SD 5102

Design and Value Creation

The Case Study of:

Aston Martin Lagonda Limited

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Kin Ngai | 1200xxxx_x

School of Design

Abstract

This case study is an investigative report to describing the design structures of Aston Martin Lagonda Limited, and how the function of its design process enhanced the values for the company as a whole, as well as the design factors that contributed to product enhancements for the market. This case studies beings with an introduction of the background information of the company to familiarize readers with its history and values. The section that follows would be the case methodology exploring and outlining the details of change factors in the Aston Martin's production process, and with the analysis summation of key enhancements that impacted the company. The case ends with a conclusion specifying the values that were created and enhanced by design.

Introduction

The name Aston Martin to the regular public perhaps may be a car that is best known for its beautiful shapes with lethal weapons that the famous Jame Bond drives in his movies; but the Bond's car of choice did not just happen without history and substance. Aston Martin cars have inimitable reputation for quality to the highest standards, style of artistry, and performance of racing pedigree; enduring the iconic status in the auto industry for radical innovation, extreme engineering and contemporary design with rich experience of craftsmanship.

Aston Martin originated in Britain and was establish in 1913, by Robert Bamford and Lionel Martin who shared the passion for beauty and fast cars. Their vision for Aston Martin was:

> *"A quality car of good performance and appearance: a car for the discerning owner driver with fast touring in mind, designed, developed, engineered and built as an individual."*

These ideals carried a history within the company that is over a century long and establishing a strong heritage that stayed with the four ownership changes during the financial difficulties in the pre and post-war era between 1913 – 1947 and then eight more ownership changes thereafter into the twenty first century.

Sir David Brown [1], who became the new owner in 1947, excelled and started the revolution for Aston Martin with his ambition 'to make the world's best sporting Grand Tourer'. Under new leadership Aston Martin was lead to a series of events that formed their strength in the auto market. The bold decisions made by David Brown to acquire specialist companies, partnering

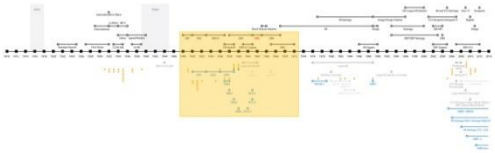
[1] Sir David Brown is a successful business man of his own family business "David Brown Gear Company Ltd.", He was knighted in 1968 for his list of efforts in repairing his companies within the industry both in UK and America that served the War efforts. He is also a car enthusiast who raced cars, motorcycles, horses, and was a qualified pilot. He is a loyal fan of the British marquee, and committed to motorsport competition.

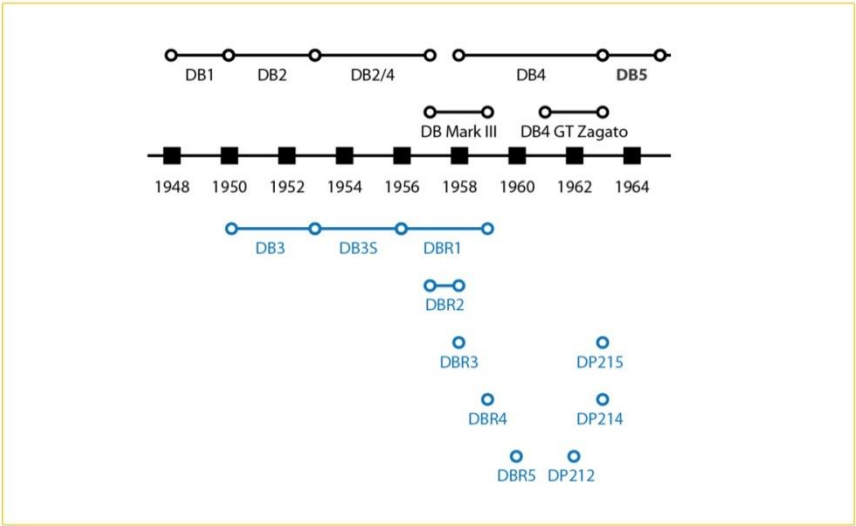
those with expertise and establishing the special unit focused purely on racing; that were all in the support of creating Aston Martin's product exclusively distinctive in the auto industry. The born of the DB series baring David Brown's initials became an infamous symbol to the general public and the Aston Martin's name was highly recognized in the Formula one and the Le Man racing circuit, as well as by racing professionals around the world.

The efforts in later models that continued to break barriers for innovations in perfection leaded Aston Martin to the status of Royal Patronage and in 1985 the company was granted the Royal Warrant of Appointment to His Royal Highness The Prince of Wales, where only one other car company shared this privilege. The legacies with ongoing developments by quality of design excellence continued into the twenty first century. Aston Martin going beyond, for the quest to delivering every car with its own character, where every owner takes pride in his or her car and with core qualities that makes Aston Martin's strong independent brand so widely reserved.

Analysis – Overview of Crucial Changes in the Development Process

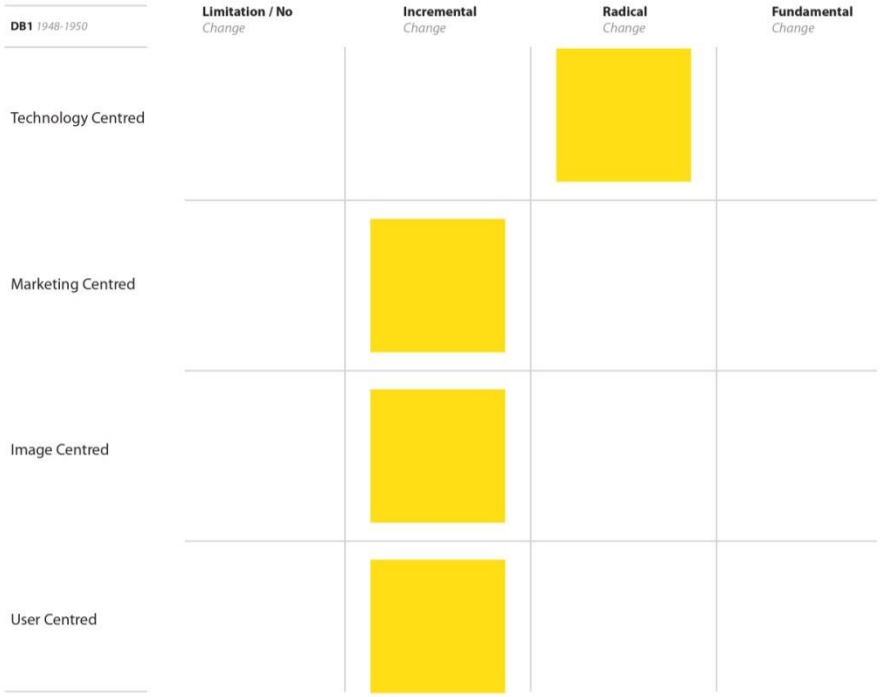
[Figure 1 – The DB Series 1-5 Production Timeline]





The start of the progressive development in the DB series was first initiated with the introduction of the DB1 in 1948 until the creation of the DB5 in 1963. In the course of the 15 years period [Figure 1], there were abundant of engineering developments, design specification changes, and consumer focused detailing; all evident in each of the DB1, DB2, DB MK III, DB4, and the DB5. These significant design changes greatly influenced and possibly shaped Aston Martin entirely to the prestigious status in the auto industry.

DB1 (formally known as: TWO-LITER SPORTS): [1948 to 1950]



[See Appendix A - for the complete development details]

Radical Changes:

- David Brown laid down his specifications to create an improved performance sports car that would be an open top, a two-seater roaster with a body shape that would be suitable for the Motor Show.
- The tube-frame chassis as the superstructure was reworked and developed, with changes accumulated to a near overhaul.
- The rigid framework set new standards in road holding and the suspension was a improved version of the already revolutionary Atom[2] suspension.
- The application of synchromesh transmission, which was a break-through of the time.

Incremental Changes:

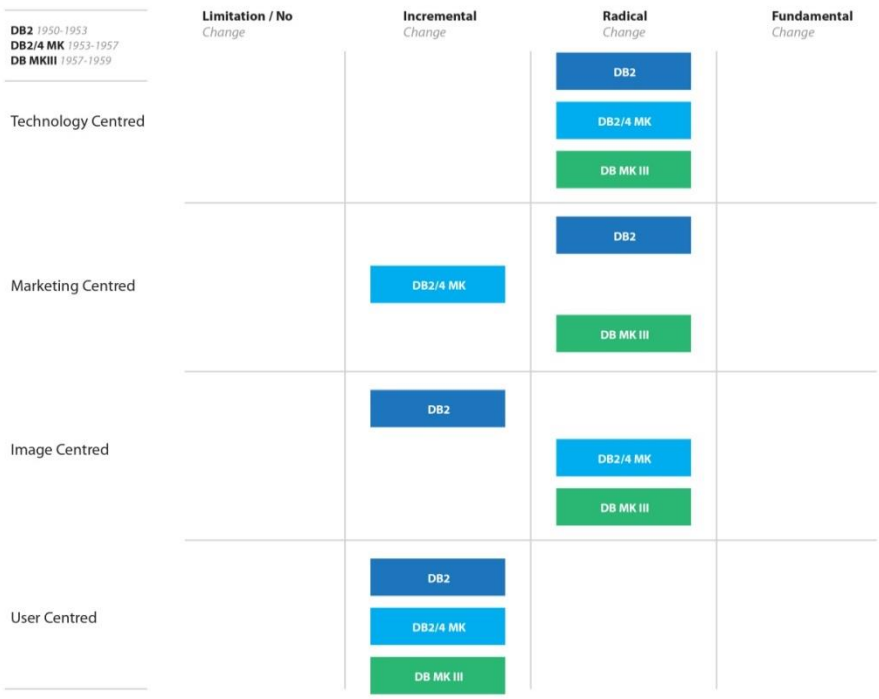
- The appearance that was completed with a 3-part grille suggesting the later Aston Martin designs.
- At the time of production 15 had been produced, as the price tag was a very expensive car at a listing price of £1,498 in comparison to a new Jaguar XK120 was only £988.
- The same year where the DB1 TWO-LITRE SPORTS entered production in 1948, they won the 24-hour

[2] Atom: was a prototype car created by Claude Hill in 1939, design and constructed with the aluminum body over a tubular steel frame, marking a design change of previous cars in the pre-war era.

race, upholding their pre-war reputation in the Le Man and in the racing circuit.

- One of the production cars was shipped as a chassis for custom lightweight coachwork to enter the 24-hour race and testing the durability.
- 1948 at the London Motors Show, The TWO-LITRE SPORTS become known as the DB1, when DB2 Officially badges the DB Name of David Brown.

DB2 | DB2 / 4 MK Series | DB MK III: [1950 to 1959]



[See Appendix B - for the complete DB2 & DB2 /4 MK Series development details]

[See Appendix C - for the complete DB MK III development details]

Radical Changes:

- The purchase of Lagonda [3] near the same time he bought Aston Martin by David Brown.
- All of the Engine, Chassis and Specifications was to be redevelopment and resulted with the speed that was recorded as 0 – 60 in 12.4 seconds and with matching cornering capacity.

[3] Lagonda is a British luxury car marquee that was established since 1906, with expertise and award winning engine developments.

- The latest 2.6L dual overhead cam straight-6 engine by Lagonda was created by chief engineer W.O.Bentley [4] at the time.
- The Lagonda engine became the basis for all the Aston Martin of the 1950s, and also become the building blocks of the development in the DB2.
- A new racing unit for motor sport established dedicated to pure racing only.
- A separate racer DB3 was to be developed at the same time.
- Aston Martin change its name to Aston Martin Lagonda Limited (AML)
- The specification of the new power 2.6 Liter engine from the racing car was released 3 days before the Motor show in New York in 1950, for the reveal of the new DB2.
- The body design modifications with increasing interior space amazed the world.
- The ongoing DB3S race development improved the weight reductions and total reduction in size with elegant practical body design improving hot air ventilation.
- David Brown purchased Tickford Limited [5] at the end of 1955.
- Partnership with famous Italian coachbuild Carrozzeria Touring of Milan [6] using the patented Superleggra [7] trademark system of the lightweight support for alloy body panels.
- In 1957 Tadek Marek redesigned the W.O. Bentley Lagonda 2.9 L straight-6 engine.
- The application of overdrive attached to the STD 4 speed gear box, and the introduction of the Borg Warner [8] automatic transmission.

Incremental Changes:

- Drop Head Coupe, Fixed Head Coupe and the Spyders was introduced, and the Vantage name was also later introduced and offered, its meaning of a high-performance version.
- Racing unit sets new records with the new engine and an outright win at the 1951 Le Man Race.
- Tickford's body designs and performance customization was made available as options.
- Limited Spyder units were made by custom coachbuild, and together with a total of 199 production units were sold in a short two year period.

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4 W.O. Bentley is an expertise who is an engineer; designer of aero engines, designer and racer of motor cars, and the founder of Bentley Motors Limited. He has passion in racing and had past records of winning five 24 hours of Le Mans with the Lagonda since 1924 and each year after in 1927 to 1930. His motto was, "To build a good car, a fast car, the best in class."

5 Tickford Limited is automobile engineering and testing company with a long history developing coachbuilt cars as early as 1898, they are experience with designed and built station wagons on the Land Rover chassis, luxurious convertibles and saloon were built on the Alvis and Lagonda chassis

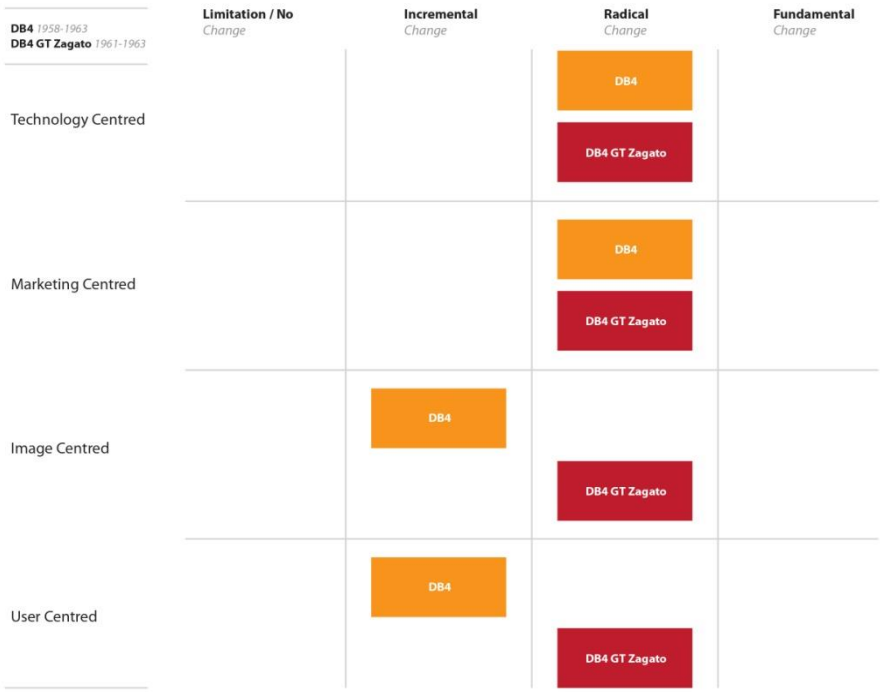
6 Carrozzeria Touring of Milan is an automobile coachbuilder established in 1926, and well known for both the beauty of its designs and patented superleggera construction methods. Their Client list consisted of Alfa Romeo, BMW, Maserati, Fiat, Lamborghini, and Ferrari.

7 Superleggra construction system consists of a structure of small diameter tubes to form the body's shape with thin alloy panels attached to cover and strengthen the framework. Aside from light weight, the Superleggera construction system gave great flexibility, allowing Touring to quickly construct innovative body shapes.

8 Borg Warner is a leading supplier of wet clutches and hydraulic modules for dual clutch transmission systems automatic transmission, they were best known as the supplier of Warner Gear overdrive units for cars of the 1930s to the 1970s, and as the developer of Ford's Ford-O-Matic three-speed automatic transmission introduced in 1950.

- The announcement of price cut in 1957 to be the same as the previous model clearing out the stocks, thought still expensive but the market response were less critical.
- Name changes of the DB2 series in 1957 to DB MK III and without the use of 2/4
- In 1958 with the introduction of standard DBA engine, optional DBB series and DBD high-output upgrade, and the competition version of the DBC rated engine.
- The total of 551 DB MK III produced, and the 1st time where James Bond as referred to driving an Aston Martin DB Mark III in the novel version of Goldfinger.

DB4 | DB4 GT | DB4 GT Zagato: [1958 to 1963]



[See Appendix D - for the complete development details]

Radical Changes:

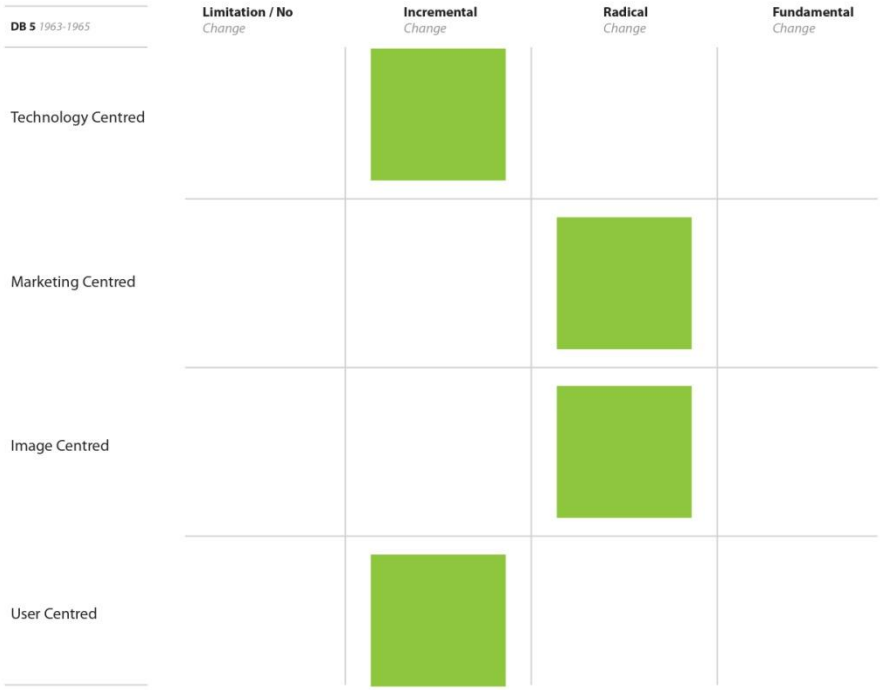
- Tadek Marek's redevelopment of the twin overhead cam aluminum engine weighed in 22Kg less.
- The standard application of a four speed all synchromesh gearbox and the addition of the redesigned coil and wishbone front suspension, and with all around discs breaks.
- The new DB4 could go from a standing start to 100 mph and back to standstill within 30 seconds.
- Licensing the application of the Carrozzeria Touring using their Superlaggera system.
- Aston Martin instituted a test program utilizing the newly opened M1 motorway.
- Enhancements and changes with solutions that improved overall performance, resulting of Vantage and Special Series (SS) engine.

- The additions of practical luxury improvements made internally and externally.
- The co-development with the racing unit resulted with the tuned powerful standard 3.7 engine that was capable to produce over 300bhp, with a top speed of 150 mph.
- The special licensed limited edition joint development of the DB4GT Zagato, resulted with the fitment of a 4.2 litre engine and the tuning of the manifolds helped the engine produced 352 bhp.

Incremental Changes:

- Top speed of 140mph, was considered one of the fastest in the world and was on a par with the best of Italian Grand Turismos.
- Carrozzeria Touring body design resulting of the wide windscreens, frameless window, and seamless doors hinges, delivered slim proportions and outstanding all-round visibility.
- The delivery of DB4 Series I, II, III, IV, V and convertibles between the year of 1958-1963, each with incremented improvements and options offer to the Vantage and Vantage GT upgrades.
- The announcement of the DB4GT in 1959 of a sports pedigree car.
- The winnings at the Le Man and the Tourist Trophy in the racing circuit between 1959-1960
- The announcement of the DB4GT Zagato in 1960, but was not available to the public.

DB 5: [1963 to 1965]



[See Appendix E - for the complete development details]

Radical Changes:

- Adding to the Aston Martin's luxury image with famous automatic transmissions applications, and luxury option such as air conditioning, electric windows, and exhaust silencers.
- The usage of the popular clutch systems and transmission applications providing comfort and smooth motions in performance sports cars.
- The DB5 became the car of choice for the famous James Bond
- The leap in publicity and to the celebrity status, which made it the most famous car in the world.

Incremental Changes:

- Tadek Marek continued with the developments and with the choice of using the 4 liter engine giving usable power right through the engine range.
- Harold Beach provided the application of 3 transmission alternatives.
- A total of 1,021 DB5 were built – 89 less than the number of DB4's but over just a 2 year production run period and convertibles accounted for 123.

Analysis Summation – Core Values Enhancements by Design

The 4 phase change progression:

DB Dev Process:	1948-1950 **DB1** (Atom) **Production Engine** *to Track Racers* TWO-LITRE SPORTS	1950-1959 **DB2 MK I, MK II, DB MKIII** **Production Engine** *to Track Racers* Original Lagonda + Tadek Redesign	1958-1963 **DB4 Series I - IV, Vantage, Vantage GT, Convertable, GT, GT Zagato, Series V** **Mod Production Engine** *as Track Racers* Tadek Design	1963-1965 **DB 5** **Mod Production Engine** *as Track Racers* Tadek Design
Requirements	DB Tech Spec	DB + MKT Specs	Tech Specifications	Tech Specifications
Design – Engine	Road Car Dev Enhance	Road Cars: STD 2.6 Engine Dev - Lagonda Track Race Cars: MKIII 2.9L Engine Dev - Tadek Marek - (DBA, DBD, DBB)	Road Cars / Track Race Cars: STD (DBA) + (DBD) + (DBB) Engine Dev	Road Cars / Track Race Cars: STD (DBA) + (DBD) + (DBB) Engine Dev
Design – Chassis	Chassis Dev Claude Hill	Chassis Dev Claude Hill Track | Chassis Specs Robert Eberan-Eberhorst DBR1-5 - Ted Cutting	Chassis Dev - Harold Beech	Chassis Dev - Harold Beech
Design – Body	Body Dev Frank Feeley	DB2 - Frank Feeley DB2/4 MK II - Tickford & Touring of Milan DB MK III - Touring Milan DB3 & 3S - Frank Feeley DBR1-5 - Ted Cutting (Works Development)	Touring Milan - New "Supperlaggera" System Track Body (Works Development)	Touring Milan - New "Supperlaggera" System Track Body (Works Development)
Performance Tests	Race Prototypes	GT | LeMan GT | LeMan | F1 Race Stock Production Mod Engine Prototype	Modified Body Builts to Race GT | LeMan | F1 Race Stock Production Mod Engine Prototype	Modified Body Builts to Race GT | LeMan | F1 Race Stock Production Mod Engine Prototype
Product Launch	Enhance Prototypes	Production STD + Upgrades Options	Production STD + Full Engine Range Options	Production STD + Full Engine Range Options
Production	MKT Demands + Customized Deliverables	MKT Multi Range Road Cars & DB3S Track Racers as Customized Deliverables	MKT Multi Range Road Cars + Body Build Series Upgrades + Authorized Race Custome Deliverables	MKT Multi Range Road Cars + Body Build Series Upgrades + Authorized Custome Deliverables

[See Appendix F - for enlarged detail views]

The 15 year progressive period of the DB series leading to the final development years of the DB5 can be reviewed in four phases and each with significant changing factors that inflicted and influenced the values in Aston Martin's design and development process, and its entirety as a company.

In the DB1 era, the initial phase of changes that were indicated was the specifications on technical requirements imposed by the new owner in charge. The requirements were; improved performance, an open top two-seater roaster and a redesign of a conventional body. These specifications gave clear focuses for interpretations and targets to achieve for engineers, chassis and body designers to develop Aston Martin's new line of product with radical changes. The specifics of the new requirements was not just a top down order, but can be perceived as the user's requirements that instigated the establishment of new product standards. In the process of the design and development, revolutionary techniques and precise engineering was

applied which resulted in break-through pre-war standards that was well ahead of its time for road handling in performance cars. The solid redesigns in strengthening the all around fundamentals not only provided the first legacy for the development of high performance sports car in the future, but it also made the DB1 a strong contender in the racing circuit. The owner's decision to develop another car in parallel with pure racing in mind and as a way to test durability, this signified the second set of changes with a process implementation for development benefits between Aston Martin's race cars and road production cars of which they are tightly integrated. The outright first win on the race track created a reputation that were remarkable to the public media, and the success of the design advancements and distinctive visual designs on the DB1 also excited consumers alike. Though with such enthusiasm, the DB1's high listing price compared to its rivals that influenced the production figures. The market position of Aston Martin at the time was considered expensive in the auto industry.

In the second phase of transition was in the DB2 series & DB MK III period, the incremental changes over the 9 years indicated most significantly in the technical, marketing and images aspects of Aston Martin. The foremost factors were the acquisitions of the Lagonda, Tickford, and the partnership with Carrozzeria Touring, which ultimately impacted Aston Martin's design innovations, market status, and subsequently the growth of consumer desires. The planning of and the act of merging with Lagonda contributed directly to the engine designs and advancements for Aston Martin which reinforced a core element in a performance sports cars. This immediately established a competitive position for Aston Martin in the market as well as the racing circuit. Also, with the owner's desires to create a true high performance sports car with pure racing pedigree and the Lagonda engine had a history of five wins at the 24 hours Le Man, fitted Aston Martin perfectly. The Lagonda engine become the core design basis for Aston Martin of the 1950s, and with elevated standards of performance and engineering developments, the ongoing changes and vital impacts extended over the next four decades.

Moreover, with the establishment of the racing unit dedicated purely on competition, this institution directly created advancing values in the design and engineering evaluations, performance testing and generating publicity that influenced market recognitions. Similarly on the chassis and body developments, the acquisition of Tickford and later partnership with Carrozzeria Touring coachbuild, created extensive design values for Aston Martin; in both the contribution of performance practicality and produced aesthetic refinements which differentiated Aston Martin from its competitors. In the phase of the DB2 series & DB MK III development, the indications revealed that design specialization in Aston Martin cause the shift to the market and user driven priorities. The introductions of the standards production cars, to luxury selections and performance racing specification upgrades, provided options and even customizations that were inflicted by the innovations in engineering designs and by the creation process. These unique distinctions created the first of many new consumer values for Aston Martin that influenced the auto market.

In 1953, John Bolster wrote for Autosport magazine:
"This should still be a young car when its contemporaries are senile and decrepit." He continued "This is an expensive car, and one would not expect it to be otherwise. Nevertheless, having regard to current prices, I consider that for sheer intrinsic value, this is one of the cheapest cars on the market."

In 1959, Roy Salvadori a British motor racing driver and manager praised:
"the gradual elimination of small faults over the years has resulted in a sports car that fulfils its purpose to perfection."

In the third phase of transition before the production of the DB5, were the changes and development of the DB4 Series. This development phase stretched only in a short five year period, but the creations of nine recorded models were produced in association with the DB4 name. These were one of the biggest design inflicted changes in the history of Aston Martin at

the time that defined their passion for the world's best sporting Grand Tourer and established their legacy in the auto industry both domestically and abroad.

A complete redesign to replace the successful DB2 with the new DB4 was the key focus and also to demonstrate the advancements in engineering expertise, quality of standards, artistry in creations and the unique distinctiveness of Aston Martin. These considered factors by design integration had strengthened the market positioning and created user values that build the dominance of Aston Martin's name. The preceded actions of purchasing Langonda and Tickford as one facility provided Aston Martin the competence in process collaborations that benefited the new engine redesign and chassis developments. The racing unit at the time was also brought to the development process as part of the integration that shared the same basis of the new developments. These unifications were a major milestone of which the racing specifications contributed to the engineering and designs of Aston Martin's pure race breed performance car for the market. Moreover, the strengthened partnership that leaded to the licensed body design by Carrozzeria Touring using their patented Superlaggera system stunned the world with aesthetics prominence and the revolution of aerodynamics practically. As a result by these combined diversities and design expertise, the developments of nine different models were produced, and each designed with their own values and elevated quality of standards with individuality. Together with glorious victories at racing circuit that shared the basis of design and engineering advancements, it assured the Aston Martin's reputation with authority. The market coverage at the time for Aston Martin fulfilled a wide range of consumer needs with large varieties of choices. The DB4 included series I, II, III, IV, V (2+2 coupé, 2-seat coupé, and 2+2 drophead), which extended to the DB4 Series Vantage upgrades, then came the race breed DB4 Vantage GT, and the addition of DB4 series convertibles; shortly that followed was the DB4 GT, which created a market and performance status of its own that inspired the licensed designed and development of the special DB4GT Zagato. The private

arrangement of the DB4GT Zagato special build was not available to the public and the customized high performance cars later became a collectors' item that made history in the auto industry as a rarity.

The transitions to the development of the DB5 as the last phase of changes impacted mainly in the market and image aspects. The continuing design developments and advanced engineering by Aston Martin resulted with a four liter engine that gave usable power right through the engine range. The DB5 had one of the most powerful production car engines in the DB series. As such, other parts of the DB5 were developed to complement the powerful output. Three transmission alternatives were made available as a result, one of which had been highly acclaimed in commercial vehicles, and the other was the famous Borg-Warner automatic gear-box. The design applications of this outstanding transmission not only coped with the powerful torque but provided smooth and seamless actions for the DB5. Other developments and additions of sumptuousness standard options also accumulated to substantial difference but the well articulated subtleties reflected the Aston Martin's luxury image. The flawless mixtures of these designs impacted the market extensively.

With the endorsement of the owner himself and his wife as the regular commute car, often seen by the public and the media, the DB5 was popular with recognition. Furthermore, one of Aston Martin's the new appointed deputy had a sharp sense of publicity and promotional values. He was keen to have the Aston Martin becoming the car of choice for James Bond, and with instrumental efforts he landed the arrangements. With ideas from co-producer Harry Saltzman; [9] the car would, as far as possible, resemble the production car, but would have a host of extras that suited the lifestyle of ultimately most famous, secret agent. Their joint

9 Harry Saltzman: a Canadian theatre and film producer best known for co-producing the James Bond film series.

effort and arrangements brought the Aston Martin DB5 into the spotlights, and made a quantum leap in publicity and to the celebrity status, which made it the most famous car in the world.

Conclusion

In the analysis of the DB series development process, it was with clear evidence that designs and its associated developments with changes towards innovation played a vital role in the enhancement of values for Aston Martin.

The designer's multi-roles to adapt or to initiate collaborative exchanges became a fundamental factor in resolving specified challenges. Cross-functionally, the designers' collective solutions propelled the company's transformations in many areas producing competitive advantages and hence the progression of value creation for Aston Martin commenced.

The technical advancements created by the joint efforts of design engineers, chassis designers and body sculptures; each as interpreters to fulfill the overall needs, and delivering practical revolutionary results. These practices of focus leaded solutions and collaborations eventually created a value concentrated process that benefited the products, and also shaped the overall product standards with great details and complete comprehension.

Moreover, the dedications to comprehensive designs on focused values, merits of standards and product distinctions, it was apparent that these design disciplines created a self-sustained internal system towards perfection. As such, the Aston Martin's product quality and

availability became notably unique in the industry and strengthening the company's position in the prestigious market.

Finally, it is with certainty that the manifest system in the overall process of product innovation by design excellence deeply contributed to the creation of new consumer values for the company; and also become a vital enhancement factor in shaping the persona of Aston Martin and what it signifies to future new market establishments.

Appendix

Appendix:

Aston Martin DB Series Development Stories – *The Details*

Appendix A - DB1 Development [1948 to 1950]:

The DB1 was first launched to the public in 1948, initially known by the name of "TWO-LITER SPORTS". Prior to the official launch, David Brown who was a successful business man of his own family business "David Brown Gear Company Ltd." bought the Aston Martin Company by responding to a newspaper classified advertisement in 1946. Under the influence of Aston Martin's "Atom" saloon that he test drove; David Brown confirmed his decision and praised highly of the "Atom's" handling and maneuverability.

Shortly after the purchase of his new company, David Brown's first executive decision imposed was the major overhaul of the highly praised Atom. David Brown as an adventurous who race horses, motor bikes, and qualified as a pilot, laid down his specifications to create an improved performance sports car, as well with an open top, a two-seater roaster with a conventional body shape that would be suitable for the London Motor Show. His desire was to create performance cars with pure racing pedigree, and an all new sensation that would impress the automotive world.
Claude Hill was assigned to this first major task. Hill was one of the two designers who created the original Atom built in 1939. Hill engineered the Atom's 2.0 liter four-cylinder push rod engine, and designed the chassis that have set new standards. At the time it was considered revolutionary and one of the best in the world.

On the strong foundation of the Atom's revolutionary chassis, Hill went extremely in depth to the refinements and modifications, in order to preserve the superb handling to the new car. The tube-frame chassis as the superstructure was reworked and developed; together with precise additional changes accumulated to a near overhaul. [10]

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[10] Detail changes included: Suspension, needle roller and ball bearings, anti roll bar, lever arm hydraulic dampers, rear axle, hydraulic drum brakes, and coil springs to countered brake reactions, and a compartment in one front wing for a spare wheel.

In this process, Hill's development of the new and more rigid framework setting new standards for road holding was considered a complete break through from the pre-war standards, his synchromesh transmission was a great advancement during the time, and the body completed with the 3-part grille to its front influenced Aston Martin later designs.

Along with the prototyping of the TWO-LITER SPORTS two-seater roaster for the London Auto Show, another was being developed in parallel with racing in mind. The car sought the light weight body design built by coachwork [11] to compete in the 24-hour race at Spa Franchorchamp, and as a way to test durability. In the race of 1948, the car was driven by St John Horsfall and Leslie Johnson, who are reputable for braking speed records in production cars, won outright. The achievement of Hill's very first prototype and together with this win, upheld Aston Martin's reputation in the racing circuit and place them back into the spotlight with the first post war international victory.
The Victory in Spa Franchorchamp rallied great publicity for the launch of the TWO-LITRE SPORTS in the 1948 London Motor Show at Earls Court. Though the two-seater rosters were received with excitement, only 15 had been sold at the time. The TWO-LITRE SPORTS listing price at £1,498 was considered expensive comparing to one of its competitor's new car listing only at £998.

The significant development and improvements made by Claude Hill laid out the solid ground works, strengthening all around fundamentals, and successfully created a highly competitive performance sports car. Yet near the same time David Brown bought Aston at the end of 1947, he also sought the opportunities to buy Lagonda, a company that had a new 2580 cc twin overhead cam straight 6 engine developed. This signifies David Brown's own ambition "to make the world's best sporting Grand Tourer", and the evolution of the new DB2 that follows. It was when the DB2 was officially launched and badges the DB initials of David Brown, the TWO-LITRE SPORTS two-seater roaster became known as the DB1.

[11] Coachwork is way of construction of bodies built for automobiles, usually constructed on separate chassis rather than unitary.

Appendix B – DB2 | DB2 / 4 MK Series Development [1950 to 1959]:

DB2 [1950 to 1953]

The infamous DB1 of 1948 had a satisfactory outcome fulfilling David Brown's desire within a very short period of time. But, as a car enthusiast, loyal fan of the British marquee, and committed to motorsport competition, he thought the DB1's original two-liter push rod engine was still a little gutless with limitations to match the superb handling. David Brown's decision to purchase Lagonda near the same time he bought Aston Martin in 1947, have already set visions under his leadership to produce a revolutionary development and hope to race his production cars in 1950.

The merge of Aston Martin and Lagonda creating his new company as Aston Martin Lagonda Ltd. (AML), established a key milestone and the building block leading to the first DB2 development. The latest Lagonda 2.6L dual overhead cam straight-6 engine at the time was a result by chief engineer W O Bentley. Overseeing the entire development with his expertise as an engineer; designer of aero- engines, designer and racer of motor cars, and the founder of Bentley Motors limited [12]; W O Bentley's experience and passion was an important contribution to Lagonda. Moreover, sharing the same enthusiasm as David Brown in motor sport racing prior to joining Lagonda, W O Bentley had won the 24 hours Le Mans in 1924, and each of his models that followed repeated the victories in 1927 through to 1930. His personal motto was, "To Build a good car, a fast car, and the best car in the class"; fitted Aston Martin's future for a true racing breed of performance sports cars perfectly. His well developed engine, become the core basis for Aston Martin of the 1950s.

Soon after the Lagonda acquisition, David Brown ordered the immediate start of the development in both the production car and the racing unit that went in to place in 1948, of which this became an imperative decision that lead to the devotion and tight integration of racing and production cars in AML's development process. The development brought about Frank Feely as the coachwork designer providing the streamlined body for all 3 prototypes that went into development, two of which retained the 2-Liter engine from the DB1 while the third used the newly developed Willie Watson designed 2.6-liter engine from Lagonda. All three

[12] Bentley Motors limited is a British manufacture of luxury car founded in 1919, and known for its range of rotary aero-engines in WWI. Bentley competed at the Le Man since 1923-1930 and the racing program stopped after it was purchased by Rolls-Royce in 1931

cars were built on the revolutionary tube frame created by Claude Hill, and were produced in time to enter the 1949 Le Mans race. Although without a noteworthy result in the race, Aston Martin released the details of their new model to the public media 3 days before the display of their three cars at the New York Motor Show in April 1950.

The first revealing of the New DB2 to the public was amazed by Freely's design with the simplest of lines to the bodyworks, a powerful new engine that sits on the shorter wheel base that added up to performance with agility, the reduced rear window that provides a more generous interior space, and the modification of the famous three part grill. At the later launch in UK at Earl's Court, the DB2 revealed the performance records of 0-60 in 12.4 seconds and the top speed of 110 miles per hour.

The receptions of the DB2 on both sides of the Atlantic were extremely strong. As performance had been the core of Aston Martin's development, the stronger Vantage engine option later became available and was quickly introduced. The performance focus was immediately reflected in the racing development unit, with the appointment of John Wyer as team manager to oversee its operations. Despite the growing demands of the new DB2, three cars were order to be taken off the production line and be prepared to compete in the 24 hour racing circuit. The results for the year were satisfactory, with race finishes in 5th and 6th overall and in 1st and 2nd in its class, the team competed successfully in Silverstone, Mille Miglia and the Alpine Rally. However, as the team's continued its races and getting third overall in the 1951 Le Mans race, David Brown realized the absolute victory in the racing circuit requires a pure racing car rather than taking cars off the production line. David Brown's recruitment of Eberan von Eberhorst, a former design engineer of Auto Union was given four key design parameters for the new race car; 1) the weight must be reduced compared with the DB2, 2) the frontal area reduced, 3) a chassis to support open bodywork and 4) yet must enhanced road holding to the DB2. These focuses are the cores of the project that lead to the development of the DB3 pure racer. The preliminary prototype debuted racing along side with two DB2 in the Tourist Trophy in 1951. While unsatisfied with just modifications of the same DB2 Vantage engine lead to a larger 2.9L engine being introduced in 1952, the DB3 was finishing at 2nd, 3rd, and 4th at Silverstone May 1952. Developments and testing continued during late 1952, while setting new sports car lap records at Monza, John Wyer was still disappointed with the dry weight of the DB3 compared to the previous lightweight DB2, he therefore suggested the

redesign that brought about the DB3S that would be better suited for the racing circuit.

By now Aston Martin was in a strong position with extraordinary success in both the market and racing developments. The production of the DB2 road cars continued during late 1950 with variant version as a Drophead coupe being introduced. Aston Martin demonstrating market sensitivity and adopting to the needs of domestic consumers; engineering upgrades were developed and reaching the market as "offered optionally" with the name Vantage Upgrade together with its standard versions. The total production for DB2s was recorded as 411 during the three year since its 1st appearance in 1950 until 1953. The Price tag for the DB2 at the time was listed at £1914 including taxes, seemingly more expensive than its predecessor, but John Bolster wrote for Autosport magazine:

> *"This should still be a young car when its contemporaries are senile and decrepit." He continued "This is an expensive car, and one would not expect it to be otherwise. Nevertheless, having regard to current prices, I consider that for sheer intrinsic value, this is one of the cheapest cars on the market."*

DB2/4 MKI [1953 to 1955]

The on-going development of the DB2 Series continued over the next four years until 1957. Starting with the 2 occasional rear seats made available, with the given name of DB2/4 MKI as distinction. Other series of modifications included reconfigurations to the chassis and bodyworks suiting the consumer desires and practical needs, brought about the final series of the DB2/4 MK II.

The enthusiasm carried from the DB2 as a road production car, together with the development at the racing circuit with record setting pace, staged the launch of the London Motor Show in October 1953. The DB2/4 MK I introduced modifications onto the market both mechanically and aesthetically and as a "Grand Tourer" based on the DB2 it replaces. The power of the 2.6L Logonda "Vantage" engine of the DB2 became the base standard in the DB2/4 MK I, and a drophead coupe and a 2+2 Hatchback for the Saloon being available was well ahead of its time. The new bodyworks and reconfigurations included widescreen, larger bumpers, repositioned headlights. The modifications were not only for aesthetic reasons but with practicality; safety was the rationale behind the newly raised headlamps influencing other associating balanced changes. The reconfiguration to space for the additional new seats and raising the roofline

gave rear passenger increased headroom. As well, the relocation and by reducing the fuel tank to allow increased luggage space and the spare wheel accommodated in a hinged carrier below the fuel tank were also for practicality. The interior upgrades to provide more space also resulted to the changes of the dashboard that was simplified, the speedometer and rev counter relocated to the centre of the display and the pedals that were moved forward. In 1954, an increase power 3.0L engine was made available to accommodate the extra weight accumulated by the changes.

The combined modifications to accommodate the overall of the DB2/4 MK I in both the standard performance upgrades and improvements; so effective was this new design that one contemporary commentator termed the DB2/4 MK I as the fastest shooting brake in the world. Stunning the world further, Aston Martin supplied a number of the DB2/4 MK I as rolling chassis to other coachbuilders resulting in the release of custom produced dropheads, fixed head coupe and Spyders, some of which become masterpieces of automotive art, and the publicity and the artistry of the DB2/4 continue to carry the reputation as a Aston Martin. In the final year for the DB2/4 MKI in 1954, production total accumulated to 565, where drophead coupe accounted for 102 and around 5 Spiders were recorded.

In the same year late in Dec 1954, David Brown decided to acquire a coachbuilt expert Tickford Limited along with its Newport Pagnell factory; this was great addition at the time in strengthening the all around development as an entirety for Aston Martin Lagonda Limited. Also, it is at this time Aston Martin have progressed with two specific directions but one common purpose; the Racing Department and its advancement towards the pure race breed DB3S concurrent with the next development of the DB2/4 Mark II with contributions of Tickford's expertise in the process.

DB2/4 MKII [1955 to 1957]

On two fronts, leading to the introduction of the DB2/ 4 MKII in 1955, Aston Martin introduced the public to the body built in its design reflecting the works of the newly acquired Tickford as well as multi options in engines power and body works customizations made available to cater the consumer needs and requirements. However, it was the racing department that focused its redesign priorities for the racer DB3S since 1953; to reduce the overall weight and

maximizing the overall performance, provided valuable test results and information for Aston Martin development. The racing department had no direct interest in the modifying the DB2 /4 MK I production car for the racing circuit, so the all around redevelopment and modifications, started with wheelbase reduction, reduction to the chassis tubes thickness and almost all parts of the car was refined and modified. The most noticeable change was the body work of Frank Feeley, the elegant cutaway behind the wheels body work was a significant development in the car with hot air reductions from the car's radiator and its vents. The Freeley design had delivered the solution that was both effective and visually stunning. The total reduction of the weight was more than 76KG, to the already lightweight racer from its predecessor DB3. The first newly redevelopment engine and later the improved design of the iron head v12 development included changes that results in substantial power output gain of up to 194bhp. The power gain helped the success to the racing seasons overall as the DB3S winning almost every race in 1953 but not without downfalls and obstacles. The wind tunnel test data results suggested handling improvements that were not evident on the track and when at Le Mans, a few crashed with disappointment. Improvements quickly follows and a few selected racers where publicly made available in 1954 with the extensively high price tag of £3,684.

The DB3S racing development continued into 1955 with more improvements that included a ZF limited slip differentials with an up grated final drive, modified engine and delivered wins at Silverstone, Spa, Goodwood, Aintree and Oulton Park as well as a class win at the Le Mans. As racing continued into 1956 but development of the DB3S line ended with the order of David Brown, who announced the focus on the future and the DBR1, a race car that would never be offered to the public.
The exposure of the racing unit and the on-going development of the DB3S were publicly available, while the concurrent development of the production road car DB2/4 MKII was to be revealed, the standards of performance and the artistry craftsmanship were expected of Aston Martin.

In the 1955 London Motor Show the world was introduced with the DB2/4 MK II, it shared the same chassis and mechanical specification with the previous DB2/4 MK I. The key significant change was the body design by the works of Tickford. Although there were little changes in appearance, there were abundant of refinements and modifications in the finer details catering

the subtle differences. A lot of which were the catering refinements for the public with practical seamless changes through its designs. The details from the roofline, door sills, bonnet wings assembly and side panels behind the front wheel arches are just a few listed modifications. Moreover, rear fins were blended into the design, the rear lights were mounted on fashionable '50's fins that were most noticeable with the vestigial tail fin which made the identification straightforward. The petrol filler was hidden behind a flap and can be opened from inside of the car; this was a subtle change but a vogue at the time, as Aston Martin repeatedly caters and tested the ordinary with each new model they later revealed. As well at the launch, a special commissioned with specific briefs to create a new two-seat fix head coupe was added in the line-up and this new coupe body being the personal choice of David Brown.

The engine specification was the 3.0L engine as the standard offer but with the option of up rated version which, through larger valves and a high lift cam delivered extra power. This allows sporting customers to order on demand for competition purposes. Specifics of the twin exhausts, close ratio gearbox, high compression pistons, and brake specification were all made available. This customization fulfilled customers to be in closer grab of the motor sport racing passion of Aston Martin.

In this progress of changes and refinements for the latest DB2/ 4 MK II, it was in 1956, David Brown sought the prospects to discuss a partnering opportunity with Italian coachbuilder “Carrozzeria Touring” that would impose a long term design impact on the Aston Martin marquee. Under this agreement at the time, three DB2/ 4 MK II were sent to build a limited edition of the Spyder design using Carrozzeria Touring’s patented “Superleggra” trademark system of the lightweight support for alloy body panels. The initial plans were to design the Superleggra DB2 /4 MKII as an export product, but the 3 newly designed Spyder became an extensive marketing show car. With great reviews in the Paris and London Motor show, John Bolster of Autosport Magazine summarized his test, calling the DB2/4 Mark II “a very sporting car that you can drive in a dinner jacket.” The short two year period totaling only 199 units sold; the late publicity of the Spyder, and with the 1957 announcement in price cut clearing the remains of DB2/ 4 MKII, it was evident to clear the deck for the next launch of DB MK III.

Appendix C – DB MK III Series Development [1957 to 1959]:

The new and final development of the DB series, with the same chassis created by Claude Hill since the DB1 era, appeared in the production form of the DB MK III, this signals a transition of further development with competitor guided priorities and the obvious drop of the 2/4 to its name. The foremost noticeable difference of its predecessor was the adaptation in appearance of its racing unit's DB3S style grille and with the revised instrument binnacles to echo the shape of the more flowing grille it adopted. While other basic design of the DB was retained, the major changes and modifications are within the details that accumulated to becoming the most beautiful of all DB models. There were bigger changes elsewhere in the modifications to this model of the DB MK III, with it mechanics, engine compartments, chassis development, and most significantly the stopping power, all of these added to the greatly improved performance and handling capabilities. The noteworthy change of Aston Martin that brought about the major redevelopment was the departure of Von Eberhorst who was solely dedicated to the DB3S racing development project in 1953. His replacement was a Polish engineer Tadek Marek. Marek immediately started the evolution of the W.O. Bentley-designed Lagonda 2.9 L straight-6 engine, with a complete redesigned. His design development became a direct contribution to Austin Martins later production car models as well as the racing development with impacts extending over the next four decades.
Marek's redesign started directly at the core of the engine block, with the stiffening of both the crankcase and the crankshaft, changing the design of the cylinder liners, revisions to the cylinder head and manifolds with higher lift camshafts timing chain adjustment, a new oil pump avoided the wear issues, lightened flywheel, and a self adjusting hydraulic clutch design. The total impact of the accumulated changes and redesigned was the production of a engine that is 162 bhp at 5500 rpm while adding twin exhausts pushed this up further to 178 bhp. The added disc brakes were a supplemented for the power increase.

At the time of the 1958 launch in London, the price of the DB MK III turned out to be exactly that of the DB2/4 Mark II, and with the disc break at the time became a standard fitment, while option of the overdrive unit was offered. The overdrive option attached to the STD 4 speed gear box was a heavenly gift that helped sell the entire stock of 1958 at the end of the show. Gradual improvements and changes continued after the show and derived directly from the

racing development standard DBA engine; came of the new optional high-output DBB series, and the mid-level DBD series upgrade. The competition DBC rated engine was also fitted with racing camshaft and special connecting rod, and with the hydraulic booster in the braking system to counter a long term media criticism of pedal pressures for braking. The total of 551 examples were produced, majority of the DB MKIII had the standard DBA engine, while 14 had the DBD mid-level upgrades, and only 2 had the DBB special series of high-output engine. Then in 1959 came the introduction of the "Borg Warner" automatic transmission which marked the final transformation of the DB2 series from a circuit bread racer, to also a luxury express.

Roy Salvadori a British motor racing driver and manager praised the DB MK III and concluded that *"the gradual elimination of small faults over the years has resulted in a sports car that fulfils its purpose to perfection."* While a 1959 review by Road & Track magazine praised the car for everything but its $7,450 price. *"A car for connoisseurs,"* they called it. *"The Aston has many virtues and few faults."* The DB MK III was an overall great accomplishment, as it was the 1st time where James Bond as referred to driving an Aston Martin DB Mark III in the novel version of Goldfinger, though it is referred to as a "DB III" in the book and it was the only Bond car in the Ian Fleming novels to have gadgets installed.

Appendix D – DB4 Development [1958 to 1963]:

The production of the DB4 series marks a major milestone in the history of Aston Martin. In its short 5 year of development from 1958 to 1963, there were a total of 9 recorded models associated with the DB4 name, each with its own refinements and improvements, and with a few that had established its own characteristics and standards of individuality. This legacy started with five initial DB4 series, which extended to the DB4 Vantage upgrade that lead to the DB4 Vantage GT, then the addition of DB4 convertible, and later that followed was the DB4 GT, and finally came the special development of the DB4GT Zagato. Though not officially recorded, a 10th model may have become the DB4 series VI. The transformations of stripping down of the five older DB4 series had been done by R.S. Williams and were developed purely for tack racing, with a given name of the DB4 Lightweight.

When production ended in June 1963, the total of 1,100 DB4s were produced [13], marking the most successful figures ever built to date for Aston Martin, and exceeding the 9 year full production of the DB2. This success became the benchmark for Grand Tourers, not only fulfilling David Brown's desire to produce the best GT in its class, but also setting a foundation for performance and specialist models with a legacy that continued for decades.

Of all the production cars in the DB4 series, it was the development of the DB4GT and the Zagato with the licensed coachbuild body works that clinched the heart of the consumers as well as the sport racing professionals.

DB4 Development Highlight & Changes

The DB4 was officially launched at the Paris Saloon in October 1958. The reaction by a French distributor for Aston Martin at the show said with tears in his eyes: "This is not a car, it is a folly, but I can sell as many as you can supply." The latest DB4 was tested as one of the fastest four-seaters in the world and on par with the best of its Italian Grand Turismos competitors. The licensed body design by Carrozzeria Touring of Milan using their Superlaggera system consisted entirely of aluminum mounted on a trellis of small diameter steel tubes welded together. Body panels were attached to the trellis and clinched around angle plates which were welded to the members with graphite pads.

The results of the wide windscreens, frameless window, and seamless doors hinges, delivered slim proportions and outstanding all-round visibility. The power came from the all new Tadek Marek twin overhead cam aluminum engine that weighed in 22Kg less than its predecessor. Marek's new engine underwent numerous combinations of refinements, together with the choice of driving through a four speed, all synchromesh gearbox and the addition of the Harold Beach designed coil and wishbone front suspension, and all around discs breaks. The new DB4 could go from a standing start to 100 mph and back to standstill within 30 seconds. This was a major statement that was placed within the advertisement by the media at the time. When the DB4 was conceived, there were no motorways in the UK for a proper durability and high speed testing to be conducted during development, and overheating of the engine was a

[13] Of the 1,110 DB4s produced, there were: 70 Convertibles, 75 GT, 168 Vantage upgrades (inc. 136 saloons and 32 convertibles), 14 Vantage GT (inc. 3 Series III, 5 Series IV, and 6 Series IV), 75 DB4 GT and 19 DB4GT Zagato.

problem in concern.

In 1960, a series of visual refinements along with engine improvements to resolve the issues; then later adding to the consumer's enthusiasm with increased power, improved standard offers with options to upgrade and special coachbuild body works; there were seven models added to the DB4 lineup over the next three years.

DB4 Series I [Feb 1960]

- Instrument panel was inherited from that of the DB2/4 Mark lll.
- No chrome surrounds were fitted to the windows initially but later over riders and heavy duty bumpers were fitted.

DB4 Series II [Jan 1960 – Apr 1961]

- Tadek Marek delivered a twofold solution to the overheating problem and introduced the oil cooler and adjustments to reduce the bearing clearances.
- Aston Martin instituted a test program utilizing the newly opened M1 motorway.
- Heavy duty front calipers were fitted together with a 17 pint sump a radiator blind and the bonnet hinged from the front.
- Height of the car was increased while the car was lowered with the ground clearance to increase the Head room.
- Options were introduced including an oil cooler, electric windows and an overdrive unit.

DB4 Series III [Apr 1961 - Sept 1961]

- Optional oil cooler continues from Series ll
- An additional bonnet style fitted together with a modified handbrake, clutch cover and brake pedal linkages.
- Separate rear lights fitted on a chrome plate, a single stalk switch, courtesy switches and an electric tachometer.
- The heating system was improved with the fitment of 5 rather than 3 demister outlets
- An optional 4.09 ratio rear axle was offered.
- Improved with new sound deadening materials and a replacement silencer.

DB4 Series IV [Sept 1961 - Oct 1962]

- Lower bonnet scoop was introduced along with a new grille displaying 7 vertical bars.
- The headlamps were recessed and protected with perspex covers to improve

aerodynamics. This design became a distinctive visual development for a clear covered was used over the headlights.

- An option was the Vantage or Special Series (SS) engine. With larger valves and a 9:1 compression ratio, this engine delivered 266bhp at 5,750 rpm.
- Most cars fitted with this engine were styled with front sloping headlamps with the addition of a chrome trim and named the DB 4 Vantage, reviving this name from the DB2.
- The GT instrument panel with separate gauges was fitted, and the ashtray previously at the top of the dash was move to the gearbox area.

DB4 Series V [Sept 1962 - Jun 1963]

- A longer and taller body gave more leg, head and luggage room.
- Putting the car on 15 inch rather than the original 16 inch wheels, meant that, even with the higher profile, the overall height of the car was unchanged.
- A thermostatically controlled fan kept the noise down
- After the first 50 cars were produced with the standard engine, majority of the remaining productions were fitted with the Vantage engine and the distinctive headlamps.
- The rear light clusters were changed from the series 4 and feature indicator, stop/tail lamp and reversing lamp. The rear reflector was therefore re-located to the bumper.
- The boot handle/number plate light was changed to a larger Hella type.
- Smaller brake pads complete the external differences.

DB4 Convertible [1963]

- Introduced at the London Motor Show in 1961, 70 were converted and manufactured
- The first 30 were Series lV (11 of which were with Vantage engines) and 40 were Series V of (21 of which were with Vantage engines)
- The relocation and the split of using twin tanks resulted with the capacity of 16 gallons, 3 gallons less than the coupe.

DB4GT [Oct 1959 - Jun 1963]

One year after the arrival of the new DB4, Aston Martin made the announcement of the introduction of the DB4GT. Although similar in appearance, but the difference were extensive, like all previous Aston Martin developments, the details in refinements and changes accumulated from every inch of the car they produced. The body and wheelbase were shorter and with the replacement of the rear seat with a simple parcel self. The use of the

magnesium aluminum body panels the car's total weight trimmed by 85 kilograms compared to the original DB4. Matching the body weight reduction and the sporting pedigree, the lightweight centre-lock Borrani wire wheels reinforces the control and made the DB4GT a more distinctive in appearance. The power came from the dedication of the Tadek Marek and the racing unit that worked all winter of 1958 to create the racer as reliable as possible to win the title of the Le Man focusing all the efforts of that one race. The resulted was a tuned powerful standard 3.7 engine that was capable to produce over 300bhp, with a top speed of 150 mph. With the increased power, the larger single plate clutch was in place, the close ratio all synchromesh four speed gearbox unit and the limited slip differential became standard on the car, and the stopping power which derived from the racing unit was the large diameter Girling [14] disc brakes.

In the same year of 1959, after a successful first and second place win at Le Mans, and also winning the World Championship at the Tourist Trophy at Goodwood that followed, David Brown announced at the victory dinner in London, that Aston Marin's withdrawal from sports car racing and to focus strictly on production cars. Though not competing directly, Aston Martin's factory and dedicated units still provided work support to individual racers, which scored second and third as individual results at the 1960 Tourist Trophy, and winning twice at later races.

DB4GT Zagato [Oct 1960 - Jun 1963]

In the late fifties where Aston Martin was dominating the sports car racing and with a new Grand Tourer of the DB4GT, it was David Brown's desire to produce an alternative to the Ferarri Berlinetta. It was John Wyer who had meet Gianni Zagato earlier that brought about the partnership between Aston Martin and Zagato which created the artistic masterpiece of the infamous DB4GT Zagato. The famous Zagato designs utilized aerodynamics resulting from experience racing drivers. The modernizing of the operations and with designs of special bodies; was a new star named Ercole Spada, he lead a series of outstanding designs which kept Zagato in the spotlight.

[14] Griling produces racing disc brake since 1952, their first racing fitment was on a super-charged V16 BRM Grand Prix Car. Since 1959, winning vehicles in the Formula 1 World Drivers Championship uses Girling products.

In the early 1960, the first DB4GT chassis was delivered to the Zagato facilities and Ercole Spada, only 23 years old at the time he was assigned his very first design task to create the DB4GT Zagato. Spada's creation was a 350 pounds lighter DB4GT than the standard production car, it also had striking lines accentuated by tightly drawn elliptical surfaces, all highly comparable to that of the rare and handsome Ferrari 250 GT Berlinetta by Pinin Farina. The striking design stunned the world, which lead to the agreement of Zagato to build four licensed approved DB4GT Zagato that was prepared by Richard Williams. Each of the four cars had inconspicuous changes resulting to an absolute impact to their performance and handling, but the major differences was the fitment of a 4.2 litre engine and the tuning of the manifolds which helped the engine works more effectively and producing 352 bhp. This private arrangement of the special build was not available to the public and these four high performance custom cars later became a rarity as a collectors' item.

Appendix E – DB 5 Development [1958 to 1963]:

With the development and introduction of the DB5 marks the departure of general manager and racing team manager of John Wyer, who leaded Aston Martin with three consecutive wins at the Le Man. At this time it was Tadek Marek who continued to carry on with the developments and with the choice of using the 4 liter engine giving usable power right through the engine range. Together with Harold Beach, who moved the company along with 3 transmission alternatives, first fitment was a standard David Brown 4 speed box with overdrive. The second fitment was available to cope better with the increased engine torque was the unit of the popular ZF 5 speed box, this unit which had been seen in commercial vehicles and with Maserati before, now became available in a Aston Martin. In reflecting Aston Martin's luxury image, the third transmission was the Borg-Warner automatic, although it had been fitted to the Lagonda, the public debut with made on the DB5. Other refinements and development changes for the DB5 once again accumulated to substantial differences. As detailed as the small hydraulic damper installed at the front of the engine to eliminate vertical shake were in place, along with larger air filter and later an installation of an alternator to cope with the increase in electrical gadgets. The use of the nine inch Borg & Beck diaphragm clutch unit significantly reducing the pedal pressure required. Aston Martin also introduced air

conditioning as a luxury option, as well with other added option such as tinted glass, exhaust silencers and electric windows. A total of 1,021 DB5 were built, of those 1,021 cars, 123 were made convertibles. Although, the figures were 89 less than the number of DB4's but the production run time for the DB5 were just two years.

With John Wyer's departure, David Brown resumes some of the duties at Aston Martin and appointed two deputies. Steve Heggies as one of the deputy had a sharp sense of publicity and promotional values. He was keen to have the Aston Martin becoming the car of choice for James Bond. With the instrumental efforts and ideas from Harry Saltzman [15]; the car would, as far as possible, resemble the production car, but would have a host of extras that suited the lifestyle of ultimately most famous, secret agent. Their joint effort and arrangements brought the Aston Martin DB5 into the spotlights, and made a quantum leap in publicity and to the celebrity status, which made it the most famous car in the world.

[15] Harry Saltzman: a Canadian theatre and film producer best known for co-producing the James Bond film series.

Appendix F – The 4 phase progression change details

DB Dev Process:	1948-1950 **DB1** [Atom] **Production Engine** *to Track Racers* TWO-LITRE SPORTS	1950-1959 **DB2 MK I, MK II, DB MKIII** **Production Engine** *to Track Racers* Original Lagonda + Tadek Redesign	1958-1963 **DB4 Series I - IV, Vantage, Vantage GT, Convertable, GT, GT Zagato, Series V** **Mod Production Engine** *as Track Racers* Tadek Design	1963-1965 **DB 5** **Mod Production Engine** *as Track Racers* Tadek Design
Requirements	DB Tech Spec	DB + MKT Specs	Tech Specifications	Tech Specifications
Design – Engine	Road Car Dev Enhance	**Road Cars**: STD 2.6 Engine Dev - Lagonda MKIII 2.9L Engine Dev - Tadek Marek - (DBA, DBD, DBB) **Track Race Cars**: STD 2.6 Engine Dev - Lagonda MKIII 2.9L Engine Dev - Tadek Marek - (DBA, DBD, DBB)	**Road Cars**: STD (DBA) + (DBD) + (DBB) Engine Dev **Track Race Cars**: STD (DBA) + (DBD) + (DBB) Engine Dev	**Road Cars**: STD (DBA) + (DBD) + (DBB) Engine Dev **Track Race Cars**: STD (DBA) + (DBD) + (DBB) Engine Dev
Design – Chassis	Chassis Dev Claude Hill	Chassis Dev Claude Hill Track | Chassis Specs Robert Eberan-Eberhorst DBR1-5 - Ted Cutting	Chassis Dev - Harold Beech	Chassis Dev - Harold Beech
Design – Body	Body Dev Frank Feeley	DB2 - Frank Feeley DB2/4 MK II - Tickford & Touring of Milan DB MK III - Touring Milan DB3 & 3S - Frank Feeley DBR1-5 - Ted Cutting (Works Development)	Touring Milan - New "Supperlaggera" System Track Body (Works Development)	Touring Milan - New "Supperlaggera" System Track Body (Works Development)
Performance Tests	Race Prototypes	GT | LeMan GT | LeMan | F1 Race Stock Production Mod Engine Prototype	Modified Body Builts to Race GT | LeMan | F1 Race Stock Production Mod Engine Prototype	Modified Body Builts to Race GT | LeMan | F1 Race Stock Production Mod Engine Prototype
Product Launch	Enhance Prototypes	Production STD + Upgrades Options	Production STD + Full Engine Range Options	Production STD + Full Engine Range Options
Production	MKT Demands + Customized Deliverables	MKT Multi Range Road Cars & DB3S Track Racers as Customized Deliverables	MKT Multi Range Road Cars + Body Build Series Upgrades + Authorized Race Custome Deliverables	MKT Multi Range Road Cars + Body Build Series Upgrades + Authorized Custome Deliverables

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