DATA ANALYSIS REPORT

Prepared by **Nhu Nguyen**

27th April, 2021

Table of Contents

1. Objective of the report

In Finland, the interest in buying second-hand electronic items with a reasonable price is growing; however, the risk of buying from flea markets and being scammed is also high. In order to solve those problems, company A has built an end-to-end market place for refurbished phones.

This data analysis provides a better understanding of the direction and trend of business for refurbished phones to support the supply team in decision making. The critical metrics will be outlined but not only on the financial performance but also the underlying state of the business.

This data analysis project is done in Python and Jupyper Notebook, using the following libraries:

- Numpy, Pandas: loading the dataframe, conducting data cleaning and preparation
- Plotly: data visualization tool

2. Overall

The data was collected from 1st May 2019 until 31st July 2019. In this overall section, we will have an overview about the business.

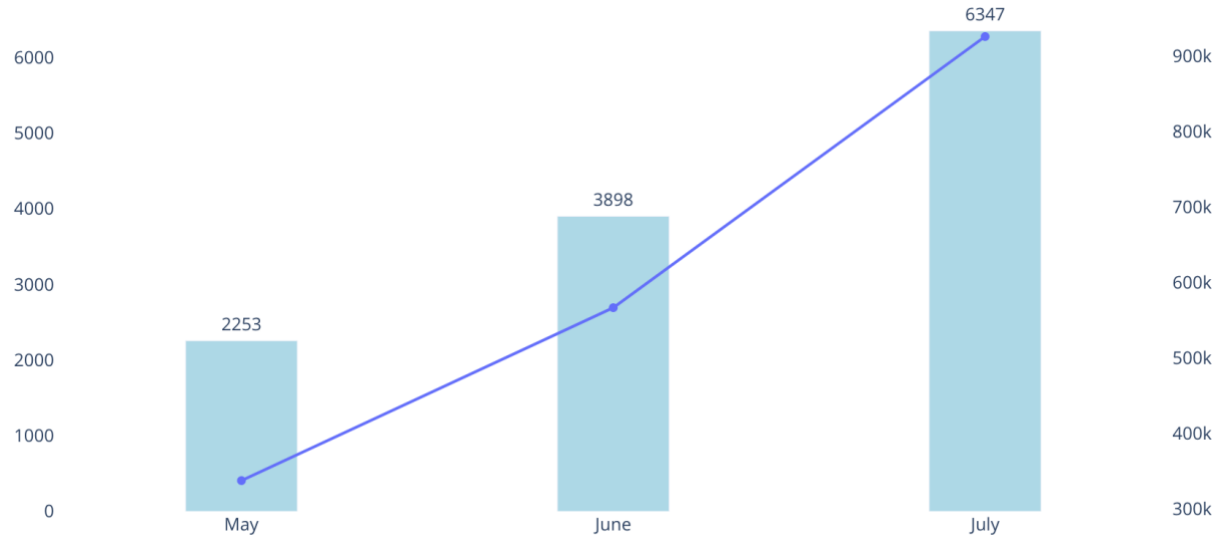


Figure 1. Sales Revenue during May-July

The total growth was mostly doubled in every month. The revenue in May just reached more than 300k euros while in July, it was more than 900k euros.

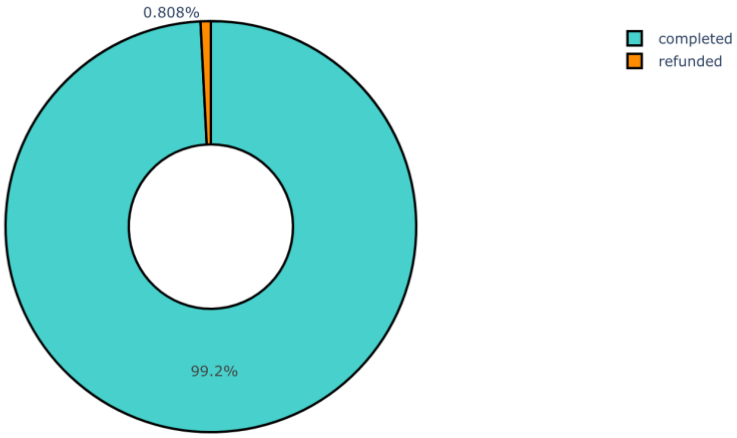


Figure 2. Complete order vs Refunded order

12498 phones were sold during this period, in which 101 phones were returned (0.808%).

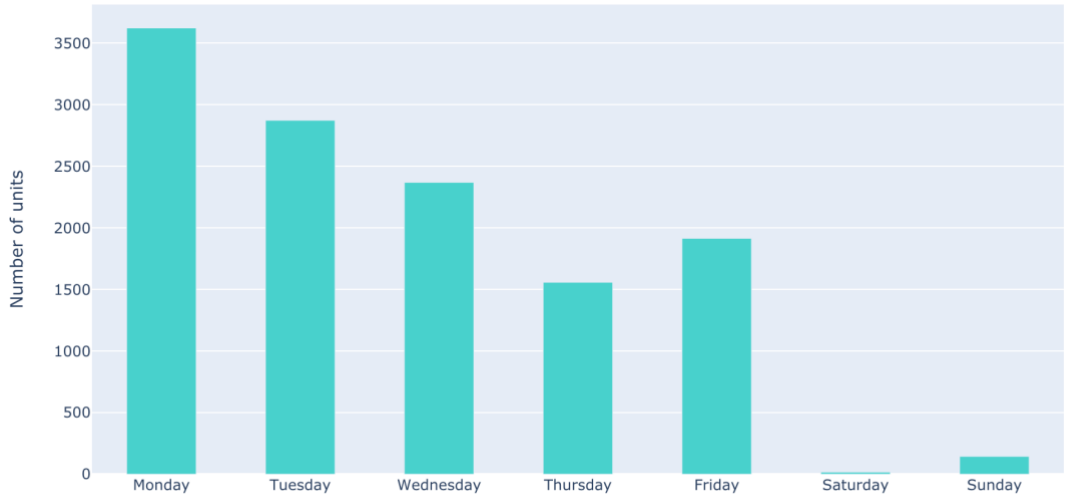


Figure 3. Number of phones sold during a week

It can clearly be seen in the Figure 3 that the number of phones sold during weekdays were much higher than the weekend. Monday is the best sales day.

3. Key metrics

3.1. Product variables

Product variables include model name, storage size and condition grade. The pie chart is chosen to illustrate these variables in order to see the contribution of each variable to the whole.

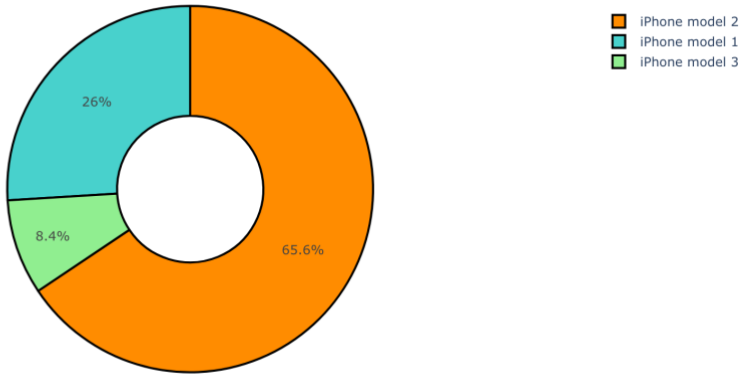


Figure 4. Sales by phone models

The popular phone model is model 2 (65.6%). The second popular one is model 1 with 26%.

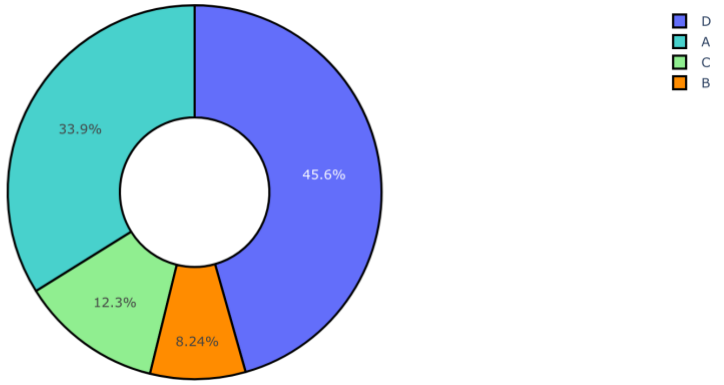


Figure 5. Sales by condition grades

Model condition grade D and A are the most popular one among others (45.6% and 33.9%).

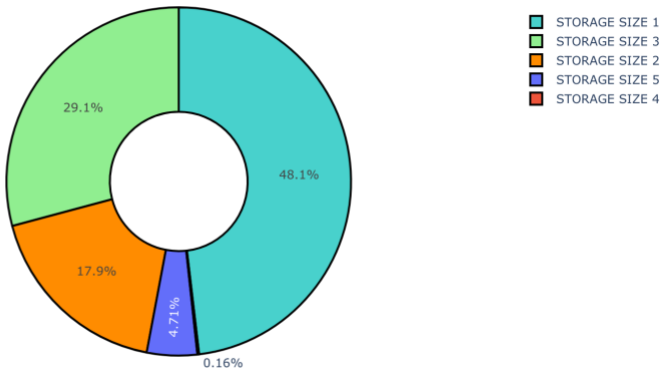


Figure 6. Sales by storage sizes

With the storage size, size 1 was the best seller in the comparison with others (48.1%).

The table below summarized the top five best-seller products and the number of sold units during 3 months.

Table 1. Top five best-seller products

Model name	Storage size	Condition grade	Number of sold units
Iphone model 2	1	D	1870
Iphone model 2	1	A	1408
Iphone model 1	1	D	952
Iphone model 2	2	D	811
Iphone model 2	3	D	807

Number of sales is critical to follow as it affects the total sales profit. For example, based on the model names, phone model 3 has the highest average sales profit (81 euros); however, phone model 2 has the highest total sales profit (450k euros) while phone model 3 only earned 85k euros in total (see Figure 7 and 8). This can be explained by the number of sold phone model 2 is undoubtedly higher than model 3.

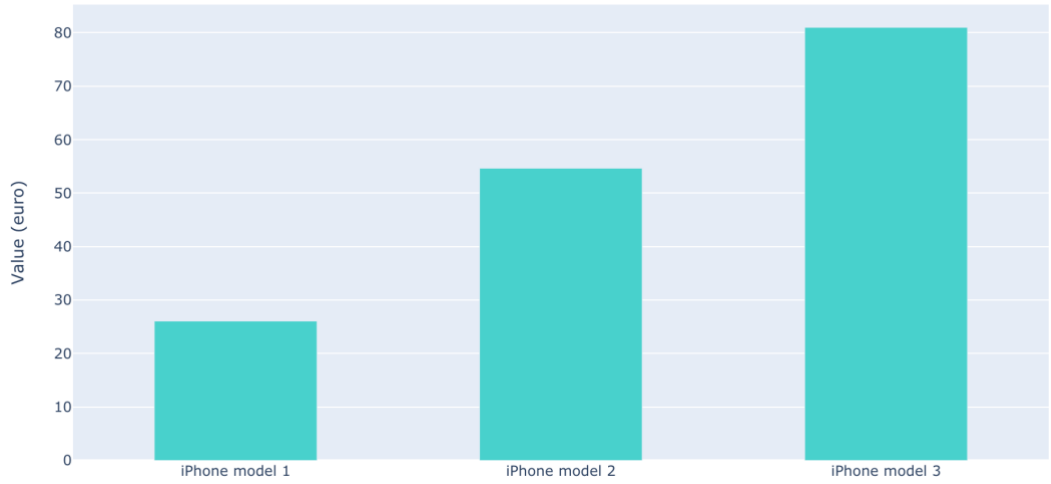


Figure 7. Average sales profit by phone models

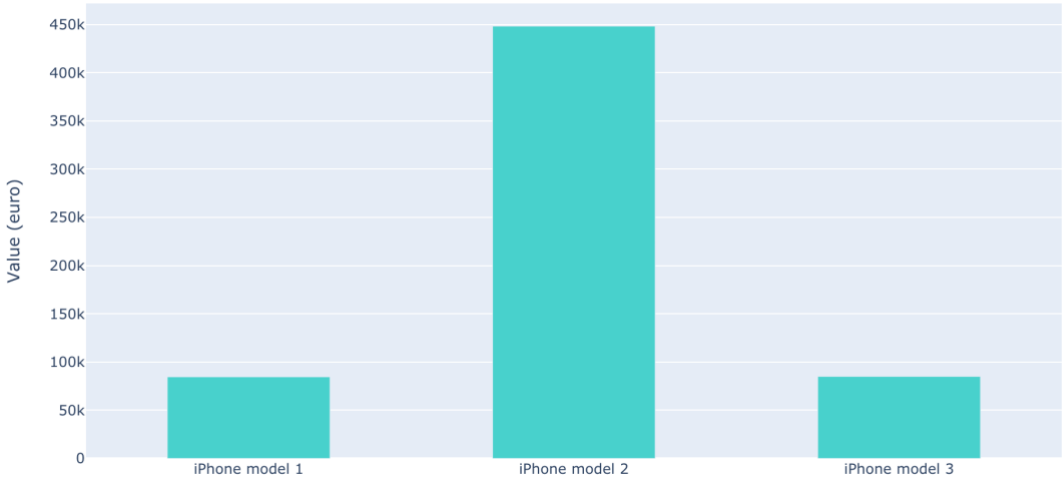


Figure 8. Total sales profit by phone models

3.2. Prices

There are three prices mentioned in the dataset, including sold price, buy price and total repair cost. The buy price and sold price will be analyzed using scatter plot and box plots.

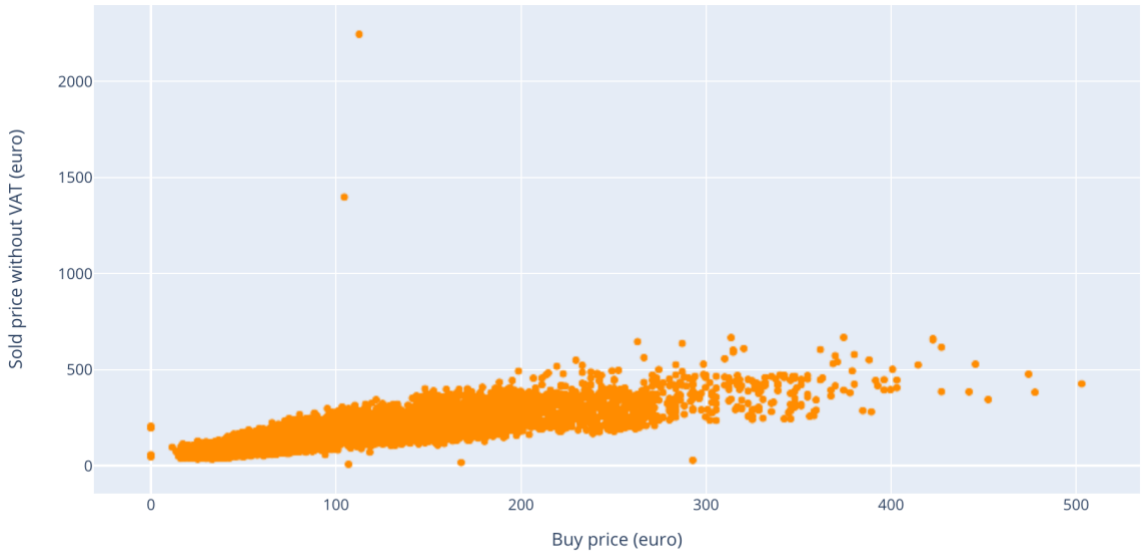


Figure 9. Sold price vs Buy price

Scatter plot is used to illustrate the high correlation between the sold price and the buy price. The higher the buy cost, the higher the sold price. The outliers are noticeable here (the sold prices are 2245 euros and 1398 euros). It is necessary to recheck on the outliers because the price is not reasonable and it could lead to the mistake in calculating profit or revenue. In order to keep the price range under 700 euros for a better analysis, two outliers were temporarily removed.

The price metric is important to notice because it is one of the impact factors to the purchase decision. The below figures show the average price range for each product variable (model name, storage size and condition grade).

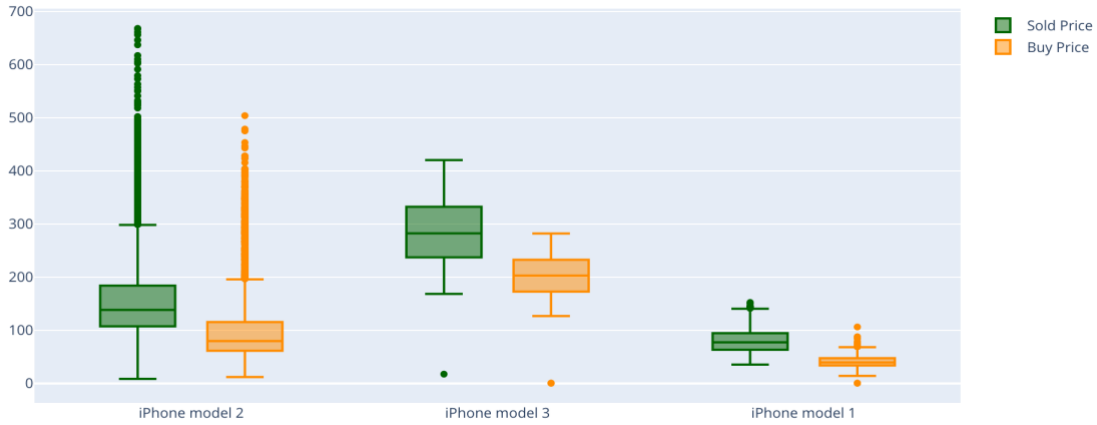


Figure 10. Price range by phone models

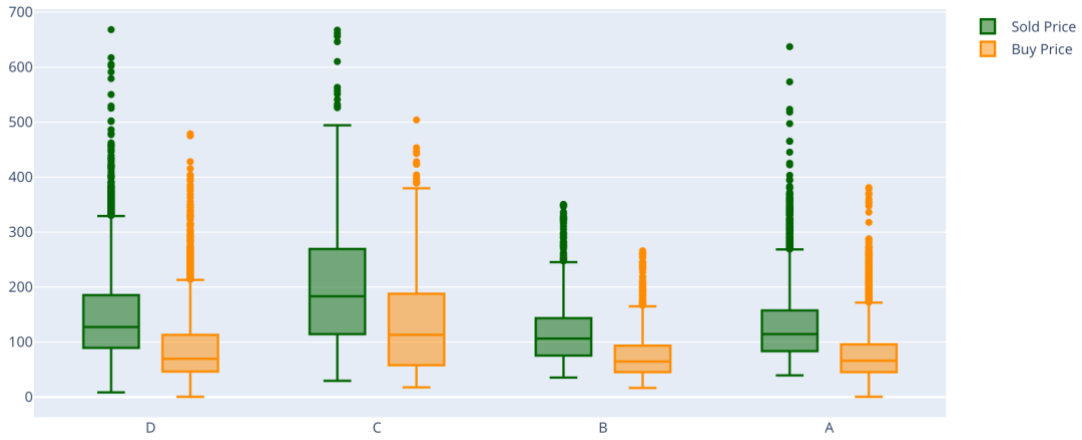


Figure 11. Price range by condition grades

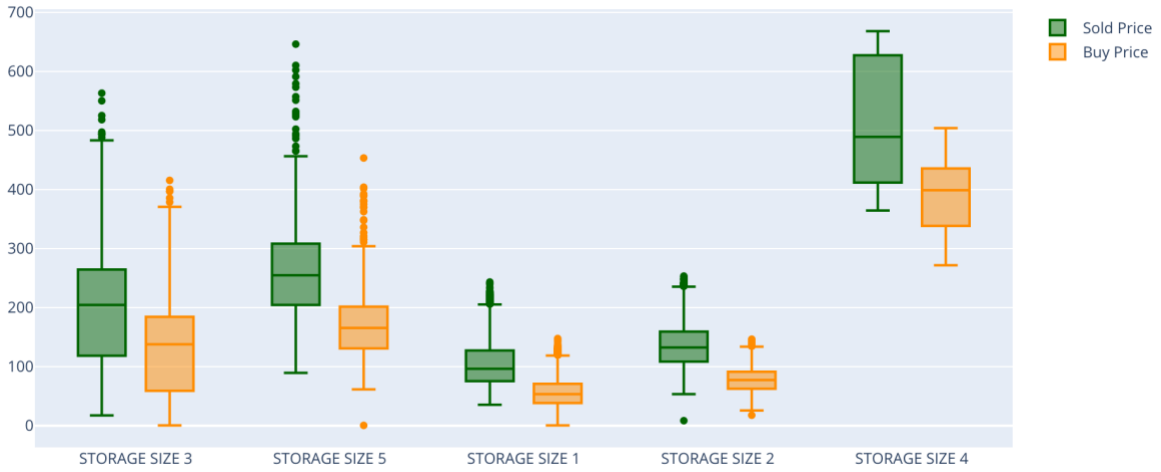


Figure 12. Price range by storage sizes

The box plot is used to show the distribution of sold price and buy price. It is clearly seen that the best seller products mostly have lower prices in comparison to others (iphone model 2, phones with storage size 1 &2, or condition grade A & D). **It is better to keep the average sold price under 200 euros.**

3.3. Refurbished processing time

Refurbished processing time is calculated from the purchase day until the on-sale day. Histogram chart is used to illustrate the distribution of repair costs in different refurbished processing time frame (by days).

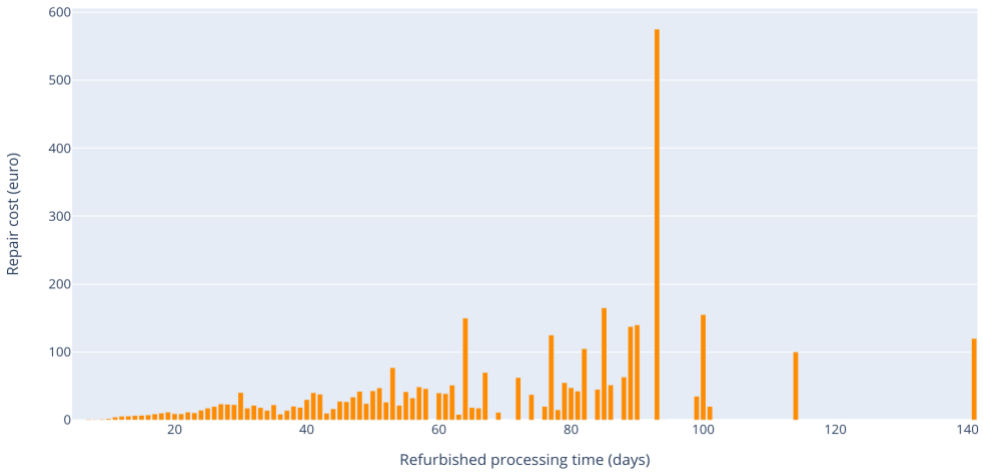


Figure 13. Repair cost and refurbished processing time

The profit will be directly influenced by the repair cost and the repair cost has a fairly correlation with the refurbished processing time. Therefore, it is necessary to keep the cost in the acceptable price range. The repair cost is low when the processing time is about 5 - 50 days.

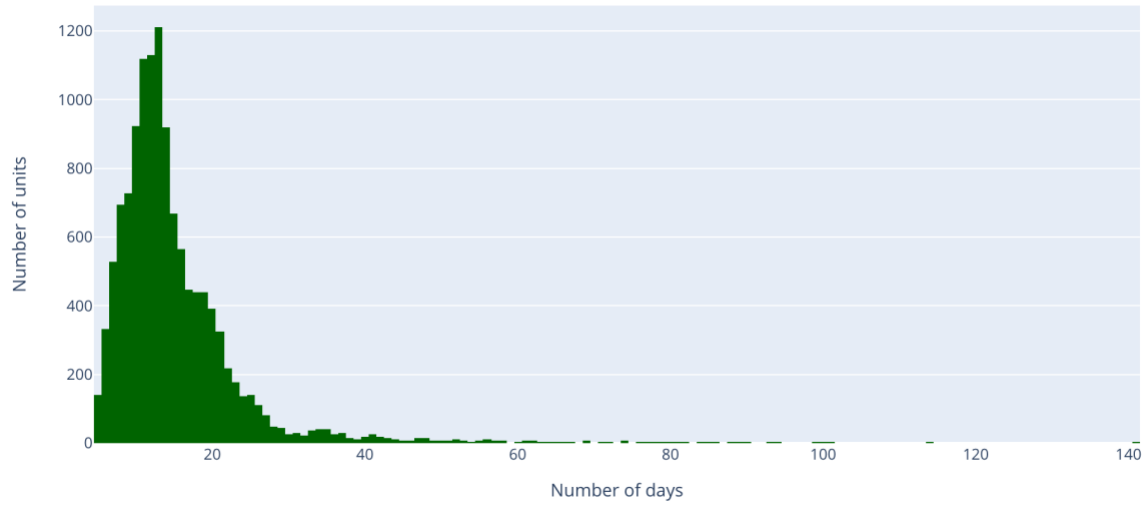


Figure 14. Refurbished processing time

During the May-July period, the processing time for most of the phones were around 5-20 days. However, there were still phones that need a longer time to process, and the longest time is 141 days.

3.4. Markets

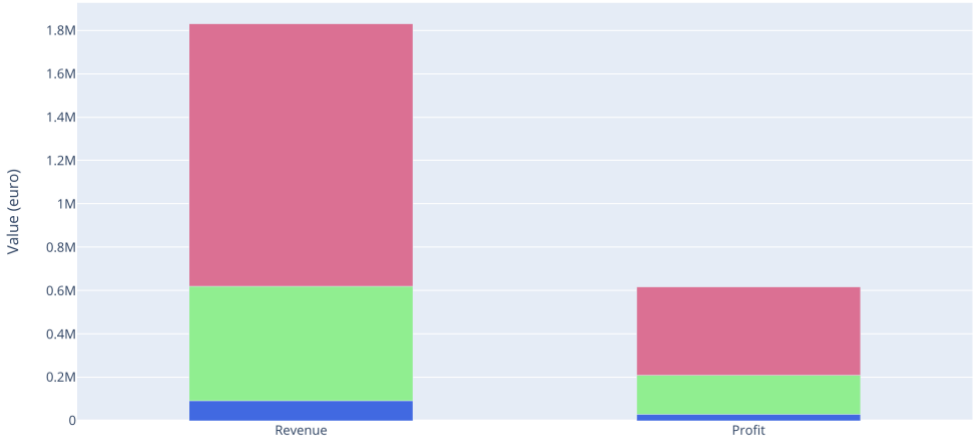


Figure 15. Total sales profit and revenue

In general, the revenue and profit of business were significantly increased during May - July with three main European markets (red, green and blue).

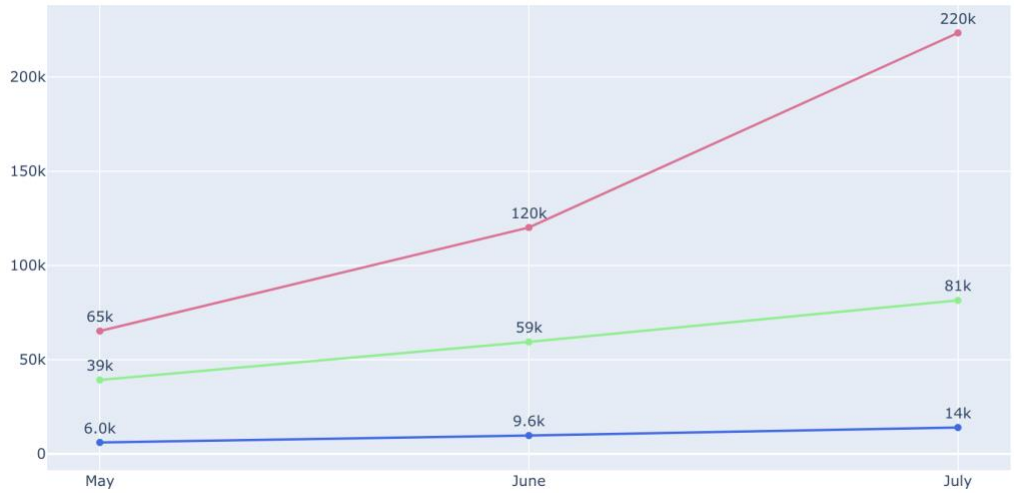


Figure 16. Sales profit during May - July

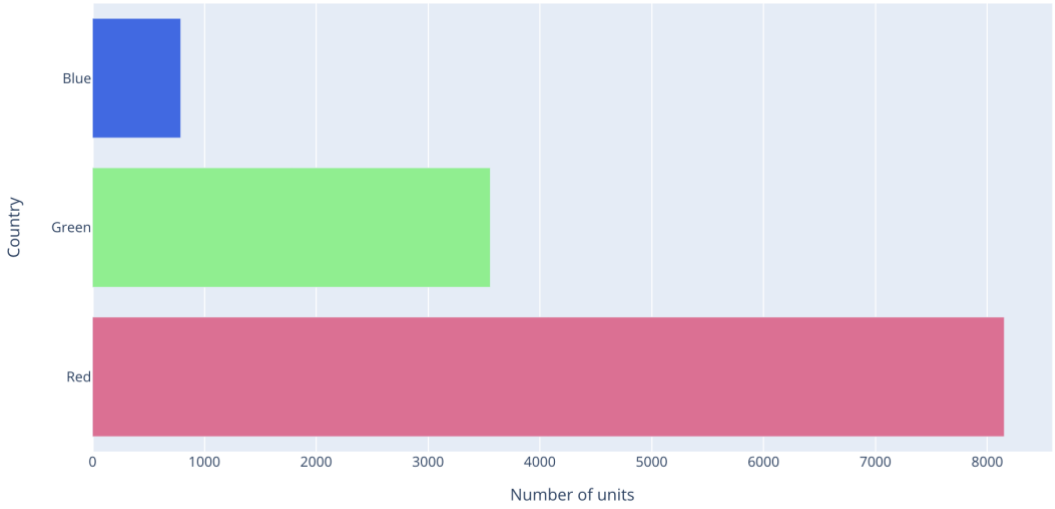
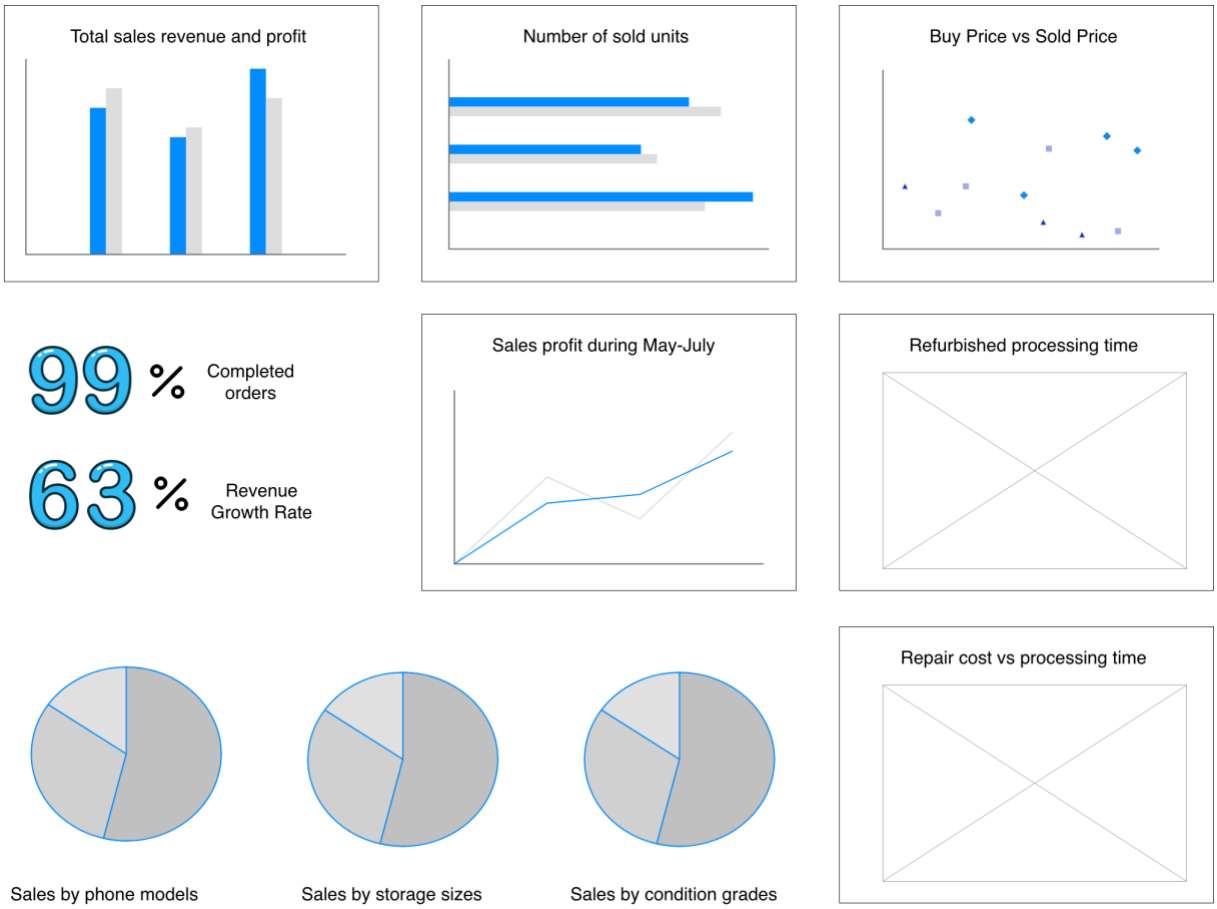


Figure 17. Number of sold units

The profit increases in all three markets during May - July period. However, only red market significantly increased with the profit was almost doubled in every month. The number of sold units in red market was doubled in comparison to the second big market (green country). The blue market only sold less than 1000 units.

4. Mock wireframe



- Repair cost vs processing time and refurbished processing time are important to follow as it affects the repair cost and profit.
- Buy price and sold price chart is used to illustrate the correlation between these two prices and the effect to the most popular devices.
- Sales by phone models, storage sizes and condition grades shows the sales of devices as well as the most popular devices. It is critical to follow as it affects the total sales profit.
- Number of sold units and sales profit during May – July shows the business growth in three markets. It especially emphasizes the import of red market.
- Total sales profit and revenue chart, percentage of completed orders, and revenue growth rate give an overview about the business.

5. Conclusion and Recommendation

The business of selling refurbished phones is undoubtedly growing. It is necessary to follow these metrics:

- The most target devices (product variable metrics) should be followed as it affects the total profits.
- Red market is the biggest market with the highest growth rate.
- The buy price and sold price should be considered (and bargained) carefully as it directly affects to the product consumption
- The refurbished processing time affects the profit through the repair cost. It should aim to keep the time between 5 to 50 days.

Recommendations:

- Providing more data or information about the reasons of return products (faults in the devices, unclean phones, etc). Currently, the rate of return product is 0.808%. It is possible to decrease the rate if the reasons of return are analyzed.
- Using the real name of products or sales countries so the publicly information data can be included.