DATA ANALYTICS ON USED MOBILE PHONE PRICES: TRENDS, INFLUENCES, AND PREDICTIONS

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**Abstract**

This is a trend, impact, and predictive modelling research paper for second-hand mobile phone prices. Because of the increasing demand for second-hand smartphones due to cost-saving and sustainability, price determinants and market trends need to be determined (Jang & Kim,2023). There are statistical analysis techniques that can be applied in the study, such as regression models and sentiment analysis, that can predict prices of second-hand phones and contrast depreciation patterns (Cheng et al., 2017). The results indicate that recent price, phone age, RAM, battery, and brand contribute significantly to resale price. Challenges such as spastic pricing and false listing are also being confronted with in the paper because it identifies the ability of data-driven intelligence to turn markets into efficient and transparent platforms.

**Introduction**

The used mobile phone market is growing exponentially based on issues like sustainability and cost (Jang & Kim, 2023). Environmental use of second-hand phones since they are relatively cheaper, and environmental awareness as a motive behind purchasing second-hand smartphones is enhancing demand. There have been facilitated used phone sales and purchases from websites like OLX, eBay, and Amazon Renewed. Used phone shopping and selling business come with inherent serious issues in the market like price variability, ambiguous depreciation value, and forgery (Cheng et al., 2017). Despite such issues, price patterns could be forecasted with the help of data analysis and market transparency improved. Based on parameters like specifications of a device, its age, and supply in a marketplace, such studies could make predictions about second-hand mobile prices. Predictive models could help buyers to make correct purchases and sellers to quote correct prices. Statistical techniques, including regression and correlation modeling, are utilized by this research in examining first-order resale price determinants and coming up with data-informed solutions to market problems

**Literature Review**

Prior research has accounted for the determinants of second-hand mobile phone prices. Jang & Kim (2023) accounted for consumer trust in internet second-hand selling websites, while Cheng et al. (2017) accounted for mobile big data adoption

to utilize for price analysis. Past research focuses on the roles of brand value, hardware attributes, and depreciation patterns in the forecasting of second-hand prices without taking into account predictive modeling and market standardization. Mobile phone depreciation research suggests that Samsung and Apple flagships are more likely to hold value for longer due to software upgrades, construction quality, and prestige brand. Battery longevity and RAM are also found to play a determining role in secondary market prices because consumers prefer long-lasting performance smartphones. (Jang & Kim, 2023). New model release changes have an impact as well on second-hand markets where price declines on older models are seen as buyers upgrade. Although previous research has been useful, it lacks the use of real predictive models with market change. This research improves on previous research by using statistical models for accurately forecasting price trends, such as device specifications, depreciation rates, and analysis of consumer sentiment to complement price forecasting.

**Methodology**

Quantitative data analysis based on authentic price data collected from websites like OLX and eBay(Cheng et al., 2017) is applied.

The main statistical methods applied are: Descriptive Statistics: Quantifying fluctuations in prices, period of usage, and characteristics of the device. Correlation Analysis: Analyzing correlations between variables such as the age of the device, RAM, and resale price. Linear Regression Modeling: Predicting resale prices according to device characteristics. MultipleRegressionAnalysis: Maximizing predictive ability through consideration of more than one determining factor.

Results and Analysis

Descriptive Statistics Average resale price: $4.45 (range $1.57 to $6.62). Average usage time: 491 days (~1.3 years), and some devices more than 3 years. Average RAM: 4GB; average battery capacity: 3653mAh.

Correlation Matrix

New price vs. Used price (0.858): High initial price positively correlates with good resale value. (Cheng et al., 2017)Device age vs. Used price (-0.437): Older phones depreciate heavily. RAM & Screen size vs. Used price (0.664 & 0.612): More specs retain their value. Screen size & Battery (0.824): Increased screen requires better battery life. Findings of Linear Regression R² = 0.823, with high predictability. Key Factors: New Price: Has greatest effect on resale price (0.5397). phones lose value (-0.00038 per day). Screen Size & RAM: Weakly increase resale price (0.0420 & 0.0350).

Multiple Regression

Model fit (R² = 0.880), accounting for 88% of variation in price. Predictors: Days Used: More day's lower value. RAM & Battery Life: Greater values enhance resale cost. Screen Size: Greater screens enhance resale value.

**Results & Discussion**

Factors Affecting Resale Price:

New price, RAM, screen size, and battery capacity increase resale value.

Older phones lose value faster, with an average resale period of 1.3 years.

Correlation & Regression Results

New price significantly affects resale price (0.858 correlation).

Older phones lose value (-0.437), and bigger RAM (0.664) adds value.

Regression models (R² = 0.880) show that age, screen size, and battery life are significant determinants of resale value.

Brand-Specific Trends

iPhones retain value best due to software support and loyalty (Jang & Kim, 2023)..

Flagships from Samsung also retain high resale values, but low-end brands depreciate faster.

Market Implications

Buyers should purchase high-RAM and larger-screen phones for good value retention.

Sellers should resell devices within 1-2 years for the best returns.

Online marketplaces must enhance fraud control and price normalization for better market transparency. (Cheng et al., 2017).

**Conclusion & Recommendations**

This study examined what influences second-hand mobile phone resale prices based on data analysis. Findings confirm that new price, brand reputation, RAM, battery life, and screen size all significantly influence resale price. Samsung and Apple flagship models retain value most since they are supported for the longest period through their software and high brand loyalty, while brand prices depreciate more quickly. Depreciation patterns are in favor of reselling in 1-2 years for optimal return, the older versions depreciating over time. Battery health and overall condition are a prime concern for the buyer, whereas inconsistency in pricing across sites is both a buyer's and seller's issue. To have a more effective second-hand market, buyers would do better with high-RAM, long-battery phones and good-phone vendors in a bid to achieve best bids. Internet websites would need to apply AI-based price suggestions and anti-counterfeiting technologies in an effort to keep counterfeits and price inconsistencies at bay. Platform parity prices would also help enhance the market's transparency and reliability. (Jang & Kim, 2023; Cheng et al., 2017).

**Future Work**

Future research can explore more advanced machine learning algorithms for better price forecasting, such as the application of deep learning and decision trees to identify underlying market trends. Sentiment analysis on review websites can offer real-time demand data so that sellers can set devices at competitive prices. Further research into economic factors like inflation and geographically influenced price variations can offer a worldwide perspective on reselling trends. Fraud prevention remains important, and blockchain verification and AI-driven identification of counterfeit listings are potential solutions. Additional research in these areas will make a safer, more efficient, and more transparent second-hand smartphone market a reality. (Cheng et al., 2017)

**References**

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