Building High Volume Digital Purchase Experiences across Global Markets

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Abstract

Free-to-play online games are increasingly becoming one of the most profitable video game business models, and with the market value of in-game purchases projected to exceed 74.4 billion dollars in 2025 [1], it is more important now than ever to build a highly reliable, secure, and seamless purchase experience for consumers that maximizes the chances of a purchase being successful.

Keywords: Gaming, in-game purchases, purchase funnel, high-revenue systems

I. INTRODUCTION

This paper attempts to provide empirical design guidelines to build an efficient digital purchase experience spanning different platforms, markets, and how improving on it is not just the right thing to do, but profitable. It does this by defining how to evaluate digital purchase transactions based on their significance to the revenue. Certain scenario-specific terms like purchase funnel, click-through rate, call-to-action, bails, common engineering pitfalls, and non-engineering limitations are explored in detail. This paper also explores engineering management ideals to help decide where to spend engineering resources.

II. RELATED WORK

There are many previous papers that analyze the design of a website and suggest design recommendations based on user- testing and usability studies. [2]

Correlation between online shopping customer satisfaction and repurchase intention has been shown to be linear which suggests that customers are likely to purchase again if they perceive the platform to be of high quality [3]

III. METHODOLOGY

To understand what constitutes a good purchase flow, we first have to try to quantify our current purchase experience. We need to understand when it succeeds, when it fails and more importantly why it succeeds and why it fails.

A. Purchase Funnel

We do this with the help of what is called a purchase funnel, a purchase funnel is a framework to visualize the customer's journey through the various decisions that they take from discovering a product to completing the purchase. We can broadly separate them out into five categories - Awareness, Interest, Consideration, Intent and Purchase. Although engi- neering plays a part in all of the categories, there is a hierarchy when it comes to where engineering resources should first be spent. We'll dive into this a little more once we define each of these categories.

Awareness: The first time a user discovers a product. Often, this could be outside of the e-commerce platform through advertisements.

Interest: The user either searches for the product in the search bar or stops scrolling a webpage to look at a particular product. This shows that they're interested.

Consideration This is often one of the most competitive stages where the user at the end of this stages chooses to buy or not buy the product. The user could be comparing this product with other products to make a decision.

Intent Once the customer shows clear intent to buy, by either adding the product to the cart or clicking on buy, the customer is said to have shown intention to buy. This is where you as an engineering leader would want to start dedicating a lot of your initial engineering resources until you have ironed out the rest of the purchase flow and before you start investing resources into bringing in more people into the previous stages.

Purchase The final transaction that transfers the credits from the customer to the platform and the transfer of ownership of the product (in this case digital product) to them. Typically this is where you'd end the purchase funnel tracking of a user.

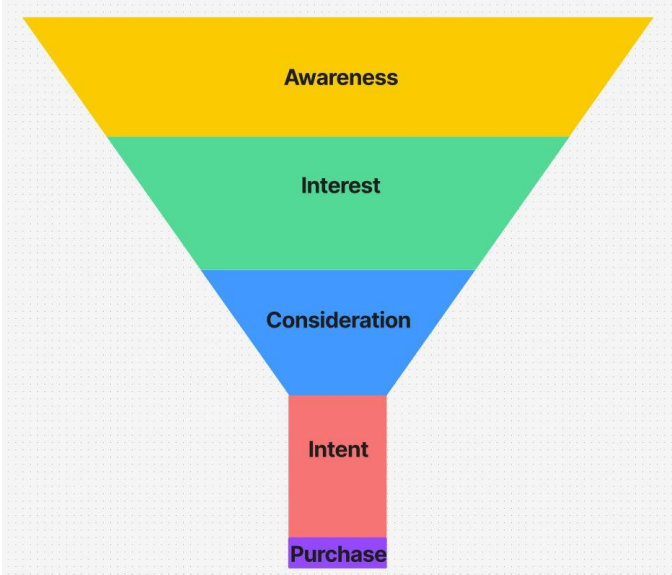

Fig. 1. Purchase Funnel

When considering high volume digital purchases like virtual currencies inside a game, we leave out the awareness, inter- est and consideration as these are mostly governed by how successful the base product is. We trust that the branding has already done its job to inform the user and bring the necessary pool of customers into the funnel. We now take a closer look at *Intent* and *Purchase*

B. *Intent and Purchase*

In an ideal setting, the goal of the Intent stage should be diminished to a point where the difference between Intent and Purchase is insignificant. This can be observed in cases like a one-click buy scenario where the customer choosing to buy the product and the actual transaction going through are the same. All high-volume digital transactions should ideally strive for this, as this eliminates the need for unnecessary clicks to get to the desired result. This is based on the idea that the more clicks required to perform a task, the higher the points of consideration and decision-making and the greater the bail rate. [4]

A simple formula for assigning a score to a purchase transaction that is useful to an engineering leader can look like this:

Purchase Transaction Score (pts) =Quantity(*q*)

$$\frac{}{Clicks\,(c) \times Time\,(t)}$$

Taking the example of a one-click buy transaction that takes exactly one second to complete, it would get a score of 1 (1 item that required 1 click and 1 second to buy).

We will discuss how we can improve the purchase score of a transaction by attempting to reduce clicks and the time taken. We will also explore how these variables affect a real- world transaction and why a higher purchase transaction score matters in a high-volume setting.

TECHNIQUES

A. *Primary and Auxiliary Data*

Consider what data points are needed to complete a trans- action. One would need the quantity of the product, which payment method to use, metadata about the product being bought which includes market, description and its price which would include taxes. When attempting to present all this information to the user, it usually takes multiple pages to avoid overwhelming the user with all the information on one page. An overwhelmed user is measured in part due to telemetry markers that indicate that the user spent more time on one page and therefore increases the *time (t)* in the overall purchase transaction score. We then split this information into two baskets, *Primary*: one that is essential to completing the purchase transaction and *Auxiliary*: information that enhances the buying experience for the user. Auxiliary data can be used to improve the purchase experience but it should not hinder the primary purchase flow. Auxiliary experiences could be a confetti effect after the user completes a purchase or an audio cue about the product itself (like coins tinkling when purchasing virtual currency) which can be used to put the customer in a more relaxed state of mind when dealing with impulse purchase flows [5]

Primary purchase data points are also treated a class higher from an engineering standpoint with respect to fetching over the network, orchestrating, and caching.

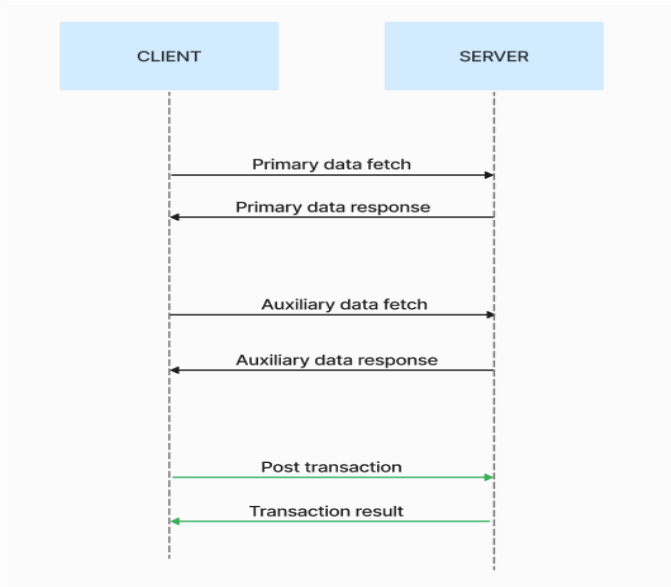

Fig. 2. Inefficient orchestration

Taking the simple of an online digital currency transaction, information about the cost of the product, the market that the product is sold (and therefore the currency to carry out the transaction), the payment method used by the customer and the quantity of the product bought by the customer all fall under

primary data. Auxiliary data could include a picture of the product in high definition (which the user would see if they clicked on a thumbnail), the terms and conditions for the transaction in the current market of the user or other non-linear paths to completing the purchase flow like retrieving all the purchase methods that the user owns.

B. *Clicks*

The goal of identifying and applying this formula is to help reduce the number of clicks needed to complete a transaction. Given the two types of information classes above (primary and auxiliary), one would want to present all the primary data points to the user without them having to click to find it. All auxiliary data when hidden behind clicks when combined with a primary ”call-to-action” button (that completes the purchase) resulted in reducing the number of clicks necessary to complete the transaction.

Caching is another option to reduce the number of clicks to complete a transaction. If a given variable has been recorded to show that it has a high likelihood of being the same value (like a favorite payment method) it serves as a good candidate for caching and thus removing the need for the user to select the right payment method and reduce the number of clicks.

C. *Time To Complete*

Continuing on with our example above, the network calls to fetch the high definition picture of a product can be classified as an auxiliary data response that shouldn’t block the actual purchase transaction, should the user decide that they wanted to complete the transaction in the middle. Our orchestration of network requests can instead look something like Fig 3. which makes it a more efficient orchestration. This reduces the overall time to complete a transaction.

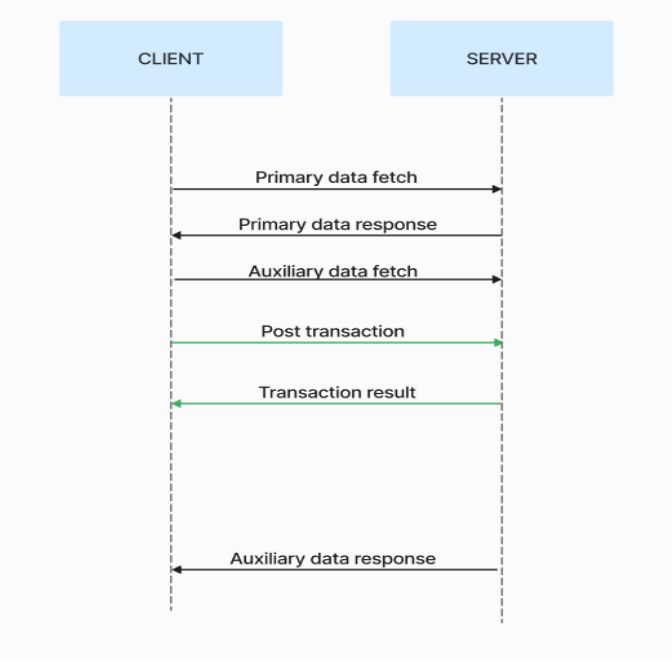

Fig. 3. Efficient orchestration

But consider this situation where the purchase laws for each market are tricky and unique. Additionally, these laws constantly change. There are now multiple application surfaces where the same changes would have to be made and there is the added risk of some less-used platform surface that is

not updated with all the right laws leading to a legal issue. This is where it might make sense to have a single purchase experience across all platforms that runs the same logic to reduce the risk of purchase errors across different markets.

Here's how that decision can be made based off data. The Platform factor in purchase experiences can magnify a given drawback or benefit. We define the overall Purchase Experience as a function of *PurchaseTransactionScore* (pts) and *Platform Constitution* (p%) and can be expressed as:

$$Purchase\ score\ per\ platform = pts \times p\%$$

Telemetry and data analytics would inform the percent contribution of each platform to the total revenue. This is the factor (p). This same framework can also be expanded to markets (m)

These models are then applied to real purchase scenarios and scored appropriately.

D. *Platform*

The higher the score, the greater is the significance of the group of transactions that the score represents.

IV. RESULTS

When reviewing results, the most important part of the purchase score is that it is relative. It is meaningful only when evaluated repeatedly and with small but controlled variations in the experiment. That small button that was moved to make the call-to-action button bigger is probably failing in a different market that uses a Right-To-Left script and therefore skewed the button out of bounds. The network request orchestration that worked over a wired connection probably does not work in markets that primarily use a cellular network to access the Internet.

An example of what a purchase score per platform could look like is shown in table 1

pts	clicks	time	platform %
1.5	4	5	30
2.25	4	4	36

TABLE I: PURCHASE SCORE PER PLATFORM

When designing purchase experiences across different global markets, device variations, and, by extension, platform variations are inevitable. Consider the user's perspective from the device they use. When returning to the example of an in- game purchase of virtual currency, the user could be playing on a console where entering payment information is difficult on a browser. The obvious answer there would be to build a custom application for that platform that is easy to use with a controller. This reduces the total time (t) to complete a transaction and therefore improves the score (s). score, the more worthy it is to improve any of its contributing factors such as *clicks* and *time*

CONCLUSION

High-Volume purchases transactions across different mar- kets can be studied and ranked based on their significance to the revenue they generate. Additionally, we can identity key-factors that influence the scores in those markets and improving on these foundational factors will improve the purchase experience.

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