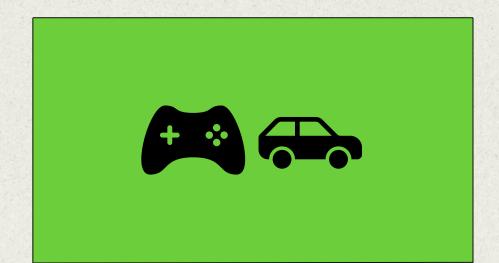
Data Analytics Fundamentals : Case Study



INTRODUCTION



- Our group will analyze two datasets for our stakeholder.
- Various analytical software's and techniques are applied.

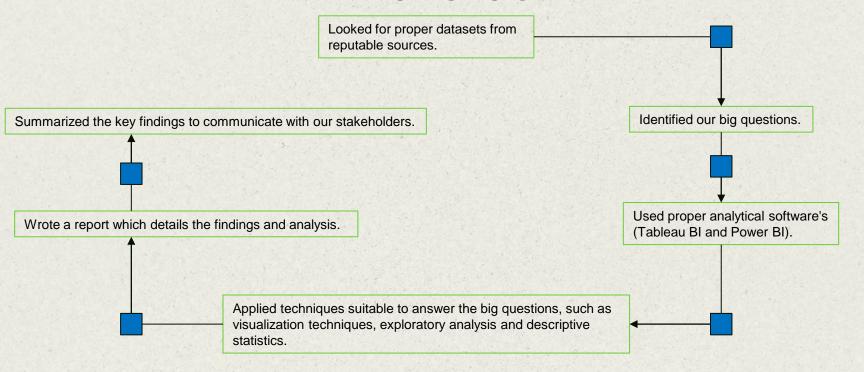


Our Goal: To crunch data relentlessly, unlocking insights that help guide wiser decisions for our stakeholders.





METHODOLOGY



DATASETS

ank	Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales	Other_Sales	Global_Sales
	Wii Sports	Wii	2006	Sports	Nintendo	41.49	29.02	3.77	8.46	82.74
- 2	Super Mario Bros.	NES	1985	Platform	Nintendo	29.08	3.58	6.81	0.77	40.24
3	Mario Kart Wii	Wii	2008	Racing	Nintendo	15.85	12.88	3.79	3.31	35.82
4	Wii Sports Resort	Wii	2009	Sports	Nintendo	15.75	11.01	3.28	2.96	33
	Pokemon Red/Pokemon Blue	GB	1996	Role-Playing	Nintendo	11.27	8.89	10.22	1	31.37
6	Tetris	GB	1989	Puzzle	Nintendo	23.2	2.26	4.22	0.58	30.26
7	New Super Mario Bros.	DS	2006	Platform	Nintendo	11.38	9.23	6.5	2.9	30.01
8	Wii Play	Wii	2006	Misc	Nintendo	14.03	9.2	2.93	2.85	29.02
9	New Super Mario Bros. Wii	Wii	2009	Platform	Nintendo	14.59	7.06	4.7	2.26	28.62
10	Duck Hunt	NES	1984	Shooter	Nintendo	26.93	0.63	0.28	0.47	28.31
13	Nintendogs	DS	2005	Simulation	Nintendo	9.07	11	1.93	2.75	24.76
12	Mario Kart DS	DS	2005	Racing	Nintendo	9.81	7.57	4.13	1.92	23.42
13	Pokemon Gold/Pokemon Silver	GB	1999	Role-Playing	Nintendo	9	6.18	7.2	0.71	23.1
14	Wii Fit	Wii	2007	Sports	Nintendo	8.94	8.03	3.6	2.15	22.72
15	Wii Fit Plus	Wii	2009	Sports	Nintendo	9.09	8.59	2.53	1.79	22
16	Kinect Adventures!	X360	2010	Misc	Microsoft Game Studios	14.97	4.94	0.24	1.67	21.82
17	Grand Theft Auto V	PS3	2013	Action	Take-Two Interactive	7.01	9.27	0.97	4.14	21.4
18	Grand Theft Auto: San Andreas	PS2	2004	Action	Take-Two Interactive	9.43	0.4	0.41	10.57	20.81
10	Super Mario World	SNES	1990	Platform	Nintendo	12.78	3.75	3.54	0.55	20.61

- Shows a list of video games with sales greater than 100,000 copies.
- > Has 11 columns and 16,600 rows
- Dataset source : https://zenodo.org/record/5898311

					EI	ectric	Vehicle F	0	pι	ılat	tio	n Data		
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GECKS54 King	Seatle	US.	98325	2018 CHEVROLE			Clean Alternative Fuel Vehicle Eligible	- 53	- 2	85		PONT 1-122 296385-47.715581	CITY OF SEATTLE - (WAIKITY OF TACOMA - IWAI	53033005002
WB/124CSERGERO	Bananin	UA	98312	2010 5954	13		Clean Alternative Fuel Vehicle Eligible	72	- 6	26		PONT 1-122 65223 47 571925	BUGET SQUADENERGY NC	5303508900
SYJJETEBB, Thurston	Ourgia	UA	50502	2018 TESLA	MODEL 3	Signery Electric Vehicle (SEV)	Clean Alternative Fuel Vehicle Eligible	246	- 3	22		PONT (-122 52145 47 045535)	PLOST SOLAD (MERCY NC	53067010520
THIAZOCPIe Thurston	Outeia	US	56502	2010 MSSAN	LEAF		Clean Alternative Fuel Vehicle Eliable	75	- 2	22		PONT I-122 52145 47 0455351	PLGET SIDLAD ENERGY NC	53067070520
ICEDSE44 Thurston	Ourein	UA	56502		VOLT		Clean Alternative Fuel Vehicle Eligible	30	- 6	96		PONT 1-122 32145 47 0453301	PLGET SOLAD ENERGY NC	5306701901
SYDICAEDING	Redmond	UA	50052	2020 TETLA	MODEL X		Clean Alternative Fuel Vehicle Eligible	290	- 2	44		PONT (-122 10302 47 67668)	PLGET SOUND EMERGY INCUSTS OF TACOPIA - (WA)	53033032328
SYLVEREN MARIO	Kinomo	US	26346	2018 TESLA	MODEL 3	Batev Becrio Vehicle (BEV)	Clean Alternative Fuel Vehicle Eliobie	76	- 0	22		PONT (-122 50156 47 8019)	PUGET SID AND ENERGY NC	53035090302
10FV5500 Hos	Seatle	US	56307		BOLTEV	Signey Electric Vehicle (BEV)	Clean Alternative Fuel Vehicle Eligible	230	- 2	- 23		PONT 1-122 378695 47 669051	CITY OF SEATTLE - (WAIKITY OF TACOMA - IWAI	53033004600
HADCC3.GHos	Septie	UA	96177	2020 934	MBO		Clean Alternative Fuel Vehicle Eligible	239	- 6	32			CITY OF SEATTLE - INASCITY OF TACORIA - INAI	53033000500
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SV-JSETEAA Sookoosii	Makken	UA	96275	2019 TETLA	MODEL 3	Flames Electric Vehicle (BEV)	Clean Alternative Fuel Vehicle Eligible	29	- 6	21		PORT 1-122 29996999999998-47 94997900000		5300000000
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THEADNCP HOUSE	Par Dishart	UA	98367	2010 MSSAN	LEAF	Eletery Electric Vehicle (BEV)	Clean Alternative Fuel Vehicle Eliable	- 73	- 7			PONT I-1/2 6/6/94/2009997 47 50645300000		50005082901
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395-239508504	Federal Van	US.	20000	2023 EMU	230E	Plug-in Michael Electric Vehicle (PHEV	Nice eligible due to low harness range	29	0	30	22394750	PCWf 1-122 31327-47 323290	PLOST SICLAD ENERGY MODICITY OF TACOMA-IN/A)	530330303030
WANABGE King	Bothell	U.S.	50075	2023 ALEX	P. TOOM		Clean Alternatus Fuel Vehicle Eligible	222	- 6		34490670	DOWN 1,522 2067799999999 47 2624252000	PLICET SICLAD ENERGY INCLICITY OF TACOMA-(WA)	530330023003
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758/5007 King	Fleraco	US.	20052	2022 TESLA	MODELY		Digibility unknown as battery range has not been research	- 0	- 0	- 1	16056062	PCR/ 1-122 15712999999999 47 46717500000	PLOST NOUND ENERGY INCIDITY OF TACOMA-(WA)	530330258025
PACESCLESCO	Searte	Via.	50325	2010 FORD	C-MAX	Plug-in Hubral Elecetic Vehicle (FHE)	Non-eligible-due to low harners range	19	0	60	12096283	PONT 1-122 256585-47 79588	CITY OF SEATTLE - INAUCITY OF TACOPIA- (MAI	53033002200
1GFD6553 Thurston	Charges	UA.	59513	2017 CHEUROLE	VOLT	Plug-in Michael Cleans Vehicle (FHE's	Clean Alternative Fuel Vehicle Eligible	53	0	- 2	23834347	PCW/f 1-122 81709-46 9085753	PLIGET SOLNDENERGY NC	53067052320
KLSCL6500-King	Shorekee	UA.	56733	20W O EVROLE	SPARK	Diamery Electric Vehicle (BEV)	Clean Alternative Fuel Vehicle Eligible	63	0	32	224451370	POWI 1-122 34563399999995 47 7672600000	CITY OF SEATTLE - INAUCTY OF TACOMA - (MA)	53033020700
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SVJSAR23 Snehome	Mirygion	VA	98223	20°B TEBLA	MODEL S	Elamery Electric Vehicle (SEV)	Clean Alternative Fuel Vehicle Eligible	208	0	39		PCW/f 1-122 12324 48 154850	PLGET SOUND EMERGY NC	53063052701
WENTEPECS Thurston	Yelm	VA	59537	2010 6667	13	Plug-in Hubrid Electric Vehicle (PHE's	Clean Alternative Fuel Vehicle Eligible	126	- 0	- 2		PCW/f 1-122 6162299999999446.94126000000		53067012421
SYJSATE28 Snohonia	Edmonds	WA	50026	2017 TEDLA	MODEL 5	Slattery Electric Vehicle (SEV)	Clean Alternative Fuel Vehicle Eligible	210	- 0	27		PCWf 1-122 3056849999999647 8037200000		53063042004
SFASPOSUS KINKAK	Eamon	WA	50325	2018 FORD	FUSION	Plug-in Hubrid Electric Vehicle (PHE's	Nor eligible due to low barners range	19	0	13		PCWf 1-121 17616319999996 47 241060000000	\$PUGET SOUND EMERGY INC	53037975101
BY INCAEZH KING	Redmond	VA.	50052	2017 TESLA	MODELX	Blattery Electric Vehicle (BEV)	Clean Alternative Fuel Vehicle Eligible	200	- 0	45	34852343	PCWf 1-122.12302-47.676689	PUGET SIGURD ENERGY INCLICITY OF TACOMA-(IVA)	53033032323

- Shows the electric cars that are currently registered through Washington State Department of Licensing (DOL).
- Has 17 columns and 143,597 rows.
- Dataset source : https://catalog.data.gov/dataset/electric-vehicle-population-data

DATA ANALYTICS AND RESULTS The Big Questions

Video Games Sales

How has the sales of different genre's evolved over time?

- 1) Which game genres have the highest total global sales?
- 2) Are there any niche genres that have performed exceptionally well or poorly?
- 3) Can we identify trends in genre popularity over time?

What are the trends and patterns across different platforms?

- 1) Which gaming platforms have generated the most sales globally?
- 2) Have there been shifts in platform popularity over the years?
- 3) Are there any specific regions where certain platforms dominate?

What are the trends, patterns and preferences in different regions?

- 1) What is the top-selling video games in each region?
- 2) Can we identify any regional preferences for specific game genres or platforms?
- 3) How do different publishers perform in different regions?

Electric Vehicle Population Data

What is the environmental impact of electric vehicles compared to traditional vehicles?

- 1) How does the electric range vary across different vehicle makers and models?
- 2) Are there any correlations between electric range and vehicle price?
- 3) How does the electric range correlate with CAFV eligibility?

How does the geographic location impact electric vehicle ownership and charging infrastructure?

- 1) Where are the clusters of electric vehicles located based on county and city?
- 2) Are there areas with limited electric vehicle charging infrastructure?
- 3) Which city and counties have most electric vehicles?

How is the electric vehicle market evolving over time?

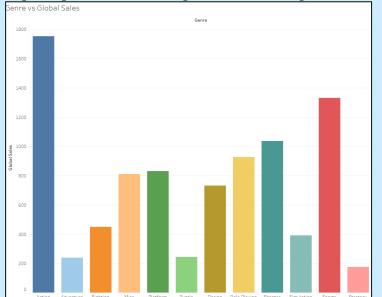
- 1) Are there trends in the adoption of electric vehicles by model year?
- 2) How has the electric vehicle market changed over the years in terms of maker and model preferences
- 3) Is there a noticeable increase in electric vehicle adoption in recent years?



Video Games Sales

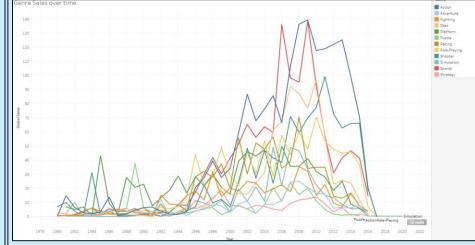
How has the sales of different genre's evolved over time?

1) Which game genres have the highest and lowest global sales?



- Highest Sales = Action (1,751 global sales, almost 20% of total global sales).
- Sports and Shooter genres are second and third best respectively.
- Lowest Sales = Strategy (175 global sales, less than 2% of total global sales.)
 - Puzzle, adventure and simulation games are also very less in demand.

2) Can we identify trends in genre popularity over time? Genre Sales over time



- Late 2000's was the peak of sales. Action, Shooter and Sports genre dominated then.
- Action, Shooter and Sports genres have consistently been well sold globally.
- Mode = Action genre in 2009 (139.4 sales)

Video Games Sales

How has the sales of different genre's evolved over time?

Genre	Median
Action	0.2500
Sports	0.2800
Shooter	0.2400
Role Playing	0.2000
Platform	0.3700
Misc	0.1800
Racing	0.2100
Fighting	0.2400
Simulation	0.1925
Puzzle	0.1550
Adventure	0.1200
Strategy	0.0950

Genre	Mean (Overall Sales)
Action	0.5281
Sports	0.5673
Shooter	0.7919
Role Playing	0.6232
Platform	0.9383
Misc	0.4658
Racing	0.5861
Fighting	0.5294
Simulation	0.4524
Puzzle	0.4209
Adventure	0.1859
Strategy	0.2572

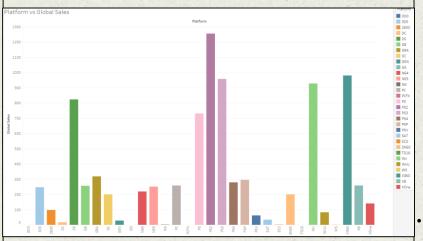
Genre	Mean (2009 Sales)
Action	0.51
Sports	0.75
Shooter	0.77
Role Playing	0.47
Platform	1.42
Misc	0.37
Racing	0.41
Fighting	0.61
Simulation	0.27
Puzzle	0.26
Adventure	0.15
Strategy	0.19

- Platform genres have the highest Medians and Means, despite not being the best sold genres.
- Due to outliers. The Super Mario's franchise (a platform genre) is among the most sold games worldwide.
- Sports and Shooter games follow closely behind. Signalling high and competitive sales.
- Despite the Action genre being the most sold game, Sports and Shooter genres have high outliers.
- This shows that these genres have been well sold throughout the decades as well.

Video Games Sales

What are the trends and patterns across different platforms?

1) Which gaming platforms have generated the most and least sales globally



- PS2 most sold platform (120 million sales), at the time the data was collected
- Followed by the Wii (90 million) and PS3 (80 million).
- Sega CD was the lowest selling at 2 million sales.
- Platforms sold before 2000's weren't well sold.

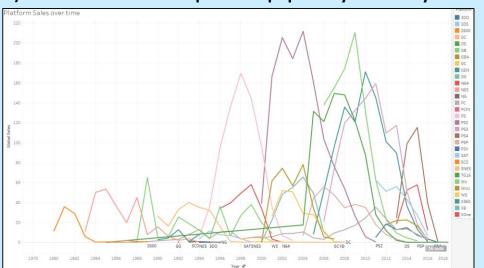
Platform	Mean	Global Sales
PS2	0.58105	1,255.64
X360	0.77467	979.96
PS3	0.72072	957.84
Wii	0.6994	926.71
DS	0.38025	822.49
PS	0.61092	730.66
GBA	0.38747	318.5
PSP	0.24425	296.28
PS4	0.82768	278.1
PC	0.2696	258.82
хв	0.31342	258.26
GB	2.60663	255.45
NES	2.56194	251.07
3DS	0.48617	247.46

- Despite PS2 being the most sold, the GB, NES and PS4 have the highest mean.
- Higher mean ratio means more games were sold per console.
- This shows that those platforms had the most sold video games.
- Game Boy (GB) and Nintendo ES (NES) released in the 80's when competition among other platforms was less, so more games for them.
- If a console has smaller game library, each game has a more significant impact on the mean.

Video Games Sales

What are the trends and patterns across different platforms?

2) What are the shifts in platform popularity over the years?



- PS1 peaked in popularity during the late 90's, particularly in 1998 (100 million)
- PS3 and the Xbox 360 had similar competitive sales from the late 2000's to the early 2010's. Both platforms peaked around 2011.
- Many platforms have sharp declines, usually just after release of newer platform or discontinuation
- Towards the late 2010's, the PS4 had sharp and steady increment, signaling its future domination

Platform	Mean
NES	0.11
NG	0.2
3D0	0.02
SAT	0.192
PS	0.354
GB	4.057
SNES	0.662

Platform	Mean
PSP	0.475
PC	0.337
DS	0.759
GC	0.348
XB	0.37
GBA	0.446
PS2	0.818

all 01 2004	3DS
	PS3
	PS4

Mean of 1994

Mean of 2004



Mean of 2014

Platform

PSP

Wii

OC

PSV

WiiU

X360

Mean

0.02

0.024

0.74

0.304

0.145

0.726

0.56

0.546 0.472 1.317

- GB (Game Boy) stood out in 1994, meaning sales of GB games were very popular.
- PS2 and DS dominated 2004.
- PS4 stands out, with Wii and Wii U close behind.
- By visualizing and taking the mean of video game platform sales over the decades, this shows how game platforms sales vary over the years and decades.

Video Games Sales

What are the trends, patterns and preferences in different regions?

1) What are the top-selling video games in each region?



Name	Mean (EU)	Mean (Japan)	Mean (North America)	Mean (Others)	Mean (Global)
Call of Duty: Black Ops	1.9	0.118	3.518	0.672	6.206
Call of Duty: Modern Warfare 3	2.8225	0.155	3.895	0.8375	7.7075
Grand Theft Auto V	4.608	0.278	4.692	1.606	11.184
Tetris	1.475	3.015	13.085	0.345	17.92
Super Mario Bros.	2.44	3.48	16.24	0.495	22.655
New Super Mario Bros.	9.23	6.5	11.38	2.9	30.01
Pokemon Red/Pokemon Blue	8.89	10.22	11.27	1	31.37
Wii Sports Resort	11.01	3.28	15.75	2.96	33
Mario Kart Wii	12.88	3.79	15.85	3.31	35.82
Wii Sports	29.02	3.77	41.49	8.46	82.74

- EU, North America and 'other regions' have Wii Sports as their highest selling video game.
- The highest selling video game in Japan is Pokémon Red, which wasn't sold well in other regions.
- There are variations in different nations, such as Wii Sports being well sold in North America but not other regions, or Super Mario Bros and Tetris being well sold in Japan alone.
- A nations culture, influence and possible loyalty to ones national products influence these sales.
- Some games that did well globally did not do well in specific regions. Such as Wii Sports, Call of Duty and GTA V, which did well in other nations but not Japan.

Video Games Sales

What are the trends, patterns and preferences in different regions?

2) How do different publishers perform in different regions?



Publisher	Mean (EU)	Mean (Japan)	Mean (North America)	Mean (Others)	Mean (Global)
Nintendo	0.595647	0.647824	1.16198	0.135605	2.54134
Microsoft Game Studios	0.363016	0.017249	0.82196	0.098201	1.30048
Take-Two Interactive	0.286053	0.014116	0.53387	0.133753	0.96741
Sony Computer Entertainment	0.274846	0.108492	0.38832	0.117789	0.88946
Electronic Arts	0.274811	0.010392	0.44047	0.096055	0.82185
Activision	0.221056	0.006708	0.44072	0.077272	0.74611
Warner Bros. Interactive Entertainment	0.228966	0.004483	0.34991	0.08	0.66332
Square Enix	0.140858	0.214077	0.2088	0.059614	0.62309
Disney Interactive Studios	0.158899	0.002569	0.32725	0.060459	0.55028
Capcom	0.10294	0.178688	0.20627	0.03895	0.52727
Ubisoft	0.177329	0.008143	0.27517	0.054571	0.51544
THQ	0.13249	0.007007	0.29199	0.044951	0.4766
Atari	0.074711	0.029504	0.30314	0.024821	0.43311
Sega	0.128326	0.089249	0.17121	0.038372	0.42721
Konami Digital Entertainment	0.083762	0.109736	0.11077	0.03643	0.34091
Namco Bandai Games	0.04574	0.136341	0.07459	0.015762	0.27263

- Nintendo, Activision. And Electronic Arts have the most sales in all regions.
- Nintendo has the highest mean global sales figure.
- Homegrown publishers play a role, such as for Nintendo's popularity in Japan
- Specialized markets are also influential, like for EA, which specializes in sports, particularly football, where 'other regions' have big fanbases of the sport.
- Publishers such as Activision and Sony also have good global sales.
- High sales in a nation indicates a strong presence in that nations market.

Region	Median
EU	Sony Computer Entertainment (1009.65)
Japan	Namco Bandai Games (488.69)
North America	Activision (1802.89)
Others	Activision (338.045)

DATASET 2: ELECTRIC VEHICLE POPULATION DATA

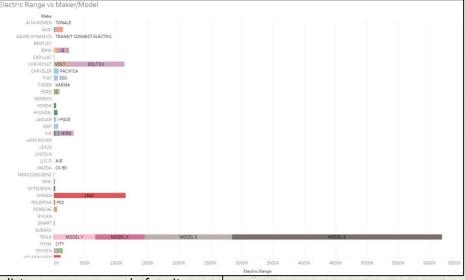


Electric Vehicle Population Data

What is the environmental impact of electric vehicles compared to traditional vehicles?

1) How does the electric range vary across different vehicle makers and models?



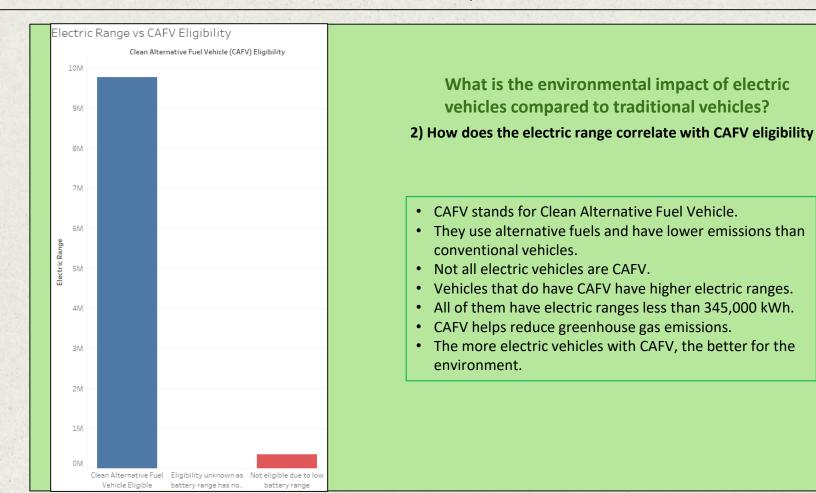




- Electric range is the distance a car can go before it needs to be recharged.
- · Measured in Miles.
- Tesla Model 3 has the highest electric range.
- Other Tesla models follow closely behind, such as Models S,Y and X.

- Shows Tesla's dominance in having good electric ranges.
- Luxury manufacturers, such as Mercedes, Mini, Porsche, all have low electric ranges.
- Signals that there is no correlation between luxury cars with good electric ranges

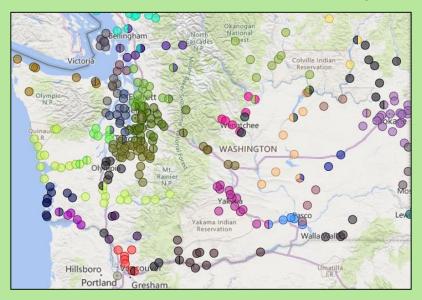
Electric Vehicle Population Data



Electric Vehicle Population Data

How does the geographic location impact electric vehicle ownership and charging infrastructure?

1) Where are the clusters of electric vehicles located based on city and county?

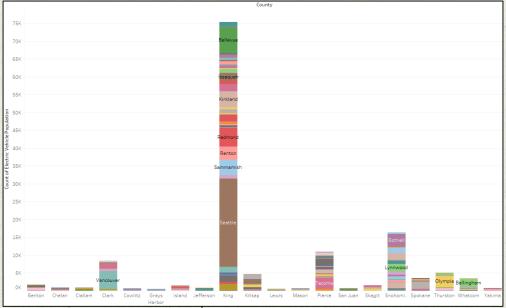


- Seattle has the highest cluster of electric vehicles in Washington.
- Seattle has the most charging stations in Washington.
- Seattle also has high gasoline prices .
- Various policies aimed at reducing carbon emissions and promoting clean energy.

Electric Vehicle Population Data

How does the geographic location impact electric vehicle ownership and charging infrastructure?

Which counties and cities have the most and least electric vehicles sales?

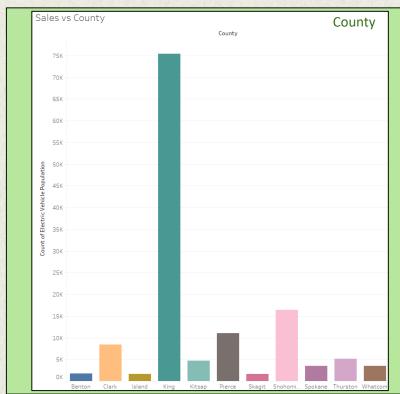


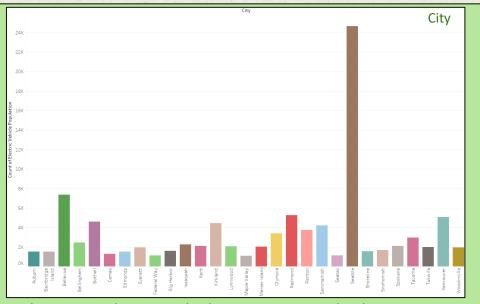
- King county has the highest number of EV sales, more than half of the total EV sales in Washington
- Followed by Pierce County and Snohomish County
- These three counties account for more than 70% of the total EV population in the state.
- Has more incentives, infrastructure, and awareness for EV adoption than other counties.
- Garfield County has the lowest EV adoption.
- Due to it being the smallest county in the state, with less access to less access to EV charging stations, dealerships, and services and its rural nature.

Electric Vehicle Population Data

How does the geographic location impact electric vehicle ownership and charging infrastructure?

Which counties and cities have the most and least electric vehicles sales?



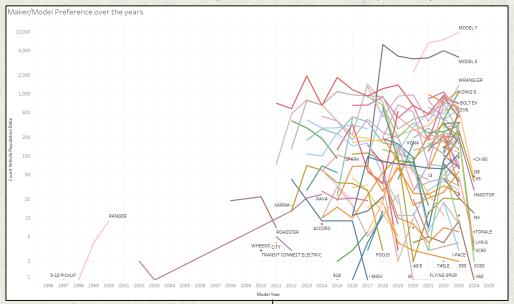


- These two graphs support the data points mentioned earlier
- The mean for counties = 12,102, so King and Snohomish have above average EV sales
- The mean for cities = 3401, 9 cities have above average EV sales, 6 of which are located in King Count

Electric Vehicle Population Data

How is the electric vehicle market evolving over time?

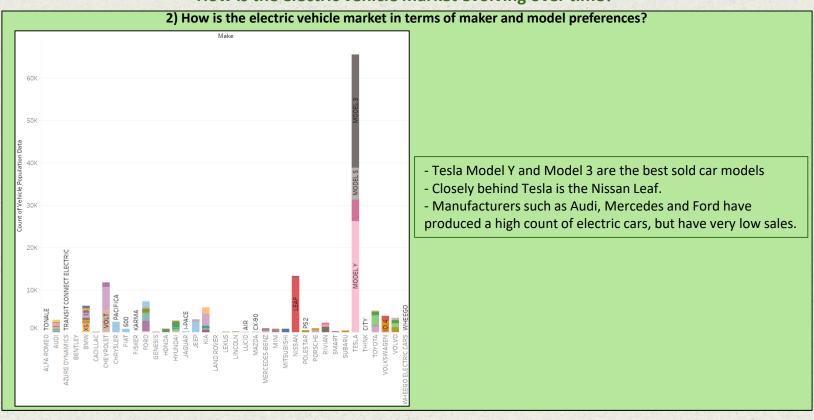
1) Are there trends in the adoption of electric vehicles by model year?



- The demands for Tesla Model X was the highest which rose from less than 100 units sold in 2015 to over 1500 sold in 2021.
- Model X, Model Y and Model 3 have the highest growth rates, suggesting Tesla cars have the highest demand.
- Over the years, it can be seen that adoption of electric vehicle has increased over the years
- More manufacturers are also increasing production of electric vehicles, signaling an increase in demand

Electric Vehicle Population Data

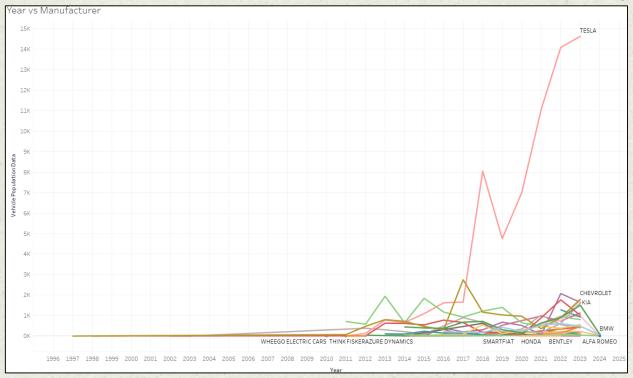
How is the electric vehicle market evolving over time?



Electric Vehicle Population Data

How is the electric vehicle market evolving over time?

2) How is the electric vehicle market in terms of maker and model preferences?



Maker	Mean
Tesla	4370
Kia	658
Ford	487
Chevrolet	844
Hyundai	357
BMW	564
Volvo	379
Audi	322
Nissan	1024
Volkswagen	564

- To make it clearer, this is the graph and mean of the manufacturers global sales.
- It shows that Nissan and Chevrolet have the highest mean car sales.
- Despite Tesla cars having most global sales, outliers, such as the popular Nissan leaf, affects the mean values.
- Nissan for example, only produced two cars but has high global sales.

THANK YOU