Chapter 1

What is Transformation?

A great deal has been written and said about transformation, and many organisations are undertaking or experiencing transformation in one form or another. 'We have a number of transformation programmes' and 'we are delivering an organisation wide transformation over the next five years' are phrases often heard, and even better is 'we are always transforming'. Indeed, a whole industry has been built around scoping, designing and delivering transformation programmes.

'All organizations must undergo transformation to remain relevant. They must rethink customer experience, embrace digital business, and redefine business models and processes to remain competitive'.

Elise Olding Gartner Research VP and Conference Chair 2016

So, what is transformation? Transformation is a marked change in form, nature or appearance. Organisations that wish to transform are seeking to make a marked change in what they do or how they do it and the motive to do this is normally to remain relevant. Transformation is seen as being essential to remain competitive; gain market share; acquire, retain or reduce customer churn; or deliver services at a reduced cost.

More dramatic transformation can be, and has been, delivered by a range of different 'enablers' over time. Economic and social historians are able to catalogue a series of enablers: the harnessing of water power, the printing press, steam power and mechanisation, to name a few. Major transformations in society have been associated with the great 'revolutions' – for example, the British agricultural revolution of the 17th to 19th centuries and the industrial revolution of the mid-19th century. The most recent enabler of 'transformation' is what is known as 'digital' and this has been termed the third industrial revolution.

Obviously, these kinds of revolutions have a major impact on society as a whole and not just companies. But any company that doesn't embrace the new paradigm ceases to exist, which is a pretty good reason to embrace transformation.

For an individual organisation to undergo transformation of any kind there are risks and costs that are perceived to be outweighed by the benefits of the end state after the transformation. There are some very well documented examples of organisations that have failed to take the opportunity to 'transform'.

> *'Kodak did not fail because it missed the digital age. It actually invented the first digital camera in 1975. However, instead of marketing the new technology, the company held back for fear of hurting its lucrative film business, even after digital products were reshaping the market'.*
>
> Avi Dan (January 2012) CMO Network

Kodak, for example, feared the risks of hurting its film business and failed to transform. Rather than focus on the possibilities of the digital age and embrace a new market it held fast to the past and completely missed its opportunity, becoming irrelevant.

Transformation is risky, painful, costly, requires change and needs great leadership. Therefore, transformation is often avoided in favour of smaller less useful exercises or does not deliver because the key elements aren't in place.

It is often easy for organisations to talk convincingly and even passionately about transformation without embracing it or delivering the transformation end state. There are many reasons why transformations

fail and these will be discussed later in the book. Do organisations really 'transform'? Is the end state so different from the start position that the change can be described as 'transformative'? We would suggest that in the majority of cases the answer is probably no. For companies to undergo transformation they must 'disrupt' the way they do things. The way they operate, their operating model, the products and services they offer, their relationship with their customers or regulators, or perhaps their relationship with their own employees, in most cases they want to protect these things rather than disrupt them.

To achieve transformation the new end state must be imagined. The vision must be more than built, described and understood, it must be brought to life in a compelling fashion that makes organisations want to go through the pain because it's worth it. They must be prepared to hold their course when the going gets tough. Lots of work and effort need to be put into understanding the new desired end state, to understand its feasibility or its shape.

During any kind of transformation data is a useful tool to help achieve the transformation; however, it may not be the central focus for the transformation. In simple terms, data is used to build the business case. So, from the very inception of the change data is used as an enabler. In fact, the insights in the data may actually reveal that change is required and be the transformation driver.

Take the example of a business reviewing its monthly sales, by looking in the rear-view mirror, using management reports. It may see that its monthly sales figures are down. Perhaps the projections for next month's sales are more positive and suggest that sales may pick up. How many organisations though will project out the sales figures, revenue and costs over an extended period, say five or ten years? The business may be making a profit even on declining sales, they may be propping up this profit by cutting costs (and perhaps quality), but how many companies

would look far enough into the future to see when the sales hit the x-axis? If an organisation uses the data to look that far ahead, they may realise that the data is showing them that they need to transform their operation.

Another example may be a water utility company in an arid region faced with growing demand for water and reduced supply from climate change. Projected out of long time scales, taking in many factors such as changing land use and standard of living, the data may provide insights showing that they need to transform their business to manage the supply–demand relationship in the future.

Once the new end state has been developed into a vision and a strategy, data continues to play a part throughout the transformation process. Key performance indicators (KPIs) will be created to measure the progress of the transformation. Data will drive these KPIs and be used to drive the decisions of the executive and transformation delivery team throughout the process.

Insights provided by the data are embedded into the decisions that drive or enable the new end state, whether these are customer, product, supply chain or operational insights.

But what really interests us in this book are the situations when data is at the heart of transformation end state. We will go on to talk about this in a bit more detail.

Why data and not digital?

Some organisations speak of 'digital transformation', in the main because we have been confused about what digital actually is. It is a frequently used term that is commonly mis-understood. We recently attended a

conference in London focused on transformation. A panel discussion in the programme was titled:

> 'What impact will digitisation have on driving customer acquisition and retention?'

However, the slide behind the panellists on stage had the title:

> 'What impact will digitalisation have on driving customer acquisition and retention?'

It's a one-word difference between the two questions, but it had the potential to transform the discussion. The starting question should have been what is the difference between 'digitisation' and 'digitalisation'? However, this was not addressed at all, in fact it was ignored.

So, let's explore these terms, because understanding them will help us understand the role and importance of data in driving these outcomes and therefore driving transformation.

There are three similar terms involved in 'digital' and it helps to understand these to unravel different types of enablers behind transformations. Often an organisation's desired transformation fails to deliver because there are misconceptions about the type of transformation that is being undertaken and what the true enabler is.

Digitisation

The first is digitisation. This is the conversion of analogue information into digital form. An example of this is the automation of existing manual- and paper-based processes. Another example is the conversion of a physical photograph into a digital image either by scanning or re-photographing the photograph using a digital camera. So, digitisation is perhaps the starting point on the 'digital' journey. There isn't any real change going on but

rather a repeat of a physical process, action or picture in the digital world. No change actually takes place on the artefact in question.

Digitalisation

The second is digitalisation. Unlike digitisation, digitalisation is the actual 'process' of the technologically induced change. It is the use of digital technologies to change a business model. This is what most people mean when they say 'digital' transformation. The use of new platforms to change operating models and drive new revenue or operational efficiencies. In this process you are still really focusing on the tools rather than taking a more holistic approach: it's like buying a car and not worrying about having a driving licence, insurance or wheels.

Digital

Finally, digital transformation is described as the total and overall societal effect of digitalization.

> *Digitization has enabled the process of digitalization, which resulted in stronger opportunities to transform and change existing business models. Digitization (the conversion), digitalization (the process) and the digital transformation (the effect) therefore accelerate and illuminate the already existing and ongoing horizontal and global processes of change in society.*
>
> Khan, Shahyan (16 September 2016) *Leadership in the Digital Age – a study on the effects of digitalization on top management leadership – quoted in Wikipedia*

So, returning to the conference we attended, was the question about the effects on customer acquisition and retention caused by moving from paper-based processes to digital processes, that was something that would have been discussed by a panel in 1990? Or was the question about the effects on customer acquisition and retention generated by use of digital platforms? Perhaps the question being put to the panellists was really about the effects on customer acquisition and retention caused by the use of data in a digital ecosystem.

We know what we think, and it was interesting that the panellists answered this from a technology point of view, rather than from a data-driven insight one. They discussed online experience and interaction and didn't talk about insights driven by data and personalisation created by data insights. They were all missing parts of the puzzle.

'Two-thirds of all business leaders believe that their companies must pick up the pace of digitalization to remain competitive.'

Susan Moore (30 October 2017) Embrace the Urgency of Digital Transformation, Gartner

At the Gartner Symposium/ITxpo 2017 on the Gold Coast, Australia, Val Sribar, Senior Vice President at Gartner said that

'Many businesses are stuck running digital projects. Some of them are very large, but digital projects are not a digital business. Executive leaders are frustrated with the slow pace of digital transformation, as they watch competitors capture new opportunities. CEOs are looking to CIOs to create new efficiencies, new value and new ways to engage constituents using

technology, quickly. Two-thirds of all business leaders believe that their companies must pick up the pace of digitalization to remain competitive. However, digital transformation is nearing a period of intense scrutiny. Four years into the digital shift, we find ourselves at the "peak of inflated expectations", and if the Gartner Hype Cycle teaches us anything, a trough is coming. Disillusionment always follows a period of extreme hype'.

The question must be asked; why isn't digital delivering the business outcomes, the transformation outcomes, that are expected? The answer is because the focus is on a 'technology digital transformation' (the platforms) rather than a 'data digital transformation' (the insight from the data). Technology in itself does not deliver value, it is how that technology is used. To coin a very old phrase, it's not what you have it's how you use it that matters.

Michele Caminos, managing vice president at Gartner, said 'the key to speeding through the trough of disillusionment and creating value at scale is all about people'.

Gartner has identified a looming talent gap for key technology skills in artificial intelligence (AI), digital security and the Internet of Things.

'But it's not just IT jobs', Caminos said. 'There's been a 60% growth in technology skills required for non-IT roles over the past four years. Digital business also requires a new set of attributes and skills that allow you to operate successfully in a continuously changing world, like more frequent complex decision making,

> *continuous problem solving, rapid pattern recognition and exception handling.'*
>
> Susan Moore (30 October 2017) 'Embracing the Urgency of Digital Transformation', *Smarter with Gartner*

These attributes are all about 'data' and not 'digital'. Digital transformation has been focussed on equipping an organisation with technology, digital platforms; or 'tooling up an organisation'. The data has often been overlooked. A new piece of technology in itself will not deliver transformation. The solution to a problem is not the tool (or the technology) it is how that tool is used. In other words, it is often the data being collected, stored and processed in a digital technology that delivers the insight and information to transform a business. It is the data that provides the actionable insights or the predictive analytics, it is not the technology.

Capital One has invested in developing and upskilling staff. Its talent programme focuses on key technology disciplines. In July 2018 M&S set up their data academy to train more than 1,000 staff in 'data skills', that is, machine learning and AI. This was billed as

> *'the biggest digital investment in staff to date as part of the ongoing efforts to ensure the business is fit for the future.'*
> *M&S is ramping up its efforts to become a digital-first business with the launch of a new skills initiative that is looking to create "the most data-literate leadership team in retail".'*
>
> Ellen Hammett (30 July 2018) *Marketing Weekly*

M&S probably had fit for purpose digital platforms but was missing the 'data piece'. It is interesting that M&S boss Steve Rowe said 'We need to change our digital behaviours, mindsets and our culture to make the business fit for the digital age'. In order to do this what he actually trained his staff in was data literacy.

We can already see that the fourth industrial revolution will be data driven. To recap on the revolutions: the first industrial revolution took place in the 18th and 19th centuries and involved innovations such as steam engines and mechanical production. The second industrial revolution was the end of the 19th century and just before World War I. It included advancements such as the telegraph and industrial sewing machines. The late 1970s saw the third industrial revolution, which is still ongoing and has been powered by the internet and smartphones.

The fourth industrial revolution will be a future of AI and robotics, and its lifeblood will be data, perhaps big data, but big data is just data on a large scale. According to Robert Dagge, big data is 'Industry 4.0' (4 November 2016, Global Manufacturing).

The Fourth Industrial Revolution Report delivered at Big Data London 2017 concluded that it is clear that the need to become data driven is a global imperative. Companies have to transform their cultures and data architectures to adapt to new technologies, new types of data and, importantly, to new governance and compliance regulations.

Before moving on in the discussion, the shift away from a technology driven digital transformation towards a data enabled transformation is emphasised by Klaus Schwab, chairperson of the World Economic Forum:

'In the future, talent, more than capital, will represent the critical factor of production'.

In the future it will be less about the capital to buy digital technology and more about the talent and skills to harness the power in the data. Data is so much more than the new oil, it is the sustainable endless energy source we have been looking for. But if this is the case then how can the energy in this powerful asset be unleashed?

The focus for successful transformations should be the data and not the technology. Let's start using the correct words and the outcomes may be more successful: you have a data driven transformation to create a 'data enabled organisation'.

Drivers

Data is literally everywhere now, it has such an impressive impact on our lives, improving the quality from birth right through to technology using data that improves quality of life towards the end. Using massive data sets has revolutionised everything from how we watch TV, to going on holiday, to traveling in taxis, but it has had more fundamental impacts as well. Tracking weather data, for example, means we can predict extreme weather events, prepare for them and potentially save lives. Just imagine the data sets that mean the elderly can stay in their homes for longer, giving them a better quality of life

That said, you don't need be trying to save the world to get better use of your data. If you are stuck in a hell of endless spreadsheets that never match it can feel pretty life changing when it eventually gets worked out. However, you have a few things to sort out first. There a number of hurdles an organisation faces when it comes to data:

1. You have multiple data sources but no control over them. You aren't even sure where some of the data is coming from or why you are using it. Different departments source data from external agencies without looking at the overall impact on or needs of the business.

2. You have different versions of data, so you think you are looking at the same thing but you are actually looking at competing data and no actual master data exists.
3. Your tools seem to work against you not for you. Poor infrastructure means you spend more time trying to fix your data or work around it rather than it enabling you.
4. There is a lack of trust in the data, which could be real or perceived (in most cases it's a blend of both).
5. You don't have clear roles and responsibilities around data.
6. There are problems with the scale of data, you literally have too much data that most people in your organisation don't understand the value of.
7. You have integration complexity so nothing matches or you have brought companies together but don't truly understand the complexity of integrating the data so you never get over the first barriers.
8. A lack of governance means that even trusted data can be manipulated without control and lose its integrity.
9. Unpredictability of data and availability: if you can't rely on it you find different ways of performing your role, which can take a lot longer.
10. There is a need to work at different levels with the data, down in the detail and up in the stratosphere. However, each level is building what it needs from scratch rather than looking at the same data through a different lens.

The drivers for data-enabled transformation for organisations have been covered to some extent already. However, it is worth drawing these out. Regular engagement with our fellow chief data officers (CDOs) and chief information officers (CIOs) from numerous organisations shows that

there are some common drivers pushing or drawing organisations into data-driven transformation. These drivers tend to come from one or more of the following five origins.

The first is competitive advantage. Many organisations understand that their data contains insights that will deliver a competitive advantage. An advantage that will allow them to serve their customers better and more efficiently. The advantage may be to increase customer acquisition, reduce customer turnover, increase customer lifecycle value or match products and services to customers at the right time in the right place. This driver includes not only those organisations seeking to transform to grow, but also those organisations looking to transform to survive. Think about the basic TV channels and what happened when Netflix came along.

The second is customer service and personalisation. Again, organisations may appreciate that the data they collect, or could collect, provides the raw material to give a better more personalised customer experience This experience may be delivered on a digital platform or in an analogue manner, again exposing that the transformation is less digitally enabled and more data enabled. This model is one that the personal insurance market works with really well.

Third is operational efficiency. Most organisations can improve operational efficiency through observations in their data. Data analysis or advanced analytics can provide actionable insights for informed decision making that could transform an organisation. Large transportation companies and utilities are starting to make the most of this area.

Fourth is regulatory pressures and requirements. Organisations, and this is the majority now, operate in a regulated environment, where they are required to provide regulatory data for compliance or assurance. Transformed operating models based on data and data insights can make the

regulatory environment more efficient, more assured and change the relationship with the regulators.

Perhaps the final driver arises because other forms of transformation have been attempted and not delivered the business outcomes that were required. This is far from unusual. A remarkable number of organisations in all sectors and verticals have undergone, often very costly, technology or digital transformations that have failed to deliver tangible business outcomes. In some extreme cases the 'transformation' has delivered a negative outcome. This may be as a result of starving other initiatives of capital investment, causing significant business disruption during the 'transformation' or simply by making the technology more complicated and less resilient than before.

If these are the basic economic or commercial drivers, others may be more abstract in nature. The driver may originate from a CEO, or senior executive, understanding the true potential that lies in the organisation's data. This visionary may be in a position to champion and instigate a data-driven transformation. This person may couch it in terms of preparing for the future or getting ahead of the competition, or even disrupting the business from within rather than being disrupted by external forces. However, this usually happens because that person is addressing one of the five above-mentioned areas.

Whatever the driver, organisations are beginning to realise that transformation is driven by more than technology and platforms. In some ways the data is the new oil analogy does work. The combustion engine is the platform, the technology, the petrol is the data. Put the data into technology and deliver the right spark (the people) and energy is released. The engine alone will not produce the energy. On its own the petrol can produce energy with the right spark, but this energy will be released in an uncontrolled and chaotic manner, an explosion. Put the data (the petrol) and the technology (the engine) together and controlled powerful energy

is released. Just remember that what you have with data is a much more powerful asset than oil, which you can reuse and reuse.

Data underpins so much of your organisation that to transform without paying attention to it means that you are building a house without clear foundations, it might work but do you really want to take that chance?

Who should drive?

Most business transformation for the past two decades has been driven by technology, and therefore by the chief technology officer (CTO) or CIO. Much transformation has been 'done to' the business so that staff don't feel part of it: and human beings are really good at digging their heels in when they feel like they don't have a say in what is happening to them.

It is interesting to note that often the project or programme delivery area sits within the information technology (IT) function. Technology is brought into the business to deliver transformation. Has this worked? If it has, why do so many technology-led transformations fail to meet the expectations of the business, or just fail? Also, if the past two decades of technology-driven transformation have been successful, why are so many businesses currently undertaking transformation programmes?

If we look at our experience in the 1980s (and we are not talking about the big hair and rather questionable dress sense, but IT and what it was like to be part of it), IT was literally the BIG thing and, as a result, lots was made of IT-driven organisations. If you didn't have an IT department full of enterprising people working on projects then your company was obviously going nowhere. Quite a few of the support people existed in basements answering questions on why people couldn't add another column on to a behemoth of a spreadsheet in scenarios that were just a bit too close to *The IT Crowd* for comfort.

IT departments trebled in size and almost became the reason companies existed – almost. What really happened is that the IT staff became comfortable in their role as company rock stars and began to forget what the purpose of the organisation was. Software and hardware were exciting and we started inventing reasons to buy things rather than focusing on what we were trying to achieve. Genuinely we tried to make sense of this situation and put in place roles like business analysts to form a translation service between the business side of the company and the technical services, while IT departments spawned more and more differing job titles to cope with evolving disciplines.

Companies became IT driven, forgetting what they were supposed to be focusing on and instead working on new shiny things. When as an industry we realised what was happening we tried harder to work with the business to get the best from the different parts (it really brings meaning to the sum of the parts being better than the individual parts). Since then the emphasis has been on creating IT-enabled companies, where IT creates a platform for the rest of the company to work on, enabling them to be better.

Despite the fact that looking after data properly is a relatively new discipline, the number of CDOs is steadily increasing and people are moving into data and information related roles while we pioneer and formalise what we do. If we aren't careful, we will fall into the trap that IT fell into in the 1980s – where we start to focus on all the things that we can do with data rather than the data strategy feeding the business strategy. Placing all of your focus on the data is fine if you are a data company, not so much if you are making socks.

We are really clear that the data professionals in a company are not the rock stars, rather they create the environment for others to be the rock stars. So, what we want is to turn a company into a data-enabled company where the focus is on the business strategy and how the data strategy underpins and helps to deliver it. It is the transformation that is data driven, the focus

of the transformation is the data and how a company looks after it so it is right that the transformation is data driven.

What about the transformation itself? For something to be transformation it has to have a marked change in form, nature or appearance – and the change word is very scary for companies. Something that creates a marked change is radical, which equates to mega frightening, but people are excited by the idea of using data (which they already have an abundance of – possibly a byproduct of hoarding too much but we deal with that in another chapter).

Who should drive the data-enabled transformations? The straightforward answer is the business. In simple terms the business units, whether that be operations, manufacturing, service delivery, engineering, investment, financial services, human resources (HR), procurement or finance. It is the business that should drive the transformation. In many instances the organisation needs more data, more insight to power, in order to enable or sustain the transformation. The company will often need data to answer the questions that they are facing. At the end of the day, the point of the change is to make the business work better, more efficient, more effective and so on, not to put in place a new shiny tool. Therefore, shouldn't the people who are committed and focused on that goal not be the ones to drive the change?

A question that often gets asked at conferences and round-table events is how data insights can be embedded or operationalised into the organisation. The answer we always give to this question is that the business should be involved from the very start. Work the company throughout the initiative or project so that the data insights become native to the organisation and are adopted from the very start of the project. To truly enable this, an agile approach to delivery lends itself to data-driven transformations, working closely with the business through a series of iterations to reach the end state. Data and data technologies tend to lend themselves to this style of working, moving towards the longer-term big solutions of the

business as usual elements increase. The more transactional something is, the less focus there should be on agile as you improve it. Not everything has to be completed in the same fashion.

The approach of the business driving the data-driven transformation is very different from the old school technology-driven project management where the organisation would provide the 'sponsor' of the project. This in itself gives it all away. The business is sponsoring a technology transformation but the sponsor rarely has a real hands-on role with the transformation – usually this is monthly check-ins and a lot can happen in a month. This should be reversed, with the business playing the major part in guiding the change. In a data-driven transformation, the data is supporting a business transformation to enable the company to get more from their data assets. You could almost see the CDO as the sponsor, forming the data and data insights into the business transformation.

The support functions must let the business lead and most importantly listen to them. Data enabling an organisation involves the data leaders listening to the needs and the questions that the business is asking.

The traditional triangle of people, processes and technology (see Figure 1.1) has been disrupted by data.

In our previous book *The Chief Data Officer's Playbook* we proposed a new relationship, as shown in Figure 1.2.

We now understand that data enabled businesses truly disrupts this model and the model of business transformation so that, as in Figure 1.3, data is the driver behind the transformation.

The relationship between the elements of transformation change once the business is the driver and the transformation is data enabled. As discussed previously, the business uses data and insights from data to help shape and make decisions about the future end state vision. This will

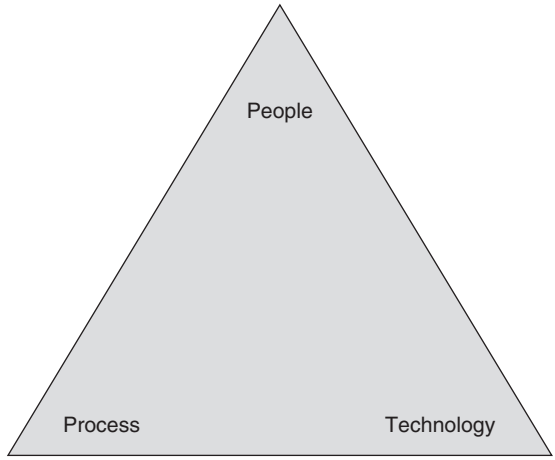

FIGURE 1.1 Business ecosystem triangle

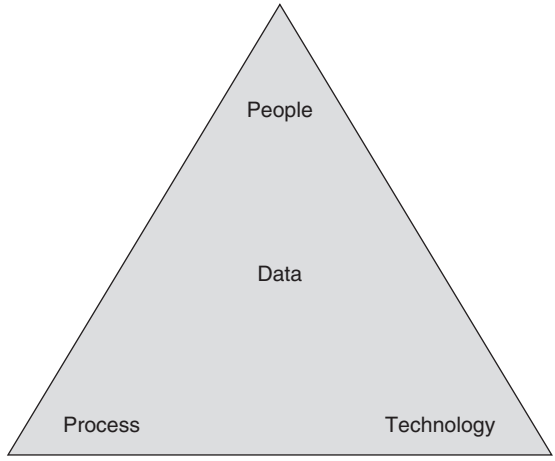

FIGURE 1.2 Business ecosystem triangle incorporating data

require much iterative working, testing the insights, tuning them and the models. Once a future end state vision has been developed the technology requirements, people requirements and process changes are defined and the business transformation is delivered to reach that end state vision.

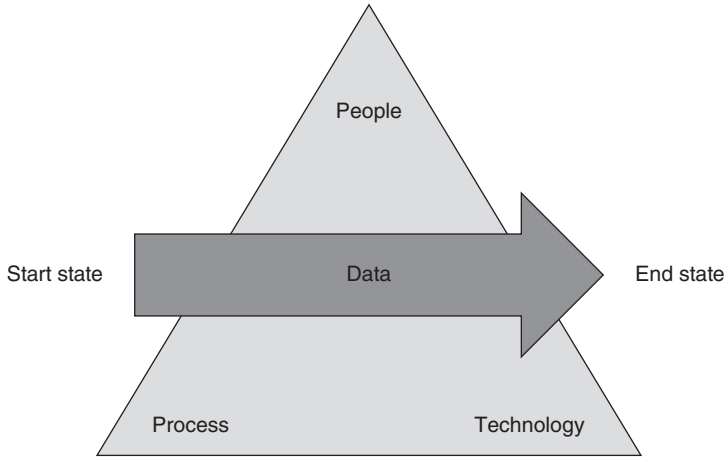

FIGURE 1.3 Business and data ecosystem transformation

At this point the data sustains the end state through data collection, data processing and data analytics. There will be a feedback loop of data that might run the transformation process again, which is possible if an agile approach has been adopted or will be constantly finetuned, providing continuous improvement to the transformed business. We will talk about this in much more detail in Chapter 2.

There may be some debate about whether the transformation function should sit independently outside of the business, outside of technology and outside of data. In an independent role the transformation may be able to pull together and coordinate multiple programmes that are elements of an overall transformation programme. This may be equally valid, especially in some larger and more complex organisations. However, the principle suggested at the start of the chapter remains constant. Transformation should not be driven by technology. Going back to first principles the technology itself tells us nothing: it does not provide insights or tell stories (we will come onto this in Chapter 2). It is the data in or being delivered from the technology that provides the insights and enables us to tell the stories that will transform businesses.

Data literacy – the art of data

Data literacy is vitally important to power data-driven business transformation. Data literacy is the ability to understand and communicate data as information, focusing on the competencies involved in working with the data. It has a wide spectrum, from the data scientist who can take data sets and create insight or information to the data citizen who can understand, appreciate and act on those insights because they understand where the insights come from. It's a bit like different dialects within the same language: two people can be talking the exact same language but find it difficult to understand each other if they come from different places. It helps that they are coming from the same base, that is, speaking the same language, but they should be careful of the nuances.

We think we can all accept that society today needs to be more 'data literate' to understand how their data is being used and abused. Data often has a value transaction associated with it. The data-literate citizen will understand this value. An individual provides their data to their social media platform and in return receives the utility of an enterprise grade communication and media platform: but how many people really understand what they are signing up for? In an increasingly data-driven world, one that is continually exploited by data, it becomes increasingly important that everyone – citizens, businesses and governments – becomes data literate. The shift to data-driven transformation has happened so quickly that huge parts of society have been left behind in their comprehension of the power of data. Since 2010 there is evidence that democracy has been increasingly disrupted by the use of data. Perhaps democracy is undergoing data-driven transformation? In this world everyone needs to be data literate.

It is essential for the data-enabled business, and therefore for data-driven business transformation, to have a high level of data literacy

across the organisation. We can refer back to the initiative taken by M&S in July 2018 to start the 'data skills' training of more than 1,000 staff to establish 'the most data-literate leadership team in retail'.

> *'Putting data in the hands of a few experts is a powerful thing, but making it available throughout the organisation can be a game-changer'.*
> Doug Bordonaro (1 March 2018) InfoWorld

Creating a data-literate organisation will enable data to be put into the hands of the whole organisation. Data literacy will allow the democratisation of data across an organisation, which can then power transformation. In simple terms think about the power of every single member of a company all pushing the company in exactly the same fashion – don't underestimate the power of the crowd. As you can see from the data-literacy spectrum in Figure 1.4 there is no one type of person who will make your organisation data enabled. Rather, as well as your data specialist, you will need to harness a range of talent from you data citizens to your data-aware people who have the lightest touch points with your data.

An organisation that does not have a data-literate work force will meet challenges going forward, and will struggle with transformation. The data literacy has to be throughout the organisation from the highest levels, for

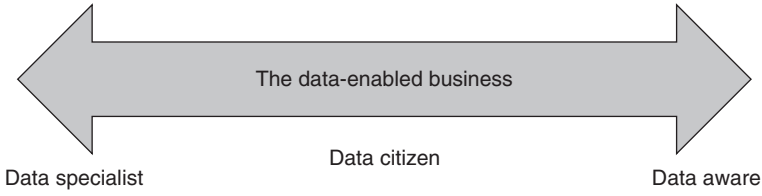

FIGURE 1.4 The data literacy spectrum

example the board and the executive team through management to the shop floor and operational levels. No one is exempt from improving their data literacy.

We often refer to the DIKW pyramid: data, information, knowledge and wisdom (see Figure 1.5).

To help understand the context of data literacy and where this sits within an organisation we have refined the DIKW pyramid to become the data-enabling pyramid, which we think makes it clearer from an organisation's point of view (see Figure 1.6).

Data literacy sits across the top end of the data layer through what was the information layer and into the lower parts of the knowledge layer. We have changed the name of the information partly to disentangle this from IT, where it causes confusions with 'information security and information management'. This layer is better described by the three 'Cs': data that has been collated, curated and contextualised to provide insight or information for the business. The three Cs (or as we lovingly call it C^3) are

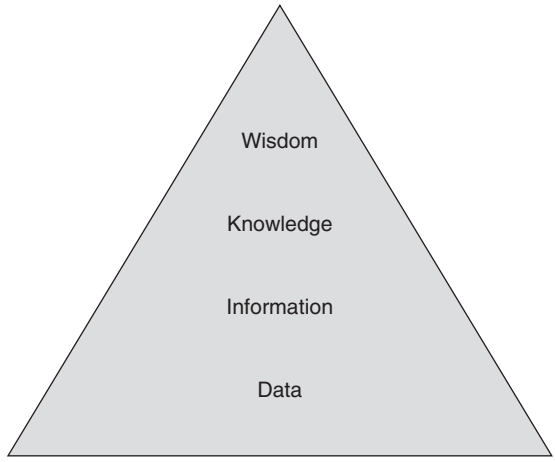

FIGURE 1.5 DIKW pyramid

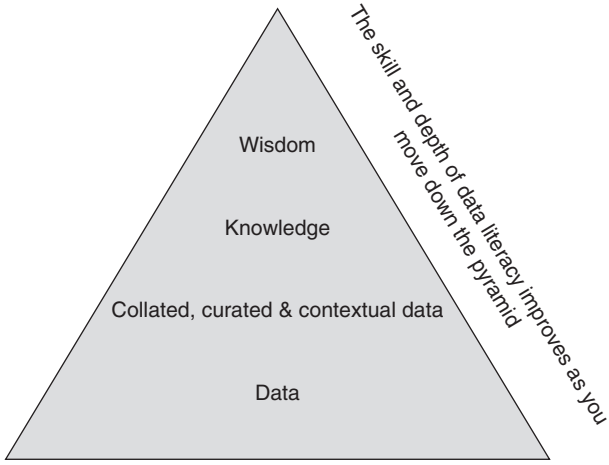

FIGURE 1.6 Data-enabling pyramid

performed by the 'data professionals'; the data governance department, engineers, architects and scientists. It helps to understand the layers in a bit more detail.

Layer 1: data

This is raw data, unprocessed data perhaps in a very granular form, with a lot of 'noise'. This is data that is sitting very close or in the operational technology (OT) function. It may have been extracted but even so it probably remains in a very raw, or even native, form. To gain any insight from this type of data is a very manual process and likely requires a great deal of domain knowledge and experience. It literally will be found by looking at the data, searching through the numbers – needle in a haystack approach.

Layer 2: C^3

In this layer the data is managed – collated, curated and contextualised – not by data architects but by 'data wranglers' and is brought into a form

that makes it of use to the business and data scientists. In this layer the data is processed to be fit for the purpose of enabling knowledge.

Layer 3: knowledge

The knowledge layer is where subject matter experts, those with domain knowledge, use the C^3 data to create the knowledge and the insight to drive the business.

Layer 4: wisdom

This is the furthest point from the raw data where the insights are being used to create a body of wisdom to run the business.

The need for data literacy sits across all four layers, but the depth and skill in data literacy decreases as one progresses up the pyramid. Often an organisation needs the CDO to tell the story here because they have the skills and knowledge across the whole pyramid.

Alongside all of this your data team provides the agility and interaction to help the flow across the layers – remember this is not a linear process, you move fluidly and by jumping around the pyramid.

To put it in really simple terms:

Data is knowing there is a red light.

Information is knowing that the red light sits above amber and green lights, which are not on.

Knowledge is knowing that that configuration is a traffic light.

Wisdom is knowing that you are heading for it and that you have to stop.

Data literacy

What is data literacy? Because of the wide range that it needs to span across the pyramid it might be hard to define in an all-encompassing sentence. At the data professional end of the spectrum data literacy is more about data skills. These skills would include data modelling, data engineering, the ability to extract, transform and load data, to manage and govern data. These are skills involved with master data management and meta data; skills required to build data catalogues, data dictionaries and data lineages; the ability and skills to create data visualisations, automated dashboards and reports; data scientist code skills of R and Python, statistical skills and building algorithms. These are true data professional skills that would not be expected at the business end of the data literacy spectrum. At the other end of the spectrum the data aware would be first to understand that these data professional skills and processes exist and how they are important. Then more specifically to be able to understand the data and collated information and draw insight from that rather than drawing exclusively upon 'gut feeling' or 'experience' to make decisions.

Whatever the level of skill required to be data literate, an important element of data literacy is the ability to tell a story from the data. This is the most powerful business skill. Technology platforms do not provide any insight, equally raw data or processed data do not tell a story. The story is drawn out by a subject matter expert who is data literate. Even machine learning and AI require a subject matter expert who is data literate, or a data scientist who is business literate, to draw out and tell the story.

Whatever sits in the detail of data literacy at any point in the pyramid, the most important feature of data literacy that must be adopted by any organisation wishing to adopt a data enabled transformation is a 'data culture'. An organisation has to build and adopt a data culture. This means valuing the data within the organisation, managing, owning, sharing and

seeking to exploit the data. A well-developed data culture will power a data-driven transformation.

> *'Achieving data literacy has several components. Tools and technology are part of it, but employees must also learn to think critically about data, so they can understand when it's useful and when it's not. And perhaps most importantly, data literacy requires a culture in which data is valued by all as a primary vehicle for decision making.'*
>
> Doug Bordonaro (1 March 2018) InfoWorld

Bordonaro goes on to suggest that there are four enablers for data literacy:

1. Widespread and easy access to data. Importantly this must be access to data that is governed and trusted.
2. Leadership onboarding a data culture.
3. A platform for sharing data, most importantly trusted, governed and consistent data.
4. Critical thinking.

Because data literacy has such a huge span from very specific data skills, to culture and storytelling, the term data literacy might not be the correct term. The range of skills and knowledge required may be better described as the 'art of data'. The best artists have the technical skills to create artworks, but the citizen is equipped with enough understanding to appreciate and value the art (though they may not necessarily like the art) and can tell the story in it. If a picture saves a thousand words, data could save millions of words. Within the art of data there may be many different disciplines: data sciences, data management and data visualisation, to

name a few. The reason we call it the art of data is because of the overall level of creativity needed to solve the problem.

How does an organisation establish and sustain a data culture? In our last book we emphasised the importance of establishing the role of the CDO to deliver this outcome. This is less about putting a person in place but more about having a central focus to make sure that the data is treated like the asset it is at board level. An organisation that realises that it requires a CDO is an organisation that is stepping towards a data culture. Appointing a senior individual to be responsible and accountable for data, an essential asset to the business, is a clear signal both internally and externally that the company values its data and is building a data culture. In that book we go on to suggest that one of the primary tasks and responsibilities facing a CDO is building the data culture.

The leader of data literacy is the CDO. The chief finance officer (CFO) looks after the asset that is money, creates a culture where the business values that money and looks after it, and is able to tell the story from the P&L or budget forecast: the CDO has a similar role with data.

Data triangles

For an organisation to undergo data-driven business transformation it must understand its own data ecosystem. In Chapter 2 we discuss the data maturity model, why it is important and how to conduct a maturity assessment. Much of that process will reveal the data ecosystem within in an organisation. However, before we get into that level of detail it is worthwhile spending a little time understanding what a data ecosystem looks like within an organisation.

All companies, whether they know it or not, and whether they accept it or not, have a data ecosystem. The triangle is made up of people, technology, processes and, not very surprisingly, data. Each of these can be

looked at in turn to understand its place and role in the data ecosystem. Fully understanding the data triangle will enable an organisation to carry out a data maturity assessment and embrace the potential of data-driven business transformation. It really helps to know where you are so that you know where you are starting from.

The technology in the data triangle may be quite complex, but we don't need to concern ourselves at this point with OT beyond understanding that unless data is gathered in a managed and governed manner, with an eye to the quality and end use of the data for business insight and decision making, then it is of little use to the data triangle. In this respect data validation and verification at the point of entry, or gathering, is vital to the health of the data ecosystem. The next step is to understand the flow or the communication of this data into safe storage. If the flow is not secure then the data may lose its integrity or volume and again will adversely affect the health of the triangle. Understanding these two fundamental elements of the technology in the triangle is therefore vitally important. Insight and subsequent decision making cannot be based on poor quality data, or even worse on data where the quality of the data is not known or understood.

The next step in the technology part of the data triangle is data storage. Where and how is the data being stored? Is it safe and secure? Is it stored in a place and manner that makes it accessible to the business? Referring back to Bordonaro, data must be easily accessible to the business. Understanding how data is made accessible to the data triangle is essential. We have heard of situations where organisations are dependent upon outsourced third parties to provide data sets that imposes time and cost constraints upon easy access. This situation makes data-driven business transformation very difficult.

The next component in the technology element of the triangle is the tools for extracting data for use within the business – the E in ETL (extraction, transformation and load). Are the extraction tools fit for

purpose? Is it possible to extract the right data at the right time? If not then the power for data-driven transformation is diminished. At this point it may be worth mentioning that the data ecosystem may have a separation between the OT and the data and analytics technology. The extraction tools might be pulling data out of the OT to load into a data technology layer. Anyway, once the data is extracted what tools are available for data transformation and are these fit for the purpose of driving transformation of the business? We have all come across instances and businesses where the predominant, if not favoured, tools for data transformation are XLS and Microsoft Access. Often these tools are used by the business in the absence of any alternative or proper tooling. The use of these tools tends to lead to ungoverned data sets being use for analysis and business decision making, they may even be unsupported by the IT team. If data transformation in the current business state is undertaken in XLS or Access then business transformation driven by data may be very difficult.

It is important to understand the location of the technology element of the data triangle, is it on the premises or cloud based, or a hybrid of the two? Finally, what documentation exists around the technology element of the data triangle? Is there an architecture to the data in the OT and a mapped data lineage across the OT and IT applications and into reporting and analytics?

Moving onto the purer data element of the ecosystem: is the data governed, are its quality and standards understood, is it owned and managed, and if it is a yes to all of these who in the organisation does these things? Is there an information asset register? Within the data element what is the matrix of tools, platforms and coding languages being used to develop and deliver data products into the business? Are third parties being used at this stage in the ecosystem for data analytics? Part of the data ecosystem is made up of the many processes that are used to develop and deliver the data outputs and analytics and the layers of assurance and governance around these processes.

The people are a vital part of the data triangle. Who are the players in the data ecosystem, what skills do they have, where do they sit within the business? Who do they report to by task, line management and profession? Are the players set up in such a way within the triangle that their activity and data become siloed and separate?

Finally, within the data ecosystem is the business: what data and insight do they need and what are they getting? Where in the business is the data and insights being used and by who, what level of skill and data literacy do they have? What is the level of the data culture within the business? See Figure 1.7.

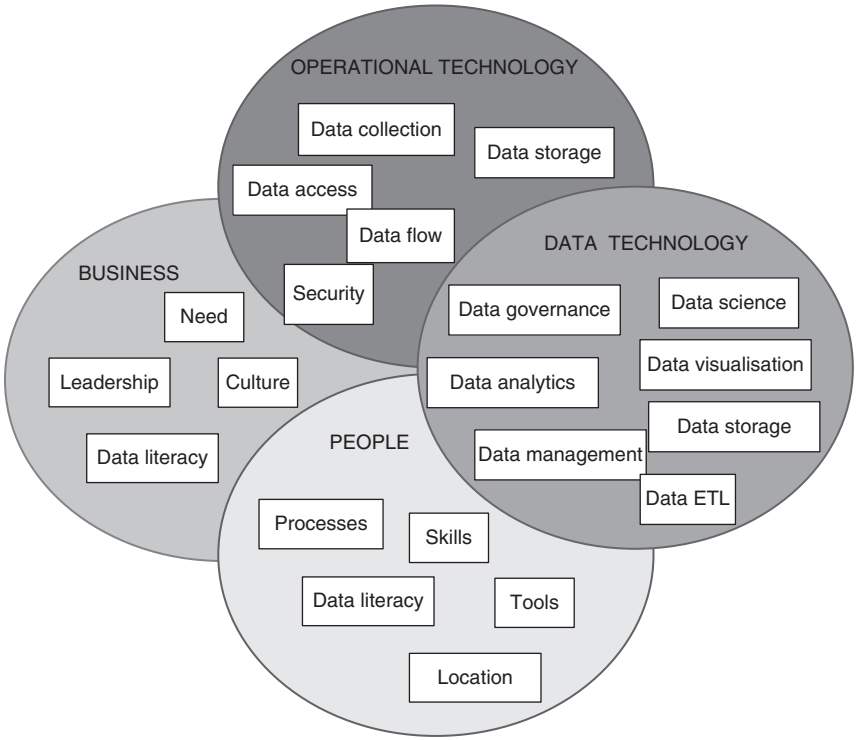

FIGURE 1.7 The data ecosystem

We call it the data ecosystem because each part interacts and the whole is diminished without any single piece. There exists a complex relationship within it, which when working together forms a whole where in some cases people don't even acknowledge the parts anymore and just see the whole enterprise. Not being able to see the wood for the trees is a great analogy here. What we are going to help you with is seeing the trees for a better wood.

Change adoption

Any business transformation, to be effective and deliver the end state, will require the transformation to be adopted. In practice transformation may be a series of smaller changes that collectively deliver the transformation. What's important is that they are all heading in the same direction, each of these individual changes need to be adopted.

The initial step to ensure transformation is to get 'your head right' at the start of the whole transformation process. This requires complete business buy-in for the transformation, the most senior sponsorship is imperative. Engage the organisation and prepare them for change. There are many books written on delivering 'transformation' and we don't wish to repeat those here. Suffice to say that to ensure a data-driven business transformation data should be placed close to the heart of this planning and strategy. The business must be involved in the transformation and lead it, rather than have it done to them.

The second step for successful adoption is to truly understand the differences between digital, technology and data transformation. Unless this is clearly understood at the beginning, and the inter-dependencies between these mapped and appreciated, adoption will fail. In fact, the transformation process will probably have failed even before it reaches an adoption phase.

The third stage is understanding the data ecosystem. How does it all fit together? This leads onto a data maturity assessment, which is discussed in Chapter 2. What these first three steps tell us is that proper preparation and engagement will increase the chances of adoption of the end state.

Part of the preparation leading into action is creating the right team to design, drive and deliver the transformation. This has to be a true blend of business, domain experts, technology and data. We would also include 'visionaries' in this broad blend of skills. Visionaries are people who can imagine the end state and can articulate and communicate this vision. They are as important as the technical unicorns. Adoption of the transformation will require changes to culture, changes to corporate vision, changing and persuading self-interest groups. It is the visionaries who can lead this. The visionaries may be the founders of a start-up, people who can imagine innovation and disruption, who can describe the future vision to investors and get them to invest. The visionaries may treat the stakeholder groups like investors or early adopters and sell them the vision.

Within each of these broad groups required in the integrated team there will be a need for a range of specialist skills. In the data group that may include data engineers, architects, analysts and data scientists.

To achieve adoption there has to be a proper approach to change. In simple terms, it has to be accepted that transformation will bring change. We must expect it to come up against protests of 'but we have always done it like this' – a phrase which is guaranteed to drive any rational change agent crazy.

Some thought should be given to the nature of the transformation to be delivered to improve the success of the adoption. In reality transformation comes in different flavours. There is innovation transformation, which will deliver an end state that is the same business model as the start state but provides new ways of doing the same things. This describes the vast majority of change transformations. This flavour of transformation is

less difficult for an organisation to adopt. Disruptive transformation will change the business model, possibly even change the revenue streams and is far harder to gain adoption of. Nokia, for example, started off selling rubber boots and Shell originally used to import and sell shells (yes really). This type of transformation may be delivered as a spin off from the main part of the business. A good example is Vodafone (the company that won the licence to build Britain's first cellular telephone network), which was a spin off from Racal, a radar and electronics company founded in the 1950s.

This raises the question of whether you build the new alongside the old. Or do you consider an organisational wide roll out overnight on D-day. Perhaps the transformation is delivered as a patchwork across the organisation, going at varying paces in different parts of the business but eventually ending up with the whole quilt once the whole patchwork has been created. This is a question that needs to be bottomed out as part of the preparation.

The organisations that best adopt transformation are those that start the process expecting things to be different at the end of the process. They may not fully understand the exact shape of things to come but they are prepared to trust the process.

Transformation blockers

One of the biggest blockers to transformation is the failure of adoption, in some cases the fear of the failure of adoption is the drawback, and that is why we have dedicated the previous section to this. Apart from the failure of adoption we identify seven other blockers to transformation:

1. Not having a clear vision of end state.
2. Lack of adequate funding.
3. The wrong people.

4. The wrong skills.
5. No culture of transformation or no data culture.
6. Transformation is too hard for the organisation.
7. Disruption elsewhere: internal or external.

Not having a clear vision of the end state

If the end state vision is ambiguous or unclearly defined or understood, there will be faults and cracks in the preparatory stages and it will be all too easy for naysayers to block the transformation. A lack of clarity, or a failure to communicate the visions clearly, will be a constant blocker throughout the transformation process: every snag will turn from being a mole hill into a full-blown mountain. The vision is the guiding star: if the star is not clear and bright then blockers will appear from the shadows. Don't forget that narrating the data-driven transformation may be difficult, and requires specialist skills and experience.

Lack of adequate funding

A lack of proper funding will blow a hole in any change or transformation. It isn't necessarily a lack of funding in the case of a data-driven transformation that is important, it is the lack of appropriate funding. Data-driven transformation will take the business, and the procurement team, into new territory around licencing and procuring software and platforms. Also, if the data-driven transformation is being delivered as a series of agile iterative processes, perhaps part of a larger patchwork of adoption, there will be moments of discovery and pivots that may not fit rigid funding cycles and models.

The wrong people

All transformation is based on people, technology and processes (and data) as discussed earlier. It should therefore not be surprising to include

people in the section on blockers. We deliberately haven't covered technology in the blockers, we will cover that in Chapter 8. Calling out people as a blocker – as opposed to skills, which comes next – is having people who are engaged, leaning into the transformation, 'change villains' or people who engage in 'change containment' are the wrong people. If they aren't with you then they are against you. The integrated transformation team must have the right people, people who can embrace change, understand change, understand data and communicate the end state with passion and vision. In a wider context the organisation that is transforming needs the right people who will adopt the transformation and engage with it.

The wrong skills

This again has two layers. The integrated transformation team needs the right mix of skills and experience. A data-driven business transformation will need people with data skills that may well be new to the organisation. So, the business will need to recruit the right skills, that is, the right people with the right skills. Knowing which skills to obtain will require specialist leadership.

The second layer is in the wider organisation. If a data-driven business transformation is to be delivered then it is very likely that the business will need upskilling in terms of data skills. This brings us back to the M&S example and data literacy.

There may also be a lack of IT skills: if the data-driven transformation is bringing in new thinking, new approaches and new technologies then other parts of the integrated team need to step up with the right skills. A simple example is the organisation that has run using on-site data centres and has an internal IT team or third party supplier team that is built and equipped to support the one location. A problem may arise with a lack of skill, experience and capability if the data-driven transformation is building an end state based on cloud platforms and software as a service.

No culture of transformation or no data culture

Lack of a culture for transformation and lack of a data culture will rapidly become blockers to successful data-driven transformation. Both of these may seem very obvious, but they are quite subtle. We have been involved with organisations that have 'talked' a great 'transformation plan' and spent time and resources on developing the plan, and even started to deliver it, but because the organisation is not set up, either through lack of leadership or middle tier resistance, the transformation plan has faded away and been quietly forgotten. How many times have we seen branded mouse mats, mugs or other items knocking about an organisation as an uneasy reminder of a long-forgotten transformation plan that was going to change the world? Some organisations become serial offenders in this respect, and often have a complete lack of corporate self-awareness or recollection at senior levels. The memory persists at lower levels in the organisation, embodied in the phrase 'oh we've tried this before and it didn't work'.

Transformation is too hard for the organisation

This is a difficult one to overcome and is driven by a couple of potential forces. First, the organisation is so busy surviving that there isn't any time or resources for transformation. The second is that they don't think that 'data' applies to them. This means getting their heads around, or even seeing the opportunities in, the data for them is too hard, a jump too far.

Disruption elsewhere: internal or external

The final blocker is disruption, which can be either external or internal. These can both be addressed in the same way. A transformation programme may be threatened by both external and internal disrupting forces that may make the transformation vision undesirable, outdated or

not appropriate. There are literally some things that you just can't prepare for (usually they are a set of events that result in a swiss cheese type example of the perfect storm rather than one individual event: you tend to be able to prepare for one event, it's the cumulation that can surprise you). These are the hardest blockers to prepare for, by their very nature they are disruptors.

We also need to take a moment to talk about two very different types of characters that you will encounter along your data-driven transformation journey: the data villains and the data heroes.

We always like to start with the negative in order to finish on a high. So, let's cover the data villain first. They are those happy souls who do not want this transformation to happen, for whatever reason that is, and we will look at that in more depth in Chapter 6. Nevertheless, they are not on board with the programme. Even worse than that they may appear to be supportive while carrying out guerrilla activities in the background. This happened to us at one company in particular. A member of the executive board who should have been a supporter (in fact they had part responsibility for the data, which made their attitude all the more surprising) was openly supportive in the executive committee but spent a great deal of energy undermining any change activities. The executive in question held lots of one-on-one meetings, asking leading questions and generally setting out to negatively disrupt the data journey. This only came to light when one of the other board members decided that this had gone too far and raised it with us as a concern. What resulted from that was a great deal of completely unnecessary catch-up work to get the programme on track. When it was finally resolved, we determined that it had all been about personal politics, which was the most disappointing aspect of it. Finding out about such people is crucial so you can either change them into a more positive mindset or at least into a neutral one.

That said, the data heroes are your superstars, they are the people in the organisation who 'get' data. They probably have been banging their head against the company walls fighting the data battles in isolation, creating policies for their own areas, but may not have joined up because they didn't have the overarching view across the company to allow them to do so. These people give you your immediate business value, they are committed, passionate and a very useful resource. They will, however, likely need a little tlc at first, due to having been in their own isolated data wildernesses, but they can be the most powerful resource going forward.