

Exploratory Question Report

Characterization of Online Shopping Cart Abandonment

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Stakeholder: Executive team at Amazon, interested in improving conversion rates, optimizing the checkout process, and reducing revenue loss due to cart abandonment.

Executive Summary

Shopping cart abandonment remains a major challenge for e-commerce sellers, with global rates at 70.19%¹. Our analysis explores key drivers of cart abandonment in online shopping across product categories, customer segments, browsing behaviors and checkout processes.

Through our analysis, we found price sensitivity is the leading cause of cart abandonment, with 42% of respondents leaving their carts for better deals. Infrequent shoppers (less than once a month) have the highest abandonment rates, especially those who don't engage in window shopping. Frequent buyers abandon carts mainly due to no longer needing the item. Browsing behavior also impacts abandonment—customers who rarely browse and those who find recommendations unhelpful abandon carts more often. Additionally, unexpected costs, high shipping fees (50%), and long delivery times (42%) significantly deter purchases. Males in the 18-24 age range who frequently shopped in the 'other' category had the highest abandonment rate (3.19 vs. median 3.0) compared to all other age/gender/product category groupings in our dataset. Addressing cost transparency, optimizing checkout, and implementing recovery strategies can reduce abandonment rates and recover substantial amounts of otherwise lost revenue.

Context

Shopping cart abandonment is a persistent issue for e-commerce businesses, directly impacting conversion rates and revenue. Thus, it is essential to identify strategies to improve pricing strategy, checkout experience and drive sales. By exploring browsing and purchase tendencies across different demographic groups, we can pinpoint customer segments who are more prone to abandonment and create targeted initiatives to more effectively increase overall cart completion rates. Identifying factors that affect purchase

¹ Baymard Institute. (n.d.). *Cart abandonment rate statistics*. Retrieved February 12, 2025, from <https://baymard.com/lists/cart-abandonment-rate>

decisions will allow us to more effectively tailor initiatives for our customers (e.g., a redesigned checkout process, personalized reminders, or an incentive like a discount).

In order to holistically explore cart abandonment in the e-commerce space, our analysis explores the following questions:

1. Are there specific product categories within specific customer segments with higher cart abandonment rates?
2. How does customers' purchasing and browsing behavior, including frequency in price comparisons, searching behavior, cart completion frequency, recommendation helpfulness and search result exploration correlate with abandonment?
3. How do cart abandonment rates vary across different stages of the checkout process, and to what extent are they influenced by unexpected shipping costs, taxes and fees, free shipping promotions or remaining items available?

Strategy

Our analysis utilized a dataset from Kaggle entitled *Amazon Consumer Behavior*. This dataset consists of webscraped survey data from 602 Amazon shoppers, including demographics information and self described purchasing behaviors. This dataset was used to explore the relationship between customer demographic information, most frequent purchase category, browsing behavior and cart abandonment. Given our exploratory questions, the factor in the dataset we were most interested in was the survey taker's rating of how often they abandon their cart after adding a product to it. We converted this variable to a 5 point scale called Cart Abandonment Score, where 1 corresponds to a customer who always completes their purchase after adding an item to their cart and 5 corresponds to a customer who never completes their cart.

Furthermore, in order to answer our third question of interest which explored cart abandonment across stages of the checkout process and the impact of unexpected shipping cost, two additional sources of data were used: SellersCommerce, which provides statistics on general e-commerce cart abandonment rates and Cross-Border E-Commerce Study, for data on international online shopping trends.

Results

1. Product Categories and Customer Segments with Higher Cart Abandonment Rates

Across all customer demographics, groceries and food products showed the lowest average rate of cart abandonment, with a mean abandonment score of 2.60 out of 5,

although this was the least popular product category in the dataset. Categories such as Beauty and Personal Care, Clothing and Fashion, and Home and Kitchen all had similar average cart abandonment scores ranging from 2.67 to 2.69. The 'Other' category exhibited the highest abandonment rate at 2.80. Though there is variation across categories, mean rates for each category are generally similar and fall below the median across the entire dataset (3.0).

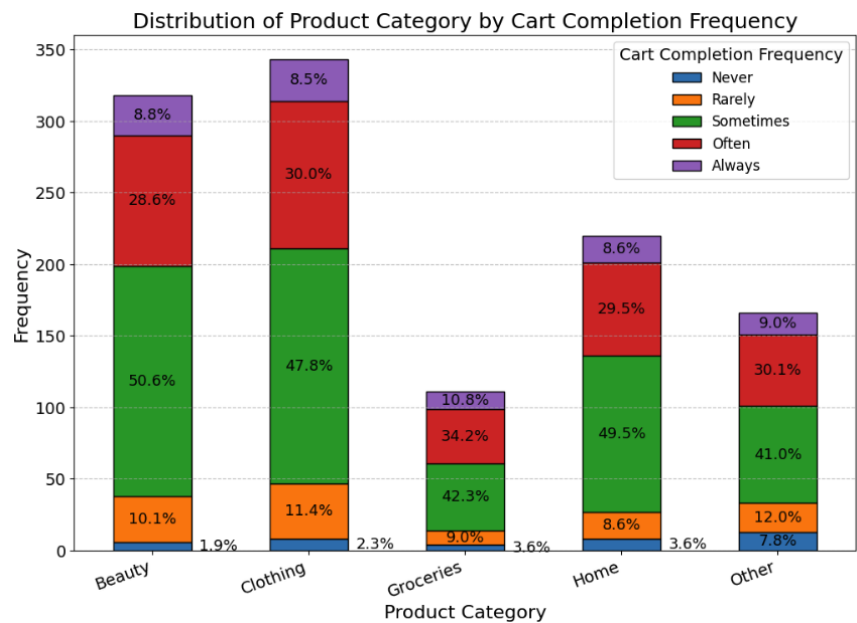


Figure 1: Frequency of Product Categories Noted as Most Commonly Shopping, Broken Down by Cart Completion Frequency

Average cart abandonment scores were relatively consistent across age groups, with the 35-44 age group having the lowest rate of 2.67 and the 55-64 age group the highest at 2.89. Gender differences in cart abandonment rates were minimal, with males having the lowest rate at 2.72 and those who preferred not to disclose their gender having an average rate of 2.87.

When examining specific customer segments, the highest cart abandonment rates were observed in males aged 18-24 shopping in the 'Other' category (3.19), females aged 18-24 shopping in the 'Other' category (3.00), and females aged 45-54 shopping in clothing and fashion as well as beauty and personal care (3.00 for both categories).

2. Customer purchasing behavior, patterns across groups and browsing behavior

The primary factor for cart abandonment was "Found a better price elsewhere," accounting for 42% of the survey responses. Reflecting on this effect, the age group that identified price as their primary reason is the group between 18-24 accounting for 20% of the survey. In contrast, finding a better price for Groceries and Gourmet Food was reported as the

least important among other potential reasons to cart abandonment with an average abandonment rate of 2.53.

Exploring purchase behavior, customers who reported making purchases "Less than once a month" showed the highest average abandonment rate with 3, representing 20% of the survey. Among those clients, the clients that answered "No" to adding items to cart while browsing are the ones with the highest abandonment rate with 3.25 indicating that those clients are not window shopping but leave their cart for legitimate reasons. Clients with a high purchase frequency had an abandonment rate of 2.3. Within this group, the most common reason for abandonment was no longer needing the item, with a rate of 2.41. For most respondents who purchase products a "few times a month" and have an abandonment rate of 2.73, the preferred search method is browsing through categories (as opposed to keyword searches or filters). This method also has the highest abandonment rate within this purchase frequency group.

Regarding browsing behavior, clients who "Rarely" browsed for items had the highest cart abandonment rate of 3.36, representing 41% of the overall survey. The age group of 45-54 had the highest abandonment factor of 4.1 for adding items to the cart as a form of expressing interest without intent to buy, representing 2% of the survey participants. Regarding the correlation between "save for later" frequency and product category, those who occasionally use this feature had the highest abandonment rate in the Groceries & Gourmet Food category, at 2.97.

Clients who found recommendations unhelpful had the highest abandonment rate at 2.82. Among them, those who never use the "save for later" option had an even higher abandonment rate of 3.69.

3. Cart Abandonment Rates Across Different Stages of the Checkout Process

Analysis by the Baymard Institute and SellersCommerce reveals that cart abandonment rates are significantly influenced by factors encountered during the checkout process, particularly unexpected costs. Industry-wide, about 70.19% of online shopping carts are abandoned². Unexpected costs are a major deterrent, with 48% of shoppers abandoning their carts due to these additional expenses³. In cross-border transactions, high shipping costs (50%) and long delivery times (42%) are primary drivers of abandonment. Further, a lack of trust in the website's authenticity (28%), unclear return policies (26%), and non-

² Baymard Institute. (n.d.). *Cart abandonment rate statistics*. Retrieved February 12, 2025, from <https://baymard.com/lists/cart-abandonment-rate>

³ SellersCommerce. (2024, February 12). *Shopping cart abandonment statistics*. Retrieved from <https://www.sellerscommerce.com/blog/shopping-cart-abandonment-statistics/>

transparent listing of final costs, including duties and taxes (25%), also contribute significantly to abandonment among international shoppers.

These findings indicate that pricing clarity, transparent communication, and logistical improvements are crucial for reducing cart abandonment. Strategies such as upfront display of total costs, free or discounted shipping, and improved estimated delivery times can help to retain international customers. Addressing these factors will enhance consumer trust and encourage completion of purchases, ultimately improving conversion rates for e-commerce businesses.

Conclusion

Reducing shopping cart abandonment requires a transparent, efficient, and consumer-focused approach. Our analysis finds that price sensitivity (42%) is the primary reason for abandonment, especially among the 18-24 age group. Infrequent shoppers (less than once a month) exhibit the highest abandonment rates (3.0), particularly those who do not engage in window shopping, indicating intentional abandonment rather than casual browsing.

Beyond pricing, unexpected costs—such as high shipping fees (50%) and long delivery times (42%)—significantly impact abandonment. Checkout experience also plays a role, with customers who rarely browse or find recommendations unhelpful more likely to abandon their carts.

To mitigate abandonment, businesses should prioritize cost transparency, optimize checkout processes, and improve trust signals such as clear return policies and security assurances. Streamlining the mobile shopping experience and offering competitive shipping options can also enhance conversions. Implementing targeted cart recovery strategies, like reminder emails and retargeting ads, may help reclaim lost sales.

However, our findings are based on a limited, self-reported survey dataset from a specific geographic location, which may not fully generalize to other markets or be representative of the average customer. Analysis on a more representative dataset, coming directly from stakeholder records, as opposed to customer self-reported responses, would likely give us stronger insight into our consumer base's behavior as a whole. Addressing cart abandonment requires ongoing refinement based on consumer behavior and industry trends, ensuring that businesses remain responsive to evolving shopper expectations.

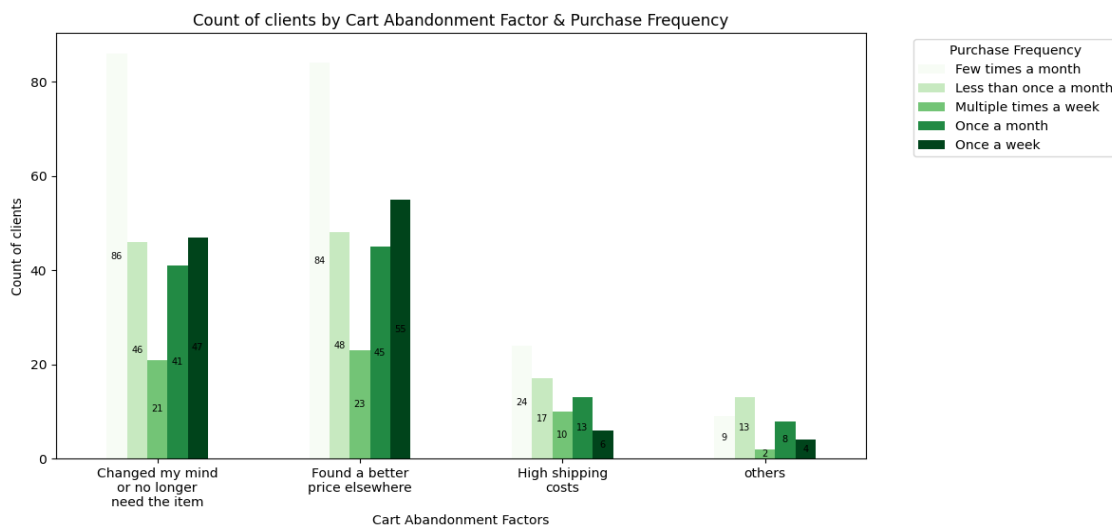
References

1. Baymard Institute. (n.d.). *Cart abandonment rate statistics*. Retrieved February 12, 2025, from <https://baymard.com/lists/cart-abandonment-rate>
2. SellersCommerce. (2024, February 12). *Shopping cart abandonment statistics*. Retrieved from <https://www.sellerscommerce.com/blog/shopping-cart-abandonment-statistics/>
3. Global-e. (2024). *The cross-border eCommerce shopper survey*. Retrieved from <https://www.global-e.com/the-cross-border-ecommerce-shopper-survey>

Appendix

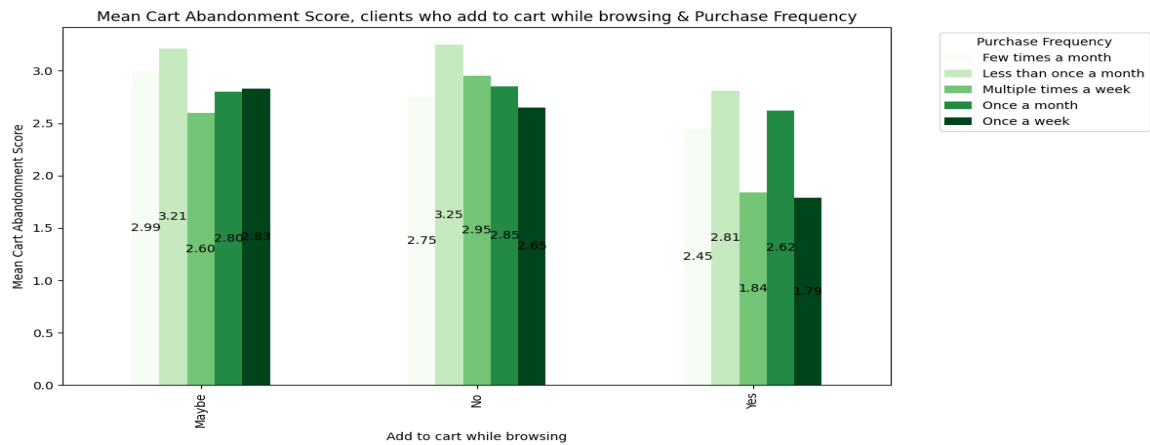
The following charts provide an aggregated overview of customer behavior in this document. The information and interpretation of these charts could be found in the section 2 of results.

Figure 2. Count of clients by cart Abandonment Factor & purchase frequency



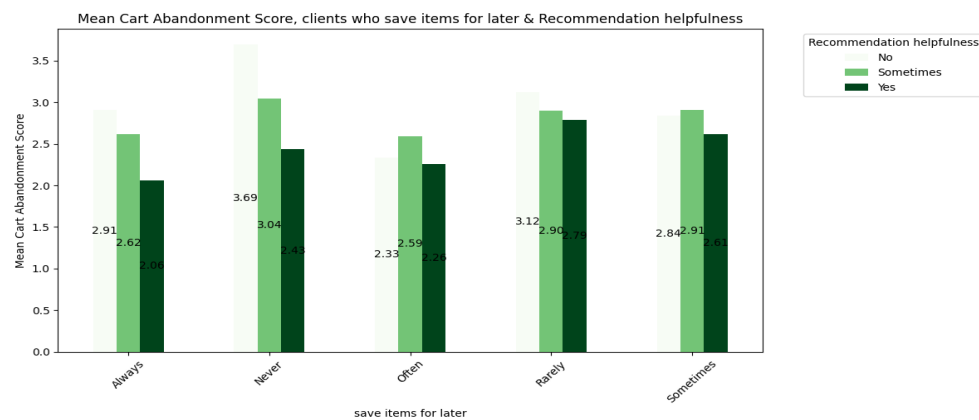
Note: A large number of clients reported abandoning their shopping carts either because they have changed their mind or they found a better price.

Figure 3. Mean Cart Abandonment Score for clients who added their item to cart while browsing separated by Purchase frequency



Note: Clients that do not add items to their cart while browsing showed the highest average abandonment rate

Figure 4. Mean Cart Abandonment Score, save for later frequency and recommended helpfulness



Note: Those who never save items for later and found recommendation not helpful have the highest rate of cart abandonment.