Assessing the Commercial Value of Predictive Color Data:

Insights from Case Studies on Sales and ROI

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Abstract

This study examines the predictive power and commercial impact of color trend data generated by FutureThinkNow (FTN), a platform that leverages artificial intelligence and social media analytics to forecast market trends.

A case study of 15 identical references having various colors and sold in the same shops in North America, reveals a strong positive correlation between item sales and the month-over-month (MoM) values of the primary color in 87% of cases. This suggests that FTN's color data, derived from large social media datasets, can effectively explain customer buying behavior on a small scale: the more customers purchase items in a given color, the more they share on social media, which increases the market share (MS) of that color, and in turn, its MoM value. The results indicate that social media posts reflect newly purchased items, with minimal delay between purchase and posting, and reveal a consistent pattern of color behavior from small to large scales. Items with positive MoM values experience an average 64% increase in monthly sales compared to those with negative MoM values.

Additionally, a meta-analysis of 33,383 product references in womenswear and menswear, encompassing 4,653 distinct color references across 261 shops in Europe, demonstrates that markdowns of products are linked to a sudden drop in the average MoM performance of their colors, while the best-selling items tend to feature colors with the largest MoM values. This large-scale validation strengthens the association between strong sales performance and favorable MoM color values, underscoring the efficacy of FTN's data in providing actionable retail insights and optimizing return on investment.

Outlook

1. Introduction

The fashion industry is one of the most dynamic and profitable sectors in the global economy, representing trillions of dollars annually in both retail and wholesale markets. Retail itself is an essential component of this industry, where sales figures are continually impacted by a wide range of factors, with color playing a pivotal role. Research has demonstrated that color influences up to 93% of the consumer's buying decision and serves as the primary motivator for 85% of all purchases, making it a key component in retail marketing strategies. As such, understanding and choosing the right color palette has the power to significantly increase sales, boost the image of a brand, and minimize production waste.

For fashion brands, creating the right color strategy is not only a means to drive consumer behavior, but also to reduce overproduction and unsold stock, thereby cutting down on waste and maximizing profit. Additionally, aligning the release of products with optimal sales windows—avoiding excessive markdowns or overstock situations—plays a crucial role in maintaining the bottom line.

Historically, trend forecasting in the fashion industry has relied on internal teams or external trend services, which are often costly and provide limited, vague insights. These services typically offer only a handful of color palettes with minimal justification for their predictions. This is where **FutureThinkNow (FTN)** provides a significant advantage. FTN combines advanced social media analysis with trend modeling to capture customer behavior in real time and predict color trends in a more transparent and data-driven way. By doing so, FTN offers its clients color palettes for up to three years in advance, backed by solid, unbiased insights. A study comparing FTN with three leading trend services has shown that FTN can accurately predict color trends over 80% of the time one year

ahead, a marked improvement over the 30% to 50% accuracy rates offered by other services. Although the color extraction and prediction capabilities of FTN are well established, the commercial impact of these data predictions—particularly regarding sales—remains an area for further investigation. This study aims to address this gap by assessing the impact of FTN's color prediction data on actual sales performance. Focusing solely on the evolution of colors derived from social media data, we evaluate the correlation between social media color behavior and retail sales over the same period.

The objective of this report is to demonstrate the relationship between FTN's social media-based metrics and observed sales, providing customers and investors with the data needed to estimate the potential ROI of FTN's products. Through this analysis, we aim to underscore the strategic value of FTN's data in maximizing sales and optimizing retail strategies across the fashion industry.

Carrying out a truly scientific comparative study in retail, particularly concerning color's impact on sales, presents significant challenges. One fundamental difficulty lies in obtaining cooperation from retail partners willing to design identical products using multiple trend services, including FTN, while intentionally incorporating incorrect colors, and to sell these items under the same conditions in order to compare sales as Retailers' business models are centered on maximizing sales, and won't agree to loose on sales for the sake of such study. Therefore, conducting a truly randomized, large-scale, scientific study comparing FTN's predictive power with other services is, practically speaking, not possible.

Given this inherent limitation, we devised an alternative approach that still adheres to rigorous scientific methods. The first step involved conducting a smaller-scale, controlled study,

focusing on a single retail partner. In this study, we examined a specific item offered for sale in 20 different color variants, all sold across the same set of shops within the same retail context and over the same time period. The only variable in this setup was the color itself, with all other parameters, including placement, marketing strategy, and other product features, held constant. This controlled setup allowed us to focus specifically on the impact of color on sales performance, removing the confounding effects of other variables.

To extend the scope of the study, we further validated our findings with a larger-scale analysis. This second study examined 4,653 distinct items across 261 shops in Europe. Although this analysis covered a broader market and larger dataset, the specific items and stores differed, providing valuable insights into the relationship between FTN's color predictions and sales performance on a more diverse scale. By combining a controlled, smaller-scale experiment with a broader dataset, we aimed to create a scientifically rigorous and meaningful comparison, drawing generalizable conclusions while acknowledging the inherent limitations of a truly direct comparative study on a large scale.

2. Methods

Color Data Origin:
Millions of images are collected daily from social media platforms worldwide and processed using FTN's proprietary data pipeline. Each image is analyzed by *Lizzy AI*, a system developed by FTN, which identifies the characteristics of the picture, such as gender, age, style, and fabric type. This enables categorization of the data, along with the detection, classification, and extraction of each clothing item depicted in the images.

Subsequently, the color of each clothing item is extracted through FTN's advanced color detection

system. This system accurately identifies colors irrespective of shadow effects, fabric texture, or variations in light exposure, ensuring precise color extraction.

Data Processing and definitions:
For a given category, the relative prevalence of each color detected in an item is averaged across all images for a given month to determine its presence on social media. This metric, referred to as the **Market Share (MS)** of the color, is expressed as a percentage of the total occurrences of all detected colors within the category:

$$MS_{color} = \frac{1}{N} \sum_{all\ items} \mu_{color}$$

Where MS_{color} is the market share of a color c, N is the total number of items in the specified category detected over a month, and μ_c is the relative percentage of the color present on the item. If the color is not detected on the item $\mu_c = 0$. If the color covers half of the item, $\mu_c = 50\%$, etc. The sum of the MS across all colors equals 100%. For example, black is consistently among the most detected colors in womenswear, accounting for 20–30% of the color market share, depending on the season and year.

The dynamic trend of a color on a monthly basis is defined by its **Month-over-Month (MoM)** value, which represents the relative change in its Market Share between two consecutive months. This is calculated as:

$$MoM_{color} = 100 \frac{MS_{color}(m) - MS_{color}(m-1)}{MS_{color}(m-1)}$$

Where m is the considered month. The MoM value has the advantage of focusing on the relative evolution of a color's presence, independent of its absolute market share. This metric effectively

describes a color's trend dynamics and serves as the basis for the studies presented here.

Work hypothesis:

When the MoM value is positive, it indicates that the Market Share (MS) of a color is increasing on social media. If social media truly reflects what consumers are wearing, this increase could have two primary origins.

First, it may reflect consumers' choices to wear and display clothing they already own, influenced by current trends or seasons. This would indeed help designers grasp customer mindsets and color trends. More significantly, it could also indicate what consumers have recently purchased in stores. This is particularly plausible given that people are often inclined to post new and exciting purchases on social media, showcasing items they are proud of.

If this hypothesis holds true, then the MoM value of a color should correlate directly with the number of sales of that color in stores. The more items of a specific color are sold, the more people are likely to purchase and display them on social media, thereby increasing the color's MS and resulting in positive MoM values.

Methods:

To test the hypothesis of a correlation between the MoM values of a color and monthly sales, an initial case study focuses on a small number of items with identical designs and selling conditions, ensuring that the primary variable is color. To generalize the findings from this well-controlled but small-scale study, a meta-analysis is conducted on thousands of diverse items in a second case study, examining whether their colors are partially correlated with markdowns, despite other factors such as price, design, and exposure—which are not controlled—also having a strong influence on the likelihood of markdowns.

3. Study case 1

3.1. Data Origin

The sales data used in this study were shared with FTN by one of its sportswear partners for the purpose of conducting this research. The name and specific details of this partner cannot be disclosed. Similarly, the exact colors are not revealed, as they are not pertinent to the study.

The data correspond to the sales numbers of 20 identical womenswear items, available in various colors, sold in North American shops between March and November 2024. Not all variations of the item were sold throughout this entire time period. Only items sold for more than four consecutive months are considered, as correlations based on limited data are deemed irrelevant. After applying this exclusion criterion, the study was conducted on 15 items.

3.2. Results and Discussion

The correlation is directly analyzed by plotting the MoM value, calculated from the womenswear data, for the main color of each item against the number of sales per month, as shown in Figure 1. The red line represents a linear fit. The closer the data points align with this line, the stronger the correlation between the MoM value and the sales numbers. In simple terms, when customers purchase more of a certain color, the market share (MS) of that color increases, leading to a corresponding increase in the MoM value.

Out of the 15 different colors investigated, a positive correlation was observed in 13 cases (87%), represented by an increasing slope. Anticorrelation was found in only 2 cases (13%), specifically items 11 and 12. However, even for item 12, the anticorrelation arose solely from the final data point, while the rest of the dataset clearly showed a positive correlation.
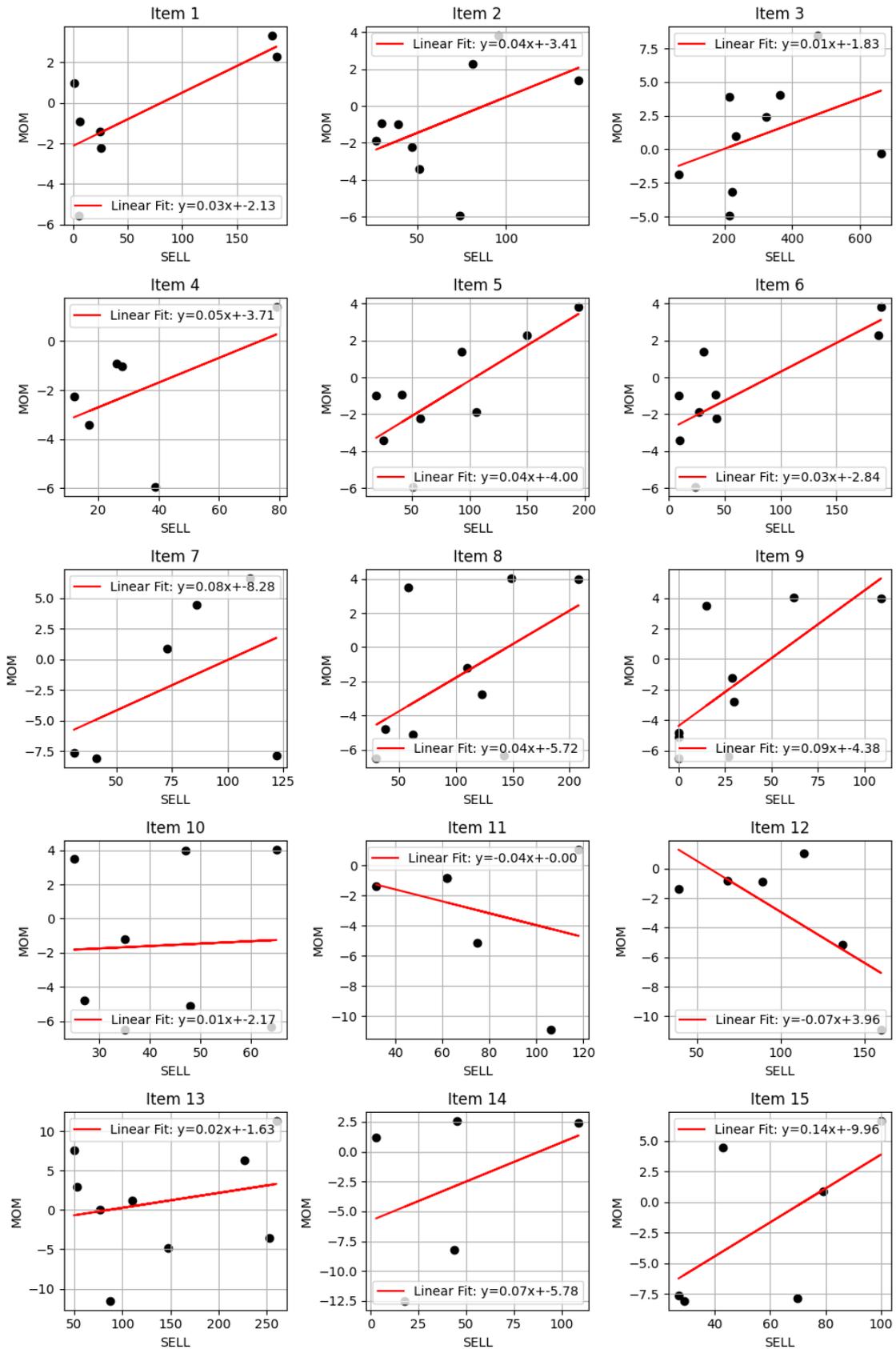
Figure 1: MoM values of the main color of each item depending on the number of sells (black dots) and linear fit (red line). Positive correlation is observed in 13 items over 15 items.
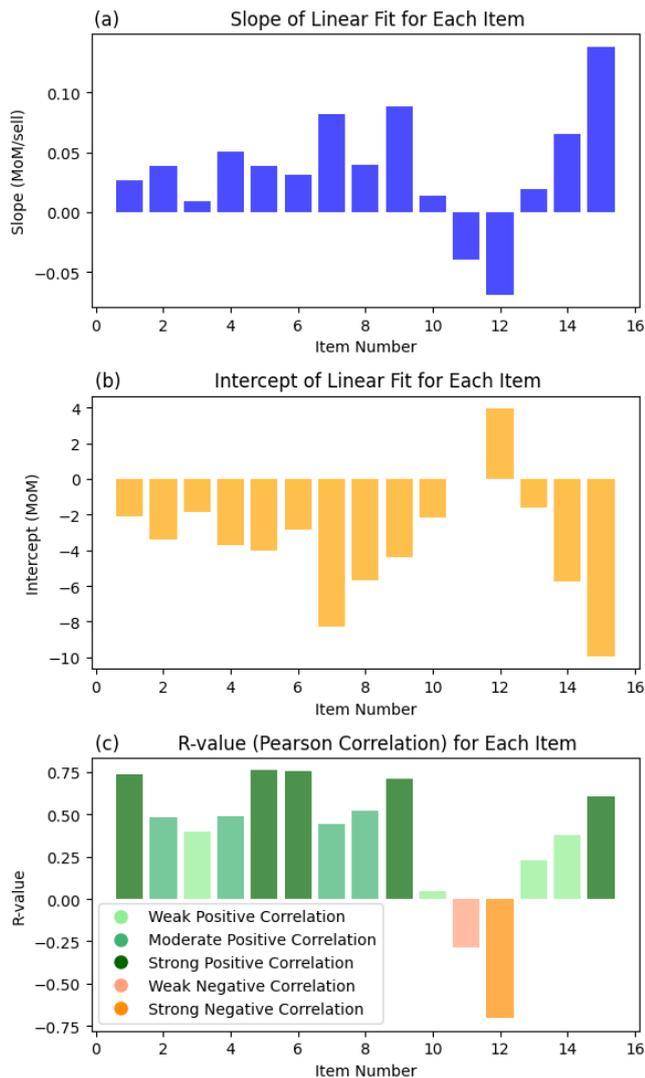
Figure 2: Parameters of the linear fits: (a) slope and (b) intercept for each item and R-value of the fit (c)

Figure 2a illustrates the slope values of the linear fit parameters for all items. As previously mentioned, a positive slope corresponds to a positive correlation, while a negative slope is observed for the two items exhibiting anticorrelation. Notably, the slope values vary between items.

Generalizing this finding to overall customer behavior suggests that the impact of sales numbers on the MoM value differs across colors. The more a color is sold, the greater its increase in market share (MS), and consequently, the higher its MoM value. However, the strength of this relationship depends on the specific color, as different colors exhibit distinct behaviors.

The slope value (MoM / number of sales) is smaller for colors with large sales volumes and smaller relative increases in their MS. This trend is commonly observed for neutral or gray tones, which typically have large MS values with a relatively small variability. These colors tend to achieve high sales volumes. This pattern is exemplified by item 2, which has the smallest slope and corresponds to a dark gray color. Item 2 maintains one of the highest MS values (around 3–4%) while being a common color.

In contrast, stronger hues or chromatic colors with smaller MS values exhibit more significant variations in their MoM values. Their smaller sales volumes lead to steeper slopes due to larger proportional changes in MS.

This variability is important to consider when attempting to infer sales performance directly from the MoM value of a color.

Additionally, for positive correlations, the intercepts of the graphs are consistently negative as shown in Figure 2b. This indicates that sales continue, albeit at reduced levels, even when the MoM value is negative. Generalizing this behavior suggests that there is a minimum sales threshold required to sustain a color's MS. If sales cease entirely, the MS of a color will inevitably decrease, as indicated by the MoM value at the intercept.

These findings support the idea that customer behavior observed on social media reflects actual purchasing patterns rather than only showcasing items that customers already own.

To further explore the correlation, Figure 2c presents the Pearson correlation coefficient, or R-factor, for the 15 fits. The strength of the correlation is categorized as follows:

- Strong correlation (R ≥ 0.6): Observed in 5 out of 15 cases (33%) and represented in dark green.

- Moderate correlation (0.4 ≤ R < 0.6): Observed in 4 out of 15 cases (27%) and represented in lighter green.
- Weak correlation (0 ≤ R < 0.4): Observed in 4 out of 15 cases (27%) and shown in light green.
- Anticorrelation (R < 0): Observed in 2 cases (13%), represented in light orange for weak anticorrelation and dark orange for strong anticorrelation.

These results provide further evidence that the correlation observed between the MoM values and sales is strong and statistically meaningful, despite the limited sample size.

Some variability and dispersion are to be expected, as the color analysis is based on overall social media data for womenswear and cannot fully capture the precise buying behavior of customers in this specific shop. To better understand this dispersion, it is necessary to consider all the data collectively in a way that accounts for differences in slope and intercept values.

Figure 3 illustrates a plot of the MoM values, adjusted by subtracting their respective intercepts, against the sales numbers multiplied by the slope of each fit. This approach effectively rescales all the data to align with the identity curve (shown in red). The observed dispersion provides valuable insight into how general color trends from social media correlate with sales in a single shop. Although notable dispersion is present, it is striking that a clear correlation emerges, with an RRR-factor of 0.70.

This overall correlation across the dataset, irrespective of specific colors, demonstrates that while the color data originate from social media, they can yield meaningful insights for individual items sold in specific shops in North America. This suggests a degree of universality in color behavior, regardless of location. With further refinement, such as narrowing the item category while maintaining statistical robustness, this correlation could be expected to improve.
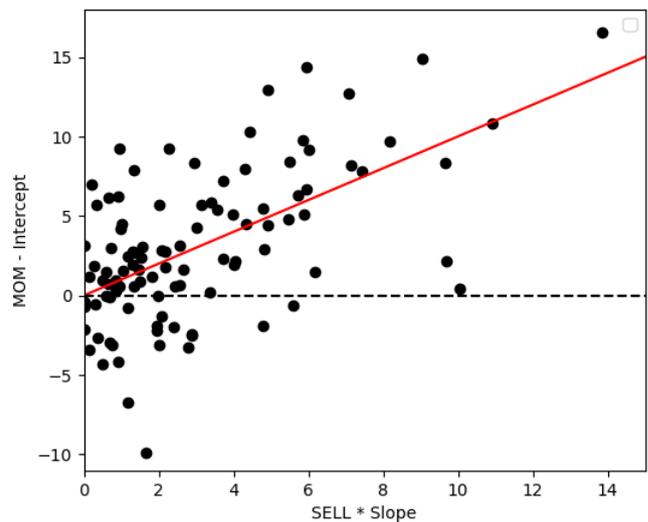

Figure 3: Rescaled MoM vs. Sell plot, accounting for the intercept and slope measured for each color. The red line corresponds to the identity curve.

3.3. Discussion on the Sales

Extrapolating potential sales increases based on such data is always a delicate exercise. While it is not possible to disclose precise sales figures from this partner's study, we observe that the sales of items during months when the MoM value of their primary color is positive increase by an average of 64%, reaching as high as +694% in the most extreme case observed.

By strategically targeting the release dates of specific items based on their colors' MoM values, companies can significantly boost sales, reduce the quantity of items in stores, and more effectively determine optimal times for markdowns. This approach helps optimize sales performance, minimize overstock, and reduce waste.

4. Study case 2

4.1. Data Origin and Processing

This study analyzes retail data from a major European retailer in July 2024, focusing on womenswear and menswear items across 33,383 product references—17,075 for womenswear and 16,308 for menswear—representing 4,653 unique color references across 261 shops in Europe. The dataset does not directly provide sales numbers for each item but instead categorizes items into three groups: markdowns from the previous collection, best sellers from the new collection that are running out of stock, and discounted items from the new collection.

Based on this categorization, we calculate the average month-over-month (MoM) values for item colors to investigate potential correlations. Specifically, we assess whether markdowns from the previous collection correlate with a decline in MoM values in July compared to earlier months. For items in the new collection, we analyze whether their classification as best sellers or discounted items aligns with their MoM values.

Given the absence of control over external factors such as product design, marketing strategies, and geographic distribution, the analysis of a large dataset provides statistical averaging of these variables. This enables a clearer evaluation of the influence of color on consumer purchasing behavior.

4.2. Results and Discussion

Figure 4a illustrates the average MoM values of item colors marked down in July for womenswear (blue) and menswear (green) over the months of May, June, and July. For both categories, the data reveals a clear decline in MoM values coinciding with the markdown events in July, indicating a
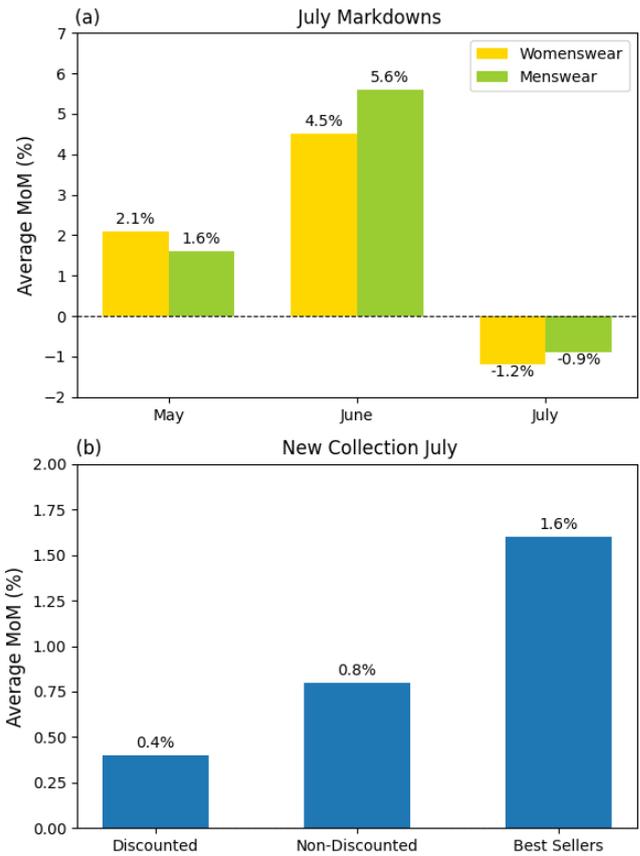

Figure 4: (a) Evolution of the average MoM values of item colors marked down in July for womenswear and menswear across May, June, and July. (b) Average MoM values of item colors from the new collection released in July, segmented into discounted items, non-discounted items, and best sellers (running out of stock).

strong correlation between markdown strategies and color trends.

In womenswear, the 4,487 product references marked down in July displayed an average MoM value of -1.2%, marking a noticeable decrease after prior increases of +2.1% in May and +4.5% in June.

A similar trend is observed in menswear, where the 3,974 marked-down items had an average MoM value of -0.9% in July, following positive values of +1.6% in May and +5.6% in June. These findings suggest that declining MoM values of item colors strongly influence the decision to markdown products.

Figure 4b represents the average MoM values for items from the newly released collection in July, segmented into three categories: discounted, non-discounted, and best sellers (running out of

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stock). The colors of discounted items exhibit a slightly positive average MoM value of +0.4%, which remains below the +0.8% observed for non-discounted items. This highlights the direct impact of MoM color trends on sales performance, even among newly released products. Conversely, the best sellers show significantly higher MoM values, with an average of +1.6%, underscoring the strong alignment between elevated MoM values and high sales performance.

Conclusion

This study highlights the significant potential for fashion brands to optimize sales, reduce waste, and drive profitability by leveraging FutureThinkNow's (FTN) color trend predictions. By utilizing FTN's AI-driven insights, which are based on extensive social media data, brands can predict color trends with high accuracy. This ability offers a compelling competitive advantage, enabling fashion companies to align their product assortments with consumer preferences well in advance, thereby avoiding overproduction and reducing markdowns.

This study reveals that items exhibiting positive MoM color performance see an average 64% increase in sales compared to those with negative MoM trends. This difference in sales could translate directly into significant revenue growth. For example, if a retail store sells 1,000 units of an item each month, and that item experiences a 64% increase in sales due to the correct color prediction, the store could see an additional 640 units sold per month. At an average price of $50 per item, this results in an additional $32,000 in monthly revenue.

Moreover, by predicting trends and preventing overstock or markdowns, FTN helps retailers avoid significant loss. A 10% reduction in overstock, typically associated with excess inventory that needs to be discounted, could lead to a considerable cost saving. For instance, if a retailer carries $1 million worth of inventory, a 10% excess results in $100,000 worth of markdowns. By more accurately predicting color trends, FTN can help minimize these markdowns, potentially saving up to $80,000 or more annually depending on the size of the inventory.

This ability to reduce waste also impacts production efficiency. As brands produce only what is likely to sell, they reduce waste by not over-manufacturing items that don't resonate with consumers. A company that reduces production waste by just 5%, given an annual production cost of $2 million, would save $100,000, further bolstering the return on investment.

Overall, the combination of increased sales from better color decisions and reduced operational costs from more accurate inventory management provides a compelling argument for brands to invest in FTN's predictive capabilities. By harnessing FTN's insights, fashion companies not only achieve higher sales and improved customer satisfaction but also lower the costs associated with inefficient production and inventory management. This integrated approach to color forecasting provides brands with a clear path toward enhancing profitability and achieving a higher return on investment, making FTN a highly valuable tool for any fashion business aiming for sustained growth and success.