

Formula One – taking risks and leading the way

Synopsis

This article describes my observations on how Formula One teams apply risk management in order to achieve their goals, and what other industries can learn from their approach.

Formula One is the pinnacle of motorsport – and it provides a great example of how to take and manage risk to achieve optimum performance. Anyone who has watched F1 live will have seen first-hand how the highly coordinated work of F1 teams, their people spread across multiple locations, comes together on race day to achieve tremendous feats of performance, with safety being central to success.

Ferrari's Sebastian Vettel celebrates winning the 2018 Melbourne Grand Prix: photo by self



Formula One and Risk Management

Formula One teams are world-class operators of taking and managing risk. What can organisations in the private and public sectors learn from their approach?

First and foremost, F1 is completely focused on safety. The way safety risk has been managed in recent years has to be admired. There are many other aspects to how F1 teams successfully take and manage risk, which organisations large and small in all sectors can learn from.

F1 is a mammoth, year-long logistical operation for each competing team, and it's not just the racing we see that has significant amounts of risk associated with it. There are many operational risks associated with transporting the cars, equipment and teams to 21 destinations (as of 2018) around the world. In addition to this are the many IT and commercial risks for teams to manage.

Here are six learnings that I personally draw about the way risk is managed in F1:

1. Safety is successfully placed front and centre of F1 strategy and culture
2. F1 innovation and resilience sets a benchmark for other industries to follow
3. Risk-informed decision-making in F1 is honed to a fine art
4. F1's use of data for decision-making provides lessons for us all
5. F1 faces many similar operational risks to other businesses
6. Continuous improvement in F1 is crucial, as is sharing knowledge with other industries

1. We can learn from the way that safety is managed in F1

Mark Gallagher, Managing Director of Performance Insights Limited and an F1 media analyst, describes it this way:

"F1 saw 47 drivers killed between 1950 and 1994. The sport has since this time shown what can be achieved when a culture is truly focused on being safety-first. Under the leadership of the sport's governing body, the FIA, the teams achieved a paradigm shift, recording zero driver fatalities in the next 20 years after Ayrton Senna and Roland Ratzenberger died during the 1994 San Marino Grand Prix weekend."

It's important to remember that F1's improvements and learnings in the field of safety have been shared and applied to various road safety programmes, including the European Union's NCAP safety certification initiative.

Car design, track safety (such as the safety barriers around the track to protect the public, and well-drilled emergency crews on hand throughout the race) all play their part in ensuring safety is of paramount importance, and that it is central to how F1 operates today."

(The one fatal crash in F1 to date, since 1994, was when the French driver, Jules Bianchi, who tragically lost his life after colliding with a crane at the Japanese Grand Prix in October 2014; he remained in a coma after the crash until he died nine months later.)

An emergency crew constantly ready to go onto the Albert Park race track if called for at the Melbourne Grand Prix in March 2018: photo by self



Today, television audiences in the hundreds of millions witness exemplary management of safety at each race. The most recent “visible” safety measure to F1 is the addition of “the halo” to all F1 cars, which is an incredible feat of engineering (having seen it on the cars at the Melbourne Grand Prix in March 2018, I personally feel that it blends seamlessly into the car design).



A McLaren at the Melbourne Grand Prix in March 2018, sporting its new halo: photo by self

It is clear that the safety-first mindset of F1 has positive additional effects. For example, whilst it is not a primary driver for the focus on safety, the costs of dealing with very serious (including fatal) accidents and the potential for prosecution and reputational damage that a team and manufacturer may suffer, give further weight to the benefits of safety being an integral part of how F1 operates today.

Here's Mark Gallagher again:

“The leadership in F1 has really focused on applying good risk management. The objective of zero fatal incidents became a key objective to them and they put their support behind it,” he added. “Now, I’m not going to say that the leadership of F1 did not take safety seriously before this, but what’s happened is that it is truly at the centre of the strategy for the whole industry.”

This total safety focus has empowered teams to commit completely to ensuring safety is their primary responsibility. For the sport's governing body, it meant setting the highest standards for car design, redesigning F1 race tracks and managing safety during races (with real and virtual safety cars when necessary). Even so, accidents can occur (such as the broken leg suffered by a Ferrari mechanic following a pit-stop error during the 2018 Bahrain Grand Prix). Teams will remain vigilant and continue to learn lessons.

As F1 moves forward, safety is set to remain central to strategy. Understanding the safety risk when, for example, when there is bad or even extreme weather forecast for the location of a race, is critical to organisational decision-making, taking into account commercial pressures that a race inevitably has (with crowds attending, television rights and inherent tourism initiatives). It's in such circumstances where the “organisational climate” of F1 should lead to safety-informed decisions being made.

Could, and should, high-risk industries (such as construction, mining, oil & gas, manufacturing and others) learn from F1's approach and mindset to safety risk? Often, the challenge that organisations are faced with is that other cultural factors such as cost and schedule can be overpowering. Yet F1 faced the same challenges over twenty years ago and it has worked out how to massively improve safety.

2. Innovation and resilience keeps F1 moving forwards

F1 is constantly tackling “firsts of a kind”, or “FOAKs” – in the form of new rules, regulations and advances in technology (including important environmental measures). Risk management helps F1 teams to understand and deal with their FOAKs – which starts with a can-do culture that embraces the challenge.

Although I have never spent time directly with an F1 team, I reckon that an F1 team culture is something that the managers of teams spend a lot of time nurturing. It probably includes ensuring that the following elements are in place:

- The tone at, and from, the top is one that promotes and undertakes good risk management;
- Risk is discussed in everyday conversations and it is on the agenda of all reviews and decision-making (think about how they plot race strategy, for example);
- The understanding of risk, and how much can be taken, is consistent across the team (this is definitely the case during a Grand Prix, with the driver in constant contact with his team);
- Debate about potential problems and risks is welcomed. If problems materialise, the team learns from them and does not have a “blame culture” (think about how teams react to errors of judgement that they make – they learn from them and move on to the next race).

With regard to resilience, this can be broken down to two areas:

- Engineering resilience is a crucial part of success for an F1 team. The reliability of the cars nowadays is better than it has ever been (coupled with the advances in safety).
- Project team resilience is the “other half” – which relates to how an F1 team deals with sudden events and major incidents when they occur.

F1 teams, and race organisers, are highly resilient and are trained to analyse and respond quickly to problems. They demonstrate the fundamental aspects of a High Reliability Organisation.

3. Risk-informed decision-making in racing is the difference between winning and losing

As the cognitive psychologist and renowned author, Gary Klein, recently outlined to me:

“The people who are going to make important progress are those who have prepared themselves to take informed risks.”

Here are two examples of risk-informed decision-making (I could quote more).

Example 1

In the final race of the 2012 season, in Brazil, Sebastian Vettel went into the race needing to win it to win the championship. His Red Bull Racing car was clipped from behind in an opening lap collision, putting his opportunity to win in peril.

"Immediately, we thought race over," said Red Bull's Al Peasland (in [an interview](#) published in “Experience Matters” in April 2016). However, the team in the pit had access to telemetry and were able to quickly assess the damage.

The car was destabilised and continuing the race with his car in its current condition would have damaged the engine and destroyed the tyres – meaning that Vettel would have no chance of winning.

However, his team analysed the options available in real-time, and by the time the car pulled into the pits a few laps later they had created a data-driven strategy to rebalance the car as best they could.

The result of this was that Vettel won the championship that year, by the narrowest of margins – thanks in part to the use of data, which was quickly turned into insights for risk-informed decision-making by his team.

Example 2

In the 2018 Bahrain Grand Prix, it became clear to the Ferrari team, reviewing their data, that Vettel would not have time for a second pit stop to win the race. They changed strategy mid-way through the race, for Vettel to stay on his existing set of tyres rather than pit and change. It proved to be a winning strategy.

These two examples lead me to my next point, about F1's use of data.

4. F1 teams live and breathe data for decision-making

Today's F1 teams capture and analyse large amounts of data direct from their cars in real time to make risk-informed decisions in real time. From car design through to pre-season testing and the race season itself, the capture and analysis of data plays a crucial part in the success of the teams on the track.

As Jakob Andreasen, Williams Martini Racing's chief technical performance and operations engineer, put it in [an interview](#) with the UK newspaper, The Daily Telegraph, in February 2017: "F1 is all about reacting quickly to ever-changing circumstances. We need fast data-transfer between the UK team and the track-side team, wherever they may be."

An F1 car has something like 100 sensors which monitor some 10,000 components, giving feedback on all sorts, such as wind force, tyre pressure, fuel burn and brake temperature. Telemetry data is constantly fed into each team's data centre.

Watching the Melbourne Grand Prix in March 2018, I was struck by how, straight after a test or qualifying lap as soon as the driver returns to the pits he is immediately presented with two screens to review data performance of the laps he has just driven. The team is analysing data all of the time, and making decisions quickly based on this analysis, during testing, qualifying and of course the race itself. It literally makes a difference between winning and losing.



A driver reviews his performance after a lap: image credit. Jamesallenof1.com

Here's Mark Gallagher again:

"F1 cars are mobile versions of the Internet of Things (the IoT), in that they are constantly transmitting data back to the pit team and the team HQ, who review it in real-time and make quick decisions with the driver on how best to proceed. This is similar to what many businesses are doing in their industries, albeit at not quite such a fast pace!"

The capture and analysis of data by F1 teams during a race is done in multiple locations, not just at the race track. Decision-making on race day is a finely tuned art, based on data, analysis and advice from a broad team of engineers, each specialising in different aspects (such as engine, tyres, performance, strategy) most of whom will be remote from the race. At the team HQ, in the pit area and close by, engineers continuously review screens as data is transmitted instantaneously from their cars. They quickly analyse it and create knowledge from it, for the team decision-makers at the pit wall to make risk-informed decisions with their drivers. The coordination of this activity determines when a driver should pit, when to make tyre changes, and how hard to push the car during the race (just like the example I gave in Point 3).

Many industries are learning how to use data with "Industry 4.0" now in full flow. Perhaps F1 provides us with some learnings on how to benefit from data quickly.

5. F1 is a business, with similar risks to other businesses

As Mark Gallagher explains:

“Commercial risk in F1 is managed through teams securing a portfolio of sponsor-customers and responding quickly to changing circumstances such as the legislative ban on tobacco sponsorship or the effects of the world-wide financial crisis.

Operationally the teams take a belt-and-braces approach to ensuring that they have the capability to compete in all 20 Grands Prix. This means being ready to race irrespective of whether cars have been destroyed in practice accidents, key personnel falling ill or urgent freight shipments being required to update the cars with the latest developments fresh from their factories.”

Well, maybe F1 operates at a faster speed than most businesses, but you get the point!”

Logistics present risk. For each race, some 30,000kg of freight must be shipped to the race location, including cars weighing about 700kg each, garage equipment, and IT infrastructure. This is done 21 times throughout the year (as of 2018) for 21 races in multiple continents, over a nine-month period, with a race taking place about every two weeks.

There are operational risks to capturing and storing the data that is so crucial to race strategy and performance. Teams store perhaps terabytes of data at their HQs, from wind tunnel testing to race performance. It's not the petabytes of data that some businesses are storing but it's significant, and as the teams move around the world to compete in races they need to protect it from Cyber crime and have real-time access to it all the time.

F1 is beginning to take its approach to data management “on the track” to use it off the track as well, to improve how it operates as a business. Between the 2017 Austrian Grand Prix and the end of the 2017 season, 18,000 racegoers opted in to complete post-event surveys on their F1 experience. Ticket-holders at every admission level were asked to rate their time at the race, and to give feedback on ideas for future fan entertainment. The F1 organisers are using this feedback to look at how to continuously improve their offering to fans who attend the races around the world.

6. F1 is continuously evolving, learning and sharing

F1 is constantly learning and improving. Competition learnings stay within the confines of each team, but there are many examples of how general knowledge has been shared with other industries – often examples you'd never think of.

For example, F1 has benefitted surgery, for matters of quite literally life and death.

In the mid-1990s, there was a high mortality for surgery in congenital heart disease. One of the important findings of a study in the UK was that the journey from the operating room to the intensive care unit (ICU) was high risk. Great Ormond Street Hospital for Children (GOSH) resolved to improve this. As part of their innovative thinking, they reached out to the Ferrari F1 team.

In F1, the pit team completes the task of changing wheels and fuelling the car incredibly quickly. The doctors at GOSH saw this as analogous to the team effort of surgeons, anaesthetist, and ICU staff to transfer a patient, equipment, and information safely and quickly from operating room to ICU.

GOSH doctors visited and observed the Ferrari pit crew in Italy. They noted the process mapping, process description, and team knowledge of what people's tasks need to be. Following their trip, the GOSH team studied the handover in the surgery unit and sent it to be reviewed by the Ferrari F1 team. From the analysis came a new handover protocol with more sophisticated procedures and better choreographed teamwork.

Conclusion

F1 provides many examples of how to take and manage risk, using good data and finely honed decision-making processes to achieve optimum performance.



A Williams car flies round a fast bend at the Melbourne Grand Prix in March 2018: photo by self

You may notice that in this article I have not talked about risk matrices, risk registers or risk appetite. Perhaps F1 teams use these tools – I have not asked or investigated. From what I gather, the focus is on their team ethos and culture, and using data intelligently to make good, risk-informed decisions. Businesses large and small will benefit from intelligently using data and understanding how to make the right risk-informed decisions.

About the author

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With thanks to Mark Gallagher, Managing Director of Performance Insights Ltd for his views and analysis for this article.



Performance Insights Ltd provides business leaders with insights into how competitive Formula One teams are led and operated. This includes showing how Formula One teams cultivate high performance team work, with a culture of learning and continuous improvement. They also focus on performance and risk management, digitisation, change management and innovation. They provide keynote presentations, workshop, team building exercises and leadership development opportunities including 1-2-1 engagements with Formula One's most successful drivers and managers.

Mark has also authored a book, [The Business of Winning](#).

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