


- Math and statistics

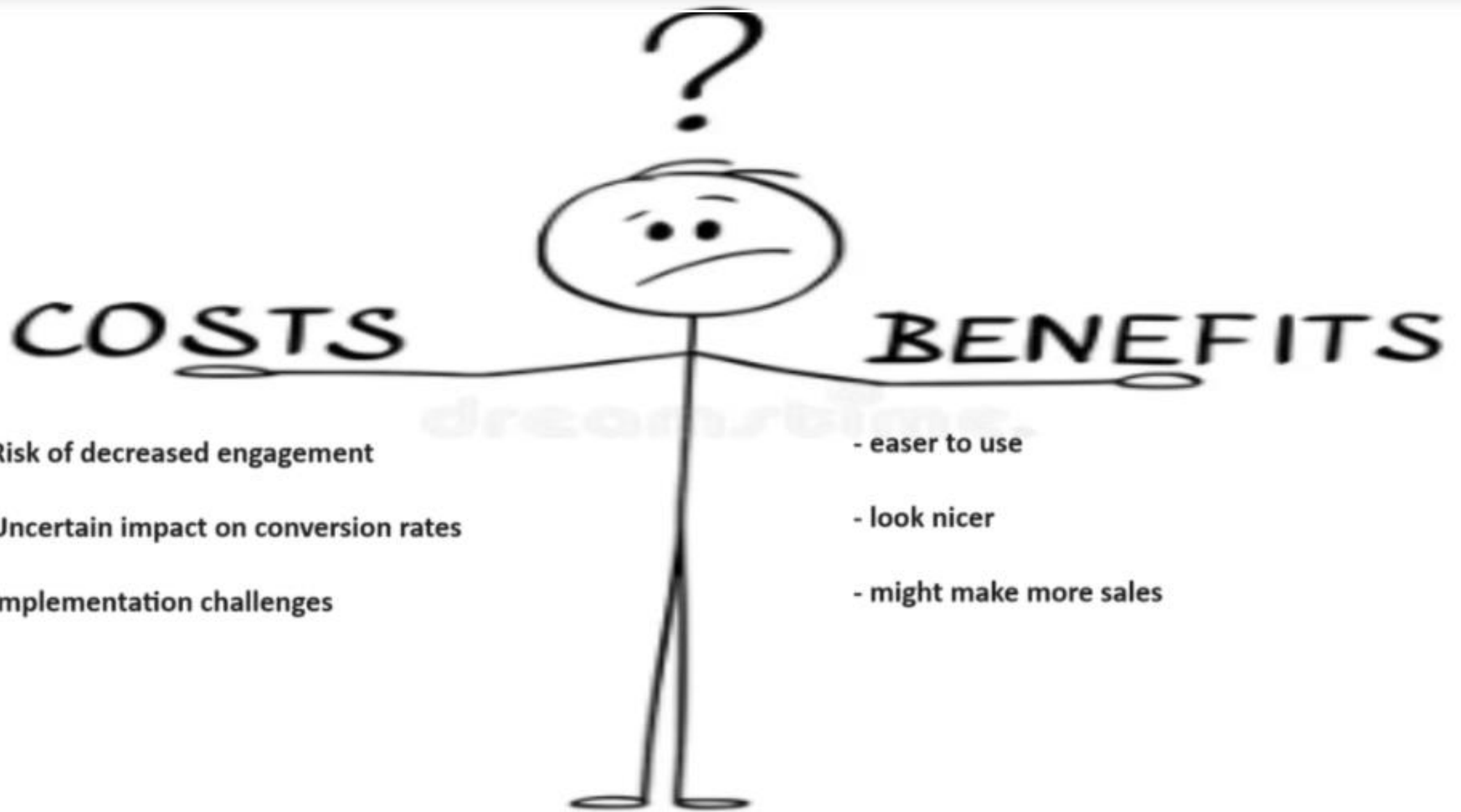
- What is the business problem you are trying to solve?
- The business problem is to determine whether changing the layout of the media rail on the product page from horizontal to vertical will lead to an improvement in user engagement or conversion rates.
-  **Goal:** Conduct an A/B test to compare the effectiveness of the new variant (vertical media rail) with the old variant (horizontal media rail) in improving user engagement on the cooking website's product page





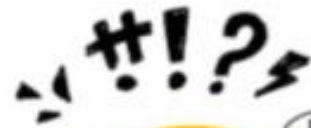
It matters to the company because improving the product page could potentially lead to increased user engagement, more conversions, and ultimately higher revenue.





- Risk of decreased engagement
- Uncertain impact on conversion rates
- Implementation challenges

- easier to use
- look nicer
- might make more sales



Let's try hypothesis testing

Null Hypothesis( $H_0$ )

VS

Alternate Hypothesis( $H_1$ )

There is no significant difference in user engagement or conversion rates between the horizontal and vertical media rail layouts.

There is a significant difference in user engagement or conversion rates between the horizontal and vertical media rail layouts.

Why is an AB test a good method for testing the hypothesis?



Because it lets us compare two things (horizontal vs. vertical media rail) fairly by randomly picking who sees each one. This helps us figure out if any differences we see are because of the new layout or just by chance.



## Propose another method that could have been used and compare pros and cons of an AB test vs this method.



### Alternative Method: Surveys and Questionnaires

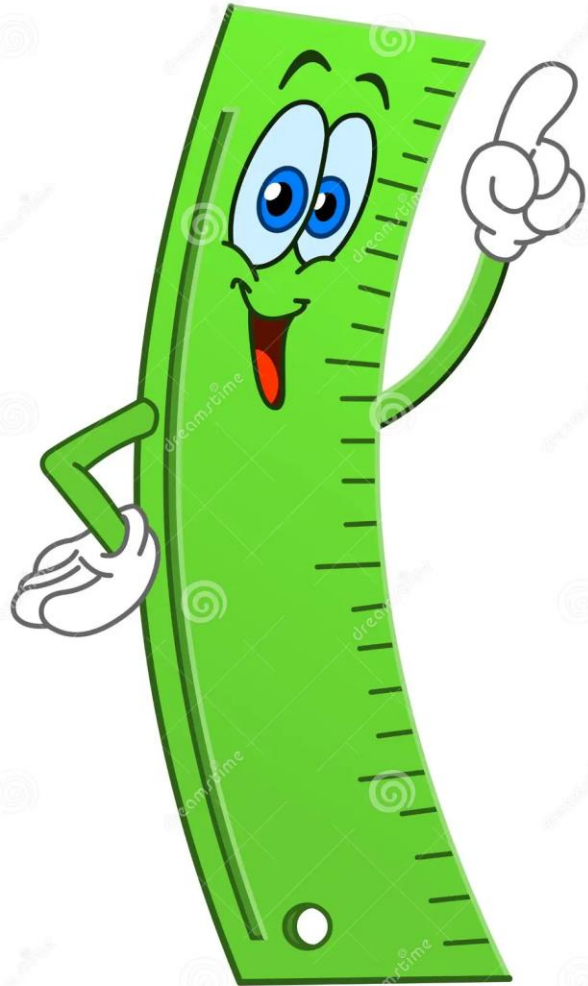
#### Pros:

- **Understanding Feelings:** Surveys and questionnaires help understand how people feel about things, giving more insights.
- **Easy to Do:** They're quick to do and can be done in different ways like online or in person.
- **Good for Learning:** They're useful for learning what people like or don't like about a product or service.
- **Cheap:** Surveys and questionnaires can be cheaper than running AB tests, especially for smaller projects.

#### Cons:

- **People Might Not Tell the Truth:** Sometimes people might not give honest answers, which can make the results not very accurate.
- **Questions Can Change Answers:** The way questions are asked can change how people answer, which can make it hard to know what people really think.
- **Can't See Actions:** Surveys only ask people what they think, so we can't see what they actually do.
- **Not as Clear as AB Testing:** The results might not be as clear or reliable as AB testing because they depend on what people say, not what they do.





dreamstime.com

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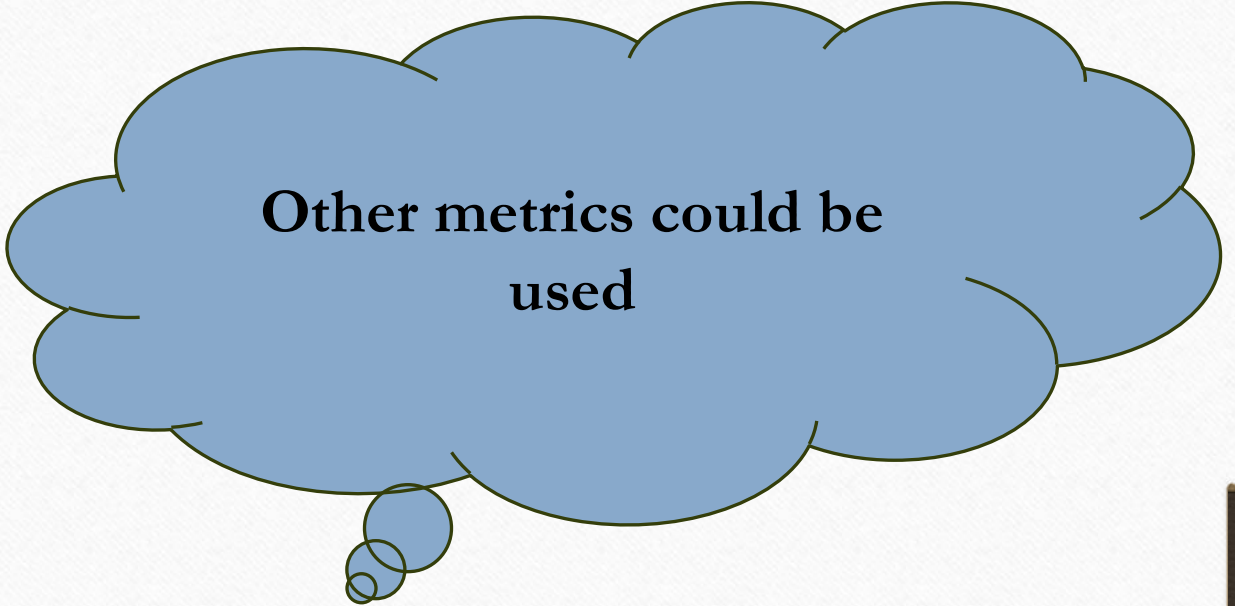
## Primary Metric: Gross Merchandise Volume (GMV)

**Why GMV:** GMV is the main thing we're looking at **because** it shows how much money the company makes from selling things on the product page. It's important because **it directly affects how much profit the company earns.** By focusing on GMV, we can see if the new vertical media rail helps sell more products, which is what the company cares about the most. **So, GMV is the key number** we're watching to see if the changes are helping the company make more money.

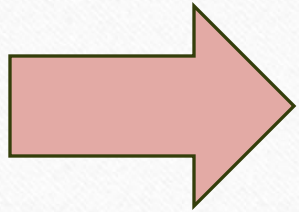
I select **number of add to cart** as **secondary metric.**



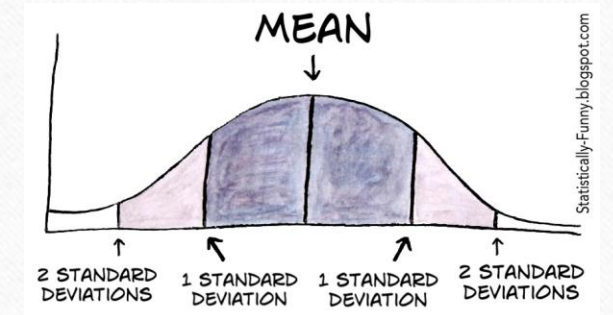
- ✓ Time spent on page
- ✓ Average order value
- ✓ Interaction with media elements
- ✓ Return rate



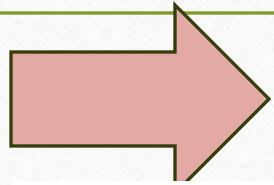
**Other metrics could be  
used**



## Metrics mean & standard deviation

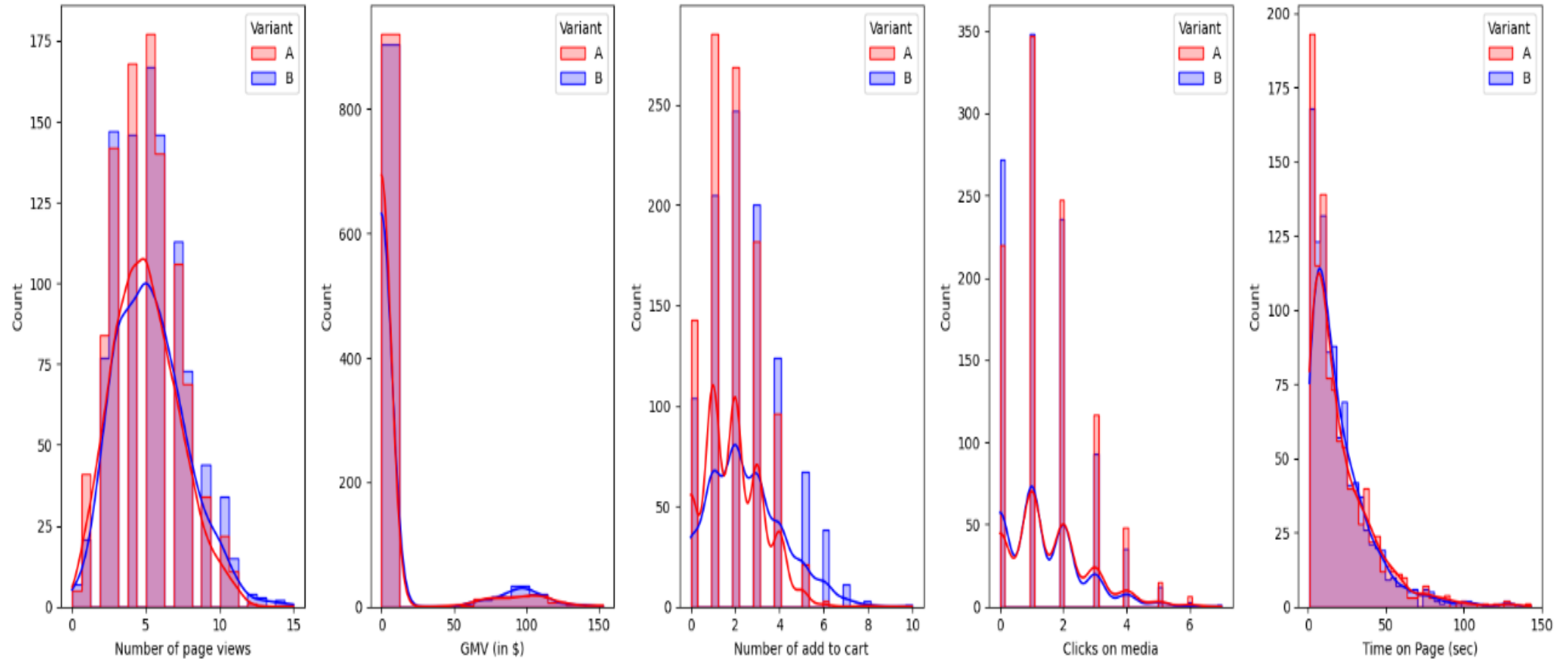


	Variant	Number of page views		GMV (in \$)		Number of add to cart		Clicks on media		Time on Page (sec)	
		mean	std	mean	std	mean	std	mean	std	mean	std
0	A	4.985	2.236465	7.68999	26.794816	1.884	1.297778	1.495	1.230239	20.543	20.596076
1	B	5.317	2.417096	9.28953	28.879687	2.469	1.660662	1.324	1.180855	20.047	19.319784



## Distribution of metrics:

Distribution of Number of page views by Variant Distribution of GMV (in \$) by Variant Distribution of Number of add to cart by Variant Distribution of Clicks on media by Variant Distribution of Time on Page (sec) by Variant







## Type of test: t-test

- a two-sample t-test to compare the GMV between Variant A and Variant B.

### Parameters:

- Mean
- standard deviation

### P-value:

- P-value with the significant level (alpha) of 0.05

- test

## T-TEST RESULT (GMV):

t-statistic: -1.283

p-value: 0.199

Alpha: 0.05

The t-test result for Gross Merchandise Value (GMV) shows that there isn't a significant difference between Variant A and Variant B. The t-statistic is negative, suggesting slightly lower GMV in Variant B, but the difference isn't large. The **p-value** is 0.199, which **is higher than** the typical threshold of **0.05**, meaning there's a 19.9% chance of seeing this difference by random chance. Since the p-value is above the significance level, we can't confidently say there's a real difference. Therefore, we **conclude that there's no significant difference in GMV between the two variants.**

## T-TEST RESULT(number of added to the cart):

t-statistic: -8.777

p-value: 3.67e-18, almost 0.000

Alpha: 0.05

The t-statistic shows that Variant B has fewer items added to the cart on average compared to Variant A, with a significant difference. The extremely low p-value indicates strong evidence against the idea that this difference is due to random chance. Therefore, **we reject the null hypothesis and conclude that there is indeed a real difference between the two variants.**



## Recommendation:

My recommendation is well-considered and highlights the importance of aligning decisions with the company's key metrics and goals.

If revenue generation (GMV) is paramount, and since there's no significant difference observed between Variant A and Variant B in terms of GMV, **it suggests maintaining the current horizontal media rail. However, it's crucial to conduct further analysis to understand user behavior that impacts GMV better.** This could involve longer duration tests or user segmentation to identify trends and optimize the website accordingly.

**On the other hand, if the number of items added to the cart is a critical metric, and there was a significant statistical difference observed in this secondary metric, it's advisable to focus on optimizing features that directly engage users in adding items to the cart.** This might involve further testing and iteration to enhance user experience and increase conversion rates.

# THANK YOU



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