Other pilots include: Genomics Research, Geospatial and Internet of Things

*It would take 223,000 DVDs (4.7Gb each) to hold 1Pb.
Big Data and Analytics: Too Many Answers, Not Enough Questions

► Data on its own is meaningless.
► The value of data is not the data itself – it’s what you do with the data.
► For data to be useful, organizations first need to know what data they need; otherwise they get tempted to know everything and that is not a strategy.
► Why go to all the time and effort to collect data that you will not or cannot use to deliver organizational insights? You must focus on the things that matter the most to the organization otherwise you will drown in data.
► Good questions yield better answers
► This is why it is important to start with the right questions; when you know the questions you need answered then it is much easier to identify the data you need to access in order to answer those key questions.
► Too much data obscures the truth. A lot of data can generate lots of answers to things that do not really matter; instead organizations should be focusing on the big unanswered questions in their business and tackling them with big data and analytics.

“The value of big data lies in our ability to extract insights and make better decisions” (Government of Australia)
Operationalizing Analytics to Drive Value
Setting the context: About analytics
Analytics is the scientific process of transforming data into insight for making effective decisions

- Analytics is a data-driven process, not just a set of tools
- Analytics starts with data, but using techniques such as predictive modelling, statistics and visualization, turns the data into insights
- Most importantly, analytics is always linked to specific business decisions

Analytics can also be considered the science of understanding the past and predicting the future in order to make effective decisions today

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<tr>
<th>Hindsight</th>
<th>Insight</th>
<th>Foresight</th>
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<tr>
<td>What happened?</td>
<td>What’s happening now?</td>
<td>What might happen?</td>
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<tr>
<td>Why did it happen?</td>
<td></td>
<td>What actions should we take?</td>
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Setting the context: The analytics “value chain”

The key to operationalizing analytics is to appreciate the analytics value chain. The ability to identify and framing right business questions is a critical first step.

What do leaders need to know to make better decisions?

To drive better decisions, we must first ask the right business questions and then seek answers in the data. Therefore, our work moves left to right, but our thinking must move from right to left.

- Avoids the temptation to put all the data in a data warehouse (EDW) and “boil the ocean” with analytics
- Focuses on outcomes so the organization does the right analytics
- Provides a road map that prioritizes the high-value impacts first

Why this matters?

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Value of leveraging analytics
Increasingly analytics is being used by organizations as a key differentiator to improve performance

Analytics is increasingly being used as a primary vehicle for driving value and solving complex problems using data and information

Analytics Provides
- Rapid and powerful solutions to solve complex business issues and provides tangible value in the decision making process
- Speed to insight
- Grounded in fact-based analysis and focused on measureable improvement

Business Insight, Value & Optimization
Organizations achieving advantage with analytics are 2.2x* more likely to substantially outperform their industry peers

Analytics now sits at the top of the agenda for many leading organizations and can be a foundational element of business transformation —challenging conventional wisdom about what we think is true.

Operationalizing analytics

Analytics operationalization requires a robust operating model, an approach that enables driving value to justify major investments all co-ordinated through a practical execution plan.

Our experience of helping organizations build and operationalize analytics to drive value informs us that the following are the key essential ingredients to your strategy:

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<td>Analytics is more than just data and technology</td>
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<td>2</td>
<td>Understanding current and target maturity is critical</td>
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<td>3</td>
<td>Identifying the optimal model structure is important</td>
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<td>4</td>
<td>Focus should be on building a self-sustaining model</td>
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<td>5</td>
<td>Robust governance structure should be established</td>
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<td>6</td>
<td>Pragmatic roadmap focused on driving value is critical</td>
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1. Analytics is more than just data and technology

Building analytics program is more than just data and technology. It involves building all aspects of the operating model...

**Focus on the right analytics to drive value and insights**
- Define common processes and procedures
- Deliver effective and efficient processes
- Define the right location for process delivery

**Ability to measure value delivered from analytics**
- Set up a consistent enterprise performance measurement framework
- Use benchmarks to promote continuous improvement of service levels across the enterprise

**Having a sustainable analytics process**
- Establish a common framework for policies to support enterprise processes and governance

**Execution layer**

**Organization layer**

**Resource layer**

**Provisioning / managing the necessary data to enable the analytics**
- Define a set of consistent global data standards
- Have single sources of data for key data assets

**Staffing with the right people to perform analytics**
- Select the right resources with the right skills in the right location
- Promote end-to-end process ownership

**Having a high-performing analytics function**
- Structure the analytics resources to deliver valuable service to the business
- Define appropriate organizational structure and governance

**Enabling the appropriate tools to perform analytics**
- Define the architecture
- Define tools to enable value-added analysis and insight

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2. Understanding current and target maturity is critical

The stage of analytical maturity is determined by ability to use analytics in taking better and quicker decisions. Operationalizing requires base-lining current and defining the target maturity.

<table>
<thead>
<tr>
<th>Areas</th>
<th>Level 1: Initial</th>
<th>Level 2: Competent</th>
<th>Level 3: Proficient</th>
<th>Level 4: Expert</th>
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<tr>
<td>1. Business Proposition</td>
<td>Decision making driven by management instinct</td>
<td>Analytics aiding management’s decisions, to an extent</td>
<td>Most decisions based on analytics, minimal personal bias</td>
<td>Decisions based solely on analytics, agility in decision making</td>
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<td>2. Sponsorship, Leadership, Governance and Policy</td>
<td>Some business functions are experimenting with analytics autonomously</td>
<td>Start of enterprise-wide strategies; considering performance metrics</td>
<td>A change management program is in place to develop analytics capabilities</td>
<td>Continually innovating to boost data-driven decision making</td>
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<td>3. Concept and Approach</td>
<td>Handful of data analysts work in particular business functions</td>
<td>Boosting the hiring of analysts</td>
<td>Recruitment of data analysts becomes a priority</td>
<td>Skills shortages not a problem, as analysts work in integrated teams</td>
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<td>4. Organizational Readiness, Capacity and Capability</td>
<td>Initiatives in analytics led by business functions</td>
<td>Starting to understand competitive opportunities</td>
<td>Analytics initiatives have executive support</td>
<td>Analytics Initiatives have C-suite leadership support</td>
</tr>
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<td>5. Risk Management</td>
<td>Awareness of data and analytics growing; demand is beginning to increase</td>
<td>Begun to drive data awareness throughout the organization</td>
<td>Business leaders have persuaded staff towards data-driven decisions</td>
<td>Entire organization geared toward analytics</td>
</tr>
<tr>
<td>6. Project/Program Management</td>
<td>Limited awareness of legal challenges associated with data</td>
<td>Growing realization of legal issues as part of an integrated approach</td>
<td>Has processes in place to ensure legal compliance</td>
<td>Consideration of legal risk fully embedded in an enterprise-wide strategy</td>
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<td>7. Requirements</td>
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<td>8. Procurement</td>
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<td>9. Human Factors (e.g. training)</td>
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<td>10. Funding</td>
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<td>11. Implementation and Deployment</td>
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<td>12. Technology (architecture, security, privacy)</td>
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Key Question: Where are you now and where do you need to be?
3. Identifying the optimal model structure is important

It is critical to be organized to form a structure that best fits your strategy (range of options exists) to effectively design and build all components of the operating model.

Centralized
All activities go through and are managed by group function

Pros
- Centralized knowledge – shared across organization
- Consistency
- Ability to develop and leverage organization-wide leading practices
- Coordination and negotiating power with vendors
- More cost effective

Cons
- Extensive personnel requirements
- Opportunity costs – resources diverted
- Potential for lower adoption of analytics - resource bottleneck or barriers
- Scalability challenges
- Difficult to obtain buy in among all stakeholders

Hybrid
Centralized activities at key points of the process

Pros
- Resource demands are spread out
- Potential higher adoption of analytics
- Easier to scale across the enterprise

Cons
- Information silos
- Potential for inconsistency and/or redundancy
- Less coordination and decreased negotiating power with vendors
- Challenges identifying organization-wide leading practices

Decentralized
Activities initiated and managed by the interested parties

Pros
- Resource allocation – involves teams with vested interest
- Easier to scale across the enterprise

Cons
- Information silos
- Potential for inconsistency and/or redundancy
- Less coordination and decreased negotiating power with vendors
- Challenges identifying organization-wide leading practices
4. Focus should be on building a self-sustaining model

Leading companies are able to establish self-funding operating models by leveraging analytics to generate rapid value and use realized value to fund investments needed.

A. Generate value by executing analytics driven projects/solutions by enhancing capabilities through partnerships

Step 1: Identify initiatives to generate value

Step 2: Prioritize the initiatives and decisions

Step 3: Implement to generate value

Step 4: Harvest value to make investments

B. Leverage value generated to build-on analytics operating model capabilities

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5. Robust governance structure should be established

Successful operationalization requires a robust governance model that enables building confidence for all the stakeholders and ensures that focus is always on the right things.

Illustrative only
6. Pragmatic roadmap focused on driving value is critical

In order to most effectively tap into the value of analytics, organizations should focus on a phased roadmap that begins by starting small and building a case for change and buy-in.

**Year 3+**

The build of various analytics enablers should continue (including some major investments) while also embedding analytics across the organization.

**Year 2**

As a next step, operationalization of strategy and execution of key foundational elements of operating model may be initiated while value is generated through project execution.

**Year 1**

The first step to implementation is to build the case for change by proving the value of analytics through ‘pilot’ projects. In addition, momentum needs to be built across the organization by clearly demonstrating the gaps against target ed maturity of the analytics organization.

**Stage 1**

1. Build the case for change

**Stage 2**

2. Operationalize while continuing to drive value

**Stage 3**

3. Sustain

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Putting it all together

In summary, operationalizing analytics is about building a model that is focused on building an ecosystem of people, process and technology that enables sustainable value creation.

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Questions?
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