Datasets:

Site	Moat Impressions	SiteVisits	CPM
yahoo.com	5000	155269275	0.01
m.yahoo.com	100	148357	0.02
drinks.com	500	500	0.09
espn.com	1000	129612	0.024
lyrics.com	600	178313	0.009
amazon.com	10	139944926	0.025

datasource for column3 : https://siteanalytics.compete.com/
CPM: Cost per impression is intuitively assumed based on the popularity of websites

Score Metrics

1. Viewability metric: This is the most basic metric that is defined per publisher as follows

$Viewability_{publisher} = (Moat\ Impressions)_{publisher} / Total\ Moat\ impressions$
$Coke\_Viewability_{publisher} = \Sigma\ ((Coke\ Moat\ Impressions)_{publisher} / Total\ impressions\ ) * Viewability_{publisher}$
$Pepsi\_Viewability_{publisher} = \Sigma\ ((Pepsi\ Moat\ Impressions)_{publisher} / Total\ impressions) * Viewability_{publisher}$

1. Assumptions: all advertisements are fully rendered.
2. We do not consider sitevisits and CPM in calculating this metric.
3. With no other additional data, we can reasonably strategize to plough money into that publisher which has a higher viewability/reach. In this case, it would be yahoo.com, followed by espn.com... with amazon.com at the very bottom

A disadvantage of this method is that, we do not take into account the number of unique visitors to a site. Which showcases the effectiveness of rendering an ad. For e.g. compare an impression count of 5 in Site A(with unique visitors as 5) and in Site B(with unique visitors 50). We can interpret that in SiteA, on an average an impression is rendered for each unique visitors. Whereas in SiteB, an impression is fully rendered per 10 unique visitors. This reflects on the publishers ability to fully render an impression. I define this metric as AdStickiness

2. AdStickiness metric: This metric measures a publishers ability to fully render an impression.

$AdStickiness_{publisher} = (Moat\ Impressions)_{publisher} / Site\ Visits$
$Coke\_Stickiness_{publisher} = \Sigma\ (Coke\ Moat\ Impressions)_{publisher} * AdStickiness_{publishe}$
$Pepsi\_Stickiness_{publisher} = \Sigma\ (Pepsi\ Moat\ Impressions)_{publisher} * AdStickiness_{publishe}$

Pros: This metric factors in the effectiveness of each publisher w.r.t impression rendering. Further we could single out those publishers which have a higher viewability but lower AdStickiness metric. For e.g(refer Fig.2) we find that yahoo.com which ranked highest in viewability, is second lowest with respect to stickiness. Intuitively, yahoo has sitevisits of 155Million while only 5000 adimpressions. This implies that for a total of 155Million unique visits, only 5000 ad impressions were fully rendered. Compare the same metric for drinks.com which had 500 unique sitevisits and total of 500 ad-impressions, roughly 1 per each customer. With no further data on hand, we can conclude

that between yahoo.com and drinks.com, we should choose drinks.com to publish our ads. Our results show that, coca cola had a total of 300 actual rendered impressions while pepsi had only 2.

One of the disadvantage of this method is that, it does not take into account the cost per impression for each publisher. i.e. without factoring in the costs that Coca cola and pepsi spent respectively on their 300,2 actual impressions, we will not be able to compare their advertising strategies

3. CPM Metric: This metric is pretty strightforward to calculate.

Coke-totalcost= Σ (Coke Moat Impressions)$_{publisher}$ * CPM$_{publisher}$

Pepsi-totalcost= Σ (Pepsi Moat Impressions)$_{publisher}$ * CPM$_{publisher}$

Coke-CPM = Coke-totalcost/Actual rendered impressions$_{coke}$

Pepsi-CPM = Pepsi-totalcost/Actual rendered impressions$_{pepsi}$

Refer Fig 3. Coke spent just 0.09$ to render an impression while pepsi spent 3.35$.

Exhibits/Results

Fig1: Publishers in viewability order(most viewed at the top)

Site	Viewability Order
yahoo.com	0.693481
espn.com	0.138696
lyrics.com	0.083218
drinks.com	0.069348
m.yahoo.com	0.01387
amazon.com	0.001387

Fig2: Publishers in ad-stickiness order(most effective at the top)

Site	Viewability	Adstickiness
drinks.com	0.069348	1
espn.com	0.138696	7.72E-003
lyrics.com	0.083218	3.36E-003
m.yahoo.com	0.01387	6.74E-004
yahoo.com	0.693481	3.22E-005
amazon.com	0.001387	7.15E-008

Fig 3: Results from CPM metric

Coke Strategy: Total cost spent **28.2** to actual rendered impressions **300.336809557**

Coke Strategy: Total cost per actual rendered impressions **0.0938945846885**

Pepsi Strategy: Total cost spent **6.95** to actual rendered impressions **2.06866298104**

Pepsi Strategy: Total cost per actual rendered impressions **3.35965793543**

CPM for coca cola

Site	CPM	Total cost
yahoo.com	0.01	0.1
drinks.com	0.09	27
lyrics.com	0.009	0.9
amazon.com	0.025	0.2

CPM for Pepsi

Site	CPM	Total cost
yahoo.com	0.01	0.2
m.yahoo.com	0.02	0.6
espn.com	0.024	4.8
lyrics.com	0.009	1.35

Coke spent less than Pepsi per impression