

Educational Cases

Data, data- analytics and AI

Leveraging Data and AI in the Danish Clothing Resale Market



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Key Insights:

- Danish clothing brands and resale platforms face significant data challenges; from supply chain management to the identification and quality control of second-hand items.
- Leveraging AI and digital tools can improve resale strategies, enhance data analytics, and ultimately increase profitability.
- EU's forthcoming Digital product passport emphasizes dual benefits: enhancing sustainability and increasing market transparency through improved data sharing.

Challenges in the resale market: data quality and identification

The clothing resale market has a long history, particularly in kids' clothing. However, recent years have seen a surge in sustainability-driven growth. Despite this, businesses face significant challenges, notably in data quality. Currently, there is no method to identify and to match resale items with their original retail data once they have been sold to the consumer. Identification of model, color, generic item description and alike is currently being done manually.

This reduces the data quality and reliability as there is no guidelines, so the resale companies mostly guess what the appropriate description is, which is time-consuming and does hinder increased sales. Additionally, it makes it hard to connect detailed findings and information back to the brands as the frames of reference are not the same.

Leveraging technology for improved data analytics and resale strategies

Identification of actual products and data quality is crucial for unlocking the potential of data analytics and machine learning in the resale market. Analysis of Danish resale businesses reveal a correlation between a company's involvement in data collection and the quality of data obtained. Despite this, even companies who have high-involvement face challenges in generating accurate machine learning models, indicating a need for extensive data storage.

CO2 emissions from clothing account for around 10 percent of global yearly emissions.[1] Coupled with a lack of visibility in the supply chain, this issue has been one of the reasons for the forthcoming implementation of the Digital Product Passport (DPP) proposed by the EU. The DPP aims to provide consumers with information about the origin of materials used in clothing, enabling more informed purchasing decisions. Beyond this, the DPP can offer other significant benefits, particularly in the resale market.

[1] European parliament on Circular economy and the impact of textile production: <https://www.europarl.europa.eu/topics/en/article/20201208STO93327/the-impact-of-textile-production-and-waste-on-the-environment-infographics>

Implementing a DPP can significantly enhance data quality by providing unique item identification, facilitating easier data retrieval for resellers and customers. This system not only helps prevent fraud but also boosts consumer confidence and trust in the resale market. Additionally, AI-driven authentication, improved data matching, and enhanced consumer experiences through personalized recommendations can further build trust in second-hand markets.

Fact box: What is data?

What is Data in Fashion?

- In the fashion industry, data refers to all information collected about clothing items, including sales figures, customer preferences, material types, sizes, colors, styles, and purchasing behaviors. This data helps brands make informed decisions about inventory, design, and marketing strategies.
- Detailed Product Information: The more detailed the information about the clothing items, the better machine learning models can analyze and learn from them.
- Systematic Tagging: Data tags must be applied consistently to enable effective categorization and maximize the utility of machine learning models.

What is High-Quality Data?

- High-quality data in fashion is accurate, consistent, and relevant. It includes detailed and correctly labeled information about each item, such as precise descriptions, correct sizing, and material information. High-quality data is crucial for machine learning models to make accurate predictions and provide actionable insights.
- Data Quality: Successful use of machine learning and data analytics hinges on the availability of high-quality, relevant data.

Leveraging data analytics for trend identification and pricing optimization

Historical data analysis

Brands can use historical sales data to identify patterns and trends in consumer behavior. Analyzing past transactions helps in understanding which items are in demand, seasonal variations, and price elasticity.

Time Series Analysis

Techniques that predict sales figures, prices, or internet traffic require data with accurate timestamps. More frequent data intervals lead to more detailed and precise predictions.

Dynamic pricing models

Implementing machine learning models, such as time series analysis (e.g., ARIMA), allows brands to forecast demand and adjust prices dynamically. This helps in setting competitive prices that increase sales and profitability.

Segmentation and targeting

Using clustering algorithms like K-means, brands can segment the market based on consumer preferences and buying habits. This segmentation helps in tailoring marketing strategies and optimizing inventory management to cater to specific consumer groups. A practice that already exists and is well described in the scientific literature.

Sentiment analysis

By analyzing customer reviews and feedback using natural language processing (NLP) techniques, brands can gauge consumer sentiment towards various products. This insight can inform product development, marketing strategies, and pricing decisions.



Enhanced inventory management

Data analytics can improve inventory management by identifying deadstock items and optimizing stock levels. Understanding which items are slow-moving or even dead-stock allows brands to adjust their pricing strategies and promotional efforts to clear out inventory efficiently. Similarly, this information can be used to inform sellers on best-selling items and appropriate price points.

Predictive analytics

Leveraging predictive analytics can help brands anticipate future trends and consumer preferences. This forward-looking approach enables proactive adjustments in product offerings and pricing strategies to stay ahead of the market. This is particularly interesting for the resale market as the product does not need to be produced hence the response time is quicker than the retail market.



How fashion brands can utilize AI?

AI-driven authentication

Danish fashion brands can implement AI technologies such as image recognition algorithms to authenticate products. Convolutional Neural Networks (CNNs) can compare resale items with their retail counterparts using high-quality images and product information, ensuring the authenticity of second-hand items and building consumer trust. (can add a source here)

Improved data quality and tagging

AI can assist in bridging the gap between resale items and their retail data. Machine learning models can automate the identification of products, extracting relevant details such as brand, size, and description. This reduces manual effort and improves the reliability of the information available to consumers. Furthermore, these techniques already exist, they are well described in the scientific literature and available on the market. Therefore, if using pictures and data directly from the clothing brands good performance should be attainable.

Enhanced consumer experience

AI-powered recommendation systems can analyze consumer preferences and past purchasing behavior to suggest items that are more likely to meet their needs. This personalized shopping experience can increase consumer confidence in the second-hand market. The main downside of this approach is that it requires large amounts of data to be of high quality.

Transparency through AI analytics

The digital product passport supports transparency. By leveraging AI most brands can utilize their data to analyze and display the history and condition of second-hand items can provide consumers with detailed information. This includes the origin, previous ownership, and usage patterns, which can reassure buyers about the quality and value of their purchases.



The role of EU's Digital Product Passport

Providing unique identifiers

Each item can be assigned a unique digital identifier that remains with it throughout its lifecycle. This identifier links to comprehensive product information, making it easier to track the history and authenticity of second-hand items.

EU is pushing for circularity

For reselling companies the identifier in fashion can provide an opportunity to reliably analyze the performance of the item on the reselling market, both given consumers insights into which items are most likely to sell, and providing or selling information to brands on how their items are performing on the reselling market.

Ensuring data consistency

DPPs ensure that all relevant information, such as material composition, manufacturing details, and previous ownership, is consistently documented and accessible. This reduces the chances of fraudulent listings and misrepresented products.

Facilitating consumer education

By giving consumers access to detailed product histories, DPPs enable informed purchase decisions. Shoppers can verify the authenticity and condition of items, fostering greater trust in the resale market.

Supporting regulatory compliance

DPPs can help resellers comply with emerging regulatory requirements, ensuring that all second-hand products meet legal standards. This reduces the risk of fraud and enhances the market's overall credibility.

Future research and technological opportunities

Future research should focus on understanding the motivations of individuals uploading items, as well as exploring more advanced machine learning models like Long Short-Term Memory (LSTM) networks. Implementing AI tagging models could also enhance data quality, providing valuable features for data analytics and improving the resale market's efficiency. Currently the lack of quality data has appeared to be the largest obstacle to implementing machine learning models.



Questions for reflections

- What insights would we like to extract from the data?
- Who would we like to educate using the insights from the data? (ourselves, our sellers, our customers, the brands?)
- Are we interested in predicting the market or analyzing the current performance of clothes?
- What should the insights be used for? (education, platform enhancement, pricing optimization or something else?).
- What data do we currently have available and can it be used for any of the purposes decided on in questions 1-4?

Conclusion

Elevating data quality through strategic involvement and innovative tools like the DPP with identifiers in the garments can transform the resale market. Enhanced data analytics and robust machine learning models can ultimately benefit resellers, customers, and brands, making the market more transparent and profitable.

By leveraging AI for improved data quality, dynamic pricing strategies, and consumer trust, Danish fashion brands can significantly enhance their presence and profitability in the second-hand market. Additionally, understanding market dynamics through advanced data analytics can lead to better inventory management, targeted marketing efforts, and overall improved customer satisfaction.

Deciding on what the reselling company would like to learn extract from the data is the first step to using advanced analytics. From there the appropriate data can be selected and the appropriate way of collecting and tagging can be decided upon.

REFERENCES

1. [1] European parliament on Circular economy and the impact of textile production:
<https://www.europarl.europa.eu/topics/en/article/20201208STO93327/the-impact-of-textile-production-and-waste-on-the-environment-infographics>

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