

PRE-INDUCTION PROJECT

RIIM- Arihant Group of Institutes

Pre- Induction Project Report- Batch 2018-20

A Project Report on:

**A COMPARATIVE STUDY OF CARS IN AUTOMOBILE
SECTOR.**

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INTRODUCTION

A motor vehicle is a self-propelled vehicle, commonly wheeled, that does not operate on rails, such as trains or trams and used for the transportation of passengers, or passengers and property. The automotive industry is a wide range of companies and organizations involved in the design, development, manufacturing, marketing, and selling of motor vehicles, some of them are called automakers. It is one of the world's most important economic sectors by revenue.

A **car** (or **automobile**) is a wheeled motor vehicle used for transportation. Most definitions of car say they run primarily on roads, seat one to eight people, have four tires, and mainly transport people rather than goods. Cars have controls for driving, parking, passenger comfort and safety, and controlling a variety of lights. Over the decades, additional features and controls have been added to vehicles, making them progressively more complex. The benefits include on-demand transportation, mobility, independence, and convenience. The ability for people to move flexibly from place to place has far-reaching implications for the nature of societies. It was estimated in 2014 that the number of cars was over 1.25 billion vehicles, up from the 500 million of 1986. The numbers are increasing rapidly, especially in China, India and other newly industrialized countries.

OBJECTIVES

1. **To get a brief description about the parts present in a car.**
2. **To get a brief description about the different kinds of car.**
3. **To compare between hatchbacks and sedans.**
4. **To compare between hatchbacks and compact SUVs.**
5. **To show the comparative data between the respective car types.**

LIST OF CAR PARTS

1.Electrical and electronics

- 2.1Audio/video devices
- 2.2Cameras
- 2.3Electrical supply system
- 2.4Gauges and meters
- 2.5Ignition electronic system
- 2.6Lighting and signaling system
- 2.7Sensors
- 2.8Starting system
- 2.9Electrical switches
- 2.10Wiring harnesses

2.Interior

- 3.1Floor components and parts
- 3.2Other components
- 3.3Car seat

3.Power-train and chassis

- 4.1Braking system
- 4.2Engine components and parts
- 4.3Engine cooling system
- 4.4Engine oil system
- 4.5Exhaust system
- 4.6Fuel supply system
- 4.7Suspension and steering systems
- 4.8Transmission system

4.Car Body and main part.

- 1.1Doors
- 1.2Windows

5.Miscellaneous auto parts

- 5.1Air conditioning system (A/C)
- 5.2Bearings
- 5.3Hose

Vehicle classification								
Not well-defined / vernacular			Defined by law or regulation				Examples	
Market segment (American English)	Market segment (British English)	Market segment (Australian English)	US EPA Size Class	Euro NCAP Structural Category	Euro NCAP Class (1997–2009)	Euro Market Segment		
Microcar	Microcar , Bubble car	N/A	N/A	=	Quadricycle	A-segment mini cars	Bond Bug , Isetta , Mega City , Renault Twizy	
Subcompact car Economy car	City car	Microcar	Minicompact		Supermini			Citroën C1 , Fiat 500 , Hyundai Eon , Mitsubishi i-MiEV , Renault Twingo
	Supermini	Light car	Subcompact					B-segment small cars
Compact car	Small family car	Small car	Compact			Small family car	C-segment medium cars	Honda Civic , Mazda3 , Suzuki Ciaz , Renault Mégane , Toyota Corolla
Mid-size car	Large family car	Medium car	Mid-size			Large family car	D-segment large cars	Chevrolet Malibu , Ford Fusion , Peugeot 508 , Subaru Legacy , Volkswagen Passat
Entry-level luxury car	Compact executive car	Medium car above \$60,000	N/A					Acura ILX , Alfa Romeo Giulia , Audi A4 , Lexus ES , Mercedes-Benz C-Class
Full-size car	Executive car	Large car	Large			Executive	E-segment executive cars	Chevrolet Impala , Ford Taurus , Mazda Xedos 9 , Hyundai Grandeur , Holden Commodore , first and second generation
Mid-size luxury car		Large car above \$70,000	N/A					Audi A6 , BMW 5 Series , Cadillac CTS , Mercedes-Benz E-Class , Tesla Model S
Full-size luxury car	Luxury car	Upper large car above \$100,000	N/A			=	E-segment luxury cars	BMW 7 Series , Lincoln Town Car , Mercedes-Benz S-Class , Porsche Panamera , Maserati Quattroporte
Grand tourer	Grand tourer	Sports car	N/A			=	S-segment sports coupés	Aston Martin DB9 , Bentley Continental GT , Ferrari

							<u>GTC4Lusso, Jaguar XK, Maserati GranTurismo</u>
<u>Supercar</u>	<u>Supercar</u>		<u>N/A</u>		<u>=</u>		<u>Bugatti Veyron, LaFerrari, Lamborghini Aventador, Pagani Zonda, Porsche 918 Spyder</u>
<u>Convertible</u>	<u>Convertible</u>		<u>N/A</u>		<u>=</u>		<u>BMW 6 Series, Chevrolet Camaro, Mercedes CLK, Volvo C70, Volkswagen Eos</u>
<u>Roadster</u>	<u>Roadster</u>		<u>Two-seater</u>		<u>Roadster sports</u>		<u>BMW Z4, Lotus Elise, Mazda MX-5, Porsche Boxster, Mercedes-Benz SLK</u>
<u>=</u>	<u>Mini MPV</u>	<u>N/A</u>	<u>Minivan</u>	<u>MPV</u>	<u>Small MPV</u>	<u>M-segment multi purpose cars</u>	<u>Citroen C3 Picasso, Ford B-Max, Opel Meriva, Fiat 500L</u>
<u>MPV</u>	<u>Compact MPV</u>	<u>People mover</u>					<u>Chevrolet Orlando, Ford C-Max, Opel Zafira, Renault Scenic, Volkswagen Touran</u>
<u>Minivan</u>	<u>Large MPV</u>				<u>Large MPV</u>		<u>Chrysler Town and Country, Kia Carnival, Citroën C4 Grand Picasso, Renault Espace, Toyota Sienna</u>
<u>Cargo van</u>	<u>Van</u>	<u>Van</u>	<u>Cargo van</u>		<u>=</u>		<u>Chevrolet Express 1500 Cargo, Fiat Ducato/Ram ProMaster, Ford Transit, Renault Master, Volkswagen Transporter</u>
<u>Passenger van</u>	<u>Minibus</u>	<u>People mover</u>	<u>Passenger van</u>		<u>=</u>		<u>Chevrolet Express 1500 Passenger, Ford E350 Wagon, Mercedes-Benz Viano</u>
<u>Mini SUV</u>	<u>Mini 4x4</u>	<u>Small SUV</u>	<u>Small sport utility vehicle</u>	<u>Off-roader</u>	<u>Small off-road 4x4</u>	<u>J-segment sport utility cars (including off-road vehicles)</u>	<u>Daihatsu Terios, Ford Ecosport, Jeep Renegade, Peugeot 2008, Suzuki Jimny</u>
<u>Compact SUV</u>	<u>Compact SUV</u>	<u>Medium SUV</u>					<u>Alfa Romeo Stelvio, Chevrolet Equinox, Ford Escape, Honda CR-V, Jeep Cherokee, Kia Sportage</u>
<u>Mid-size SUV</u>	<u>Large 4x4</u>	<u>Large SUV</u>	<u>Standard sport utility vehicle</u>		<u>Large off-road 4x4</u>		<u>Ford Expedition, Hyundai Santa Fe, Jeep Grand Cherokee, Volkswagen Touareg, Volvo XC90</u>

<u>Full-size SUV</u>		<u>Upper large SUV</u>					<u>Range Rover, Cadillac Escalade, Toyota Land Cruiser</u>			
<u>Mini pickup truck</u>	<u>Pick-up</u>	<u>Ute</u>	<u>Small Pickup truck</u>	<u>Pickup</u>	<u>Pick-up</u>	<u>=</u>	<u>Chevrolet Montana, Fiat Strada, Renault Duster Oroch, Volkswagen Saveiro</u>			
<u>Mid-size pickup truck</u>							<u>Ford Ranger, Chevrolet Colorado, Mitsubishi Triton/L200, Nissan Navara, Toyota Hilux</u>			
<u>Full-size pickup truck</u>		<u>Pickup</u>	<u>Standard pickup truck</u>				<u>Dodge Ram, Ford F-150, GMC Sierra, Nissan Titan, Toyota Tundra</u>			
<u>Heavy duty pickup truck</u>							<u>Chevrolet Silverado HD, Ram Heavy Duty, Ford Super Duty</u>			
<u>Special purpose vehicle</u>	<u>=</u>	<u>Limousine</u>	<u>Special purpose vehicle</u>	<u>=</u>	<u>=</u>	<u>=</u>	<u>Lincoln MKT Livery</u>			

COMPARISON BETWEEN HATCHBACKS AND OTHER MAJOR CAR TYPES IN INDIA

HATCHBACKS are a car type with a rear door that opens upwards. They typically feature a four-door configuration, excluding the rear door. However, two-door hatchbacks are not uncommon.

Examples of four-door hatchbacks: Maruti Suzuki Alto 800, Renault Kwid, Hyundai Grand i10, etc.

Examples of two-door hatchbacks: Volkswagen Polo GTI (Upcoming), MINI Cooper S 3 Door, etc.



HATCHBACKS OVER SEDANS

A car buyer's confusion is augmented by the narrowing gap between the prices of a hatch and a sedan. But, the hatchback clearly stands out because of its features.



Advantages of hatchbacks over sedans:

1. Practicality

The compact dimensions of hatches with chopped boots make them easy to manoeuvre in busy city traffic. Also, it takes less space for parking.

2. Fuel efficiency

Most hatchbacks offer better fuel economy compared to sedans thanks to their comparatively lighter weight.

The example of the **Hyundai Grand i10** and its boot-added cousin, the **Xcent**; in which the former offers marginally better mileage than the latter, reason being the added weight of the boot in the **Xcent**.



3. Boot space

The limited opening space in a sedan's boot lets in only a limited amount of baggage, and that too, of a small/medium size. Contrarily, Most hatches are offered with foldable rear seat options, eliminating the need of a dedicated trunk. The **Honda Jazz** is a perfect example here -- it has magic seats in its top end variant which can be folded down completely to make way for huge boot space. This space can't be matched by the **Honda City's** fixed boot.

4. Resale value

The two-box car definitely has better resale value compared to a sedan. This is because, in general, hatchbacks have more takers than SUVs and sedans in India.



Hatchback vs Compact SUV, Which one to choose?

Advantages of Hatchbacks over compact SUV

Lower Price

Most hatchbacks are generally cheaper than comparable compact SUVs. For example, the fully-loaded **Swift** is cheaper than the top-end **Vitara Brezza**. So, basically, you get all the comfort and safety features for a lower price. Roughly speaking, a fully-loaded hatchback is up to Rs 2 lakh cheaper than a compact SUV with the same level of features. So, all those who are on a budget are better off buying a feature-laden hatchback over a similarly priced compact SUV with lesser features.

Lower Cost of Running

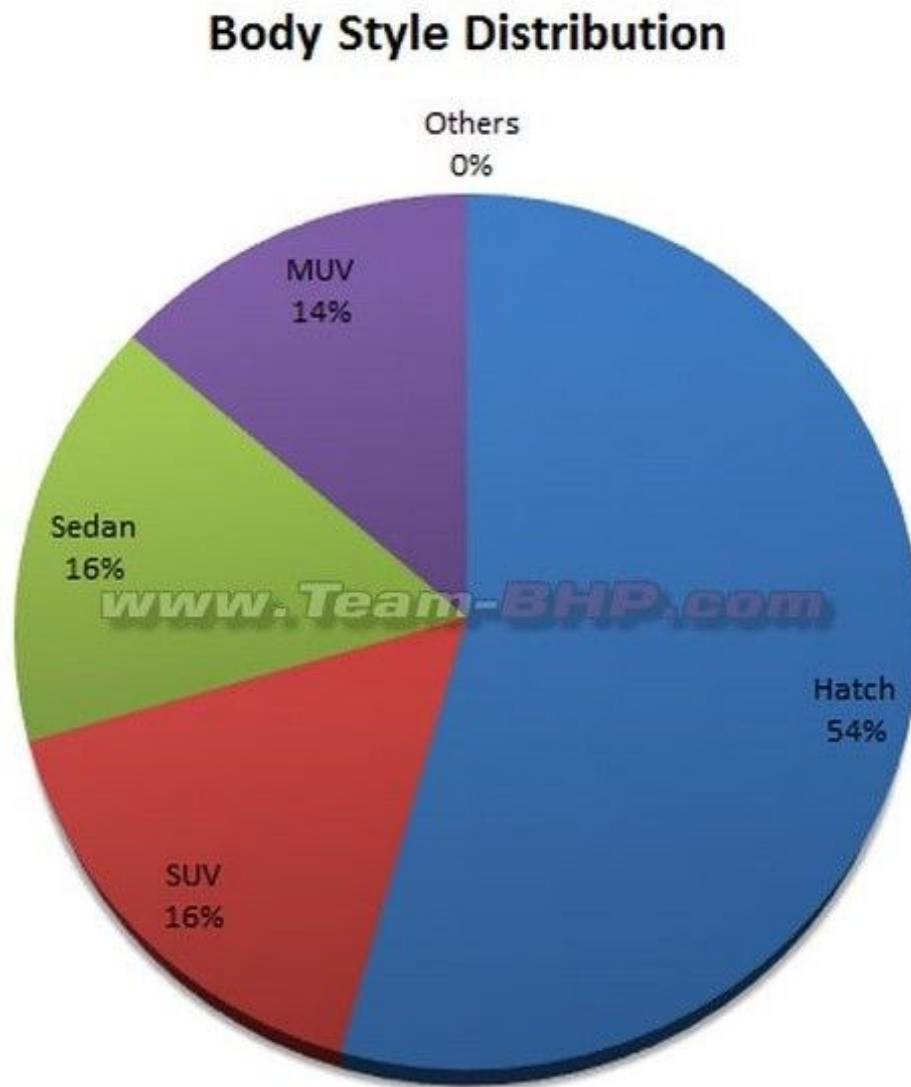
Most hatchbacks are not only lighter than their compact SUV counterparts but also come with small engines. The end result is that they end up having a mileage in spite of offering similar performance. So, ultimately, hatchbacks end up not only being easier to buy but also easier to run. Also, they are easier to maintain due to lower cost of spares. One ends up spending a lot lesser on maintaining a hatchback than a compact SUV. It makes far more sense to buy a **Ford Figo** over an **EcoSport** if low running costs is what you're looking for.

Sportier

While Compact SUVs like the **Ford EcoSport** are sufficiently fun in the corners, hatchbacks like the **Fiat Punto** or even the new **Figo** are a tad better. This is simply because the hatchbacks have a lower centre of gravity, which means the body roll is better contained and you feel more confident while pushing a car in the corners. The major issue with Compact SUVs is the higher body roll. This is simply because of the high ground clearance. Hence, you can carry a higher speed into a corner in a sporty hatchback without worrying about things going out of control.

DIFFERENCE IN SALES OF HATCHBACKS AND OTHER TYPES

The advantages that come with hatchbacks get reflected on its sales when compared to other types of cars, especially SUVs and compact SUVs.



1. Hatchbacks(excluding premium).

OEM	OEM	Apr'17	Apr'16	Growth (%)
Maruti	Swift	23802	15661	52%
Maruti	Alto	22549	16583	36%
Maruti	Wagon R	16348	15323	7%

2. Premium Hatchback

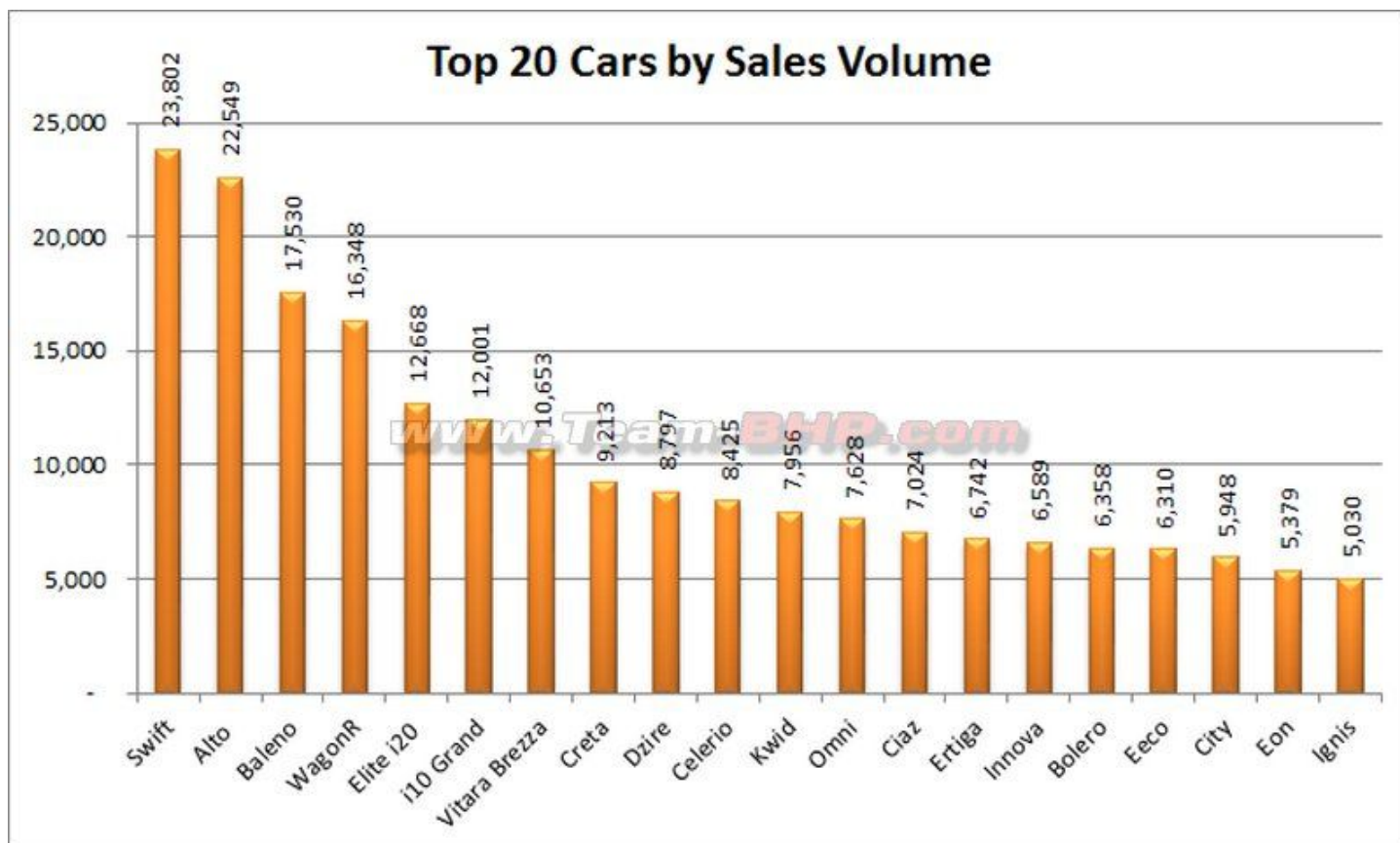
OEM	Model	Mar'17	Mar'16	Growth (%)
Maruti	Baleno	17530	9562	83%
Hyundai	i20 Elite	12668	11147	14%
Honda	Jazz	2061	869	137%

4. C/SUV

OEM	Model	Apr'17	Apr'16	Growth (%)
Maruti	Vitara Brezza	10653	7832	36%
Hyundai	Creta	9213	7900	17%
Maruti	Santro	4489	4328	4%

5. Sedan

OEM	Model	Apr'17	Apr'16	Growth (%)
Maruti	Ciaz	7024	5702	23%
Honda	City	5948	5793	3%
Skoda	Rapido	1077	621	73%



April 2017 : Indian Car Sales Figures & Analysis

Top 20 with Year-on-Year Movement						
No.	Make	Model	Segment	Sales	YoY (%)	
1	Maruti	Swift	B2	23,802	▲	52.0
2	Maruti	Alto	A	22,549	▲	36.0
3	Maruti	Baleno	B2	17,530	▲	83.3
4	Maruti	WagonR	B1	16,348	▲	6.7
5	Hyundai	Elite i20	B2	12,668	▲	13.6
6	Hyundai	i10 Grand	B2	12,001	▲	22.0
7	Maruti	Vitara Brezza	C2	10,653	▲	36.0
8	Hyundai	Creta	C2	9,213	▲	16.6
9	Maruti	Dzire	C1	8,797	▼	-33.6
10	Maruti	Celerio	B1	8,425	▼	-1.4
11	Renault	Kwid	A	7,956	▼	-18.8
12	Maruti	Omni	Utility	7,628	▼	-8.7
13	Maruti	Ciaz	C2	7,024	▲	23.2
14	Maruti	Ertiga	Utility	6,742	▲	22.9
15	Toyota	Innova	Utility	6,589	▲	54.3
16	Mahindra	Bolero	Utility	6,358	▲	9.9
17	Maruti	Eeco	Utility	6,310	▲	2.4
18	Honda	City	C2	5,948	▲	2.7
19	Hyundai	Eon	A	5,379	▬	-0.7
20	Maruti	Ignis	B2	5,030	▬	0.0

INDIAN HATCHBACKS

Hatchbacks are the highest selling car body style in India. The Maruti 800 sold over 2.5 million units since its launch in 1983. Since 2004, Maruti 800 has been overtaken by Maruti Alto as the car with highest annual sales. In March 2009, Tata Motors launched the Nano hatchback, the least expensive road car in the world. The most popular hatchbacks currently sold in India are as follows:



1. Maruti Swift

Maruti Swift is priced at Rs.4.8 lakh to Rs.7.46 lakh and is among the best-selling cars of all time. Some of the best features of this car include keyless entry and push-button to start or stop the engine, automatic climate control, etc. It has a 1,248cc diesel engine which develops 74 bhp power and 190 Nm torque.



2. Volkswagen Polo

Volkswagen Polo is priced at Rs.5.42 lakh to Rs.9.56 lakh and is loaded with amazing features like auto-dimming mirror, touchscreen infotainment, and automatic air-conditioner. This car appeals to individuals with families as well as car enthusiasts. It has a 1,498cc diesel engine which develops 108.5 bhp power and 250 Nm torque. The automatic variant of Volkswagen Polo also comes with a petrol engine option.



3. Maruti Baleno

Maruti Baleno is priced at Rs.5.26 lakh to Rs.8.43 lakh and is available in 4 trims - Alpha, Zeta, Delta, and Sigma. You can choose from 7 colour options - Granite Grey, Pearl Arctic White, Premium Urban Blue, Autumn Orange, Premium Silver, Fire Red, and Ray Blue. Some of the unique features of this car are the full-colour MID screen, bi-xenon projector headlamps, and UV glass windows. It was the first car to provide Apple CarPlay with a 7-inch SmartPlay infotainment system. The safety features of this car include front fog lights, reverse camera, parking sensors, dual-front airbags, and ABS with EBD. The car runs on a 1248cc diesel engine that produces 74 bhp power and 190 Nm torque.



4. Tata Tiago

Tata Tiago is priced at Rs.3.21 lakh to Rs.5.75 lakh and has been one of the best-selling cars for Tata Motors since its launch in 2016. The car is available in 10 variants. It runs on a 1.2-litre petrol engine that develops 85PS power and 114 Nm torque and a 1.05-litre diesel engine that produces 70PS power and 140 Nm torque. Both the engines are paired with a 5-speed manual gearbox. The petrol variant comes with an automatic transmission option. The Tiago model is considered practical due to the 242 litres of boot space.



5. Renault KWID

Renault KWID is priced at Rs.2.62 lakh to Rs.4.55 lakh and is available in 5 variants with 2 engine options - 0.8-litre and 1-litre petrol engines. The car has a touchscreen infotainment system,



power steering, AC, dual-tone dashboard, and a digital speedometer. The safety features of this car includes front seatbelts, central locking, driver's side airbag, and child safety locks. The car runs on a 799cc petrol engine that produces 53.3 bhp power and 72 Nm torque.

6. Maruti CelerioX

Maruti CelerioX is priced at Rs.4.57 lakh to Rs.5.43 lakh and is available in 4 variants - ZXi (O), ZXi, VXi (O), and VXi. These variants come with an automated manual transmission. The car has black alloy wheels, black plastic cladding around the wheel arches and a silver scuff plate in the back. It has a 1-litre K10-B engine that produces 68PS power and 90 Nm torque.



7. Hyundai Elite i20

Hyundai Elite i20 is priced at Rs.5.29 lakh to Rs.9.15 lakh and is available in dual-tone colours - Polar and Red Passion. It has a 7-inch touchscreen infotainment system with Android Auto, Apple CarPlay, and Mirror Link connectivity. It is powered by a 1.2-litre petrol engine that produces 83 PS power and 115 Nm torque. Another option is a 1.4-litre diesel engine that produces 90 PS power and 220 Nm torque. The diesel engine is paired with a 6-speed manual transmission while the petrol engine is paired with a 5-speed manual gearbox. The 3rd option is a 1.4-litre petrol engine that produces 100 PS power and 132 Nm torque. It is paired with a 4-speed AMT.



8. Maruti Alto 800

Maruti Alto 800 is priced at Rs.2.46 lakh to Rs.3.72 lakh. This car has got a facelift with fabric upholstered door pads and seats, central locking system, and power windows. It is powered by a 0.8-litre, 3-cylinder petrol engine that produces 48 PS power and 69 Nm torque. This engine is paired with a 5-speed manual transmission.



9. Maruti Wagon R

Maruti Wagon R is priced at Rs.4.1 lakh to Rs.5.31 lakh and is one of the best-selling hatchback cars since its launch in 1999. Maruti has sold over 20 lakh units of Wagon R. The car has ABS with EBD and is offered with a 5-speed AMT or manual transmission gearbox. VX+ variant of Wagon R has projector headlamps and clear lens tail lamps. It is powered by a 1-litre, 3-cylinder petrol engine that produces 68 PS power and 90 Nm torque.



10. Hyundai Grand i20

Hyundai Grand i20 is priced at Rs.4.59 lakh to Rs.7.33 lakh and is available in 12 variants. The Grand i10 has a rear parking camera with a 7-inch touchscreen infotainment system with navigation, voice recognition, Mirror Link connectivity, Android Auto, and Apple CarPlay. It is powered by a 1.2-litre diesel engine that produces 75 PS power and 190 Nm torque. It is paired with a 5-speed manual gearbox. You also have the option of choosing the petrol engine option - a 1.2-litre engine that produces 83 PS power and 114 Nm torque. It is paired with either a 4-speed AMT or a 5-speed manual transmission gearbox.



11. Maruti Ignis

Maruti Ignis is priced at Rs.4.56 lakh to Rs.8.08 lakh and is available in 4 variants - Delta, Sigma, Alpha, and Zeta. The car is powered by a 1.2-litre petrol engine that produces 83 PS power and 113 Nm torque. The 1.3-litre diesel engine produces 75 PS power and 190 Nm torque. The engines can be paired with a 5-speed manual or AMT. The car has LED projector headlamps, 7-inch touchscreen infotainment



system with Android Auto, Apple CarPlay and navigation, 15-inch alloy wheels, and automatic climate control system.

12. Datsun Redi GO

Datsun Redi GO is priced at Rs.2.41 lakh to Rs.3.75 lakh and is available in 5 variants and 2 engine options. If you are looking for a budget hatchback car, Datsun redi-GO is the one. It has limited features such as daytime running LED lights, wheel covers, and body-coloured bumpers. The interior features of the car includes AC, keyless entry, power steering, and a music system. The safety features of this car includes a driver's side airbag and engine immobiliser. The car runs on a 799cc petrol engine that produces 53 bhp power and 72 Nm torque.



13. Maruti Alto K10

Maruti Alto K10 is priced at Rs.3.26 lakh to Rs.4.12 lakh and is available in 3 variants - VXi, LXi, and LX. The car has AC, power windows, central locking, power steering, and a double-din audio system. It is powered by a 1-litre K-series engine that produces 68 PS power and 90 Nm torque. It is paired with a 5-speed manual or AMT gearbox.



CONCLUSION

The compact SUV might offer a higher street presence along with more ruggedness. But, A hatchback is sporty and budget friendly. A hatchback is also easier to maintain, which means one can continue to save money in the long run. It is ideal for Indian roads. Therefore, hatchbacks are most favoured in India. As a result, the collected data and figures show an increasing sales of hatchbacks in Indian market.