Homework 3: Decision Making

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- **Determine the selection criteria**

Assumption:

Cost, safety, range and brand are the only criteria to be considered when purchasing the new electric vehicle

Cost:

Cost is one of the key factors to consider as this determines how much you'll have to pay for it

Safety:

Accidents are possible to happen when driving. Safety rating is the most crucial criterion to consider among all criteria. Cars with better safety ratings can protect you and your passengers during any unexpected accident

Range:

For electric vehicles, charging stations are harder to find than gas stations and it is quite a disadvantage compare to non-electric cars. How long a charge lasts determines how often you'll need to charge the vehicle

Brand:

Brands may reflect the car's durability, depreciation rate, maintenance and more

Selection Criteria
Purchase Cost
Safety
Range per Charge
Brand Recognition

- **Determine the criteria weightings**

Safety rating would weigh the most as it is crucial when accidents happen. Cost and range are important factors to consider when purchasing an electric car and they are relatively easy to quantify. Brand weighs the least among these 4 criteria as it is the least important in terms of daily usage

	Cost	Safety	Range	Brand
Cost	1	2/3	3/2	5
Safety	3/2	1	2	9
Range	2/3	1/2	1	4
Brand	1/5	1/9	1/4	1

	Cost	Safety	Range	Brand	Mean	Weight
Cost	1	2/3	3/2	5	1.50	0.29
Safety	3/2	1	2	9	2.28	0.45
Range	2/3	1/2	1	4	1.07	0.21
Brand	1/5	1/9	1/4	1	0.27	0.05

- **Identify alternatives**

Assumption:

There's no personal preference or budget limit considered when identifying the alternatives below.

Highlights of each recommendation:

BMW i3: Unique look, relatively affordable with great safety rating

FIAT 500e: One of the most budget-friendly electric cars on the market with decent safety rating

Tesla X P100D: The most advanced technology brings the longest battery life among all the alternatives, as well as best safety rating in the market

Alternatives
BMW i3
FIAT 500e
Tesla X P100D

- **Rate alternatives relative to the criteria**

Ratings are mostly quantified with numbers looked up from various responsible websites. The only criterion "brand" rating isn't quantified but based on our group's general awareness of BMW, FIAT and Tesla

Reference:
https://www.fleetcarma.com/
https://www.usnews.com/

Purchase Cost

	Price	Factor a	Normalized Factor a
BMW i3	$42,400	1.29	0.19
FIAT 500e	$32,995	1	0.15
Tesla X P100D	$145,000	4.39	0.66

Safety

	Safety Rating	Normalized Safety Rating
BMW i3	9.9	0.35
FIAT 500e	8.5	0.30
Tesla X P100D	10	0.35

Range per Charge

	Range	Normalized Range
BMW i3	114 miles	0.23
FIAT 500e	84 miles	0.17
Tesla X P100D	289 miles	0.59

Brand Recognition

	BMW i3	FIAT 500e	Tesla X P100D	Brand Rating
BMW i3	1	2	1/2	0.29
FIAT 500e	1/2	1	1/4	0.14
Tesla X P100D	2	4	1	0.57

- **Compute scores for the alternatives**

	(Weight)	BMW i3	FIAT 500e	Tesla X P100D
Cost	0.29	0.19	0.15	0.66
Safety	0.45	0.35	0.30	0.35
Range	0.21	0.23	0.17	0.59
Brand	0.05	0.29	0.14	0.57
Score	-	**0.275**	**0.221**	**0.501**

- **Review the decision**

	(Weight)	BMW i3	FIAT 500e	Tesla X P100D
Cost	0.29	0.19	0.15	0.66
Safety	0.45	0.35	0.30	0.35
Range	0.21	0.23	0.17	0.59
Brand	0.05	0.29	0.14	0.57
Score	-	**0.275**	**0.221**	**0.501**

Base on the weighted and quantified calculation above, we'd recommend Tesla X P100D as the best among the alternatives we chose. With budget not being a constraint, this is certainly the ultimate electric automobile, providing the best safety rating and longest range per charge, available this very moment on the market. This most premium Tesla is the "safest, quickest, and most capable sport utility vehicle in history. Designed as a family car without compromise, it comes standard with all-wheel drive, ample seating for up to seven adults, standard active safety features, and up to 289 miles of range on a single charge"