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From Data to Decisions

DATA-DRIVEN DECISION MAKING IN PRACTICE

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Collecting and using the right data to support decision making

Here we will look at some practical real-life examples of organizations putting data-driven decision making – as outlined in CPA Canada’s Guideline, *From Data to Decisions: Five Steps to Data-Driven Decision Making* – into action.

Figure 1 provides an overview of the five-step process framework for implementing data-driven decision making.

The main aim of data-driven decision-making is to make sure that organizations collect the right data to support the important decisions they have to make, instead of measuring everything and ending up drowning in data while thirsting for insights.

MANAGEMENT ACCOUNTING GUIDELINE

CASE STUDIES

FIGURE 1: FIVE-STEP FRAMEWORK FOR MOVING FROM DATA TO DECISIONS

Step 1

Defining objectives and information needs. This step is about answering the questions, “What are our strategic aims?” and “Based on those aims, what do we need to know?” This vital first step ensures we clearly articulate the real information needs of your organization, and clarify who needs to know what, when and why.

Step 2

Collecting data. This stage centers on gathering and organizing the right data. The emphasis here is on finding meaningful and relevant data to meet the information needs identified in Step 1. Organizations need to either:

- assess whether the required data is already held somewhere in the organization
- identify the best way to collect the data

Step 3

Analyzing data. Once the right data has been collected, it must be turned into insights. To do this, the data must be analyzed to extract information.

Step 4

Presenting information. This step is about communicating the information extracted in Step 3. The focus here is on getting the right information, in the right format, to the right people, at the right time.

Step 5

Making data-driven decisions. This step concerns turning information into decisions, which means making sure the available information results in action. Successfully turning information into decisions requires a culture shift, from making decisions based on assumptions or gut instinct to making decisions that are firmly rooted in data-driven insights.

Hospitality industry

Service Hotel¹ is a small, family-owned hotel group that focuses on personalized service in the mid-range market. The hotel was collecting traditional performance data in terms of:

- Finance (e.g., net profit margin, profit per available room, turnover)
- Customer (e.g., complaints, customer loyalty, service perceptions)
- Operations (e.g., occupancy rate, energy and water usage per room, maintenance costs)
- Employees (e.g., staff turnover, employee satisfaction, staff training)

Almost all of this data was the company's own internal data, and little use was made of external data. What's more, even though the data was reported on regularly, few decisions were made based on the data. The aim was to create a culture of data-driven decision-making right across the business.

Step 1

Defining objectives and information needs

To start with, the leadership team went back to their strategy and formulated a set of high-level questions that needed answering. This gave them a framework for the data collection and analysis, and made sure that the data being collected was clearly linked to their key information needs and unanswered questions.

They identified about 15 strategic goals and across those came up with 22 key questions, including:

- To what extent are more satisfied customers more loyal customers?
- Which customers are most valuable to our business?
- To what extent do happier employees deliver a friendlier service?
- How can we better predict occupancy rates and optimize our pricing?

Step 2

Collecting data

The organization tackled these questions one after another, and checked how well the existing data was helping them to answer their key questions. In many cases, it meant introducing new data collection methods or supplementing existing internal data sets with external data.

For example, when it came to predicting occupancy rates and optimizing pricing, the hotel was relying on its own historic occupancy and pricing data. This was widened to include external data such as weather reports, scheduling information for local events, and competitor pricing information. Such data is commonly used in the hospitality industry to create a more accurate picture of demand throughout the year and understand the fair value for rooms.

¹ In this case, the name has been changed to protect the anonymity of the organization.

In terms of customer and employee satisfaction, the organization had enough data from their employee and customer satisfaction surveys to understand whether happier employees provide a better service. But the team realized the data collection could be simplified and collected more frequently. The annual survey was not really giving them the depth of data they needed, and only allowed them to perform the analysis once a year. As a consequence, they introduced a shorter and more frequent online employee satisfaction survey. Because the data was now sampled (e.g., 1/12 per month), the resources required to collect and analyze the data were not significantly higher. The company also ensured the data collection complied with data privacy laws and legal requirements.

The same was true for customer satisfaction and loyalty, but here they introduced completely new data collection methods. Instead of the long and expensive annual customer satisfaction survey, they switched to two simpler indicators: the net promoter score (NPS) and the online ratings from review sites. NPS is a measure that is based on a single question: “How likely are you to recommend us to a friend?” and rated on a 10-point scale. This indicator is now collected in monthly customer surveys that sample a proportion of recent guests. The second indicator is online customer reviews and ratings, such as TripAdvisor scores. Not only is this data freely available, it’s also very public, meaning potential customers are using this information to inform their decisions on where to book.

Step 3

Analyzing data

To ensure the data was properly analyzed, the team recruited a new analyst and trained two existing employees (one from finance and one from HR).

The employee satisfaction and customer satisfaction data were analyzed using correlation analysis to test the strength of the relationship. The NPS data was also tested against customer and finance data to determine the links. The organization discovered there were very strong correlations between customer satisfaction and organizational performance. They also found a correlation between employee satisfaction and service delivery – indicating that happier employees deliver a better customer service.

When it came to deep-diving into online customer feedback, the team used sentiment analysis and natural language processing tools to trawl through online customer reviews and extract actionable insights based on customer feedback. This was also correlated with internal finance data, which showed that positive online reviews translated into immediate increases in sales.

The team also used customer lifetime value analytics to identify which customers were most valuable to the business. This is an important metric for hotels to get to grips with because, to put it bluntly, not all guests are equal. Some will spend a fortune on dining, spa treatments and the like, while others will quietly check in and check out with barely an interaction. The ability to identify those customers who are likely to spend more over the lifetime of the relationship, allows an organization to tailor their sales and marketing accordingly.

In terms of predicting occupancy and optimizing pricing, the team used a machine learning algorithm to analyze large amounts of internal and external data to spot patterns. Not only does this give a much more detailed insight into the hotel's occupancy patterns, the system can also dynamically adjust pricing, in much the same way as Airbnb and Uber do.

Step 4

Presenting information

The organization realized existing management reports were not providing management with the information it needed. In the past, the set of key performance indicators (KPIs) was presented twice a year in data tables showing performance against target and comparing performance to the previous year.

This meant it was hard to really gain insights and make connections between the different data sets. It was also hard to spot trends and performance patterns over time.

Instead, a set of dashboards was introduced, with a one-page summary dashboard for each of the 22 key analytics questions, presented on a monthly basis. Instead of lists of measures, these new dashboards now followed the principles of a newspaper front page with a headline, visual, and high-level narrative. Each summary dashboard now includes a short headline outlining the current situation, a red-amber-green traffic light visual to show performance against target, a data chart, and a narrative comment to provide context.

Step 5

Making data-driven decisions

The management team now reviews the data regularly at weekly operational and monthly strategic meetings. Each meeting looks at five questions on a rotating schedule, with some time allotted to exceptional issues. The management team is making sure that if any presented data is not really used to make decisions, then the data collection will be stopped or the analysis will be replaced with something more useful. Decisions made so far include:

- A revised staff induction and training program based on the customer feedback.
- A new customer segmentation and marketing strategy (including online and social media).
- New package deals for high-value customers.
- Simple improvements to rooms based on online customer feedback, such as providing more bathroom storage in family rooms and rearranging the layout of rooms aimed at solo business travelers.

AI assistants and chatbots are coming to a hotel near you

Artificial intelligence is changing the way hotels interact with their guests. Take Connie, Hilton's new AI-powered robot concierge, as an example. Connie acts like a human concierge and analyses natural language on the fly to understand and respond to guests' queries on the spot.

There are also lots of other AI-enabled customer service solutions being deployed in the hospitality industry. Chat bots or AI-based virtual assistants are increasingly being used to enhance guest satisfaction by responding to simple questions and requests via direct messaging. So instead of having to call the front desk to ask for a late-night cheeseburger (or salad), you simply interact with the hotel's chat bot service on your phone.

These tools are giving hotels the ability to collect data on every customer interaction. On top of that, response times are instant and unwavering (chat bots do not get tired on the night shift), which is great for customer service. Staff can use their time more effectively. And the hotel benefits from a wealth of valuable data about its customers' habits and needs.

Google

Google's mission is to organize the world's information and make it universally accessible and useful. And in pursuing this mission, the company is very serious about using information to inform their decisions.

Founded by two engineers, Google is a company where data-driven insights are part of its DNA, and where Googlers (employees in Google) speak the language of data as part of their culture. In fact, Google aims to make all decisions based on data and analytics.

Step 1

Defining objectives and information needs

Data can provide much-needed answers, but only if you are clear about the questions you need to answer. Google aims to start with these questions and be very clear about the information it needs at the outset. As the company's former executive chairman, Eric Schmidt, has said, "We run the company by questions, not by answers."

Within its global HR function, Google has created a people analytics department that enables the organization to make data-driven people decisions. One question Google wanted to answer was, "Do managers actually matter?" This is a question Google had been wrestling with for years; at one point, the company actually got rid of all managers and made everyone an individual contributor. This did not really work, and managers were brought back in, but the suspicion lingered that managers perhaps were not that important.

So, Google had identified a critical people-related question that it wanted to answer: Do managers matter?

Step 2

Collecting data

To start with, the people analytics team looked at the data sources that already existed: performance reviews (top-down reviews of managers) and employee surveys (bottom-up reviews of managers). The team took this data and plotted it on a graph that revealed that managers were generally perceived as good. The problem was the data did not really show a lot of variation, so the team decided to split the data into the top and bottom quartiles.

Using regression analysis, the team was able to show a big difference between these two groups in terms of team productivity, employee happiness, and employee turnover. In other words, the teams with the better managers performed better, and employees were happier and more likely to stay.

This answered the original question – clearly, managers *did* matter – but it did not really give much in terms of actionable insights. So the team came up with a new question that needed answering: “What makes a good manager at Google?”

To answer this new question, the team introduced two new data collection methods. The first was a “Great Managers Award,” through which employees could nominate managers they felt were particularly good. As part of the nomination, employees had to provide examples of behaviors they felt supported their good assessment of managers. The second data set came from interviews with the managers in each of the two quartiles (bottom and top) to understand what they were doing or not doing (the managers did not know which quartile they were in.

Step 3

Analyzing data

Data from the manager interviews and the Great Manager Award nominations was coded using text analysis to extract the top eight behaviors of a high-scoring manager, as well as the top three reasons why managers were struggling in their role.

According to the findings, a high-scoring manager displayed the following eight characteristics:

- a good coach
- empowers the team, does not micromanage
- expresses interest / concern for team members’ success and personal wellbeing
- productive and results-oriented
- a good communicator – listens and shares information
- helps with career development
- has a clear vision / strategy for the team
- has important technical skills that help him / her to advise the team

Furthermore, the data showed that the top three factors that cause a manager to struggle are:

- has a tough transition (e.g., suddenly promoted, or hired from outside with little training)
- lacks a consistent philosophy / approach to performance management and career development
- spends too little time on managing and communicating

Step 4

Presenting information

Google used different ways of sharing these insights with the relevant managers. The top level team received a newspaper-style report with headlines, graphs and narratives. Senior and middle managers received a more action-orientated analysis, outlining the findings and expectations for them as a manager.

Step 5**Making data-driven decisions**

Just sharing the insights with managers was not enough, though; Google needed to act on what the data highlighted. Many concrete actions followed this analysis but some of the key ones include:

- Google started to measure people against these behaviors and introduced a new bi-annual feedback survey to help with this measurement.
- Google decided to continue with the Great Manager Award to further measure manager performance.
- Google revised the management training to support and promote the most desirable management behaviors.

Beyond Google, the ability to pinpoint and screen for desirable behaviors is becoming more prevalent in recruiting. In other words, when you know what makes a good manager (or a good customer service adviser, or a good sales person), you can hire people who fit that profile - based on solid data rather than gut instinct. Increasingly, this screening is becoming more and more automated thanks to AI-driven recruitment tools.

In fact, Google offers its own recruitment tool in the form of a recruiting app called Hire. The app has many features, such as being able to schedule interviews and communicate with candidates more easily, but one of the most exciting features is the ability to analyze resumes. Hire analyzes resumes and screens them for key terms that are relevant to the job description and person specification. This enables HR teams to screen applicants more quickly and find the best person for the job.

Looking at another key strategic priority for Google

Google has been fully carbon neutral since 2007, but that has not stopped the company striving for new ways to reduce the amount of energy used by its network of data centers. With data centers accounting for 2% of the world's global energy usage, largely because of the enormous amount of energy used to keep data centers cool, it's easy to see how this is a big priority for Google.

The challenge, though, lies in the complex nature of data center cooling equipment. There are billions of possible configurations of servers, chillers, cooling towers, heat exchangers and control systems – and working out which configuration will lead to the optimum level of energy efficiency is a task that is way beyond the human brain.

So, to answer the question, “How can we reduce the amount of energy used to cool our data centers?” Google turned to machine learning algorithms. These algorithms can spot patterns across various systems, see how they impact the cooling infrastructure and make decisions on the best configuration of equipment. A recent Google pilot indicates that machine learning has helped to deliver a 40% reduction in the overall amount of energy used to cool a data center.

Retail sector

Walmart, one of the world's largest retailers, may have been around for decades but it is certainly giving Silicon Valley tech companies a run for their money when it comes to data and innovation. In fact, Walmart relies on data to make its retail operations more efficient and provide a better shopping experience for customers. Here we look at just a few ways in which the retail giant successfully uses data to drive decision making.

Step 1

Defining objectives and information needs

One area in which Walmart has been particularly successful is in democratizing data, providing employees at all levels of the company with the data they need to make smarter decisions, improve sales and customer service, and uncover opportunities to drive performance.

The company has created what it calls the Data Café, a state-of-the-art, centralized analytics hub, where Walmart's people can pose their critical business questions and get the answers they need. The idea behind the Data Café is simple: the faster Walmart's people can access data and unlock insights, the faster they can make decisions and take appropriate action.

While democratizing data is a great idea in theory, it really needs to be done in a controlled, considered way to avoid employees drowning in information overload. That's why, at Walmart, analytics experts work closely with retail staff to drill into the company's massive data sets and extract the insights those employees need. It is basically Walmart's way of helping people identify their key analytics questions. Anyone can walk into the Data Café, sit down with a data scientist, and figure out the exact question they need an answer to.

Step 2

Collecting data

The Data Café pulls data from hundreds of sources, from both inside and outside the company. Internal data includes 200 billion rows of transactional data (incredibly, this represents just the past few weeks' worth of transactions), and external data includes weather data, social media data, gas prices, economic data and local events databases. In Walmart's view, anything within this vast array of data could hold the key to answering critical questions and solving business challenges.

In fact, the sheer volume of data that Walmart gathers on a routine basis means the company is effectively building the world's biggest private cloud, capable of processing 2.5 petabytes an hour. (To put that in perspective, all the content in academic research libraries across the entire USA adds up to an estimated 2 petabytes.)

But Walmart is also exploring innovative new ways of collecting relevant data, going beyond the typical transactional data. For example, the company has experimented with using facial recognition data to combat shoplifting and is considering expanding this to work out whether

shoppers in store are happy or frustrated when they are waiting in line. When high levels of frustration are detected, the system could alert managers to open up more checkouts.

Walmart has also filed a patent to introduce tags into products capable of gathering data on customer usage, monitoring expiration dates and even automatically ordering replacement products when needed. So, in theory, Walmart could tell when you are going to run out of washing powder and automatically add it to your shopping list for you. This technology would give Walmart incredible amounts of data on customer behavior, including when and how often they use Walmart's products.

Step 3

Analyzing data

At the Data Café, Walmart's more than 200 streams of internal and external data can be modeled, manipulated and visualized in a matter of seconds to come up with real-time solutions to business questions.

Thanks to this, the amount of time it takes to find answers and solve business questions has been cut from weeks to minutes; and this ability to analyze data and extract insights so quickly provides an important competitive advantage for the company.

Step 4

Presenting information

Walmart has very successfully brought frontline retail employees and analytics experts together to find the answers they need. So rather than circulating lengthy reports or expecting employees to sift through data in complex self-service dashboards, teams from across the company are invited to bring their problems to the Data Café's analytics experts, where they can be presented with a solution before their eyes, via touch screen "smart boards," within minutes.

As well as responding to questions and problems, the analytics hub can also deliver automated alerts when particular metrics fall below certain thresholds. In one example, during Halloween, analysts noticed in real time that a novelty cookie that had been selling really well in most stores was not selling at all in one store. The store was alerted and, after a quick investigation, it turned out that a simple stocking oversight had led to the cookies not being put on the shelves. The store's staff were able to rectify this straight away.

Step 5

Making data-driven decisions

Whether it's through teams bringing questions to the Data Café, or the system automatically flagging up when something doesn't look right, this rapid access to data has enabled people at all levels of the company to make better decisions, improve sales and drive performance. In short, thanks to the Data Café, data leads to action.

For instance, one of Walmart's grocery teams came to the Data Café for help figuring out why sales had suddenly declined in one particular product category. By drilling into the data, the analytics and grocery teams were quickly able to spot that a simple pricing miscalculation meant that products in that category were being listed at a higher price than they should have been. The miscalculation was fixed and sales for this particular category returned to normal.

Clearly, Walmart has extraordinary volumes of data to work with, far more than the average company. But one thing that any organization can learn from Walmart is the importance of being able to react to data quickly and make decisions based on what the data shows.

Key learnings

What makes organizations succeed in today's competitive and unpredictable world is the ability to learn and act faster than the competition. The framework outlined in this guideline is designed to help organizations do exactly that.



The tips and tools presented as part of the five-part model should enable organizations to become more data-driven in their decision-making and avoid the traps of making decisions based on gut instinct or dangerous half-truths.

We are on the verge of an exciting transformation in business. There is more data available than ever and we are constantly finding exciting new ways to extract never-before-seen insights from data. This is allowing businesses of all shapes and sizes, across all kinds of industries, to make better decisions, drive performance and boost their competitive position. By aligning data

with strategy, collecting the best available data, analyzing this data to extract valuable insights and communicating the information in a way that allows people to act on these insights, any organization can achieve better results.

The power of data is so great that, within a few years, we may no longer need to refer to “data-driven decision-making”: data will be at the core of all business decisions. It will become second nature. Organizations that can get ahead of the curve and implement this five-step framework for improved decision-making will have an even bigger competitive advantage in a data-driven world.

Resources

Also by Bernard Marr:

- *Artificial Intelligence In Practice: How 50 Companies Used AI and Machine Learning To Solve Problems, 2019, Wiley*
- *Big Data in Practice: How 45 Successful Companies Used Big Data Analytics to Deliver Extraordinary Results*
- *Big Data For Small Business For Dummies*
- *Big Data: Using Smart Big Data, Analytics and Metrics to Make Better Decisions and Improve Performance*
- *Data-Driven HR: How to Use Analytics and Metrics to Drive Performance*
- *Data Strategy: How to Profit From a World of Big Data, Analytics and the Internet of Things*
- *How to develop a data strategy: With handy template:*
www.bernardmarr.com/default.asp?contentID=1838
- *Key Business Analytics: The 60+ Tools Every Manager Needs to Turn Data Into Insights*
- *Key Performance Indicators For Dummies*
- *Key Performance Indicators: The 75 Measures Every Manager Needs to Know*

About the author

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Bernard Marr is an internationally bestselling author, popular keynote speaker, futurist, and strategic business and technology advisor to governments and companies. Through his organization Bernard Marr & Co., he helps companies improve their business performance, use data more intelligently and understand the implications of new technologies, such as AI and big data.

Bernard is a frequent contributor to the World Economic Forum, writes a regular column for Forbes and is the author of 15 books, including the international bestsellers *Data Strategy*, *Big Data in Practice* and *Key Business Analytics*. Bernard's books have been translated into over 20 languages and have earned accolades such as the CMI Management Book of the Year award, the Axiom book award and the WHSmith best business book award.

LinkedIn has ranked Bernard as one of the world's top five business influencers, and every day he actively engages his 1.5 million social media followers and shares content that reaches millions of readers.

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