

Team Identification Number

16926

M3 Challenge 2023

Executive Summary

Title

Exec Summary

Keywords: Keywords, More Keywords

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1 Q1: The Road Ahead

1.1 Defining the Problem

In Problem 1, we were tasked with producing a short-term predictive model for e-bike sales. More specifically, we were asked to develop projections for total sales volume 2 and 5 years into the future respectively.

1.2 Assumptions

Assumption 1: There will be no major legislative changes, governmental campaigns and/or 'black swan' (i.e., highly unpredictable and consequential) world events that significantly impact the market for e-bikes within the next five years.

Justification: in practice, it is impossible to account for rare or extreme events within the constraints of a mathematical model; the implications of such events cannot be predicted with accuracy.

Assumption 2: The market for e-bikes in the European Union behaves comparably to that of the United Kingdom; therefore, British and European sales can be considered to be in direct linear proportion.

Justifications:

a) Of the data provided for European sales, several figures appear to include sales made in the UK (CITE EBICYCLES.COM). Therefore, UK consumer behaviour is partially accounted for even within the larger dataset.

b) E-bicycles have only begun gaining traction as a mode of transport in relatively recent years; as a result, UK-specific consumption data is largely unavailable to the public.

c) To a large extent, the UK and EU follow similar urban planning practices that include pedestrian walkability and bicycle access. In other terms, city layouts support the practical use of e-bikes. For this reason, population-scaled EU predictions can be considered appropriate substitutes for UK-specific predictions. By contrast, most American cities use car-centric design, frequently involving longer commute distances and poor bike access. This renders the United States hostile to the adoption of e-bikes in a way that the EU and UK are not. For this reason, we chose to exclude the US from our analysis, instead focusing on the UK and EU.

Assumption 3: Statement **Justification:** blah blah

1.3 Variables

See table 2.1:

Variable	Definition
x	description
y	description
z	description

Table 1.1: Variables in the Model

1.4 The Model

Model

1.5 Results

Results

1.6 Model Revision

Model Revision

1.7 Evaluation

Strength 1: asdf

Strength 2: asdf

Weakness 1: asdf

1.8 Technical Computing

Technical computing

2 Q2: Shifting Gears

2.1 Defining the Problem

Defining the Problem

2.2 Assumptions

Assumption 1: Statement **Justification:** blah blah

Assumption 2: Statement **Justification:** blah blah

Assumption 3: Statement **Justification:** blah blah

2.3 Variables

See table 2.1:

Variable	Definition
x	description
y	description
z	description

Table 2.1: Variables in the Model

2.4 The Model

Model

2.5 Results

Results

2.6 Model Revision

Model Revision

2.7 Discussion

Strength 1: asdf

Strength 2: asdf

Weakness 1: asdf

2.8 Sensitivity Analysis

Sensitivity Analysis

2.9 Technical Computing

Technical computing

3 Q3: Off the Chain

3.1 Defining the Problem

Defining the Problem

3.2 Assumptions

Assumption 1: Statement **Justification:** blah blah

Assumption 2: Statement **Justification:** blah blah

Assumption 3: Statement **Justification:** blah blah

3.3 Variables

See table 2.1:

Variable	Definition
x	description
y	description
z	description

Table 3.1: Variables in the Model

3.4 The Model

Model

3.5 Results

Results

3.6 Model Revision

Model Revision

3.7 Discussion

Strength 1: asdf

Strength 2: asdf

Weakness 1: asdf

3.8 Sensitivity Analysis

Sensitivity Analysis

3.9 Technical Computing

Technical computing

4 References

4.1 Bibliography

4.2 Program Code

Result data generated:

```
text data stuff
```

Python program code:

```
# pass
```
