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# Performance at the Limit

Business Lessons from  
Formula 1 Motor Racing

CAMBRIDGE

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## *Acknowledgements*

One of the hardest parts of writing this book has been to know where to start saying thank you to the many people who have contributed.

Formula 1, both as a sport and a business, takes huge commitment and effort in all areas. But despite these pressures, everyone we have spoken to has given freely of their time, experience and knowledge to assist us in the creation of this book. We would like to express our gratitude to all those who have supported this project.

Our sincere thanks go to Bernie Ecclestone for allowing us unrestricted access to the San Marino Grand Prix at Imola in April 2004. His positive response to our request meant we were able to meet and talk to some of the great names in the sport and business of Formula 1.

To Paul Stoddart, Paul Jordan and James Gilbride of the Minardi F1 Team our special thanks also. Often called the 'minnow' of Formula 1, Minardi is a giant in terms of its extremely friendly and approachable manner and, despite great business challenges, is always prepared to offer assistance.

During the Imola weekend, we met and talked at length with Minardi's Sporting Director, John 'Boy' Walton, one of Formula 1's most respected and likeable senior figures. We were saddened to hear of John's passing, due to a heart attack, at the age of just forty-seven. Some of John's comments live on in this book. His experiences in Formula 1, which included working with Toleman, Jordan, Arrows and Prost, Grand Prix, provide some invaluable insights on the working of the team and the detail of the pit stop process. We owe him much for his views that weekend, and his passing leaves a great void in the paddock.

Another sad loss to the world of Formula 1 was Ken Tyrrell. Ken passed away in August 2001, after a long battle with cancer. In 1999 both he, Derek Gardner and Bob Tyrrell generously gave their time to discuss the development of Tyrrell Racing and the revolutionary six-wheel car. Ken was very much a gentleman in the world of Formula 1, and his presence is sadly missed.

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Today's Formula 1 car owes much to the pioneering work of two Technical Directors: John Barnard and Gordon Murray. Like so many of our interviewees, both gave generously of their time and provided us with some real gems regarding the development of Formula 1 technology.

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Think of the World Rally Championship, engineering success with Prodrive and British American Racing in Formula 1, and one man springs to mind, David Richards. David's clear thinking and dedicated management style add much to motorsport today. Thank you David for the time spent in sharing your visions with us.

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## *The Grand Prix experience*

As part of the research process for this book we were able to visit a Grand Prix during the 2004 season. What follows are some observations and impressions from what was for us a very memorable experience. There are two perspectives to the Grand Prix experience, the public, external world of the fans and the insider's view of those who either work there or are privileged enough to be allowed inside the inner workings of the Formula 1 world.

The external world at the circuit includes the public grandstands, vending areas, programme sellers, campsites, huge parking areas and tens of thousands of people hoping to catch a glimpse of their favourite driver or perhaps celebrity drawn to the glamour, excitement and extensive press coverage of these events.

The internal world exists within an area controlled by FOM (Formula One Management). Entry requires an electronic security pass issued by them. This is the World (with a capital W) of Formula 1 – the teams, drivers, media, agents and myriad movers and shakers within the sport. In this World – no pass, no entry!

This 'exclusivity' is what sponsors, guests and VIPs expect. It is a place where deals are cut, partnerships developed and, sometimes, where relationships are ended. It is a hive of international sporting power brokers and business men and women that buzz around the racing event itself.

The paddock is also where the tyre companies' stock of racing tyres and fitting facilities are based, the teams' racing car transporters and the multipurpose race hospitality areas and team working areas all congregate. Add in the ever present silver and grey coach with its tinted windows belonging to ringmaster Bernie Ecclestone, where countless people wait patiently for an audience with motorsport's most powerful man, then this is the Formula 1 not seen by the fans attending the race and to which the vast television audience may only get to see small bites.

In April 2004 the authors arrived at the Circuit Dino Ferrari in Imola Italy for the twenty-fourth San Marino Grand Prix. Walking past the first security gate, we were greeted by rows of immaculate articulated trucks, vans and rigid-sided vehicles decorated in the various teams' colours and designs. These are the 'workhorses' that bring pit equipment, spares, bodywork, fuel and countless other items of equipment to each of the European Grands Prix.

The scale of 'the show' is simply enormous. When watching a 'long haul' Grand Prix such as Brazil or Australia, just consider for one moment that in terms of actual content, everything present at a European Grand Prix in addition to all of the equipment as yet unseen in the garages and main paddock area has to be packed, boxed and transported to a central airport, then flown across the world in several Boeing 747 freighters, it is then unloaded, customs cleared and transported to the circuit for use before being reloaded and then sent back to the teams individual HQs.

Throughout Europe, this fleet of trucks, vans and mobile hospitality areas makes their way on a weekly basis. For the 'long haul' races to other continents, their entire contents (although not the units themselves) and much more besides are flown as described above.

Teams of people now arrive a week in advance of the races to set up the huge team hospitality units in the paddock area. The positioning of these units, racing car transporters and mobile workshops is closely overseen by an FOM representative. The team that won last year's World Championship locates itself at the entry to the pit lane and after that there is a clear pecking order progressing onward as each team installs itself in a garage. In Formula 1, image and performance go hand in hand.

Such is the attention to detail in paddock layout, that it is possible to run a measure along the front of the trucks and motorhomes and find them millimetre perfect.

When first entering the paddock via the electronic pass reader system, the visitor is confronted by a truly astounding sight. Backed up to the pit garage complex underneath several floors of VIP observation boxes, administration and media centres and at most venues, the rooftop Paddock Club where several thousand VIPs are hosted by the range of teams, sponsors and manufacturers involved in Formula 1, are the race teams' transporters.

These vehicles are specifically designed and manufactured not just as transportation for the racing cars and their spare parts, but also as

mobile workshops, data management suites and meeting and briefing rooms. Once in position they are adorned with extremely high telemetry and radio communication masts and throughout the weekend are endlessly polished and cleaned by the 'truckies' who drive them to and from events.

Step inside the race teams' garages and you enter another, very different, world. Painted and, in some cases, tiled floors, complete wall-to-wall panelling featuring images, the team's names and sponsors, digital clocks and weekend timetables all topped off with custom made overhead gantries carrying heat, light, power, compressed air – it is simply a workshop created for a weekend to the very highest standards, always mindful that the world's media and TV are watching.

Exit the garages, walk along the sides of the trucks and the opposite side of the 'corridor' is lined with the teams' motorhomes. The word 'motorhomes' does not do these justice. They are in fact double-decked structures with a central area enclosed with glazed windows and decorated to the very highest standards. They feature every conceivable luxury extra, including air conditioning, flat screen plasma TV displays, private office and larger meeting rooms and a level of catering and a level of customer service that would be the envy of most restaurants!

Placed at the rear of these team 'centres' and mainly out of view from the guests and VIPs are the catering units that provide constant food, drinks, breakfast, lunch and dinner as required. Quite simply the teams are self-sufficient from the moment they step foot inside the circuits.

Whilst all of this embodies the 'I' word (image), the teams themselves are of course there to race. In amongst the deal brokering, VIP and sponsor tours and endless meetings, the drivers, engineers and mechanics have to concentrate upon practice, qualifying and the actual race meeting. Their schedule is another work of precision drafting with a clearly defined timetable as shown in Figure 1.

As the weekend progresses, the pressures increase. Friday is a time for circulating the paddock, searching out specific people and journalists, catching up on the latest 'word' on the street.

Come Saturday, and the mechanics, tyre fitters, engineers and drivers can be seen moving from motorhome to garage, garage to media meetings, back to motorhomes for lunch and, if required, sports therapy. There is practice and there is qualifying – the need for pole position (the front of the starting grid) occupies everyone's mind and at the end of

<b>2004 FIA FORMULA ONE WORLD CHAMPIONSHIP</b>
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**24° GRAN PREMIO FOSTER'S DI SAN MARINO**  
**Imola, 23 – 25 April 2004**

**GUESTS TIMETABLE**

<b>Friday 23<sup>rd</sup> April 2004</b>
--

09:00 – 09:45	Porsche Michelin Supercup Free Practice Session
10:00 – 10:30	<b>FORMULA ONE PADDOCK CLUB PIT WALKABOUT</b>
11:00 – 12:00	<b>Formula One Practice Session 1</b>
12:20 – 13:15	<b>FORMULA ONE PADDOCK CLUB PIT WALKABOUT</b>
14:00 – 15:00	<b>Formula One Practice Session 2</b>
15:30 – 16:00	Formula 3000 Free Practice
16:30 – 17:10	Formula 3000 Qualifying Session
17:30 – 18:15	Porsche Michelin Supercup Free Practice Session

<b>Saturday 24<sup>th</sup> April 2004</b>
--

07:45 – 08:30	<b>FORMULA ONE PADDOCK CLUB PIT WALKABOUT</b>
09:00 – 09:45	<b>Formula One Practice Session 3</b>
10:15 – 11:00	<b>Formula One Practice Session 4</b>
11:30 – 12:15	Porsche Michelin Supercup Qualifying Session
13:00 – 13:50	<b>Formula One Pre-Qualifying Session</b>
14:00 – 15:00	<b>Formula One Qualifying Session</b>
16:30 – 17:45	Formula 3000 Race (31 laps)

<b>Sunday 25<sup>th</sup> April 2004</b>
--

09:00 – 09:30	<b>FORMULA ONE PADDOCK CLUB PIT WALKABOUT</b>
10:30 – 11:00	Porsche Michelin Supercup Race(13 laps)
11:10 – 12:10	<b>FORMULA ONE PADDOCK CLUB PIT WALKABOUT</b>
11:15	<b>Formula One Drivers' Track Parade</b>
12:45 – 13:15	Formula One Grid Presentation
13:46	National Anthem
14:00	<b>24° GRAN PREMIO FOSTER'S DI SAN MARINO</b> (62 laps)

**Figure 1.** Guests' timetable San Marino Grand Prix 2004

Source: Minardi F1

qualifying on this weekend in April 2004 it was not a Ferrari, it was Jensen Button in his BAR that took the glory.

The paddock is alive with journalists, alive with beaming BAR staff and David Richards, the Team Principal, standing outside his motorhome, shaking hands and enjoying a celebratory cigar. Button alongside him continues to smile long into the afternoon . . .

For the drivers and team principals, assisted by their marketing and PR teams, Saturday evenings usually mean official sponsor dinners,



guest appearances and drinks parties. Whilst sometimes onerous, all recognise the importance of these events and undertake them professionally.

Sunday, of course, is the longest and most important day. Arrive early enough and you will see the first people (motorhome staff) arriving and opening up their various 'HQs' for the day ahead.

Shortly after, engineers, mechanics, team managers and drivers arrive. (The team principals are never far behind!) Suddenly, the paddock is abuzz, the 'truckies' are giving the race transporters one final polish, the drivers, now focused, still stop and smile for photographs and autographs, the journalists continue to search for one more quote and Bernie Ecclestone can be seen frequently going from motorhome to motorhome ensuring the show runs faultlessly.

Amidst the noise, energy, sights, smells and sounds, one becomes increasingly aware of the crowd, the paying public who for hours have driven, camped, walked to see their favourite stars in action. Increasingly with Ferrari's continued success, the sea of red has grown to a point where at some circuits you begin to wonder if there is anyone other than Ferrari supporters present!

At Imola, they wait with air horns, flags, fireworks and banners and thirty minutes before the start of the race when the pit lane officially opens they begin to cheer. As we are in Italy the sea of red supporting Ferrari is a dominant vista across the grandstands. Earlier in the day, the drivers completed a lap of the circuit on the back of a flatbed articulated trailer. They wave and the crowds cheer them, but this is nothing compared to the noise of the engines and the combined sound of the crowd as they wave them out with just minutes to go before the start of yet another Grand Prix . . .

Exactly on the hour, the cars are flagged off on their final warm-up lap to complete one lap under controlled conditions, the pole sitter leads them all round, each car weaving its way across the circuit to warm up the tyres and forming up for the grid where seconds later the red lights come on in sequence, go out as one and the San Marino Grand Prix at Imola is underway.

The paddock is now quiet, everyone is focused on the track but one thing never changes, the deadline for the next race. Teams of motorhome workers have already begun to pack the items that are no longer required. The Grand Prix 'circus' is packing up and heading for Barcelona in two weeks' time . . . the show goes on!

This is not a book about the sport of Formula 1. It is not about racing cars, commercial sponsorship or the politics of motorsport. It is about something that we believe to be far more important and enduring. This book focuses on the problems of sustaining organisational performance in dynamic and competitive environments. We are concerned with how organisations achieve performance levels at the limits of their financial, technological and human potential. It is a book that considers the turbulent ride between outstanding success and humiliating failure and explores the reasons for such outcomes.

To survive and prosper the organisation of today has to be both lean and agile, creative and efficient, effective at recruiting, motivating and retaining the highest calibre of staff, and also able to restructure and redeploy these individuals into teams across a range of challenging tasks and locations. Such demands are accepted as part of the dynamic business environment of today.

However, the ways in which such management challenges are met and addressed are rarely examined in detail. Whilst there is a wide range of work that has considered generic issues such as best practice and performance across many global industries, these often lack the specific insight to help deal with such challenges on a day-to-day basis. In this book we offer a different approach. We do not attempt to distil generic characteristics of performance success across a range of business contexts; this has already been effectively done in a range of management texts such as Peters and Waterman<sup>29</sup> and Collins and Porras.<sup>12</sup> Our agenda is to examine a highly specialised industry in depth; we do so because we believe that this particular industry encapsulates many of the challenges faced by today's manager across many different types of organisation and sectors. Challenges such as increasing knowledge creation and transfer, working in global and virtual teams, managing across boundaries, enhancing innovation and creativity, accelerating speed to market, effective

execution of strategy, creating transformational change and, above all, through all of these challenges, creating sustained levels of performance that competitors are unable to match. Many of these issues have already been considered in management texts such as Richard D'Aveni's work on hypercompetition<sup>13</sup> and Shona Brown and Kathy Eisenhardt's consideration of fast-paced organisations that are highly adaptable and responsive to change.<sup>10</sup> We are not claiming that the detailed issues we examine provide quick transferable solutions to other organisations, or that we are able to prescribe easy panaceas, but we do believe that our case histories and examples provide both inspirational and instructional guidance to those seeking to achieve levels of performance – at the limit of possibility.

We draw on accounts of ambition, wealth, enduring relationships and most of all, levels of passion and commitment that are inspirational to those involved in shaping and managing organisations. In this chapter we first outline some of the key insights we have drawn from our study, we then describe the research process we have adopted and conclude with a statement on the overall purpose of the study. In Chapter 2 we outline why we have used the world of Formula 1 motorsport as a basis for understanding the dynamics of organisational performance, including an overview of the history and structure of the Formula 1 industry that provides our research context. In Chapter 3 we go on to introduce the central framework of the book and identify some of the key elements of the performance framework. In the subsequent chapters we then explore each of these elements before elaborating some of the more generic lessons that can be drawn for those concerned with organisational performance outside the context of Formula 1.

But first as a preview of our findings, which are developed in detail in Chapter 12, we present the core characteristics of an organisational system (we use this term to emphasise the role of partner organisations in creating performance outcomes) that achieves 'Performance at the Limit'. We do not purport these factors to be necessary or adequate in themselves, however we found these to be central in the success of Formula 1 teams and the general distinctiveness of the industry.

### Characteristics of performance at the limit

- *Maintain open and constant communication.* A constant flow of open communication to all in the organisation is critical to ensure

that everyone is aware of how things are developing and where potential sources for improvement can be found.

- *Isolate the problem, not the person: the no-blame culture.* The readiness of everyone to be open and honest about their mistakes. What is surprising is that this occurs in a context that has its fair share of inflated egos, but there is widespread recognition that the whole system can only improve when this happens, and this can only be created where the whole organisation is underpinned by a warts-and-all, no-blame culture.
- *Build the organisation around informal processes, networks and relationships.* Very often the structure and roles within the organisation will emerge from the particular competences of, and relationships between, individuals. In this case, rather than creating the structure and fitting individuals into predefined roles, we see the structure emerging from the capabilities of individuals within the organisation, thereby allowing their potential and the performance of the organisation to be maximised.
- *Alignment of goals between individuals, teams and partners.* Alignment at all levels is critical to success. This is both in terms of everyone sharing the same goals, which is perhaps easier in Formula 1 than other situations, but also in terms of everyone understanding how they, and the groups they participate in, contribute to this performance.
- *Focus, focus, focus.* The successful teams are those that are focused. When teams take their 'eye off the ball' they are vulnerable to competitors who are more committed and more focused.
- *Make quick decisions and learn from the results.* The pressure of Formula 1 is such that the teams have to arrive with a competitive package every two weeks. This puts a premium on fast decision-making and the avoidance of prevarication. Make a decision, live with it, and if it is the wrong one learn from it as quickly as you can and move on.
- *Real gains come at the boundaries.* The critical performance gains occur at the margins, at the boundaries between the various interfaces whether these be component areas of the car, between partner organisations or between different teams.
- *Be realistic about what can be achieved.* Being realistic about what can be achieved is perhaps not expected in a pressurised environment of this kind. Often teams get ahead of themselves and lose their grip



on performance. Change for the sake of change is not embraced here. It has to be realistic change for the sake of performance.

- *Never believe you can keep winning.* Organisations often end up believing their own rhetoric. The key for maintaining success in Formula 1 is to actually disbelieve in the sustainability of your own performance. To continually feel that you could have done it better, and to continually strive for the unattainable goal.
- *Leaders exist at all levels of the organisation.* Success requires a 'portfolio of leaders' all fulfilling and supporting different roles in the system. In effect these teams succeed because there are individuals throughout the organisation who are willing and capable to accept the responsibilities of leadership regardless of their formal authority.

The chapters that follow provide both an overview of the dynamics of Formula 1, and also an insight into the ongoing struggle as to how these organisations sustain performance in such a highly competitive and dynamic context.

In Chapter 2 we address the question: why Formula 1? We focus on the reasons as to why this is a valuable context in which to consider the dynamics of performance. In Chapter 3 we articulate a framework for creating performance using the elements of individuals, teams, partners and the organisation and combine these with the processes of integrating, innovating and transforming. In Chapters 4, 5, 6 and 7 we consider each of the elements of the framework (individuals, teams, partners and organisations) in more detail. This is then followed in Chapters 8, 9 and 10 by a consideration of the core processes of integrating, innovating and transforming. Chapter 11 focuses on the nature of performance and how it is achieved 'at the limit'. Finally, in Chapter 12, we reflect on some of the learnings from our study and develop a series of ten lessons that can be extended from the Formula 1 context.

## The research process

The concept for this project first emerged in 2001 when the authors came together to help design and deliver a management development programme for a leading international law firm, Freshfields Bruckhaus Deringer. Formula 1 was used as it provided a stimulating context to consider issues relating to teamwork, project management, client relationships and business dynamics.

Our experience in developing this programme lead us to increasingly focus on describing, explaining and taking lessons from the sources of performance advantage in Formula 1 motorsport. The idea that Formula 1 provides not only an exciting context, but also exemplifies how organisations are able to create and sustain the basis for optimised performance, has lead us to develop a more rigorous approach to these questions. The objective of this book is therefore, first to explore these issues in a more holistic and systematic way than we have been able to do so far, and second, to develop a structured basis for both representing organisational performance and providing a basis for applying the concepts in other contexts.

Our process has involved three distinct stages. The first was to develop the conceptual framework as outlined in Chapter 3, which consists of four key elements (organisation, individuals, teams and partners) and three core processes (integrating, innovating and transforming). This was done through a review of published sources that have evaluated the performance of Formula 1 teams. One of the benefits (and challenges) of researching the Formula 1 context is that there is an abundance of published information on Formula 1 organisations and particular individuals such as drivers, founders and CEOs. A painstaking review of this material enabled us to draw out some of the key aspects of the performance system in Formula 1, which is summarised in Chapter 3. A full list of all published sources used is itemised in the References section.

The second stage of the process was to identify a number of experienced individuals who were to provide the bedrock of our research. In particular we sought out those individuals who could bring a range of differing kinds of experience, either through having worked for differing kinds of Formula 1 organisations or through having worked in other industries, such as Renault F1 Team's Flavio Briatore, who formerly ran the US operation of the Benetton clothing company and Jaguar's Tony Purnell who founded and built Pi Electronics before selling it to the Ford Motor Company. The following outlines some of the organisational characteristics that we endeavoured to represent through our selection of individuals to be interviewed for the book:

1. Exhibited both enhanced and declining performance at different stages in their lifetime
2. Underwent a change of leadership and/or ownership

## 2 | *Why Formula 1 motor racing?*

We have selected Formula 1 motorsport as it provides a number of important ingredients to help us explore the nature of organisational performance. The first is that it has a clear performance outcome – consistently winning races and thereby consistently outperforming the competition. The importance of this measure of performance, and there are many others as we shall discuss later, is that it is concerned with *relative advantage*. The notion of competitive advantage is based on the premise that an organisation's performance is superior relative to all the available competition. Formula 1 clearly exhibits this criterion as a team may make significant performance enhancements to their own car, only to find that it has become inferior to the competition who have made greater advances and therefore their relative pace of improvement is insufficient to maintain a competitive position. All too often organisations lose sight of the external relativity of performance and focus too heavily on performance enhancements relative to their own internal benchmarks; in Formula 1 performance benchmarking is always relative to the competition and a team's performance is only as good as the last race. These factors create a context where there is no let-up in the search for both short- and long-term performance gains.

A further aspect that makes Formula 1 a valuable subject for our study is that it integrates all the fundamental resources of organisations: human, financial and technological and relies on the continual development of knowledge to ensure competitive performance. It is primarily a people-based industry, but also one which requires large sums of cash to fund the technological development and human resources needed to generate superior performance.

The longevity of Formula 1 also provides us with an important opportunity to consider the long-term implications of performance rather than focusing on those firms that are currently the high performers. This also means that, unlike many other performance-based



studies, we don't have to apply a short-term cross-sectional research approach, we are able to focus on the dynamics of these organisations, both in terms of their growth characteristics and emergent cultures, but also through the opportunity to examine both the highs and lows of their competitive performance.

The nature of Formula 1 as the pinnacle of motorsport technology allows us to focus on the role of technology in supporting competitive performance. Frequently technology is seen as both an enabler of high performance, but also as a huge cost; a potential 'black-hole' that can quickly devour an organisation's resources for no benefit in performance. This is a tension that is particularly evident in Formula 1 where many high-budget teams have been unable to translate their superior technological resources into enhanced performance. Formula 1 therefore provides the ideal context for us to consider this problem.

Formula 1 is also a global phenomenon. Whilst in its beginning it was primarily a European championship (with the Indianapolis 500 also included from 1950–1960) it has now become a global spectacle taking place on five continents across the world; performance therefore has to be seen in a global, rather than local, context. The global nature of Formula 1 is also exemplified through the diverse mix of nationalities within the employees of the constructors. In 2004 Ferrari employed German and Brazilian drivers, a French CEO, an English technical director, a South African chief designer and an Italian engine director; such cultural mixtures are common in many global organisations and here we are able to relate such diversity to the performance of these organisations.

Our final reason for selecting Formula 1 as a basis for understanding competitive performance is that it provides a 'fishbowl' for us to examine the components of performance at the critical levels of organisational systems – the Formula 1 team and its partner organisations; teams – the various groups of individuals who amongst other things create components of the car, coordinate race strategy and change the wheels and tyres during a race. And individuals – looking at how individual employees are able to sustain motivation and develop the skills and competence needed to perform at the limit.

While these factors provide a basis for our investigations it is also important to be mindful of the limitations of using Formula 1 in this way. Our study is of a very particular and unusual industry. It operates on the basis of a commercial activity to feed a technological system to

ultimately create a car to race against the competition. It is therefore less concerned with issues such as customer satisfaction and cost control than perhaps other organisations. We are mindful of these limitations, but we do believe that the overall benefits of exploring a performance-rich context such as Formula 1 outweigh some of the concerns around the idiosyncratic nature of this particular context. It is important for managers to look beyond their own contexts not only in order to help them recognise the distinctiveness of their situation, but also in order to stimulate new ideas and questions about their own performance.

### **The basics of Formula 1 motor racing**

Formula 1 is the longest established motorsport championship series in the world. The purpose of Formula 1 was initially to provide a racing series that allowed different manufacturers to showcase their cars and technology. A fundamental part of Formula 1 is therefore that each team not only races, but also designs and manufactures the car. There are also several instances where teams design and build their own engines as is the case with teams such as Ferrari and Toyota. For this reason the term ‘constructor’ is often used to identify a Formula 1 team. Table 1 provides a summary of some of the distinctive features of Formula 1 in comparison to other internationally recognised race series.

Formula 1 is an ‘open-wheel’ formula, which means that the wheels of the car are exposed and that, within certain parameters, the designers are free to come up with whatever solutions they feel will provide the best race performance. Figure 2 provides a simple schematic to represent the typical layout of a Formula 1 car.

Figure 2 identifies a number of important aspects about the car. The first is the term ‘chassis’, which refers to the main body and structure of the car. An efficient chassis is critical for the car to achieve the maximum level of grip, thereby optimising cornering speeds. The second is the engine and gearbox, which is located behind the driver at the rear of the car. This component actually forms part of the main structure and is attached directly to the chassis, the engine and transmission providing the power needed to propel the car around the circuit. The third group of components are the aerodynamic devices, known as ‘wings’, at the front and rear of the car. These devices combined with the overall shape of the car also provide grip, but do so through using aerodynamics to

*Table 1. Contrasting Formula 1 with other types of motorsport*

<i>Characteristic</i>	<i>Formula 1</i>	<i>NASCAR</i>	<i>Le Mans &amp; American Le Mans (ALMS)</i>	<i>Formula 3000</i>	<i>Indy Racing League</i>	<i>World Rally Championship</i>
International race locations	Yes	No	Yes	Yes	No	Yes
Cars designed and manufactured by teams	Yes	Yes	Yes	No	No	Yes
Open wheel or fully covered bodies	Open	Covered	Covered	Open	Open	Covered
Based on production cars	No	Yes	No (yes in GT class)	No	No	Yes
Type of track	Tarmac circuit	Tarmac oval	Tarmac circuit	Tarmac circuit	Tarmac oval	Tarmac and rough terrain roads
Weather/light conditions	Dry and wet	Dry only	Dry, wet and night	Dry and wet	Dry only	Dry, wet and night

constructors involved in Formula 1, with an average tenure of just under six years (in comparison, the average lifetime of a UK plc is around twelve years).

Many great automotive marques have attempted and failed to secure a competitive position in Formula 1; names such as Porsche, Aston Martin and Bugatti were all unable to support their entry into Formula 1 with competitive performances (although Porsche later became a successful engine supplier with the TAG-funded engine, which powered the Championship winning McLarens of 1984 and 1985). Originally a showcase for manufacturers such as Maserati, Alfa Romeo and Mercedes to demonstrate the prowess of their cars, Formula 1 soon developed into a more specialised activity with purpose-built single-seat racing cars manufactured by companies such as Ferrari in Italy (who in contrast to their Italian counterparts introduced road cars to help fund their race activities rather than vice versa) and Cooper and Lotus in the UK.

### **The spectacle**

Formula 1 is the third most-watched sport in the world. It is surpassed only by the Olympic Games and World Cup Soccer, but unlike both of these events it takes place annually. It also enjoys a relatively high frequency of events during the year and also is less dependent on the weather as suggested by Table 2.

In 2004 eighteen races took place across five continents and in sixteen countries, as shown in Figure 3.

In 2003 each race was watched on TV by an average of 162 million viewers and many more are exposed to other related news coverage. There are also 3.6 million spectators each season with an average of 212,000 per race, 45% of whom are women. There were ten constructors each of which entered two cars and two drivers per race. However, due to the need to continually develop their cars the constructors will produce approximately ten chassis a year and use around 150 engine 'lives' (a term used to denote the fact that many of these engines are rebuilds rather than brand new units). With budgets often in excess of \$300 million and a workforce of up to 1,000 individuals, these are not small organisations but specialist technology and marketing companies that provide the fundamental part of the glamour and spectacle of the Formula 1 series.



Figure 3. World map showing 2004 races

The 'Grand Prix Circus' involves around 2,000 people at each race and 150 huge transporters travelling around the world in order to relocate the cars, spare parts and mass of equipment that is required to support a Formula 1 team. At the long haul intercontinental 'fly-away' races the transporters are left in the home bases of the teams, however all of the same relevant equipment has to be packed, containerised and flown to each of those specific events. This number is made up of the race teams, a whole range of support organisations from race organisers, through the medical teams, to the hospitality and marketing operations. However, these 2,000 people are the tip of the iceberg and are supported by an estimated further 10,000 or so back at the various factories and facilities that support the Formula 1 industry. The teams themselves have state of the art design and manufacturing facilities, which deal with a constant pressure to continually improve and enhance the designs and manufacture of the cars.

Formula 1 teams use complex networks of high technology suppliers who are responding to the demands for new levels of performance from new designs, new materials and new manufacturing approaches. The entire system is fed by a sophisticated commercial operation, which forges partnerships based on brand synergies and reciprocal marketing arrangements. The teams are led by a range of individuals from corporate managers to serial entrepreneurs who live, breathe and sleep the sport, but for all, most importantly, winning is always at the top of the agenda. Sir Jackie Stewart, three times World Drivers' Champion and Team Principal, Jaguar Racing, says,

*'I can tell you how many races I've won, but I haven't the faintest idea how many times I came second.'*

Dickie Stanford, Team Manager, WilliamsF1, states,

*'If we don't win a race there's a problem. We haven't done our job properly. Somebody, somewhere down the line hasn't done something and we've failed.'*

### Technological change

Like many dynamic industries Formula 1 has undergone a number of technological shifts over the years that have created new competitors and also destroyed some of the competences of established firms. As with any industry undergoing change these firms either manage to



transform themselves or collapse. An illustration of the impact of such changes is provided in Appendix B, which details many of the Formula 1 teams who have either collapsed or left the sport from 1950 to 2004. Table 3 shows a summary of some of the key stages in the evolution of Formula 1, with technology shifting from the large powerful Italian cars of the 1950s through to the light agile British cars of the 1960s through to the focus on aerodynamic grip, which began in the 1970s and has made aerodynamics the central competence for creating performance in Formula 1. It is also interesting to note that in the Formula 1 seasons for each new decade over the fifty-year period featured in Table 3, Ferrari is in every season with the exception of 1980, an issue that we will return to later.

### **Growth and prosperity**

Whilst today Formula 1 is a well-established industry of medium-sized companies, it is only in recent years that it has achieved this status. In the early 1990s it was still a niche industry of relatively small firms. In 1992 the payroll at Williams included 190 employees, in 2004 this had risen to 493. There are a number of reasons to explain this shift, first, Formula 1 enjoyed a huge growth in TV interest during the early 1990s, which made it the most-watched sporting series in the world. Second, and partly as a consequence of the increased global exposure of Formula 1, many automotive manufacturers, who had kept a safe distance (with the notable exceptions of Fiat and Ford), began to get more and more involved.

### **The constant pressure of competition**

One of the reasons why Formula 1 provides such an interesting parallel with today's business environment is the constant pressure of competition. Competition can come in many different forms, for Formula 1 a key issue is that standing still means going backwards – such is the pace of development of every constructor. As shown in Figure 4, Formula 1 is constantly improving its performance, despite the fact that regulations are continually formulated in order to keep the speed of the cars within safe limits.

In the 1950 Monaco Grand Prix Juan Manuel Fangio achieved pole position in an Alfa Romeo 158 in a time of 1 min. 50.2 secs., an average

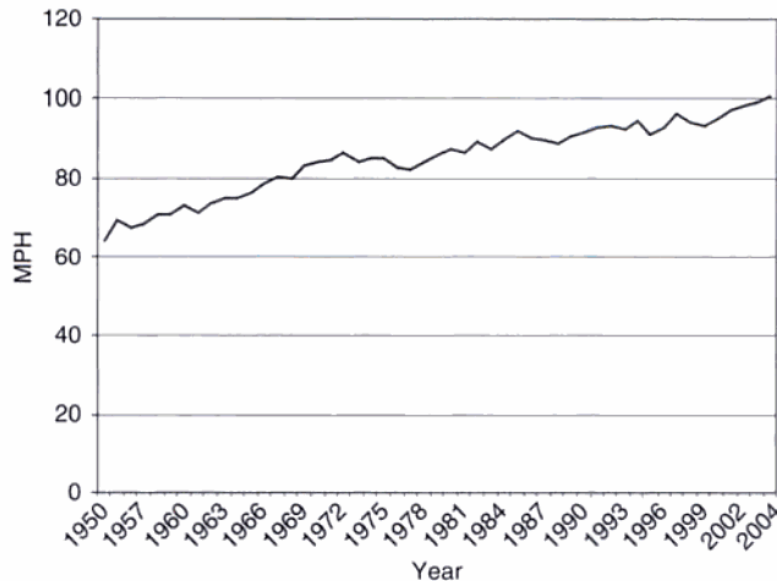


Figure 4. Fastest qualifying lap, Monaco Grand Prix 1950–2004

speed of 64.55 miles per hour (104 kph). In 2004 Jarno Trulli in a Renault R24 achieved a time of 1 min. 13.96 secs., representing a speed in excess of 101 mph (163 kph) underlining the constant pace of development even at a historic road-based circuit, which has the slowest speeds of them all.

### Revenue streams

The flow of funds into Formula 1 has moved full circle over the last fifty-five years. Initially, most of the funds were provided by the automotive manufacturers simply by subsidising their own engineering departments to design and build Formula 1 cars. The cars themselves carried very little identification other than the colour schemes used to underline their country of origin: silver Mercedes and Porsches from Germany, red Maseratis, Alfa Romeos and Ferraris from Italy, the light blue Talbots were French and the British Racing Green Vanwalls and BRMs represented the United Kingdom.

In 2004 almost half of the estimated \$1.8 billion revenue that flowed into Formula 1 came from the car manufacturers, with Japanese manufacturer Toyota providing the largest contribution at \$170 million.<sup>8</sup>

In the interim period the advent of commercial sponsorship into Formula 1 was in 1968 when Colin Chapman's Lotus team secured funding from cigarette manufacturer Imperial Tobacco to paint their cars in the colours of their 'Gold Leaf' cigarette brand. During the subsequent years tobacco became a major source of funding for many teams with Philip Morris's Marlboro brand proving to be the most enduring. Having first sponsored the McLaren team in 1973 they were still active in 2004 as a major sponsor of Ferrari (at \$86 million). As part of the agreement it is they, through Ferrari, who pay driver Michael Schumacher's annual salary in excess of \$30 million. This does not include the various other sponsorship deals that supplement his basic pay.

A key part of the relationship for the sponsors is that they achieve exposure for their brands on the car, but there are other aspects to the relationship, in particular where the sponsor is also a technology partner, such as the relationship between Ferrari and Shell. Shell not only provide direct cash to support their sponsorship but also technical support to help develop both the performance of the Ferrari engine as well as their own fuel and lubricant products.

In more recent years the return of the car manufacturers has also meant the sponsors may benefit from particular reciprocal marketing agreements, such as the supply of Hewlett Packard computers in BMW dealerships reflecting the close relationship between BMW, WilliamsF1 and Hewlett Packard.

### **Formula 1 management**

The focus of our study is the Formula 1 constructors – the organisations which design, manufacture and then race their purpose-built cars. However, we also need to recognise that as a sporting event Formula 1 is itself a product that operates in a highly competitive marketplace. This was not always the case, in past years the Formula 1 World Championship was a relatively ad hoc affair with the individual race circuits determining the financial conditions for entry and appropriating the advertising and media rights for the event. This all changed in 1972 when the racing car constructors, a typically eclectic and fractious amalgam of organisations, were first represented as a (relatively) cohesive bargaining group by Bernard Charles Ecclestone, an entrepreneur who had formerly raced, managed Austrian driver

Jochen Rindt in the late 1960s and had purchased the Brabham Formula 1 team in 1970. The Formula One Constructors' Association (FOCA) effectively shifted the balance of power away from the race circuits to the constructors – the teams who raced their cars in the World Championship. Soon the advertising and media rights for every race in a World Championship became the property of FOCA with circuits now having to pay for the right to hold a Formula 1 Championship race. The financial gains from these sources were distributed amongst the teams through the Concorde Agreement (so called because it was signed in Paris at the headquarters of the Federation Internationale de l'Automobile, FIA, which is located near the Place de la Concorde), which specified the basis by which the teams would operate and also the way in which funds were allocated.


This shift of power to the constructors made Ecclestone one of the world's wealthiest men, and created millionaires out of a number of team owners who had built their businesses up from almost nothing to become successful Formula 1 constructors. However the influx of the car manufacturers back into Formula 1 in the 1990s led to concerns that the management company – now called Formula One Management – was too powerful. In the opinion of the team owners, the revenues generated by Formula 1 were not being fairly distributed to the teams and the circuits, which in the latter case were now requiring significant investment to keep in line with spectator expectations and new safety requirements.

In November 2001, a number of Europe's leading car manufacturers founded GPWC Holdings BV, a joint venture established to create a competitor to Formula 1 when the current Concorde Agreement expires on 31 December 2007. One of the main stimuli for this move was the acquisition of 75% of SLEC – Ecclestone's company that owns the media rights to Formula 1 – by media tycoon Leo Kirch. The car manufacturers were concerned that Formula 1 could lose its free-to-air TV coverage and become limited to Kirch's pay-TV channel – Premiere, which had been broadcasting Formula 1 for several years. However, the subsequent collapse of Kirch's media empire placed some doubt as to where the ownership of the remaining 75% of SLEC would end up. This essentially meant that a situation existed with the automotive manufacturers pouring in around \$2 billion per annum into Formula 1, with no control or influence over how Formula 1 would be broadcast to its target markets.

On 19 December 2003 five of the world's biggest car makers, represented through GPWC Holdings, signed a memorandum of understanding with SLEC Holdings, the holding company of Formula One Administration Ltd, for the car manufacturers to gradually acquire up to 50% of SLEC and thereby receive a greater share of the television, circuit franchise, trackside advertising and race sponsorship rights estimated at \$656 million. At this time the management board of GPWC was made up of Chairman, Jurgen Hubbert (Daimler-Chrysler), Luca di Montezemolo (Fiat/Ferrari), Burkhard Göschel (BMW), Patrick Faure (Renault) and Richard Parry-Jones (Ford). This accord suggested that the teams could look forward to receiving greater contributions, estimated to be around 40% of SLEC revenues, as opposed to the 23% they received previously. It was also proposed that there would be a series of one-off payments to protect the smaller privately operated teams such as Minardi and Jordan.

However in January 2005 there was a dramatic shift in the GPWC alliance when Ferrari broke ranks and signed a preliminary agreement to a new Concorde Agreement with Formula One Management Ltd and the Fédération Internationale de l'Automobile. How this all unfolds remains to be seen, but it is likely there will be many more twists and turns along the way.

# 3



## *The performance framework*



A Formula 1 team is a complex system. It combines many different resources such as human capital, technology, marketing and finance to achieve a performance outcome that hopefully is superior to those of its competitors. It is a critical balance between optimising the potential of individual areas and ensuring that the integrated effect exceeds the sum of the parts. For many watching the Formula 1 spectacle it is all down to the skill of the driver. In our study we conclude that the driver is an important ingredient, both from the point of view of driving skill and also in influencing the motivation and dynamics of the team. But a driver can never succeed without the support of the organisation and its technology. One only needs to look at situations where the winners of the Formula 1 World Drivers' Championship have moved to other teams following their point of success to illustrate this effect. An example of this is provided in Figure 5.

In 1995, 1996 and 1997 three different drivers won the World Drivers' Championship. Each of these drivers moved to a new team shortly following their championship success and the subsequent fortunes of each was very different. In 1996 Damon Hill won the World Drivers' Championship but left Williams to join Arrows in 1997 and then in 1998 moved to Jordan, eventually retiring at the end of 1999. Also driving for Williams, Jacques Villeneuve won the title in 1997, he stayed with Williams during 1998, but then left to help set up the new British American Racing team (BAR) of which his manager, Craig Pollock, was Managing Director and a major shareholder. However, he was unable to repeat his earlier success and left BAR at the end of 2003. In contrast Michael Schumacher was champion with the Benetton team in 1994 and 1995 and then left to join Ferrari, but it took five years before he became world champion again in 2000, supported by the top technical team at Benetton who followed him to Ferrari a year later in 1997.

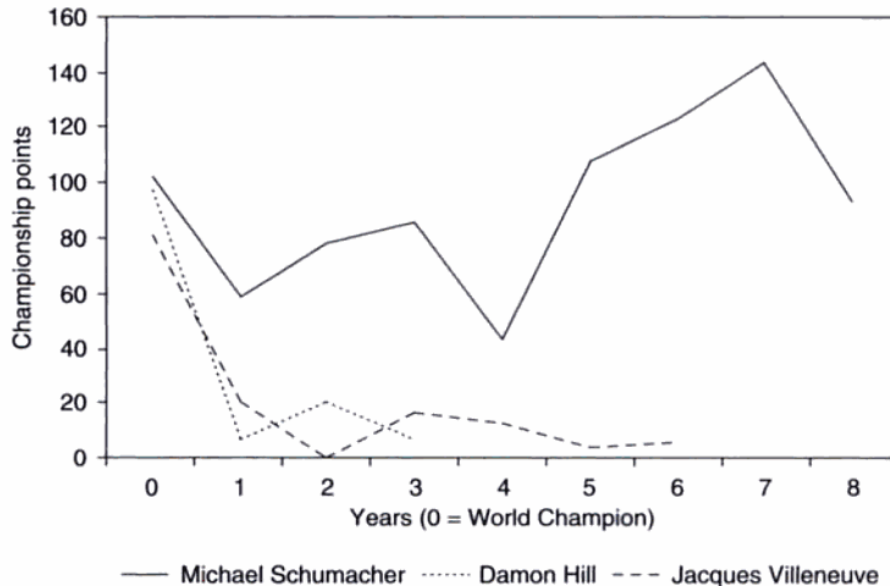


Figure 5. Driver performance following winning the World Drivers' Championship

The point here is not to explain the demise of some drivers and the success of others, but to illustrate that in the same way there are many factors that can explain the lack of performance of a driver relating to the design of the car and effectiveness of the race team, there are many factors that explain the apparent success of a driver rather than just driving skills. The driver is therefore one part of this team and in order to sustain success in this highly competitive situation all aspects of the team have to integrate effectively.

It therefore requires *individuals* to be knowledgeable and highly motivated in order to maximise their contribution to the whole system. But it also requires that these individuals work effectively in *teams*, whether it be the pit crew who refuel and change the tyres of the car in a matter of seconds, whether it be part of the design team who work to create an aerodynamic component linking in with staff in the wind tunnel and the composites department, or whether it be the commercial team who work together to engage a new sponsor thereby ensuring future funding for the technology. Furthermore these teams and individuals also have to work with their *partners* at the team and individual level. This may involve tyre suppliers such as Bridgestone effectively becoming part of the race team to ensure that the tyre performance is maximised through analysis of

wear rates, track temperature and air pressures. But the system has also to work at the *organisation* (or multi-team, cross-functional) level ensuring that connections are being made between the test team, the race team and the designers to improve the car as effectively as possible and even where the pit crew are working with the commercial team to ensure that their most prestigious sponsors get access to the pit garage, but without compromising race performance.

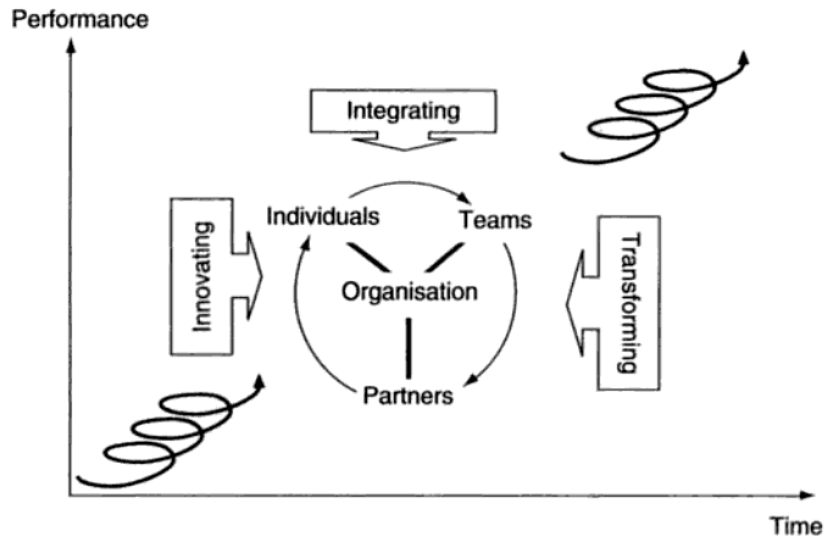
The central framework that we will use as the basis for this study relates to four key elements in the performance system of an organisation: the *organisation* itself, *partner* organisations, *teams* and *individuals* all work together to produce the outcome of performance.

These four elements are in turn influenced by three dynamic processes that move across these elements. These are concerned with: *integrating* – the way in which the organisational system brings together all of its diverse, but connected activities, providing clarity of purpose and also constantly adjusting the various tensions that need to be balanced to optimise performance, *innovating* – the way in which the system continuously improves and enhances its performance levels, and *transforming* – the way in which the system reconfigures itself in order to create new resources and new performance levels in response to changing conditions and competitive pressures. All of these processes impact on the elements to explain the overall performance outcome as illustrated in Figure 6. Together they provide the organising framework for the book, which we will now consider in more detail.

## Individuals

For many of the individuals working in Formula 1 this is their dream job. They have always wanted to be in Formula 1 and have now achieved this. Their focus is therefore, at one level, to maintain this situation, but the highly competitive nature of Formula 1 means that they are also constantly striving to both establish their worth and progress as well. This can produce examples of the ‘Peter principle’<sup>28</sup> where talented designers and aerodynamicists have taken on more managerial, coordination roles as they believe these to be advancements, but have then been found to be sadly lacking in terms of the abilities needed to succeed in this role.

There is a huge range of roles encompassed within Formula 1 from those working on leading edge car design to those handling the



**Figure 6.** The performance framework

negotiation of multimillion dollar sponsorship contracts. There is also a wide range of nationalities involved, and not just from those countries that hold Formula 1 races. While there is a broad blend of nationalities, the gender mix is still predominantly male. However, there are some indications that a strong female presence in marketing and public relations is also spreading into the more technical aspects of Formula 1.

### Teams

Within Formula 1 the challenges of motivating and coordinating individual talent are central to both creating and sustaining a competitive edge. Labour turnover rates are particularly high in Formula 1; in this context turnover often meaning staff moving to, and being recruited from, the competition. This means that, on the whole, Formula 1 teams cannot afford to rely on individual knowledge, but on building a wider social capital that underpins the whole organisation and perhaps most importantly by welding individual knowledge into the combined capability of a team.

Teamwork is a central element of the Formula 1 organisation. It is recognised that the performance of the organisation is only as good as its weakest link. Therefore, the focus is on ensuring that everyone is up to speed and pulling their weight. In the Formula 1 context we see the

periods when relationships with tyre suppliers became critical in achieving performance advantage. For Ferrari in 2002, 2003 and 2004 their relationship with Bridgestone was critical to the performance advantage that Michael Schumacher was able to leverage.

There are of course differing kinds of partners for Formula 1 teams, these range from technical partners, who provide key products and technologies, to pure sponsors, who have no direct involvement other than the exposure of their brand on the Formula 1 car.

### **Organisation**

The purpose of the organisation in Formula 1 is very simple. It is a structure that is created to generate the revenue streams that enable it to design, manufacture and race the fastest and most reliable car. A key part of the flexibility and responsiveness of the Formula 1 organisation is attributed to the importance of the informal organisation. In Formula 1, concepts such as 'grade' and 'structure' are virtually non-existent, what matters is getting the job done in order to make the car go faster and whilst there are clear separations between technical disciplines, such as aerodynamics and electronics, these to a large extent are delineated by parts of the car. A team that works on the gearbox is defined by this particular component and also the way it integrates with other areas such as the engine design is defined by the component area.

The fact that technical areas are delineated so clearly allows a clarity, which is perhaps lacking in other organisational contexts. The hard part is therefore making trade-offs between areas regarding performance, weight and shape all of which can have major effects on the other parts of the system. Whilst this is a challenging area for today's Formula 1 team, it is also where potential sources of competitive advantage are to be found. The core processes of a Formula 1 team often cut across functional boundaries and organisational levels. These processes relate to the design and manufacture of the car with all the resultant issues around supply chains and assembly of components. Other aspects relate to the development process where cars are constantly refined, to the mechanisms by which sponsors are engaged and brought into the team and also the way in which race strategies are developed and executed.

A further aspect of organisation relates to culture. Whilst Formula 1 is a particularly close-knit and incestuous industry with many employees

Colin Chapman in the 1960s and 1970s. Others have focused on constantly integrating innovations into their cars, many of which have originated from other teams, but which are combined in highly effective ways to maximise the performance of the cars. For example, Patrick Head created the Williams FW14B, one of the most successful Formula 1 cars of all time, through integrating many different small innovations effectively into one car. To talk about the 'importance of innovation' in Formula 1 is stating the obvious, it has to go on all the time, but it is also true that there is no such thing as a truly new idea. Technology is changing but innovation is often about reconfiguring and rearranging ideas from both within and outside the industry.

Creating the kind of organisation that is able to perform at the highest levels with total reliability, but which is also constantly innovating and changing the basis for competition, is the ultimate competitive organisation. Every Formula 1 team has to constantly live with this tension, and how they achieve this provides some important insights into managing the uneasy balance between exploiting today's ideas and exploring those of tomorrow.

### **Transforming**

Change is a constant imperative in any dynamic organisation, so much so that management consultants are now referring to change fatigue and the importance of stability. Undoubtedly, all organisations are finding ways to deal with the problems of constant change, however, for many this is a necessary evil to be countered, and they seek the restoration of stability as the objective of such initiatives. For Formula 1 teams, change is a constant pressure they can't ignore. However, this is at the level of continuous improvement based around their current systems and technologies. This has not always been the case, but it is fair to say that really radical change only occurs when teams are performing poorly and when new technologies or new entrants require a more radical response.

There is also the issue of organisational and culture change, where organisations have to reinvent themselves. In Formula 1, few teams have the luxury of being able to do this, unless they are well resourced, as in the case of Ferrari in the late 1990s. However, despite many of these firms often being owned by multinational corporations they are run as family businesses. This creates many of the advantages outlined



in this chapter but it also creates the kind of inertia that makes radical change particularly challenging. It is notably so when many of the original staff and senior management are still in place, they've seen it all before and therefore provide a potential barrier to the radical change that may be needed to achieve sustained performance.

## Performance

Every Formula 1 team wants to be a winner. Despite perceptions from the outside, no-one is going to the race just to make up the numbers. Even Minardi, at the back of the grid, take great pride in the fact that their pit stops can be just as fast as those of the Ferrari team. Each team declares that it is their 'will to win' that keeps them going. If they all have an equal desire to win, what then makes the difference? What is important here, as in any organisation, is that there is a clear connection between all the activities that are undertaken and their contribution to performance. However, such connections are difficult to establish in practice. Many managerial initiatives are based on the assumption that there will be a positive impact on performance, however such a relationship is often merely asserted and there is frequently no subsequent effort made to validate this relationship.

In our framework the elements of *individual*, *team* and *partner* are connected to each other to signify the obvious interrelationships that exist between them. When these components are working in synergy, a virtual circle of activity can exist that allows the collective efforts of all three to drive organisational growth and improved effectiveness. The processes of *integrating*, *transforming* and *innovating* acting upon the organisation add additional levels of complexity and also create potential conflicts. The spirals in Figure 6 represent the competitive advantages and disadvantages that the interaction between these activities can create for a firm. People or organisations can develop behaviours and momentum that lead to cycles of success or winning streaks. It becomes a virtuous circle involving greater levels of communication and participation. It makes it easier to bond because people respect each other in a group of winners. This frequently occurs in Formula 1, however, the circle can also become 'vicious' in the sense that this bonding may manifest itself in terms of arrogance and views of invincibility that allow new competitors to seize the initiative. It is, therefore, critical that the cycles of winning are tempered with the ability to

challenge and adapt as conditions require. Similarly if performance deteriorates then organisations fragment into factions that, in the worst case, pass the blame on to each other, making it increasingly difficult to meld the elements back together. It is all too easy for the virtuous circle to quickly become a vicious one.

Formula 1 provides one of the few organisational contexts where we can get closer to the linkage between individual actions, team outputs, organisational characteristics and performance.

## 4 | *Individuals*

*The people in this business all have the same fever. It's do it yesterday, never tomorrow.*

Sir Jackie Stewart, Former Triple World Drivers' Champion and Founder and Team Principal, Stewart Grand Prix

Formula 1 is perceived as the pinnacle of international motorsport and people working in it, at all levels, believe they are involved in the ultimate racing endeavour. They enjoy a unique opportunity to participate in a global sports and business arena associated with international travel and the excitement that comes from advanced technologies, powerful engines and high speeds.

Each person brings to the team his or her own personality and skills set that contributes to the collective effort. Sir John Allison, Operations Director at Jaguar, provided an interesting backdrop for understanding the diversity of behaviours and styles in a Formula 1 team. He compared his experience at Jaguar Racing not to other businesses, but to the Royal Air Force. Prior to joining Jaguar Racing, Allison had spent thirty-eight years in the RAF retiring with the rank of Air Chief Marshal, Commander-in-Chief, Strike Command. In his view there are, surprisingly, many similarities between the two.

*The Royal Air Force is striving to produce a world-class performance on a limited budget, which is certainly true of Formula 1 also. Like F1 the RAF goes to deployed theatres to do its operations, it sends a small proportion of its number out to that theatre and an even smaller proportion actually go into battle; and yet, we are trying to create an 'all of one company' team spirit. The RAF is an organisation where the contribution of everybody matters and has to be valued. The same is true of a Formula 1 team. The RAF is high-tech, it's high performance, it's dangerous for people at the sharp end – so too is motor racing.*

According to Allison such similarities between the two fade when it comes to the people involved.

*The RAF tends to attract in the first place people who fit into a certain mould or it later sieves out people who don't fit, which means there are very few mavericks. This means you can usually predict roughly how people will behave, either because that's the way they have been genetically programmed or that's the way they have been trained in order to fit into the organisation. That's not true of motor racing because the industry hasn't been subjected to those kinds of constraints and disciplines, and it attracts a wider and more individualistic cast of characters.*

In business, one is accustomed to working with people who demonstrate a wide spectrum of personality types and behaviours. This is also true in Formula 1. But a closer examination of the mechanics, technicians, engineers, managers and drivers in the sport reveals certain common characteristics that are worth noting. We have identified several common characteristics that consistently cut across all Formula 1 teams. Formula 1 people demonstrate *passion* and *drive*; *focus* and *competitiveness*; *knowledge sharing* and *desire to improve*; an *entrepreneurial mindset*; and *attention to details*. However, before taking a closer look at these, we start with a few comments about the people who lead Formula 1 teams, the team principals.

### Team principals

Team principals sit at the top of every Formula 1 organisation. They are lightning rods for praise, dissent and media gossip. Egos among this group of individuals run high. This is not a position for someone without a high degree of self-confidence. All team principals are passionate about the sport and work long hours relative to anyone else on their teams. Interestingly, and perhaps consistent with the entrepreneurial nature of this business, people in senior positions at Formula 1 teams are, according to Pat Symonds, Engineering Director at Renault F1 Team, almost

*... without exception people like myself, professional engineers who have been in the business a long while, but not managers. And in common with most Formula 1 teams, we don't have trained managers, you won't find any MBAs here, which I find quite interesting.*

These are typically self-made men. Many have been race drivers and most have been associated with the motor industry or motorsports in

some way before moving up to Formula 1. Most have seen the development of their businesses from the bottom up. They have been schooled through experience and ‘hard knocks’, and, therefore, they have tended to develop ad hoc practices for designing, building and running their cars to the limit. Some can be very detail-oriented and at least in their earlier years, as admitted by most, not very savvy in terms of managing people and external partnerships.

Over time, this has had to change. The teams have grown to sizes of major companies. The amount of money at stake has increased significantly over time. Team principals have needed to learn about operating in a different, more professional environment and, in some cases, bring in management talent or consultants to help provide guidance for the business going forward.

Managing people in this industry is not easy. As Pat Symonds points out,

*The interesting thing about Formula 1 is they're all rather difficult people to manage because they are self-opinionated, arrogant sort of people in the nicest possible way. To be honest that's what we look for at Renault. We look for people who think laterally, who never accept that something is impossible and who are prepared to work hard. They've got to be team players, while they've got to be individuals. They should be individualistic in their thinking, but team players in their actions.*

## Formula 1 people

With that in mind let's take a look at some common characteristics we have found among the people who work in Formula 1. To summarise, they demonstrate:

- Passion and drive
- Focus and competitiveness
- Knowledge sharing and desire to improve
- Entrepreneurial mindsets
- Attention to detail

### *Passion and drive*

The one word that would encompass the mindset of all the Formula 1 people interviewed in preparation of this book would have to be *passion*. An all-encompassing passion for just about everything that



*I don't work. I satisfy a passion. Which means I don't watch the clock. If you want to get involved with the Formula 1 programme, you have to give your all to win.*<sup>3</sup>

And a team leader in the chassis assembly team put it this way,

*When I take on new members of staff, my number one criterion is passion. Number two is passion. Number three? you've guessed it, I'm sure.*<sup>4</sup>

Ferrari stands out in that it not only garners millions of loyal fans, but also represents the hopes and aspirations of a whole country. Michael Schumacher put it this way,

*Driving for Ferrari is more than special, Ferrari is more than a team. In Italy it is a kind of religion. If you win or if you lose, there is a whole country behind you. It took me a while to understand that and maybe I have learned it the hard way, but now I feel part of that feeling and part of that family.*<sup>4</sup>

Ross Brawn added an interesting angle through a personal experience to the subject of fan loyalty and passion.

*It's our strength and our weakness because when we're not doing so well then it puts a huge pressure on the team and there's no hiding place. All those friends and family who were congratulating you are now giving you a hard time.*

Brawn recalled arriving at Bologna airport during his first season at Ferrari, 1996,

*this airport porter came up and berated me about the performance of Ferrari and what a load of rubbish we were. I barely knew any Italian at that stage, so I had to get someone to translate for me . . . But you get both sides of it, when its good you get something that you don't get with any other team.*

This enveloping passion extends from all the Formula 1 teams to the millions of fans and supporters who follow the sport on television, through the printed media and at the track. And it is this passion, translated into brand loyalty, that Formula 1 team sponsors and owners (particularly in the case of the car manufacturers) hope to tap into in order to spur additional product sales.

Matched with their passion, individuals working at all levels in Formula 1 do nothing by half-measure. They are in a word *driven* (and the authors apologise for the obvious pun that cannot be avoided). Some are propelled by the heady excitement of powerful engines and high speeds, some by the leading-edge technology employed, some by

*rare that I go home before 9:30 or 10:00 at night. If I get in late by 5 minutes I actually feel guilty.*

Paolo Martinelli, Engine Director at Ferrari, commented on the total commitment of their Managing Director, Jean Todt,

*I think it is something that is evident day to day, by the fact that he is present 365½ days a year. You have to be present and understand when people need your help.*

Martinelli humorously recalled when

*Someone came up to me and said that he was going to visit his psychologist. I wondered who that could be and why he was telling me. I realised then of course that he was going to meet with Jean Todt.*

For his part Todt acknowledges the constant pull of his job.

*I am driven to succeed. I cover what I have to cover. I don't want to leave anything uncovered. Even going through all the detail. It can be crazy sometimes, but you know it has to be done.*

### *Focus and competitiveness*

Successful Formula 1 teams *focus* on maintaining steady improvement and obtaining results. To succeed in Formula 1 according to Jackie Stewart,

*It takes a special individual with total commitment and total focus ... nothing like it exists in the corporate world.*

From Frank Williams's point of view,

*Focus is pretty common amongst all the top teams. It's partly borne of passion, partly born of a strong competitive spirit.*

Over the years some Formula 1 teams have attempted to expand their brand and move into product areas that would develop additional revenue streams. Williams added this on that subject,

*We did not do well with our diversification, and we're glad we're no longer involved. I don't think this is a reflection on a weakness or incompetence of our management, rather than a decision that we do not want to do it. There are other examples of how you can manage diversification successfully. The companies may not all be profitable, but some may feed Formula 1 with specialist services. But for us it's simple, we just focus, we just focus here.*

Focus is generally thought to be a positive force in business; but when applied to the wrong strategy or at the expense of the business that can need development, it can be detrimental. Such was the case with Enzo Ferrari's obsession with engines. He believed that motor racing teams lived and died on power. It has taken a great deal of effort to change internal mindsets at Ferrari, but today the focus has been re-channelled. Ross Brawn explained,

*A few years ago it used to be an engine and a chassis. Ferrari was renowned for having very powerful engines, but the chassis was not very good. Today, we would never take that view. It's the car that matters. It's the result of the car on the track that matters and the junction between engine and chassis is seamless. We apply that principle to all areas of the car – electronics, engine, chassis, aerodynamics, structure – it has to be a whole. There is no point in having one area very strong and the other areas weak.*

This focus on the integrated package and total control of all the contributing elements is, Brawn feels, a key factor in their success of recent years.

*A Ferrari is a Ferrari it's not an engine, it's not a chassis, it's not an aero package. It's a Ferrari.*

Formula 1 people are very *competitive*. They work in highly pressured situations and always under tight deadlines. The very nature of the business is about going faster, improving performance while maintaining consistent quality and reliability. They are constantly measuring themselves against the clock. This pertains not only to performance on the track or changing tyres in the pit lane, it also relates to making minute but important changes in the chassis, gearbox, engine or electronics so they can reduce lap speeds by a fraction of a second at the next race. Formula 1 people are strongly motivated to improve on each previous performance. Their successes and failures in this sport are on display for everyone to see within the industry and, thanks to the enormous media coverage, on view for hundreds of millions of fans and enthusiasts.

In the words of Flavio Briatore, Team Principal at RenaultF1 Team,  
*Every two weeks you present your balance sheet. Every two weeks people are judging if you have done a good or a bad job.*

Ron Dennis, Team Principal at McLaren Racing, has said,

*If you are in Formula 1 and you are not a competitive individual, and I mean anywhere in Formula 1, you are going to struggle and have a tough time. It is a cut-and-thrust business where the rewards for success are massive and the penalties for failure are punitive. When you go into the Grand Prix environment you are constantly trying to outmanoeuvre and out-think your opposition and I don't mean only in how you are going to run the car in such a way that you win, I am talking about every single aspect of Grand Prix racing: the politics, the sponsorships, the way you portray yourself, how you race, how you look, how you attract investment and how you optimise or shape your performance.<sup>11</sup>*

Alex Burns, General Manager, WilliamsF1, added his view,

*I think what is important about Formula 1 is the strong motivation you get from being associated with something that you really believe matters. These people are here to win, there's a real sense of competition.*

### *Knowledge sharing and continuous improvement*

Formula 1 is a business that relies on sophisticated engineering techniques, creative design and pioneering use of state-of-the-art materials and electronics. Individual learning is not enough to reach the level of performance that is required to succeed. Successful Formula 1 teams have therefore become very adept at sharing knowledge across the business. There is no place in Formula 1 for people who guard information closely and are not prepared to share their expertise.

One distinctive approach to *knowledge sharing* is being used in the design area at the Renault F1 Team. While Formula 1 teams typically centralise new car design in the hands of one individual, Renault have two chief designers who share an office and, effectively, design cars for alternate years. Pat Symonds, explained,

*The Chief Designer on the 2004 season car is Mark Smith. He's been working on that car throughout 2003 and the winter of 2003/2004. He will oversee its development during the 2004 season. Meanwhile we have finished with our 2003 car and the Chief Designer on that car was Tim Densham. It was effectively finished around September, that's really our last development stage of it. Then he turns his attention to the 2005 car.*

Symonds explained further,

*We've already had our 2005 initial design meeting [in February 2004]. In fact, even before we've run the 2004 car we are having 2005 design meetings. Now that's a fantastic situation to be in and it really does produce a quality product. But it relies on the fact that we've got two chief designers who share the same office, who get on well together, and who don't have inflated egos.*

In this manner Renault can ensure that learning from the 2004 car is incorporated into the 2005 car. Symonds emphasised that,

*It's a continually evolving process. The work being done on the 2005 car is at a stage of fundamental research, things that may or may not work. It does not really matter at this point. But if as the 2004 car develops we see a definite trend, the designer working on the 2005 car would be running with that trend. He'll know about it, he'll be pushing it forward.*

Having the two chief designers sharing the same office is a vital element in fostering this knowledge sharing.

This represents an interesting example of how Renault has been able to mould its organisational structure and therefore strategic approach to design around certain individuals rather than taking the more common approach wherein human resource decisions follow the formation of strategy. As a concluding note, Symonds added that this approach works well with these two particular individuals, but he is not sure if it would work in the same way if other people were in those roles.

All Formula 1 teams demonstrate a drive for continuously improving their performance. No team has been enjoying consistent success during the past few years like Ferrari, so it was interesting to observe that everyone in that organisation works from a mindset that their run of good fortune could end very quickly. This pushes the team to review their performance and seek improvements on all aspects of the car and driver's performance each and every day. Ross Brawn says,

*We talk far more about our failings than we do about our successes. Michael might win a race, but we'll be analysing why Rubens didn't come second far more than analysing why Michael won the race. Because that's the thing that needs fixing . . . that's how we try to push and it's sometimes probably a bit wearing on people because we're winning races, but then complaining. But this is how we try and keep the thing going without getting complacent.*

Patrick Head, Director of Engineering at Williams, commented on how Williams makes sure it follows problems that need to be reviewed and fixed,

Eddie Jordan originally entered motor racing as a driver before getting into team management and ownership.

*Some people might classify me as a form of entrepreneur, but that is only because I'd probably be unemployable in a regular business.*

He recalled discussions with Honda in the late 1980s when they were interested in purchasing his team and suggested putting him under a contract to them.

*This gave me a big shock. It meant that I could be hired and fired. Therefore, the only way to guarantee the project is to do it myself and continue myself.*

His entrepreneurial nature sets the tone for the entire Jordan racing team.

### *Attention to detail*

Formula 1 is a sport where winning and losing is measured in fractions of a second, so it is not surprising that team members pay a great deal of attention to detail. While the lofty vision of a podium finish is crucial for individual and team motivation, day-to-day performance depends on thousands of precise measurements in the wind tunnel, sophisticated aerodynamic and stress simulations on computers, and parts manufactured and assembled to tolerances within microns. Every element of design, development, manufacture, assembly and car set up impacts the fractions of a second that the teams are striving to shave from their lap times. Therefore, focus on detail is paramount.

McLaren Racing's Ron Dennis is renowned for his attention to detail:

*I have a view that every single thing in a company is important; the entire spectrum, from how a toilet roll dispenser functions, to who drives our racing cars . . . The great companies are those that have the intentions of being the best at everything. And this envelops the whole environment.<sup>19</sup>*

And according to Jean Todt at Ferrari,

*The final result in Formula 1 is very much the combination of all the details. And if one detail does not work, you fail, that's why it is so difficult.*



with designers and engineers, and attend innumerable sponsor events. The best do this with a natural grace and aplomb that inspires everyone else on the team.

### *Driving skills and physical conditioning*

Drivers' on-track skills are honed through countless experiences during testing and races as they work their way through the various racing levels up to Formula 1. Some drivers are naturals, but all need grooming because the skill requirements to drive in Formula 1 are a cut above any other car racing formula. Eddie Jordan remarked,

*The gap between all of the Formulas and that of Formula 1 is so immense, it's huge, it's a chasm. With all the razzamataz and all the bits and pieces and the gizmos on the car, it is mind-blowing what the driver has to do.*

Suffice it to say, being able to drive a 900 horsepower Formula 1 car while dealing with all the technologies that Jordan refers to, and while maintaining control at the limit takes fast reactions, exceptional coordination and strong nerve.

It may not be obvious to those who do not follow the sport, but Formula 1 drivers are highly conditioned athletes. Formula 1 cars can accelerate from 0 to 110 mph (180 kph) and back to 0 in less than 7 seconds. This can put a driver under 5 gs of force under braking. So drivers must be as fit as fighter pilots. Therefore, gone are the days when drivers played hard into the night and then hopped into their cars for races the next day. In the 1970s and 1980s there were champion drivers who smoked and drank considerably, but that would not be considered feasible or appropriate now. All the Formula 1 drivers today benefit from personal trainers, carefully crafted diets, and scheduled rest and relaxation periods.

During a race, given the considerable levels of stress and heat, drivers can lose up to 1.5 litres of body fluid. They are schooled in how to hydrate themselves correctly before a race and they are also able to drink fluids through a tube during the race. What has become apparent during the last twenty years is how much leaner the drivers have become. Mansell, Hill, Cheever and Warwick for example were all tall, well-built men. Today, drivers are smaller, lighter and, certainly in terms of their well-developed cardio-vascular systems, in much better condition to withstand the cumulative stresses of an eighteen-race season.

### *Racing intelligence*

One thing that makes a top driver stand out is his racing intelligence. Drivers have a remarkable ability to memorise each turn and elevation on every one of the eighteen Formula 1 circuits. After driving for up to two hours, drivers can recall every gear change or other chassis or engine adjustment made at any given moment during a race. While making split-second decisions guiding their cars around the track, drivers must also be thinking about race tactics, wear on their tyres, car handling and also dealing with unexpected situations. When Jensen Button achieved his first podium finish for the BAR-Honda team at the Malaysian Grand Prix in 2004 he revealed afterwards that he had suffered oil pressure 'spikes' during the early laps. This meant he had to repeatedly reset the oil pump during the race by pressing the pump button ten times in quick succession repeatedly. Sometimes, he commented later, this was necessary more than once during a lap.

*A driver makes thousands of decisions every single lap he's out there and he lives or dies by them, literally.<sup>20</sup>*

The top drivers take in a vast amount of data, compartmentalise it and then use the appropriate information when required. They retain everything and can bring forward remembered experiences and references to avoid problems and difficult circumstances. Being able to keep these memories on tap, ready for use, is a skill great drivers must develop.

Those hoping to become top level Formula 1 drivers eventually learn the importance of continually upgrading their knowledge and skills. However, for many it is not easy. David Richards, Team Principal at BAR, said,

*Keep in mind that racing drivers are inherently very confident, self-assured, and macho. They don't take easily to the notion they can be improved.*

Richards has taken a very systematic approach to assisting the driver-development process at BAR.

*We have built in a programme of self-assessment. After each race five people give an assessment of the driver and the driver himself shares his own view. The feedback takes place through email on Monday. It is confidential and shared only within that group. Jensen Button has said that he never believed he could personally improve as much as he has since we started this process.*

Finland's Kimi Raikkonen has remarked,

*You never stop learning, I guess. I don't think you get much faster as you get more experienced, but you do get better. You learn to adapt to changing conditions. You learn to get the best out of your tyres as they degrade. And you learn to be more consistent. You learn to make fewer mistakes.<sup>9</sup>*

### *Communication skills*

The driver's ability to communicate his views and insights is crucial. Much like the language divide that often exists between information technologists and commercial specialists, drivers and engineers have to get to know how each other speaks. Pat Symonds recalls,

*We often laugh about a driver who'll come in and say, 'There's no grip at all out there.' Of course the engineer says, 'Well, how did you get out of the garage, then?' ... You don't need a driver to be an engineer, but you do need him to be clear, logical, relatively verbose without going on too much.*

External to the racing team, today's Formula 1 driver also needs to be what one might call 'sponsor-friendly', that is schooled in the art of public relations. They, in fact, spend far more time touring around the world at the behest of their sponsors and performing public relations duties than actually spend driving in racing competition. Some are masters at this task and they truly give superior value to their supporters. For many younger drivers this is steep learning experience.

# 5 | *Teams*

*Formula 1 is entirely teamwork related,  
there's almost a dependency on  
teamwork.*

Sir Jackie Stewart,  
Former Triple World Drivers'  
Champion and Founder and Team Principal,  
Stewart Grand Prix

### Formula 1 – a team sport

When Jensen Button reflected on his first top-three finish for the BAR-Honda team at the Malaysian Grand Prix in 2004 he said,

*There was a lot of emotion, and feelings you can't fully explain rush in as you realise you have achieved something with the team that so many people had been working so hard for.<sup>7</sup>*

Button was graciously and accurately paying tribute to the many contributors within the team who had made it possible for him to be spraying champagne while standing on the podium. Formula 1 drivers know they would not be racing week after week without the extraordinary efforts of the entire team. While the driver is seemingly alone on the track, Formula 1 is a team sport and the skills of the best driver cannot guarantee victory without a well-coordinated and efficiently executing team behind him.

By convention, the competitors in this business are called a *team* – the WilliamsF1 *Team*, the Jaguar Racing *Team*, the Minardi *Team*, and so on. Certainly the use of the word 'team' to describe organisations participating in sports events is not uncommon. But even as the Formula 1 industry has evolved into a multibillion dollar business, the description of each of its participants as a *team* is significant and the operative word 'team' conveys something meaningful and powerful.

In short, he described the key element on which a Formula 1 team succeeds or fails. He took the team reference further by referring to his associations in the sport as his *family*.

*The people that work with us are not just employees. They're part of the family and you've got to build that family up.*

The term 'family' to describe a Formula 1 team is heard repeatedly in this industry. It conveys a sense that teamwork and working relationships are being taken to a deeper, more personal and meaningful, level.

Raoul Pinnell is Chairman of Shell Brands International and responsible for Shell's successful relationship with Ferrari. He shared a story about his own learning experience about the Ferrari race team family. After joining Shell, Pinnell was charged with negotiating the contract with Ferrari. He flew to Milan where he had organised a meeting with the Ferrari management team:

*I had arranged these standard office rooms serving poor coffee and stale sandwiches. During the meeting I banged on about the details of the contract until it ended without result.*

Realising there had been a style and cultural disconnect, Pinnell arranged to return to Italy a few weeks later. But this time the Ferrari people offered to organise the venue.

*They took me straight to a restaurant and offered me some wine. Normally I don't drink wine at lunch but I realised it would be rude if I did not oblige. They asked me about my family, my friends, my history, and my life in general. I kept thinking when are they going to get to business. I kept checking my watch and thought about my plane departure time. Finally, I mentioned my concern and they said, 'Don't worry; we've got a car ready for you. And now we know you and like you. You are part of the family.' They gave me a big bear hug, we talked and after we agreed certain things in principle, they poured me into a Ferrari for the drive to catch my plane.*

Pinnell experienced a clash between his concern for getting the contract negotiated – a more 'Northern European' approach as he put it – and their relationship focus. But while enduring the initial discomfort of the experience he was also introduced into the Ferrari way of doing business, where in Pinnell's words,

*if you are one of the family we will do things for you and they expect that this will also work in reverse whether it is in the contract or not.*

Perhaps this sense of family that one finds in most Formula 1 teams can be expected given the constant pressure and tight deadlines under which they operate. Individuals exhibit remarkable commitment to their team and to each other. They are accustomed to pulling together in order to get the job done under difficult circumstances. This element of making it work under adverse conditions adds to the feeling that they are part of a *family*.

Our research has determined that Formula 1 teams exhibit four key traits that foster the type of teamwork that is required to win races. Team members within their functional units share a *clear, common goal*; work at *building trust* between each other, are willing to *learn and collaborate*; *communicate* openly within a *no-blame culture* that has been established by the senior leadership of the organisation.

Before discussing these characteristics it would be instructive to look at one crucial Formula 1 team activity that cuts across all of the competitors in this sport equally. All four of these teamwork traits are evident in how a Formula 1 organisation handles its pit stops during a race.

### The Formula 1 pit stop

No demonstration of teamwork more fully represents the dedication and commitment required in this sport than that which is displayed by the pit stop crew. Other than the driver they are by far the most visible team unit at each race. Their efforts are displayed, and replayed in slow motion, to be viewed by hundreds of millions on televisions around the world. The successful completion of the pit stop task is absolutely crucial if a team wants to finish on the podium. According to Jackie Stewart,

*Enzo Ferrari knew as a racing driver that you had to have pit signals and you had to have the garage organised. You had to have the pit stops working better because the time that was lost there could never be made up by the driver. Whatever time the driver could gain on the track, it wasn't as much as could be gained changing wheels or putting in fuel.*

John Walton, Minardi's Sporting Director, headed the Minardi pit stop team until his untimely death in July 2004 at just forty-seven years of age. Walton reinforced this view:

*The pit stop plays the major role in the race strategy because a second lost in a pit stop can be the difference between winning and losing a race.*



The pit stop is a very special part of a Formula 1 race. This activity that at its best takes place in about seven seconds has been described as

*... a preordained set of manoeuvres that is barely related to the rest of the weekend's efforts, calling for complex activities where many discretionary, invisible, coordinated decisions are made in a split second.*<sup>14</sup>

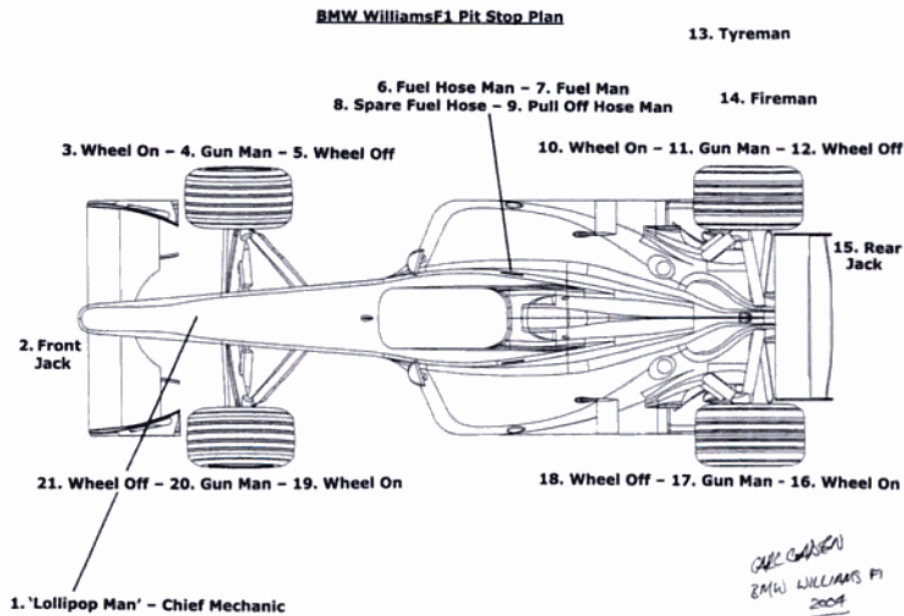
The pit stop in its basic form involves changing all four tyres and adding a pre-measured amount of fuel. Interestingly, it is the regulated flow of injecting fuel that determines the total time necessary to complete the pit stop. A Formula 1 pit stop crew can actually change all four wheels and tyres in less than 3 seconds. Ironically, this often prompted John Walton to remind his Minardi tyre change crew to slow down.

*It's the fuel that dictates the length of the pit stop. The best these guys can do to change the tyres is 2.8 to 2.9 seconds. It's pretty slick. When we practise it, of course they want to be really quick, but when it comes to the race I often must remind them to 'take it easy, take your time, you've got loads of time' because if we are putting in fifty-two litres of fuel that takes at least 6½ seconds. We could change the tyres twice during that time.*

Taking a closer look at the pit stop reveals the teamwork required to accomplish it successfully. The pit stop crew's performance in many ways also represents the many team interactions that enable an entire Formula 1 organisation to perform successfully.

Firstly, the scene is set as shown in Figure 7 – a Formula 1 pit stop requires that twenty-one (some teams use twenty-eight providing for additional back-up) people work in a confined space, not much longer and wider than the car itself, in the pit lane in front of their team garage. This is a rather hostile environment as racing cars are passing by on the track at speeds of up to 200 mph (320 kph) only 15 metres away on the other side of the safety wall, and at 62 mph (100 kph) within the pit lane itself. Earplugs and radio headsets within fire proof helmets are required because the noise from the engines is deafening. Very often competitors' cars are pulling in or out of their pit area at the same time, passing a few inches away from the pit crew.

The pit crew can be seen huddled around television monitors in the garage watching the race. They are wearing fire retardant suits similar to those worn by the drivers along with helmets and protective gloves. The driver is given a signal three laps before being called in and the pit



**Figure 7.** Schematic of Formula 1 pit stop (2004 regulations)

Source: WilliamsF1

stop crew is informed simultaneously. The driver is given another pit alert one lap before coming in and he signals back an acknowledgement by pressing the appropriate button on his steering wheel. The crew is not permitted into the pit lane in front of the garage until twenty to thirty seconds before the driver steers the car into the pit lane entrance. The team members responsible for fitting the new wheels and tyres remove the electric heat blankets that have kept them warmed to track operating temperatures. All members of the team then take their carefully scripted positions in front of the garage door. Prior to the race, in rehearsal with the drivers, a specific grid was marked with tape on the ground. This is a target position for the driver to aim for that will maximise the team's efficiency by aligning the car with the refuelling rig, new tyres and wheel guns.

From the enclosed confines of their helmets, voice communication is difficult over the loud revving of the high performance engines. Each member of the team must know his task, coordinate together with others and be ready to communicate his intentions and actions clearly.

The driver pulls into the pit lane, stopping in front of a key crew member holding a sign that simply says, 'STOP'. The other members of

coordination with the others. The scene has been referred to somewhat poetically as a place where,

*task and process unite in a state of flow – a combination of head and heart.*<sup>14</sup>

No words are spoken by the mechanics during all of these activities. It is too noisy and happening all too quickly. Non-verbal signals are exaggerated. When a tyre change has been completed the four crew members with air guns raise their hands high into the air to signal that their tasks are completed. Unless there is a problem, only one person speaks during this seven-second period, the team leader. He is responsible for ensuring that all the tasks have been completed as planned. Given the explosiveness, literally, of this highly energised situation, he is also responsible for the safety of the pit stop team and driver. This leader is known as the lollipop man, so called because he is the one who is standing at the front of the car with a round sign on a long pole. The sign says 'STOP' as the driver pulls into position. After the car has been lifted off the ground, he spins the lollipop sign around to show the words 'BRAKES – FIRST GEAR' written on the other side. This reminds the driver to engage the brake and to have the car in first gear so he can depart immediately upon the pit stop's completion. If the brakes are not engaged the rear wheels would spin, making the tyre change impossible. While this might appear to be an exaggerated, almost unnecessary gesture, given the skill levels of Formula 1 drivers, it is important to recall that at this moment the driver is concentrating on the race situation and he might also be talking in his headset to team engineers who are monitoring the car's performance and to team management providing advice on race strategy.

The lollipop man takes full and final responsibility for the pit stop as he is the only one with a complete view of all the team members, including the driver, as they complete their tasks on the car. It is up to him to raise his lollipop at the right moment, signalling to the driver that he can accelerate back into the pit lane in order to re-enter the race circuit. This is no small responsibility. Things can go wrong.

The scene was the Portuguese Grand Prix at Estoril on 22 September 1991. Nigel Mansell, driving for Williams, was leading the race as he pulled into position for his pit stop. While all four wheels and tyres were changed everything seemed to be proceeding according to plan. The lollipop man, watching his crew intently, saw the wheel gun man on the right hand rear corner extend his gun into the air seemingly to signal

of their competitors. The common purpose – to provide an advantage for their driver – is meaningful and can make a significant difference in the result of the race. Certainly other functional areas of Formula 1 teams cannot as easily associate their efforts to making as direct an impact on the race. But their efforts to develop new designs, build new components and test them for their reliability give them clarity of purpose and direction. They know that in the end it is the sum of all the activities that go into the car and the race performance that will determine success for the whole team.

### *Building trust*

According to Jackie Stewart the one thing Formula 1 team leaders should never do is

*Compromise their integrity. If you do the right thing you'll always be given credit, it may not come out and you may not hear everybody talk about it, but it's the respect you get for going about your business in an honourable fashion, it's trust ... you can't buy it.*

Trusting the leader and trusting each other is the glue that integrates the team. It enables the environment for open communication and for dealing with conflict. It extends from top down, bottom up and literally throughout the organisation. Stewart once again:

*Being able to respect the people you are working with, to depend on them, to trust them, to have dependency and trust in somebody that you know is extremely important.*

Stewart also spoke about trust by describing the relationship he had with his Chief Mechanic, Roger Hill,

*Roger was a genius, he could see the problem before it arrived. Roger won three World Championships for me. He was an artist at what he did. He was better at what he did than I ever was at what I did. I could trust him. I knew that if Roger said it was OK, it was OK and I could forget about it.*

### *Collaborating*

In the most effective Formula 1 teams, roles are clearly defined and individuals know how their jobs interrelate with others. In order to achieve the speed and consistency discussed earlier, pit stop crews, for

*We want internal competition because that keeps everyone on their toes, but if the team that is working one driver's car is running late, I'd expect the guys working on the other car to ask if they want a hand.*

At Ferrari, Head of the Motor Sport Press Office, Luca Colajanni, acknowledged that between the drivers,

*there always has to be some competition because it pushes each of them to improve. But generally we do not have the drivers and the drivers' support teams competing against each other. It's not just propaganda that they say at interviews. They believe in the spirit of the whole team.*

Pride and a sense of excellence fuel their quest for high performance even for the teams that are at the back of the grid. John Walton of Minardi said,

*If you are winning races that's fantastic motivation, the best obviously. If you're down this end, it's a bit more difficult to be motivated. But one of the things that probably motivates our guys the most is doing a good pit stop and being as good as everybody else at it. In this respect we work as hard as any other team at winning the World Championship.*

### *Communication in a no-blame culture*

Constant team practice and discussion about performance provides opportunities for continual review of actions (input) while maintaining a clear focus on the goals (output). It also provides chances for open sharing of views and the retention of knowledge gained from experience.

Ross Brawn commented on the after-race reviews they have with the Ferrari drivers,

*We have an open relationship in an open organisation so the problems of the engine are discussed in front of me and the problems of the chassis are discussed in front of Paolo [Martinelli, Engine Director]. So there's no hiding place and we're all together. In the debrief Michael starts by discussing the engine and then he finishes by discussing the chassis. The same engineers are all together listening. Again, this is a very open approach.*

In more general terms Jean Todt echoed the words of many team leaders,

*Communication is the key thing in a company because you have to be seen and you have to explain to people. You have to enable people to participate*

*in what you do ... At Ferrari we have our normal general meetings about the current situation. Also every two months we have a meeting with all the employees of the racing division to keep them informed. Paolo Martinelli and I will have 800 people in front of us. Yesterday we had a meeting where we had about 100 managers so they could share information with their teams. And then, after every win, we make a buffet for all the employees to celebrate the success.*

In addition to formal meetings and presentations there is also an informal communication process that takes place within a Formula 1 team. This plays an important role contributing to an atmosphere of trust and mutual commitment that is vital both for high performance and for sustaining their peak performance over a long race season. According to Jackie Stewart,

*Communication. Total communication. No hiding behind closed doors. No telling lies. No ... 'Don't tell them that.' Total openness. Total frankness. Total integrity. That's what's required.*

Stewart's colleague at Jaguar Racing, Operations Director John Allison, echoed this sentiment.

*Communication more than anything else is how we motivate people at Jaguar ... Obviously, results help, when the team starts to do well that gives us all a buzz and encouragement. But in terms of making everyone feel that this is a worthwhile enterprise to be a part of, it's absolutely communication, honest and open communication. There are regular, planned communications meetings, of course, but probably the more important sort of communication is the informal dialogue that happens in the corridors, in the canteen, and on the shop floor. That said, we are far from perfect and there are always some things that you cannot talk about, not least because F1 is such a media goldfish bowl.*

Frank Williams emphasised the importance of going around the factory in order to maintain communications in a business that is growing in size and complexity.

*We have lots of corridor chats, I'm pretty good at getting around and you always see Patrick [Head] talking to people in the corridor.*

Patrick Head also added,

*that's the great thing about having the coffee machine in Dickie's [Stanford] office, it means we talk every morning when I go there for my caffeine fix.*



Open communication plays an important role in enabling a Formula 1 team to continually improve performance especially when things go wrong. Looking back at the Nigel Mansell disaster described earlier when his wheel and tyre came off in the pit lane, the Williams team actually used the situation to review their procedures and move forward. Dickie Stanford recalled the situation,

*We had a wheel nut failure. So you go back. You talk to the person or the people who were actually using the equipment and we tried to redesign the problem right there. Then we looked at our overall procedures during the pit stop. With the significance of the incident behind us we decided there were a lot of loopholes that we had missed, so we totally rescheduled the way we did a pit stop from the equipment to personnel. We put in different procedures so the car couldn't go without everybody signalling according to a new approach. In those days everybody put their hand up when the wheel was finished, so you had three people putting their hands up at each corner of the car. You got a group of people all squashed within a five-foot area and it's such a rush when you've all twenty-three putting their hands up. One person is controlling it and he can't see every one of those twenty-three people. We realised that we only need the guy who does the last job on the wheel to signal to say that he's finished. The lollipop man needs only to be able to see the last four men on the wheels, the jack men and the refuelling man.*

Stanford continued,

*Individuals doing certain jobs on the car now wear different coloured gloves, so Carl [Gayden, the lollipop man] is looking for colours rather than actual people. When the wheels are finished he's looking for four yellow hands because everyone else's gloves in the pit stop are dark. He is looking for four fluorescent yellow hands, two jack men signalling to him thumbs up that everything is finished. We even tried putting the refuelling man in yellow overalls to make him more visible so we could see him because the fuel always takes longer than the wheels.*

Significantly, Stanford concluded the story with the following statement about how the team deals with the stigma of blame.

*We don't hang anyone out to dry. You don't just point a finger at someone and say they're to blame. That doesn't help because all you do is create bad feeling. You try to isolate the problem, not the person.*



John Allison at Jaguar strongly supported the need for establishing a no-blame culture within the organisation.

*If people are afraid of blame, they will cover stuff up. If they know that a mistake will be understood and forgiven then they won't cover it up. They'll come forward and say, 'I'm sorry I got that wrong' and fine, people do, we all do.*

## 6 | *Partners*

*The best way is for everything to be put  
on one table and it will be discussed.*

Hiroshi Yasukawa,  
Director of Motorsport, Bridgestone,  
commenting on the relationship between  
Bridgestone and Ferrari.

### **Types of partnership in Formula 1**

In Formula 1 there are four main kinds of partnership:

- Suppliers who provide products and services in return for cash and receive no other direct benefits from their relationship with the Formula 1 team, such as specialist trailer manufacturer JS Fraser (Oxford) Ltd who provide the semi-trailers used by the Formula 1 teams to transport cars and equipment around Europe.
- Technical partnerships are focused on the direct provision of products and expertise for building the car in exchange for marketing services to the company, perhaps through brand exposure directly on the car or also through access to Formula 1 events. The relationship between Shell and Ferrari would fit into this category.
- Corporate partnership involves the supply of related products and services in exchange for marketing services and branding; examples of this kind of relationship would be the supply of trucks by German manufacturer MAN to WilliamsF1.
- Conventional sponsorship, which involves the supply of funding in exchange for promotion of the sponsor's brand within the team. Tobacco companies such as Marlboro are the classic example of this kind of partnership.

These four categories are shown in Figure 8. However, these should be thought of as loose categories, in that there are many overlaps between

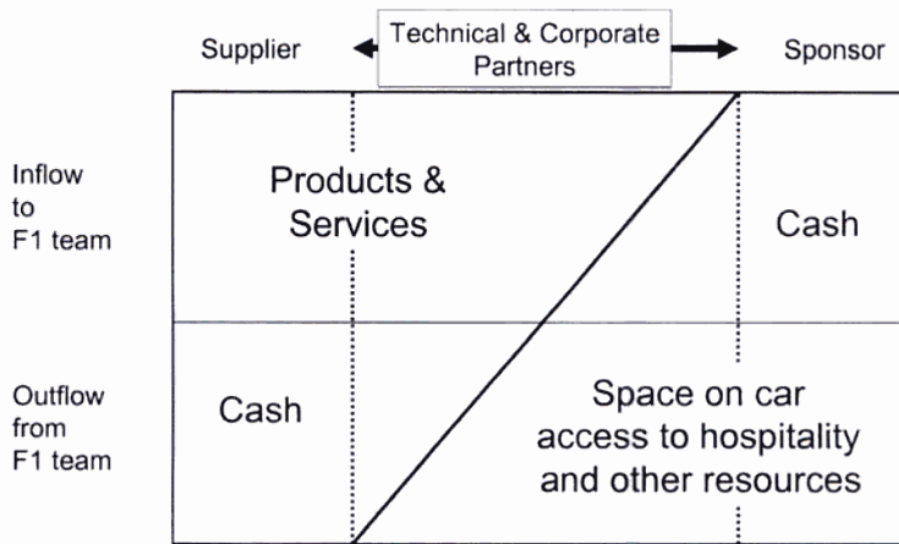


Figure 8. Spectrum of partnerships in Formula 1

these four types. For example, a corporate partner such as Hewlett Packard provided \$37 million in cash for the 2004 budget of the Williams team and also \$1 million in products and services. In contrast BMW provided Williams with \$95 million in products and services – engines and the related infrastructure to support the programme and also \$30 million in cash.<sup>8</sup> Technical partnerships relate to all the key areas and systems of the racing car as outlined in Table 4. Corporate partnership involves other products and services needed to operate in Formula 1 as illustrated in Table 5. The fourth category involves the provision of funding in return for enhanced brand awareness and other potential revenue streams – what some might refer to as the Formula 1 customers – its sponsors (Table 6).

The duration of the partnerships will vary by category and by their nature. Typically, substantial partnerships, such as the supply of engines, will be on the basis of renewable five-year contracts. For example, the original contract between Williams and BMW ran from the end of 1999 to 2004 and was subsequently renewed to run to the end of 2009. In contrast sponsorship deals can be for a single season and even a single race. In the case of the Minardi team, Formula 1's smallest operation, out of a portfolio of fifty sponsors for 2004 they only had three that carried over to 2005. Paul Jordan, Minardi's Commercial Director, has to focus on putting together a wide range

*Table 4. Categories of technical partnership (Formula 1 team)*

<i>Category</i>	<i>Examples</i>
Engine	BMW (Williams) Mercedes (McLaren)
Fuels and lubricants	Shell (Ferrari) Castrol (Williams)
Tyres	Bridgestone (Ferrari) Michelin (Williams)
Software and systems	Computer Associates (McLaren) 3D Systems (Renault)
Instrumentation	TAG Heuer (McLaren) Magnetti Marelli (Ferrari)
Components	SKF (Ferrari) Alcon (BAR, Toyota)

*Table 5. Corporate partnerships in Formula 1*

<i>Category</i>	<i>Examples</i>
Computer systems	Hewlett Packard (Williams)
Trucks	Volvo (Jaguar)
Car hire	Europcar (Ferrari)
Logistics	Hanjin Shipping (Renault)
Communications	Vodafone (Ferrari)

*Table 6. Sponsors in Formula 1*

<i>Category</i>	<i>Examples</i>
Tobacco	Philip Morris (Ferrari)
Financial and insurance services	HSBC (Jaguar)
Beverages	Budweiser (Williams)
Electrical products	Panasonic (Toyota)
Entertainment	Time Warner (Toyota)
Food	Aqua Parmalat (Minardi)
Clothing	Hugo Boss (McLaren)

of arrangements, some that include race-by-race deals to target sponsors in particular markets such as Malaysia and Australia. However, in Jordan's view this doesn't dilute the quality of experience that these partners receive.

*'Minardi are the fifth oldest team in Formula 1, and we're also the friendliest. You spend \$5 million with Minardi and you get the full nine yards, in the bigger teams that would hardly get you on the mirrors.'*

Partnerships between organisations can take many different forms to fulfil many different purposes. Within Formula 1 these tend to fall into three distinct categories: enhancing market power through brand exposure; leveraging relationships; and accessing and developing competences. We consider each of these in further detail.

### **Partnering to enhance the brand: phase 1 tobacco**

Pure sponsorship arrangements are often directed towards increasing market power by enhancing brand loyalty. For much of Formula 1's recent history tobacco companies have been a major source of sponsorship revenue. The first overt sponsorship of a Formula 1 racing car, apart from the usual logos of tyre and fuel suppliers, were in 1968 when the rules governing advertising on racing cars was relaxed. The traditional green and yellow Lotus cars appeared in the red, white and gold livery of Imperial Tobacco's Gold Leaf brand, and the team was renamed 'Gold Leaf Team Lotus'. This was an approach that Lotus owner Colin Chapman had picked up from competing in the Indianapolis 500 where naming the car after the title sponsor was commonplace; in the 1930s entrants had included Al Gordon's 'Cocktail Hour Cigarette Special' and Floyd Robert's 'Abels and Fink Special'.<sup>35</sup> In 1972 Lotus took things a stage further with their new car being referred to as 'John Player Special' the name of the cigarette brand, dropping the reference to Lotus all together. This focus on raising funding through sponsorship also increased demands to maximise the available space on the car.

### *Marlboro and Formula 1*

Philip Morris's Marlboro has been one of the most enduring cigarette brands in Formula 1. It was first involved in 1972 when it sponsored the BRM racing team, and in 1973 also supported Frank Williams's

They were also sponsoring track side advertising, and taking title sponsorship to Formula 1 races even to the extent that the kerbs on some tracks were painted in the red and white colours of the Marlboro brand.

As previously mentioned, their activities also embraced other forms of motorsport such as Formula 2 (latterly Formula 3000), Formula 3, rallying and motorcycle racing and in 1988 Marlboro extended their activities to directly sponsoring drivers, both talented newcomers and established drivers.

One of their first drivers was Finn Mika Hakkinen who went on to drive for the McLaren Formula 1 team and won the 1999 World Drivers' Championship, although by this time Marlboro had themselves moved to Ferrari. As part of this programme Marlboro had started to sponsor drivers for the Ferrari team. It meant that the driver would wear Marlboro overalls and would also have his name displayed on the car within Marlboro's distinctive chevron logo.

Ferrari had transformed themselves into a high performing, modern Formula 1 team in the 1990s under the leadership of Chairman Luca di Montezemolo. A key part of their strategy had been to recruit the top driver of the time, Michael Schumacher.

Despite their high levels of funding from the Fiat motor company this was something they could not do alone. This was at a time when Marlboro were becoming concerned with a lack of success at McLaren; having lost their engine partner Honda at the end of 1992, and with Ayrton Senna bound for Williams at the end of 1993, they were therefore struggling to stay competitive. This was compounded in 1994 when, with strong encouragement from Marlboro, McLaren persuaded Nigel Mansell to return from retirement, only to find that he was unable to physically fit into their 1995 McLaren Mercedes MP4/10 car. After just two disastrous races, Mansell went back to retirement. This and other problems around performance created a deterioration in the relationship between Marlboro and McLaren, which ultimately led to Philip Morris formally withdrawing from their long-term association with McLaren. As a result McLaren Racing Team Principal Ron Dennis was faced with recruiting a new title sponsor, which he did in the form of West cigarettes. Owned by the Reemtsma company, in addition to providing long-term funding, the West brand had one other very important criterion: its black and silver colours mirrored the aspirations of engine supplier Mercedes to create a colour scheme that reflected the Mercedes 'silver arrows' of the 1920s and 1930s.



*Table 7. Proportion of revenue provided by categories of partners in Formula 1*

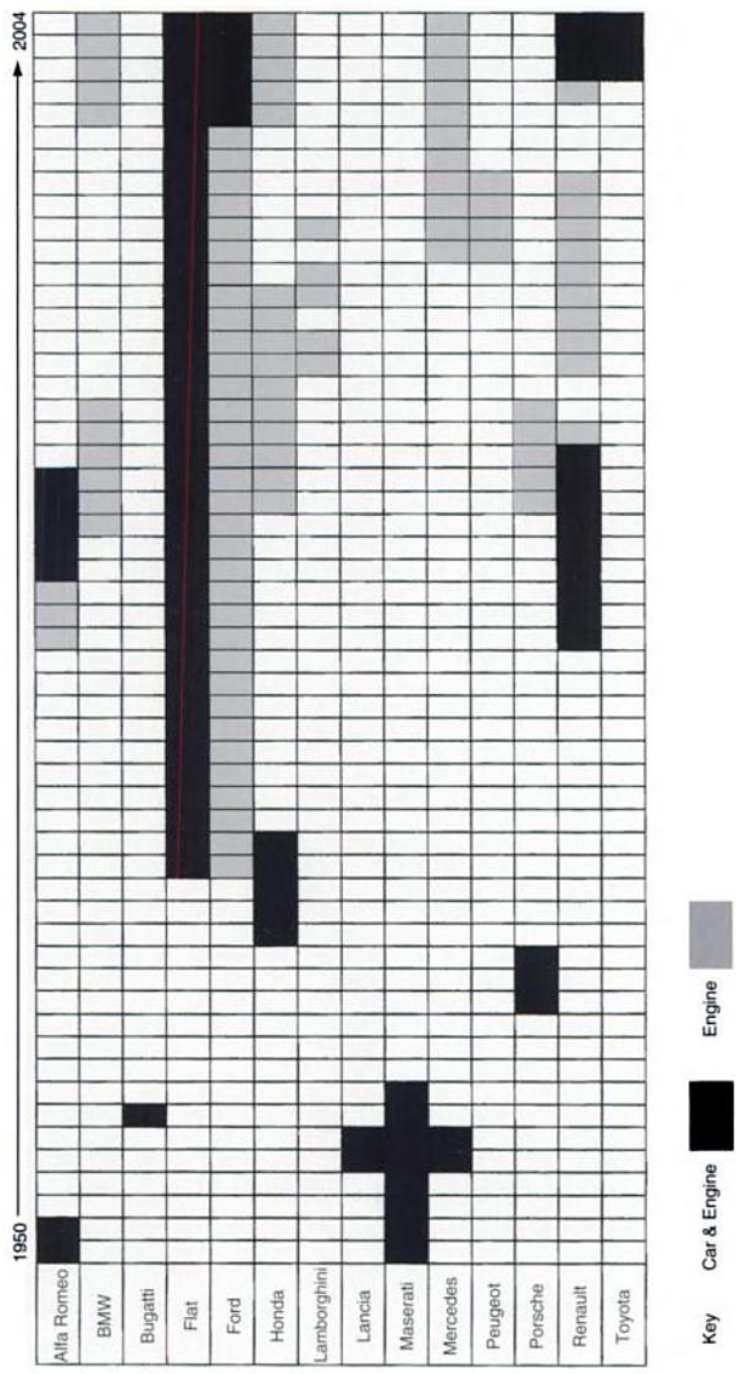
<i>Category</i>	<i>Share of sponsorship (%)</i>	<i>Examples</i>
Car manufacturers	49	Toyota, Renault, Ford, Mercedes
Tobacco	13.3	Philip Morris
Oil companies	9.4	Petronas
Technology	7.7	Hewlett-Packard
Other automotive	5.6	Bridgestone
Telecoms	5.4	Vodafone
Financial services	3.5	HSBC
Beverages	2.6	Red Bull, Budweiser
Other	3.5	Time Warner

Data from *BusinessF1*, March 2004, pp. 229–79

recommended the total ban of all tobacco advertising in motorsport by the end of 2006. This has meant that both teams and tobacco companies have taken steps to change their portfolios in advance of this date.

Second, the competitive nature of the global car market has put greater pressure on the car manufacturers to differentiate themselves. Many of them had noted the significant shifts in market perception that were achieved by Honda and Renault who were both successful engine suppliers in the 1980s and 1990s. For example, Honda's Type-R sub-brand is underpinned by the Formula 1 programme<sup>17</sup> and during their spell as an engine supplier in the 1990s Renault developed a high performance version of their Clio mini-car in collaboration with Williams. For an automotive manufacturer wanting to differentiate its brand, Formula 1 is an attractive option relative to other advertising expenditures. The automotive manufacturers also have a long history in Formula 1 as summarised in Figure 9, which allows them to draw on racing heritage as a basis for underpinning the brand identities they seek to develop in order to differentiate their products.

Figure 9 shows how in the early 1950s a number of manufacturers were involved in Formula 1. In 1954 there were three companies all racing their own cars – Lancia, Maserati and Mercedes. However, following a series of major accidents, including a tragedy at the Le Mans



**Figure 9.** Automotive manufacturer involvement in Formula 1 1950–2004

24 hour Race in 1955 when eighty spectators were killed when a sports car crashed into the grandstand, by 1959 all three had withdrawn from the sport.

For many years Formula 1 was the exclusive domain of the specialist constructor, but a growing interest during the 1990s led to a situation in 2004 where, for the first time in the history of the sport, four of the ten competing teams were fully owned by car manufacturers, in this case by Fiat (Ferrari), Ford (Jaguar), Renault and Toyota. Furthermore, a number of manufacturers supply dedicated engine programmes to support established teams, such as BMW (Williams) Mercedes (McLaren – with Mercedes also taking an equity stake in McLaren) and Honda (BAR), making an all time high of seven automotive manufacturers involved in 2004 at a time when this industry, like many others, had seen high levels of consolidation and merger between these global companies.

There are number of reasons for this development. Whilst all automotive manufacturers are driving down production costs, this is common practice and is therefore unlikely to provide any long-term benefit for a manufacturer over their competitors. Sources of advantage in the car industry are more likely to reside in areas such as brand affinities, which clearly Formula 1 can enhance. In 2002 the average age of a Mercedes owner had dropped by ten years since their re-entry to Formula 1 in 1995; they have also found that the proportion of cars finished in silver – Mercedes' traditional racing colour – has also increased significantly.

### **Partnering to leverage relationships**

The trend within Formula 1 has been to move towards increasingly complex and enduring kinds of relationships that involve the flow of cash, goods and services and related benefits, such as brand affinity, between the Formula 1 team and its partners. A key part of this is being able to leverage the synergies between the different relationships of the sponsors. For example in the 1970s Frank Williams used his sponsor Saudi Airlines, owned by the Saudi royal family, to attract Leyland Trucks who, at the time, were seeking to enter the Saudi market. Through this relationship Leyland were able to sell several hundred heavy duty Trucks into this emergent market. Some thirty years on the potential for leveraging partnership relationships still isn't lost on Williams:

*BMW deliver a wonderful brand for us, it makes it much easier to open doors.*

### **Partnering to improve capability**

The other potential source of advantage involves speed to market. A key issue for the car companies is the length of time it takes to get a design concept into the showroom; typically for a manufacturer this process takes around thirty-six months. Typically for a Formula 1 car this takes around a year but can be achieved below this. The Mercedes engine, which was designed and built by specialist motorsport engine builder Ilmor Engineering, took twenty-six weeks from design to manufacture. For many, the process enhancements that Honda were able to demonstrate as a car manufacturer in the 1990s were largely attributable to their policy of engaging teams of engineers in Formula 1 and then moving them back into mainstream automotive engineering. The knowledge they had acquired in terms of faster development times was seen to create a step change in the product development process at Honda and with it a significant improvement in the company's fortunes. Although it is also interesting to note that a number of Formula 1 teams felt that this rotation of personnel disrupted the continuity of their relationship with Honda.

### **The dynamics of partnerships**

A key part of the partnership process in Formula 1 is its dynamic nature. Partnerships move through different phases, which bring different benefits to the parties at different times. Figure 10 shows the potential nature of a partnership life cycle moving between the stages of initial exploration prior to creation of the partnership through to termination.

When these principles are applied to the performance of McLaren through the period of the relationship with Marlboro we can see a similar pattern as illustrated in Figure 11. When we apply actual performance data we can see how these cycles are reflected in the relationship between McLaren and Marlboro. The initial relationship was founded after Marlboro had tried a number of other teams and linked in to McLaren at a point when they were already well up the performance curve. However, this performance dropped off in the late

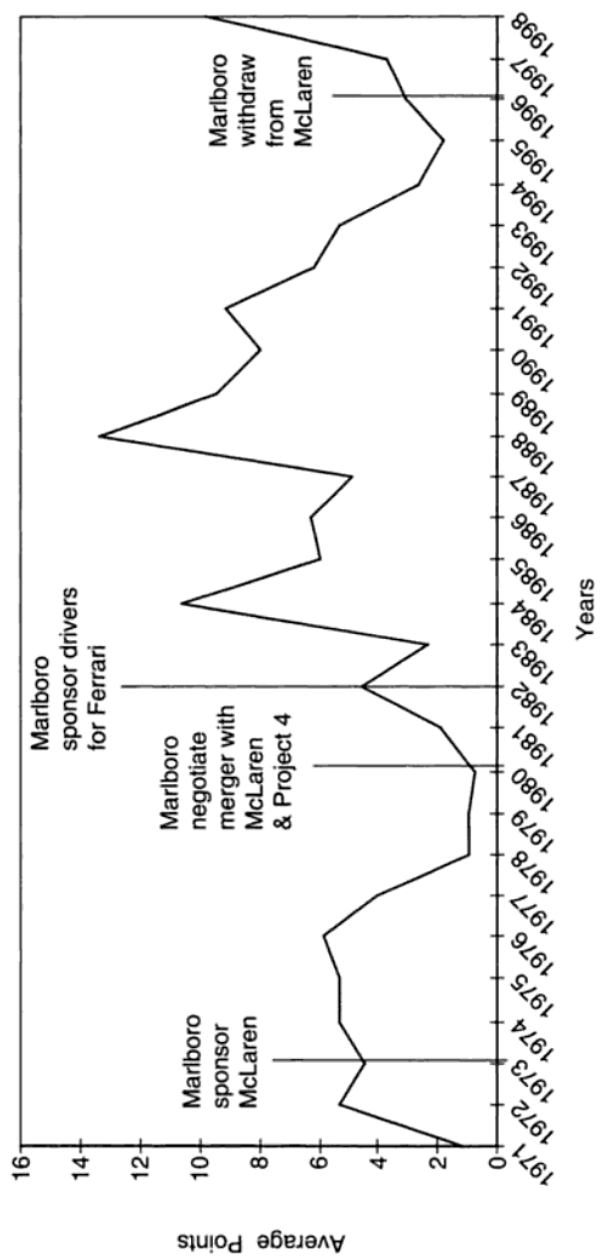


Figure 11. Relationship between Marlboro and McLaren 1971-1998

they both had co-locations in the UK. However they are also hugely differentiated by scale and ownership. Ferrari is owned by Fiat and has enjoyed huge investment to support the fact that they are the most distinctive global Formula 1 brand; this investment included the establishment of their own private circuit at Fiorano which they use for testing and developing their cars.

In contrast Minardi is privately owned by Paul Stoddart an Australian entrepreneur who founded an innovative airline charter and leasing business, European Aviation, which he continues to run in parallel with the Minardi team. Minardi have always struggled to gain continuity of finance, which affects their ability to invest. Whereas all the other teams develop a new car every year, the cars they ran in 2004 were based on a three-year-old chassis with modifications to improve the aerodynamics and suspension. Table 8 summarises the contrasts between Ferrari and Minardi in terms of the contribution of their partners.

The important contrast is that Ferrari is more dependent on a small number of major partners, whereas Minardi has a large number of smaller partners. Minardi's position is not one that is adopted through choice, but the necessity of trying to find the enormous funding needed to support a Formula 1 team. In these contrasting companies, the nature

*Table 8. Contrasting partner contributions: Ferrari and Minardi*

	<i>Ferrari</i>	<i>Minardi</i>
Budget (2004)	\$336.2 million	\$50.34 million
Employees	1,000	200
Location	Maranello, Italy	Faenza, Italy and Ledbury, Herefordshire
Top three partners	Marlboro (\$86 million) Vodafone (\$41 million) Shell (\$30 million)	European Aviation (\$1 million) Superfund (\$0.75 million) Wilux (\$0.5 million)
Percentage of budget covered by top three partners	47%	4.5%

Data from *BusinessF1*, March 2004 pp. 229–79

of partnership is also in strong contrast as illustrated by the relationship between Ferrari and Shell and between Minardi and Wilux.

### Ferrari and Shell

Ferrari and Shell have had a very successful partnership. CEO Jean Todt was instrumental in starting up the relationship in the mid 1990s.

*Up until 1995 Ferrari had been with Agip [Italian Oil and Petroleum Company]. I had contacts in Shell from my past experience [Todt had been a professional co-driver in the World Rally Championship] and so we entered into discussions and came to an agreement.*

However, when Chairman of Brands at Shell, Raoul Pinnell, joined the company in 1997 he felt that the relationship was not all that it could be:

*I inherited a sponsorship that had an incomplete partnership approach to it because we had a technical basis for our association and we had a marketing basis for our association. But it didn't appear to me that the objectives were clear, that the activities to exploit benefit from those objectives were in place and there didn't appear to be much data.*

Interestingly one of Pinnell's first actions was to undertake an internal survey within Shell to establish the climate in terms of the value of the partnership with Ferrari:

*We did a big management survey 'Do you think we should be with Ferrari or not?' and we wanted to flush out and understand how a technically driven organisation would respond to rather open-ended questions like that. We were actually a little bit disappointed, too many just said yes or no without any data.*

Pinnell followed on from this initial research to try and establish what the impact of the relationship had been on Shell's customer base:

*Around 1999 we did a study and found that 15% of our customers were aware of our association with Ferrari. I considered this to be a challenge. We renegotiated our contract with Ferrari to ensure that we could exploit the relationship as effectively as possible. Now [2004] 27% of our customers are aware of our relationship with Ferrari.*

One of the key actions that Pinnell and his team took was to bring the Ferrari brand closer to the Shell product:



*We want a brand association, we want a rub off of the magic and sexiness of the Ferrari brand to a rather neutral brand in terms of its emotional attributes*

But the point that is often forgotten is that the partnership with the Formula 1 team is only the start of the process:

*I think the big learning for me in sponsorship is that everyone assumes that just being placed on a car or on the back of a sports person, customers will somehow make the connection because they just don't. You have to do lots of other work to help them recognise the link.*

A key contribution for Shell was that they were launching a range of differentiated fuels that were positioned to offer the motorist greater levels of power and efficiency; the relationship with Ferrari would help this from both a technological and a marketing perspective.

*Now much of that work [on the new fuels] has been informed by the work that we have done with Ferrari. The petrol that you use in Formula 1 is very similar to the petrol that you can buy now, so we have had direct technical improvements in working with this terribly demanding partner.*

The same applies in the lubricants market, another important area for Shell:

*A lot of my work actually is outside of Formula 1 and if I mention a small example to support that Carrefour in France, ten lubricant brands on the shelf, which one would you buy? Well we're the only brand that has a little Ferrari shield on our pack of oil that says 'Recommended by Ferrari' we have given the customer a reason to believe, a reason to purchase our product against everyone else and therefore that's where I spend my time.*

It also had a powerful effect with Shell's partners – the petrol stations and their staff:

*We gave the staff at the forecourt these red shirts with Ferrari/Shell/V-Power. It's the first shirt that staff have ever really said, 'Can I keep it? Can I take it home?', 'They got lost', they were 'destroyed in the wash so can I have another one?' This had never happened before and it just shows the kind of impact this can have.*

However, to make the relationship work Shell had to consider, not just the strategic and marketing issues between themselves and Ferrari, but also the relationship aspects. How they would actually work together 'on the ground'.

*We've had to think about our own people that interface with Ferrari. I employed a man who works for me who is Colombian so he exhibits all the Latin skills. He can walk around the Ferrari team and nod, kiss, hug everybody from the guy who does the tyres to the top guy with spirit and Latin panache, which is very helpful. A very good technical guy who is English but again who is smiley and very technically competent so he has public relations skills as well as technical skills. I would call them Relationship Managers on the technical and marketing side who have been critical in the turning around of what we can extract in terms of value because they give you things because of the person dynamic and I have to say that this is a big learning for me.*

The other interesting observation made by Pinnell was that he didn't believe that actual performance on the track was the critical factor in their relationship with Ferrari:

*I don't actually think winning is everything here. Ferrari transcends even Formula 1. There are countries in the world in which Shell operates where there has never been the Formula 1 Grand Prix, it's hardly ever on the television station, nobody in those countries has ever owned a Ferrari and never seen one, but people know Ferrari! It is a brand phenomenon beyond Formula 1, it's quite unique.*

### **Minardi and Wilux**

Rudi Wildschut, CEO of Wilux, a manufacturer of bathroom fittings, has a very clear rationale for why he involved his relatively small business in the global circus of Formula 1.

*It doesn't matter where you finish in the race, when you are in Formula 1 you are a winner! We are a relatively small company (\$44 million turnover in 2004) but the fact we are in Formula 1 means that we create the image of a large company and it allows us to do a lot of things that the competition cannot.*

A Dutchman, who now lives in Monaco, Rudi first got involved in Formula 1 by sponsoring Dutch driver Jos Verstappen. However, this developed into Wilux being one of Minardi's main sponsors, a relationship that ended halfway through the 2004 season.

Through a clear focus on how Formula 1 could support his business Rudi attributes a significant increase in turnover (140%) to his involvement in Formula 1.

## 7 | *Organisation*

*It's the informal organisation that runs things here. It's the experienced people in the organisation who are empowered to get on and do things.*

Alex Burns,  
General Manager,  
WilliamsF1

So what business is a Formula 1 team in? Who is their customer? From one perspective they are in the performance-engineering business. They produce a small number of highly specialised vehicles over the space of a year, which they continually develop in order to achieve sustained performance levels. From this point of view we can understand why the region around Oxford in the UK is referred to as Motorsport Valley, a comparison with Silicon Valley on the west coast of the USA, where a local cluster of firms dominated the world in a particular technology, in this case micro-processors.<sup>33</sup>

For many on the technical side of Formula 1 it is all about designing cars. John Barnard, former Technical Director of McLaren, Benetton and Ferrari says,

*It's nice to win but it isn't what gets me going. What gets me going is the technology and the engineering and trying to take another step that perhaps no-one has done.*

In this case the technology of Formula 1 is 'sticky'; it is located primarily in a fifty-mile radius of Oxford, although a number of teams are located well outside this area in continental Europe. Figure 12 provides a map of the location of all the teams and their engine suppliers competing in the 2004 World Championship.

Who then is the customer of a Formula 1 organisation? And how are these firms able to secure huge inflows of cash to feed their technological

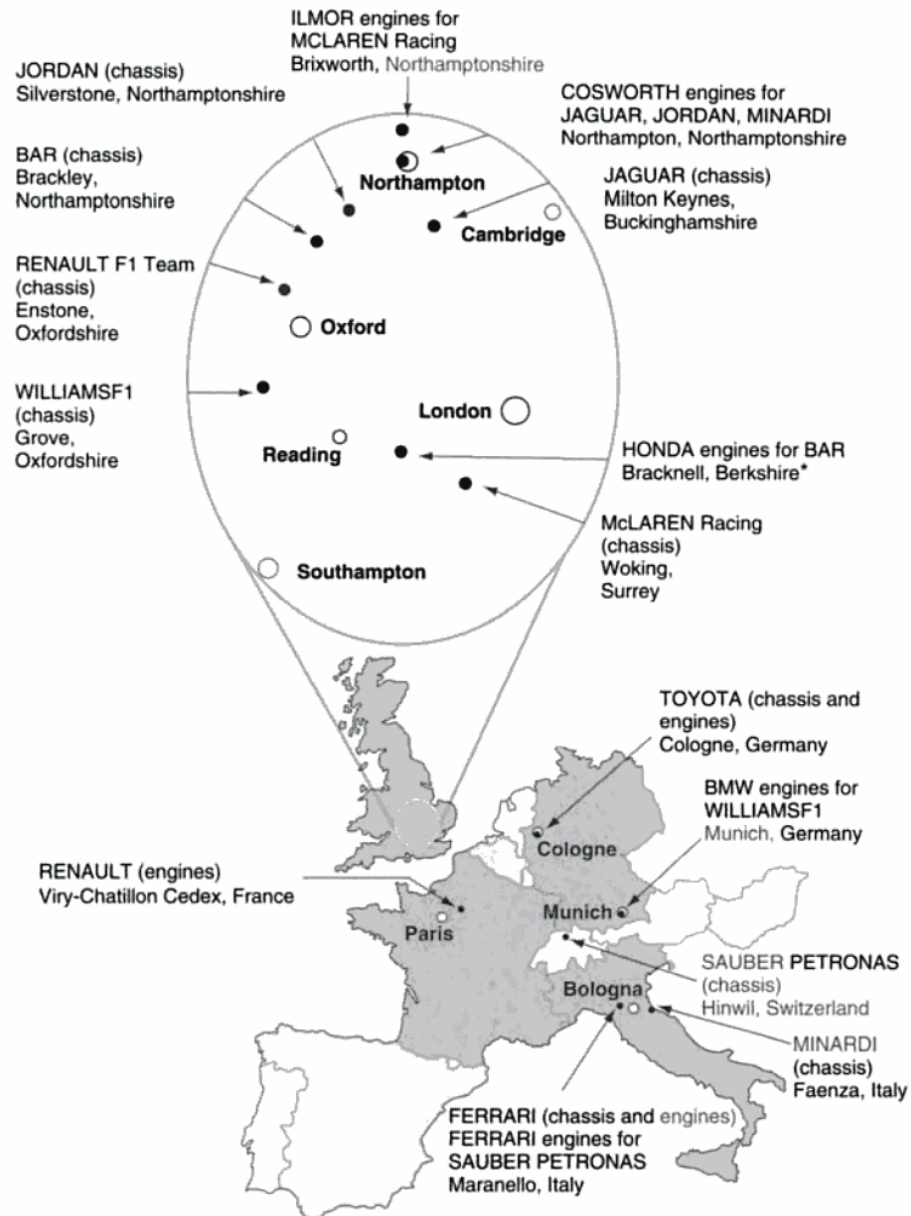


Figure 12. Location of Formula 1 chassis and engine supply 2004

\* Pre-season testing and Pacific rim race engines are built at Tochigi in Japan.

aspirations? To answer these questions we need to take a different perspective on defining the business.

Formula 1 teams are also in the entertainment and aspiration-creation business. They produce a spectacle and foster dreams, drawing consumers into the atmosphere of the Formula 1 event. Therefore they provide a platform for many products and services that seek to enhance the value of their brands through association with this glamorous global series. The customers of Formula 1 can be defined in two groups. First, the consumers of the events – the public at large – and second, more directly, those firms who provide revenue or products and services in exchange for brand exposure on the car and access for themselves and their guests to Grand Prix events.

The reality perhaps combines both of these groups. Formula 1 teams are in the business of providing a technological entertainment. Depending on where you sit, then, the business may be more strongly aligned to one than the other. But in the context of Formula 1 both are necessary to define and distinguish it from other race series (see Table 1). Much of the viewing audience are motivated by the excitement of the race and their allegiance to particular drivers, usually one of their fellow countrymen (in 2004 Germany had one of the highest national viewing figures due to the success of Michael Schumacher).

### **Why does a Formula 1 constructor exist?**

The Formula 1 constructor exists to consistently win races. It does so by bringing together a group of talented individuals, with the best technology possible, to design and manufacture a racing car, and create the best race-winning team that can develop flexible and responsive race strategies to keep them ahead of the competition. This organisation needs to both allow specialist expertise to develop but also to balance all the different areas of expertise – aerodynamics, electronics, vehicle dynamics and engine design – in order to optimise overall performance. It needs to engage partner organisations and bring them into the process in a way that ensures both parties are learning and stimulating each other to continually improve.

A Formula 1 team is also a money-making operation. They exist to generate inflows of both cash and products and services, and often do so in highly creative ways involving multiple trading arrangements. However, they are not generally seen as profit-making entities; they exist to keep

*Table 10. Development of WilliamsF1 1969–2004*

<i>Year</i>	<i>Employees</i>	<i>Championship ranking</i>	<i>Key events</i>
1969	5	8 <sup>th</sup> out of 18 for driver Piers Courage	Frank Williams (Racing Cars) Ltd established with offices in Reading.
1977	21	Driver Loris Kessel failed to qualify	Williams Grand Prix Engineering Ltd established at Didcot.
1980	62	1 <sup>st</sup>	Driver Alan Jones wins the drivers' title.
1986	101	1 <sup>st</sup>	Serious road accident leaves Frank Williams tetraplegic.
1987	111	1 <sup>st</sup>	Nelson Piquet wins drivers' title.
1990	148	4 <sup>th</sup>	New engine partnership with Renault established.
1992	190	1 <sup>st</sup>	Nigel Mansell wins the drivers' title, but retires at the end of the year.
1994	203	1 <sup>st</sup>	Ayrton Senna dies in accident at Imola. Italian authorities charge Williams management with manslaughter.
1997	262	1 <sup>st</sup>	Jacques Villeneuve wins the drivers' title. BMW confirm that they will re-enter Formula 1 as an engine supplier in 2000 with Williams.
2003	475	2 <sup>nd</sup>	BMW renew engine partnership for further five years.
2004	493	4 <sup>th</sup>	Second wind tunnel (60% scale) completed at Grove facility.

In order to win a World Championship the organisation has to consistently deliver a car and driver to the podium at successive races. This means that the whole organisational package has not only to create a fast and reliable car, it has to adapt to the changing competitive conditions of a race. It has to make fast decisions, but it also needs to be developing longer term designs that are going to win races in the future. The core



*Table 11. Key areas of design in a Formula 1 car*

<i>Example component areas of the car</i>	<i>Example specialist areas</i>
Chassis	Electronics and instrumentation
Suspension and steering	Metallurgy
Engine *	Computational fluid dynamics (CFD)
Aerodynamic package	Finite element analysis (FEA)
Fuel *	
Transmission	
Brakes *	
Tyres *	

\*may involve close collaboration with a partner organisation

process can usefully be broken down into three areas with very different time spans and organisational requirements: (1) creation of a competitive Formula 1 car; (2) consistent race-winning performances; (3) generation of revenue streams. We now consider each of these areas in more detail.

### *Creation of a competitive Formula 1 car*

The creation of a Formula 1 car is both a complex and demanding process. It draws on many different technologies from areas such as aerospace, instrumentation, automotive technology and computer software. It is an amalgam of many different areas all of which combine to create the racing car. In the Formula 1 organisation there would typically be structures or groups created around the component areas of the car. Fundamentally there are two aspects to the creation of the car: (1) design and engineering, which involves the evolution of a concept into a detailed design, and (2) manufacture in which the design is transformed into a race-winning car.<sup>37</sup>

In Table 11 we can see the key areas that are often used to create the design organisation. These relate to the component areas of the car such as engine and transmission, chassis, suspension and steering and also specialist areas such as electronics and computational fluid dynamics (CFD).

The manufacturing process also involves a range of different activities that are used to structure the organisation. These are shown in Table 12.

*Table 12. Key areas in the manufacture of a Formula 1 car**Example areas of manufacture*

Composites	Machining
Electronics *	Fabrication
Models (for use in the wind tunnel)	Heat treatment
Components *	Finishing
Quality control	Casting *

\* may involve outsourcing

Whilst ideally these areas should work close together there is often a distinction drawn between the design office (design and engineering) and the shop floor (manufacturing).

*Consistent race-winning performances*

The second key area of the organisation concerns the ability to develop the components and the car as an entire system through testing. Formula 1 operates a limited testing schedule, where teams are only allowed certain days when circuits are available for testing. This means that testing events are important opportunities to try out new ideas and components outside the pressure of a Grand Prix.

Typically each Formula 1 team would run a test team of around fifty people and a race team of around twice this number. In each group there would be engineers whose role is to work specifically with the driver to maximise the set-up of the car and to determine race strategy. Each car will also have a group of mechanics responsible for working on the car and undertaking pit stops. There are also 'truckies' responsible for driving the transporters and moving equipment around and the hospitality people who provide catering, who are often outsourced through specialist organisations such as Edwards Catering Services.

*Generation of revenue streams*

The third central area within the organisation of a Formula 1 team is the commercial department whose responsibility it is to attract, secure and maintain relationships with sponsors and other partners.

More recently the activities of this area have broadened into merchandising and other branding activities.

Typically the structure of the commercial organisation would be split between business development, which focuses on getting new sponsors, and account management, which focuses on maintaining relations with existing sponsors and partners.

A further, and sometimes separate, area relates to public relations. This activity is concerned with optimising the team's communications with the press and various other stakeholders. It may also involve the operation of websites and team-related fan clubs.

### **The informal organisation**

Alex Burns says,

*It's the informal organisation that runs things here. It's the experienced people in the organisation who are empowered to get on and do things.*

When Burns talks about empowerment he's not referring to some formal human resources policy, but simply that the informal organisation works because people know who to contact to get something done without having to work through formal channels and convene time-consuming meetings.

However, one of the challenges of the organisation is that as the cars become more and more sophisticated, they need more and more specialists to deal with particular areas and as a consequence the organisation gets larger and larger. Alex Burns states,

*The problem is as you grow these informal structures break down as you introduce more people and individuals become more specialised.*

In the case of WilliamsF1 the focus has therefore been on building clarity from the informal organisation, rather than trying to overlay a functionally correct organisation over the top of it. Alex Burns says,

*It's always been that this designer has always done the exhausts, so he goes and talks to whoever makes the exhausts to sort it all out, who talks to the guy who needs to get the right grade of metal for the manifolds and between them they make it happen and they design the exhaust together, actually produce it together and off it goes and the right quantities go out, so we're*

*trying to make those linkages much more clear and formalise the connections.*

According to Burns, a further challenge with the reliance on the informal organisation is that so much of the knowledge and routines is embedded in particular individuals and their relationships.

*This reliance on the informal, makes staff retention critical. It is vital to have experienced staff, people who have been at the sharp end at the track, you then bring them into the factory.*

### **Balancing out the organisation**

One key problem is keeping the balance in the hierarchy of the organisation. A Formula 1 team is like any organisation where hierarchies develop and can become dysfunctional. Traditionally in Formula 1, the race team are the 'elite' and those running the test team seen as second class citizens. Dickie Stanford, Team Manager, WilliamsF1, says,

*Ten years ago the test team was like a little dirty group in the corner. Now it's on a par with the race team. We have some people now on the test team who don't want to move on to the race team. At one time the race team were all paid more than the test team and everybody wanted to get on the race team. When I became team manager I looked at the whole thing, the test team actually worked longer hours, so why should they be paid less? So now we made the test team exactly like the race team. We only take people from the test team on to the race team, you have to work on the test team before you move to the race team.*

The emphasis on the organisation is therefore to ensure that everyone sees themselves as connected and involved in the ultimate outcome of winning a race. John Allison, Operations Director, Jaguar Racing, says,

*There is undoubtedly a difference between the guy who is a laminator in the factory, who is in effect doing, a factory job and one of the mechanics in the race team, who sees himself as in the front line, but you've nevertheless got to make sure that the laminator realises that his contribution is valued and that his effort counts and that's part of the purpose in always debriefing everyone after a race. Absolutely everybody listens to the debrief and benefits from the championship points bonus scheme we have – the same amount, £100 per point, to everybody in the factory from Dave [Pitchforth, Managing Director] downwards.*



**Plate 11.** Shell takes it's motorsport sponsorship to the public via their petrol station forecourts.

*Source:* Shell



**Plate 16.** The WilliamsF1 facility at Grove in Oxfordshire where almost 500 staff now work. Note the brown field area (top/centre), which at the time of writing houses the team's second wind tunnel (2002).

*Source:* WilliamsF1

## 8 | *Integrating*



*At the end of the day it comes to trust. Building a relationship. These people know what they are supposed to do, we have empowered them to do it. We will hold them responsible to get it done and let them get on with it.*

David Richards, Team Principal, BAR

We have seen that Formula 1 people are passionate and competitive, and that they also work collaboratively in teams. As in all effective organisations, however, there is a need for individuals who can spur, motivate and inspire their colleagues into action. They do this by creating a harmony within the working environment that enables the separated but interrelated functions in the business to operate in an integrated manner. This requires a form of leadership that integrates the efforts of strong-willed individuals so that they can work cohesively towards common objectives. David Richards said,

*We do things to make sure everybody feels involved in what is going on at the track, to get total involvement from the ground up. One guy may be drinking champagne, but everybody makes the difference.*

Richards related a favourite story on this subject to a racing magazine,

*A friend of mine told me a story about a visit he made to Cape Canaveral. My pal had been shown the whole facility – extremely impressive, of course – and on the way out he had a quick chat with the janitor. ‘What an incredible place!’ said my mate. And the janitor replied, ‘Thank you, sir. I’m so proud to work here – because I put a man on the moon.’ And I think that’s marvellous. And that’s what we are trying to achieve at BAR ... Because if you can get every single person in your organisation to understand the total importance of their role, their commitment and their involvement in the whole bigger picture of*

some teams are more hierarchical than others. There are leadership roles, perhaps even a requirement for them given the competitive pressures and tight deadlines in this industry, at *many levels* within a team. Formula 1 leaders stimulate action among their followers also by celebrating successes that are meaningful for their team. In summary, they create an environment in which individuals can strive for improvement and the overall team can come together to provide a complete package that excels.

It requires only a small stretch of the imagination to consider that Formula 1 leaders are stewarding their teams forward in order to give greater life and vitality to their business's key product, a racing car. A Formula 1 car takes on a life of its own. Each new design and set-up gives the car its own characteristics and peculiarities. The designers, engineers, mechanics and drivers are in some ways working with a living object that requires both stimulation and control.

Jensen Button gets ready for his lap, the race starts, after the first two seconds he asks,

*Can you change the traction control? There's too much, you can't balance the car. And can you adjust the downforce and rear wing? The back end's all over the place.*

His race-booted feet worry away at the throttle and brake in search of chassis balance. Button is actually sitting in a PlayStation® Formula 1 simulator in which the game console and screen are mounted in a frame containing a race seat, pedal box and lookalike wheel. He is attempting to coerce the faux BAR 006 that he drives in reality around a digital lap of Bahrain's Sakhir circuit.<sup>6</sup> His natural driver instinct is to get a feel for the car that surrounds him even in this virtually real situation.

During the 1970s and 1980s an entire Formula 1 team was small enough to fit into a single garage. The team leader oversaw the entire operation with a quick walk through the factory, putting him in touch with all the key people and operations of the business. Teams were run like small, entrepreneurial businesses. If a new component needed to be purchased, the team principal would immediately work the phones in order to raise the necessary cash. Decisions were made on a day-to-day, even moment-to-moment basis.

Sponsors were looked upon simply as funding sources. They received an allotted space on the car or team uniform to advertise their product in return for payment. Technical suppliers provided their parts and components mainly to place their company logo on the car and in

anticipation of the brand association that comes with their relationship. Neither of these types of partners was truly integrated into the heart of the Formula 1 team's business activities. These small teams had limited operating budgets. Much was done through 'seat of the pants' management. Just surviving financially and getting a car ready for the next race was the main goal for most of the teams.

During the past twenty years the situation has changed significantly, although staying ahead of the cost of new technology remains a significant challenge. As the Formula 1 industry has grown in size and global reach, so too have the race teams. Along with size has also come increased complexity. Brand and product sponsors today, as we have seen, have a greater call on the whole team in order to leverage their advertising investment. Technical partnerships have become fully integrated into the teams they support where they play important roles in the design, development, delivery and installation of components.

With this complexity and further specialisation, the leader's ability to stay on top of the business simply by walking through the garage has changed. As with many growing businesses the tendency for separate departments to develop within the organisation, so-called silos or chimneys, has increased. This in turn has required that a new style of leadership and management has had to emerge in order to enable Formula 1 teams to cope with the new business environment.

We have identified five integrating principles, familiar to all successful businesses, also actively seen in Formula 1. Effective leaders:

- Set appropriate expectations
- Focus on results
- Act as role models inspiring with their own determination and style
- Are rapid decisions makers
- Are found at all levels in the organisation

### Setting expectations

Typically one would expect the leader of an organisation to create the vision that will inspire the team to achieve superior performance. In Formula 1 this is not a very difficult task. The image of what success means is visible to all team members eighteen times during the race season. It includes their driver (or both of the team's drivers) standing on the winners' podium after a race, receiving a large trophy and then ceremoniously spraying a magnum of champagne over his fellow drivers on the

podium and anyone watching from the pit lane below. Another representative from the team, perhaps the technical director, is also on the podium in this vision accepting the Constructor's trophy for having finished first, representing the collective efforts of the entire team. It is worth noting that in Ferrari's case this honour is shared around the members of the team. At the French Grand Prix at Magny-Cours on 11 July 2004, Ferrari won largely thanks to an idea to have four, rather than three pit stops, thereby allowing them to get past the Renault of Fernando Alonso. Chief Race Engineer Luca Badoer was credited with the idea, and it was he, not Team Principal Jean Todt or Technical Director Ross Brawn, who was on the podium accepting the constructor's award for Ferrari.

However, there are teams who are at the back of the grid, without the funding of the larger, wealthier teams. They may be racing a chassis that is three years old, with an engine that is leased from another team's production from the previous year. These teams have a realistic understanding that their chances to win races or even attain points in the championship tables depend to a degree on factors outside of their control. Sometimes the 'right' conditions, such as inclement weather or mechanical failure or driver error of the front-running competitors, can even out the better-financed and superior technology playing field.

Paul Stoddart, is Team Principal at Minardi one of the smallest teams in Formula 1, but also one with a great heritage. He has the challenge of creating the right expectations for his team. And when success comes their way, even if it is not necessarily in the form of a podium finish, they make the most of it.

*If you have given your working life to a team and a sport that you love, then to get the 2 points (for finishing fifth in 2002) that we got at the Australian GP a few years ago, well, we had the whole of the world at that moment in time, and thought we'd actually won the race. You can live off of that for an awfully long time and indeed we do.*

In fact, in terms of the importance of celebrating success, especially if they are far and few between, Stoddart says,

*Australia is still celebrating that one. It's even in the top ten sporting events list. I don't get recognised in England, but in Australia I give out autographs, photos and everyone congratulates me on what happened in 2002.*

Paul Jordan, Minardi's Commercial Director, describes the role that Minardi play that also sets the expectation levels for those working there.

*Our motivation is just to be here. We've been going since 1985 and we're the fifth oldest team. Minardi is the Academy of Formula 1. We introduce drivers, engineers, commercial people and sponsors to the sport.*

In Ross Brawn's words,

*I think one of the key things is always to be realistic about what you can achieve. I often think that if you try and achieve too much, you achieve less. It's finding that balance between not turning the organisation upside down and making it collapse, but turning it up a gear so that you react and try to find solutions.*

According to John Allison, Operations Director, Jaguar, leaders must be careful not to set expectations or make statements that cannot be delivered. He recalled when Jaguar was first bought by Ford,

*In 2000 [Jaguar] bragged endlessly about what it was going to do. And they arrived in Melbourne with a massive sea of green everywhere and a huge build up of PR and spin – the car was useless. Now it is clear that one has to underpromise and overperform.*

### Focus on results

Frank Williams, Team Principal, WilliamsF1, distils his business focus down to a very powerful and simple question,

*Will it make the car go faster?*

It is the yardstick against which all key decisions are made at WilliamsF1. This credo is echoed throughout the Formula 1 racing world. Eddie Jordan, CEO, Jordan Grand Prix, says,

*The philosophy that we use is quite simple, the first thing that gets spent is to make the car quite good. The first priority is speed and the reliability, performance and the rest are chosen ad hoc after that.*

Every effort is made at all levels of a Formula 1 organisation to get another fraction of a second out of the car. Winning becomes everything and the intense focus on all aspects of the business to get there drives the whole process. Frank Williams once again,

*In order to make the car go faster, as a rule of thumb, unless it's unaffordable, truly unaffordable, it will be done. We are at war in this business. It really is war. Either you sink or swim. If you drop away from the top three your*

*people to behave in that way. It's got to come from inside them and you've got to create the environment in which that spirit is engendered. When this succeeds it's pride, team spirit, the feeling of doing something special and different that are the motivators that make people rise above themselves. This aspect is one of the most attractive things about the industry and, indeed, is one of the ways in which it is most like the RAF.*

The story about Frank Williams's return from a crippling accident has been told many times. It serves as an outstanding example of a leader inspiring others through his courage and personal drive. Williams was in a road accident in the South of France in March 1986. His car overturned and he broke several vertebrae in his back. Remarkably, through intensive care and rehabilitation, Williams came back to Formula 1 only four months later to watch practice sessions at the British Grand Prix. He was able to travel with the team to all their races the following year and has missed very few since. Williams is a tetraplegic, paralysed from the shoulders down, confined to a wheel chair. Perhaps it is his innate competitiveness, tempered with his personal trials, that fuels Williams's drive for excellence from himself and his team.

*I'm truly far more pissed off with myself as a leader if the people downstairs are not adventurous, if they are mediocre. This leads to mediocre racing cars.*

### **Rapid decision making**

According to Flavio Briatore, Managing Director, Renault F1, *'In Formula 1 we need everything yesterday. We are no good at looking at things in the long term'*.

Short timescales, tight deadlines and rapid decision making have been mentioned by many interviewees as key distinctions about working in Formula 1. Behind every race there are thousands of decisions made at all levels in the teams and all must be made quickly. Jackie Stewart says,

*People in other businesses have it easy, as the company supports them. The decision process is terrible, they are all frightened to make mistakes. If I were frightened to pass cars, I would never have won a race. In a race if I see a gap open up ahead, I have to make a decision. I can't prevaricate. I can't hesitate. I have to decide there and then and generally that's what works here. Formula 1 operates at a faster pace, it requires more decisive decision making than other businesses.*



*total involvement from the ground up. One guy may be drinking champagne but everybody makes the difference.*

*Communication is fundamental. We have done team-building exercises this week and have done it regularly with everybody for a number of years under different guises.*

*When we were a small business it was easy to communicate and get around. One of the things we have found is that the company, of necessity, has become more complex. Firstly, it cannot be managed by one individual in the original sort of structure that one puts into place at a race team. Cross-functional communication becomes absolutely critical to the success. So we spend a lot of time in making sure that things will work; building relationships, structured, formal ones and also informal ones, across the organisation.*

Flavio Briatore of RenaultF1 Team is the boss. He does not believe in big organisation structures. Too many managers makes it difficult to have 'the same line'. His approach is a very personal one. He believes that the leader must touch everyone to be effective.

*You need contact with your people everyday. The organisation is big, the logistics are big, everything is big, but we are still a very personal company. There is only room for one leader and the company has to reflect that leader. For me it is about being close to your people. A team is like a family, you're travelling six to seven months together. You need to protect your people. I try to make them feel secure, you give them the right budgets, the right salaries and make sure their families are happy.*

As a former World Champion driver and successful team principal Jackie Stewart knows the importance of 'walking the talk' for his people. He says

*The man at the top is the example to the others to follow in the culture or the manner in which business should be done.*

You need credibility to lead effectively. Stewart once again,

*Let's say you've had no experience of running a Formula 1 team and you go down there and meet these old shoes. They're going to find out in two minutes. It doesn't mean to say you're not bright, but you've got to have a shoe that fits the foot, it's not the foot that fits the shoe.*

But Stewart is also not just talking about being a figurehead.

*You can't be up there in your office. You've got to be in the factory in the morning, in the canteen at lunchtime and you've got to be down there in the*



*afternoon again. They've got to feel you and touch you. It's small, it's dynamic ... There were no weeds in my shooting school up at Gleneagles. I would pick up weeds. The staff would think 'Oh my God, we must have missed those weeds' I don't care how grand you are or how much you're paid, if there's a weed there, then pick it up. It's all to do with attention to detail, motivating others and if the boss does it, everyone should do it.*

Ron Dennis, Managing Director at Mercedes-McLaren, symbolises a leader who has successfully made the transition from small team entrepreneur to holding company chairman. Starting his career as a mechanic, Dennis was eventually hailed on the cover of the British business journal *Management Week* in 1991 with the headline, 'Is This the Best Manager in Britain?' Stories abound of his early days of racing team management when Dennis did not trust anyone other than himself to do whatever work was necessary. He was the typical small business owner-manager and hierarchical leader. Over time however, as the business has grown to major proportions and the stakes increased, Dennis has had to learn to empower others.

*The thing a manager has to remember, is that you are being a fool if you try to make yourself the beginning and end of the company.*<sup>19</sup>

Tony Purnell takes the role of an intellectual stimulator in his position at the head of Ford's Premier Performance Division.

*I've got a bit of an unusual position in that I'm in charge of three companies and I've made it so that the MDs of these three companies lead them. I'm the bloke from Head Office who's here to help and I don't want to position myself as the charismatic leader. I prefer the more intimate leadership of people who are there everyday walking around the factories. So my leadership is really about encouraging those three guys to keep on message, to provoke them, to question and to provide a little bit of the intellectual stimulus that they need.*

Frank Williams and his partner Patrick Head have demonstrated how shared leadership at the top level of an organisation can work effectively. They co-own and co-lead a business that employs almost 500 people. Frank Williams says,

*I'm the senior shareholder [70%], but because I'm very clever, he's [Patrick Head, 30%] got the greater amount of work and responsibility, that is to say, engineering. I'm mainly business, Formula 1 politics and money in-money out.*

Williams clearly understands his own boundaries.

*I'm not a trained manager, Patrick is actually a better manager than me I think, more logical and structured in his thinking. I'm careful not to manage too many people.*

Patrick Head, the technical brains of the partnership, commented on the evolution of their business, in particular his changing role as a leader.

*I think fifteen to twenty years ago, Formula 1 was quite different from a lot of normal businesses outside. Today I don't think there's a lot of difference between a Formula 1 team and any other kind of business. They both have the same pressures of trying to bring product to market, generation of ideas, recognition and nurturing of the good ideas, keeping each department within the company healthy. To make it work you can't have somebody in a senior position who's protective and defensive ... A lot of my job as I go round the place is sort of linking. I suppose it is troubleshooting, but also I think I act to a certain degree as a lubricant. I can make sure that if anything is getting jammed I can give it a kick. Equally if I see a programme that is slipping behind and I don't think it is getting the attention that it needs, I get the appropriate people together.*

*I have to keep in touch with what's going on and I do this by talking to people as I move around the factory. I will get feedback as to how things are going and either be able to help move things along myself or get people to talk across departments.*

Jean Todt has succeeded as a consolidator of expertise and talent. He brought all of Ferrari's activities to one location in Italy soon after taking team principal responsibility. He brought Ross Brawn and Rory Byrne on the technology and design side and Michael Schumacher with Rubens Barrichello to drive. He retained the best talent from inside the company and created the working environment to support bringing the whole package together.

*When I arrived I analysed the situation. Eventually it was a matter of putting the right people at the right place, something easier to say but more difficult to do. I took power and developed credibility with the facts, with real examples, so that slowly people started to believe that things are moving, things are changing. There was no communication in the company. Communication is key. You have to be seen and to explain to people. You have to get people to want to participate in what you do.*

When conflicts have arisen, as they inevitably would where a culture change was underway,

*We try to take them on from the beginning. I keep saying, if you have a cut on the arm and you don't cure it right away, you may have to cut the whole arm off because it gets infected. So if there is a problem, you must open your eyes and not say 'Let's wait for it to be sorted,' you have to sort it.*

*What takes a team from being just a team to a family? I would say, respect of the people, maintaining their work, giving them visibility. We try to share the credit.*

### **The Formula 1 driver as leader**

Given the driver's high profile we would be remiss not to discuss his leadership role within the team. Not all drivers interact with their teams in the same way. Some drivers are actively involved with many aspects of the team's activities. Others restrict their inputs to a more limited frame of responsibility related specifically to the on-track performance of the car. In many cases it may be that they are not as integrated into the guts of the engineering equation as one might have imagined. Patrick Head says,

*If you had a driver who was all over the technology, he probably wouldn't be a very good driver.*

However there is no denying the fact that the driver plays an important leadership role in a Formula 1 team both on the track and off. David Richards says,

*The role of a great driver is as much outside the car as it is inside the car. In most companies it is clear where the culture and leadership comes from, the MD or chairman at the top. In a motor racing team you might think that in a conventional structure it comes from team principal. However, a significant, real influence comes from the driver because it is he whom people become passionate and emotional about. As a result they have a far greater role than they can imagine.*

John Allison sees the driver's role like this,

*It's a leadership of a kind that you can see with certain personalities. They can infuse the team with their own ambition and competitive spirit and desire to succeed. They can make the team more believing that their efforts to get the driver to the top truly matter and that the team should be leaving no stone unturned to do well.*

From Jackie Stewart's point of view,

*The best driver leadership example is unquestionably Ferrari and Schumacher. No matter how good Ross Brawn is, no matter how good Rory Byrne is, no matter how good Jean Todt is, no matter how good other members of their team are, the man who pulled that together was Schumacher. They hadn't won a World Championship in twenty-one years before he arrived.*

Schumacher has been the lightning rod around which Ferrari's success has been built. He catalysed an underperforming team into a modern racing dynasty. According to Raoul Pinnell Chairman, International Brands, Shell, Schumacher is the consummate leader,

*He is fitter than anyone else, he works out more than anyone else, he gets up earlier than anyone else, he does more testing than anyone else, he motivates the most junior person on the team in a better way than anyone else.*

How does he do it?

*Personal. Touching them, saying, 'Thank you.' Or he looks at them and shakes their hands. When a race is over and the drivers are dehydrated some of them want to go back to their masseurs and their motorhomes. Michael is walking around to all saying 'Thank you.' or 'Oh, that was great.' It's a team. You think it's an individual, but it's not. Michael knows his skills and he also knows there is a team behind him.*

*I think that anybody that says it's impossible to come up with new ideas now ought to go off and do something else.*

Patrick Head,  
Director of Engineering WilliamsF1

Whilst Formula 1 is a global motor racing spectacle, each team relies on technology and the ability to continually innovate in order to outpace the competition. Innovating is concerned with continuously enhancing performance. It is about creating new opportunities, whether these be related to a product, technology or process. The point of innovating is to create new sources of performance, to find new ways of doing things that may improve both the efficiency and effectiveness of processes.

In Formula 1 we see not only technological innovation but many other creative ideas, such as the development of 'trade' deals rather than direct cash sponsorship, new standards in mobile hospitality, such as Paul Edwards, Managing Director, Edwards Hospitality Services, claims,

*We were the first to bring china plates into the paddock.*

Edwards Hospitality are the largest provider of corporate hospitality services to the Formula 1 teams, they have achieved this through continually developing and enhancing the service they offer their clients:

*You're told there will be twenty for lunch and then fifty turn up, you have to respond, turning people away is just not an option. So we have to be continually flexible and adaptive.*

In other areas, innovative ways have been found to provide products and services to the teams, as outlined by Bernard Ferguson of Cosworth Racing:

*We came out with the concept of leasing engines to the teams in the early nineties.*

reduce the speed of the cars and in 1998 the specifications of the tyres and chassis were changed to reduce the levels of mechanical grip.

So is innovation in Formula 1 different from any other kind of company? WilliamsF1 Engineering Director, Patrick Head thinks not:

*Today I don't think there's a lot of difference between a Formula 1 team and any other kind of business. They both have the same pressures of trying to bring product to market, generation of ideas, recognition and nurturing of the good ideas.*

So what are some of the pressures and demands of innovating in the context for Formula 1? Two factors emerged from our research: speed to market and the challenge of innovating in organisations that are growing larger and larger.

### **Speed to market (or the track!)**

Whereas there are similarities between Formula 1 and other businesses, there are real differences in terms of the pace and intensity of innovating. The pace of innovation is significantly faster in Formula 1 than other technology industries. Here innovating is a continuous process with a constant array of design changes and new components being incorporated into the car. This is shown in Figure 13, which has been kindly provided by Paolo Martinelli, Engine Director, of Ferrari. The top part of the figure shows how Ferrari develop their production engines, which are used in their high performance road going cars. We can see that the total development period for a production engine is forty-two months, if we exclude the time for the concept study, up to the start of production (SOP). In contrast during the same period within Formula 1 there have been three new engines designed, built and raced, each with three iterations or evolutions (EVO1, 2, 3) of the design. It can also be seen from Figure 13 that within Formula 1 the development process is continuous, meaning that the engine is being both raced and developed simultaneously. For Formula 1 we therefore see a total of nine stages of development during the single stage of development for the production engine.

One of the critical aspects of Formula 1 is that it requires all the teams to attend fixed race meetings around the world. There can be therefore no possibility of a car not being ready for these events.

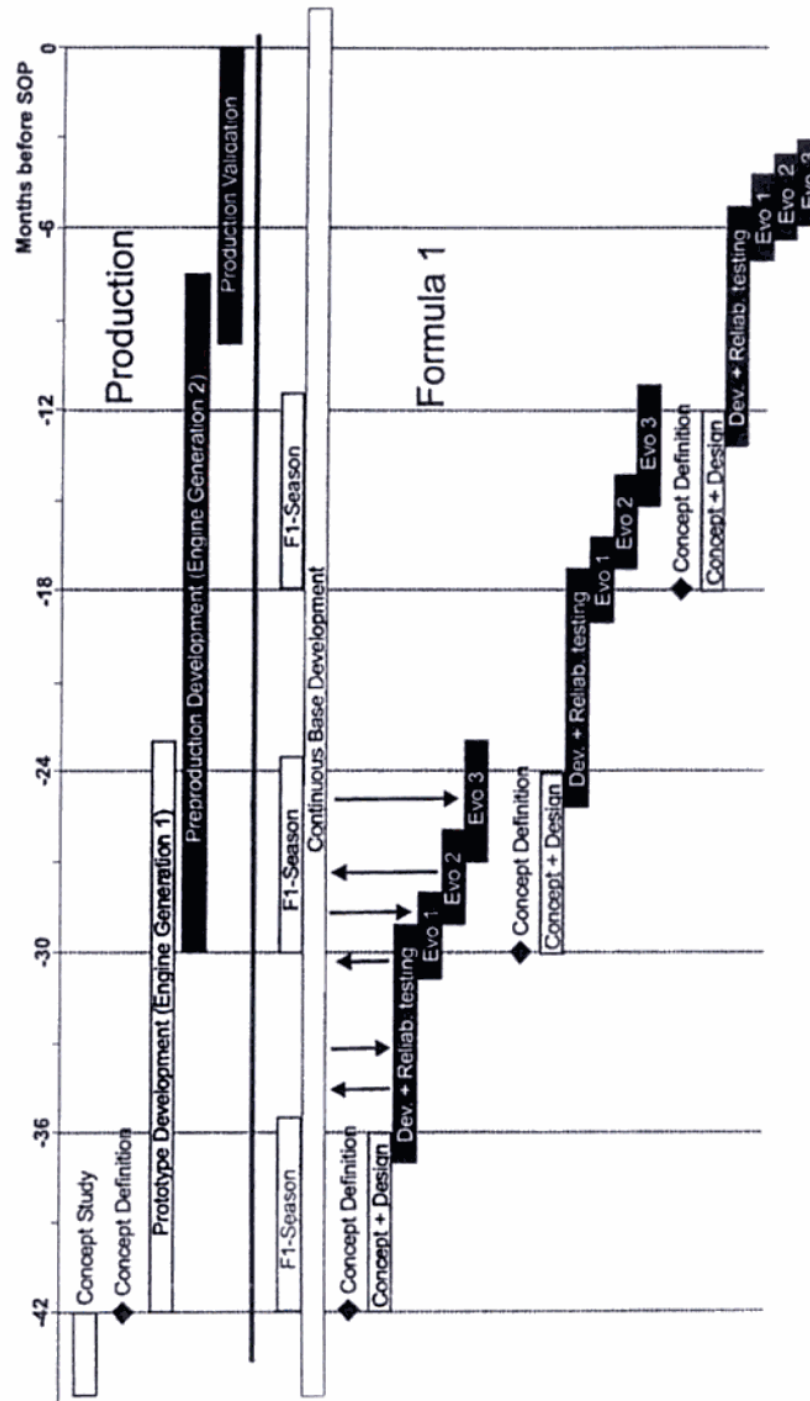


Figure 13. Engine development process at Ferrari, Formula 1 vs production  
Source: Ferrari SPA



*testing, all the test facilities that most of these Formula 1 teams have now, they've all ended up being focused down pretty much the same path in the same channel.*

However, Patrick Head believes that the increasing intensity of regulation has meant that the nature of innovating in Formula 1 is changing rather than disappearing.

*I think innovation in terms of bringing in radical new systems like active ride suspension is much more inhibited by regulation, but new ideas are still needed and the thinking tends to be on a more micro scale. We tend to look at adding a lot of micro scale innovations together to give a larger overall effect.*

### Who gets the benefit?

The history of Formula 1 is littered with innovations where teams have created a step forward in performance, but the innovating team has not always been the one who has enjoyed the most race success as a result of their innovation.

As can be seen from Table 13, often the innovator is not the prime beneficiary of the innovation. Whilst Cooper undoubtedly enjoyed success from their mid-engine layout it was Colin Chapman of Lotus who took the design to a more refined stage and was able to overtake the Cooper concept on performance. Similarly, whilst it was Lotus who pioneered the development of the Ford Cosworth DFV engine, which required a different concept in chassis design (the engine formed a structural part of the car), Ford's decision to make the engine available

**Table 13. Who benefits from innovations?**

<i>Innovation</i>	<i>Innovator</i>	<i>Beneficiaries</i>
Mid engine	Cooper	Cooper/Lotus
Cosworth DFV	Lotus	All British constructors
Ground effect	Lotus	Lotus/Williams
Flat 12 engine	Ferrari	Ferrari
Turbo engine	Renault	Honda
Active suspension	Lotus/Williams	Williams
Six-wheel car	Tyrrell	Tyrrell
Composite monocoque	McLaren	McLaren
Semi-automatic gearbox	Ferrari	Ferrari

to other teams meant that the performance potential was dispersed across a range of constructors and effectively created Grand Prix winners out of teams such as Matra, Tyrrell, McLaren and Brabham.

Renault entered Formula 1 in 1978 with a car using a lightweight turbocharged engine. The regulations at the time stipulated that engines were either 3.0 litre normally aspirated or 1.5 litre turbocharged. It was generally believed that no-one would be able to build a 1.5 litre turbo that would be competitive against the 3.0 litre engines. Renault did so but in the nine years they raced the turbo engine they failed to win a World Championship. In contrast Honda who entered with their own turbocharged engine in 1983 were able to win three World Championships between 1983 and 1988.

But there were also instances where the innovating team were able to capture much of the value of their innovation. Ferrari's 'Flat 12' engine was developed originally to be fitted into an aircraft wing, but found its true potential in the Ferrari 312T racing car. The powerful twelve-cylinder format with a low centre of gravity meant that it posed a significant threat to the well-established Ford Cosworth DFV. Whilst there were attempts to copy the Ferrari format, most notably with Alfa Romeo supplying the Brabham team with a Flat 12 engine, these were uncompetitive and Ferrari enjoyed a prolonged period of success before the engine was rendered obsolete by new ground-effect aerodynamics.

These examples raise some important questions about how Formula 1 teams are able to protect their ideas. Secrecy is a big issue in Formula 1, but is something that Patrick Head at WilliamsF1 believes can be taken too far:

*Some Formula 1 teams are so concerned about secrecy and the loss of IP that they literally build physical walls around departments to ensure that if someone leaves from the transmission department, they won't have an idea of what's going on in the suspension department. In contrast we have the view that providing we're progressing and developing it's more positive to have an open internal exchange of information than the risk of losing IP when somebody goes.*

From Ferrari's point of view, their location outside of the UK's Motorsport Valley could be a benefit here. Ross Brawn, Technical Director, of Ferrari says:

*If you've got an innovation you're lucky to keep it for three or four months particularly once it goes out on the circuit. I guess we gain and lose from that because we don't have the grapevine feeding us, but generally I'm happier with the degree of isolation we have.*

Another potential concern is the frequent movement of drivers around the teams, but in Patrick Head's view this is not a problem:

*Most drivers are only aware of what we're doing on the surface, they know that if they press this button it does that, but they've got no idea of what goes on inside.*

Of course another possibility is to mask the potency of the innovation by other aspects of the car performing poorly. Gordon Murray, former Technical Director, Brabham and McLaren, says,

*Where we've had a massive innovation and we think we're going to walk it but the driver makes a mistake, the engine fails, you choose the wrong tyres or whatever and you have a series of races where other things go wrong. That happened to us a lot. It can be a bad thing if you cream the first race as everybody panics.*

### **Innovating in public**

Patrick Head identifies a further difference in the fact that in Formula 1 the success or failure of innovating is a very public one:

*You've got to do better and better each year, there is no hiding place if someone's not doing a good job. They can't tuck themselves away, it tends to become visible pretty quickly.*

A similar sentiment is expressed by Tony Purnell, CEO, Ford Premier Performance Division, who also combines the point that it is both highly visible and immovable:

*In Formula 1 you cannot disguise the truth about your 'product' because you are absolutely exposed to the reality of your situation every two weeks. And that's where Formula 1 is special, it really is.*

Formula 1 therefore presents a very particular challenge to the process of innovating, because of the competitive pressures it has to be relentless, but it is also highly visible in terms of the success or failure of the process.

### **Balancing innovation with growth**

Formula 1 teams enjoyed particularly high levels of growth in the period between 1993 and 2003. During this time the typical number of employees in a Formula 1 team grew from around 100 to 500. This, however,

*other groups. It's also important that each group has something which is clearly related to the car, rather than just saying your delivery performance against your works order due dates must be high. For it to work in Formula 1 everyone has to be able to relate their activities to the performance of the car.*

Individuals such as Patrick Head have experience in all the component areas of the car, which they bring to bear when making trade-offs between different aspects of the car, but many of those coming up through the organisation have tended to be specialists in one particular area, most notably aerodynamics. Patrick Head says,

*One of the problems created by this growth is that you see some people who were very capable in one particular area, such as aerodynamics, being head-hunted to be a chief designer or technical director in another team. But the result is often completely wrong for the individual and the company.*

In Formula 1 there have certainly been a number of notable innovations over the last fifty or so years. Here we pick a number of particular examples to consider some of the general principles of innovating within Formula 1: the Ford DFV engine in 1967; the six-wheel Tyrrell of 1976; the Brabham pit stop car of 1982; Ferrari's paddle gear change in 1989; the Williams active suspension of 1992; and the all conquering Ferrari F2004 of 2004.

### **Changing the face of Formula 1: Ford DFV engine**

The Ford DFV engine was a disruptive innovation in Formula 1. It changed the way in which Formula 1 cars were designed and effectively further shifted the basis of competitive advantage away from the engine to the chassis and aerodynamic aspects of the car. In many ways it was this engine that created the regional cluster of expertise in the UK known as Motorsport Valley; now the core competence needed was focused on chassis and aerodynamics rather than engine design. The DFV's contribution to Formula 1 and the motorsport industry more generally is highly significant.

The basic concept of the Ford DFV was that it replaced the need to construct a chassis for the entire length of the car. The DFV was part of the car and was attached to the chassis behind the driver with the rear suspension and gearbox attached to the back of the engine as illustrated earlier in Figure 2. This created a significant increase in the power-to-weight ratio of the racing car.

As an innovation the Ford DFV was a joint development between Cosworth Engineering who developed the engine, and Formula 1 constructor Lotus who designed their type 49 car around the engine, allowing it to be attached to the rear of the chassis. The Ford Motor Company sponsored the project with a capital investment of £100,000. One of the main catalysts for the innovation was a change in regulation. In November 1963 the FIA announced that from 1 January 1966 Formula 1 engines would either be normally aspirated 3.0 litre or 1.5 litre supercharged. Prior to this point the normally aspirated 1.5 litre engine had dominated, most notably with that produced by Coventry Climax and used by successful teams such as Cooper and Lotus. However, Coventry Climax decided that the development costs of a new 3.0 litre engine would be too high for them to bear, and during 1965 they announced their withdrawal from Formula 1 at the end of the season.

Colin Chapman of Lotus approached Keith Duckworth of Cosworth to see if he could design and build a new 3.0 litre engine. Chapman then sought support from Ford, which he received from Walter Hayes who was responsible for Ford's motorsport activities. Duckworth developed a novel layout for the combustion chamber using four valves per cylinder; at the same time Ford had also commissioned a smaller four-cylinder Formula 2 engine using the same layout. The Formula 1 engine effectively doubled up two four-cylinder blocks into a V8 formation. It was therefore given the name 'DFV' for Double Four Valve. The car and engine were developed during 1966 and made their first appearance at the Dutch Grand Prix at Zandvoort on 4 June 1967. It won the first race and went on to dominate the rest of the season. Whilst Lotus and Cosworth were delighted with the situation Ford's Walter Hayes was not so sure:

*Almost at once I began to think that we might destroy the sport. I realised that we had to widen the market for the DFV engine, so that other teams could have access to it.<sup>30</sup>*

In 1968 the Ford DFV, which had been instigated by Colin Chapman of Lotus, became available to other teams for the sum of £7,500 per unit. This started a tradition in Cosworth in building customer engines. In 2004 Cosworth were still supplying 'customer' engines to Minardi and Jordan. Bernard Ferguson, Commercial Director, Cosworth Racing, says,

*Cosworth has been in the business of supplying customer engines for many years. Ken Tyrrell was our first customer in 1968.*

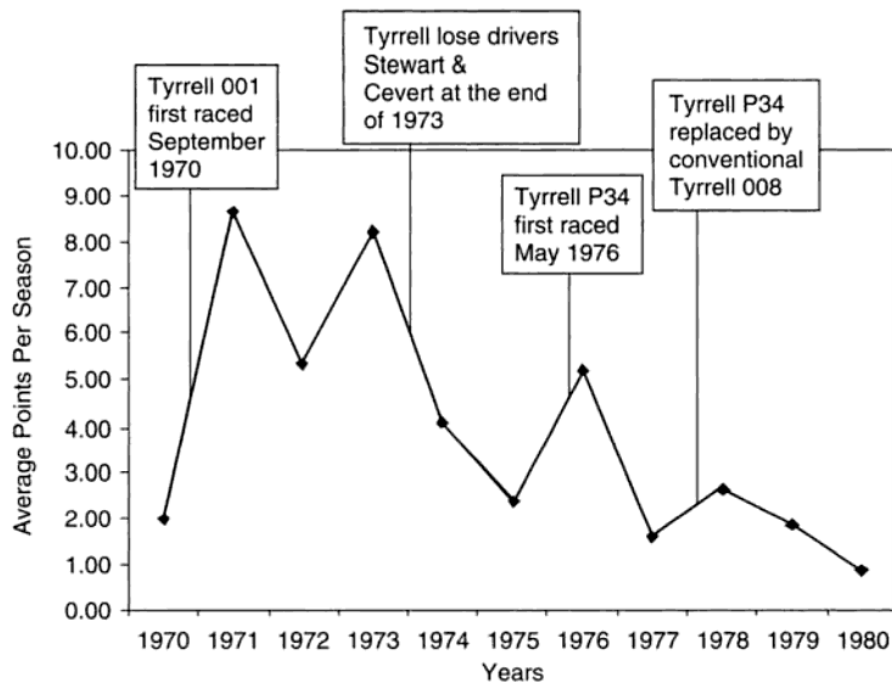


Figure 14. Performance of Tyrrell Racing Organization 1970–1980

all the Formula 1 teams with tyres. Gardner shared his ideas with Goodyear who responded to the challenge by creating a tyre with a 10-inch width and a 16-inch diameter. The introduction of the six-wheel P34 temporarily restored the fortunes of Tyrrell Racing, as can be seen from Figure 14.

Despite a promising performance in 1976, when Tyrrell finished in third place in the Constructors' Championship, 1977 proved to be a different story with the P34 becoming uncompetitive relative to conventional cars. The reasons for this appear to have been due, not to any fundamental aspect of the concept, but to the speed of development of specific components that were supplied by external suppliers to Tyrrell. Ken Tyrrell stated,

*It became difficult to get big enough brakes to fit inside small front wheels. Because everyone else was using a standard front tyre it became politically difficult for Goodyear to develop the small tyre for us. The car became too heavy with our attempts to put bigger brakes in it and at the end of the second year we had to abandon it.*

Derek Gardner added,

*... where I think we went wrong, was that Goodyear were supplying most of the teams with rubber, [and] they were only supplying one team with very small front wheels. Therefore the development of the tyres, which is continually going on, meant that almost with its first race the development of the front tyres went back – they just didn't develop as fast as everyone else. Whereas the rear tyres were being developed with the existing front tyres, so in effect you're having to de-tune the back of the car to stay with the front which was, really, not what it was all about.*

As a result Tyrrell returned to using a conventional chassis with the Ford DFV engine. Derek Gardner left Tyrrell to return to industry and it wasn't until he had retired and became involved with the Formula 1 Thoroughbred Racing Series, which races historic Formula 1 cars, that he was able to work with the six-wheel car once more.

### **Innovating the whole system: the Brabham pit stop car**

Pit stops have been a feature of Formula 1 for many years. But contrary to popular belief they were not introduced by regulation to liven up the racing. Contemporary pit stops were created by the innovative Brabham BT50 or pit stop car. The point of the pit stop car was that this was not just a technical innovation, but an innovative race strategy that enabled a lighter, more nimble car to outpace the opposition to the extent that it would be able to enter the pits, stop, refuel, fit new wheels and tyres, return to the circuit and still be in front. It is a classic case of problem solving and lateral thinking to win the race. Gordon Murray, former Technical Director of Brabham and McLaren, says,

*I was the one who introduced pit stops in Grand Prix racing by designing a half tank car – to get the advantage of the lower weight, the lower centre of gravity. But it wasn't just pit stops, it was a plan that allowed you to achieve advantage through a faster, lighter car and a pit stop. It's just pure mathematics. You just draw a graph of the race – you draw the car's weight, the centre of gravity and the benefit per lap as a curve and then you take a chunk, a negative curve out of the middle bit where you lose say twenty-six seconds slowing down and coming into the pits and refuelling and if the total equation's better then you do it.*

But Gordon Murray's idea created other problems such as tyre temperature. The performance of a Formula 1 car is very susceptible to



changes in the condition of the tyres. When a race is started the tyres are relatively cool and performance is only optimised as they warm up to operating temperature. The challenge with the pit stop car was that this problem was multiplied one, two or even three times in a race. So its success was also dependent on the tyres being able to get to their optimum temperature as soon as possible. Gordon Murray explains,

*We developed these wooden ovens with gas heaters in them to heat the tyres up so the driver didn't lose the time and smacked those on at the last minute with the fuel.*

One surprise for Murray was that the other teams were relatively slow to respond to Brabham's innovative approach:

*In the first four or five races the turbo chargers kept failing. I said to Bernie [Ecclestone – Brabham Team Principal], well that's it, we started in Austria, we only had four races left to end the year, everybody's going to turn up at Brazil with a pit stop car. But no – Williams had it – but it was a kit that could be put on the car – it wasn't integrated into the design of the car.*

### Politics and innovating: the paddle-shift gear change Ferrari

Perhaps of all the innovations in Formula 1 the paddle-shift gear change is the most recognisable innovation that found its way on to the high performance road cars. The paddle-shift utilises a semi-automatic gearbox where the driver does not operate the clutch but selects gears by a pair of 'paddles' located on the steering wheel, pushing one side to change up a gear and the other to change down.

It was developed by John Barnard who was trying to find a way to improve the performance of the turbocharged Ferrari. However, the problem with this innovative idea was that it meant that the car had to be either designed as a paddle-shift car or a conventional gear-shift car, there was no possibility of producing a competitive car that combined these two features. Barnard said,

*There was a massive amount of politics around the whole paddle-shift concept. It actually happened at the time when Enzo Ferrari died. Vittorio Ghidella, who was running Fiat Auto at the time, came into Ferrari to take over Enzo Ferrari's mantle. Towards the end of 1988 I was designing the 1989 car, which was a more developed version of the 1988 test car, but I was designing it such that it would not take a manual gear shift, you could only*

*where the engine was completely integrated into the car then that must be the best situation. So one of the things that was very important to myself and Rory [Chief Designer Rory Byrne] was to have someone here who understood that and luckily Paolo Martinelli [Engine Director] very quickly appreciated our ideas and was completely receptive to the idea of a fully integrated engine as part of the car package.*

One of the key ways in which they achieved this was by maximising the integration between the engine and the other systems of the car, as outlined by Paolo Martinelli:

*'I think the integration of the work [between chassis and engine] has been a continuous process and is ongoing, so I think year by year we are continuing in this direction. I think it was very important that there was trust from the top management and direction from the top, from Mr di Montezemolo [Chairman, Ferrari] and from Jean Todt [General Manager, Ferrari].*

*We do have some cross-functional areas. For example electronics. We do not have electronics for the chassis and a separate group for the engine and gearbox, they cover the whole car and they help us to integrate the designs between chassis and engine. It is the same for metallurgy, they cover the whole car. Within each area we have experts who also work together, for example, in the area of Computational Fluid Dynamics where someone in the chassis group may be working on design of the airbox and someone in the engine group is working on the flow of gases in the engine they may often share ideas and calculations.*

So what makes successful innovation in Formula 1? One of the most influential designers over the last thirty years is John Barnard. Many of his ideas form the basis of the conventional Formula 1 car today. He summarised some of his ideas around being innovative in design:

*If it's a really innovative project then that means that I can't be 100% sure that it's going to work. So the one thing I always try to do when I'm either sitting down to design something or I've got an idea in my head is to have a backup solution. I would generally try and think as I'm doing it 'Okay if it doesn't work what do I do?' so that I'm ready for that catastrophic event that there is something that we haven't foreseen that is so bad there is no other way to go but dump it and thinking about that at the back of my mind 'What would I do?' I tend to approach things like that because you're not going to get too many chances to be very innovative in any business and you have to recognise that everything is going to have some sort of problem. That problem is either fixable in a fairly short space of time, hopefully, or it's so*

# 10 | *Transforming*

*We're proud of our history, but not  
restricted by it.*

Ross Brawn Technical Director,  
Ferrari

Change is pervasive in Formula 1. Whether it be the hundreds of small design changes made to a car during the course of a year, or the fact that the individuals employed within Formula 1 are likely to work for eight different teams during the course of their career.<sup>18</sup> The teams themselves have an average lifetime of under six years and are frequently either dissolved or acquired by other teams, creating a constant state of flux.

There are many explanations for the constant pace of change that pervades Formula 1. Not least is the incessant search for technological advantage, as a consequence of which many radical ideas have disrupted the evolution of the Formula 1 car. These have included such developments as gas turbines, four-wheel drive and six-wheel cars.

However, technological advances are tempered by the impact of regulation. Regulation within Formula 1 is a contentious issue and often the focus of political manoeuvring by the teams to try and ensure that changes benefit their own situation and disadvantage their competitors. The pressures for regulation can be grouped around three key areas: safety, competitive racing and cost reduction.

The imperative of safety within the regulations of Formula 1 has steadily emerged from the 1960s when fatalities were all too frequent and a small number of drivers, such as Jackie Stewart, were outspoken in their criticism of safety standards. In 1978 Professor Sid Watkins was appointed as Grand Prix Surgeon with the remit to develop overall medical standards at Grand Prix circuits. The efforts of Professor Watkins and his colleagues revolutionised the situation, particularly in terms of the care that drivers received when injured on the track.<sup>36</sup>

More urgent pressure for radical change was created following the deaths of drivers Roland Ratzenberger and three-times World Champion

Ayrton Senna in two separate accidents at the San Marino Grand Prix at Imola in 1994. There had been a period of twelve years without a single fatality, and many of those working within Formula 1 had never experienced the loss of a driver at a Grand Prix event. There was universal shock within the Formula 1 community, amongst the Formula 1 fans, but also beyond to the public at large. Senna's death had been covered by live television broadcasts and there was widespread condemnation of safety levels within the sport from the press, governments, sponsors and even the Vatican.

Max Mosley, FIA President, stated that the only acceptable safety objective was zero fatalities and zero serious injuries. Mosley established the FIA Safety Committee, chaired by Sid Watkins, to explore how this objective could be achieved. Safety regulations have covered many areas from the construction and testing of the cars, to the equipment worn by the drivers and the design of the circuits to protect both drivers and spectators. However, as the racing car designers constantly strive for enhanced performance, so must the regulators respond to meet increased speeds with appropriate measures to ensure the safety of all those involved.

From the perspective of competitive racing the regulations seek to destroy any areas of competitive advantage that a team may develop in order to maximise the competition on the track. There have been various regulations passed over the years in order to try to reduce the technological advantage of particular cars. It is interesting to note that invariably these regulations lag the innovations. This is perhaps not surprising in that a regulation can only be drafted once the source of advantage is more widely understood or 'codified', enabling the regulation to effectively remove it. For example, it took a number of years before the principles of ground-effect aerodynamics were fully disseminated around the Formula 1 paddock. It was only when these concepts were fully understood that regulations could be defined to curb its competitive potential.

However, there are situations where cars have been banned on their first race or even beforehand. In 1978 Brabham Technical Director, Gordon Murray, developed the Brabham fan-car, which used a mechanical fan to enhance the ground-effect that other cars were achieving aerodynamically. However the fan created a dust cloud behind the car and was banned on safety grounds after winning its first Grand Prix at Anderstorp in Sweden. Another example was the Continuously Variable Transmission (CVT) system developed by Williams in the

early 1990s. This system removed the need to change gear, with a belt and pulley system ensuring that the wheel speed was matched to the track conditions, the engine running constantly at maximum power. The system was based on technology used on the DAF road car that had been developed by Van Doorne using a rubber belt system. The demands of Formula 1 meant that steel rather than rubber was used for the belt. The car appeared at a public test session at Silverstone in 1993, it was rumoured that a number of competitors had identified the huge potential of the system during the test, and somehow regulations were drawn up banning the use of CVT by the end of the year. Therefore despite all the time and cash Williams had invested, they were never able to race the system in a Grand Prix.

Regulation has also been used to reduce costs by standardising certain components and reducing the usage of certain items. For example in 2004 a regulation was passed that stipulated that each driver could only use one engine during a race weekend, the intention being to prevent cost escalation by reducing the number of engines used over the course of a season. However, as is often the case the impact of this change was significant to the engine builders. They now had to change their specifications regarding the lifetime of engines resulting in many components having to be redesigned in order to cope with this change. As observed by Cosworth Racing's Commercial Director, Bernard Ferguson, whilst the objective of the regulation was to cut costs, that was not necessarily the outcome:

*'The biggest cost for an engine manufacturer is obsolescence, so for us, the less change the better.'*

In addition to the changes created by the competition on the track, many changes were also created by the commercial demands of Formula 1. Until the 1970s Formula 1 teams were either funded by car manufacturers or by private individuals, such as Ray Walker who funded his racing activities from the wealth created by his family's Johnnie Walker whisky business. Walker successfully ran his own team with cars purchased from Lotus and Cooper using top class drivers such as Stirling Moss and Jack Brabham. Then came sponsorship that required the teams to develop marketing and sales operations in order to both recruit and manage sponsors. During the 1970s, 1980s and early 1990s much of this sponsorship came from the tobacco companies who, due to increased legislation on tobacco advertising,

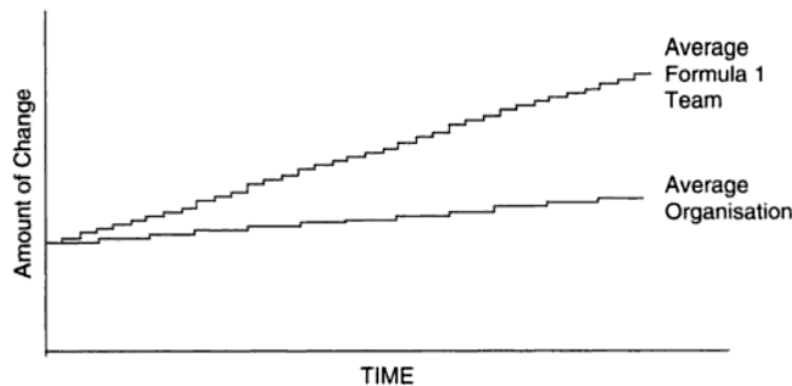


Figure 15. Comparative rates of incremental change

Even though change is pervasive and impressive in Formula 1, it is nonetheless incremental change; it occurs in discrete steps within a dominant mindset and therefore produces relatively predictable outcomes. Incremental change in the context of Formula 1 would cover aspects such as changing sponsors and technology partners, adapting to new regulations, bringing in new people, systems, and so forth. The rate of change will also vary by team. For the smaller teams such as Minardi, issues such as partnerships are changing race by race, presenting them with a very different problem when compared to Ferrari whose major partners would be on three- or five-year contracts.

As an organisational type, we suggest that the flexible and responsive Formula 1 teams are able to deal with higher levels of incremental change than their counterparts in other kinds of industries. However, the challenge comes when they have to achieve more radical steps in performance improvement that require fundamental changes in mindset, rather than continuous improvement within the existing organisational framework.

These radical changes are required when the competitive landscape is changing faster than the organisation's ability to change with it. If an organisation fails to respond to these changes it is unlikely to survive in the longer term.

There are many examples where teams have failed to become established in Formula 1. Perhaps one of the most disastrous recent attempts was Lola Cars in 1997. Established by former quantity surveyor Eric Broadley in 1957, Lola became a highly successful manufacturer of racing cars, at one time dominating the CART/Champ Cars series in



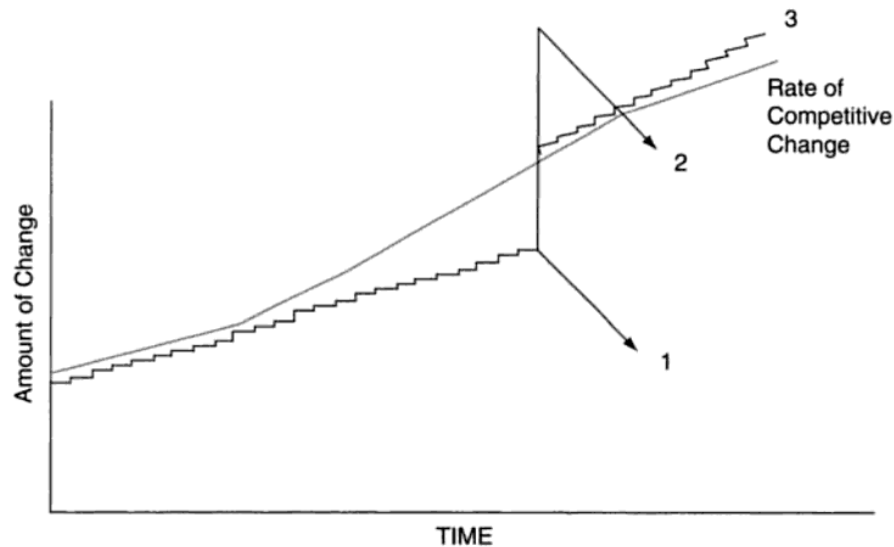


Figure 16. Differing patterns of change in Formula 1

the USA, and winning the Indianapolis 500 in 1978 with Al Unser. They had had a number of forays into Formula 1, first with a Broadley designed car in 1962 and then in 1974 designing and building cars for Graham Hill's Embassy-Hill team. After a number of projects during the late 1980s, they had attempted to re-enter under their own name in 1997. Sadly the major sponsor they had anticipated failed to materialise and whilst the cars had arrived for the opening race at Melbourne in Australia they were unable to take part. Lola Racing folded with debts of \$9 million in 1997, also forcing the parent company into administration.<sup>11</sup> Whilst Lola have subsequently been turned around by new chairman, Martin Birrane, their 1997 entry into Formula 1 remains a dark period in the company's history.

We can discern three distinctive types of change situation in Formula 1. These are situations where teams have either failed to adapt to the changing competitive conditions of Formula 1 (Type 1 in Figure 16), where they have overreacted or overanticipated environmental change and therefore were unable to fully exploit the benefits of their transformation (Type 2 in Figure 16) or where they have been able to undertake a transformational change to re-establish their competitive position (Type 3 in Figure 16).

We consider three cases of highly successful teams who have responded in differing ways to the pressure for change and exhibit the

three types in Figure 16. Each case has been used to draw out some of the principles in Figure 16 and we now expand these in further detail in order to clarify their characteristics.

For Type 1 we consider Tyrrell Racing, which operated as a constructor from 1970 to 1998 competing in a total of 418 Grands Prix, winning 23 of these and taking the Constructors' Championship in 1971. For Type 2 we consider the Brabham Formula 1 team who operated as a constructor from 1962 to 1992, competing in a total of 399 Grands Prix, winning 35 of these and 2 Constructors' Championships in 1966 and 1967. Finally for Type 3 we consider Ferrari. The oldest team, competing since 1950, in 2004 they were the most successful team in the history of Formula 1. Up to the end of 2004 Ferrari had competed in a total of 704 races, with over 180 wins and a total of 14 Constructors' Championships in 1961, 1964, 1975–7, 1979, 1982–3 and 1999–2004. We now review each in turn and then consider some of the issues these three case studies raise.

### Tyrrell Racing (Type 1)

Figure 17 shows the example of Tyrrell Racing during the period from 1970 to 1998. Tyrrell enjoyed a particularly successful period as a Formula 1 team, but eventually succumbed to an environment that was changing faster than their ability to adapt.

However, it was never Ken Tyrrell's intention to become a Formula 1 constructor. Ken was a naturally gifted team manager and talent spotter who ran his own team in the smaller Formula 3 category with cars provided by Cooper in the early 1960s. In 1964 he had signed up-and-coming driver Jackie Stewart to drive for his team, in order to improve their performance he negotiated with French aerospace and performance engineering conglomerate Matra to build a specialist chassis for the car. This they did and the relationship eventually moved into Formula 1 with Tyrrell running a Matra chassis with a Cosworth engine to win the 1969 drivers' title for Jackie Stewart and also the constructors' title for Matra. However, Matra's desire to develop their own engine led to a parting of the ways, as Ken Tyrrell outlined:

*Matra came to us and said if you want to use our car in 1970 then you have to use our engine. So we tried the engine. We put it in the car and took it to Albi in the South of France [north-east of Toulouse], it made a very nice noise, but it actually didn't go very fast, so we made the decision to stay with the Ford*

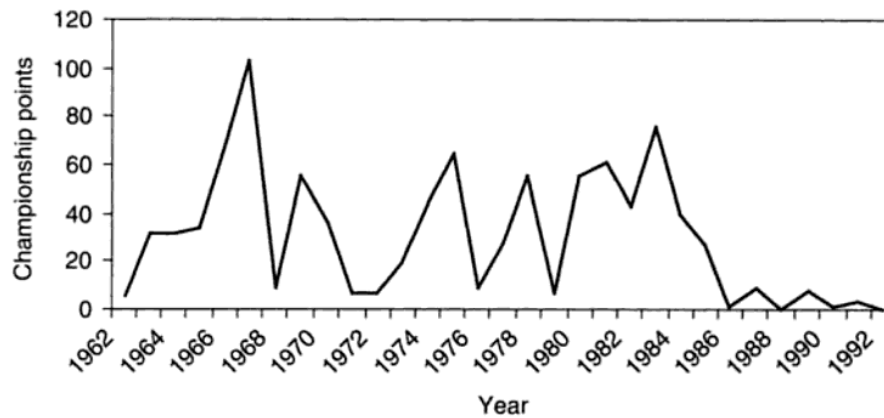


Figure 18. Brabham 1962–1992

for cash and resources and the team were purchased by British American Racing at the end of 1997. The original plan had been for Ken to run the team as Tyrrell Racing in 1998 with it being renamed British American Racing in 1999. However, due to differences over the choice of drivers, Ken resigned from the team at the end of February 1998. The final race of a Tyrrell car took place at Suzuka, Japan, in November 1998 without the presence of the founder of the team. Sadly Ken Tyrrell passed away in 2001. Behind him he left a legacy of the values of the team owner of the 1960s and 1970s who undoubtedly played a major role in the history and development of Formula 1.

### Brabham (Type 2)

Founded by Jack Brabham with fellow Australian designer Rob Tauranac in 1962 Brabham were one of a number of teams founded by drivers to support their racing activities but that eventually became a successful constructor in their own right. Figure 18 shows the performance of the team from the period 1962 to 1992.

In contrast to Tyrrell, who enjoyed success almost immediately as a constructor, it took Brabham a few seasons to establish and build up the performance of the team. Once this had been achieved they became a successful operator using a series of different engine suppliers such as Coventry Climax, Repco and Ford Cosworth. In 1966, at the age of forty, Brabham became the only driver to win the World Drivers'

Championship in a car bearing his own name – the Brabham BT3 (the model number using the first letter of the two partners' surnames). This was followed by a further World Championship for both the Constructors' Cup and the drivers' title, but this time with New Zealander Denny Hulme at the wheel. At the end of 1970 Brabham retired from driving, having sold his share of the team to Tauranac a year earlier and departed for Australia to take up farming and a number of other business ventures. Interestingly, following Brabham's departure, Chief Mechanic Ron Dennis and his number two Neil Trundell left to set up Rondel Racing. Dennis went on to create a series of racing organisations that eventually metamorphosed into McLaren International in 1982.

Tauranac found the commercial pressures of running the team, as well as designing and overseeing the construction of the cars, an unsustainable burden to bear. In the autumn of 1970 he sold the company to Bernie Ecclestone whilst he became Joint Managing Director with responsibility for car design and engineering. This situation remained until early in 1972 when Tauranac left the company and Ecclestone assumed full control.

Ecclestone set about restructuring the Brabham operation. He sacked four of the five-man design team and promoted the remaining designer, Gordon Murray, a twenty-four year-old South African, to Chief Designer. Ecclestone had a very direct style for running the team. Keith Greene who became Team Manager of the new operation described how he resolved the growing friction between drivers Graham Hill and Carlos Reutemann as both believed the other was being supplied with superior engines:

*Bernie said 'Right I'm not going to have any more arguments with these drivers. What we are going to do now is decide their engines for the year, OK?' So he got the drivers to alternately call out heads or tails while he flipped a coin and that decided who would have which engines for the year. Once the draw was finished he said: 'I don't want to hear any more about engines.' And he was gone and there were no further complaints.<sup>24</sup>*

Ecclestone set about making some other changes to the operation. He had both the workshops and cars painted white, and redesigned the layout of the factory. Brabham employee Nick Goozée commented on the changes:

*We found the changes, which were introduced quickly, a little over the top, but, in fact, we were not an efficient company. We were very basic in some of*

*our methods, which had been fine in the 1960s but once Bernie bought Brabham change was both inevitable and necessary.*<sup>24</sup>

In the early 1970s the Brabham budget was around £100,000 per annum and there were seven full-time employees. It was a very demanding time for all those involved, but the new team at Brabham had the sense that this was a new beginning with new opportunities, as outlined by Gordon Murray:

*Bernie gave me the opportunity to be, first of all Chief Designer, and then Technical Director. And that was good and bad. The good thing, and the reason the performance started to climb, was that he had the trust in me to do a brand new car. He said to me: 'I'm tired of all these bits and pieces, I want a completely new Formula 1 car, we need a clear head, a clean sheet of paper.' And that's why we started climbing and we led the first race, in fact, with the new car and won in 1974 for the first time.*

But things were very stretched and whilst the Brabham operation could be described in today's terms as an agile organisation, in that it was both lean and flexible, it also placed a great deal of strain on the individuals working within it:

*The bad part was that he fired everybody and made me Chief Designer and at the time I was pretty hard-headed about doing everything myself, I couldn't delegate. I wanted to draw the whole car, draw the gearbox, the body and the aerodynamics, everything. And I went far too long without any help. In fact I was on my own, running Brabham, designing and doing the truck spares and organising everything until 1978 that was far too long, by then people had an engineer on each car as well as a technical director. I was Technical Director and I was also engineering both cars, in the same race.*

In addition to the organisational strains that Brabham were enduring, the competitive situation was also changing. Brabham, like most of the British-based Formula 1 constructors, were using a Ford DFV V8 engine. In 1975 Ferrari, who designed and built their own engines, were beginning a renaissance that was seeing a new kind of engine dominate the circuits – the Ferrari 'Flat 12' or boxer engine used four more cylinders than the DFV, and whilst it was heavier, the extra power it provided made it dominant on many circuits in the Grand Prix series. Ecclestone and Murray were very quick to respond to this new development and began to look around for an alternative engine to the Ford that could provide the performance levels being enjoyed by Ferrari. Midway

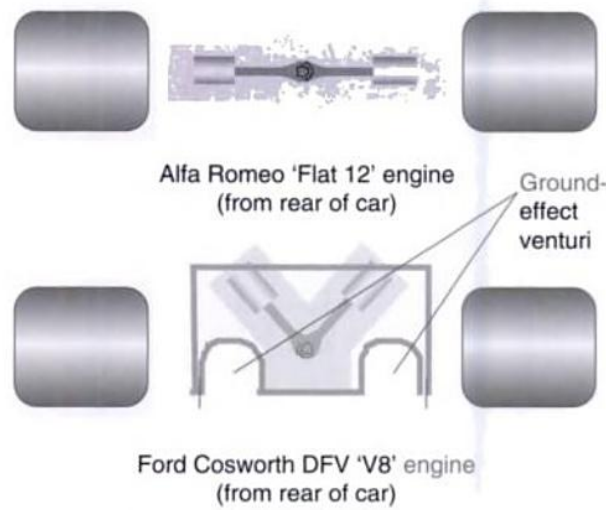


Figure 19. Car profile for ground-effect aerodynamics

Murray therefore had to face the problem of again radically redesigning the Brabham car:

*I'd said to Bernie, we're just about getting up there again, we've shot ourselves in the foot by going with Alfa, we're just starting to climb up again and now this is ground-effect, and he said 'What's ground-effect?' – Bernie's essentially non-technical and I got up and drew this thing, and I said I can't get past the engine – right where the venturi diffuser wants to start expanding, we've got a twelve-cylinder engine sticking out there and exhaust pipes. So he said 'Well what are we going to do?' We were sat there racking our brains thinking how else can we – you know we've got to have a ground-effect car. How can you have ground-effect or down-force with a Flat 12 engine, and the fan-car bought us time to go back to Alfa and say – we need a V12 engine.*

In fact Alfa Romeo were able to respond more quickly than Ferrari to this new development and provided a new V12 engine for Brabham to start to race in 1979. By this time everyone was returning to Ford DFV as the ideal engine to use with ground-effect aerodynamics. Brabham bowed to the inevitable and switched to the Ford DFV at the Canadian Grand Prix in September 1979.

The fortunes of the Brabham team took a marked upturn in 1981 when driver Nelson Piquet secured the drivers' title by a margin of one point in their ground-effect car with the Ford DFV engine. In 1982 they switched from the normally aspirated Ford DFV to a turbocharged

BMW engine. Renault had entered Formula 1 with a turbo engine in 1978, and won their first Grand Prix in 1979. With the banning of ground-effect skirts in 1982 Brabham were able to emulate Renault and Ferrari and switch to a turbocharged engine supplied by BMW part-way through 1982. However, the BMW engine, whilst powerful, suffered with reliability problems.

In 1983 these problems were resolved and when combined with Gordon Murray's revolutionary pit stop car (as discussed in Chapter 9) enabled Brabham to win their fourth and final World Drivers' Championship. Brazilian Nelson Piquet took the World Drivers' Championship for Brabham BMW in 1983, with Brabham also coming third in the Constructors' Championship.

However, this was the last positive highlight in the history of Brabham. With Ecclestone increasingly involved with the Formula One Constructors' Association, and also becoming central to the negotiation of television and advertising rights for the Formula 1 series as a whole, Brabham was left more and more to its own devices. Nelson Piquet who had given the team many victories quit at the end of 1985, being unable to agree terms with Ecclestone for the 1986 season. In 1987 a dispirited Gordon Murray left to join the McLaren team, with whom he enjoyed a successful period as Technical Director and went on to develop a series of McLaren road cars.

During 1987 Brabham only managed eighth place in the Constructors' Championship. In 1988 they did not submit an entry to compete in the World Championship and Bernie Ecclestone sold Brabham and their holding company, Motor Racing Developments, to Alfa Romeo. Alfa intended to use the team as a basis for a production car racing project. However, later in 1988 Brabham were again sold, this time to a Swiss financier Joachim Lüthi.<sup>24</sup> The team was kept afloat with support from Japanese sponsor Nippon Shinpan and in March 1990 was purchased by the Middlebridge Group of Japan. Brabham did manage to keep going up to 1992 when they used Italian woman driver Giovanna Amati, and also introduced driver Damon Hill to Formula 1. Hill finished eleventh at the Hungarian Grand Prix of 1992, Brabham's final race finish. In 1993 the FIA declared that Brabham would not be allowed to continue to 1994 unless all their debts were settled, a demand they were unable to meet. This brought to an end the journey of a team who had been the first Championship winner for a driver-owner, produced many highly innovative and



World Champion since Formula 1 began in 1950. However, this success had not come without controversy. At the Austrian Grand Prix of 2002 Ferrari were accused of unsporting behaviour when their second driver, Rubens Barrichello, who had dominated the race, moved over to allow Michael Schumacher to win, thereby maximising Schumacher's World Championship points. Whilst there was a furore in the press, the Ferrari management remained stoical about their approach. After all, this success had been a long time coming, their 1999 Constructors' Championship title had been their first for sixteen years, during which the honours had been dominated by the British-based Williams, McLaren and Benetton teams. Moreover Ferrari's focus had always been to secure the World Drivers' Championship and Schumacher's title in 2000 had been Ferrari's first since Jody Scheckter in 1979, a gap of twenty-one years. The roots of Ferrari's 2000 victory can be traced back to the appointment of a new chairman, Luca di Montezemolo, in 1991. The fact that it took Ferrari nine years to reinvent itself into a World Championship winner meant that those involved in this journey felt justified in savouring the fruits of victory for as long as possible.

In 1929 Enzo Ferrari a former driver with the works Alfa Romeo Grand Prix team created Scuderia Ferrari (SF) based in Modena, between Parma and Bologna in north-eastern Italy. SF prepared Alfa Romeo cars for competition by private enthusiasts; in 1932 Alfa Romeo outsourced all of its racing activity to SF. The partnership between SF and Alfa Romeo was a very successful one, they won 144 out of the 225 races up to 1937. Following the Second World War Alfa Romeo split with SF and Enzo Ferrari went on to build his first car at his new factory in Maranello some 10 km from Modena. The Ferrari 125 was debuted in May 1947.

A key feature of the 125 was the Ferrari supercharged twelve-cylinder engine, the first in a long line of *dodici cilindri* to feature in Ferrari cars. The 125 was entered into the first season of Formula 1 in 1950, which was won by Alfa Romeo. In 1952 Ferrari secured their first World Drivers' Championship (the Constructors' Championship did not start until 1958) for Alberto Ascari. Ascari went on to win a further Championship in 1953 and this was followed up by Mike Hawthorn in 1958. However, at this time the red Italian cars of Ferrari, Alfa Romeo and Maserati were beginning to be outpaced by the smaller, lightweight Coopers and Lotuses whose designs focused on

maximising mechanical grip through better weight distribution and improved suspension. This was in contrast to the philosophy at Ferrari where the engine was always the starting point of car design and the search for enhanced performance.

Enzo Ferrari had a rather enigmatic approach to running his company. After the death of his son Dino he very rarely left the Modena area, and hardly ever attended a race, preferring instead to spend his time either in the factory or at the Ferrari test facilities. He relied on the Italian media – whom had always reflected Italy's strong interest in Ferrari – and his closest advisors for information, which often created a highly political atmosphere in the team.

Ferrari initially resisted the trend being pioneered by the British constructors whom he referred to as '*assemblatori*' or '*garagistes*'. He defended the engine layout of the Ferrari with the analogy that the 'horse' had always pulled, not pushed, the cart (although he later denied having made this statement). Not an engineer himself, the designers whom Ferrari employed up to 1980 (Alberto Massimino, Gioachino Colombo, Carlo Chiti and Mauro Forghieri) had first learnt their trade as engine designers and so the design of a new car would always start with the engine. Ferrari himself often referred to 'the song of the twelve' underlining the distinctive high pitched note of the Ferrari power unit.

By 1960 the dominance of the British cars was clear, and Ferrari had to build a lighter rear-engined car, which they did using a highly effective V6 engine. The Dino 156 (1.5 litre, V6) or 'shark nose' dominated 1961 and gave Ferrari further drivers' (for American Phil Hill) and constructors' titles.

However, the advances made in chassis construction by other teams had meant that they were increasingly uncompetitive and in 1964 the Ferrari 158 was launched with a similar monocoque-type chassis to the Lotus 25 of 1962.

Also in 1964 Ferrari first tried out the Flat 12 engine developed by Mauro Forghieri. Originally commissioned for an aircraft application, the Flat 12 was designed to fit into the wing of an aircraft. It was powerful, relatively light and its flat profile gave it a low centre of gravity that would help in improving mechanical grip. It was this twelve-cylinder unit that was seen to be the future for Ferrari.

In the late 1960s Ferrari merged with Italian automotive manufacturer Fiat. This was, in effect, a benign acquisition, with Fiat acquiring 40% of the equity in Ferrari, thereby providing a huge injection of cash

Championships. But perhaps their greatest moment was in 1979, when Ferrari finished first and second at the Italian Grand Prix at Monza sending the fanatical Italian fans, or *tifosi*, and the Italian press into a complete frenzy.

However in 1980 the 312T5 car was outclassed by the competition. New innovations in aerodynamics brought the 'ground-effect' revolution, pioneered by Lotus and quickly adopted by Williams (see Chapter 9). Whilst the Ferrari's engine was one of the most powerful it was a Flat 12, meaning that the cylinders were horizontal to the ground creating a low and wide barrier that gave little opportunity to create the ground-effect achieved with the slimmer V8 DFV engines (see Figure 19). In 1979 engine supplier to Brabham, Alfa Romeo, had launched a V12 engine to replace their Flat 12 for this very reason. No such initiative had been taken at Ferrari who were concentrating on a longer term project to develop a V6 turbocharged engine. Autosport correspondent Nigel Roebuck commented on this change of fortune:

*Maranello's flat-12, still a magnificent racing engine, is incompatible with modern chassis. Villeneuve and Scheckter were competing in yesterday's cars.*<sup>31</sup>

The lowest point came in the Canadian Grand Prix when the reigning World Champion, Jody Scheckter, failed to qualify his Ferrari for the race, the equivalent of Italy failing to qualify for the soccer World Cup. Once again the full wrath of the Italian press descended on the team.

In the mid 1980s more and more investment was poured into the Italian facilities, but to no effect on performance. A key problem was that new developments in aerodynamics and the use of composite materials had all emerged from the UK's Motorsport Valley.

In 1984, British designer Harvey Postlethwaite became the first non-Italian Technical Director of Ferrari. In 1986 British designer John Barnard was recruited to the top technical role. Barnard was responsible for the introduction of the carbon-composite chassis into Formula 1 in 1981; this material created a lighter and stronger chassis than the aluminium monocoques that had previously been used. It is now accepted as an essential part of Formula 1 design.

However, Barnard was not prepared to move to Italy as he felt that his technical team and network of contacts in the UK would be essential to the success of his position. Surprisingly Enzo Ferrari, now eighty-eight years of age, allowed him to establish a design and manufacturing facility near Guildford in Surrey. Barnard says,

*Through intermediaries, Enzo Ferrari contacted me and the outcome was that I didn't want to go to Italy, but he wanted me so he said 'Okay, do you want to set something up in England?' and given that opportunity I said 'Yes'. So we started what was originally called 'GTO' which actually stood for Guildford Technical Office. Ferrari was at that time [1986] fundamentally an engine company and the chassis was always second place. Enzo saw what was going on in the British side of Formula 1 with the introduction of composites and so on, so he wanted to give the chassis side a boost.*

The fact that Barnard was defining the technical direction of Ferrari meant that he became increasingly involved in activities at both sites. Unfortunately, the geographical separation between the car and engine departments led to the development of various 'factions' within Ferrari, making Barnard's job increasingly difficult. In 1987 on arrival at Maranello he became famous for ordering a ban on the consumption of wine at the midday canteen:

*When I went racing and testing with them in 1987, middle of the day, out come the tables, out come the white table cloths, a bottle of Lambrusco or something on the table and they all sit down and tuck in. You know pasta, a glass of wine. That's what they tend to do for their lunch. Marco Piccinini, Enzo's right-hand man said 'What did you do at McLaren?' I said 'Well we'd have a few sandwiches and a cup of tea and get on with it. You don't stop, you just have a quick snack and then you were eating at six o'clock in the evening or something like that because it's all going on and you've got to get ready for qualifying and so on.' 'Yes' he said 'I thought so. Do you want to change the way they do this? Because it's up to you if you want to change this ... we can ...' And I said 'Well, yes, I think we should Marco. You can't sit down in the middle of the day, it's completely unrealistic, if you've got work to do on the car you've got to be keen ...' 'Right' he said, 'Well leave it to me ...'. And of course the next thing you know 'John Barnard bans wine', it was a classic and Marco climbs in there and says 'Mr Barnard doesn't want the glass of wine ... sorry but what can I do, he's the boss' and I thought 'Right, I'll watch you Mister!' But at the end of the day it's what needed to happen; it was probably things like that, that Enzo saw were fundamentally wrong with the team but he didn't know how to change them.*

Enzo Ferrari's death in 1988 created a vacuum that was filled by a series of executives from the Fiat organisation for a number of years. It was written into the contract between Fiat and Ferrari that on Enzo's death Fiat's original stake would be increased to 90%; this greater

*England for chassis development and specialist sub-contractors while still harnessing the huge potential of Maranello.*<sup>16</sup>

When asked why he was repeating the 'GTO' initiative that Enzo Ferrari had set up with Barnard and that had ultimately ended with Barnard leaving and taking the facility with him, di Montezemolo had a very clear response:

*I think that the GTO concept of Enzo Ferrari was a super idea. Unfortunately, at the time Ferrari was very old and the situation was managed in a bad way. But the fundamental idea was very good. For me the approach is slightly different. First of all, I am in charge of the company with full powers, so I can take a decision without anyone else taking a parallel initiative. I take my responsibilities and I want the people in the company to follow my ideas. If they follow, I am very happy. If they don't then there are many other doors, many possibilities available to them outside Ferrari.*

*My objective is to create a smaller racing department which contains less bureaucracy, of course, there will be a lot of discussion between the engine and chassis departments. In Maranello we have a huge organisation geared to building cars, but I want to take advantage of the UK facilities, and for a world-wide company like Ferrari it is certainly not a scandal to have an affiliate in the UK. If you want to make pasta, then you have to be in Parma, I want to make a sophisticated Formula 1 project so I want to be involved in England. Then it is up to me to put everything together.*<sup>16</sup>

In August 1992 John Barnard signed a five-year contract with Ferrari to design and develop their new cars. In an effort to avoid a 'them and us' situation between the UK and Italy a number of Italian technical people were recruited to work for Barnard in the UK. The re-established UK operation was called Ferrari Design and Development (FDD) and was a Ferrari-owned subsidiary.

At the launch of the 1992 car, Luca di Montezemolo broke with tradition and introduced a new numbering system based on the year a car would be racing, an approach that has been followed from 1992 up to the Championship-winning F2004. Prior to this the numbering of many Ferrari cars had been based on the characteristics of the engine – the 312 of 1971 representing 3.0 litre 12 cylinders; the 126C4 of 1984 representing a 120° 'V' angle with 6 cylinders, and C standing for 'Compression' or turbocharging.

*At Ferrari we have always devoted and will continue to devote, great attention to racing, racing is part of the history, the culture and the traditions of*



*this company. We live in a country in which, especially in recent times, people have yelled and complained a bit too much. We hope that the only noise around here will be our engine as it sets new lap records at Fiorano. We are looking for a revival here, and with an eye to the future we have tried to put together a group which combines young engineers, many of them with the highest qualifications, and people whose enthusiasm and abilities will make a notable contribution. We have a lot of work to do, we have a lot of ground to make up on the opposition. We have code-named the new car F92A to demonstrate that we are turning a new page in our history.<sup>1</sup>*

When asked about drivers in 1992 he also gave some indication of his thinking:

*The main priority is the new organisation. We are lucky because it is a big challenge to offer a driver the chance to help re-establish Ferrari to a competitive level. I want a driver who is motivated and prepared to work with us. Motivation is everything in a driver, as Niki Lauda reminds us!<sup>16</sup>*

In addition to the structural changes, di Montezemolo had also brought in some familiar faces from Ferrari's successful period in the mid 1970s, driver Niki Lauda acted as a consultant to the team and Sante Ghedini took on the role of Team Manager. With an Englishman heading up design he followed this up with the appointment of a Frenchman, Jean Todt, to handle the overall management of the team. Todt had no experience in Formula 1 but had been in motorsport management for many years and had recently led a successful rally and sportscar programme at Peugeot. Driver Gerhard Berger commented on Todt's team-building skills:

*I was able to bring some links in the chain to Ferrari, but it took Todt to join them together. Ferrari is now working as a team for the first time. He has made a huge difference.<sup>32</sup>*

Chief Mechanic Nigel Stepney joined Ferrari in 1993, but his first impressions were not positive.

*When I joined Ferrari at the beginning of 1993, it was like being thrown into the lion's den. I was in a non-position, regarded as John Barnard's spy and not allowed to take any responsibility.*

He recalled the arrival of Jean Todt as a turning point in the team.

*It was like Julius Caesar every day. People getting sacked and leaving every five minutes. You never knew who was boss – not until Jean Todt arrived,*

*took control of the situation and instilled organisation, stability and loyalty into the team.<sup>2</sup>*

However, the physical separation between design and development in Guildford and the racing operation in Maranello led to increased problems and eventually Barnard and Ferrari parted company for the second time in early 1997. This opened the way for Ferrari to recruit, not only driver Michael Schumacher, but also a number of the key individuals in the Benetton technical team that had helped him to his world titles in 1994 and 1995. The arrival of Schumacher provided new impetus for the team, as Nigel Stepney recounted:

*Once Schumacher arrived, everyone started putting us under incredible pressure. We weren't quite ready as we still needed key people, but at some point you just have to go for it and get the best driver around. He was the icing on the cake and it sent out signals that we were serious again.<sup>2</sup>*

Todt and di Montezemolo also chose not to make a direct replacement for the role of technical supremo who would both lead the design of the car and the management of the technical activity. They split the role between the Chief Designer, Rory Byrne, who had overall responsibility for designing the car, and Ross Brawn, Technical Director, who managed the entire technical operation; these were roles that both had undertaken in working with Schumacher at Benetton.

On leaving Ferrari, Barnard had purchased the entire FDD operation from them, which subsequently became B3Technologies, a specialised design, development and manufacturing operation. As most of the existing staff remained working for Barnard this meant that Byrne and Brawn faced the task of building up from scratch a new design department – around fifty people, based in Italy. The engine department continued to develop Ferrari's engines, but in line with new technologies and developments these were now lighter V10s to compete with the Renault and Mercedes engines, rather than the beloved, but now dated Ferrari *dodici cilindri*.

As part of their recruitment of Michael Schumacher in 1996 Ferrari entered into a commercial partnership with tobacco giant Philip Morris to use their Marlboro brand on the Ferrari cars. In a novel arrangement Philip Morris, rather than Ferrari, covered Schumacher's salary, and also made a significant contribution to Ferrari's annual operating budget. There was one price to pay that was too high for many long-



However, in 2000 Ferrari secured both Championships, a feat they repeated for the following four years. It was at this point that they felt they had truly returned to the glory of the mid 1970s.

### **Transforming performance in Formula 1 teams**

Figure 16 outlined three conceptual responses to the need for transformation. The first is illustrated in the case study on Tyrrell Racing. Here we see the difficulty of an organisational mindset that is no longer consistent with the basis for superior performance in Formula 1. As the name suggests Tyrrell Racing was just that, an excellent racing organisation that was unable to keep up with the escalating demands of technology and commercial partnerships needed to succeed as a constructor in the next millennium. What was required was for Tyrrell Racing to become an integrated Formula 1 business and perhaps this was something that Ken Tyrrell and his management team would feel was going too far beyond their original ideals in establishing the business.

The case study on Brabham illustrates a different set of issues. In many ways Brabham had made some of the transformations needed to align them to succeed in the 1970s and 1980s. A key problem for them seemed to be that they were either too fast to react, as was the case with the Flat 12 engine, but also that their lean and agile organisation lacked the resources to enable them to fully exploit their creative ideas. They had the vision and the innovation, but lacked the ability to integrate these ideas into a coherent organisation. They undoubtedly got the success they deserved in the early 1980s, but were unable to sustain the managerial focus needed to really turn the organisation into a major Grand Prix player in the way that Williams, McLaren and Ferrari have managed to achieve.

Ferrari provide the example of the transformational organisation who not only achieve the changes needed but are able to integrate these elements into a high performance organisation that has left the competition well behind and the regulators searching for ways to dissipate their advantage in the interests of more entertaining racing. However, Ferrari took almost ten years to achieve this turnaround and it is probably true to say that it is only Ferrari who could have sustained the funding and commitment needed from Fiat to pull them through a

very difficult period. If nothing else, this type of transformation underlines the difficulty in being able both to create the level of change needed to effect a transition, but also to provide the commitment to achieve the level of integration that has underpinned Ferrari's success during the first part of the twenty-first century.

# 11



## *Performance*

*We are living convinced that we will be  
beaten tomorrow.*

Jean Todt, CEO, Ferrari

If the focus of this book is organisational performance, then what is the nature of performance and how is it achieved 'at the limit'? Organisational performance relates to the extent to which an organisation achieves its stated objectives. Of course such objectives can be wide ranging, potentially conflicting and also emphasising the needs of different stakeholders. In business the performance criteria tend to focus on financial variables, such as profitability and shareholder value. However, with the development of tools such as the balanced scorecard<sup>22</sup> there is a greater awareness of the need to complement financial performance with other performance criteria such as the delivery of customer needs, the efficiency and effectiveness of internal processes and the ability to learn and grow.

A further aspect of performance often exemplified in Formula 1 is the differing timescales upon which performance is considered: the tension between short- and long-term performance. In every race of the annual series (World Championship) a team is under careful scrutiny as to how well it performs; a bad weekend and they are written off as no-hopers, a good result and they suddenly have the Championship in the bag.

This rollercoaster nature of how performance is perceived by those watching is described by Ross Brawn, Technical Director, Ferrari:

*We get measured every two weeks and if we're not doing a good enough job it's in the public domain.*

Similarly even within a race weekend there may be varying timescales being considered in terms of optimising performance. At the pre-qualifying practice sessions the smaller teams will often focus on

achieving a fast time in order to impress their sponsors, whilst the leading teams will focus on preparing their cars for the following day and therefore are less concerned with any immediate impact on the timesheets.

When a new technical director is appointed to a team at the start of the season – as was the case with Mike Gascoyne who moved from Renault to Toyota at the beginning of 2004 – there are different time-scales for evaluating performance. The fact that Toyota performed poorly at the start of the year was attributed by parts of the media as a reflection on Gascoyne as Technical Director. In reality Gascoyne's primary focus was on building a new technical team to develop the 2005 car, as this was the car that he could directly influence, and so it is this car's performance that will provide a greater indication of the impact he has had on the team.

So what is performance in Formula 1? Eddie Jordan, Team Principal, Jordan, sees his role as focusing on two key areas of performance:

*I have two very great responsibilities that are linked to performance. One is performance on the track, but the other one is performance on the balance sheet and that is not always the concern of the major teams.*

Similarly, at Minardi, Commercial Director Paul Jordan does not see the measure of performance purely in terms of what happens on the track:

*If you look at success in terms of what we achieve with what we have then we're right up there with all the big teams.*

### **Do budgets explain race performance?**

If we focus on these two areas of race performance and budgets then we can see in Figure 21 that budgets in Formula 1 have steadily increased over the four-year period between 2000 and 2004, but that also there is a 'top team' figure of around the \$250 to \$350 million mark, and that the smaller teams drop down to a level between \$50 and \$100 million.

These figures also emphasise the marked distinction between the 'works' manufacturer-owned teams, the lowest budget indicated being Jaguar at \$229 million in 2004, and the independent or 'private' teams of Sauber (who receive some support from Ferrari in terms of subsidised engines), Jordan and Minardi. The one exception to this is WilliamsF1 who whilst they have a long-term agreement with BMW

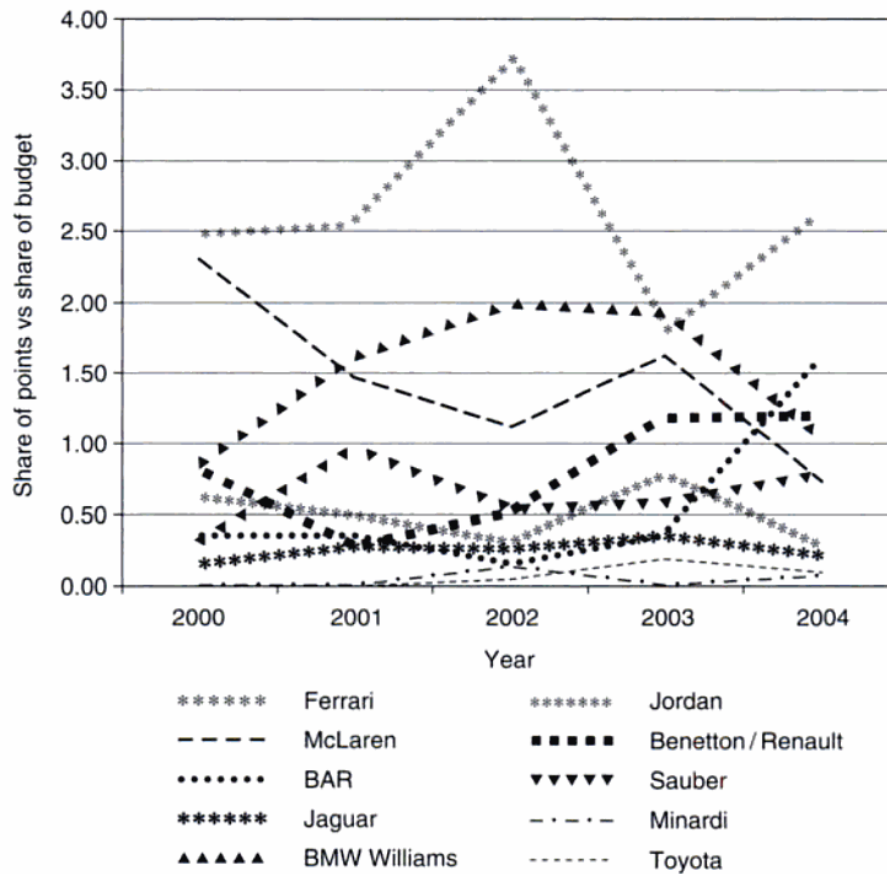


Figure 23. Value for money in Formula 1: share of points vs share of budget 2000–2004. Budget data from *Eurobusiness* and *BusinessF1*, 2000–2004

share of the race performance than their proportionate budget suggests. This is shown in Figure 23.

One of the problems in the current structure of Formula 1 is that it is geared to the top teams. Tony Purnell, CEO, Ford Premier Performance Division, explains,

*I describe Formula 1 as a celebration of unfairness: if you win you get more money, you get more TV. Everything's stacked in your favour and frankly you don't have to be so very good to continue winning, in business terms. But if you're down the bottom it is an awesome struggle. As you look up the stack everything is against you doing well. This is because all sorts of wheeler dealer types and the top teams have bought advantage. You know, the best team gets the best garage, the best drivers, the best engineers. This has gone to*

*such extremes that they are horrified that cars don't get out of the way for them. It doesn't just stop on the track, the position with the motorhomes is the best team gets the best position. It's absolutely stacked up to favour the top teams. The important thing here is that the TV revenues and the extra sponsorship you command give you a huge advantage if you're in the top three, because money buys success in this game. So it's a bit odd in that way. It is not a remotely even playing field.*

A key question that many organisations would be expected to ask would be the nature of the business case. For Ford this is an important part of their thinking. Purnell continues,

*Now we've been trying to build it up, but the bottom line is that for Ford they like being in Formula 1, but definitely not at any price. If it can be justified in conventional business sense stay in, if it's overpriced go out and I believe that we might not be the first people here thinking along those lines.*

The other point to consider is just what are the benefits of being a Champion versus a winner, versus a qualifier? Purnell goes on,

*What you have to remember is that if you're spending hundreds of millions of dollars you can get to the stage that continual winning isn't necessarily the best business outcome in the long term. You've got to consider things like saturation and also the associations that are being made to your name. If you are expected to win and then you have a prolonged losing streak, many marketing advisers will argue it would be better simply not to be there at all since one only attracts negative association.*

So what are the different levels of performance within Formula 1 and is it a different set of performance criteria that is needed at the back of the grid as compared to the front? We consider three categories of performance within Formula 1: the qualifiers, the winners and the champions.

### *The qualifiers: they made it to the race*

For the qualifiers the focus is on survival. The critical measure is being able to attend and compete in Formula 1. If they can sustain this then they have achieved a great deal, but history suggests that it is particularly difficult to sustain this kind of level and the qualifiers come and go.

Whilst a team like Minardi will only have 10–15% of the budget of the top teams, their performance levels, based on lap times, are around 96–97%. This means that they need to operate at a different level; they



The Jordan team may have slipped down Formula 1's greasy pole, but over the years they have won a total of four Grands Prix which certainly puts them above the 'one win wonders'.

Another perspective for considering the category of winners is to reflect on why these teams are not champions. Many of these organisations such as McLaren Racing and Renault F1 Team (formerly Benetton) were at one time champions, so why are they no longer in that situation? Jean Todt offers one explanation that we alluded to earlier:

*The final result in F1 is very much the combination of all the details. And if one detail does not work, you fail, that's why it is so difficult.*

If these teams are not in a position to put all of these details together so why is this? Again Jean Todt:

*One of our strengths now is stability, but stability could be a disaster if you have bad people. If you have a bad, stable organisation, it is a disaster, so stability is good if you have the right people at the right time.*

So in one sense the winners are those with all the potential to be champions but these various details have not yet come together. They are latent champions, but they just need the break that will make those within the organisation take that step closer together. This may be achieved by bringing in some new individuals such as a driver, or perhaps by bringing together new technologies or new partners to create the consistency of high performance needed. What matters is finding some way to help bring the organisation together as one cohesive team. Alex Burns, General Manager, Williams, says,

*We have to keep that sense of belonging. There are people who've been here fifteen or twenty years who are saying we've lost the sense of belonging, we've lost that connection with the product because it's got so big. We have to make it happen again, to build that connection even though we're a lot bigger.*

What is interesting is that all of these factors are related to the process of integrating. Winners are organisations who have not yet integrated into champions.

### *The champions: they won and kept on winning*

So what makes a Formula 1 team a World Championship winner? Fundamentally the World Championship team is one that is able to

# 12

## *Ten business lessons from Formula 1 motor racing*

In this final chapter we have sought to pull together some of the generic lessons that characterise Formula 1 teams. These are the underpinning of our performance framework shown in Figure 6. In the framework we explain organisational performance as a function of individuals, teams and partners coming together and through integrating, innovating and transforming these elements they continually adapt and combine in order to sustain performance in changing competitive situations.

But how does this all come together on the ground? What are the kinds of things that can be done to make organisations perform at the limit? From the insights gained from our interviewees and other data sources there are ten generic lessons that explain how these organisations work in the way they do. These offer key learnings that more conventional kinds of organisations can draw from the Formula 1 context. We are not presenting these as instant panaceas that every organisation should attempt to adopt, but we do suggest that they provide a series of insights that will help those who are trying to make their organisations become more performance-focused, more flexible, innovative and, above all, more competitive.

Each of our lessons connects into the elements and processes of the performance framework. They explain how Formula 1 teams are able to innovate, transform and integrate the complexity of groups and relationships that generate the knowledge base on which they depend. The first five factors of open communication, no-blame culture, building on the informal network, alignment of goals and focus are all central to the integration needed to make the organisation work as a team. The following four of making quick decisions, looking for gains at the boundaries, being realistic and never believing in your success relate to the processes of innovating and transforming. The final lesson of dispersed leadership at all levels relates to all three processes and provides the basis by which organisations are able to move fluidly

### **3. Build the organisation around informal processes, networks and relationships**

Across all the teams we found a common emphasis on building from the expertise and relationships of the people within the organisation and the partners allied to the business. This approach enables the structure to emerge from these relationships, rather than imposing a 'theoretical' organisation that is populated by rigid, specified roles and job descriptions that do not relate to the pressurised world that Formula 1 teams inhabit.

Perhaps we could criticise those teams who do not have ready-to-hand organisational charts or detailed job descriptions. Clearly these are important aspects of modern organisational life. But in a situation where there is real commitment and passion from employees it illustrates how the organisation becomes 'empowered' by these motivations to remove layers of potentially needless bureaucracy. The Formula 1 organisation is an emergent structure that is designed to optimise and facilitate the potential of individuals and their relationships, rather than determining and micro-managing such interactions. The conclusion that we reach is that it is only through effectively supporting these interactions and relationships through an emergent structure that performance can be truly optimised.

In business management there is a mantra that structure drives strategy, which in turn drives performance. In Formula 1 people and their relationships drive the structure that in turn drives performance. Perhaps surprisingly for its strong technology orientation, Formula 1 is a very people-driven business.

### **4. Alignment of goals between individuals, teams and partners**

There are two parts to the issue of alignment. One is commonality of goals towards which everyone in the organisation is striving. The other is the connection between the individual's actions and the end result. Perhaps this is best illustrated in the way that Frank Williams constantly asks the question when signing cheques: 'How will it make the car go faster?' against which all can measure the value of their specific contributions on a day-to-day basis. From the Formula 1 team partner's perspective the question may obviously be different, 'Will it help us sell more product?' It is the continual alignment of these factors that helps to optimise business processes in Formula 1 teams.

way in which Michael Schumacher is not just a driver of the car but a proactive builder of a coherent team.

### **8. Be realistic about what can be achieved**

Change fatigue is not an unusual problem in organisations today. Continual change is necessary in order to keep pace with competitors' strategic actions and customers' ever-changing demands. However, one of the important lessons that can be drawn from the recent success of Ferrari is that change in organisations has to take place within realistic constraints, otherwise the development process may fall apart. Setting high, but realistic goals and keeping everyone apprised of progress against those goals is a key factor in driving the change process forward.

There are probably many organisations who suffer from the kinds of problems experienced by Gordon Murray, Technical Director at Brabham where the pace of change outstripped the resources and support available. The organisation out-accelerated itself and as a consequence failed, for many years, to deliver on the promise of its potential. The need to change is recognised and responded to, but the individuals and knowledge within the organisation are unable to keep pace with these demands. They are always working to catch up, not able to gather the resources to deliver on the potential promised. As Gordon Murray noted, they may have been better to actually stick with what they had and make the best of this – as has been the case with Ferrari – rather than go through radical changes that they were unable to sustain.

### **9. Never believe you can keep winning**

The Icarus Paradox<sup>26</sup> considers the problem of success blinding the organisation to future threats. In considering the case of Ferrari the trick appears to be to refuse to believe that you are inherently capable of being consistently successful. Always assume each win is your last victory and therefore you will continually search for those extra tenths of seconds that will sustain you at the top. There is not a better time to challenge one's processes and methods, or business strategy for that matter, than when leading the industry. The really hard part is maintaining the pressure and urgency to do so while retaining the energy and

motivation that is so important for the team. That is one factor in how Ferrari has been able to build such a formidable record in recent years.

### **10. Leaders exist at all levels of the organisation**

Due to the fast pace of this industry employees throughout Formula 1 teams are empowered to make decisions, drive processes and take risks. We have witnessed people at all levels within Formula 1 organisations stepping up to be accountable and to lead their colleagues when it is their time to take responsibility.

This means that the more senior roles are concerned with problem solving and connecting up different parts of the organisation, rather than coaching or directing. At times this can be problematic particularly when big egos are not in short supply, but the lesson here is to recognise that in the most successful teams people are prepared to put their heads above the parapet and lead their project or initiative. Also, in these contexts the drivers are not prima donnas but real catalysts for the team encouraging everyone to play their part to achieve performance at the limit.

*Appendix C (cont.)*

<i>Name</i>	<i>Organisation</i>	<i>Position at time of interview</i>
16. Sir Jackie Stewart	Stewart Grand Prix (1996–1999) Jaguar Racing (2000–2004)	World Drivers' Champion in 1969, 1971 & 1973 Director, Jaguar Racing
17. Paul Stoddart	Minardi	Team Principal
18. Pat Symonds	Renault F1 Team	Engineering Director
19. Jean Todt	Ferrari	CEO
20. John Walton	Minardi	Sporting Director
21. Ruud Wildschut	Wilux	Founder and CEO
22. Sir Frank Williams	WilliamsF1	Team Principal
23. Hiroshi Yasukawa	Bridgestone	Director of Motorsport
24. Paul Edwards	Edwards Hospitality Services	Managing Director

Further to the above we have also utilised transcripts from a series of research interviews conducted in 1998 and 1999 by the first author to explore the nature of performance in Formula 1.

Derek Gardner	Tyrrell (1971–1977)	Former Technical Director
Gordon Murray	Brabham (1972–1986) McLaren (1987–1989)	Former Technical Director
Ken Tyrrell	Tyrrell	Founder and Team Principal
David Williams	WilliamsF1(1992–1998)	General Manager





**Plate 14.** Four yellow gloves indicate to the BMW WilliamsF1 team's lollipop man that all four wheels and tyres have been successfully changed!

*Source:* Sutton Motorsport Images



**Plate 9.** The six-wheel Tyrrell P34s, sit in the pit lane awaiting action (1977).

*Source:* The G. P Library (GPL)





**Plate 10.** The original John Barnard designed 'paddle gear change system', as used today in all Formula 1 cars, is clearly seen being operated by a Toyota driver on today's state of the art steering wheel.

*Source:* Sutton Motorsport Images



**Plate 15.** Sir Frank Williams and Patrick Head stand outside the original Didcot, Oxfordshire based Williams Grand Prix Engineering Formula 1 factory, with FW06 in the background (1978).

*Source:* WilliamsF1



# Performance at the Limit

Performance is the central focus of every organization, and yet for many how this can be achieved is an unanswered question. This book takes the case of Formula 1 motorsport, where the connection between performance and all elements of the organization is fundamental to success. Can you imagine your organization as a Ferrari or a Jaguar, a Williams or a Minardi? Your management team as a pit crew? Your sales force as the race team and your marketing and research people as the design studio creating a Formula 1 car? The case histories and examples which feature in this book provide both inspirational and instructional guidance to those seeking to achieve levels of performance – at the limit of possibility.

'The authors have produced perhaps the most definitive analysis of what makes Formula 1 teams such high performing businesses. It is a book all senior business leaders should read to help them find ways to speed up their business performance.'

Robert Baldock, a former senior Accenture partner and strategic adviser to the Williams F1 team, and founder and former chairman of the Motorsport Industry Association

'Speed, simplicity, boundaryless behavior and leadership at all levels are the hallmark of winners in Formula 1 racing. The same is true for winners in today's global businesses. *Performance at the Limit* builds these lessons from unique and insightful research on Formula 1 racing. This is a great read and filled with practical concepts for global business leaders.'

Noel Tichy, Professor, University of Michigan Ross School of Business, and author of *The Cycle of Leadership* (with Nancy Cardwell)

'Formula 1 is the pinnacle of motor sport and one of the most watched sports in the world. Those taking part – drivers, managers and engineers – are always working in pursuit of excellence in a highly competitive environment. *Performance at the Limit* is a detailed analysis of this world, carried out with a scientific approach. I think it makes for very useful reading for those who want to learn from what goes on behind the scenes and below the surface in Formula 1.'

Jean Todt, Managing Director, Ferrari

'*Performance at the Limit* captures the extraordinary power of analogy to create deep meaning. With vivid examples from Formula 1 racing, the authors bring to life the lessons of teamwork, competition, and design that ring true for executives seeking the highest performance. An inspiring and engaging read.'

Kathleen M. Eisenhardt, S. W. Ascherman Professor, Stanford University

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