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WHITEPAPER

Practical Analytics

Using practical methods of measuring risk for organisations, overcoming the challenge of making definite decisions based on indefinite data.

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About this paper

In this whitepaper we set out to show that business can benefit from using quantification in risk to reduce uncertainty. We've called this approach **Practical Analytics**. Practical because it is useful and Analytics because our approach is rigorous and based on mathematical science. This paper explores what risk management 'done well' looks like for leadership teams embarking on ambitious strategies. It is not by accident that two specialists, one in enterprise risk management and another in data analytics have come together to write it. The outcome? A better way, using practical methods of measuring risk for leadership teams, creating informed decisions leading to the achievement of business goals.

Large organisations encounter many growth opportunities that create complex challenges. Each strategy has its complexities which is why the approach of Practical Analytics is designed specifically to make better decisions about risk, without making the quantification complex and difficult to understand.

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Context

The past 18 months have shown how quickly organisations can be impacted by risks that were always present, but not understood or quantified. Could a data- driven approach to risk management have provided a better understanding of what might have happened? With new capabilities in data analytics, today's leaders know that answers to complex questions are more readily available and are primed to seek competitive advantage for their organisations.

Our experience is that organisations are overly optimistic when they do not have data to make a decision. They rely on the success rate of their past judgements and the context in which they were made. That optimism is what drives entrepreneurial spirit, but it means that we often underestimate the risk until it is too late to reverse the decision. Organisations are then forced to react quickly.

In our work with large organisations looking to improve their approach to risk management, a constant theme is the struggle to accurately measure risk beyond simply making educated guesses with a risk matrix. Measurement is often seen as straightforward for financial risk assessments, but something that an organisation is not ready for when it comes to other major decisions. There are perceptions that there is a lack of appropriate data, skill set or both. Or that the time and resource cost to measure the risk is prohibitive.

In some cases, these perceptions are accurate. The history of developing quantifiable and repeatable measures shows that the process is often harder than we think, however, when the right expertise is applied to the challenge, the process can be less time consuming and less costly to produce - and far more useful than imagined! We've seen organisations measuring risk from the way the hiring process works through to setting budgets and, even more importantly, discovering ways of measuring risk for individual strategic objectives. In a nutshell, the most successful organisations are making informed decisions about risk by assessing risk WITH data.

Measures that Transform

The challenge for large complex organisations when it comes to quantifying risk is knowing what's possible. Our experience is that senior leaders recognise that the information they use for making decisions is at best imperfect. When we've attended board meetings, the most common question we hear is: 'where did these numbers come from'? The answer provided rarely provides reassurance: 'we estimated these'. It is clear to us, senior leaders want quantifiable and actionable data, not people guessing numbers and presenting these as a known truth.

When we work with teams who are providing this information, we often hear the argument – some numbers are better than none. From our experience we disagree. Subjectively estimated values for risk are actually harmful. Boards and senior leaders see these numbers and begin to make decisions based on these being correct. Instead of being appropriately cautious, they base their decisions on these numbers and execute on their strategy. **The challenge organisations face is that they have to make definite decisions based on indefinite data.**

Knowing the shortcomings of guessed numbers, the tendency is to move to only looking at widely available quantifiable values which can take considerable time and effort to create. We think organisations should use their experts to determine what's important, and then find ways to measure them. Prioritising what's important is what creates measures that matter. These measures may not be as precise as we'd like, but they are simple to understand and useful, for example, meteorologists try to provide highly accurate weather forecasts; these detailed forecasts are important for a small number of people. Most of us simply want to know if it will be a bit warmer tomorrow i.e. we don't need precise measurements unless we're doing something new or unexpected. If you were planning to go trekking in the Himalayas, then a precise forecast is important.

The point being that sometimes you need really accurate numbers, but this is rarely the case and usually only when you're doing something different, or higher risk such as hiking in the Himalayas.

For many organisations the journey towards measures that matter is a significant step. We've witnessed organisations, that work with measures that matter, able to make better decisions - quicker. Better because the information has been clearly identified as key drivers of risk. Quicker because everyone understands their importance in driving the strategy. There is no conjecture.

More and more organisations, particularly the data smart ones, pursuing strong data analytics strategies, want to move beyond this. We recommend a more objective approach where some of the core "rules" of statistical analysis are applied. This involves forming hypotheses and using ranges (confidence intervals) rather than discrete estimates. By moving towards this we've found that organisations can use these measures to transform. These transformations can be in the form of changing the business through mergers and acquisitions, or by shifting to servicing the sustainability market as examples. The measurement of risk now moves towards a quantifiable model.

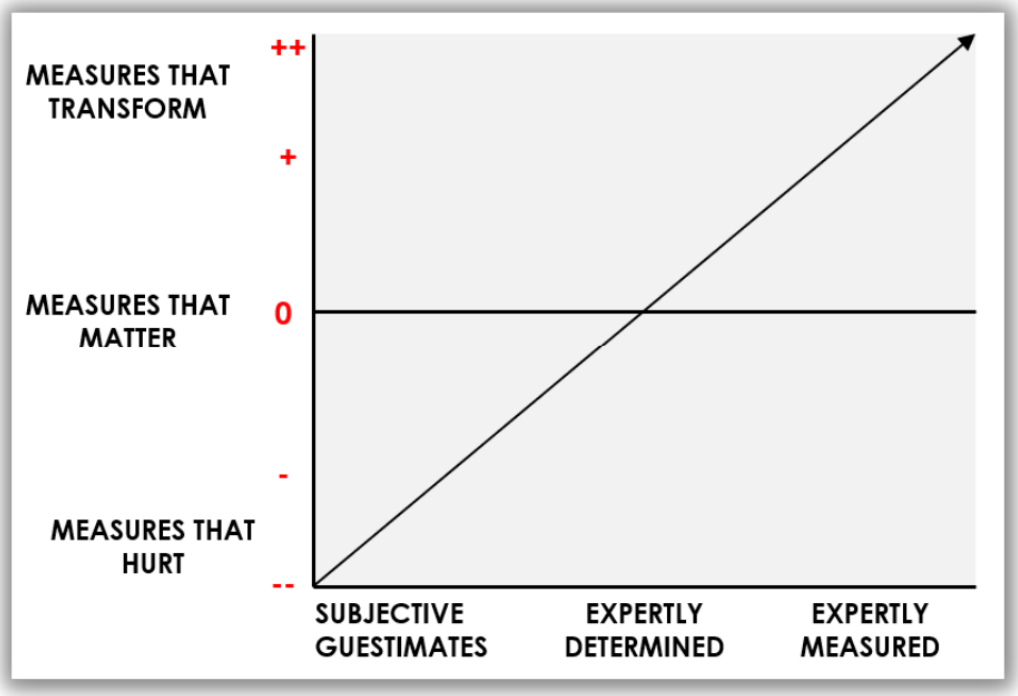


Figure 1: Increasing Confidence in Strategic Success

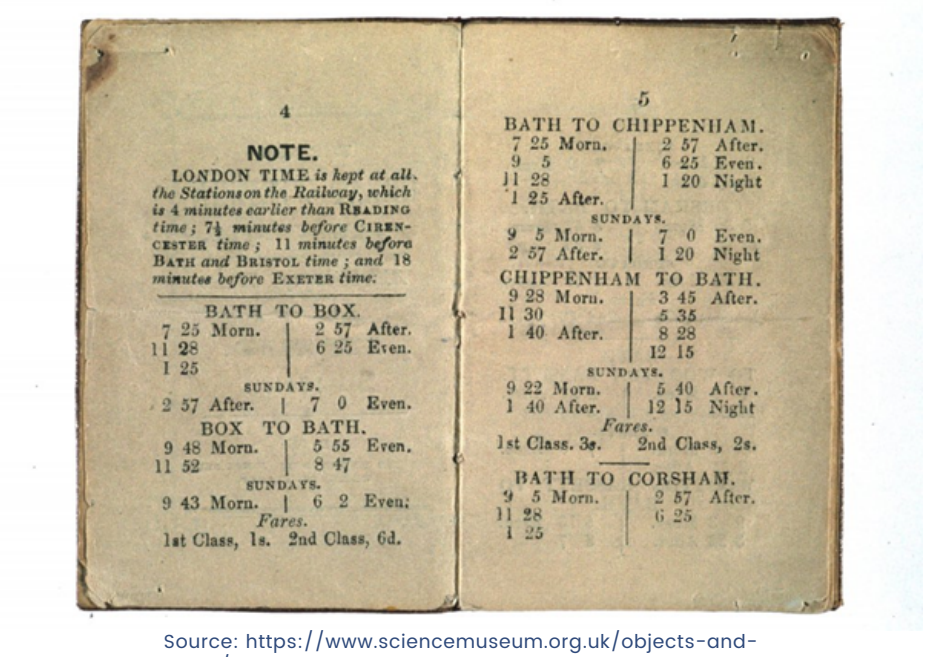
An Historic Example

Measurement is quantification. Measurement means moving from the abstract to the precise. Measurement becomes important once systems grow and comparisons are required. Measurements that we take for granted were only developed because of a pressing need, for example, the need to measure the area of a plot for valuing land for sale. We argue that organisations are at this point, with regards to risk. The increasing complexity, in particular for large complex organisations, makes the need and the opportunity compelling to measure risk in the form of confidence intervals (ranges) to enhance decision making.

We consistently see organisations looking for quantifiable data on risk. We believe this is long overdue and requires a commitment to explore the challenge of using quantifiable data in a way in which we have not seen done to date.

The story of how standard time developed is an example of what we currently face in the modern business environment when it comes to quantifying risk. Britain was the first country to introduce the concept of standard time. Prior to this, every locality had their own local mean time from which midday was set by position of the sun. A lack of consistent time across Britain was proving problematic for the railway system. Early timetables had notes on adjustments passengers needed to make to the timetable, to allow for local mean time, which varied between cities.

Will we look back on the risk matrix in a hundred years the way we look at the early train timetables and opine about the immaturity of the old ways?



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NOTE.

LONDON TIME *is kept at all the Stations on the Railway, which is 4 minutes earlier than* READING *time; 7½ minutes before* CIRENCESTER *time; 11 minutes before* BATH *and* BRISTOL *time; and 18 minutes before* EXETER *time.*

BATH TO BOX.

7 25 Morn.	2 57 After.
11 28	6 25 Even.
1 25	

SUNDAYS.

2 57 After.	7 0 Even.

BOX TO BATH.

9 48 Morn.	5 55 Even.
11 52	8 47

SUNDAYS.

9 43 Morn.	6 2 Even.

Fares.

1st Class, 1s. 2nd Class, 6d.

5

BATH TO CHIPPENHAM.

7 25 Morn.	2 57 After.
9 5	6 25 Even.
11 28	1 20 Night
1 25 After.	

SUNDAYS.

9 5 Morn.	7 0 Even.
2 57 After.	1 20 Night

CHIPPENHAM TO BATH.

9 28 Morn.	3 45 After.
11 30	5 35
1 40 After.	8 28
	12 15

SUNDAYS.

9 22 Morn.	5 40 After.
1 40 After.	12 15 Night

Fares.

1st Class. 3s. 2nd Class, 2s.

BATH TO CORSHAM.

9 5 Morn.	2 57 After.
11 28	6 25
1 25	

Source: https://www.sciencemuseum.org.uk/objects-and-stories/standardising-time-railways-and-electric-telegraph

Not having a consistent time increased the risk of collisions between trains. In 1840 The Great Western Railway was the first to adopt standard time. Seven years later in 1847 the Railway Clearing House, an industry standards body recommended standard time be adopted across the railway network. By 1855 the majority of public clocks had moved to standard time. In 1880 the British legal system finally switched to standard time, which we now know as Greenwich Mean Time. The underlying concept of measuring time had been developed hundreds of years earlier. The move to measurement occurred not because of the development of the method, but because of the inconvenience of not having a standard approach that everyone could understand and use.

We see the development of standard time as one of the first examples of Practical Analytics. The development served the purpose of the business, was not overly technical and everyone understood the idea. What we've left out of the story of time is the subsequent 100 years of hard scientific work to come to the SI second. Like the detailed weather forecasts, the development of the SI second was important for a small number of people. Back in 1840, as today, people just want to know when the train is going to arrive.

Providing Clarity over Scepticism

Statistical methods are slowly becoming used by the risk profession, as understanding risk is a practical application of statistics. Statistical methodology was developed in the first half of the 20th century by Ronald Fisher as a result of his desire to understand crop variations. Statistics is the branch of mathematics that deals with uncertainty and statisticians talk about confidence intervals as a way of quantifying this uncertainty where they intuitively understand the concept that there is no one answer ... that the assumptions we make change the expected outcome. The risk matrix approach forces us to pick an arbitrary value for consequence and likelihood, when really we want to say: 'It depends'.

Using data involves a combination of subjective and objective approaches. We tend to think that a data-driven approach is purely objective, that's simply not the case. Statisticians conveniently don't speak about this. We all make assumptions, and these are by their very nature, subjective. We'll define subjective as decisions which trained professionals might differ in, and objective as decisions which trained professionals would agree on. Fisher developed objective methods of analysis. Any person using any software should get the same answer when running a specific test. The inferences from this test will also be objective. If you were to go and get the data set Fisher collected, and run the same analysis a century later, you should get the same results.

Figure 2 shows what we see in the risk profession, the use of objective measures at the start of a risk assessment, being utilised in a way that results in subjective outcomes. When data is not readily available, risk departments turn to people to produce estimates of the drivers of risk in the form of calibrated ranges. The focus being on ensuring consistency of the estimate, rather than making the right estimate. The logical next step is to run Monte Carlo simulations on the calibrated ranges to produce a range estimate for the risk level. Typically, a range of financial or schedule outcomes. What is actually happening is that you train people to consistently guess numbers, then you take these guesses and put them into a software program that builds a distribution. The problem now is that no one really knows what these numbers mean. There's no agreement. We're left with a subjective outcome that results in different people making different conclusions. When you hear about "getting any answer they want" using Monte Carlo, this is because the people running the model know the outcome is subjective.

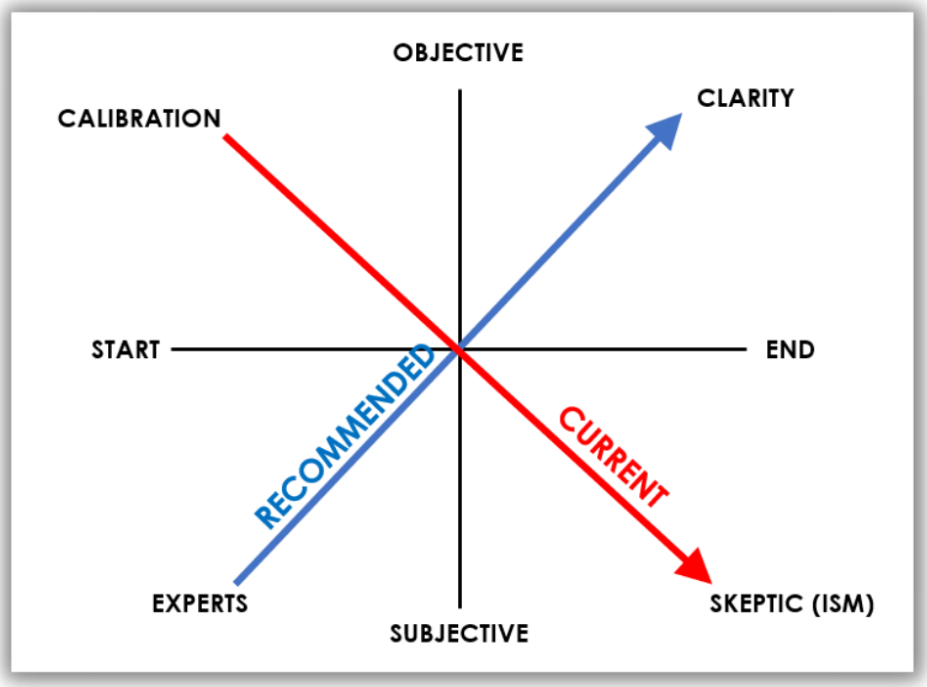

Figure 2: Delivering Clarity Instead of Scepticism

We think there is a better way, rooted in the statistical methods as developed by Fisher. We argue that we need to start with a subjective approach and move to objective measures. This seems counterintuitive, until we reflect on the time, effort and money that is spent on the current approach for little benefit.

In his quest to understand crop variations, Fisher didn't get together a group of farmers and try and train them to guess how the crops were growing. He didn't collect a small amount of data and create distributions to try and guess what makes some crops grow more than others. Instead, Fisher used his judgement. He considered that water, fertilisation and time of planting may be the reasons for variation in crop yield. A different statistician may well have selected different variables such as crop rotation and cross planting. But it's important to note that we believe there isn't one right answer, which means it doesn't matter where you start, but how you analyse the data that matters. The belief that there is one right answer is part of the reason for the over reliance on objective measures at the start of the process, which is why our approach is to focus on analysing the data to develop objective approaches. Once Fisher selected the variables, a form of measurement needed to be agreed upon. Whilst there might be some variation here, most professionals would agree on a small number of ways to assess yield (usually by measuring the weight).

We argue that a subjective approach is required to get an objective outcome and that experts should be used for their expertise, and not trained to guess values that could be measured. By providing objective outcomes, the risk profession can serve their organisations with clear, reliable information that decision makers can use to determine their strategy.

Fisher's approach to resolving a complex problem in a simple way that everyone understood, makes him a fantastic example of Practical Analytics.

Driving Business Transformation

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Figure 3: Practical Analytics

One of the main criticisms of statistics is that whilst the answer might be right it is of no use. In the modern business context spending a lot of time to find a precise answer is rarely useful. Spending a fraction of that time to make improvements is far more useful and improves the outcome immediately. This is the same methodology and idea behind continuous improvement that has been used extensively in manufacturing for decades. There are a small number of manufacturers for whom precise measurements are critical. For most manufacturers they simply want to reduce waste and improve productivity. The same is true for most organisations.

Consider the example of a major project that is running behind schedule. The default outcome is to invest more money and resources. If this doesn't work, then senior leaders want to know how late the project will be. This is a complex calculation involving estimating a range of outcomes and assigning a probability. After much effort, you may well have an accurate estimate of the delay, but no plan with which to change the outcome. We believe a better approach is, instead of trying to accurately determine the final outcome (which we all agree we don't want) we should spend the time working out what we need to measure to turn performance around and identify what we need to do to improve performance. For major projects there is a body of evidence that shows long term planning has little value but short-term planning (i.e. day-to-day) is where the effort should be expended. We'd suggest starting here, determining what exactly you need to measure and then using this to transform your project into one that is successful.

In Closing

This approach of Practical Analytics is a modern take on the methods employed by Fisher over a century ago. To re-emphasise, Fisher didn't set out to measure the exact model for assessing agricultural productivity. He started by looking at a range of different variables and determining which ones matter.

In the last century we've come a long way with technology, but we believe the fundamental aspects of science still hold true today to solving problems that seem as complex and as intractable as determining how plants grow.

We know that applying quantification in risk to reduce uncertainty is the way forward. If you are interested to explore our approach of Practical Analysis for your risk team and organisation, we'd love to hear from you.

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About Bryan and Andrew

Bryan Whitefield is a management consultant operating since 2001, specialising in risk-based decision making, born from his more than twenty years of facilitating executive and board workshops. Bryan's experience as a risk practitioner includes the design and implementation of risk management programs for more than 150 organisations across the public, private and not-for- profit sectors. Bryan is author of **Risky Business: How Successful Organisations Embrace Uncertainty**; **Persuasive Advising: How to Turn Red Tape into Blue Ribbon** and is writing **Team Think: How Teams Make Great Decisions.** He was President and Chair of the RMIA from 2013 – 2015. He is licenced by the RMIA as a Certified Chief Risk Officer (CCRO) and is the designer and facilitator of their flagship Enterprise Risk Course since 2019.

Armed with a PhD in Statistics and Engineering, Dr Andrew Pratley has ten years of experience in helping companies see the value in their data. He is author of **Inside Job: Doing the work you want with the job you have** and when not helping clients use data to solve their most pressing problems or serving as a subject matter expert in government and legal forums, Andrew serves as a regular commentator in the media and at industry conferences on issues of data, analytics and insights.

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