BAX 423 Final Project:
Forecasting Trendiness and Pricing Dynamics

1. Business Objective

Our business objective is to help companies predict the prices of trending items based on social media metrics and secondhand market data. By analyzing TikTok engagement data and pricing trends on Mercari, companies can identify emerging products and forecast price fluctuations. This will enable companies to make decisions about collaborations, promotions or discounts on their product based on the lifecycle of trends. By strategically timing these initiatives to align with peak interest in trending items, companies can maintain a competitive edge in the market.

2. Key Actionable Business Initiatives

Initiative 1: Utilize Prediction Model
Identifying where each product stands in its trend cycle is crucial for effective decision making. By leveraging our predictive model, we aim to give companies insight into their products' lifecycle stages, enabling tailored marketing efforts. Companies with a clear understanding of trend dynamics will be able to capitalize on emerging trends and minimize losses for declining trends.

Initiative 2: Influencer Collaboration
Collaborating with social media influencers can help increase brand visibility and engagement. By targeting products at the beginning or near the peak of their trend cycle, companies can ensure that influencer marketing is used to its full potential to drive engagement and sales.

Initiative 3: Dynamic Pricing Models
Our goal is to develop a dynamic pricing model that can adapt to changing trends and market demand in real-time. By analyzing trend data and market dynamics, companies can implement optimized pricing strategies at various stages of a product's lifecycle and respond to market fluctuations, maximizing profitability.

Among the proposed initiatives, the most impactful business initiative is Initiative 3: Dynamic Pricing Models. By utilizing real-time data analysis and market insights, companies can dynamically adjust their pricing strategies to align with trends and consumer demand. These companies will be able to remain competitive and respond to market changes.

3. Metrics of Success

The success of our initiative can be evaluated through the **accuracy of price predictions** and **market performance** metrics. Accurate price predictions help companies make better pricing decisions, boosting their profitability and competitive advantage. Additionally, assessing market performance, including sales growth and revenue generated, allows us to measure companies' effectiveness compared to their competitors.

We hypothesize that leveraging predictive models and data analytics will enhance companies' pricing strategies and their ability to capitalize on market trends. We anticipate that this will lead to an increase in the accuracy of price predictions, resulting in a **20% reduction in pricing errors**. We also expect to see a **15% increase in sales growth and revenue** for companies that follow our recommendations and tailor their marketing efforts accordingly. By utilizing these metrics, we can gauge the success of our initiative in improving pricing decisions and overall market performance.

4. Role of Analytics

Analytics adds value to the business initiative in three key ways. Firstly, it **enables the execution of the initiative** by using predictive modeling and data analysis to optimize pricing strategies and informing marketing efforts. Secondly, analytics **aids ideation and refinement** by providing insights from social media metrics and consumer behavior patterns. This allows companies to identify emerging opportunities and tailor strategies accordingly. Lastly, analytics serves as a critical tool for **evaluating the initiative's success** by tracking key performance indicators such as sales growth and customer engagement metrics. Companies can use this information to make data-driven decisions and strengthen their competitive advantage.

5. Thinking Through the Analytics

We are using existing data to gather insights into trending items on TikTok and pricing trends on Mercari. These platforms contain publicly available information, which we have obtained through web scraping. By extracting variables such as **selling price, discount, date of listing, purchase**, as well as social media metrics such as **views, likes and shares**, we can analyze the dynamics of trending items and their market behavior. The social media metrics are used to determine the extent to which items are trendy and in turn inform strategies for pricing optimization.

Our approach involves predictive analytics using a Random Forest Regression model. By analyzing variables such as selling price, discount, and date of listing, the goal is to predict the selling prices of products. We broke down our date feature to gain a more accurate assessment of the price fluctuations. We considered **year, month, day of the month, week of the year and day of the week** as distinct features. We analyzed these features under the assumption that the

more engagement there is on TikTok, the more popular the item, and as a result, higher the selling price. There are a few instances where the selling price on a secondhand website is higher than the retail price, one of which being that a desired colorway is out of stock on the official website for an extended period of time and those who want to participate in the trend feel the need to do so as quickly as possible. This desire is an indicator of an item's "trendiness" and can be measured in the amount of items being sold at or above retail price. On the other hand, when an item is at the end of the trend cycle, people start expelling it from their closets and homes on second hand websites, hoping to make some of their money back. However, if there is no longer any desire for the item, selling prices drop in response, indicating that items lack "trendiness".

Before we developed our Regression model, we plotted the selling price for Adidas Sambas against the average likes received on popular Tiktoks advertising the Adidas Sambas sneakers. We calculated a 7-day moving average to smooth out the variation in values and lagged the Tiktok likes values by 3-days so we could capture the delayed response in the market. The figure below shows this plot:
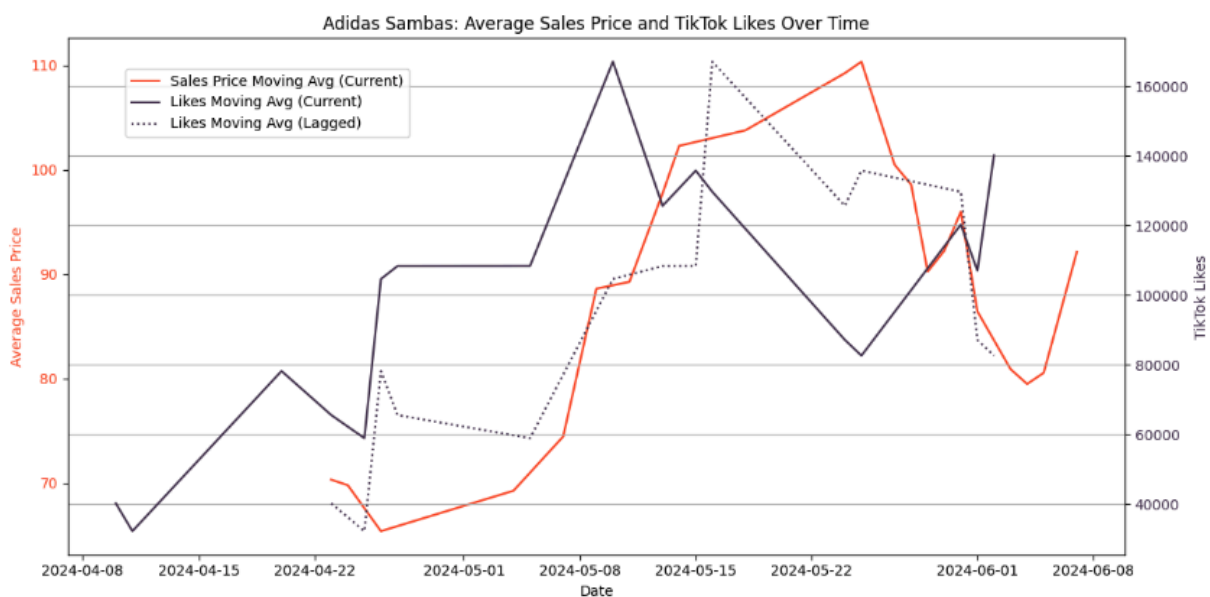
This plot clearly indicates that there is a strong correlation between the selling price of Adidas Sambas on Mercari and the average number of likes received on Tiktoks advertising these sneakers.

6. Executing the Analytics

Our team will divide the responsibility for executing the analytics in terms of data collection and model execution and evaluation. Two individuals will be responsible for collecting data from

TikTok and Mercari while the other two members who are more experienced in data analysis and modeling will spearhead the predictive modeling and evaluation using the collected data.

All team members will be involved in defining metrics and planning analytics strategies. The team will hold brainstorming sessions and decision-making discussions to identify business objectives and refine analytical approaches together.

7. Implementation

The results of our analysis will influence our decisions regarding which products to promote and when and how we promote these products. We will prioritize items identified as trending or at the beginning of their trend cycle for targeting marketing efforts, including influencer collaborations and social media campaigns. Based on the insights, we will also adjust pricing strategies to capitalize on emerging trends and market demand. Items with higher engagement on social media may be ideal candidates for dynamic pricing while those at the end of their trend cycle may require discounts. In the long term, we can prioritize product categories and features that align with emerging trends and consumer preferences identified through the analytics.

To ensure adoption and integration into existing workflows, we can establish regular review meetings to assess the performance of our initiatives and make any necessary adjustments. This approach ensures that the analytical insights remain relevant and aligned with the business objectives and market trends.

8. Scale

The main issue in scaling our business initiative is data accessibility from companies such as Mercari and Tiktok, who value their data greatly. A way to get around this would be to propose partnerships with these companies. Giving these companies access to our model would give them better insights into what videos, listings or deals to promote on their respective platforms. TikTok, in particular, could use this model on their shop feature to better promote trending products through targeted promotions or discounts.

To keep improving our business initiative, we will continuously monitor performance metrics, gather feedback and adapt our model to evolving business needs. Our goal is to conduct regular reviews, identifying areas for improvement in our strategies and adjusting priorities accordingly. We will also explore alternative methodologies to enhance the scalability and sustainability of our business initiative over time.