DATA-GUIDED BUSINESS

A new approach to success

INTRODUCTION

Data-guided business: A new approach to success

For years, technology executives have been told that the future of their business rests on data. We've gone from management information systems through Big Data, analytics, machine learning and Artificial Intelligence. But many business leaders are weary of the promises and sceptical about investing in the next data miracle — with good reason: roughly 85% of big data projects are deemed failures[1].

So why do businesses continue to invest so heavily in trying to master their data? The answer is obvious: it's because knowledge is power. Those businesses that understand how to properly use their data — what we call data-guided businesses — can make better decisions faster than their competitors. They can identify and exploit new opportunities before the competition; they know how to prioritise investments; they automate the right decision-making processes and use human smarts where it matters most. Simply put, data-guided businesses outperform their peers.

Data-driven businesses are four times more likely to grow faster than shareholders' expectations.
FORRESTER RESEARCH

---

1   https://www.techrepublic.com/article/85-of-big-data-projects-fail-but-your-developers-can-help-yours-succeed/

What those successes show is that data failures aren't caused by the technology — when properly exploited, technology is the bedrock of the data-guided business. But success alone needs more than technology; it needs board-level understanding of the process, organisational alignment and often a shift in culture. Success is based on understanding the implications of continually using the knowledge you're able to glean from your operations.

The path to data mastery

In this report, we'll explore practical ways to think about your current data capabilities and help you to plot a path to becoming a data-guided business. We'll examine the technical consequences that flow from this approach to interrogating data. And we present a five-stage classification model for understanding where you — or parts of your business — are today.

Most businesses recognise some part of themselves within these levels. It's not a linear model from Level 0 travelling up through to being data guided and into continuous intelligence, but a progressive journey. This classification model will enable you to identify practical routes from where you are today towards becoming a fully data-guided business.

PART 1

WHY THE DATA-GUIDED APPROACH IS DIFFERENT

Free from the past

Since the dawning of the computer age, information has been the vital ingredient in managing businesses. Through Management Information Systems and Decision Support Systems to knowledge management and data warehouses, Big Data initiatives and Artificial Intelligence, the refrain has remained the same: data is the key to creating sustainable competitive advantage.

But past efforts to master data have often turned out to be technological dead ends. For instance, the data warehouses built in the 1990s and 2000s might still do a fine job producing their monthly reports today — but they're little use when it comes to analysing the torrent of real-time data from sources such as Twitter feeds.

And herein lies the data conundrum: business leaders want systems that continue to improve decision making long into the future without having to start from scratch. They want state-of-the-art analytics without ripping up and replacing their technology estate each time an analytics advance emerges.

It may sound like a pipe dream. But it doesn't have to be.

"The more companies characterised themselves as data-driven, the better they performed on objective measures of financial and operational results."

HARVARD BUSINESS REVIEW

Intelligence as a continuous improvement project

Becoming a data-guided business is about lean experimentation: finding out what works in particular use cases, and scaling from there.

It's about finding ways to integrate data from the multitude of sources available today — some of which, such as natural language, are totally new to your business — and being able to analyse data alongside the information that your business has been running on for years.

To achieve that goal, we'll explore some of the ways you can change your business — we'll look at "thinking cycles", "data and intelligence chasms" and "product lenses". But let's start by looking at a data maturity model.

PART 2

THE DATA MATURITY MODEL

Five levels of data mastery

LEVEL 0 *Disempowered - untapped value*
This level describes a business or department that doesn't take advantage of the data that's available to it. Systems are manual, or support systems are not used directly in decision making.

This might seem like an anachronism today — but many companies ignore the potential of the data that they have.

For instance, you may have people in the field that use their close customer relationships to brilliant effect when it comes to driving sales, but you lack a mechanism to capture customer feedback that could influence product development.

LEVEL 1 *Line of business support - data in silos*
Many businesses identify with this level. They've built or purchased line of business applications that facilitate some access to data that remains domain specific.

Think of a sales database or an inventory system. The business benefits of these systems working together are blindingly obvious. But today, most businesses have applications where the data remains in silos — where there's little extensibility or collaboration across products or domain areas. These might be your HR or document management systems — your data silos could be anywhere in your estate.

LEVEL 2 *Decision support - centralised data warehouse*

Businesses that find some or all of their business to be at Level 1 often seek a solution that pulls data together from disparate sources in order to form an aggregated view of the entire business. Central databases are often seen as the solution.

Such systems have been the backbone of businesses through the 1990s and early 2000s, and provide rich query and reporting facilities — typically under the banner of Online Analytical Processing (OLAP) and Online Transaction Processing (OLTP) systems.

But these systems rely on fixed data schema to produce their results, where the logic is pre-defined. For example, customer names might have to follow a fixed pattern (forename separated from surname by a comma, for example). Without that uniformity, the record was unusable — and so businesses were forced to transform and convert inbound data before they could get insights from it. And that's unsustainable when dealing with unstructured data sources such as Twitter feeds and the like.

A further restriction is the lack of choice in the type of analytics available. Today's analytical solutions are paired with the shape of the data at the source, and the choice of analytical models might vary depending on the problem that one needs to solve. Enterprise Data Warehouses remain a common sight today; however, over half of them remain poorly utilised or are seen as a bad investment due to the above factors.

LEVEL 3 *Precision accuracy - specific analytics and data at scale*

Having the data together in one place doesn't have to be one physical database cluster. That's an expensive option. Cloud storage has become increasingly common — especially as cloud providers have improved their data processing capabilities. The term 'data lake' is often used.

Having extensible, open cloud-based systems enables you to tailor your choice of analytics to the job at hand — so different models and approaches can be employed depending on your needs.

Customer Relationship Management systems can be replaced by recommendation engines that allow personalisation and therefore a closer relationship with consumers. Behaviour and discussion outside corporate systems within social media can be responded to and interacted with.

At this level, data is seen as valuable and crucial to the business in decision making, and strategists can explore new ways in which uses of data can help them make decisions.

LEVEL 4 *The data-enabled business - harvesting and using data as a differentiator*

Very much building on Level 3, data is generated from all systems within a business. Business monitoring becomes simplified and more responsive to changes in legislation for compliance purposes, as everything is already likely to be available.

The maturity of the decision support increases, and strategists experiment more with the predictive and prescriptive capabilities of analytics. New ideas are modelled before being road tested in lean experiments. At this level, businesses will find it possible to start introducing Artificial Intelligence and machine learning to automate routine decision making.

LEVEL 5 *The data-guided business - continuous intelligence*
For the data-guided business, data is central to all planning. All decisions are empirical because all data is available. Even where legacy systems have survived, they will have been adapted to emit valuable information.

Businesses at Level 4 have moved from information retrieval through intelligent insight into a realm of real-time decision making. Those that reach the next level — what we've termed a stage of 'continuous intelligence' — use machine learning and Artificial Intelligence to improve decision making that is continuously retrained or adapted to improve the quality of its insights.

This means new ideas and the required analytics can be added, without having to disrupt existing systems. It's not one product on one cloud. It's the choreographed dance of many products on potentially multiple clouds.

PART 3

CONTINUOUS INTELLIGENCE

Continuous Intelligence: start with Thinking Cycles

The value you get from your data will depend at which level you're currently operating. It is highly likely that a business that operates at Level 5 will make better use of information than one at Level 1. But more than that, these levels impact the speed at which your business can make changes to its technology estate, and how quickly new insights can be acted upon. The impact of this is obvious when considering the explosion of new Artificial Intelligence and machine learning technology.

As Artificial Intelligence technology matures, it's opening up new horizons for businesses — providing new insights into customer behaviour and market opportunities. The number and types of decisions that can be automated is increasing, freeing up workers to solve creative challenges.

As the titans of the technology industry have invested in Artificial Intelligence, we're seeing huge advances in natural language processing and image recognition. Where Apple's Siri may have initially been dismissed as a gimmick, we're now seeing voice-activated digital assistants being rolled out in customer-facing channels[1] — where consumers expect 24/7 service. For Amazon, image recognition software is the key to its groundbreaking cashierless convenience stores[2].

---

1   https://www.itproportal.com/features/how-voice-assisted-commerce-is-speaking-up-in-retail/
2   https://www.washingtonpost.com/gdpr-consent/?destination=%2fnews%2fbusiness%2fwp%2f2018%2f01%2f22%2finside-
    amazon-go-the-camera-filled-convenience-store-that-watches-you-back%2f%3f&utm_term=.c684236d2b53

These opportunities are open to every business — but you should expect only those at Level 5 to be ready to embrace it. Many businesses will have to rely on renting data sets to train their Artificial Intelligence systems or even use pre-trained algorithms. For many, differentiation still lies in very precise and deliberate use of data that is local to your business. Using rented data will give your business an advantage over those not using any, but will not provide insights specific to your business.

Those businesses at Level 5 operate in a state we've dubbed continuous intelligence. This is akin to dealing with information in the same way as a human mind: data is treated as stimuli, flowing into the brain. As the stimuli flood in, they're analysed, compared to what's already known ie. information from past experience or from other live sources. And critically, decision making is based on a feedback cycle.

This flow, from stimulus through insight into action, creates what we call a Thinking Cycle *(see Figure 1 on the next page)*. By implementing Thinking Cycles, you can move along the path towards continuous intelligence.
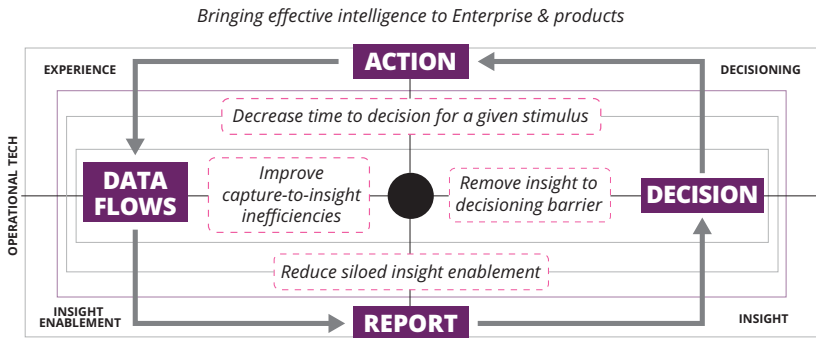
Figure1: Thinking Cycles

Let's explore these Thinking Cycles

An event occurs, such as a purchase completed in your digital marketplace or a request for information arriving. This event is a stimulus, regardless of whether it comes from an internal system or external device.

A Thinking Cycle needs to be constructed in order to decide how to handle the practicality of dealing with this stimulus from a technical perspective. This decision could be which analytical models or products to use for reporting, or which logic to use for future purchase recommendations, or simply how to track traffic.

Traditionally, at this point the data would be handed over to researchers who would use samples of the data and custom tailored platforms to derive insight. The key to continuous intelligence is to automate these Thinking Cycles as far as possible.

That may not be possible initially, but through constant optimisation and testing we can increase the proportion of automated cycles. And as we do so, the time from stimuli to decision is reduced.

The difference between this approach and simply making good use of a data lake is at the heart of continuous intelligence: your day-to-day strategy needs to focus on your suite of analysis methods, models and tools — and where you can reliably automate decision making. You need to know what you can build and what you should buy in the drive to optimise.

Crossing the chasms

So how do we know that we are charting to the right course? In a volatile market, knowing where and what to optimise can be hard to pin down. You find yourself continuously asking: Are we on the right path? Are we making the right bets? To understand how to adopt a continuous intelligence Thinking Cycle, we need to understand the intelligence journey.

We can think of this journey as one of crossing chasms: our data chasms and our insight chasms.

What is a data chasm? It is the struggle that businesses face with getting the they data need in formats they can use.

The insight chasm comes from increasing use of these technologies throughout the business to both support and drive decision making. Some companies keep data analysis tools local to a department — this isn't being fully data driven.
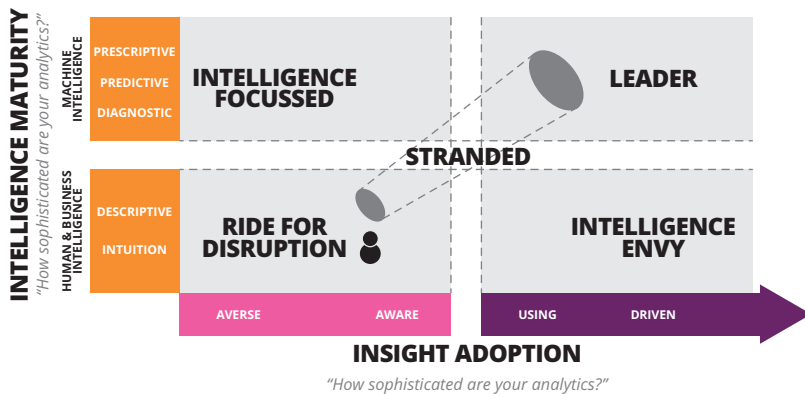
Continuous intelligence can only be achieved when the business uses approaches such as Thinking Cycles to achieve faster and better results. Crucially, this is a methodology and a modus operandi. One has to continuously work at each element of the cycle — that is the key to crossing the chasms.

Applying the Product Lens

Of course, data itself only provides the raw materials for insight. The context within which Thinking Cycles can be applied works best when it is applied within a lean PDCA (plan, do, check, act) cycle.

In this way, business strategy can be converted into a series of technology-driven experiments, all of which are founded on the use of data to guide decision making.

Figure 3 on the next page is an example of how this works in practice. Here, we see a business with its pre-selected suite of analytics technologies. Some data might be streamed, some batch fed, some in legacy warehouses that might still be used for a time. There are also frameworks that house their chosen chain of analytical models. Everything from this description sounds theoretical. How do we apply PDCA cycles? How do we take an idea and 'prove it?'

The key to this is to take a product-centric approach: What business outcomes do we want? Which type of questions do we need answers to? Can we represent this in terms of a consumer facing product?

Questions like this enable us to create a context within which to dive deeper into business-critical issues. In other words, we can think of the problem we need to solve as a thin slice through our estate of tools and technologies. We iterate over the data, models and results until we are satisfied that the hypothesis we started with has enough proof to enable us to decide what to do next.
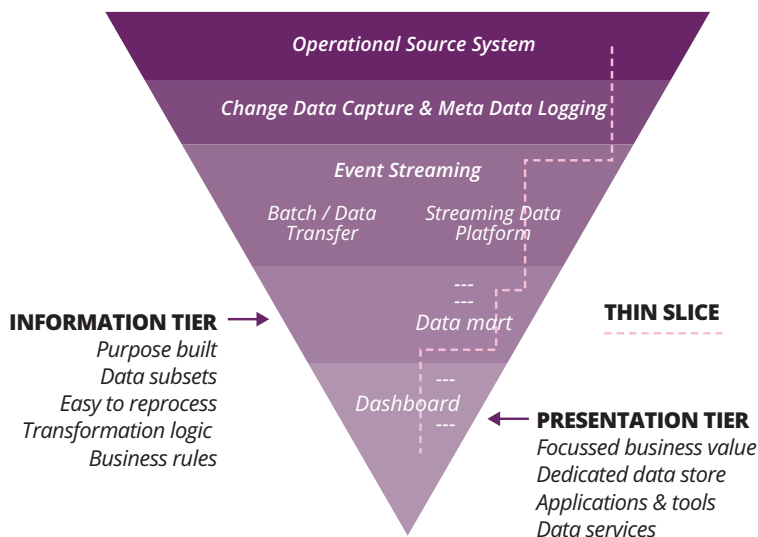
Figure 3: Applying the product lens

The inverted triangle diagram contains the following labels from top to bottom:

Operational Source System

Change Data Capture & Meta Data Logging

Event Streaming

Batch / Data Transfer   Streaming Data Platform

Data mart

Dashboard

INFORMATION TIER
Purpose built
Data subsets
Easy to reprocess
Transformation logic
Business rules

THIN SLICE

PRESENTATION TIER
Focussed business value
Dedicated data store
Applications & tools
Data services

A FINAL WORD

The building blocks for a data-guided business

For those wanting to start down the path to becoming a data-guided business, it's worth considering these building blocks:

1. When planning your approach, think in terms of lean experimentation: what can you prove and how will you prove it?

2. What data do you need? Do you have it today? If not, can we get it in the future?

3. Set up a multidisciplinary team to work through the problem from beginning to end

4. Be business-outcome oriented. Align investment around clear business outcomes, in short 'start-up' style investment cycles that dictate work priorities and success criteria

5. Optimise optimise optimise! Be supremely efficient. Aim to use operational intelligence to optimise human effort and machine intelligence to streamline processes and automate repetitive decision making

6. Be ruthlessly responsive. Respond to market changes at pace, enabling them to seize opportunities before competitors have even noticed

7. Make your lean cycles customer centric. They can create immersive customer experience across multiple channels through a deep understanding of the customers' needs

8. Become platform centric. Select, commission and decommission your technical tools as needed. Don't stay wedded to products. Stick with the lean experimentation

9. Use Agile, continuous delivery and DevOps to get ideas into production as quick as it's provable and safe to do.

Becoming a data-guided business will not just improve your decision making tomorrow, it will enable you to continually improve your decision making in the future.

ABOUT THE AUTHOR

DAVE ELLIMAN

Global Head of Technology, ThoughtWorks

[in]

Dave has approaching 35 years of professional technical experience in a wide variety of industries through consulting as well as specialisms in banking, finance, media and software methods tooling.

He is deeply immersed in technology and its impact on business and society - from development through architecture, analytics, infrastructure, emergent ideas and prototyping as well as large scale program management, implementation & planning. He is a Fellow of the Chartered Management Institute and thus has significant management experience of teams, programs, global initiatives, governance and steering.

He advises board C-suites and executive committees on how lean enterprise and technical strategic thinking can co-exist as well as advising on cloud migration, data analytics, security - from strategy to detail levels.

ThoughtWorks®

ThoughtWorks is a global software consultancy
that helps leading organisations capture
market opportunities with technology.

Get in touch with us at
uk-marketing-team@thoughtworks.com

thoughtworks.com