A Second Life

The Business of Selling Refurbished iPhones

Team KIM, May 2022
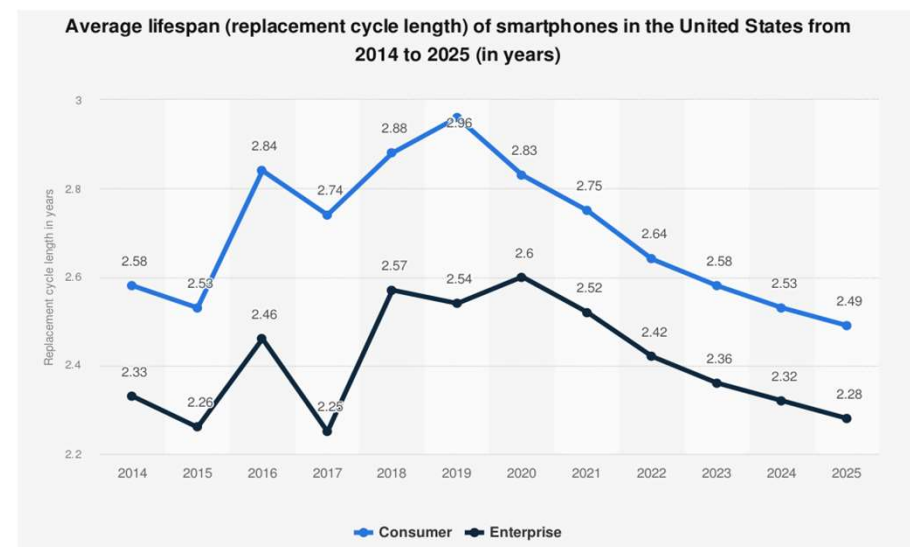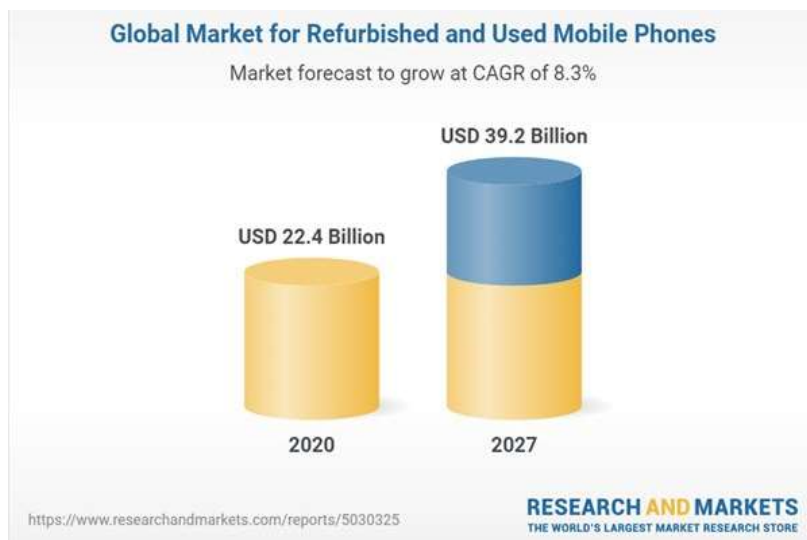
Aim

Apple iPhones shipments worldwide from Q1 2018 to Q2 2021 (in millions of units)
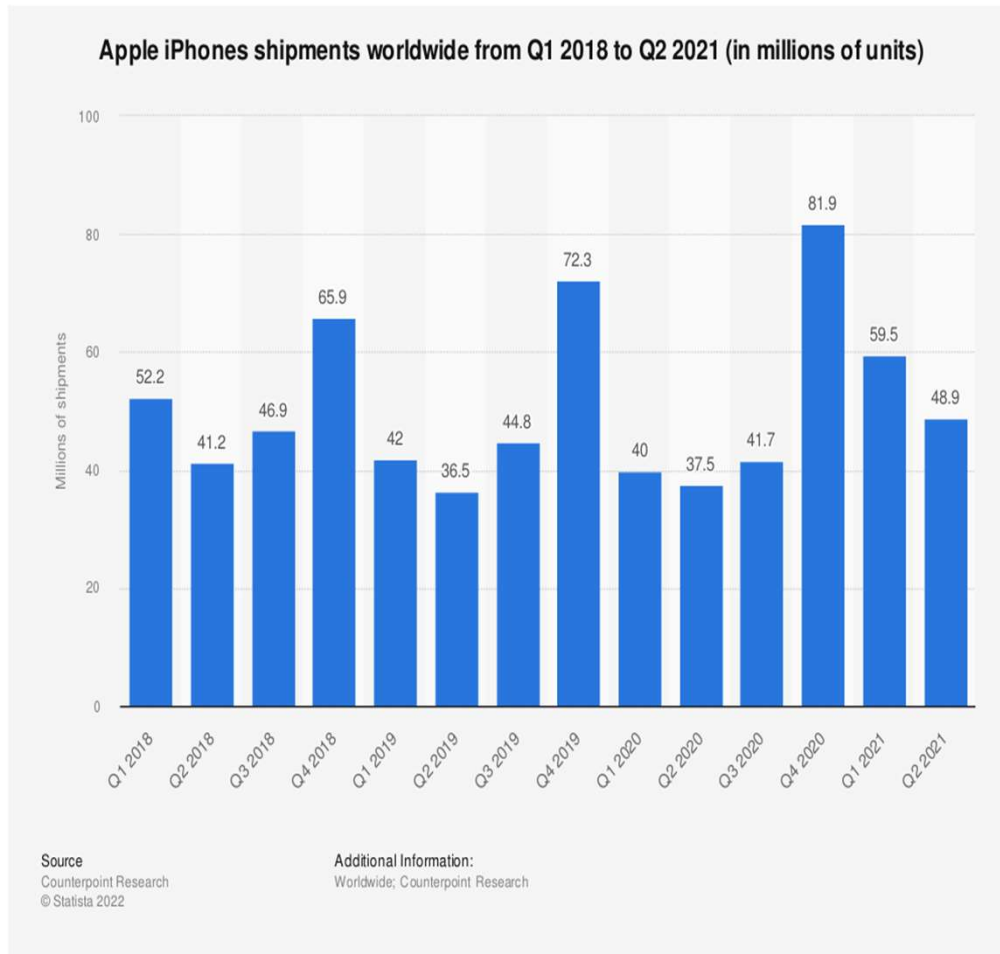
- Apple ships about 200mn iPhones annually, which reflects strong demand for its products, but also leads to a generous market for used iPhones

- Refurbished iPhones are ideal for cost-conscious users, while being environmentally-friendly

- We want to seek optimal profits from selling refurbished iPhones through analyzing the price and cost dynamics of the refurbished phones market
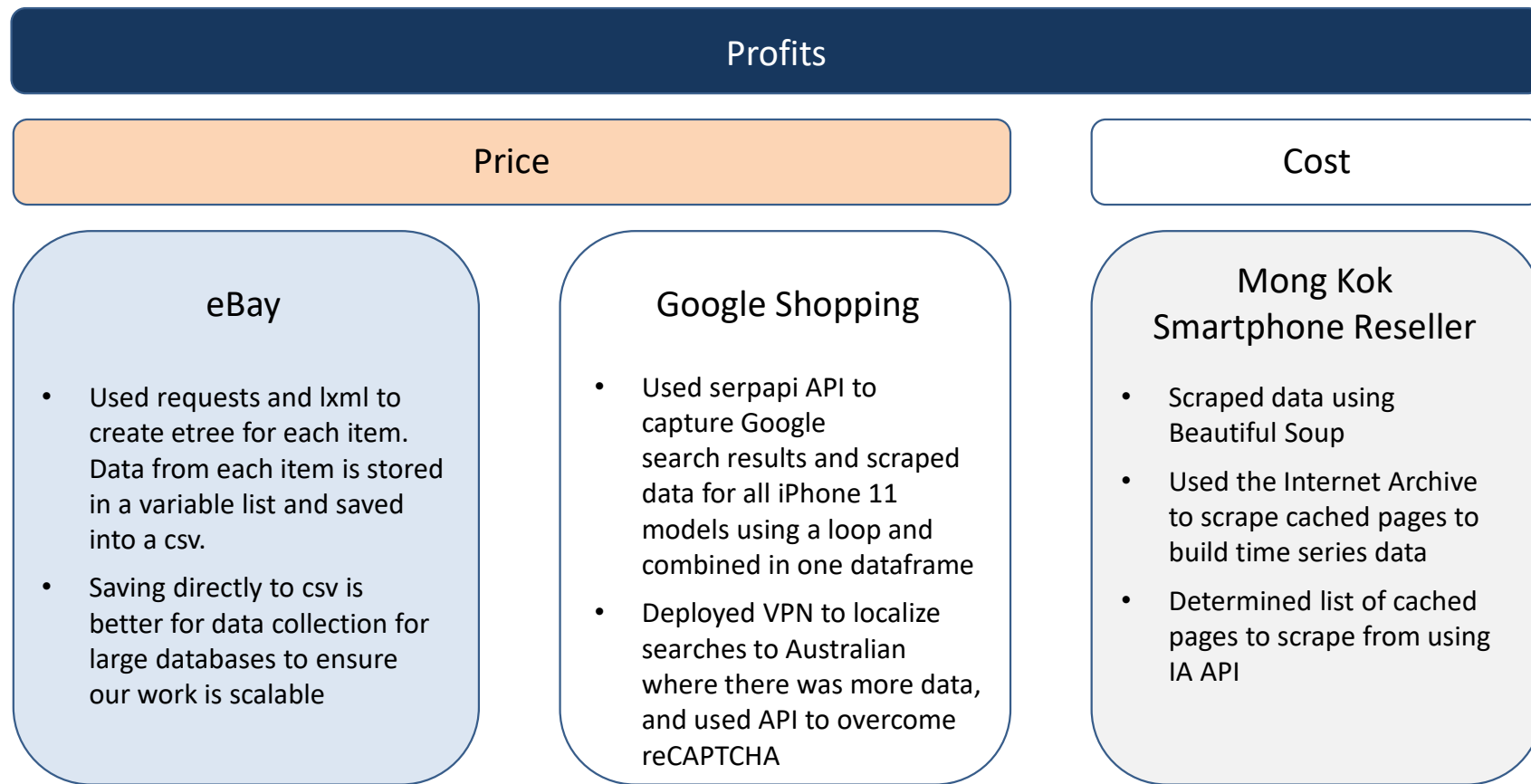
Business Value

- The market for refurbished smartphones is worth USD 22bn and fast-growing

- Users can receive trade-in values for used phones and also save money when buying refurbished phones

- For businesses, selling refurbished phones reduces innovation cost and benefits from a steady supply of inventory from the smartphone replacement cycle (<3Y)

- Using data analysis, we can increase our advantage in this marketplace by analyzing competitors' pricing and adjusting our sourcing strategy to optimize profits

Global Market for Refurbished and Used Mobile Phones
Market forecast to grow at CAGR of 8.3%

USD 39.2 Billion

USD 22.4 Billion

2020   2027

https://www.researchandmarkets.com/reports/5030325

RESEARCH AND MARKETS
THE WORLD'S LARGEST MARKET RESEARCH STORE

Average lifespan (replacement cycle length) of smartphones in the United States from 2014 to 2025 (in years)

Consumer values: 2.58, 2.53, 2.84, 2.74, 2.88, 2.96, 2.83, 2.75, 2.64, 2.58, 2.53, 2.49

Enterprise values: 2.33, 2.26, 2.46, 2.25, 2.57, 2.54, 2.6, 2.52, 2.42, 2.36, 2.32, 2.28

Years: 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025

Consumer   Enterprise

Data Collection

To prove the profitability of our business model we focused on the iPhone because it had an active reseller market, which meant it retains value better and that data would be more easily available

Profits	
Price	**Cost**

eBay

- Used requests and lxml to create etree for each item. Data from each item is stored in a variable list and saved into a csv.
- Saving directly to csv is better for data collection for large databases to ensure our work is scalable

Google Shopping

- Used serpapi API to capture Google search results and scraped data for all iPhone 11 models using a loop and combined in one dataframe
- Deployed VPN to localize searches to Australian where there was more data, and used API to overcome reCAPTCHA

Mong Kok Smartphone Reseller

- Scraped data using Beautiful Soup
- Used the Internet Archive to scrape cached pages to build time series data
- Determined list of cached pages to scrape from using IA API

Pre-Processing

Data Structure
- Web scraping data is received in a structured format with Title, Subtitle, Rating, Item Price, Trending Price, Item Link, Shipping Price
- Since we had multiple data sources this data was standardized and combined into a master csv

Price Data
- Special characters and text are removed data is converted into float, to allow analysis
- Calculations are completed to find the total price of each iPhone 11, by model

Data Extraction
- Model, Storage and Condition data is extracted from the title
- Item link provides merchant information
- Titles are sometimes generic, which it made it hard to extract Storage information

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# Profitability Analysis

Gross Profit by iPhone 11 Model
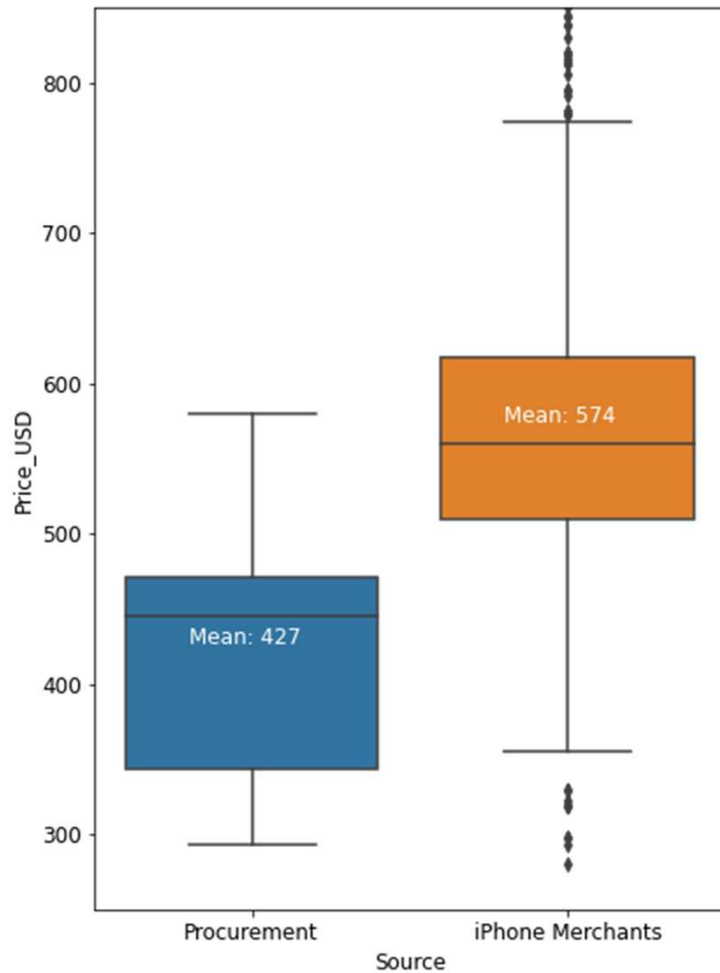
- Sampled ~700 merchant prices by scraping Google Shopping and eBay listings
- We expect to only buy used phones in good condition to minimize repair costs
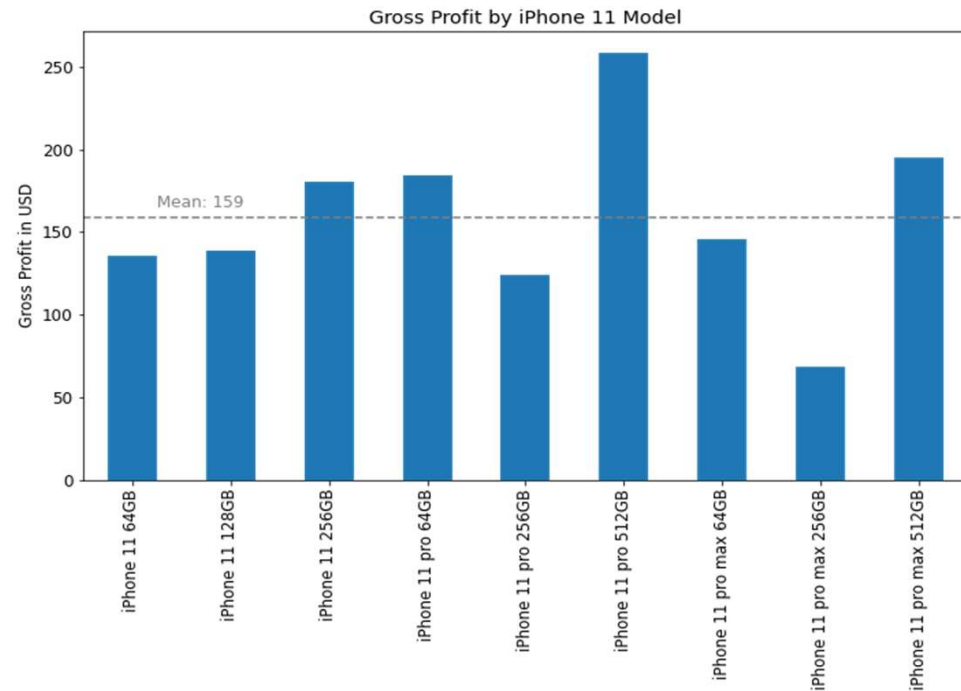
- Combing through competitor prices of refurbished iPhones, we found the average selling price to be USD 574

- Our cost of sourcing is about USD 427, on average

- Across models, our **gross profit** is expected to be USD 159, but lower-end iPhones cost less to acquire and would have the highest margins

Price and Availability
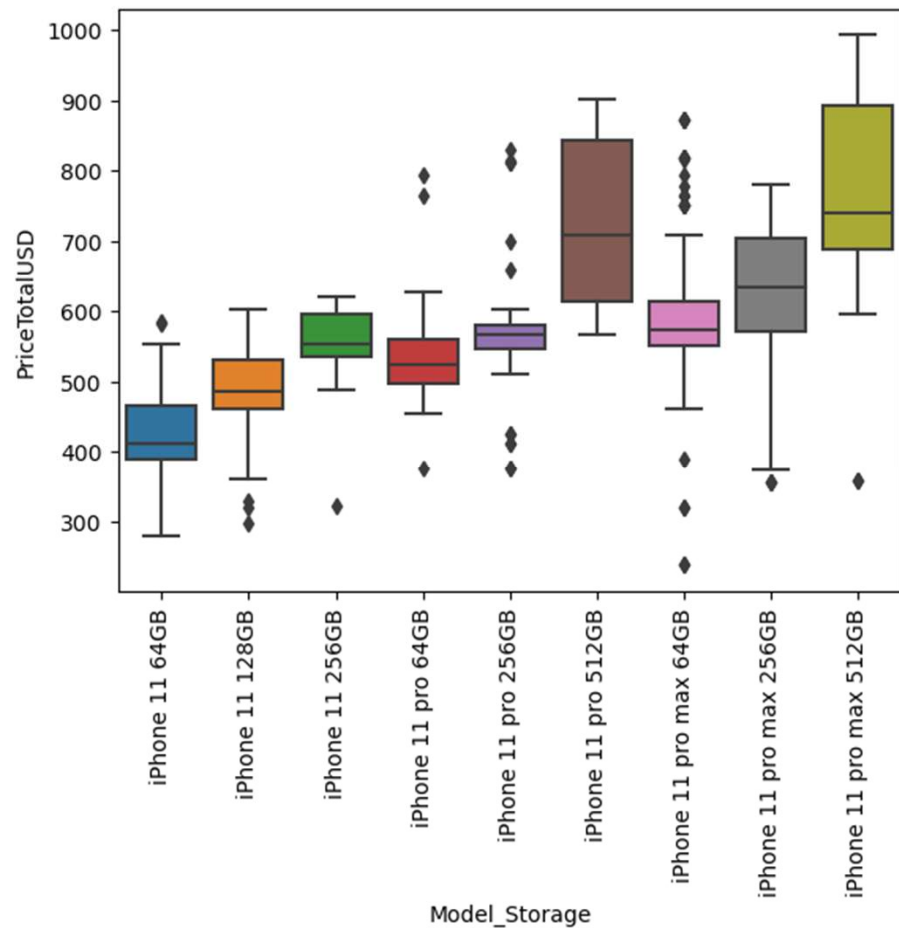
Pricing of Refurbished iPhones

- The iPhone 11 pro and pro max 512Gb sell for the highest prices but also have the widest variation in prices ranges, suggesting illiquidty

- iPhone 11 series has a tight price range which hints higher competition in this segment

- The mean for all iPhones falls between USD$400 and $700

Listings

- The market appears flooded with 64 Gb models. Perhaps limited storage forces user to trade up more frequently. More research needed

- There are fewest listings for the iPhone 11 256Gb and could be a general lack of demand and supply

Number of Listings

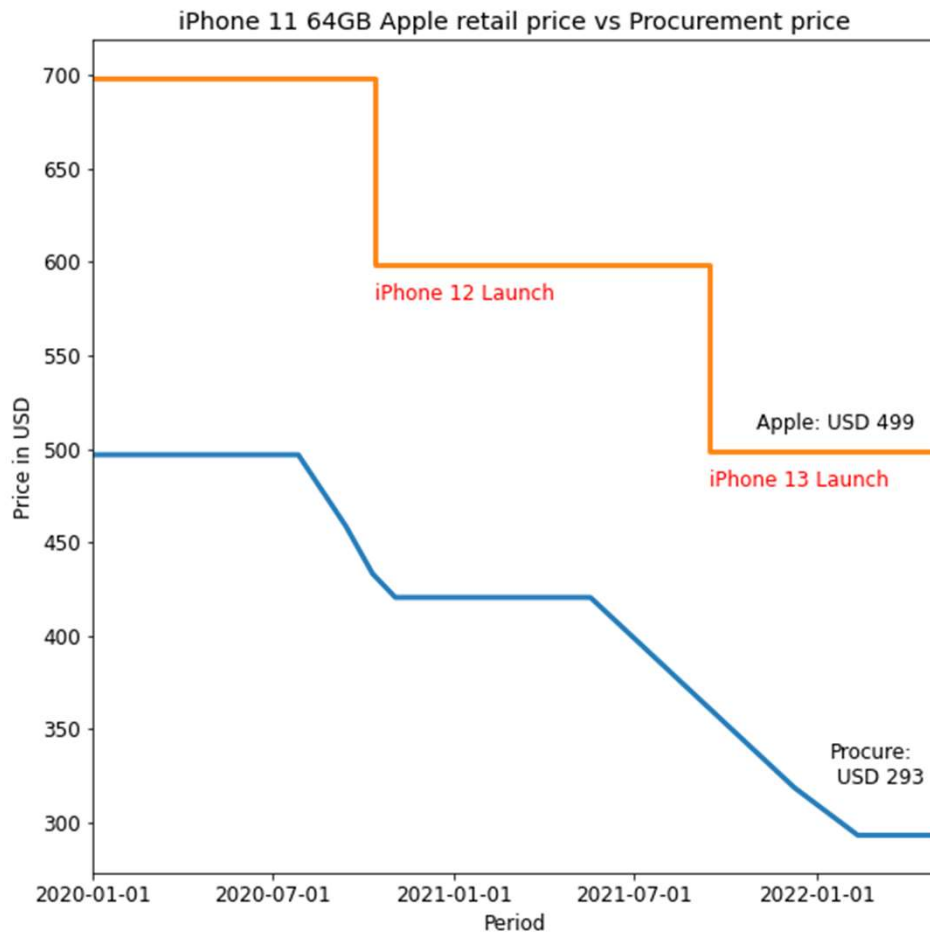| Model_Storage	
iPhone 11 pro max 64GB	223
iPhone 11 pro 64GB	121
iPhone 11 64GB	82
iPhone 11 pro max 256GB	67
iPhone 11 128GB	61
iPhone 11 pro 256GB	60
iPhone 11 pro max 512GB	50
iPhone 11 pro 512GB	41
iPhone 11 256GB	25

Competitive Landscape
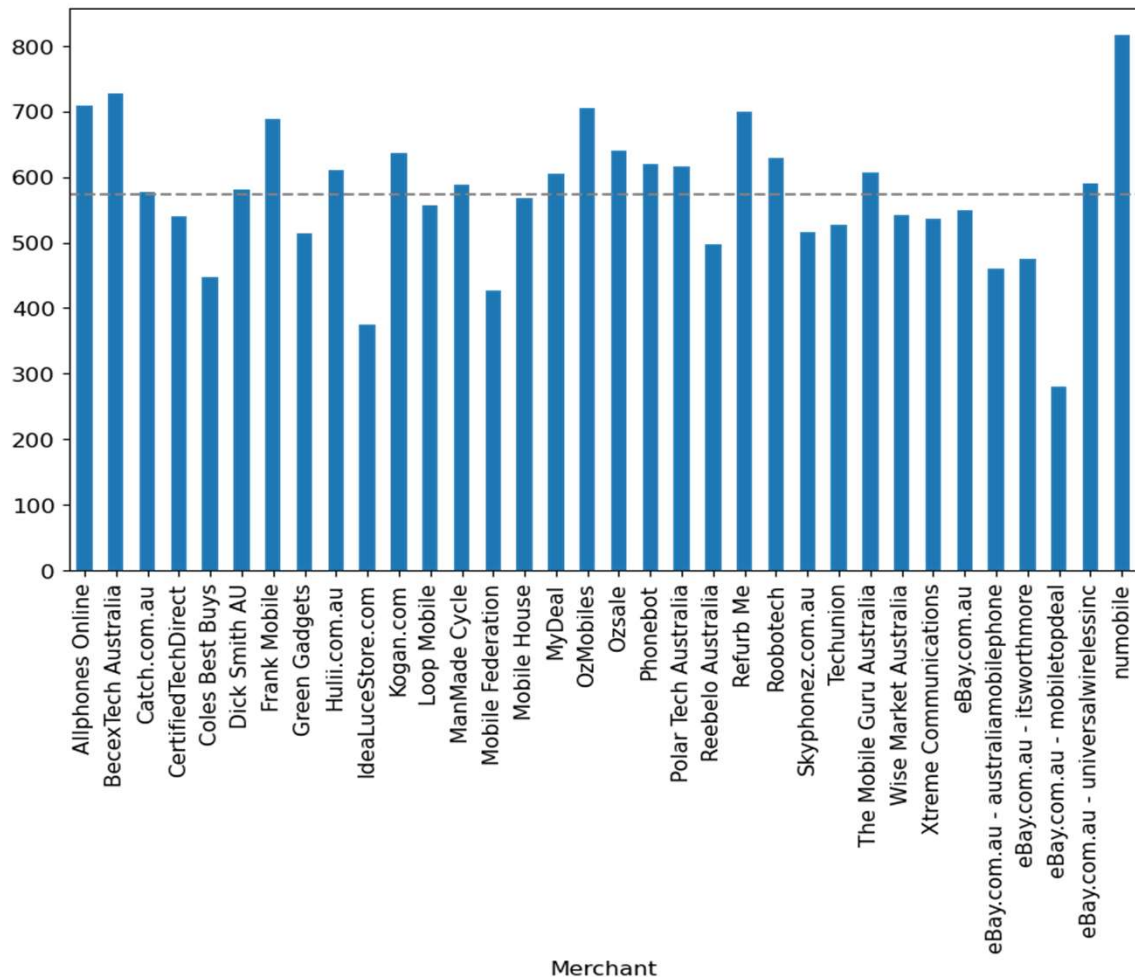
- The refurbished iPhone marketplace is crowded so we expect significant price competition

- There appears to be some niche players, such as numobile that focuses on higher priced iPhones

- Ebay and Idea Luce merchants appear to target lower cost iPhones

Price Evolution Over iPhone Lifecycle

iPhone 11 64GB Apple retail price vs Procurement price

iPhone 12 Launch

Apple: USD 499

iPhone 13 Launch

Procure: USD 293

- Secondary prices are sensitive to Apple pricing policy, but spread remains relatively stable

- The difference between Apple's retail price and the price we source iPhone 11 for is about USD 200 across models

- This spread favors lower priced iPhones, where potential margins are higher

Spread of Retail Price to Cost (iPhone 11 128GB)

Spread
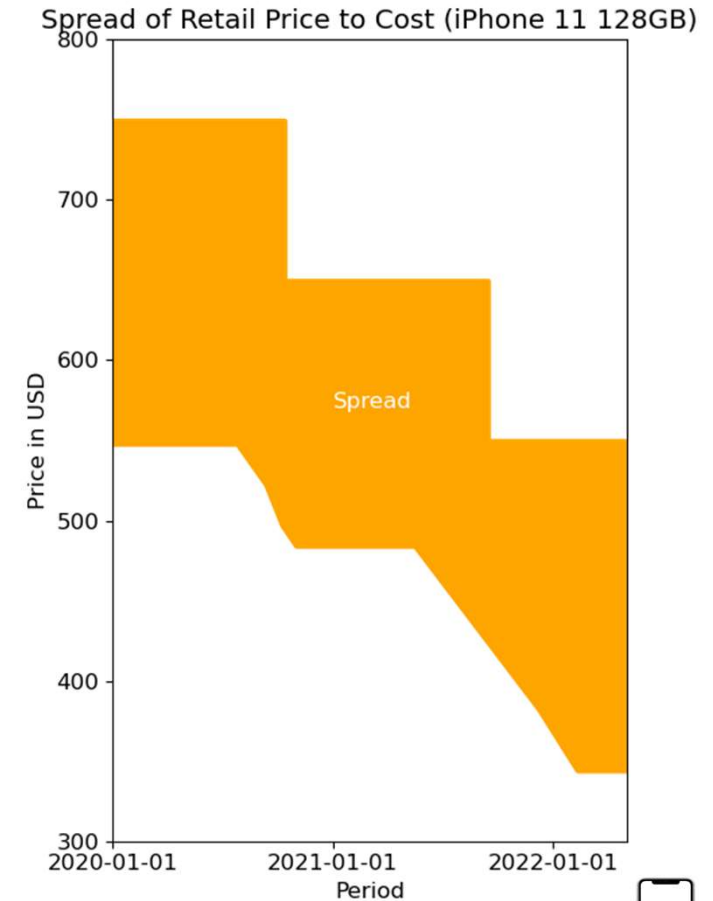
Challenges

- Data unavailability meant we had to be creative
  - Time series data was hard to find
  - Cost data is usually closely guarded
- Data cleaning from sources and eliminating outliers
- User selling information may not be reliable with current market/bulk sale trends
- We assumed we were paying high prices to secure high quality used iPhones, but in reality, the procurement price would need to be adjusted according to the phones' condition
- Scalability: we focused on one product line in one market, there is a lot of room to expand the scope of our research

Conclusion

- Our analysis justifies that selling refurbished iPhones is a viable and profitable business proposition

- Selling of refurbished iPhones not only contributes to the circular economy but is part of a fast-growing market globally

- If we expand our analysis to more marketplaces around the world, we may uncover even more exciting pricing opportunities

Used and Refurbished Smartphone Market - Growth Rate by Region (2022 - 2027)

Regional Growth Rates

High
Mid
Low

Source: Mordor Intelligence
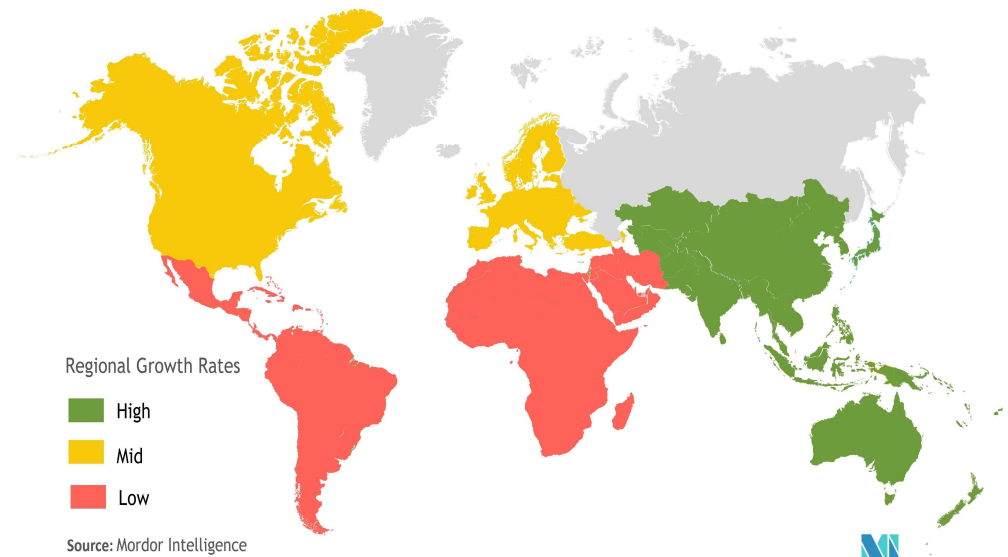
Appendix: Improvement Ideas

- Further analysis can be conducted into the data for better understanding of stock data with each vendor

- More data can be collected on direct costs, such as tax, exchange rate, shipping, and transaction fees involved to better price our iPhones

- Create a script to monitor phone prices and in response create postings when there is a demand for these phones