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Formula 1: Unleashing the Greatest Racing Spectacle on the Planet

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At the conclusion of its 2019 season, Formula 1's Chief Executive Officer (CEO) Chase Carey, Chief Commercial Officer (CCO) Sean Bratches, and Managing Director of Motorsport Ross Brawn had a lot to celebrate. Attendance for the season's series of 21 Grands Prix (races) was 4.2 million, a 2% increase over 2018. This uptick took into account the partial cancellation of the Japanese Grand Prix in October due to a typhoon. The average three-day race weekend attendance was over 202,000, with three Grands Prix – Great Britain, Australia, and Mexico – boasting attendance of over 300,000.[1] The last race of the season, held in Abu Dhabi, attracted a sold-out crowd even though the driver and team champions had already been determined weeks prior. Meanwhile, the TV cumulative audience of 1.9 billion for the motorsport was up 9% over 2018, although the number of unique viewers was down 4% to 471 million. The F1.com site recorded 1.1 billion page views, and the sport had a social media following of over 25 million.

In addition, Formula 1,[i] which held the commercial rights to the FIA Formula One World Championship, was close to achieving consensus with the sport's regulator, the Fédération Internationale de l'Automobile (FIA), and the F1 teams on an updated Concorde Agreement. Among other things, the highly confidential agreement spelled out how prize money would be divided among teams. The agreement, which was typically renewed every five or six years, also included new rules and regulations for the sport which would come into effect in 2021. It was hoped that some of the new rules would answer a chief complaint among fans: There wasn't enough "wheel to wheel" competition on the track. As Brawn explained, "From an aerodynamic perspective, the cars are very fragile. When

[i] For the purpose of this case, the sport will be referred to as F1, and the commercial organization will be referred to as Formula 1.

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they get into the wake of another car, the performance is damaged. A car that's following two or three car lengths behind is losing a substantial percentage of its own performance. A car in front has a protective bubble around it. You can't get near it, because when you get near, you lose performance. So the drivers have to develop techniques and styles to stay away from the damaging wake of the car in front." As a result, overtaking, in many races, was difficult if not impossible. For four consecutive seasons, the same three teams with the largest budgets in the sport (Mercedes, Ferrari, and Red Bull Racing) finished atop the standings for the Constructors' Championship. During these seasons, two competitions often unfolded: one among the top three teams; another among the remaining seven teams in the midfield. Formula 1 was trying to shake up the sport by introducing more unpredictability.

Formula 1 wanted the sport of F1 to be the greatest racing spectacle on the planet. Since being acquired at the end of 2016 by U.S.-based Liberty Media, the organization had been run much like a startup. Carey, Bratches, and Brawn had inherited an organization that had been under the strict control of the same individual since the early 1980s. In many ways, time had stood still. The commercial side of F1 had not kept up with the evolution of sports in the digital age, and had done little to understand or engage with its fans. With a fan base of over 500 million, 41% under the age of 35,[2] many fans wanted more from the sport, and there were more fans, particularly younger and female, to be had.

Aside from its commercial and on-track responsibilities, Formula 1 also had obligations to the automotive industry. As Chase Carey explained, "F1 has always played a role in leading the automotive and mobility world. And clearly, mobility is changing. But I think we can play a role – whether it's sustainability, safety, or guidance systems, or an array of things that exist in cars today, I think we can continue to be a platform to show what's possible in the future."

The challenge facing Formula 1 was finding the right balance among running the business side of a sport, ensuring that the sport was exciting and engaging for fans, meeting the demands of drivers and teams, and fulfilling its obligations as the automotive industry technology leader.

F1: The Sport

The sport of F1 was the highest class of single-seater, open-cockpit, and wheels auto racing in the world. Its origins date back to the European Championship of Grand Prix motor racing from the 1920s and 1930s. The word "formula" referred to the set of rules and regulations to which teams and drivers had to adhere. The formula was constantly evolving in step with automotive innovation. (In addition to F1, there was Formula 2, a second tier of F1 which started in 1948, and Formula 3, a third tier of F1 which began in 1950, each of which had different car regulations than F1. Formula 1 owned the television rights to both. Formula E, launched in 2014, was a single-seater championship motorsport that used electric engines. **Exhibit 1**.)

The first F1 races were in 1946 with the first driver's championship held in 1950 in Silverstone, United Kingdom. A Constructors' (manufacturers') Championship (based on team results) began in 1958. By 2019, the F1 season was made up of 21 races known as Grands Prix that typically happened every two

weeks, between March and November, in different countries around the world. Each Grand Prix lasted an entire weekend, with practice sessions held on Fridays, qualifying on Saturdays, and the race on Sundays. Races ran on purpose-built circuits (race tracks) and a few ran through public streets, including the famous race that wound through the streets of Monaco. In a given race, only the first 10 finishers were awarded points with the first-place finisher receiving 25, the second 18, the third 15, etc. (**Figure 1**). A point was also awarded to the driver for the fastest lap, a new rule that had been introduced in 2019 as a way to add an extra element of strategy and unpredictability to the end of races when cars were the lowest on fuel, therefore lighter and typically faster.

Figure 1 F1 Race Points System

Place	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10
Points	25	18	15	12	10	8	6	4	2	1

Source: F1.com.

F1 teams were responsible for building their cars from scratch every season. The design and manufacture of certain parts (e.g., engines) could be outsourced. Honda, Renault, Mercedes, and Ferrari supplied the teams with 1.6-liter V6 hybrid engines.[3] F1 cars had run on hybrid engines since 2014. Teams were restricted to four engines per driver per season.[4] Tire manufacturer Pirelli supplied tires for all the cars and for every race selected three types of tires from which the teams could choose (ranging from soft to hard). Drivers could choose up to 13 sets of tires each race weekend.

A critical component to each car's design were its wings (**Exhibit 2**). The front and back wings helped to control the total airflow around the car by generating downforce (downward pressure on the car and tires bringing the car closer to the track, increasing its aerodynamic grip around corners, but also slowing it down). The rear wing's drag reduction system (DRS)[ii] enabled drivers to open a gap in the rear wing, reducing the drag it produced. There were strict regulations on how wings were designed and manufactured.

All cars were equipped with sophisticated electronics. A typical car had up to 1 kilometer of wiring,[5] and 8,500 electronic components.[6] McLaren supplied F1 teams with electronic control units (ECUs) that provided control for a variety of systems, including the engine, gearbox, differential, throttle, clutch, energy recovery system (ERS), and DRS. The ECU was also the car's primary data-logging feature. It fed live data – via telemetry – to the teams, allowing them to monitor the performance of their cars in real time, including engine health, tire wear, and fuel consumption.[7]

With a carbon fiber chassis composed of roughly 11,000 components,[8] cars had to weigh at least 728 kg (1,598 lbs.) including the weight of drivers, but excluding the fuel.[9] (In comparison, a Honda Civic

[ii] DRS was a form of driver-adjustable bodywork aimed at reducing aerodynamic drag in order to increase top speed and promote overtaking.

weighed over 3,000 lbs.) Cars were rebuilt or redesigned as necessary from race to race depending on the track.

Racing was looked at as a "technological testing lab" for automakers.[10] In fact, Mercedes rotated its engineers in its car production operation to its F1 team.[11] Technology that was introduced in F1 cars often made it to road cars.[12] Turbocharged engines, for example, went mainstream in road cars after being introduced to F1 cars in the 1970s. While they gave a car extra power, turbochargers enabled engines to be downsized in the name of fuel economy.[13] With the global reality of climate change, in late 2019, Formula 1 announced, and F1's regulator agreed, that the teams and the sport would go carbon neutral by 2030, providing some promise for significantly cleaner road cars in the future.[14]

A typical race lasted two hours with drivers traveling an average of 160 miles/257 kilometers at speeds sometimes topping 230 mph/370 kph. Equipped with eight forward gears and one reverse gear, cars could accelerate from 0 to 190 mph in 10 seconds and decelerate by 60 mph in .7 seconds.[15] The noise on a race track was 134 decibels, similar to that of a jet engine.[16] All 20 drivers (10 teams had two drivers each) started from a dead stop, and their starting position was determined by their performance during qualifying the day before.

The physical toll on F1 drivers required them to be as fit as many other athletes. As motorsport journalist and broadcaster Stuart Codling described:

> At Monza in Italy, for example, the cars must slow from over 200 miles per hour to just 30 miles per hour for the first turn. That takes just 100 meters and around 1.9 seconds, during which the driver is subjected to over five times the force of gravity while standing on the (unassisted) brake pedal with a pressure equivalent to doing a 135-kilogram [298 lbs.] single-leg press in the gym.[17]

Strategy

Teams could have up to 60 engineers and technicians trackside, helping to determine a team's strategy prior to and during the race. Dozens more were involved in helping set strategy back at team headquarters.

Many variables went into developing a racing strategy, including:

- Tires – what type to put on and when during the race. Soft tires gripped better but had a shorter lifespan than harder tires;
- Pit stops – when to stop and change tires and when to undercut. Undercutting involved overtaking the car ahead by "pitting" first then using fresh tires to complete a set of fast laps, or overtaking the opponent when they pull in to pit;[18]
- Grid position – where a driver would be starting the race from in a group of 20 cars;
- Type of track – tight corners versus long straightaways; and,
- Weather – dry versus wet and windy.

Deciding when to refuel during races, which used to be a key part of racing strategy, was banned in 2009 due to safety and cost. There were calls to bring refueling back to help bring down the weight of cars and lessen the risk of overheating.[19]

Role of Data

Historically, data had been an important part of F1 – and with new technologies, such as machine learning, it had become even more so. As James Allen, the president of Motorsport Network who had covered F1 as a journalist for 30 years, explained, the sport, like many others, was going through a data-driven revolution[20] and was changing as a result.[21] During a typical race weekend, an F1 car, equipped with up to 200 sensors, produced 500 GB of data.[22]

During a race, all team members – including those who were back at factory headquarters – had access to data in real time and highly trained data analysts to interpret the data. Allen pointed out:

> As these highly paid sportsmen are driving the race cars out on the track, you've got these brilliant mathematicians in the background who are having their own race…. If you have to cover a 200-mile race – 70 odd laps, for example, of a race track – you have to figure out what's the fastest way from start to finish. And the drivers are pretty dependent on the mathematicians who are figuring out what's the best way to do this.[23]

A team's data analysts modeled numerous performance variables to determine when, for example, a particular driver would make a pit stop for fresh tires and how that timing would affect the positioning of their driver.[24] They informed decisions based on balancing damage with performance. For example, was it better to do a quick or smooth gear change? The latter put less wear on the gears, but it wasn't as fast.[25]

Unlike drivers of the 1950s and 1960s who were the main source of "data capture" for teams, present-day drivers had to be data analysts in their own right. "Teams know exactly what is going on, and they can therefore measure the performance of the driver literally second by second," Allen explained. "So, [a driver] has always got a whole set of KPIs hanging over his head, and he can't get away with anything, because they have full transparency of what he's doing."[26] The sport was a delicate balancing act between machine and human decision-making. In sports, Allen went on to say, fans typically preferred the latter: "There's something fascinating about people being under pressure and being forced to make decisions."[27] The troves of data helped inform teams on whether and how to change their cars during and after every Grand Prix.

Stakeholders

The sport was organized around three key stakeholders: the teams; the FIA; and Formula 1, the commercial entity.

Teams, which ranged from 600 to 900 people, included drivers, engineers, R&D staff, technical and mechanical staff, team managers, and others. While the sport was dominated by men, three of the 10 chief strategists for F1 teams were women.[28] Teams were managed by team principals who also acted as the public face of the team. Their finances came largely from sponsors, who paid to have their names on cars and driver uniforms, and prize money which came from Formula 1. Wealthy principals also contributed funds to their respective teams when needed. Team annual budgets ranged from $130 million (Williams) to $460 million (Ferrari).[29] A lack of a budget cap had resulted in a spending race among the teams, leaving three filing for bankruptcy since 2014 (Force India, Manor, and Lotus).[30] Many F1 teams were consumer-facing multinational brands, such as Red Bull, Mercedes, and Ferrari, which needed to keep their boards and shareholders financially satisfied, while others like Williams were considered pure racing teams.[31]

As the governing body for world motorsport, the FIA acted as the regulator and oversaw safety for the sport of F1. For every race, FIA's director managed the logistics of a Grand Prix weekend and ensured that the cars, drivers, and tracks were in compliance with FIA regulations during and after a race. Each Grand Prix had three stewards from FIA who were the race officiants or referees. Introducing new regulations for the sport required the approval of Formula 1 and seven of the 10 teams, so long as one of the seven teams was Ferrari, the only team that had veto power. The FIA worked closely with Formula 1 as well as the teams and team principals.

Formula 1 was the commercial side of the sport. It was responsible for marketing the sport of F1, making money through its partnerships with race promoters and sponsors, and managing broadcast agreements. It was also responsible for paying teams. As spelled out in the Concorde Agreement, Formula 1 paid teams from a prize fund the size of which depended on Formula 1's EBITDA.[iii] Half of the fund was shared equally among all teams while the second half was paid out on a sliding scale, depending on where a team finished in the previous year's championship. In addition to the prize fund, various bonuses were paid to a few teams (e.g., Ferrari) based largely on agreements made before Liberty Media took over.

Formula 1

The story of Formula 1 begins with Bernie Ecclestone. Between the 1940s and 1970s, U.K.-born Ecclestone was involved with motorsport first as a driver, then as a manager of drivers, and finally as a team owner. During much of the 1960s, he took a break from the sport and sold used motorcycles and cars before returning to motorsport racing a much wealthier man.[32]

Ecclestone's involvement with the sport went in a different direction in the early 1980s. At the time, television coverage of the races was unpredictable. Races could be canceled at the last minute if there weren't enough cars to fill the grid.[33] Seeing a potentially lucrative commercial opportunity, in 1981 Ecclestone convinced the teams to sign the Concorde Agreement, which committed them to participate

[iii] EBITDA stands for earnings before interest, taxes, depreciation, and amoritization.

in every race. With this commitment, Ecclestone was able to convince television broadcasters to cover all races. Through his company Formula One Promotions and Administration (FOPA), Ecclestone negotiated television deals on behalf of teams in return for a share of the revenue. The Concorde Agreement also established that the FIA owned the commercial rights of F1, though it "handed the rights" to the teams which Ecclestone commercialized on their behalf.[34] In 1995, FIA awarded Ecclestone ownership of F1's commercial rights, beginning in 1997 for a period of 14 years, through his personal investment vehicle FOCA, which later became Formula 1.[35] Financial problems forced Ecclestone to sell his shares, and in 2006 Luxembourg-based private equity firm CVC paid $2 billion for a majority stake in Formula 1.[36]

While no longer its owner, Ecclestone continued to run the organization. In leading Formula 1, he was known for his tight control over the sport. He was a consummate dealmaker. During his tenure, Ecclestone was successful in bringing F1 races to television audiences around the world, as well as expanding the sport into emerging markets. There were certain areas of the business, however, that he was less concerned about. For example, he did not see the value in digital technology or younger fans. As he stated in a 2014 interview, "I don't know why people want to get the so-called 'young generation'…. Is it to sell them something? Most of these kids haven't got any money. I'd rather get the 70-year-old guy who's got plenty of cash."[37] Ecclestone's decision-making style was chaotic and opaque. Relationships with promoters, sponsors, and teams were often fractious, and there was little trust. In one interview, he criticized the lack of competition on the track by saying, "We are not putting on a very good show. Imagine if people turned up to watch the Rolling Stones and Mick Jagger couldn't sing and the others couldn't play their instruments."[38]

In 2016, U.S.-based Liberty Media, owner of the Atlanta Braves baseball team and streaming music provider SiriusXM, purchased Formula 1 from CVC for $4.6 billion. The new owners asked Chase Carey to lead the organization. Through his 30-year career in media, Carey had been COO of Fox, Inc., CEO of DirectTV, president and COO of News Corporation, and, most recently, former vice chairman of 21st Century Fox.

Carey's first move was to hire Sean Bratches and Ross Brawn. Bratches, who had retired from ESPN in 2014 as executive vice president of sales and marketing, was charged with generating more revenue by making the sport more fan friendly, enhancing the fan perception and experience, and strengthening the brand. With nearly 50 years in the motorsport world, including as team principal for several F1 teams and as owner of Brawn GP, which won the Constructors' and Drivers' Championships in 2009, Brawn's mandate was to develop the technical specifications for the next-generation F1 car and work to create the greatest racing product on the track. In addition, he oversaw Formula 1's broadcast center. Prior to Brawn's arrival, Formula 1 never had a technical leader or function. It had been left up to the teams to research how the sport should change. As Brawn noted, "We'd never tried to identify what made a great racing car or what could contribute to a great race…. A great race is one where the gladiators, the drivers, battle each other for as long and as close as possible…." Bratches and Brawn

operated their respective sides of the business in parallel. There wasn't a lot of interfacing between the commercial and motorsport sides.

The trio had their work cut out for them. While they inherited a profitable commercial enterprise, there was no business infrastructure supporting it. With the exception of a very basic ad-free website with the latest F1-related story, Formula 1 had no digital assets or social media strategy. In fact, Ecclestone had prohibited drivers from using F1 iconography on social media unless they paid him a fee. The organization also had no formal marketing, promotion, sponsorship, or research departments. Ecclestone's focus had been on short-term profits coming from promotion, broadcasting, and sponsorship, all of which he managed and controlled.

Formula 1's new leadership team was looking to evolve F1 from a motorsport to a global entertainment brand, much like other sports had, such as the NBA. "The NBA is the most forward-thinking [professional sports organization]," noted Yath Gangakumaran, Formula 1's director of strategy and business development. "They really push boundaries. They've engrained themselves into the wider pop culture with music and fashion." As Carey explained, "The organization wasn't doing the things you needed to do to compete in a world with a lot more competition, a lot more dynamic ways in which people were engaging in sports. The organization was run for short-term cash flow."

Carey, Bratches, and Brawn knew there were many new ways in which Formula 1 could create new streams of revenue, particularly by shifting the organization's focus to its fans and introducing multiple ways in which they could engage with the sport. Without fans, there was no business. As Carey noted, to be successful as a business in sports, it had to be successful for fans.

Fans

Unlike many other popular sports, F1 had an athletic and a technology component and therefore attracted a wide array of fans. There were many traditionalists who had been watching the sport for decades who were typically men over 50 from Europe and South America and who were less interested in seeing changes made to the sport. There was also a smaller percentage of younger fans, increasingly in places like Asia, who were less bound to the old ways of the sport and open to changes and new ways of engaging with F1.

Unlike European football or basketball, one typically didn't become a fan of F1 through participation. A popular precursor to becoming an F1 driver, karting, also known as go-kart racing, was expensive: Club racing could cost up to $4,000 a year, excluding the cost of a kart.[39] Gaming, however, was helping to democratize participation and develop new fans. F1's new Esports Series was opening up opportunities to participate in the sport, and many within the industry believed new drivers would be identified through this channel and many new fans gained.

According to Brawn, F1 fans liked the mix of technology, complexity, and the factual richness of the tires, brakes, engines, pit stops, and human competition that they couldn't find in other sports: "Some

want to see battle on the tracks whereas others want to know about the latest front wing of the McLaren car. Many F1 fans are not general sports enthusiasts. There isn't really a crossover with other sports like there is with, say, the NFL and NBA." Fans increasingly were drawn to data, and Formula 1 was eager to learn how they liked or would like it presented in the future.[40]

The average age of an F1 television viewer was 40; 14% of viewing fans were younger than 25. Younger viewers were in newer markets like the United States and China.[41] The majority of F1 fans, especially those in traditional markets (Europe and South America), watched races through broadcast television. As one media executive put it: "[F1's] audience is older, it's wealthier, and it is very sophisticated. But while they love technology in [F1], they don't want to watch it on their phones, or their iPads, or their computers. They want to watch it on a big screen."[42] While it would undoubtedly grow as technology improved, Formula 1's head of research estimated that less than 2% of viewers watched races over streaming services. Younger fans preferred snippets of content (two-minute videos they could watch on a smartphone) as opposed to sitting through an entire two-hour race.

Fans who wanted to attend a live race could purchase tickets for specific days of a race weekend or for the entire three-day event at the F1.com website, which was run by Formula 1. They could also purchase packages that included additional experiences at various price levels (**Exhibit 3**).

Building a Team

Before putting their respective teams together, Carey, Bratches, and Brawn identified five pillars that would direct the growth strategy for both the sport of F1 and Formula 1, as the sport's commercial entity (**Figure 2**). The plan was to have a new strategy team come up with initiatives that Formula 1 could employ to support the pillars.

Figure 2 Formula 1's Five Pillars

Pillar 1	Make the sport better and healthier for both teams and fans. This included finding ways to improve the competition on the track and improving relations with the teams by being more transparent, providing visibility as to Formula 1's objectives, and seeking feedback.
Pillar 2	Upgrade events. Many of the events at F1 races had been the same for decades. They not only needed to be modernized, they had to become "spectacles."
Pillar 3	Engage fans through traditional and digital platforms (e.g., streaming technology, social media).
Pillar 4	Expand the brand in ways that would enable F1 to connect with fans in multiple ways (e.g., Esports, fantasy leagues, exhibition tours).
Pillar 5	Broaden the sport's global footprint by putting particular attention on China and the United States.

Source: Formula 1.

With these pillars directing them, Carey, Bratches, and Brawn hired people with fresh thinking to lead new areas in the business that did not exist under Ecclestone. They brought in people from media giants such as Sky and Virgin, as well as the world of rugby, to lead formal revenue-generating functions, including promotion, sponsorship, and innovation and digital technology, as well as new marketing, research, and strategy functions. They hired Pat Symonds as the chief technical officer of motorsport to work alongside Brawn. Symonds was well known in the F1 world, having been a chief motorsport engineer with many teams since the 1980s.

Not everyone was new to Formula 1. Several people who had been kept on from the Ecclestone days had institutional knowledge, particularly when it came to key commercial relationships. They were also retained because they had an eagerness to move the sport forward. This group included people from the organization's legal team, one of whom was tapped to lead the promotions business unit, the chief financial officer, and the head of commercial development, who became Formula 1's head of hospitality and experiences. The new units were given a lot of freedom to experiment, and evidence-based decision-making was widely encouraged. Internally, Formula 1 was referred to as a 40-year-old startup.

As they were hiring their teams, Bratches commissioned a global brand study focused on understanding global fans' associations with and perceptions of the sport of F1. Ellie Norman, the head of marketing and communications, noted that it was critical for Formula 1 to break down negative perceptions of the sport and build new and different associations. From the study, Formula 1 learned that fans had a positive association when it came to the role of drivers and were eager to understand what gave them the motivation to be champions. "Essentially getting behind or under the helmet, having those drivers elevated as heroes is a really motivating factor for driving fandom," Norman explained. The study also indicated that fans felt the sport was elitist (due to the expense of the sport and the high cost of tickets) and, with a lack of digital and social media presence, they perceived the sport as inaccessible.

In addition to illuminating fan perceptions, the global brand study identified five "North Stars" to serve as guiding principles for Formula 1's marketing and communications strategy: break through borders (break into new areas such as digital, content, and events entertainment); revel in the racing (make racing more exciting and entertaining); put the spectacular back into the spectacle (heighten the fan experience of each race, both in real life and online); taste the oil (tell the technology story of F1); and feel the blood boil (tell the behind-the-scenes stories of drivers to bring out more of the sport's humanity).

Improving the sport for fans would take time. It would require significant marketing and research experiments and investments, as well as innovation on the track from Brawn's motorsport group. In the immediate term, the leaders of the organization's revenue-generating business units got to work, picking up where Ecclestone had left off and helping to create something better.

Business Units

By the start of 2019, Formula 1 had four revenue-generating business units, with each having its own P&L. (See **Exhibits 4**, **5**, and **6** for select financials.)

Promotion

Formula 1 granted race promoters the rights to host, stage, and promote their country's Grand Prix in accordance with their particular contract.[43] Every promoter contract differed across the 21 countries that hosted F1 races. Promoters were responsible for providing a race circuit, a paddock, garages, and pits for the teams, and event-based infrastructure like grandstands, concessions, and toilets. While Formula 1 was responsible for ensuring that all equipment and teams arrived on time for every race weekend, promoters handled all custom clearances and oversaw the transportation of equipment from the ports or airports to the racing venue. Promoters paid Formula 1 an annual fee averaging $30 million. Fees could increase up to 5% annually over the lifetime of the contract. In return, promoters kept revenue generating from ticket sales, secondary concessions (this excluded Formula 1's Paddock Club), and local sponsorship.

Race promoters were typically circuit owners, local and national automobile clubs, special events companies, government bodies,[44] or some combination thereof.

Contracts lasted anywhere between three and seven years and were renewed based on local market conditions. For the 2020 season, Germany was being dropped and Vietnam would be hosting its first Grand Prix. (See **Exhibit 7** on Grand Prix hosts since 2005.)

The promotions business unit accounted for 30% of Formula 1's 2019 revenue, down from 34% in 2017, the year Liberty Media took over.

Broadcast

Formula 1 produced its own race broadcast and licensed the rights to broadcasters like ESPN and Sky to show F1 events, including races, qualifying sessions, practices, and highlights on television and other media platforms in specified countries or regions and in specified languages. Media rights agreements typically had a three- to five-year term. Broadcasters paid Formula 1 an annual fee that often increased yearly by varying amounts.[45]

Historically, F1's relationship with fans had been through its broadcast. Races could be watched live and for free (free-to-air) in many markets (e.g., RTL in Germany), while in other markets they could be viewed via satellite or cable broadcast subscriptions (e.g., Sky in the U.K.). In 2019, Formula 1 had 14 free-to-air television agreements, seven pay television agreements, and 27 agreements that covered both free-to-air and pay. The broadcast of F1 races reached 200 territories worldwide.

While the vast majority of fans watched races through the main broadcast feed, there were a couple dozen supplementary digital feeds, including cameras in the cars showing what the driver was doing and saying during a race (**Exhibit 8**).

Broadcasting accounted for 38% of Formula 1's total revenue in 2019, up from 34% in 2017.

Advertising and Sponsorship

Formula 1's advertising and sponsorship group sold trackside advertising and race sponsorship packages to companies and organizations. The amount sponsors paid to Formula 1 often increased each year based on a fixed monetary amount, a fixed percentage, or in accordance with the United States or European consumer price index or another agreed-upon metric.[46] Advertising and sponsorship contracts typically had three- to five-year terms. According to Carey, since the new team had come on board in 2017, it had been more challenging than anticipated to acquire sponsors. The organization had not done enough to tell its story and create excitement around the sport to attract new sponsors. The majority of the organization's 15 global sponsorship deals had been struck before Liberty Media took over.[47]

Each sponsorship deal was completely different; sponsors had a myriad of objectives. One commonality, however, was a need to have information about the fan base. As Murray Barnett, the head of sponsorships and commercial partnerships, noted, "It's almost essential now in signing any new sponsorships that you have a vast amount of data about your fan base, about what the potential sales volume could be for that particular property, or some kind of understanding of what business sponsors will generate out of a partnership with you – return on investment – either directly with the F1 ecosystem and business environment or the fan base."

In the era of digital technology, sponsorship was no longer just about hospitality and strategically placing signage around tracks. According to Barnett, sponsorship had become more focused on "interactivity, product proof points, and emotions." As one example, Formula 1 had entered into a sponsorship partnership with Amazon Web Services (AWS) that contained an element of "business back." Formula 1 used AWS products and services to create on-screen graphics, which in turn allowed AWS to tell an authentic story of product integration in delivering fan insights. The graphics included a tagline that read: "F1 Insights Powered by AWS" (**Exhibit 9**).

Like the other business units, the success of sponsorship was dependent on the sport itself. "If the beating heart of F1 isn't functioning properly," Barnett explained, "it has a huge impact on every other part of the business. So, if the on-track racing isn't a hugely compelling experience, it has a [negative] impact on everything we do. We can lay a table with the finest linen, finest china, and have the greatest guests around the table, but if it's not a great meal, nobody is coming back to the restaurant."

Formula 1's sponsors included Heineken, DHL, Rolex, tire maker Pirelli, and Emirates airline. Advertising and sponsorship accounted for 15% of revenue in 2019 and was relatively unchanged since 2017.

Other

The remainder of Formula 1's revenue came from a number of sources, including the Paddock Club, F1's race-based corporate hospitality program. The Paddock Club sat directly above each race track and was an exclusive place for teams to bring sponsors. It was also a popular gathering place for companies and institutions to take clients, prospective customers, and partners. Paddock Club ticket sales grew 7% (to 80,000) during the 2019 season.[48]

Formula 1's streaming F1TV Pro service, launched in 2018, also sat in the other revenue category. Its rollout year had seen a number of technical glitches. Problems continued into 2019, with Formula 1 agreeing to compensate viewers for the Azerbaijan Grand Prix during which many active subscribers were unable to log in to the site.[49] The digital and social media division, which included F1TV Pro, recorded a $1.9 million loss in 2018.[50]

Research

Formula 1's research department was a shared service for all of the business units as well as the motorsport side of the business. When Director of Research Matt Roberts joined Formula 1 in mid-2017 from Sky, he inherited two research reports: One provided the TV audience numbers for each race for five European markets, and the second was a one-page report on sponsorship exposure (how many seconds a particular brand was seen on screen during a race weekend). Neither of these reports told the organization what fans liked and didn't like about F1 and what they wanted to see or experience more of between and during races. Furthermore, there was no information on their commercial behavior.

The research team began collecting data from a wide array of sources and providers in order to help the organization make decisions that would help grow commercial revenue. They started producing reports after every race that broke down all the TV, digital, social media, and attendance numbers. They worked with companies like Nielsen to find sales stories for the sponsorship team (e.g., insights indicating that an F1 fan was twice as likely to drink beer as a Premier League fan). They hired a linguistic analytics company to understand the language used by F1 viewers across numerous social media platforms at certain points in a race. That information was then fed back to the motorsport team so they had data on what fans reacted to positively and negatively during a race.

The research department started capturing data on how people behaved commercially with the sport, such as who had registered for the F1 website but had not signed up for F1TV. This information would be fed back to the marketing department who would try to close the loop.

Research was conducted on spectators to highlight the peaks and valleys of a race so as to drive fan engagement. Through the 2019 season, 100 fans volunteered to wear a monitoring device on their hand while watching a race on television. The device measured changes in sweat gland activity; an increase in sweat denoted engagement. This data was fed back to the broadcast team to help guide them in what

elements of the race to show more of (e.g., takeovers in the middle of the pack) and less of (e.g., pit stops).

At a number of races, WiFi analytics (collected from 50 sensors placed around a race circuit) were used to look at how attendees moved around during a race. The data was useful not only for promoters who would be able to know the best spot to put concessions, but also for the sponsorship unit who would be able to determine the best place to put ads based on where people traveled.

Working in conjunction with the strategy team, in the latter part of 2017 Roberts and his team analyzed the average viewership in two of F1's biggest markets – Europe and South America. In doing so, they were able to determine that starting races an hour and 10 minutes later (14:10 GMT) would ensure that as many races as possible were shown at peak times and would enable F1 to avoid scheduling conflicts with football (soccer) games in the United Kingdom and Brazil, which was four hours behind. In addition, starting races 10 minutes after the hour would allow sports commentators time to set up the tension of the race prior to its start.[51] The change to the race start times began in the 2018 season, and the season ended with television viewership up 5%.

The 2019 Season

The 2019 F1 season, featuring 21 races – or 21 NFL Super Bowls as Carey liked to refer to them – commenced on March 15 in Melbourne, Australia and ended on December 1 in Abu Dhabi, UAE.[iv] Lewis Hamilton from the United Kingdom won the F1 World Drivers' Championship for the fifth time in six years (his teammate won the championship in 2016 and Hamilton came in second), and his team Mercedes won the F1 World Constructors' Championship for the sixth straight year after Hamilton earned an extra point for the fastest lap during the Japan Grand Prix (**Exhibit 10**). Despite Hamilton's and Mercedes's victories being determined in October, the last races of the season were a huge success. At the Brazil Grand Prix, a collision between the two Ferrari drivers took them out of contention, and Lewis Hamilton, who finished third, was pushed down to seventh place after receiving a five-second penalty. Finally, while the Red Bull team's victory was not surprising, Toro Rosso and McLaren's second and third place finishes were.[52] The sold-out Abu Dhabi Grand Prix saw the most Paddock tickets sold in the history of the race. By a number of metrics, the entire 2019 season had been a good one for Formula 1 (**Exhibit 11)**.

Aside from the excitement on the track, the teams, the FIA, and Formula 1 were close to agreeing on several technical and sporting changes that aimed to make future competition among the teams fairer and the racing results less predictable. The 2021 Concorde Agreement, which had achieved general consensus by the end of the 2019 season, included a rule that would cap teams' budgets at $175 million per season. The cap would exclude driver salaries, marketing costs, and the salaries of the top three principals. With a cap on spending, teams would be competing on a more level playing field, at least

[iv] For the 2019 season, races were held in Australia, Bahrain, China, Azerbaijan, Spain, Monaco, Canada, France, Austria, Great Britain, Germany, Hungary, Belgium, Italy, Singapore, Russia, Japan, Mexico, the United States, Brazil, and Abu Dhabi.

financially. As Bratches put it, "The engineers in the sport will tell you that every $100 million you spend above $200 million equates to one-tenth of a second per lap advantage. So here you have these three teams that are spending $400 million more than the rest for four-tenths of a second per lap advantage. This investment brings little if no value to the fan experience."

Technical changes for 2021 would include a radical new design for F1 cars (**Exhibit 12**). Starting in 2021, cars would have "sweeping bodywork, simplified front wings, bigger rear wings, increased underbody aerodynamics, wheel-wake control devices, simplified suspension, and low-profile tires with 18-inch rims."[53] The purpose of the design change was to enable closer racing. The larger back wings, for example, would help direct the air in their wake higher in order to lessen the impact on the car following behind.[54] Together with the new budget cap, Formula 1 believed the design changes would improve the F1 on-track experience, thereby positively influencing the organization's value chain (**Exhibit 13**).

From a fan perspective, there was as much going on off the track as on during the 2019 season. Following on the success of its 2018 debut at the Silverstone Grand Prix, a free exhibition of 12 cars from James Bond movies spanning six decades traveled to six different Grands Prix during the season. The exhibition could be accessed for free inside the circuit by fans with tickets. Fans could experience what it was like to be an F1 driver through the F1 Pirelli Hot Laps program. Participants in the program, which was offered at 10 Grands Prix, were driven around the circuit in a supercar (a high-performing, street-legal sportscar) by a professional driver. Car manufacturers, including Mercedes, McLaren, and Aston Martin, provided the cars and drivers. The cars were outfitted with Pirelli's P-Zero road car tires to demonstrate what a high-performance road car tire could do on a track.[55] The cost to experience a "hot lap" was $15,000. Then there was the Sotheby's international car collection auction which was held on the Saturday night before the last race of the season in Abu Dhabi. The 2002 car in which Michael Schumacher won his fifth world championship sold for $6.6 million. The auction generated $31 million in sales. A portion of the proceeds from the Sotheby's auction and the F1 Pirelli Hot Laps went to Formula 1.

Off-site, there were fan festivals held in Shanghai, Chicago, Los Angeles, and São Paulo during the season. Fan festivals were free events that brought the Grand Prix atmosphere to city streets. They featured an array of musical acts and other entertainment, followed by an F1 live car run. Fans could experience the sound of the engines and the smell of burning rubber that permeated an actual race circuit. Festivals always fell on the Saturday of a race weekend. Qualifying was streamed on a jumbotron during the festival.

In addition to the many live F1-related experiences, in 2019 fans engaged with the sport in many other ways, whether it was through the various F1 apps, social media sites, the *Beyond The Grid* podcast, F1 Esports Series, or F1 Fantasy League. In 2018, Netflix introduced *Drive to Survive*, a series depicting the lives led by F1 teams, drivers, and managers both on and off the track. (Mercedes and Ferrari were

the only two teams that didn't participate in the first season in 2018; they had agreed to be in season two which was filmed in 2019.)

Besides providing fans with many forms of engagement with the sport of F1, Formula 1 was also focusing on giving them a more personalized F1 experience. It was able to do so, primarily with younger fans, by building what Ellie Norman referred to as a value exchange: "More often than not a fan will be willing to give us their email and basic information about who's their favorite driver, in exchange for personalized content and access to the content they've been crying out for…. A millennial or a Gen-Z audience tends to be more comfortable with data and much more aware of the value of their own data."

Asked at the end of the 2019 season if he was happy with where the sport of F1 was, Carey admitted, "Look, I don't think you should ever be happy. There's always more to do and in some ways you can always do better. If 100% of what you're doing has worked exactly the way you wanted it to, then you're not doing enough."

Conclusion

Since arriving in 2017, Carey, Brawn, and Bratches, and their teams had done a lot to turn F1 from a motorsport into a global entertainment brand. The fan base was growing and becoming younger. There were many ways in which fans could engage with the sport beyond watching races on TV or attending them live. Content was becoming more portable and personalized. But there still remained a key challenge that, if not solved, could put the organization's accomplishments at risk. As Bratches noted, "We have this myopic belief that if we better serve fans tomorrow than we did today, our business is going to grow…. My concern is that, if we don't fix what's on the track, this positive arc that we're seeing is going to start to plateau…. Competition elevates engagement."

But the sport of F1 went beyond the fans and what happened on the track. It had historically developed important automotive innovations. There was general global consensus that the world needed cleaner cars. With Formula 1, FIA, the teams, and the sport's manufacturers agreeing to make the sport carbon neutral by 2030, the race to innovate was only just beginning.

Formula 1 balanced a number of sporting, commercial, and societal interests. Would the changes to the sport be enough to introduce more competition and unpredictability, while also satisfying all key stakeholders? How could the sport continue to grow revenue and its fan base? Would the sport remain relevant amidst the climate change crisis and an automotive industry in transition? F1 had a history of constant innovation and change. Perhaps the 2020s would be its most crucial inflection point.

Exhibit 1 Formula E Esports

The Formula E racing series was launched in 2014. Like F1, it was overseen by the FIA. The season comprised 13 races that ran on temporary street circuits near major cities, such as New York, Paris, and Monaco. In 2018, the sport attracted 476,000 spectators, more than double the previous year's audience.[56]

Unlike F1, Formula E races were more competitive with a wider array of winning drivers. Cars were powered by a 250 kW motor giving them top speed of 174 mph. While slower by 25% than F1 cars, they produced no exhaust emissions and were quiet. In 2019, Formula E participants included Audi, BMW, Nissan, and Mercedes-Benz. Notably absent was Tesla. Twelve teams competed.[57]

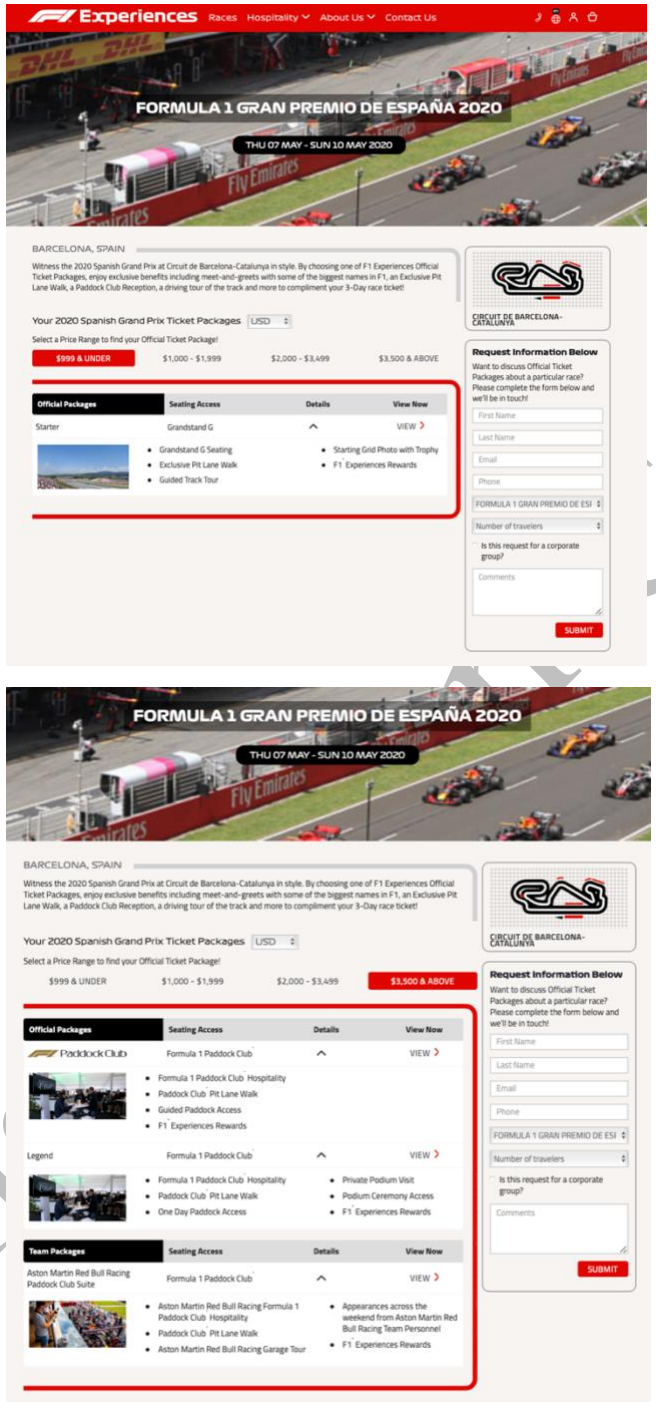
Team expenditures were notably lower than what F1 teams spent. In 2018, Jaguar spent $11.7 million on its Formula E team.[58]

Revenue came from promotion and sponsorship deals. In 2018, the organization lost $29 million on revenue of $149 million. Total losses since 2014 added up to $168 million.[59]

Exhibit 2 Wings on an F1 Car

Source: Formula1.com (https://www.formula1.com/en/latest/article.in-full-all-the-drivers-on-the-2019-formula-1-grid.2UuZsxj5FmAMEeYEYYWcAM.html, accessed March 24, 2020).

Exhibit 3 Grand Prix Weekend Ticket Packages



Source: Formula1.com.

Exhibit 4 Liberty Media Consolidated Operating Results

	Years ended December 31,		
	2019	2018	2017
	amounts in millions		
Revenue			
Liberty SiriusXM Group			
Sirius XM Holdings	$ 7,794	5,771	5,425
Total Liberty SiriusXM Group	7,794	5,771	5,425
Braves Group			
Corporate and other	476	442	386
Total Braves Group	476	442	386
Formula One Group			
Formula 1	2,022	1,827	1,783
Total Formula One Group	2,022	1,827	1,783
Consolidated Liberty	$ 10,292	8,040	7,594
Operating Income (Loss)			
Liberty SiriusXM Group			
Sirius XM Holdings	$ 1,578	1,659	1,588
Corporate and other	(34)	(39)	(41)
Total Liberty SiriusXM Group	1,544	1,620	1,547
Braves Group			
Corporate and other	(39)	1	(113)
Total Braves Group	(39)	1	(113)
Formula One Group			
Formula 1	17	(68)	17
Corporate and other	(52)	(42)	(57)
Total Formula One Group	(35)	(110)	(40)
Consolidated Liberty	$ 1,470	1,511	1,394
Adjusted OIBDA			
Liberty SiriusXM Group			
Sirius XM Holdings	$ 2,453	2,233	2,109
Corporate and other	(17)	(16)	(15)
Total Liberty SiriusXM Group	2,436	2,217	2,094
Braves Group			
Corporate and other	49	88	2
Total Braves Group	49	88	2
Formula One Group			
Formula 1	482	400	438
Corporate and other	(36)	(25)	(41)
Total Formula One Group	446	375	397
Consolidated Liberty	$ 2,931	2,680	2,493

Source: Liberty Media Annual Report, 2019, p. II-9.

Exhibit 5 Formula 1 Group Operating Results

	Years ended December 31,		
	2019 (actual)	2018 (actual)	2017 (pro forma)
	amounts in millions		
Primary Formula 1 revenue	$ 1,664	1,487	1,483
Other Formula 1 revenue	358	340	301
Total Formula 1 revenue	2,022	1,827	1,784
Operating expenses (excluding stock-based compensation included below):			
Cost of Formula 1 revenue	(1,393)	(1,273)	(1,221)
Selling, general and administrative expenses	(147)	(154)	(125)
Adjusted OIBDA	482	400	438
Stock-based compensation	(19)	(16)	(24)
Depreciation and amortization	(446)	(452)	(451)
Operating income (loss)	$ 17	(68)	(37)
Number of Events	21	21	20

Primary Formula 1 revenue is derived from the commercial exploitation and development of the World Championship through a combination of race promotion fees (earned from granting the rights to host, stage, and promote each Event on the World Championship calendar), broadcasting fees (earned from licensing the right to broadcast Events on television and other platforms, including the internet), and advertising and sponsorship fees (earned from the sale of World Championship and Event-related advertising and sponsorship rights).

Primary Formula 1 revenue increased $177 million and $4 million during the years ended December 31, 2019 and 2018, respectively, as compared to the corresponding periods in the prior year.

The increase for the year ended December 31, 2019 was primarily driven by an increase in broadcasting revenue due to contractual increases in fees, partially offset by the net adverse impact of weaker foreign currency exchange rates used to translate broadcasting fees that were not denominated in U.S. Dollars. Additionally, advertising and sponsorship revenue increased due to revenue from contracts with new customers. Race promotion revenue decreased due to the financial terms of two race promotion agreements and the net adverse impact of weaker foreign currency exchange rates, partially offset by contractual increases in a number of contracts.

The increase for the year ended December 31, 2018 was driven by an increase in race promotion fees due to contractual increases in fees for certain Events and increased economics from contractual arrangements at one Event (which was fully offset by a decrease in advertising and sponsorship revenue, as discussed below). In addition, broadcasting revenue increased during the current period as compared to the corresponding period in the prior year due to the favorable impact of foreign currency exchange rates used to translate Great Britain Pound and Euro-denominated contracts into U.S. Dollars and the impact of certain contractual rate increases, partially offset by the early termination of one contract with a failing broadcast rights holder. Advertising and sponsorship revenue decreased during the current period as compared to the corresponding period in the prior year due to revised contractual arrangements at one Event and non-renewal of another small sponsorship arrangement, partially offset by revenue from new contracts and increases in existing contracts.

Other Formula 1 revenue is generated from miscellaneous and ancillary sources primarily related to facilitating the shipment of cars and equipment to and from events outside of Europe, revenue from the sale of tickets to the Formula One Paddock Club at most Events, support races at Events (either from the direct operation of the F2 and F3 series or from the licensing of other third-party series or individual race events), various television production and post-production activities, digital and social media services, and other ancillary operations.

Other Formula 1 revenue increased $18 million and $39 million during the years ended December 31, 2019 and 2018, respectively, as compared to the corresponding periods in the prior year. The increase in 2019 was due to an increase in digital media revenue, higher Paddock Club attendance, increased revenue from other Event-based activities, and higher sales of equipment, parts, and maintenance and other services to the competing F2 and F3 teams, partially offset by non-recurring television production revenue recorded in the prior year. The increase in 2018 was primarily attributable to increases in revenue from the sale of the new F2 chassis, engine, and other components to the series' competing teams due to 2018 being the first year of the F2 vehicle cycle, higher logistical and travel services revenue, higher digital media and television production related revenue, and increased revenue from hospitality and various fan engagement and other Event-based activities.

Source: Liberty Media Annual Report 2019, p. II-26-27.

Exhibit 6 Formula 1 Cost of Revenue

	Years ended December 31,		
	2019 (actual)	2018 (actual)	2017 (pro forma)
	amounts in millions		
Team payments	$ (1,012)	(913)	(919)
Other costs of Formula 1 revenue	(381)	(360)	(302)
Cost of Formula 1 revenue	$ (1,393)	(1,273)	(1,221)

Cost of Formula 1 revenue consists primarily of team payments. Other costs of Formula 1 revenue include hospitality costs, which are principally related to catering and other aspects of the production and delivery of the Paddock Club, and circuit rights' fees payable under various agreements with race promoters to acquire certain commercial rights at Events, including the right to sell advertising, hospitality, and support race opportunities. Other costs include annual fees payable to the Fédération Internationale de l'Automobile, advertising and sponsorship commissions and those incurred in the provision and sale of freight, travel, and logistical services, F2 and F3 cars, parts and maintenance services, television production and post-production services, advertising production services, and digital and social media activities. These costs are largely variable in nature and relate directly to revenue opportunities.

Cost of Formula 1 revenue increased approximately $120 million and $52 million during the years ended December 31, 2019 and 2018, respectively, as compared to the corresponding periods in the prior year.

Team payments increased $99 million and decreased $6 million during the years ended December 31, 2019 and 2018, respectively, as compared to the corresponding periods in the prior year. The increase in team payments during 2019 was attributable to an increase in Primary Formula 1 revenue and the

associated impact on the calculation of variable Prize Fund elements, which are calculated with reference to Formula 1's revenue and costs. The 2018 decrease was attributable to a reduction in the variable elements of the Prize Fund.

Other costs of Formula 1 revenue increased $21 million and $58 million during the years ended December 31, 2019 and 2018, respectively, as compared to the corresponding periods in the prior year. The 2019 increase was primarily due to costs related to various technical initiatives, the continued further development and delivery of digital and social media products and platforms, increased costs related to the sale of equipment, parts, maintenance, and other services to the competing F2 and F3 teams, and higher FIA and hospitality costs. The 2018 increase is primarily due to increased technical, logistics and travel, hospitality, and Formula 2 and GP3 costs associated with the changes in the World Championship calendar, increased costs associated with sale of the new Formula 2 chassis and components to the competing Formula 2 teams during the first season of the latest three-year Formula 2 cycle, costs associated with increased fan engagement activities, technical and digital media development and delivery, and higher freight and hospitality costs.

Selling, general and administrative expenses include personnel costs, legal, professional, and other advisory fees, bad debt expense, rental expense, information technology costs, non-Event-related travel costs, insurance premiums, maintenance and utility costs, and other general office administration costs. Selling, general and administrative expenses decreased $7 million and increased $29 million during the years ended December 31, 2019 and 2018, respectively, as compared to the corresponding periods in the prior year. The 2019 decrease was driven by foreign exchange gains and lower bad debt expense, partially offset by higher personnel and information technology costs. The 2018 increase was primarily driven by higher marketing and research costs and an increase in bad debt expense.

Stock-based compensation expense relates to costs arising from grants of Series C Liberty Formula One common stock options and restricted stock units to members of Formula 1 management, subsequent to the acquisition of Formula 1 by Liberty. Stock-based compensation expense increased $3 million and decreased $8 million during the years ended December 31, 2019 and 2018, respectively, as compared to the corresponding periods in the prior year. The 2019 increase in stock-based compensation is primarily due to an increase in the number of awards granted.

Depreciation and amortization includes depreciation of fixed assets and amortization of intangible assets. Depreciation and amortization decreased $6 million during the year ended December 31, 2019 and was relatively flat during the year ended December 31, 2018, as compared to the corresponding periods in the prior year. The 2019 decrease was primarily due to a decrease in amortization expense related to certain intangible assets acquired in the acquisition of Formula 1 by Liberty.

Source: Liberty Media Annual Report 2019, p. II-27-28.

Exhibit 7 Grand Prix Hosts (since 2010)

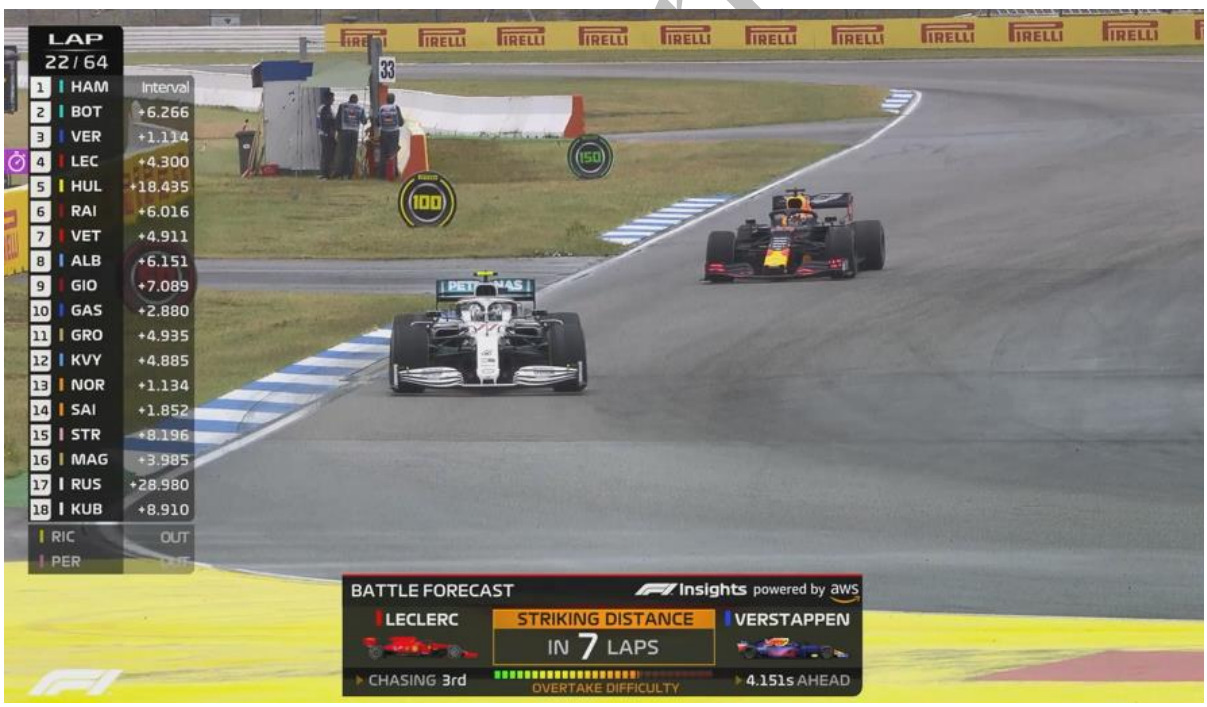
Abu Dhabi	2010-
Australia	2010-
Austria	2014-
Azerbaijan	2017-
Bahrain	2010, 2012-
Belgium	2010-
Brazil	2010-
Canada	2010-
China	2010-
Europe	2010–2012, 2016
France	2018-
Germany	2010–2014, 2016, 2018–2019
Great Britain	2010-
Hungary	2010-
India	2011–2013
Italy	2010-
Japan	2010-
Malaysia	2010–2017
Mexico	2015-
Monaco	2010-
Netherlands	2020-
Russia	2014-
Singapore	2010-
South Korea	2010–2013
Spain	2010-
Turkey	2010–2011
United States	2012-
Vietnam	2020-

Source: Formula1.com.

Exhibit 8 Still of a Video Feed from an F1 Car

Source: F1.com.

Exhibit 9 F1 Insights Powered by AWS



Source: Formula 1.

Exhibit 10 F1 2019 Season Results

	2019 Drivers' Championship			
Place	**Driver**	**Nationality**	**Car**	**Points**
1	Hamilton	GBR	Mercedes	413
2	Bottas	FIN	Mercedes	326
3	Verstappen	NED	Red Bull Racing Honda	278
4	Leclerc	MON	Ferrari	264
5	Vettel	GER	Ferrari	240
6	Sainz	ESP	McLaren Renault	96
7	Gasly	FRA	Scuderia Toro Rosso Honda	95
8	Albon	THA	Red Bull Racing Honda	92
9	Ricciardo	AUS	Renault	54
10	Perez	MEX	Racing Point BWT Mercedes	52

Source: https://www.formula1.com/en/results.html/2019/drivers.html (accessed January 23, 2020).

	2019 Constructors' Championship		
	Team	**Points**	**Budget** ($ millions)
1	Mercedes	739	$484
2	Ferrari	504	$463
3	Red Bull Racing Honda	417	$445
4	McLaren Renault	145	$269
5	Renault	91	$272
6	Scuderia Toro Rosso Honda	85	$138
7	Racing Point BWT Mercedes	73	$188
8	Alfa Romeo Racing Ferrari	57	$141
9	Haas Ferrari	28	$173
10	Williams Mercedes	1	$132

Source: https://www.formula1.com/en/results.html/2019/team.html (accessed January 23, 2020).; https://www.essentiallysports.com/what-are-the-budgets-for-all-10-formula-one-teams-2019/ (accessed January 23, 2020).

Exhibit 10 (con't) ***Drivers' and Constructors' Championship Winners 2005–2019***

	Driver	Team	Points
2005	F. Alonso	Renault	133
2006	F. Alonso	Renault	134
2007	K. Räikkönen	Ferrari	110
2008	L. Hamilton	McLaren Mercedes	98
2009	J. Button	Brawn Mercedes	95
2010	S. Vettel	Red Bull Racing Renault	256
2011	S. Vettel	Red Bull Racing Renault	392
2012	S. Vettel	Red Bull Racing Renault	281
2013	S. Vettel	Red Bull Racing Renault	397
2014	L. Hamilton	Mercedes	384
2015	L. Hamilton	Mercedes	381
2016	N. Rosberg	Mercedes	385
2017	L. Hamilton	Mercedes	363
2018	L. Hamilton	Mercedes	408
2019	L. Hamilton	Mercedes	413

Constructors	Points
Renault	191
Renault	206
Ferrari	204
Ferrari	172
Brawn Mercedes	172
Red Bull Racing Renault	498
Red Bull Racing Renault	650
Red Bull Racing Renault	460
Red Bull Racing Renault	596
Mercedes	701
Mercedes	703
Mercedes	765
Mercedes	668
Mercedes	655
Mercedes	739

Source: https://www.formula1.com/en/results.html/2019/drivers.html (accessed January 23, 2020); https://www.formula1.com/en/results.html/2019/team.html (accessed January 23, 2020).

Exhibit 11 F1 Top 20 Markets TV Reach 2019

TV reach (unique viewers) - top 20 markets
**Minimum viewing time of 3 mins*

Rank	Market	2018 reach	2019 reach	% change
1	Brazil	115,225,500	100,483,500	-13%
2	China	67,959,000	62,939,000	-7%
3	Germany	27,467,721	39,991,900	46%
4	USA	34,217,000	28,758,000	-16%
5	Italy	30,910,566	27,780,583	-10%
6	United Kingdom	27,726,371	25,919,659	-7%
7	Pan Middle East	5,209,146	17,691,210	240%
8	France	14,950,000	15,144,000	1%
9	Pan Russia	13,127,788	13,287,690	1%
10	Russia	13,769,000	11,968,800	-13%
11	Pan Latin America	10,695,249	11,728,014	10%
12	Poland	1,262,620	8,455,600	570%
13	Netherlands	5,441,000	7,132,000	31%
14	Pan Africa	8,078,317	6,881,967	-15%
15	Mexico	5,768,680	5,711,350	-1%
16	Greece	4,559,953	5,380,893	18%
17	Australia	5,054,064	4,521,316	-11%
18	Belgium	4,323,086	4,195,792	-3%
19	Austria	4,933,200	3,824,000	-22%
20	Finland	3,776,700	3,771,300	0%
	Top 20 markets	404,454,961	405,566,574	0%
	Rest of the World	85,864,768	65,421,558	-24%
	Total Reach	490,319,729	470,988,133	-4%

- The top 20 markets account for 86% of global reach.
- The trend is also more positive in our biggest markets - the top 20 markets have seen a marginal increase of 0.2% yoy, but smaller markets have fallen by 24% yoy.
- Please note that reach patterns do not always reflect cumulative audience patterns, as reach is not affected by the volume of content watched by a viewer,

Market insights

Brazil: This market does reflect the drop in cumulative audience, and probably relates to the continued lack of a Brazilian driver on the grid.

China: A 7% drop from last year, but still our 2nd biggest market, and reach remains almost 3 times higher than in 2017.

Germany: The addition of Sky Sports coverage helped to reach large numbers of new viewers.

USA: The decrease in reach came mainly from the Monaco GP, which in 2018 had far more viewers coming in for the first time that season. However, reach remains just above 2017 levels (+1%).

Middle East: As with cumulative audience, reach has more than tripled thanks to the new free to air coverage on MBC.

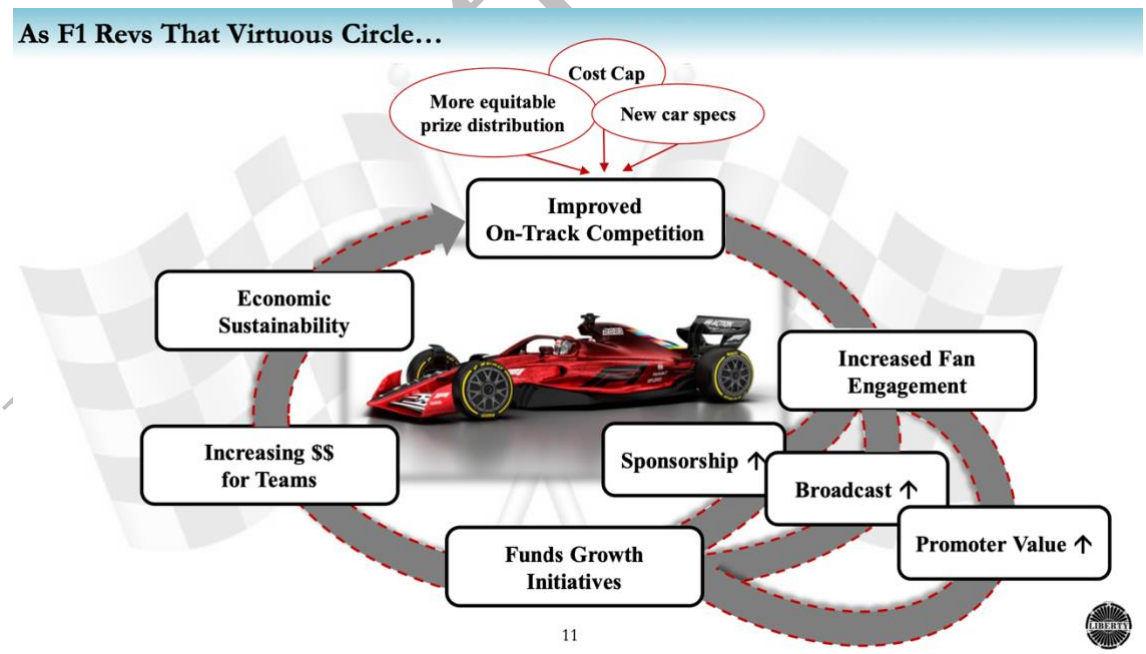
Poland: Increases in reach due to the extra sub-licencing deals in place for 2019, but increases in reach were even more significant than for cumulative audience.

Source: Formula 1.

Exhibit 12 F1 Car in 2021

Source: F1.com (https://www.formula1.com/en/latest/article.gallery-every-angle-of-the-2021-f1-car.4jDflKZxqvA1Mq1nApR1DU.html, accessed February 2, 2020).

Exhibit 13 Improved On-Track Competition Positive Feedback Loop



Source: Liberty Media 2019 Investor Day, November 21, 2019 (http://ir.libertymedia.com/static-files/5f55f3f6-b748-48ea-b46a-b5ef48f6aa03, accessed January 12, 2020).

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