State of the Industry Research Series:

Big Data in Consumer Goods

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Big Decisions, not Big Data.
You’ve heard it before. A convergence of consumer, economic and business trends have led to dynamic changes in the consumer goods industry. Consumers are socially active, mobile enabled, always on, information hungry and more value conscious than ever before. Manufacturers operate in an environment of rising input costs, tighter regulations, increased supply chain complexity, and questionable marketing ROI.

One such trend supposedly causing seismic shifts in the industry is the explosion of consumer and enterprise data, and the associated assumption that the analysis of this “Big Data” is, in and of itself, a desirable pursuit for manufacturers.

In Edgell Knowledge Network (EKN)’s view, the fundamentals of the consumer goods industry are sound, and at an over simplified level not much different from the traditional view of what a consumer goods manufacturer needs to do to succeed.

- Design products in response to rapidly changing consumer needs and preferences (innovation, product development)
- Manufacture products quicker and at a lower cost (sourcing, manufacturing)
- Optimize the cost of delivering the product to the consumer (logistics)
- Fulfill demand with increased certainty and reduced cost – reduce stock-outs, optimize inventory holding (inventory management, retail collaboration)
- Build a stronger emotional connection with the consumer (customer development, branding, sustainability)
- Increase the return on marketing investment, including optimizing trade promotions (marketing, trade promotion)

Undeniably, consumers and enterprises produce more data today than ever before. This data not only resides in enterprise systems but in a multitude of new data sources that include:

- Email inboxes
- Machine logs & customer service call logs
- GPS logs of your truck fleet
- The thousands of “likes” on each of your product pages on Facebook and in the consumer aspirations expressed on Pinterest
- The video reviews of your products on YouTube and in the location awareness of their check-ins on Foursquare
- The navigation path they follow on your website
- Publicly available Census data

What is important to establish, however, is that the real opportunity for manufacturers is not in building the technological capability to capture, store and analyze this data, but in identifying specific outcomes that enable better, more profitable decisions in the context of the above fundamentals of success in the CG industry. Big Data, therefore, is a misnomer. Big Decisions would have been more apt.
Software tools and technological advances such as in memory computing are active enablers that make it possible for organizations to think about data and analysis in ways never before possible. However, to equate them with Big Data would be to miss the forest for the trees.

Manufacturers have already taken strides towards increased analytics maturity in areas such as supply chain insights (downstream data), shopper insights (category management) and trade promotion optimization. Big Data presents an opportunity to expand the scope of these use cases to include larger data sets, new data sources and speedier analysis. The insights ultimately offer input that improve existing decisions, or uncover opportunities to make new ones.

**Big Data is about business decision-making.** It has to be. This report will focus on the larger picture of Big Data; moving the spotlight away from the semantics of its definition and technological underpinnings to more important aspects such as use cases for the Consumer Goods industry, the changes required in organization structure and capabilities, and how and where to get started.

Edgell Knowledge Network (EKN) conducted a survey of 50 consumer goods (CG) manufacturers to benchmark the industry’s awareness, readiness and impact assessment of Big Data.

### Big Data Fast Facts
- We create 2.5 exabytes of data (exabyte = 1,000,000,000 GB) each day, and this data is projected to grow at 40% every year
- 15 out of 17 industry sectors in the U.S. (such as manufacturing, insurance, healthcare, utilities) have more data stored per company than the entire U.S. Library of Congress
- By the end of 2012, the average volume of data stored per company is projected to be 500 TB
- 2.7 billion – average number of “likes” and comments posted on Facebook. Daily
- 90% of the world’s data created in the last 2 years

### Research Findings Snapshot
- 84% of manufacturers are aware of Big Data as a concept, but only 36% are aware of the amount of unstructured data in their organization
- 1 in 2 manufacturers rate data variety as their top data management challenge, more than volume (29%) and velocity (26%)
- Manufacturers demonstrate higher analytics maturity with 1 in 2 conducting predictive or investigative analytics, compared to 1 in 3 retailers
- 16% of manufacturers have executed a Big Data project, 24% are currently implementing one, and a further 28% have a Big Data strategy in place
- 64% of manufacturers who plan to execute a Big Data project in the future plan to do so within the next 2 years
- Supply Chain, Marketing and Customer Development are top focus areas for Manufacturers’ Big Data plans
- While 50% of retailers enjoy support for Big Data at the VP or CXO level, only 38% of manufacturers reported executive sponsorship at this level
Big Data: Concept trumps definition
While this is an acceptable general definition, EKN’s position is that there is no absolute specification of what Big Data is; each enterprise must define what it is for them. Following these guiding principles may be more useful than getting caught up in definitions:

- **Decisions:** Start your definition with the types of decisions and outcomes Big Data would enable. The purpose of Big Data must be to make sense of and gain knowledge from this data to create competitive advantage; and that must be reflected in its definition.

- **Strategy:** Big Data definition must address data strategy issues such as whether you are focused on storage, consumption, or both.

- **Types of data:** Typically Big Data strategies would address at least 2 of the 3 types of data – structured, unstructured and semi-structured.
  - Structured data: The type of data that conforms to a pre-defined data model. Data that typically fits in a relational database.
  - Semi-structured data: A form of structured data that does not conform with formal structure of data models, but contains metadata tags or other information to separate its elements. XML, email, an invoice document in a word processing software are all examples of semi-structured data.
  - Unstructured data: Data that does not conform to any pre-defined data model and does not fit well into relational tables. Unstructured data can include heavy text files, email messages, social media activity, audio, video and analog data.

- **Size of data sets:** No absolute size qualifies as this depends on how much of what kind of data can you currently store or analyze. Typically ranges from a few dozen terabytes to hundreds of petabytes.

- **Tools and Technologies:** While it is very likely that you will require specialized tools in your Big Data initiatives, no specific type of tool or technology needs to be included as part of your Big Data definition, as different tools (including your existing database software) may be appropriate for different circumstances. For instance, If you are able to add structured meta-data describing the unstructured portion of your data, and you want to run standard reports on the structured portion or retrieve individual unstructured elements (such as a single PDF document), then standard databases may do the job. More likely, you will need specialized tools to do the job.
Where does analytics end, and Big Data begin?

The fundamentals of Big Data analytics aren’t very different from the analytics manufacturers are already adept at. You need to collect the right data, clean it, integrate with other relevant data sources and then run your tools/algorithm on it. Having a Big Data tool will not solve the fundamental issues of data cleanliness, integration, and the need for skilled resources.

One of the areas of increased analytics activity in consumer goods companies is the analysis of “downstream data” – any inventory or sales information collected after the product leaves the manufacturer. Traditionally, downstream data, especially as focused on sell-in (manufacturer to retailer), has been an analytics use case. Downstream data includes Retail POS and inventory data, vendor managed inventory data, syndicated data and consumer loyalty data. All structured data, whose analysis requires a certain class of skills and tools.

Companies such as Kraft Foods and Procter & Gamble are using downstream data to better predict demand, improve shelf availability and enhance replenishment strategies.

As more manufacturers expand their focus to sell-through (manufacturer to consumer), they will need to deal with an exponential increase in the volume, variety and velocity of data. It is the combination of downstream data with contextual forms of semi-structured (spreadsheets that contain delivery schedules, email communication between the distribution center and retailer etc.) and unstructured data (a consumer’s Facebook “like” post purchase, truck fleet GPS data) that yields a Big Data use case that the same tools, skills and processes from the earlier example may be ill equipped to handle.
Research findings
Respondent Profile

Survey respondent distribution by segment
(Figures are percentage of total respondents)

Survey respondent distribution by annual revenue
(Figures are percentage of total respondents)
Manufacturers have high conceptual awareness of Big Data but low awareness of Big Data in their enterprise

Manufacturer awareness about Big Data
(Figures are percentage of total respondents)

Manufacturers’ estimate of data growth (per year)
(Figures are percentage of total respondents)
Comparison of awareness of unstructured data as a percentage of total data, manufacturers vs. retailers
(Figures are percentage of total respondents)

<table>
<thead>
<tr>
<th></th>
<th>Manufacturers</th>
<th>Retailers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aware of the % of unstructured data</td>
<td>36%</td>
<td>25%</td>
</tr>
<tr>
<td>Not aware</td>
<td>64%</td>
<td>75%</td>
</tr>
</tbody>
</table>

While 8 out of 10 manufacturers responded that they are aware of the term Big Data, the lack of a standard concrete definition has made it difficult for the manufacturers to understand what it really means, and how it is significantly different from what they are or have been doing (in data warehousing and analytics). Only 3 in 10 manufacturers stated that they were well aware of Big Data.

Further, 1 in 2 manufacturers are not aware of the growth of data within their company, and only 36% are aware of the proportion of unstructured data in their organization as a percentage of total data. While compared to retailers (25% aware) manufacturers demonstrated higher internal awareness, it still points to the lack of discussion on such metrics at the executive level in consumer goods companies.
Manufacturers demonstrate higher analytics maturity and readiness for the move towards Big Data compared to retailers

Biggest challenge in managing data
(Figures are percentage of total respondents)

Comparison of analytics maturity, manufacturers vs. retailers
(Figures are percentage of total respondents)
The challenges of managing data can be looked at across three dimensions:

- **Volume** – The amount of data generated
- **Variety** – The different types of data generated
- **Velocity** – The frequency with which data is generated and captured

Typically, organizations with lower analytics maturity levels find data volume (storage and computing power related) or velocity (speed of data input and output) as their biggest challenges. The fact that 1 in 2 manufacturers rate data variety as their biggest data management challenge reflects a relatively high maturity. Retailers, for instance, rate data volume as their biggest challenge.

A comparison of the type of analytics conducted by manufacturers and retailers further confirms this difference in maturity. 1 in 2 manufacturers conduct predictive or investigative analytics while only 1 in 3 retailers do.

While the higher analytics maturity points to a better state of readiness for the move towards Big Data, manufacturers need to address the data variety challenge. 29% of manufacturers don’t incorporate any unstructured data into their analytics. Only 1 in 2 manufacturers integrate unstructured data from either social media or consumer mobile location or online sources.
Unclear ROI and lack of budget emerge as top inhibitors to Big Data adoption. Resource augmentation, training and software identified as key capability building investments.

### Challenges in starting Big Data initiatives
*(Figures are percentage of total respondents)*

- **No resources (people)**: 48% biggest challenge, 27% significant challenge, 14% minor challenge, 5% not a challenge
- **No tools**: 43% biggest challenge, 39% significant challenge, 13% minor challenge, 5% not a challenge
- **No budget**: 54% biggest challenge, 25% significant challenge, 16% minor challenge, 5% not a challenge
- **No internal ownership/champion**: 41% biggest challenge, 24% significant challenge, 11% minor challenge, 5% not a challenge
- **Not a business priority**: 37% biggest challenge, 29% significant challenge, 11% minor challenge, 5% not a challenge
- **Unclear benefits or ROI**: 43% biggest challenge, 34% significant challenge, 18% minor challenge, 5% not a challenge

### Important elements in building Big Data capabilities
*(Figures are percentage of total respondents)*

- **Outsourced analytics services**: 51% most important element, 26% important element, 21% somewhat important element, 2% unimportant element
- **Internal team augmentation & training (analytics)**: 50% most important element, 43% important element, 7% somewhat important element
- **New tools / software**: 53% most important element, 42% important element, 5% somewhat important element
- **New hardware**: 54% most important element, 25% important element, 7% somewhat important element

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*State of the Industry Research Series: Big Data in Consumer Goods*
As anyone who has built a business case for an analytics project would attest, providing a watertight model for analytics ROI is inherently difficult. Unsurprisingly then, manufacturers cite unclear benefits and the difficulty in demonstrating ROI as the biggest inhibitor to Big Data investments.

Manufacturers cite new analytics tools or software, as well as augmenting and training internal analytics resources, as the most critical factors in building big data capabilities. This speaks to an interesting realization that tools, while critical to Big Data, are only as important as the organization's capability to analyze and understand data.

Manufacturers can have the fastest servers and the prettiest visualization in town, but if they don't have people who can make sense of the information or business processes that enable the decisions they want to make, they are no better off than before.
Manufacturers preparing for significant investments in Big Data in the next 2 years

Current status of Big Data initiatives
(Figures are percentage of total respondents)

- **Strategy created**
  - Yes: 18%
  - No: 54%
  - In progress: 28%

- **Executed a proof-of-concept (POC)**
  - Yes: 19%
  - No: 63%
  - In progress: 18%

- **Executed a project or program**
  - Yes: 16%
  - No: 60%
  - In progress: 24%

Budgeting for Big Data
(Figures are percentage of total respondents)

- Not aware: 42%
- Already have a Big Data budget: 22%
- Within the next 2 years: 11%
- In the next 2 years - 4 years: 5%
- Beyond 4 years: 2%
- Never: 18%
While only 16% of manufacturers have executed a Big Data project, 24% are currently implementing one, and a further 28% have a Big Data strategy in place.

40% of manufacturers either already have a budget for Big Data initiatives or will have one within the next 2 years. 64% of manufacturers who plan to execute a Big Data project in the future plan to do so within the next 2 years.

Supply Chain, Marketing and Customer Development are top focus areas for Manufacturers’ Big Data plans

Functional areas that will benefit most from Big Data initiatives

(Figures are percentage of total respondents)
EKN’s survey asked respondents to identify the business functions that would benefit most from Big Data initiatives. Manufacturers clearly identified 3 areas of highest impact:

- Marketing (44% of respondents)
- Supply Chain (43% of respondents)
- Customer Development (36% of respondents)

While the consumer facing applications of Big Data are the ones that grab the headlines, it is encouraging that manufacturers identified Supply Chain as one of the highest priority areas. Big Data has tremendous enterprise-wide appeal and relevance that can sometimes get lost in all the focus on the get-closer-to-the-customer use cases.

When asked which functional areas would their first Big Data initiative focus on, manufacturers validated the importance of these 3 areas with their responses.

- 30% would focus on Supply Chain or Customer Development
- 19% would focus on Marketing
Lack of executive support may point to ROI buy-in and lack of budget related challenges facing manufacturers

Executive sponsorship level of Big Data initiatives
(Figures are percentage of total respondents)

As established earlier, Big Data is not a technology project. It is an enterprise wide strategic initiative that calls for strategic alignment across business units, an investment appetite, change readiness, clear accountability and quick decision-making. None of which is possible without executive sponsorship at the highest level.

In a cross-tab analysis of manufacturer vs. retailer responses to EKN's Big Data survey, manufacturers consistently displayed higher maturity and readiness for Big Data adoption. However, while 50% of retailers enjoy support for Big Data at the VP or CXO level, only 38% of manufacturers reported executive sponsorship at this level. Of concern is that 47% of manufacturer respondents were either not aware of an executive champion or reported no executive owner at all.
Recommendations

EKN’s recommendations on how manufacturers should approach Big Data are based on a proprietary framework it has developed for the retail and consumer goods industries. Key elements of this framework, including a Big Data Adoption Roadmap and Opportunity Identification Framework are provided as part of this report.

Recommendation Icons

- **ST** = Short Term (0-6 months)
- **MT** = Medium Term (6-12 months)
- **LT** = Long Term (1-2 years)
Start by assessing Big Data maturity, and do proof of concepts (POC) before you invest big

EKN suggests manufacturers start with proof of concepts (POC) and adopt the “Fail Fast, Fail Cheap” philosophy. The experience of the POC or pilot programs will help provide the right kind of grounding required to prove value on which future investment decisions can be based. Larger manufacturers that are further along the analytics maturity curve and have more resources at their disposal may be better positioned to take on larger Big Data initiatives as their first step.

Even in this case, EKN recommends breaking up that larger vision into smaller; pilot or POC sized “sprints”. Not only will this help reduce complexity by distributing it over a number of smaller scopes, it will also ensure a deeper inspection and exploration of the larger initiative, its objectives and expected benefits. The EKN Roadmap on how retailers should approach Big Data is provided in the next section.

**Tactical Steps:**

- Use the EKN Big Data Maturity Assessment Framework, and follow Sprint 1 of the EKN Big Data Roadmap to understand and baseline your preparedness for Big Data.

**Impact Area:**

- Opportunity Qualification
- Organization Readiness
Identify areas of high impact opportunity and build detailed use cases

It is not about what data you have; rather, about what decisions you are trying to make, and how you can improve them. Towards this end, use cases of opportunity areas need to be defined in terms of objectives and outcomes you want to see achieved. Business and technology teams should work together to create a master list of such use cases, and use that as a starting point to identify potential proof of concepts.

While enterprise-wide relevance and applicability is one of Big Data’s core appeals, it also represents one of its key challenges – i.e. the Big Data rhetoric doesn’t usually define specific boundaries within which organizations can realize value. This boundary-less nature of the Big Data conversation is a challenge for those looking for quick wins and measurable ROI.

Get Started:

EKN recommends manufacturers focus on 3 measurable problems to assess the benefit of Big Data in their organization:

1. Forecasting: Demand & Inventory
2. Customer segmentation
3. Trade promotions

We also recommend that manufacturers focus on 3 big picture concepts:

1. Demand Signal Repository
2. Customer Signal Repository
3. Collaboration Spaces (Manufacturer-Retailer), (Manufacturer-Consumer)

Follow the 4-step EKN opportunity identification process in the Opportunity Identification section of this report to identify and detail the use cases for a proof of concept.

Impact Area:

- Opportunity Qualification
Prioritize resourcing and training

You have all the data that you want and the latest tools in the market. Now what? Without the right analytical resources and training, the data and tools have little value. Invest in capability building across the board, from executive training to building a strong analytics team.

Manufacturers need to accelerate their efforts in analytics training; EKN recommends that a portion of the HR training budget be set-aside for this. An executive program needs to be put together for the leadership team. The creation of an analytics services unit or Center of Excellence needs to be evaluated.

Get Started:

- **ST** Assess the current analytics capability and resource strength in the organization.
- **MT** Build a resourcing and training plan based on the assessment.
- **ST** Create an executive program on business analytics in the consumer goods industry for the mid to senior executive levels
- **MT** Invest in building and expanding the analytics/customer insights team

Impact Area:

- Opportunity Qualification
- Organization Readiness
Create a comprehensive data strategy covering 3 core areas

1. Customer data/Master data management
2. Data policy and process guidelines
3. Data pool use and sharing (i.e. collaboration with retailers)

The move towards understanding and harnessing Big Data will raise a lot of long buried questions around MDM, data privacy and collaboration. Fundamental strategy decisions will need to be taken in these areas, and these decisions will not go away. Data policy and processes regarding the collection, storage and use of consumer and social data are specific areas requiring attention. Global manufacturers need to be careful about privacy and data laws in view of the recent spate of legislation in Europe and US.

Get Started:

- Start by making an operational plan to detail the capture, storage and consumption of the data that you plan to integrate for your POC's.
- Build detailed data policy and process guidelines.

Impact Area:

- Organization Readiness

Focus on, and plan for, organizational change associated with analytics adoption

The rise of analytics as a discipline will lead to structural organization changes. Analytics' growing importance in consumer goods is illustrated by the amount of investment that is being pumped in, and by the creation of senior leadership positions like Chief Insights or Chief Data Officer. However, even progressive manufacturers that have such titles, struggle to answer the question of who owns analytics or insights, and how best can analytics fit into the current organization structure.

As manufacturers augment their analytics capabilities and teams, EKN sees analytics eventually being instituted as a separate department, or Business Insights Unit, that would lie at the intersection of Business and IT. Typically these teams sit in different departments across business and IT, but EKN sees the emergence of a shared analytics services center in the future.

Get Started:

- Call out organization change as a focus area when you create your Big Data strategy.
- Initiate a dialogue with key stakeholders on the organization structure required to support your Big Data and analytics strategy.

Impact Area:

- Opportunity Qualification
EKN Big Data Maturity Assessment Framework
EKN has developed a model to assess the relative maturity of Big Data awareness and capabilities of an organization. The model was first introduced in our report on the impact of Big Data on the retail sector and has been modified based on the feedback and inputs from the EKN advisory board and peer forum.

**Definition of each stage:**

<table>
<thead>
<tr>
<th>Maturity Level</th>
<th>Strategic Investment (SI)</th>
<th>Organization Readiness (OR)</th>
<th>Opportunity Qualification (OQ)</th>
<th>Investment Appetite (IA)</th>
<th>State of Analytics (SA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beginner</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Tinkerer</td>
<td>Medium</td>
<td>Low, Medium</td>
<td>Low</td>
<td>Low, Medium</td>
<td>Low, Medium</td>
</tr>
<tr>
<td>Leader</td>
<td>High</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium, High</td>
</tr>
<tr>
<td>Guru</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
</tbody>
</table>

**Stage 1: Beginner**

- Strategic Intent: Low
- Organization Readiness: Low
- Opportunity Qualification: Low
- Investment Appetite: Low
- State of Analytics: Low (Standard periodic or ad-hoc reporting)

**Big Data Adoption:**

There are no Big Data initiatives currently underway at the organization.

**Characteristics:**

There is low awareness of Big Data, including understanding its implications on the organization. It is very difficult to start a Big Data project, due to lack of awareness and an unwillingness to invest. There is no Big Data expert in the organization.

Since the management and employees have low awareness of Big Data, there is very little chance of a Big Data initiative being undertaken by the organization in the short term.

**Analytics Maturity:**

Low. These organizations typically do not perform any analytics on data and have a standard rudimentary reporting system (excel or worksheet based), where data is extracted from relevant sources, and reports generated when required. Data is not managed or analyzed to provide further insights into issues. In case of an understanding required on the incidence numbers or frequency of occurrence, there could be an ad-hoc requirement for further investigation.
Stage 2: Tinkerer

- Strategic Intent: Medium
- Organization Readiness: Low to Medium
- Opportunity Qualification: Low
- Investment Appetite: Low, Medium
- State of Analytics: Low to Medium (Problem diagnosis and flagging)

Big Data Adoption:

The organization is actively researching this space and has started doing proof of concepts (POCs).

Characteristics:

There is awareness and curiosity about Big Data, but the management is not convinced about Big Data's value. Limited budgets are available for analytics projects, and it is difficult to get funding approved for Big Data. The organization is investing or has invested a minimal amount in understanding Big Data better use cases, competitive moves and applicability to their sector. The initiative is driven at the middle to senior executive level (Director, Senior Director, or VP). The organization is on the cusp of starting to build a strategy or executing small proof of concepts to validate the use case and ROI.

This is the longest maturity phase and firms at this level will execute proof of concepts within 6 to 9 months and decide on a longer-term Big Data strategy within the next 12 to 18 months.

Analytics Maturity:

Low to Medium. The firm stores a huge amount of data, but performs basic post-facto root cause analytics. Big Data analytics are championed at the Manager or Senior Manager level, and operated as silos within a particular function; there is limited top management involvement. Parts of the organization are pushing the existing technology and solutions to the brink, however there is no corporate or top driven transformation program for them to hop on to.
Stage 3: Leader

- Strategic Intent: High
- Organization Readiness: Medium
- Opportunity Qualification: Medium
- Investment Appetite: Medium
- State of Analytics: Medium to High (Statistical analysis including forecasting)

Big Data Adoption:

The organization has executed proof of concepts, and captured the lessons from the experience. They have built a Big Data strategy and identified key focus areas for projects.

Awareness:

The CIO, CTO or CMO is the Big Data champion in the organization. The organization may still struggle with Big Data being looked at as an IT initiative, however there is generally widespread awareness of the concept among key stakeholders.

Analytics Maturity:

Medium to High. The firm’s analytics strategies include a wider and more complex set of data sources than a Tinkerer’s, typically integrating all 3 types of data (structured, unstructured, semi-structured). They have the ability to perform investigative analytics using statistics to understand the reason of occurrence of an event/problem and simultaneously deploy forecasting techniques to determine patterns from the data, basis the existing trend, to forecast the future and help drive better business decisions. The Big Data pilot or proof of concept included an upgrade of the organization’s Big Data infrastructure – including software, hardware and tools.
Stage 4: Guru

- Strategic Intent: High
- Organization Readiness: High
- Opportunity Qualification: High
- Investment Appetite: High
- State of Analytics: High (Prediction models and optimization techniques)

Big Data Adoption:

A Big Data initiative with multi-function impact has been implemented that delivered measurable benefits. There is a separate Big Data division, a strong bench of data scientists, and best-of-breed Big Data technology tightly integrated with enterprise systems.

The firm is positioned to provide strategic advice to other firms in the industry on Big Data initiatives.

Awareness:

An orientation towards Big Data is integrated within the firm’s strategy, being driven into the organization from the CEO down. The management team is aware of and aligned with the need to leverage Big Data for competitive advantage. Big Data spending is planned for at the beginning of the year, as part of the business planning process.

Analytics Maturity:

High. The organization has a demonstrable track record of successfully leveraging Big Data to influence or deliver positive business outcomes. The organization is capable of conducting investigative and predictive analytics by accounting for all factors that could have an influence on the final outcome.
EKN Opportunity Identification Framework
Opportunities are clear actions or decisions that a manufacturer can take to impact its business. Capturing new data or product RFID code or even doing predictive analytics is not an opportunity - they are important enablers. Opportunities must be defined in the context of a business outcome in a specific functional area or associated business process.

EKN sees opportunity identification as a four-step process.

**Step 1: Identify an opportunity area based on your organizational goals, time and budget appetite, and ROI expectation.**

The Big Data Opportunity-Impact Matrix is an illustrative framework that outlines Big Data opportunities for manufacturers, taking into account time taken to implement and potential impact of outcome.

### Big Data opportunity-impact matrix

<table>
<thead>
<tr>
<th>Impact</th>
<th>High</th>
<th>Medium</th>
<th>Low</th>
</tr>
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<tbody>
<tr>
<td>• Optimize inventory levels</td>
<td>• Optimize assortment</td>
<td>• Implement optimal price point/band</td>
<td></td>
</tr>
<tr>
<td>• Optimize media mix</td>
<td>• Create new demand forecast models using predictive analytics</td>
<td>• Optimize product portfolio</td>
<td></td>
</tr>
<tr>
<td>• Develop an effective promotional events calendar</td>
<td>• Optimize trade promotions</td>
<td>• Re-design logistics network using store and warehouse cluster data</td>
<td></td>
</tr>
<tr>
<td>• Monitor ROI on trade spends and campaign evaluation</td>
<td>• Monitor brand health</td>
<td>• Deeper segmentation of retailer, distributors based on profitability</td>
<td></td>
</tr>
<tr>
<td>• Analyze consumer behavior online (clickstream analytics, etc)</td>
<td>• Manage cost-to-serve and margins product-wise and channel-wise</td>
<td>• Optimize sales force structure and strength</td>
<td></td>
</tr>
<tr>
<td>• Monitor digital brand sentiment (online, social)</td>
<td>• Deeper segmentation of retailer, distributors based on profitability</td>
<td>• Manage in-store activities within stores</td>
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</tbody>
</table>

EKN has mapped several business processes and created use cases which can serve as a starting point for proof of concepts. The time to action and impact will vary for each organization and the above matrix should be used as a framework for manufacturers to plot their business processes. The framework can then be used to build use cases; a few illustrative examples are given in step 2 below.
To ascertain the time to action and impact, manufacturers should benchmark the amount and periodicity of the data that they receive. They need to track and summarize the data feeds that they get at a granular level. For instance, tracking the SKU performance feeds at a channel level (i.e retailer, master distributor) will give you the table below.

<table>
<thead>
<tr>
<th>Retailer ABC data feed (SKU)</th>
<th>Chain level</th>
<th>Store level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Real-time</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Per “n” hours</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Daily</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weekly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monthly</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Doing a similar exercise across all your key data sources will help you create a summary table that can show how often certain data can be integrated into a larger pool of data (i.e Demand Signal Repository).

<table>
<thead>
<tr>
<th>Signal Repository: Periodicity of data integration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Real-time</td>
</tr>
<tr>
<td>-----------</td>
</tr>
<tr>
<td>Retailer POS data</td>
</tr>
<tr>
<td>Market surveys (consumer data)</td>
</tr>
<tr>
<td>Public data</td>
</tr>
<tr>
<td>Syndicated data (Nielsen, IRI)</td>
</tr>
<tr>
<td>Social media data (Twitter, Facebook)</td>
</tr>
<tr>
<td>Shipment data</td>
</tr>
<tr>
<td>Distributor data</td>
</tr>
</tbody>
</table>

This will also help you compare and contrast the current availability of data feeds with the desired availability.

<table>
<thead>
<tr>
<th>Current Availability</th>
<th>Desired Availability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retailer POS data</td>
<td>Monthly</td>
</tr>
<tr>
<td>Market surveys (consumer data)</td>
<td>Monthly</td>
</tr>
<tr>
<td>Public data</td>
<td>Quarterly</td>
</tr>
<tr>
<td>Syndicated data (Nielsen, IRI)</td>
<td>Monthly</td>
</tr>
<tr>
<td>Social media data (Twitter, Facebook)</td>
<td>Daily</td>
</tr>
<tr>
<td>Shipment data</td>
<td>Monthly</td>
</tr>
<tr>
<td>Distributor data</td>
<td>Monthly</td>
</tr>
</tbody>
</table>
### Step 2: Define an opportunity and the expected outcome for a business process or functional area

<table>
<thead>
<tr>
<th>Business process or functional area</th>
<th>Expected outcome</th>
<th>Key decisions to be taken</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marketing</td>
<td>Optimize marketing spends</td>
<td>How can we use our existing data to improve campaign effectiveness?</td>
<td>Analyze the entire data set on campaigns across channels (POS, online, coupons only sites) to measure impressions and effectiveness. Use this to create a predictive model of campaign performance.</td>
</tr>
<tr>
<td>Branding</td>
<td>Monitor and measure brand sentiment</td>
<td>How can we measure and track our brand sentiment across channels?</td>
<td>Integrate your consumer research data from market surveys to social sentiment data from digital channels like Twitter, Facebook, Pinterest posts, blogs to create a brand sentiment index across channels.</td>
</tr>
<tr>
<td>Pricing and promotions</td>
<td>Increase promotion effectiveness across the brand portfolio</td>
<td>How can we develop a robust mechanism to measure ROI for all the past campaigns across the brand portfolio?</td>
<td>Gather and clean all data from past campaigns at the product level and channel level (retailer). Use existing ROI parameters and augment them with other variables that can affect performance. Analyze the data to create ROI models.</td>
</tr>
<tr>
<td>Marketing</td>
<td>Improve trade promotion spend</td>
<td>How can we improve our trade promotion spend across retailers?</td>
<td>Use past data to identify leakages from time bound deductions and create strategies to plug them. Analyze retailer performance on promotion spend and compare and contrast with each other. Also map performance to customer segments created for the product line to measure performance.</td>
</tr>
</tbody>
</table>
### Business process or functional area

<table>
<thead>
<tr>
<th>Product management</th>
<th>Expected outcome</th>
<th>Key decisions to be taken</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Increase penetration of strong SKUs</td>
<td>How can we increase sales and margins for stronger SKUs, and look for replacements for low performers? How can we eliminate stock-outs of strongly placed SKUs and also keep the product planning function informed in advance of any deviation?</td>
<td>Manufacturers will get SKU performance data from various sources like retailer sales data, market surveys and syndicated data. The manufacturer can combine these to understand the demand and relative performance of its products across retail partners and against competing products. The speed at which this analysis can be done will help drive replenishment to reduce stock outs. This analysis can also help uncover the actual vs. perceived strength of a SKU/brand with a retailer. This can help a manufacturer use the pricing and promotions levers to further dominate a category, support a new product that has been introduced or decide to eliminate a product altogether.</td>
</tr>
</tbody>
</table>

---

### Step 3: Detail the various enablers that will be required for you to achieve the expected outcome

For every opportunity that leads to an identifiable and finite scope for a proof of concept (POC), pilot, or project, you will need to activate a combination of the following enablers.

- Establish new metrics
  - How will you measure success?
- Add and integrate new datasets
  - Twitter, Facebook, location data
- Use new analytical tools and techniques
  - HADOOP, sentiment analysis, genetic algorithms, in-memory computing
- Document business process change
  - Map out as-is and to-be-determined processes and identify specific areas where new data sets and tools make an impact
Step 4: Synthesize your analysis to create a use case in the context of your business

The following are sample Big Data use cases, across the different business processes EKN evaluated. You can use this framework for any product segment or expected outcome.

<table>
<thead>
<tr>
<th>Business Process or Functional Area</th>
<th>Use Case</th>
<th>Expected Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning</td>
<td>Customer signal repository: A concept that is similar to a demand signal repository. There is a need to integrate all the various customer data - POS, syndicated data, social data- Facebook, Twitter, Pinterest, market survey data, media impressions - to create detailed customer profiles and track customer sentiments. The manufacturer can compare and contrast customer signals, sentiment and performance across their products and their competitors.</td>
<td>Quick information on market pulse/ feedback related to brand/product and overall market dynamics</td>
</tr>
<tr>
<td>Demand Forecasting</td>
<td>The ability to utilize more data leads to better forecasts. The ability to analyze all of your sales data and get results quickly helps provide more accurate forecasts and also the ability to respond more quickly to changes in customer demand. Quicker responses to demand signals aid CG companies to re-work their product, pricing and promotional strategies and prevent an out-of-stock or price based customer defection.</td>
<td>Increased forecast accuracy. Reduced stock outs</td>
</tr>
<tr>
<td>Customer Segmentation</td>
<td>The onset of the Great Recession led to an interesting issue for both retail and consumer goods companies. Their customer segments weren’t behaving the same way as they had traditionally done; hence the accuracy of the forecasting models was off more than usual. This was the result of a once in a lifetime macro-economic event, but it highlights the need to constantly track key macro-economic, consumer preference and spending trends and use all of those inputs to create dynamic customer segments that can help predict customer behavior. The consumer signal repository could be used for this.</td>
<td>Increased pricing and promotion effectiveness</td>
</tr>
<tr>
<td>Business Process or Functional Area</td>
<td>Use Case</td>
<td>Expected Outcome</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>------------------------------------------</td>
</tr>
<tr>
<td>Spend Management</td>
<td>Getting visibility into how much and what you are spending the trade budget on is the first step. Combining and analyzing the data from agreements, payment data on deductions, promotion effectiveness, and sell through data, and then mapping it to internal product categories will help provide visibility into the spend. This itself should open up opportunities in terms of reducing automatic deductions and spend reconciliation. Using this spend to measure actual sales performance by looking at impact data like sales, sell through, performance of competition products and a relative comparison across retailers will help drive optimization of this spend. Big Data helps by taking the system data and combining it with the vast unstructured data that lives mainly in excel sheets to provide meaningful insight.</td>
<td>Trade spend optimization</td>
</tr>
<tr>
<td>New Product Development</td>
<td>In order to stay responsive to changing customer preferences, it's important for a CG manufacturer to reduce the overall 'time-to-market' for a product. It is possible by decreasing the entire cycle – research, development, prototype testing, test launch, incorporating test launch feedback and launch. Big Data can help shrink each of these discrete steps. For instance, automated triggers on consumer trends combined with a demand forecast based on historical sales data can help reduce the time taken to decide on a new product idea.</td>
<td>Reduced 'time-to-market' in bringing a new product</td>
</tr>
</tbody>
</table>
EKN Big Data Roadmap
The EKN Big Data Roadmap is built to help manufacturers move up the Big Data maturity ladder by focusing on the key levers of Strategic Intent, Organization Readiness, Opportunity Qualification, Investment Appetite and State of Analytics.

This is not a one-size-fits-all recommendation, but is meant as a starting point for manufacturers that benchmark themselves as “Beginners” or “Tinkerers”.

**Sprint 1: Months 0 – 3**

**Focus:** Understand and baseline your preparedness

**Expected Outcome:**

**A. Baseline your data**

- How much data you currently have
- How is the data growing
  - Types of data: structured, unstructured, semi-structured
  - Domain areas
- At what rate is that data growing
- Document your data governance and privacy policy
- Check the variety of data possessed i.e. vendor managed inventory, trade fund management including deductions management, invoicing and payment processing, POS transaction data, order tracking and management, logistics trucking (truck fleet tracking), social media
  - How much do you have
  - Who owns it (for e.g. logistics partner, distributors, retailers, marketing/research agency, user)
  - What are the governance and privacy requirements

**B. Understand the landscape**

- What is your immediate competitive pool doing
- What are the top 5 CG manufacturers doing
- Create a list of use cases based on the above analysis

**C. Baseline your current analytics capabilities**

- How many resources do you currently have
- Which department are they currently in
Execution Model:

For this initial discovery and benchmarking phase, EKN recommends you rely more heavily on internal resources. There are many consultants who can help, however for this particular phase, EKN recommends engaging them only if available bandwidth and opportunity cost are significant barriers to forming a cross-functional internal team. This phase will help you get a stronger hold of your environment, and be better placed to direct and manage consultants in future phases.

Ideally, a lean, 3-member, cross-functional team from IT and Business, working part-time on this project, should drive this. If resourcing is a challenge at this stage, try to have at least a single dedicated and experienced resource that you can support with part-time analysts.

As established previously, Big Data success requires senior level buy-in from the get go. Ensure you have a senior (reports directly to CEO) executive sponsor identified during this stage.

Sprint 2: Months 3 – 6

**Focus:** Get buy-in and pick a few areas in which to do a proof of concept (POC)

A. Communicate and generate buy-in

- Publish your findings to key stakeholders
- Create a CXO note on Big Data
- Get your business partner involved
- Arrange a joint business-IT workshop
- Based on business buy-in, explore a small POC
- Create a working group on Big Data

B. Crystallize POC ideas

- Focus on these areas
- Promotional spends and allocation across products/media
- Pricing ladder across supply chain
- Inventory management
- Development of digital channel for promotions and sales
- Evaluate solution and service providers

C. Identify capability and training requirements

- Identify skills and capabilities required for analytics
- Create competence levels for analytics
Sprint 3: Months 6 – 9

A. Execute POC

- Finalize vendor partnerships
- Set clear measures for what a win is
- Execute the most promising POC and use cases
- Constantly communicate progress to business and IT Leadership
- Create a ROI measurement framework for the POC

B. Assess current capability levels and conduct executive training

- Conduct an assessment center on analytics for the current resources
- Benchmark all current resources on the competence scale
- Create a training plan on business analytics for senior executives
- Conduct executive training on business analytics for senior executives

Sprint 4: Months 9 – 12

A. Incorporate feedback and decide strategy

- Publish performance of POC to key stakeholders
- Organize a formal feedback session with stakeholders, partners and vendors
- Conduct a visioning session based on the experience and all the data collected
- Conduct a resource and training forecasting exercise
- Initiate stakeholder discussion on organization structure
- Take a call on whether any Big Data program is worth focusing on
- Detail a single pilot program that you would like to focus on
- Do formal budgeting for a Big Data program
- Initiate partner selection process

Execution Model:

EKN's recommendation on reliance on internal resources from Sprint 1 applies to Sprint 2 as well. Look at partnering with consultants more actively as you move towards defining the areas for a POC. For training and capability building, explore partnerships with niche firms or universities. For consulting and technology, a partner that is strong in the corresponding domain and has strong analytical capabilities would be a good fit. As you move to the POC and execution stage, start inviting and testing out vendors. While enterprise vendors seem easy to work with, EKN suggests taking a good look at some of the niche vendors. The Big Data Vendor Landscape on the EKN Portal is a good place to start.
What Next:

- Decision on go / no-go for a specific Big Data project
- If it is a go, start working on a comprehensive strategy
- Continue to execute on the pilot

The EKN Big Data Roadmap is intended as a broad framework using which manufacturers can develop a high level approach towards identifying and executing their first Big Data initiative. The Opportunity Identification Framework and Maturity Assessment Model are complementary to the roadmap, and are best used during the relevant steps of the roadmap.

Big Data is an organizational strategy focused on improved decision making through speedier, better integrated and more wholesome analysis of an increasing number of sources and a growing quantum of data previously considered out of bounds, cost prohibitive or impossible. To think about it as a technology project would be to limit its vision, scope and possibilities.
Manufacturer Honor Board:
Big Data case studies from across the globe
<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Category</th>
<th>What they are doing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nokia (Finland)</td>
<td>Volume of data</td>
<td>Big Data is now part of Nokia’s central nervous system. It has implemented a solution that aggregates data from all its business units and applications across the globe into a single version of the truth, allowing the company’s 60,000+ employees to access the data. Nokia analyzes the data to better understand how people interact with different applications around the world.</td>
</tr>
<tr>
<td>P&amp;G (USA)</td>
<td>Capability Building</td>
<td>Though P&amp;G has several initiatives such as CDSN (Consumer Driven Supply Network) that leverage the concept of Big Data, it finds recognition in EKN’s report for an often-overlooked dimension of Big Data adoption – resources. P&amp;G is quadrupling its staff of business analytics experts even as it reduces spending elsewhere; including a hefty 30% cut in annual IT spending. P&amp;G realizes that the latest hardware or software isn’t the secret sauce to Big Data adoption. Human judgment is. And, it is investing in building industry leading judgment capability so it can act quicker, bolder and with more clarity.</td>
</tr>
<tr>
<td>Domino’s Pizza (USA)</td>
<td>Variety of data</td>
<td>Beyond being in the Quick Service Restaurant industry, Domino’s is one of the largest dough manufacturers, producing and distributing dough to more than 5,000 stores in the US. Domino’s instituted a survey on their website, mined comments from consumers from social media and detected patterns in what customers liked or did not like in their recipes. They revamped their recipes, launched a promotional campaign and tracked it to being responsible for a 9% increase in sales the next year.</td>
</tr>
<tr>
<td>Nongfu Spring (China)</td>
<td>Time to decision</td>
<td>The largest bottled water company in China reduced the time taken to collect and produce reports on a large volume of POS data from its retail partners from two days to real time. For instance, one business process that took 24 hours to complete now takes 37 seconds.</td>
</tr>
</tbody>
</table>
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