



Industry Outlook

Luxury Automobile

2023/2024



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Luxury Automobile Industry



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ABOUT THE REPORT

From this present report, the **ITIC-ISCTE Trading & Investment Club** and the **research team** are committed to **enhancing the knowledge** and improving the capacity of both the financial and non-financial sectors to make more informed decision-making. Aligned with the SDG's sustainability goals, the report aims to deliver on several key objectives:

- **Quality Education:** The report strives to provide "Quality Education" by offering free and high-quality materials in English. The goal is to promote inclusive and equitable education through simple and straightforward analyses, helping foster life-long learning.
- **Decent Work and Economic Growth:** The team highlights the economic impact of the Luxury Automobile industry in the report. This industry is a crucial element for accessing the worldwide economic situation.
- **Responsible Consumption and Production:** Emphasizing the importance of sustainability and environmental responsibility in the Luxury Automobile Industry, the report addresses the growing demand for eco-friendly products and practices from consumers and regulators.
- **Climate Action:** The report discusses the challenges and opportunities faced by the Luxury Automobile industry due to climate change. It addresses rising commodity prices, supply chain disruptions, and carbon-neutral commitments.
- **Partnerships for the Goals:** Through distributing reports to financial and governmental partners, the ITIC-ISCTE Trading & Investment Club aims to catalyse and amplify its commitments, like those outlined in the SDGs.

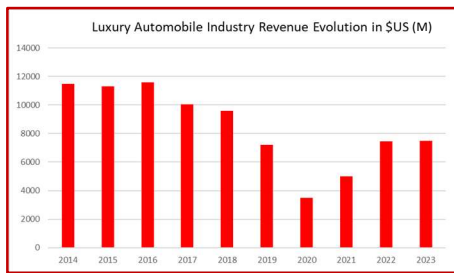
In conclusion, the ITIC-ISCTE Trading & Investment Club is deeply committed to delivering meaningful insights that empower society. Networking with our partners, the club seeks to provide in-depth and insightful analyses of the international financial and economic landscape, contributing to broader societal understanding, progress, and cohesion.



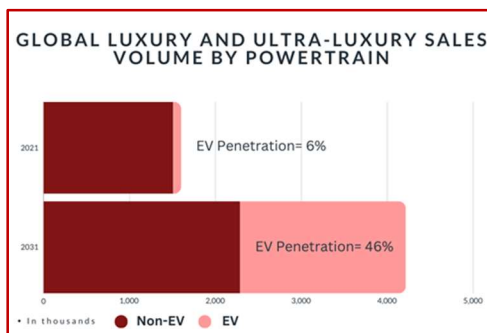
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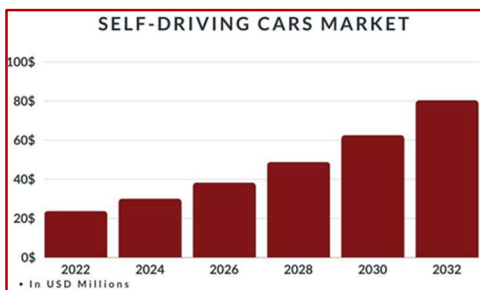
KEY INSIGHTS



Source: Statista

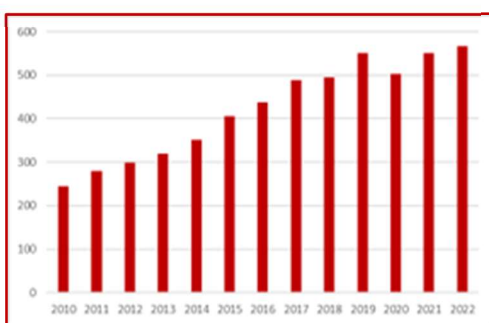


Source: Oliver Wyman Analysis



Source: Statista

Premium vehicles - luxury car market size worldwide



Source: Statista

The luxury automobile is a highly competitive and segmented industry emphasizing comfort, performance, technology and exclusivity.

As global prosperity increases, partly caused by emerging economies' improvements in standards of living, the global luxury car market achieved an astonishing valuation of **617.36 billion dollars**, a remarkable increase of **9%** from the previous year. Projections for the future are equally fascinating with an anticipated expansion of the luxury market at a projected Compound Annual Growth Rate (**CAGR**) of **6.9%** from 2022 to 2031.

Increasing Production Costs

Although supply chain pressures have subsided slightly, **semiconductor chips** are still low in supply and its prices have continued to rise. The price of **raw materials** used in manufacturing have also increased, with the World Bank reporting that prices have decreased since their height in 2022, but still continue to stay above pre-pandemic levels. **Labor costs** are ascending as unionized automakers organized a strike for higher wages. Considering raw materials, auto parts are the main cost driver for manufacturers.

Market Saturation

The luxury automobile industry may become saturated with numerous brands entering the market, **especially from China**. The growth in the number of models and sub models also contributes to this threat. Increased competition can lead to pricing pressures and **reduced profit margins** for luxury car manufacturers.

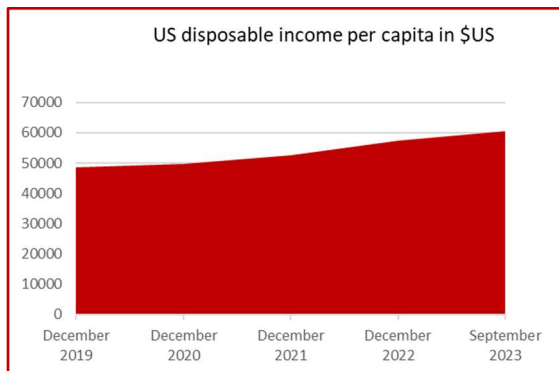
Electric Vehicles (EV) and AI

Automakers are working towards zero carbon emissions, **aligning with global governmental initiatives to accelerate EV adoption**.

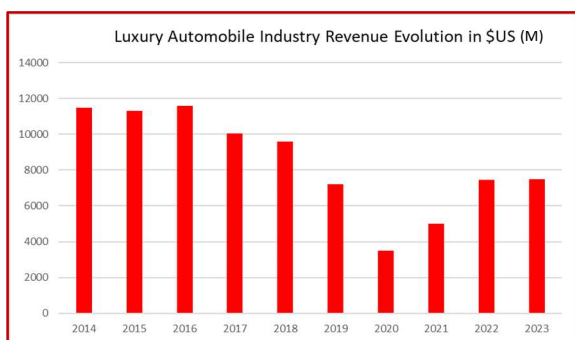
The global transition towards Environmental, Social, and Governance (ESG) principles has led approximately 20 nations to plan ICE vehicle sales phase-outs in the next 10-30 years. Moreover, **over 120 countries** are committed to achieving economy-wide **net-zero emissions in the coming decades**. At the local level, city authorities are restructuring vehicle license plate acquisition, favouring green plates for EVs and making ICE license plates harder to obtain.

Moreover, the **integration of Artificial Intelligence (AI)** and autonomous driving systems stands as a cornerstone for the future of luxury cars. These companies are actively investing in AI-driven technologies to **enhance vehicle intelligence, safety features, and overall driving experience**.

INDUSTRY



Source: YCharts



Source: Statista

Industry Revenue Evolution

The luxury automobile is a highly competitive and segmented industry emphasizing comfort, performance, technology, and exclusivity. COVID-19 led to lower disposable incomes, supply chain disruption, economic uncertainty, and health concerns, causing revenues to drop by almost half. Despite the setback, revenues increased from pre-pandemic numbers, generating **7.448 billion USD** in 2022, representing a **107%** increase in two years. The prospects of such an exponential growth in the long-term are not likely, due to high interest rates and present supply chain disruptions, yet it should experience a slight growth due to the low effect that crises have on the high-class purchasing power.

As global prosperity increases, partly caused by emerging economies' improvements in standards of living, the global luxury car market achieved an astonishing valuation of **617.36 billion dollars**, a remarkable increase of 9% from the previous year. Projections for the future are equally fascinating with an anticipated expansion of the luxury market at a projected Compound Annual Growth Rate (CAGR) of 6.9%.

Main Players

Key Players:	Revenues in 2022(\$US) :	Market Cap 2023(\$US)	Description:
Tesla	77,389 M	629.68 B	Tesla, Inc. is an American EV vehicle company founded in 2003. Tesla's primary activities include designing, manufacturing, and selling electric vehicles, battery energy storage systems, and solar energy products.
BMW	98,807 M	60.99 B	Bayerische Motoren Werke AG (BMW) is a German multinational company founded in 1916. BMW is primarily known for manufacturing luxury automobiles, motorcycles, and engines. They also provide financial services and have a strong global presence in the automobile industry.
Mercedes	150,017 M	62.80 B	Mercedes-Benz is a renowned German automobile manufacturer founded in 1926. The company is recognized for producing luxury vehicles, including cars, trucks, and buses. Mercedes-Benz is a division of Daimler AG, a prominent automobile corporation.
Lexus (Toyota Motor Corporation)	237,788 M	235.5 B	Lexus is the luxury vehicle division of the Japanese automaker Toyota. It was officially founded in 1989, with the aim of producing high-quality, upscale automobiles. Lexus is known for its superior customer service in the industry.

Main Suppliers

Although the main players of the industry are from Germany and the US, nowadays, approximately **40% of the materials used in production are provided by Chinese companies** due to lower production costs. The Industry relies mostly on **semiconductor, lithium batteries, technology and auto parts suppliers**, and is responsible for the increased demand in the Semiconductors in the last years, as it is possible to see in the graph. The main materials used in production are Aluminium, Cobalt, Copper, Glass, Lead, Lithium, Magnesium, Nickel, Rubber and Steel, and the largest Suppliers are respectively Guinea, Democratic Republic of Congo, Chile, China, Australia, China, Australia, Thailand, and again, China.

The restructure of the supply chains due to the new consumer sustainable demand, shortage of semiconductors and political and geopolitical tensions are the biggest challenges regarding the supply chain.

To address these problems all the companies are restructuring their supplier strategy by switching to **new suppliers** which fit the new demands.

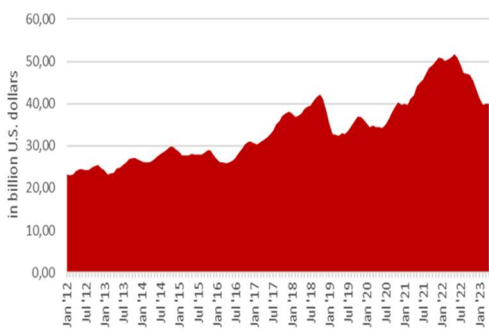
Main cost drivers

Supply Chain Pressures: Coupled with shipping delays and port closures due to the pandemic, car manufacturers were forced to slow production until distribution centres were able to deliver the parts necessary to assemble their vehicles. This inventory backlog drove the cost of all cars to record high prices increasing by an average of 30% since 2019.

Production Costs: Although supply chain pressures have subsided slightly, semiconductor chips are still low in supply and its prices have continued to rise. The price of raw materials used in manufacturing have also increased, with the World Bank reporting that prices have decreased since their height in 2022, but still continue to stay above pre-pandemic levels. The price of raw materials represents 57% of the total costs of manufacturing a car. Labor costs are also increasing, as unionized automakers organized a strike for higher wages. Considering raw materials, auto parts are the main cost driver for manufacturers.

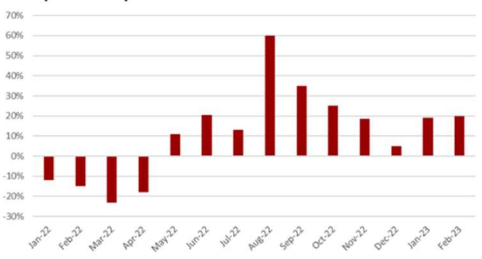
Research and Development: The automobile industry is prioritizing investment in research to equip their cars with advanced, unique technological features at a pace faster than their competitors. In 2021 the amount invested in research increased by about 51% (22,4 billion \$) in comparison with the previous year (14,9 billion \$), accounting for 16% of the total costs.

Global Semiconductor Sales



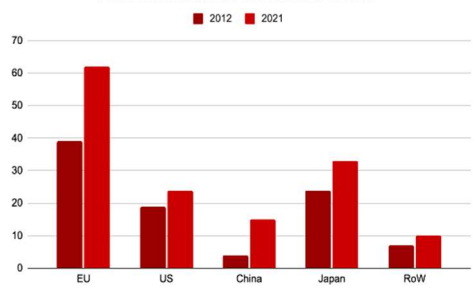
Source: Statista

European auto production volumes



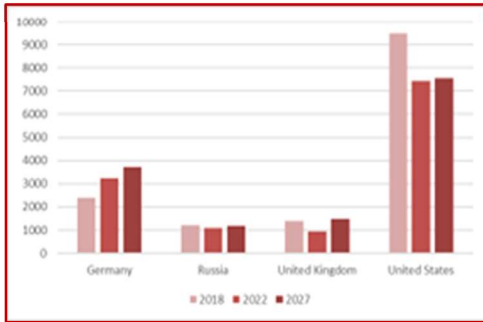
Source: Statista

R&D Investment in Automobile Sector



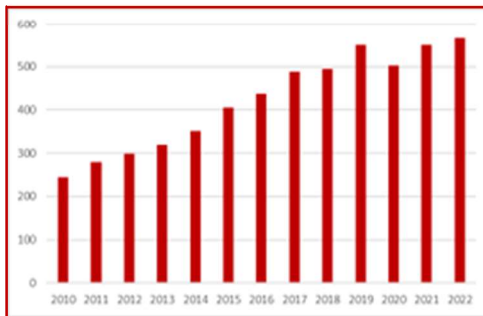
Source: Statista

Premium vehicles - luxury car market size world wide



Source: Statista

Premium vehicles - luxury car market size world wide



Source: Statista

Revenue by Geographical Location

The luxury automobile industry exhibits different presence and significance across the world. Historically, the United States holds the forefront of the market in terms of revenues, achieving USD 7,551 million mark in 2022. **Tesla is currently the leader** in the region, capturing 27.5% of US car sales in Q12023, followed by BMW, Lexus and Mercedes.

Despite the US dominance in the market, the country's reign may be on the verge of ending, as **China** is experiencing exponential growth and is expected to grow at a **3.7% CAGR rate until 2027**. China's premium car market was valued at USD 158.38 billion in 2022. Key automotive players such as BMW, Mercedes and Audi are strategically betting in the Chinese market as **High-Net-Worth Individuals** and EV demand are increasing in the country.

Regarding **Europe**, native region of German BMW and Mercedes, the market was valued in 2022 at USD 157.3 billion with a staggering foreseen CAGR of 9% (2022-2023). **SUVs are expected to drive the European market** as consumers preferences have reached a pivotal stage. Moreover, the tightening in regulation on CO2 emissions, aligned with the European Union's goal of reducing emissions by 45 % from 2030 (European Council).

Risk Factors

Market Saturation: The luxury automobile industry may become saturated with numerous brands entering the market, especially from China. The growth in the number of models and sub models also contributes to this threat.

Increased competition can lead to pricing pressures and reduced profit margins for luxury car manufacturers.

Consumer Preferences and Trends:

Since the industry is a luxury one, characterized by both high competition and consumer's expectations, it presents a constant dynamism and change. Nowadays, the major risks regarding this category are: consumers changing demographics, shifts in design preferences, paid subscriptions models and vehicle personalization. New concerns regarding the urban congestion can also negatively impact the future automobile sales, due to the use of other types of options such as public transports or micro mobility vehicles and services.

Global Market Risk:

Given that the luxury automobile market reflects strongly macroeconomic trends, due to its superfluous nature, the industry is vulnerable to any crisis and instabilities, as happened in the Covid-19 pandemic.

PESTEL Analysis

Political	<ul style="list-style-type: none"> • Governmental regulations regarding emissions, safety standards, and import/export tariffs.
Economical	<ul style="list-style-type: none"> • Fluctuations in global economic conditions can impact consumer purchasing power and demand for luxury cars. • Changes in interest rates and currency exchange rates can affect production costs, profitability, and pricing strategies for luxury car brands operating globally.
Social	<ul style="list-style-type: none"> • Growth of demographic of consumers valuing technological advancements • Transitioning to EVs align Societal emphasis on sustainability and eco-consciousness cultural shift
Technological	<ul style="list-style-type: none"> • Technological breakthroughs in battery efficiency • Integration of autonomous driving features and artificial intelligence (AI) systems • Transitioning to digital sales platforms
Environmental	<ul style="list-style-type: none"> • The recent development of cleaner and more fuel-efficient technologies. • Companies reevaluating their sourcing and use of materials to minimize their impact on natural resources.
Legal	<ul style="list-style-type: none"> • Government regulations globally are becoming increasingly strict regarding vehicle emissions • Compliance with safety regulations • Cross-border trade regulations • Intellectual property rights

SWOT Analysis

Strengths	<p>Major brand recognition</p> <p>High profit margins compared with the normal automobile Industry.</p>
Weakness	<p>Intense competition</p> <p>Environmental concerns are posing challenges for high-performance, fuel-consuming vehicles.</p>
Opportunities	<p>Growth of the Emerging markets</p> <p>Rise in demand for Electric vehicles</p> <p>Digitalization: The use of digital platforms for marketing can enhance customer engagement.</p>
Threats	<p>Disruption from new entrants, tech companies entering the automobile market may pose a threat to traditional automakers.</p> <p>Regulatory changes, new laws and regulations can impact manufacturing and sales.</p> <p>The current geopolitical environment of the world, stands a challenge to every automobile manufacturer.</p>

FUTURE OF THE INDUSTRY

Industry Growth

The luxury automobile industry, **the largest segment within luxury goods**, is intricately linked to the global wealth distribution and economic fluctuations.

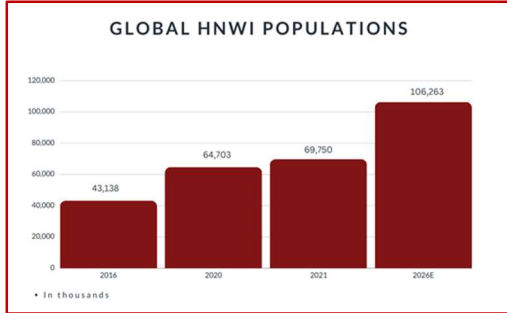
The Knight Frank World Wealth Report 2022 highlights a surge in **High-Net-Worth Individuals** (HNWIs), reaching a record 70 million worldwide, expected to surpass 100 million by 2026, driving the growth of the luxury market. In 2021, around 1.6 million luxury and ultra-luxury cars were sold, representing about 2% of the total 80 million passenger cars sold globally.

Forecasts suggest a steady **3% annual growth rate** for the overall passenger vehicle market from 2021 to 2031. In contrast, luxury and ultra-luxury vehicle segments are projected to experience a substantial 10% compound annual growth rate during the same period. This trend demonstrates the industry's resilience and potential for sustained growth driven by an expanding affluent consumer base and their affinity for luxury vehicles. The escalating numbers of HNWIs coupled with evolving consumer preferences and market dynamics present a promising trajectory for the luxury automotive industry.

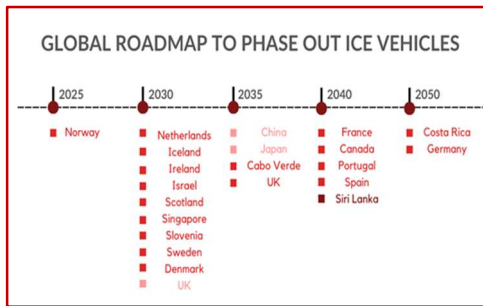
In the Luxury segment, ranging In the Luxury segment, vehicles priced between **\$80,000 and \$500,000** are forecasted to achieve a robust **10% CAGR** until 2031, with sales projected to surpass 4 million units from the existing volume of 1.57 million units, while those priced **above \$500,000** are expected to reach an even higher **CAGR of 14%**.

The future of luxury automobiles is closely tied to Electric Vehicles (EVs). Automakers are working towards zero carbon emissions, **aligning with global governmental initiatives to accelerate EV adoption**.

The global transition towards Environmental, Social, and Governance (ESG) principles has led approximately 20 nations to plan ICE vehicle sales phase-outs in the next 10-30 years. Moreover, **over 120 countries** are committed to achieving economy-wide **net-zero emissions in the coming decades**. At the local level, city authorities are restructuring vehicle license plate acquisition, favoring green plates for EVs and making ICE license plates harder to obtain. This governmental initiative will drive Original Equipment Manufacturers (OEMs) to expedite their transition to EV production and influence consumer preferences towards EV models.



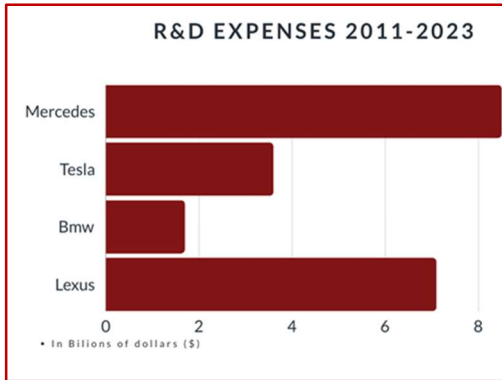
Source: Knight Frank World Wealth Report 2022



Source: IEA Global EV Outlook 2021, Oliver Wyman Analysis

	LUXURY		ULTRA-LUXURY	
	\$80K-\$149K	\$150K-\$299K	\$300K-\$500K	> \$500K
SALES VOLUME (2021,K)	1,413	163	22	2.4
SALES VOLUME (2031E,K)	3,664	485	57	8.8
CAGR (2021-2031,%)	10	11.5	10	14

Source: Oliver Wyman Analysis



Source: Statista

R&D and Tech Implementation

In recent years, the luxury car industry has witnessed a paradigm shift towards **innovation**, propelled by the emergence of groundbreaking technologies and evolving consumer preferences. Key players such as BMW, Tesla, Lexus, and Mercedes **have intensified their focus on Research and Development (R&D)** investments as a strategic avenue to **secure their positions and survival** in an increasingly competitive market.

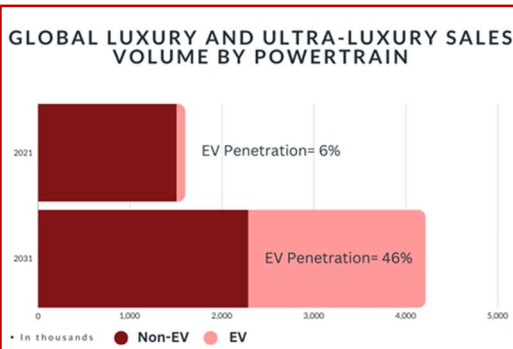
BMW, Tesla, Lexus, and Mercedes have collectively dedicated substantial financial resources to R&D initiatives, aiming to spearhead **technological advancements** and maintain a competitive edge. Their committed R&D expenditures, evidenced by public disclosures, reflect a steadfast commitment to innovation, fostering new technologies, and enhancing product offerings. This financial commitment underscores their drive to pioneer groundbreaking solutions that align with future industry trends.

Mercedes have spent **8.5 billion euros on R&D** expenditures. By 2030 they expect to invest more than **1.3 billion in the qualification and training of employees in Germany**.

COUNTRY	PURCHASE INCENTIVE	CONDITION
FRANCE	\$6.400	P/ HOUSEHOLD
GERMANY	\$9.500	PRICE<\$40,000\$
ITALY	\$3.200	PRICE<\$35,000\$
SPAIN	\$7.400	PRICE<\$35,000\$

Source: ACEA, Oliver Wyman Analysis

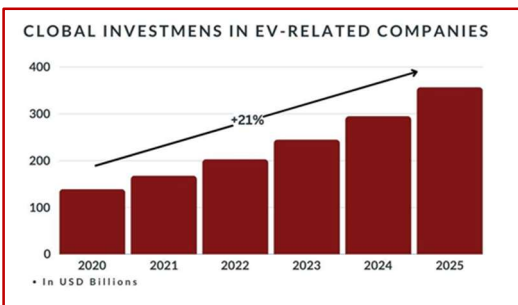
Autonomous Driving



Source: Oliver Wyman Analysis

In addition to the traditional features of comfort, convenience, entertainment and safety, luxury car brands are trying to bristle with advanced autonomous driving, connectivity, intelligent interaction with smart cockpits and enhanced vehicle usage experiences.

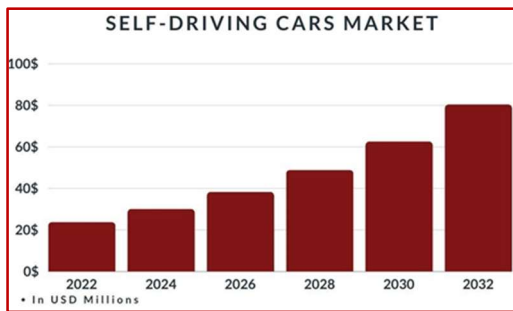
Advanced autonomous driving (AD) luxury are introducing higher level autonomous driving features, given that they have fewer cost limitations regarding technology deployment. Advanced AD applications for luxury and ultra-luxury electric vehicles are supported by **stronger computing power chips** and more advanced algorithms. A US emerging BEV OEM's model has equipped independently developed AD chips, called full self-driving (FSD) chips, with the **capability of over 100 trillion operations per second (TOPS)**. Considering the high initial research and development investments, more cutting-edge AD technological advancements, such as high-precision maps and high-pixel Light Detection and Ranging (LiDAR) technology, will soon be more readily available in luxury and ultra-luxury electric vehicles.



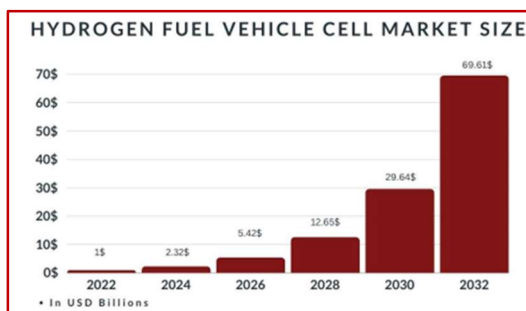
Source: Oliver Wyman Analysis

Moreover, the **integration of Artificial Intelligence (AI)** and autonomous driving systems stands as a cornerstone for the future of **luxury cars**. These companies are actively investing in AI-driven technologies to **enhance vehicle intelligence, safety features, and overall driving experience**. Tesla, in particular, has garnered attention for its strides in AI-powered autonomous driving, demonstrating a commitment to pushing the boundaries of automotive innovation.

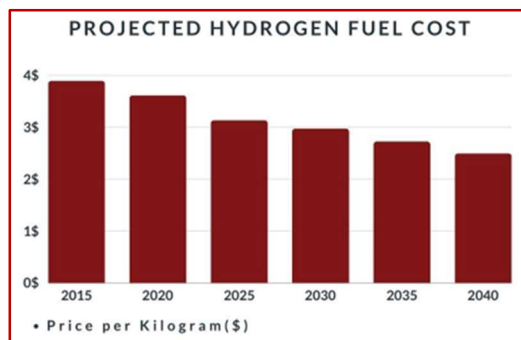
The pursuit of autonomous driving technology continues to evolve, with BMW, Lexus, Mercedes, and Tesla at the forefront of developing sophisticated driver-assist systems. These advancements not only reflect a strategic alignment with future market demands but also underscore a collective commitment to redefine the driving experience through technological innovation.



Source: www.precedenceresearch.com



Source: www.precedenceresearch.com



Source: Fauzan, Ir Ts Dr Mohd Faizal. (2019). *Review of Hydrogen Fuel for Internal Combustion Engines*

Hydrogen Cars

One prominent trajectory within the luxury car sector is the burgeoning interest and investment in hydrogen fuel cell technology. With an emphasis on **sustainable mobility solutions**, several manufacturers, including Toyota (parent company of Lexus), have been advancing research and development efforts toward hydrogen-powered vehicles. While still in nascent stages, this technology holds promise for **zero-emission driving and has the potential to revolutionize the automotive landscape in the future**.

To Conclude

The future of luxury cars looks bright. **Electric cars, self-driving cars**, and hybrid cars are all significant trends in the automotive industry that are here to stay. **Hydrogen** will certainly also have an important place in the future of this industry. Luxury car manufacturers have been quick to embrace these trends and have started producing cars that incorporate these technologies. Whether you're looking for a fast and responsive electric car or a comfortable and convenient self-driving car, the future of luxury cars has something for everyone.

As technology continues to advance, we can expect to see more innovation and advancements in luxury cars. The automotive industry will continue to push boundaries and make driving safer, more comfortable, and more convenient. Regardless of your reason for owning a luxury car, it's undeniable that these vehicles are a symbol of luxury, power, and success. The future of luxury cars looks bright, and we can't wait to see what it holds.

INDUSTRY PERFORMANCE

Ratio Analysis	Automobile Industry	Total Market	Premium
D/E Ratio	50.19%	53.52%	93.77%
Market Debt to Capital	33.40%	34.78%	96.03%
D/(D+E)	33.42%	34.86%	95.87%
E/(D+E)	66.58%	65.14%	102.21%
Effective Tax Rate	3%	41.37%	7.25%
Gross Margin	14.70%	36.28%	40.52%
Net Margin	5.02%	8.89%	56.47%
Pre-Tax Operating Margin	6.43%	11.66%	55.14%
COGS/Sales	85.50%	63.72%	134.42%

Industry Data:	Automobile Industry	Total Market	Premium
Expected Growth in Revenue (5Y)	75.91%	23.33%	325.38%
EPS Growth (5Y)	17.37%	13.05%	133.10%
Aggregate Market Cap/net income	20.43	19.86	102.87%
Std deviation in stock prices	52.61%	41.37%	127.17%
Cost of Equity	13.03%	10.75%	121.21%
Cost of Capital	10.15%	8.44%	120.26%
Net PP&E/Total Assets	23.10%	NA	NA
Capital Spending/Total Assets	5.27%	NA	NA
Beta	1.54	1.16	132.76%
Unlevered Beta	1.12	0.83	134.94%
Cash/Firm Value	8.67%	6.66%	130.18%
Divident Yield	0.40%	1.58%	25.32%
Divident Payout	10.55%	34.69%	30.41%

Multiple Analysis:	Automobile Industry	Total Market	Premium
ROE	15.68%	16.47%	95.20%
ROIC	6.46%	9.13%	70.71%
P/E	14.07	109.25	12.88%
Forward P/E	10.18	30.7	33.12%
Trailing P/E	10.88	16.05	67.79%
PEG Ratio	0.89	1.3	68.46%
EV/EBITDA	10.57	14.77	71.56%
EV/SALES	1.18	2.71	43.54%

While accessing the **risk and volatility** we can conclude that the Automobile Industry is above the market average, due to a higher Beta and Unlevered Beta when compared with the market.

A forward P/E ratio of 10.18 shows that the industry could be slightly **undervalued**, when compared with the total market.

The gross profit **margin** for this industry is 14.70%, less than half of the total market's margin of about 36% which can be justified by the enormous competition in the sector and the continuous need of improvement that companies are subjected to in order to survive.

Considering the automobile industry is capital intensive, needing production plants, property, and equipment, a **higher COGS** margin is not a point of concern - rather a defining characteristic, however the industry has put 85.5% of its revenue towards the costs of selling the automobiles, an average significantly higher than the market's 62.72% of sales devoted towards costs.

This suggests **slimmer profit margins** and less spendable capital to focus on company growth. With a **ROE of 15.68% and ROIC of 6.46%**, in comparison to the market's ROE of 16.47% and ROIC of 9.13%, the industry is **able to generate profits** for its investors at a rate similar to the market's.

There is 33.42% of debt being held in the industry's **capital structure** - a mere 1.44% less than the market average. As mentioned, this is typical for a capital-intensive industry, yet could attribute a small risk upon investment.

The **cost of capital is higher than the market average** due to the increased return investors are demanding to fund the industry. The overall unpredictability of the industry, high competition and low profit margins are the factors that add risk to the Luxury Automobile market.

Future predictions indicate that the total industry revenue in 5 years will have an exponential growth of 75.91%. The EPS in 5 years in the Automobile Industry will also grow at a higher rate than other industries.

In summary, we can conclude that the automobile industry fits the profile of investors which are willing to subject their savings to financial options with a higher risk. A healthy financial structure and stunning future predictions regarding revenue growth are the biggest strength of the industry, however the cost of capital, the profitability indicators and the margins present fewer encouraging results. A very low P/E ratio may indicate that it is a good time to invest in the Industry, however investors must carefully consider all information before making a decision.

MAIN PLAYERS



TESLA

Operations are structured into three key segments: Tesla Automotive, Tesla Energy, and Tesla Services. In the fiscal year **2023**, Tesla Automotive stood out as the predominant contributor, comprising approximately **80% of the total net sales**. Remarkably, the **United States** played a pivotal role in Tesla's revenue landscape, constituting over **60% of the company's overall revenues**. Notably, the European market emerged as the highest-generating international location. Among the various product categories, **electric vehicles** significantly dominated Tesla's net sales, representing **75% of all revenues** within the Tesla Automotive segment.

Strategy

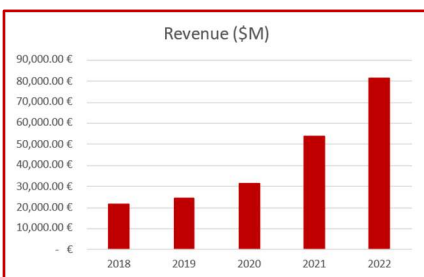
Tesla's strategy towards reaching their **50% CAGR** target is by increasing production to **1.8 million cars a year**, lowering manufacturing costs, providing better financing options to consumers, and **developing AI** at a pace ahead of its competitors. The strategy of Tesla is all about innovation, technological improvement, and sustainability. Their main principles include the advancement of **autonomous driving technologies, renewable energy sources, and electric car innovation**. Another element of Tesla's strategy is more of a vertical strategy surrounding the quality and efficiency of the production line. Through these strategies, Tesla gained a technological advantage that differs them from the competition.

Financial Analysis

Even with the current market conditions, Tesla has reached a record high in the fourth quarter of 2023, **achieving a \$25 billion revenue mark**. Its commitment to ensuring their growth is seen by their **0% dividend yield ratio and high P/E**: all cash is being reinvested back into the company and large capital expenditures are decreasing its earnings. ROE has contracted slightly in the past year (**from 1% to 27%**), as well as its gross profit margin (**25.6% to 21.49%**), after two consecutive years of growth, yet its most probable cause is the increasing interest rates and manufacturing costs. In terms of financial stability for the company, a **D/E ratio of a mere .013** suggests a low leverage risk for investors, and also means that Tesla has the capacity to prioritize continuous reinvestment rather than focusing on paying back creditors. In regard to liquidity, Tesla's **current ratio of 1.59** suggests that all current liabilities are covered.

Key Financial Analysis

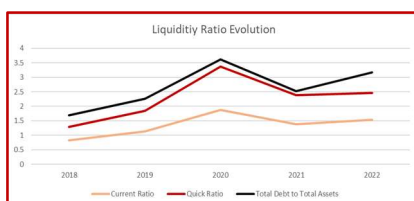
Key Financials	2018	2019	2020	2021	2022
Revenue (\$M)	\$ 21,461.30	\$ 24,578.00	\$ 31,536.00	\$ 53,823.00	\$ 81,462.00
Growth (YoY)	-	14.50%	28.30%	70.70%	51.40%
Gross profit	\$ 4,042.00	\$ 4,069.00	\$ 6,630.00	\$ 13,606.00	\$ 20,853.00
EBITDA	\$ 1,513.00	\$ 2,511.00	\$ 4,767.00	\$ 10,061.00	\$ 18,201.00
Net Income	\$ -976.10	\$ -862.00	\$ 721.00	\$ 5,519.00	\$ 12,556.00
EPS	\$ -5.72	-	-	-	-
DPS	-	-	-	-	-
Free Cash Flow	\$ -2.90	\$ 1,078.00	\$ 2,786.00	\$ 5,015.00	\$ 7,566.00
Profitability					
Gross Margins	18.83	16.56	21.02	25.28	25.6
EBITDA Margin (%)	7.05	10.22	15.12	18.69	22.34
NI Margin (%)	-4.55	-3.51	2.29	10.25	15.41
ROA (%)	-3.34	-2.69	1.67	9.66	17.38
ROE (%)	-21.31	-14.94	4.78	21.04	33.53
Liquidity and Solvency					
Total Debt (\$M)	\$ 11,971.40	\$ 14,603.00	\$ 13,228.00	\$ 8,873.00	\$ 5,748.00
Debt/Equity	1.9	1.8	0.56	0.28	0.13
Current Ratio	0.83	1.13	1.88	1.38	1.53
Quick Ratio	0.46	0.71	1.49	1.00	0.94
Debt to Assets	0.04025	0.04256	0.03	0.01	0.07



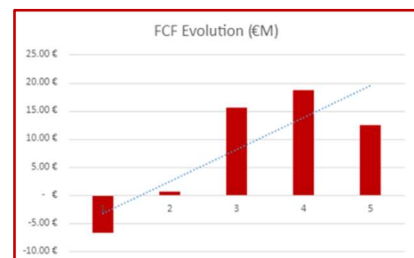
Source: Bloomberg

Valuation	2022
P/E	33.66
P/Book	8.72
P/Sales	4.73
EV/EBITDA	20.58
Market Cap (\$M)	\$ 389,741.50
Beta (5Y Monthly)	1.52

Source: Bloomberg



Source: Bloomberg



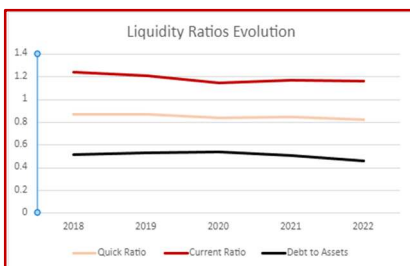
Source: Bloomberg



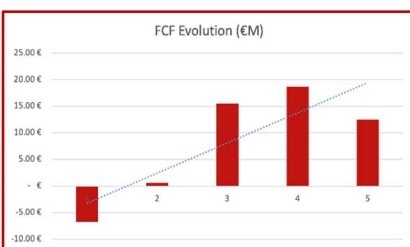
Source: Bloomberg

Valuation	2022
P/E	4.53
P/Book	0.77
P/Sales	0.44
EV/EBITDA	1.69
Market Cap (\$M)	65,698.00 €
Beta (5Y Monthly)	1.245

Source: Bloomberg



Source: Bloomberg



Source: Bloomberg

MERCEDES-BENZ

Mercedes-Benz operates in three core segments: Mercedes-Benz Cars & Vans, Mercedes-Benz Trucks, and Mercedes-Benz Financial Services. **Mercedes-Benz Cars & Vans was the key revenue driver** in fiscal year 2023, accounting for nearly **70% of total net sales**. The North American market was critical in Mercedes-Benz's financial landscape, accounting for **more than half of the company's total revenues**. Furthermore, the Asian market, notably China, has emerged as a substantial contributor to worldwide sales.

Strategy

Mercedes-Benz, a well-known luxury automaker, has continually positioned itself as a leader in innovation, engineering, and cutting-edge design. The company's **strategy** depends on **offering a varied variety of vehicles to meet various client requests**, ranging from elegant sedans to high-performance sports cars and SUVs. Mercedes emphasizes a flawless blend of **history and modernity**, integrating its rich legacy with **cutting-edge technology**. The company is noted for offering enhanced safety features and connection choices across its product range, demonstrating a dedication to not only meeting but exceeding client expectations. Mercedes-Benz also **prioritizes** sustainability, introducing eco-friendly technologies and components into its vehicles as part of an overall strategy to address environmental concerns and connect with evolving consumer preferences.

Financial Analysis

Surprisingly, within the last three years Mercedes experienced **its highest revenues during 2020**, generating 176 billion USD, yet its gross profit margins continue to increase even with a smaller revenue (**from 16.58% to 22.68%**). The company is working towards paying off debts and better using equity to produce profits as seen by their increasing ROE (from 6.05% to 18.76%) and **substantial decrease in total debt (a -36% change)**. Their decreasing D/E ratio suggests efficient use of equity over time, and with a ratio of .67, also means a low leverage risk for shareholders. Its current ratio is in good standing (1.18), and given its upwards trend, investors may feel increasingly confident in Mercedes' financial stability.

Key Financial Analysis

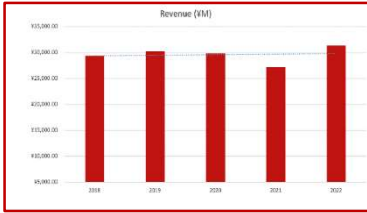
Key Financials	2018	2019	2020	2021	2022
Revenue (\$M)	167,362.00 €	172,745.00 €	121,063.00 €	1,133,893.00 €	150,017.00 €
Growth (YoY)	-	3.20%	-29.50%	9.90%	12.00%
Gross profit	33,067.00 €	29,165.00 €	20,522.00 €	31,000.00 €	34,127.00 €
EBITDA	16,571.00 €	11,863.00 €	14,624.00 €	21,339.00 €	24,907.00 €
Net Income	7,392.20 €	11,797.10 €	5,503.00 €	11,626.00 €	14,202.80 €
EPS	6.91 €	11.00 €	5.15 €	10.90 €	13.27 €
DPS	3.25 €	0.90 €	1.35 €	5.00 €	5.20 €
Free Cash Flow	6.72 €	0.64 €	15.51 €	18.67 €	12.54 €
Profitability					
Gross Margins	19.80%	16.90%	16.90%	23.20%	22.70%
EBITDA Margin (%)	9.90%	6.87%	12.01%	15.94%	16.60%
NI Margin (%)	4.40%	6.80%	4.50%	8.70%	9.50%
ROA (%)	2.70%	0.81%	1.23%	8.43%	5.58%
ROE (%)	11.28%	3.77%	5.94%	34.69%	18.43%
Liquidity and Solvency					
Total Debt (€M)	144.90 €	161.78 €	145.84 €	125.84 €	111.84 €
Debt/Equity	2.19	2.57	2.47	1.8	1.37
Current Ratio	1.24	1.21	1.15	1.17	1.16
Quick Ratio	0.87	0.87	0.84	0.85	0.82
Debt to Assets	0.5145	0.5349	0.5392	0.5089	0.458



LEXUS

Although Lexus is regarded as its own brand of luxury cars, it is part of the parent company **Toyota Motor Corporation**.

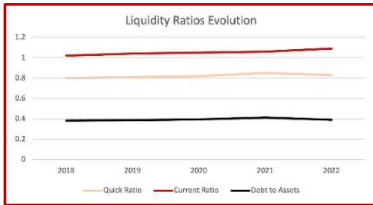
Lexus, a major participant in the automobile business, has divided its activities into several categories, with a primary concentration on Lexus Cars and Lexus Financial Services. **Lexus Cars exhibited dominance in fiscal year 2023**, accounting for almost 75% of total net sales. The **North American market**, with a significant presence in the United States, was critical, accounting for more than 60% of Lexus' total revenues. The Asian market, particularly in Japan and China, has been extremely successful, adding considerably to Lexus' worldwide income stream.



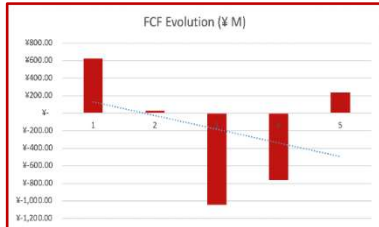
Source: Bloomberg

Valuation	2022
P/E	10.83
P/Book	1.17
P/Sales	0.98
EV/EBITDA	5.67
Market Cap (¥M)	¥ 30,622.30
Beta (5Y Monthly)	1.002

Source: Bloomberg



Source: Bloomberg



Source: Bloomberg

Strategy

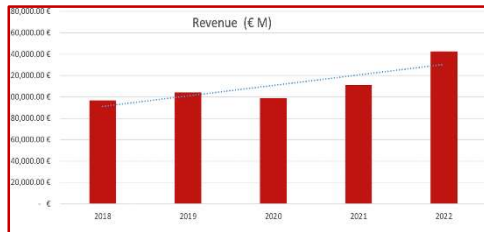
Their strategy in promoting growth as an overall company is to increase sales, acquire new original equipment manufacturers, and **lower costs through increasing productivity**. Lexus, the luxury division of Toyota, aligns with this overarching strategy by focusing on **delivering an exceptional customer experience** while also contributing to the company's growth objectives. Lexus has strategically positioned itself as a brand synonymous with reliability, craftsmanship, and a seamless blend of performance and comfort. By aligning with Toyota's commitment to innovation and efficiency, Lexus emphasizes a holistic approach to luxury, **incorporating Japanese precision engineering into vehicles that provide a smooth and refined ride**. Leveraging their parent company's expertise in hybrid technology, Lexus stands out by offering a compelling mix of performance-oriented and environmentally conscious vehicles. This approach not only caters to evolving consumer preferences but also aligns with the broader corporate strategy of growth through innovation and efficiency.

Financial Analysis

Toyota sells a wide variety of automobiles, unlike its counterparts that solely on the top-end segment of the market. This explains its larger revenues (\$286.56 B in 2023) and liabilities (\$333.29 B in 2023) when compared against its competitors. **As its revenues have been steadily increasing since 2021**, their strategies have been proven successful. Given a low dividend yield (2.44%), D/E ratio of good standing (1.11), increasing P/E ratio, current ratio, and ROE, it suggests that Toyota is a **low leverage risk investment**, and investors should feel confident in the financial stability of the company.

Key Financial Analysis

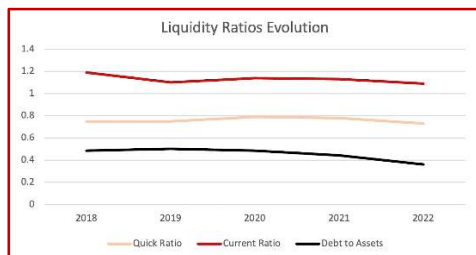
Key Financials	2018	2019	2020	2021	2022
Revenue (\$M)	¥ 29,379.50	¥ 30,225.70	¥ 29,866.50	¥ 27,214.60	¥ 31,379.50
Growth (YoY)	-	2.90%	-1.20%	-8.90%	15.30%
Gross profit	¥ 5,490.40	¥ 5,443.90	¥ 5,381.20	¥ 4,832.40	¥ 5,971.70
EBITDA	¥ 4,133.90	¥ 4,254.90	¥ 3,994.60	¥ 3,842.00	¥ 4,817.60
Net Income	¥ 2,506.60	¥ 2,127.50	¥ 2,046.40	¥ 2,245.30	¥ 2,855.40
EPS	¥ 168.22	¥ 146.80	¥ 144.74	¥ 158.40	¥ 205.61
DPS	¥ 44.00	¥ 44.00	¥ 44.00	¥ 48.00	¥ 52.00
Free Cash Flow	¥ 624.40	¥ 27.70	¥ -1,043.10	¥ -762.30	¥ 238.50
Profitability					
Gross Margins	18.69%	18.01%	18.02%	17.76%	19.03%
EBITDA Margin (%)	14.07%	14.09%	13.37%	14.12%	15.35%
NI Margin (%)	8.49%	6.23%	6.82%	8.25%	9.08%
ROA (%)	5.04%	3.68%	3.85%	3.86%	4.39%
ROE (%)	13.69%	9.81%	10.22%	10.25%	11.51%
Liquidity and Solvency					
Total Debt (€M)	¥ 19,353.40	¥ 20,150.20	¥ 21,341.00	¥ 25,659.60	¥ 26,496.40
Debt/Equity	0.97	0.98	1.01	1.06	0.98
Current Ratio	1.02	1.04	1.05	1.06	1.09
Quick Ratio	0.8	0.81	0.82	0.85	0.83
Debt to Assets	38.47%	38.80%	39.54%	41.21%	39.14%



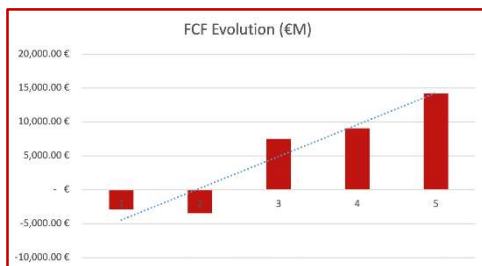
Source: Bloomberg

Valuation	2022
P/E	3.05
P/Book	0.63
P/Sales	0.38
EV/EBITDA	2.02
Market Cap (\$M)	55,146.74 €
Beta (5Y Monthly)	1.201

Source: Bloomberg



Source: Bloomberg



Source: Bloomberg

BAYERISCHE MOTOREN WERKE AG

BMW's operational framework is delineated across three main segments: BMW Automotive, BMW Motorrad, and BMW Financial Services. In the fiscal year 2023, **BMW Automotive played a central role in driving revenue, contributing nearly 75% to the total net sales. The United States featured prominently in BMW's revenue composition, accounting for over 50% of the company's overall revenues.** Additionally, the Asia-Pacific region emerged as the highest-grossing international location. Noteworthy is the fact that luxury vehicles constituted a substantial share of BMW's net sales, making up 70% of all revenues within the BMW Automotive segment.

Strategy

Bayerische Motoren Werke AG (BMW) is centring their business around becoming the **pioneers of e-mobility and sustainability with a goal of net zero emissions by 2050.** The Group has recently consolidated a previous joint venture with BMW Brilliance, a manufacturing company based in China, which likely contributed to the increase in revenue (from \$131.61 B in 2021 to \$158.45 B in 2023) due to having oversight and cost management of the entire production facility.

Financial Analysis

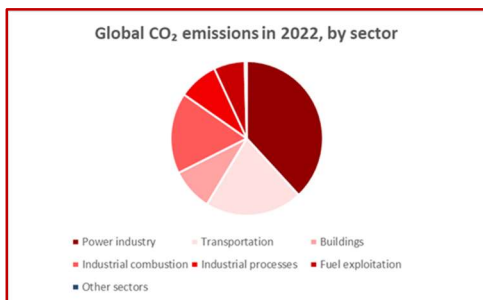
Although **revenues have been increasing**, BMW has **assumed more liabilities** and is not using them as **efficiently to finance their expenditures**, as seen by its **increasing debt (from \$90.47 B in 2021 to \$96.04 B in 2023)** and **decreasing ROE (from 17.39% to 13.35%)**. These metrics, along with a current ratio that is not notably high (1.1), challenge the financial stability of the company and may make investors hesitant upon investment. However, given its relatively stable D/E ratio of .59, investing in BMW is still considered low risk.

Key Financial Analysis

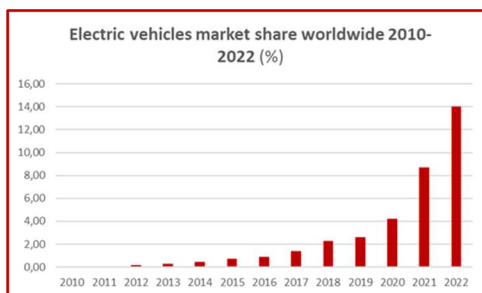
Key Financials	2018	2019	2020	2021	2022
Revenue (\$M)	96,859.00 €	104,210.00 €	98,990.00 €	111,239.00 €	142,610.00 €
Growth (YoY)	-	7.60%	-5.00%	12.40%	28.20%
Gross profit	18,378.00 €	18,063.00 €	13,582.00 €	21,986.00 €	24,568.00 €
EBITDA	17,565.00 €	18,144.00 €	15,682.00 €	20,050.00 €	22,682.00 €
Net Income	7,057.40 €	4,827.60 €	3,019.30 €	12,508.60 €	18,031.50 €
EPS	10.73	7.34	4.58	18.96	27.45
DPS	3.50 €	2.50 €	1.90 €	5.80 €	8.50 €
Free Cash Flow	- 2,862.00 €	- 3,439.00 €	7,533.00 €	9,078.00 €	14,251.00 €
Profitability					
Gross Margins	19.00%	17.30%	13.70%	19.80%	17.20%
EBITDA Margin (%)	18.05%	17.46%	16.93%	17.86%	15.81%
NI Margin (%)	7.30%	4.60%	3.10%	11.20%	12.60%
ROA (%)	3.45%	2.25%	1.70%	5.55%	7.53%
ROE (%)	12.57%	8.43%	6.28%	18.31%	22.22%
Liquidity and Solvency					
Total Debt (€M)	103,687.00 €	116,740.00 €	106,376.00 €	103,463.00 €	94,196.00 €
Debt/Equity	1.76	1.91	1.71	1.35	0.98
Current Ratio	1.19	1.1	1.14	1.13	1.09
Quick Ratio	0.75	0.75	0.79	0.78	0.73
Debt to Assets	0.48	0.50	0.49	0.44	0.36

ESG ANALYSIS

Environmental



Source: Statista



Source: Statista

This industry is currently undergoing significant changes, as sustainability awareness arises. In 2022, the **transportation sector** accounted for **21% of worldwide CO₂ emissions**, specifically regarding the automobile industry. According to Statista, **cars and vans were responsible for 48%** of transportation emissions, the largest share.

Nowadays, the world is not merely watching the shift from combustion engines to electric vehicles, rather automakers are in a fierce competition to produce EV cars in the most efficient way. The **sales of EV** have increased substantially, reaching in 2022, **14% of global market share in terms of sales**.

While EVs may seem a promising solution to achieve more sustainable practices, automakers are now facing some challenges regarding EV cars' longevity, which have a **lifespan ranging from 10 to 20 years**, as well as battery recycling. Statista estimates that by **2040, 20 million tons of EV batteries will be available for recycling**. This forecast may revolutionize the industry to shift towards a **circular economy**.

On the other hand, constructing a supply chain with a smaller footprint is one of the main goals in automakers' agenda. The automobile industry is facing some challenges to **build a sustainable supply chain** while simultaneously achieving the **quality, cost-efficiency and social standards** imposed by luxury automobiles.

BMW leads the the way in Environmental matters

According to Bloomberg, BMW achieved the best environmental score out of the four main players. The German brand is strongly committed to achieve **total climate neutrality by 2050**, set strict goals to achieve **by 2030 in terms of CO₂ emissions** and demand rigorous standards for its suppliers.

Regarding **GHG emissions, Tesla stands out as the leader of the indicator**, despite its relatively low environmental score. This may be explained by Tesla's innovative utilization of solar panels during the production process. In terms of water per unit of production BMW heads the list, followed by Tesla, Lexus and Mercedes which displays a notably higher number compared to the other players.

Source: Bloomberg	Tesla	BMW	Mercedes-Benz	Lexus/Toyota
Environmental Score	5.18	6	5.65	5.13
GHC Scope 2 Emissions	408	1187.34	1121	3900
Water/Unit of Production	2570	1900	4881	3930

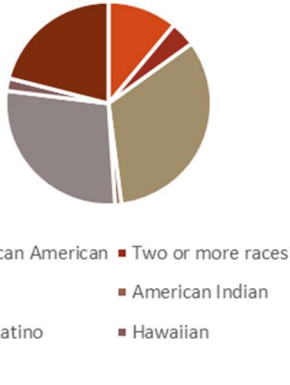
Social

Nowadays, the focus regarding workforce diversity is a growing concern for most of the companies. One of the leading players in this industry, **Tesla**, is a majority-minority company with **underrepresented groups as 67% of its U.S. workforce**.

They continue to expand access to hiring opportunities for underrepresented communities by building community partnerships and training interviewers. **With over 3.6 million job applications received globally in 2022**, interest in joining Tesla's mission is at an all-time high.

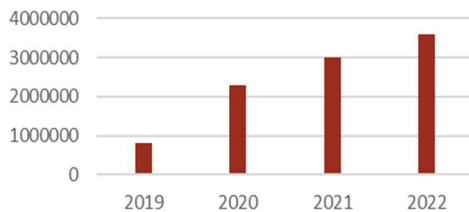
All the key players are trying to increase their applications, making the companies more attractive. As we can see on these charts, Tesla's total applications have been increasing since 2019 and they have created over 127,000 jobs in a decade. Their employee count has grown 29,000 year-over-year and they continue to hire extensively as we can see.

Tesla's US Employees



Source: Tesla's Impact Report

Total Tesla's Job Applications



Source: Tesla's Impact Report

A Social Responsibility Role

The luxury automotive industry and principally **Mercedes-Benz Group** has obligated its direct suppliers to comply with the Responsible Sourcing Standards (RSS), communicate them to their employees and to their direct suppliers and ensure their compliance within their sphere of influence. The aim is to **prevent, minimize or, where possible, end these negative effects on human rights worldwide**. In addition, the standards include requirements for environmental protection, the goal of these is to conserve natural resources and prevent environmental damage caused by economic activity, to repair it when it occurs and to compensate for it if it's unavoidable or not rectifiable.

According to Bloomberg, **Lexus is the best positioned in the social parameter** with the best score, when compared to other brands such as Tesla, BMW and Mercedes. Through various measures, they want to ensure that both production materials and services are procured in compliance with sustainability standards worldwide.

Topics like **abolition of child labour**, working hours, eradication of forced labour, equal opportunities and protection against discrimination are always present in their sustainability reports, so it is very important for the players to have an important role in social responsibilities, specially due to the current **human rights violations** that have been reported in the **extraction of lithium in Africa**, a material which is crucial for the production of electric batteries.

Governance

In accordance with the **Bloomberg ESG data**, **BMW** is the company with the **highest value** regarding governance. This indicator represents the **shareholders voting power distribution, firms' internal control, corruption, and others**.

Out of the four companies **Tesla** is the one that presents the **lowest value of governance** score and that can be explained by its leadership structure. Due to **the significant influence of Elon Musk** and while ruling as CEO and Chairman of Tesla can create some concerns about the **separation of powers in the company**.

The **percentage of women on board** is an indicator which has become very relevant in the last few years, so companies are making efforts to increase the number of women on their boards. The two firms with the higher percentages of women in power positions are Lexus and Mercedes with a 35% result.

Source: Bloomberg	Tesla	BMW	Mercedes-Benz	Lexus/Toyota
Governance Score	5.47	6.77	6.57	5.61
% of women on the board	14.3%	30%	35%	35%
Board Size	8	8	20	20

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