

Web Analytics 2.0: Empowering Customer Centricity

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In this two-part article, we start by describing the most standard practices of Web Analytics; the first steps required to analyze a website and understand the behavior of its surfers. For this purpose we present a Web Analytics process created by the authors based on industry best practices. The paper details each step of the process, going from defining goals and KPIs to collect, analyze, and take action using website data. Instead of presenting a single case study, we chose to spread real life examples throughout the article, enabling readers to connect each section to its practical application more easily. Following the hands-on process, part II proposes a pioneering concept of the next generation Web Analytics or, as we call it, Web Analytics 2.0. This concept advocates a holistic approach to website analysis in which we consider several sources of knowledge: website data, multichannel analysis, testing, competitive analysis, and customers' voice. The papers are especially valuable to people managing, maintaining or optimizing websites because they provide the tools to analyze and improve online customer experience and website profitability.

INTRODUCTION

Web Analytics is the science and the art of improving websites to increase their profitability by improving the customer's website experience. It is a science because it uses statistics, data mining techniques, and a methodological process. It is an art because, like a brilliant painter, the analyst or marketer has to draw from a diverse pallet of colors (data sources) to find the perfect mix that will yield actionable insights. It is also an art because improving websites requires a deep level of creativity, balancing user-centric design, promotions, content, images, and more. Besides, the analyst is always walking the fine line among website designers, IT personnel, marketers, senior management and customers.

By now, website managers are aware that visitor acquisition is a multi-faceted endeavor, which makes use of the following techniques: email, mail, affiliate marketing and of course search. With each option they have become better at finding the right visitor to bring to their websites. For example, every website now has a Search Engine Optimization (SEO) strategy that will help them rank highly on search engine organic results. Likewise they are also aware that Pay-Per-Click (PPC) campaigns can be effective at driving relevant visitors. **Acquiring visitors is only the start of the process rather than, as many marketers believe, the end.**

Jim Sterne and Matt Cuttler provide an excellent explanation of the value analysts can bring to websites in the following graph [2]:

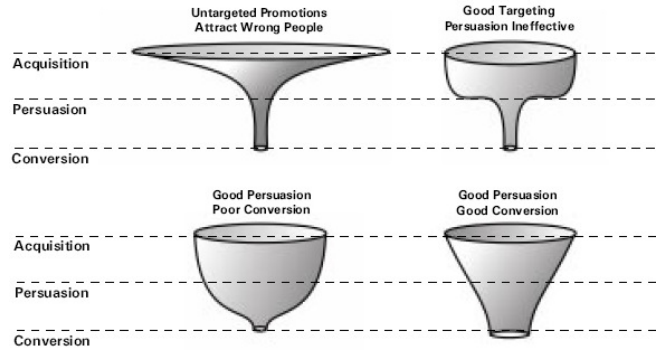


Fig. 1: Customer Life Cycle Funnel

The web analyst's responsibility is to help identify insights that will evolve website visitor behavior from top-left to bottom-right. The first scenario (top-left) represents a website that receives a high number of visitors but is unsuccessful in persuading them to convert (any action that the website owner considers his/her objective). In the best scenario (bottom-right) a small percentage of visitors leave the website without converting. Therefore, **Web Analytics can be defined as the act of increasing a website's persuasion and relevancy to achieve higher conversion rates.**

WEB ANALYTICS PROCESS

The objective of Web Analytics is to understand and improve the experience of online customers, while increasing revenues for online businesses. Among other techniques (described in part II), this can be done by studying the ways customers navigate a website. According to the Web Analytics Association [6], the official definition of Web Analytics is "the measurement, collection, analysis and reporting of Internet data for the purposes of understanding and optimizing Web usage."

Web Analytics is not a technology to produce reports; it is a process that proposes a virtuous cycle for website optimization. Based on the field's best practices, a framework for analyzing website performance should include the following steps:

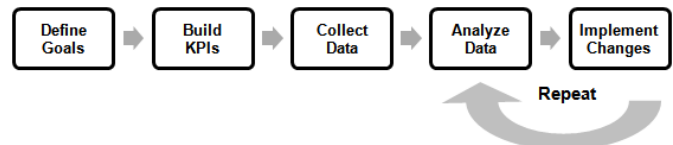


Fig. 2: The Web Analytics Process

This process will enable a website owner to measure customer acquisition costs against profits, to find how the most profitable

visitors are behaving in the website, and to optimize the website to improve its performance or profitability. Following, we discuss each step in detail.

A. Defining Goals

The answer to the following question is critical in defining a website's goals: why does your website exist?

Each website will have its own unique answer to that question: for example, an ecommerce website should sell products, a support website should answer the customers' questions, and a news website should provide content. Each website owner must define success according to his/her own objectives and revisit the goals periodically.

Website objectives are critical input that will assist in identifying the metrics that help to measure the success of this channel (for many companies, a website is one channel among several others). **The website should be accounted for in the same way as other business expenses; investment must be measured against return.**

One of the key evolutionary trends in the last couple of years is the ability to measure success no matter what the goals of your website are. We could just do ecommerce before; now you can measure success in terms of driving social media campaigns or a support website or a nonprofit website or even a blog (both online and offline). The only requirement is an articulation of the business goals.

B. Defining Metrics (KPIs)

Measuring goal achievement can be done by creating Key Performance Indicators (KPIs) that show whether the website is getting closer to its objectives or not. It is common knowledge in the Web Analytics community that information is not worth collecting if it does not generate insight. **There should be an action linked to each KPI proposed for a website.** For example, if the marketing cost per visitor to a website is measured, there should be two actions related to it: one for a decline in this number, and one for an increase in it.

Steve Bennett, former Intuit CEO, is known to push everyone to **identify the "critical few": priorities, goals, metrics, KPIs, anything.** If the business were on the line how would you know things are going well or badly? Cutting through the clutter of data, what are the "critical few" metrics? Almost all of us have too many things we measure, too many things that distract us and take away our precious time and attention. But everyone probably has at most three "critical few" metrics that define his/her existence.

One important characteristic of a KPI is that it is highly adjustable: each company, department, or person should have its KPIs defined according to the company or personal objectives and interests. One common division of KPIs across the industry is by hierarchy: upper-management receives reports on the overall achievement of the website's goals; mid-management receives reports on campaign and 'site optimization results; and analysts receive detailed and technical reports on website performance. Articulated another way, **there should be a clear line of sight between the company's**

goals and what each level of the organization is solving for.

Good KPIs should contain four attributes:

- I. **Un-complex:** decisions in companies are made by people in several departments with different backgrounds. If only the web analyst understands the KPIs, it is unlikely that decision makers across the company will use it.
- II. **Relevant:** each business is unique, even businesses that seem like they might be in the same business. Avinash [3] uses the example of Best Buy and Circuit City. It might be thought that both companies should/would/could measure their website with similar web metrics. However, the only thing they have in common is the fact that they sell large-screen TVs on their website. Everything else is different: their business models, their priorities, and how each tends to use the web in its multi-channel portfolio.
- III. **Timely:** great metrics must be provided promptly so that decision makers can make timely decisions. Even excellent KPIs are useless if it takes a month to get information when your industry changes every week.
- IV. **Instantly useful:** it is vital to understand quickly what the KPI is, so that one can find the first blush of insights as soon as s/he look at it

One good example of a great KPI that meets all of the preceding criteria is bounce rate (percentage of single pageview visits). It is un-complex because it is easy to understand, explain and propagate. It is relevant because it identifies where you are wasting marketing dollars and which pages under-perform. It is timely because it is a standard in all Web Analytics tools within one click. And it is instantly useful because the website owner can look at it and know what needs attention; s/he sees 25 to 30% for your 'site and instantly you know things are fine; s/he looks at a page with a 50% bounce rate and knows it needs attention; s/he sees a campaign or keyword with a 70% bounce rate and knows there is a fire.

You will have lots of metrics or KPIs at your disposal, yet only those that meet the preceding four criteria will yield actionable insights that will have a positive impact on your website.

C. Collecting Data

It is vital that data be collected accurately and saved on a local or external database for further analysis. Data collection is crucial to analysis results. Following we describe the four main ways of capturing behavior data from websites.

i. Web Logs

Every time a visitor to a website requests information (for example, when a visitor clicks a link to go to another page in the website) the server of the 'site registers this request in a log file. The log file can have several different formats, but Extend Log File Format, which is the commonest, saves the following information: the IP of the computer that requested information, date or time at which the transaction was completed, time taken for transaction completion, bytes transferred, records whether a

cache hit occurred, and the referrer. Advantages of this method are:

- The website owner owns the data (as opposed to JavaScript Tagging below), meaning that the owner has full control over the privacy of the information;
- Web logs are available backwards, which enables the website owner to reanalyze past campaigns and reprocess data;
- It saves web crawler behavior (crawlers from search engines visit the website to index them and show in search results).

Following is a description and visualization of how the Web Logs are collected [3]:

1. Customer types URL in a browser.
2. Request comes to one of the web servers.
3. The web server creates an entry in the log file.
4. Page goes back to the customer.

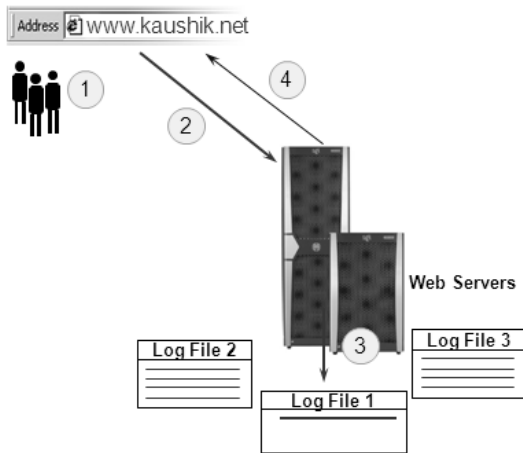


Figure 3: Log File Data Collection Visualization

ii. JavaScript Tagging

This technology consists of inserting a small JavaScript (which is not allowed to be cached) in every page of a website. This means that every time a visitor opens a page, this JavaScript is activated and the visitor information and actions are saved in a separate file. Advantages of this method are:

- It counts every visit (unless the customer closes the page before the script is loaded) to a website, while log files can be affected by cached pages by the Proxy (the network connection provider) or the user’s browser, which can send a page to a visitor without registering a log file in the server. The cached information is lost whenever analyzing log files, reducing the accuracy of the customer’s information.
- The JavaScript is not read by crawlers, which generates high amounts of traffic and are not representative of customers’ behavior. Crawlers can be excluded from the analysis; however, it is a time-

consuming task, and many of them are not recognizable.

- The analysis resources are outside the company, i.e., the company does not have to process and save the data internally.

Following is a description and visualization of how JavaScript Tagging works [3]:

1. Customer types URL in a browser.
2. Request comes to one of the web servers.
3. Web server sends back the page along with a snippet of JavaScript code appended.
4. As the page loads it executes the JavaScript code, which captures details about the visitor session and cookies, and sends it back to the data collection server.
5. In some cases upon receipt of the first set of data the server sends back additional code to the browser to set additional cookies or collect more data.

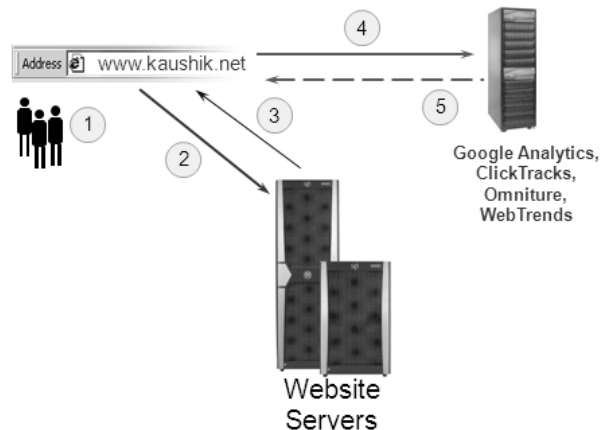


Figure 4: JavaScript Tagging Data Collection Visualization

iii. Web Beacons

This technology is used to measure banner impressions and click troughs. Although not used often, web beacons can still be found on the web. A great benefit (and common usage) of web beacons is in tracking customer behavior across different websites. It answers questions such as: how are banner ads performing across multiple websites (where they could be seen by the same or different sets of customers)? Because the same server is collecting the data, reading the cookies and doing the tracking, it is quite easy for advertisers to track, anonymously, the same visitor across multiple sites or different visitors to the same ‘site.

Following is a description and visualization of how Web Beacons are collected [3]:

1. Customer types URL in a browser.
2. Request comes to one of the web servers.
3. Web server sends back the page along with a get

request for a 1x1 pixel image from a third-party server.

4. As the page loads it executes the call for the 1x1 pixel image thus sending data about the page view back to third-party server.
5. Third-party server sends image back to the browser along with code that can read cookies and capture anonymous visitor behavior data.

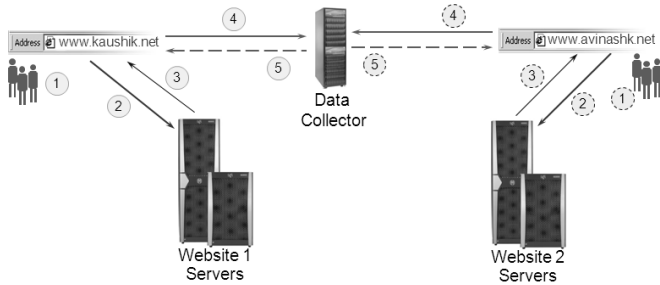


Figure 5: Web Beacon Data Collection Visualization

iv. Packet Sniffing

Although packet sniffing is very advanced in terms of technology, it is used mostly for multivariate testing. Its biggest advantage is that it need not tag pages; all the information goes through the packet sniffer (hardware).

Following is a description and visualization of how packet sniffing works [3]:

1. Customer types URL in a browser.
2. Request is routed to the web server passing through software- or hardware-based packet sniffer that collects attributes of the request.
3. The packet sniffer sends the request onto the web server.
4. The request is sent back to the customer but is first passed to the packet sniffer.
5. The packet sniffer captures information about the page going back, stores that data and sends the page on to the visitor browser. Some vendor packet-sniffing solutions append a JavaScript tag that can send more data about the visitor back to the packet sniffer.

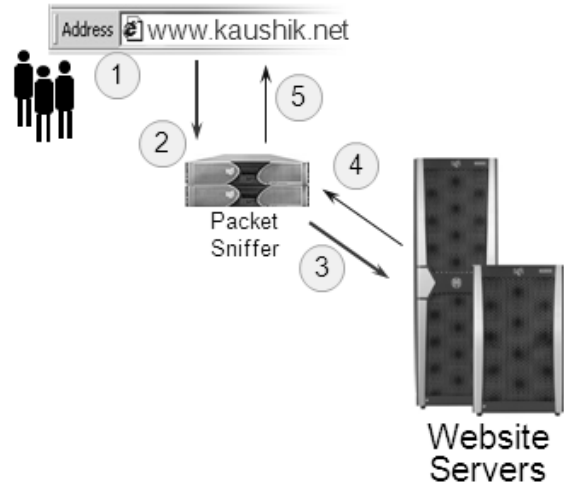


Figure 6: Packet Sniffing Data Collection Visualization

D. Analyzing Data

To understand the customer behavior from the data, the (web) analyst should follow a few initial steps. Following **we identify analyses that should help on the conversion of data into insights, which will be essential for optimizing any website.**

i. Start from the Basics

Any web analytics tool presents a summary report, a group of basic metrics that are available immediately after logging into the tool. Google Analytics shows the following chart:

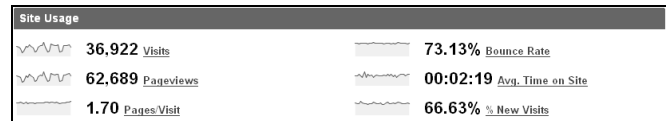


Fig. 7: Google Analytics Basic Metrics

The preceding chart shows the following metrics:

- **Visits:** the number of sessions on your website and number of times someone interacted with your 'site.
- **Bounce Rate:** the percentage of single pageview visits (this metric can also have different definitions, such as a visit that last less than 5 seconds).
- **Page Views** number: the number of pages that were requested in all visits.
- **Pages/Visit:** how many pages were seen, on average, in each visit.
- **Average Time on Site:** how long people stayed on the 'site.
- **% New Visits:** how many sessions were from people who visited your site for the first time.

The preceding numbers will vary from industry to industry, and for this reason there is no absolute benchmark to which a website owner can compare. The best way to proceed is to trend it over time, as much data as possible, to understand if

the website is improving or not.

A high number of pageviews on the website is a good sign in most cases, except, for example, for support websites, where the customer wants to find the information fast. New website design or programming technologies (such as Flash and AJAX) will make these metrics obsolete. However, time on 'site might be a good indicator of visitor engagement.

Bounce rates measure the quality of traffic you are acquiring, and if it is the right traffic then it helps you home in on where or how your website is failing your visitors. It is almost instantly accessible in any web analytics tool, easy to understand, hard to misunderstand and can be applied to any of your efforts (banner, PPC, or email)

ii. Understand Traffic Sources

Another standard report on Web Analytics tools is the traffic sources report. It usually shows the percentage and absolute number of visitors that came from each type of source. Following is an overview chart as represented on Google Analytics.

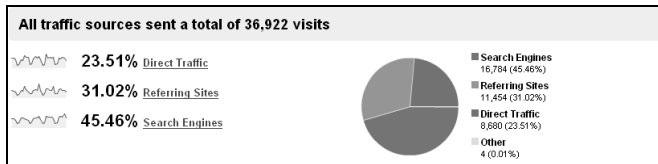


Fig. 8: Google Analytics Traffic Sources Summary

The terms used in the chart above are defined as follows:

- **Direct Traffic** represents visitors that show up on the website by entering the website's URL or from a bookmark. In case the incoming links pass through badly coded redirects or improperly coded campaigns, the traffic may also be registered as direct. When looking at the direct traffic, a website owner can understand how much traffic s/he is getting from people who know the website deep enough to know the URL or have it bookmarked.
- **Referring URLs** are other websites linking to the website being analyzed. These could be a result of banner ads, campaigns, or from blogs interested on your website. Referring URLs help a website owner to identify sources that are not known to send traffic to the website being analyzed. Depending on the value being generated by specific referrers, a marketing relationship could or should be done between both parts. The referring URL world also shares a hint of why a customer might be there.
- **Search Engines** (Google, Yahoo!, MSN, Ask, and others) will include both organic and paid (PPC/SEM) traffic. Search is the vehicle most Internet surfers use to find their destination, so this is a critical place to be for all websites. Analyzing keywords used by visitors to get to the website can indicate their intent.

- **Other** includes campaigns on the website that have been configured accurately, such as: email, direct marketing, etc. This information can be used to analyze and optimize campaigns.

It is crucial to drill down to specific websites (or keywords) that send traffic to the website. Both of those help to understand critical customer intent.

iii. Act on the Data, Save Money

In the past, website managers could choose their landing pages for each campaign and have the luxury of deciding how the visitors would start their visits to the website. Today, this control is lost. Search engines decide the website's landing page. People search (or click through from a link on another 'site) and go directly deep into the 'site.

The top entry pages report, following figure, shows how many people are entering on each page of a website, and hence it shows the top landing pages of a website. By adding the bounce rate you have an indicator of how engaging each of your landing pages is (comparing to the 'site average).



Fig. 9: Yahoo! Web Analytics Top Landing Pages

Web analysts should look, initially, for pages with the highest bounce rate: bounce rate measures single pageview sessions, un-engaging interactions with the website. Pages with a high bounce rate are not delivering on the promise that is driving customers to the website. The pages in the top ten entry pages report need attention. Once those pages are fixed, the website has an increased likelihood that visitors will go deeper into the 'site, and maybe convert.

The same can be analyzed for the keywords that led traffic to the website, as shown in the following figure:

Inbound activity	Visits	Inbound totals	Visits (%)	Bounces	Bounce rate
www.google.com					
avinash+kaushik	382	382	4.37%	156	40.84%
working+at+google	252	252	2.89%	203	80.56%
avinash	251	251	2.87%	116	46.32%
occam%27+razor	219	219	2.51%	133	60.73%
survey+questions	212	212	2.43%	196	92.45%
customer+survey+questions	79	79	0.90%	68	86.08%
competitive+intelligence	79	79	0.90%	68	86.08%
web+analytics+tools	71	71	0.81%	35	49.30%
working+for+google	69	69	0.79%	62	89.86%
occams+razor	57	57	0.65%	20	35.09%

Fig. 10: Microsoft adCenter Analytics Top Keywords

The keywords report is even more interesting because the keyword searched implies the visitor's intent. The visitors are telling why they are coming to the website, and keywords with

high bounce rates show where the intent is not met. It could be that the website is ranked for the wrong keywords. It could be that the pages these visitors are landing on don't have the right calls to action.

iv. Data Visualization, 'Site Overlay

Numbers, metrics and spreadsheets are still overwhelming for many; they want to see the data visually represented. The 'site overlay' report, or 'click density' present in most Web Analytics tools, shows the number of clicks on each link on the page.

Web analysts should look for clusters of heavy clicks, the top two or three most clicked links; then try to reconcile this information against links that s/he wants visitors to click on. S/he should also look at links that ultimately drive high conversions and ask questions such as: do more people convert on the 'site if they click on product comparison on the home page or go directly to a product page?

It is critical to try to follow the couple of heavy clicks and see what people do next. Walk in their shoes; experience the website through a customer's eyes.

v. Focus on Outcomes

Most Web Analytics efforts fail to catch on. Few companies are truly data driven. Most people focus on the thousands reports that come out of the Web Analytics tool. Web analysts tend to focus on visits and visitors and parameters and nuances, except outcomes.

As we mentioned in the KPIs section, Web analysts should push themselves to find the "critical few" important metrics for the 'site. And they are usually linked to the overall objective of the website's existence. For a blog, it can be the number who visit the speaking engagements page and attend one of the engagements. For a non-profit, it can be to use the core search functionality (e.g. to look for a volunteering opportunity). For an ecommerce website, it is the bottom-line numbers: revenue, conversions, average order value, products sold, etc.

The Web analyst should ask the following questions to be sure to focus on the right metrics:

- Visitors are coming to the website, but is it having any impact on the 'site?
- If there is an impact on the bottom line, is the website converting enough?
- What's selling and what is not? Why is it selling? How much of it?

It is fundamental to website survival to understand the customers; this is the only way to understand what action to take on the website to improve and keep pace with the competition.

vi. Implementing Changes, Improving Actionability

As concluded by Phippen A., Sheppard L., Furnell S. [4], collecting data is just the beginning:

[...] all the data gained is useless unless the data is understood and the findings are applied. The

emphasis therefore should be on *Web intelligence* – the information gleaned from a Website should be analysed and applied in a relevant context.

In talking to many marketers, sales people, website owners and "management" it becomes clear that Web Analytics is considered as hard as climbing Mount Everest. However, to get to the top, one has to start, and the best way is by making one step a time and showing website improvement along the way.

We have shown several analyses that could be used to improve website performance, but convincing stakeholders the importance of Web Analytics is fundamental to implementing changes. Web analysts should try to get everyone in the organization more excited about using data, make it appealing. From experience, we recommend five approaches to do that:

1. **Surprise people:** employees are always looking for ways to solve their problems. Receiving a hundred spreadsheets packed with data doesn't solve problems. One way to help employees is to informally approach them and try to understand their data needs. After a Web analyst understands how to help, a short email message with a single piece of information could gain the employee's good will.
2. **Measure impact, not visits:** when approaching data consumers, a Web analyst should always show them how much money the website is making; how many leads the website got; macro and micro conversions; how the 'site is solving for driving traffic to retail stores, or movie theaters. Every person understands outcomes, but it takes a while to explain what a unique visitor is.
3. **Promote other employees:** convince one decision maker to listen to you and help him/her to improve whatever s/he is responsible for. After succeeding in one project, the decision maker will spread the word that s/he made a data-driven decision and improved the website by X%. This should convince other employees that data will help in their efforts as well.
4. **Use customers and competitors:** free competitive information can be found on the web and can be used to compare websites and convince managers that a competitor is doing a better job in specific areas. In addition Web analysts can use free customer survey tools on the website and get direct information on what annoys a customer.
5. **Involve others:** if the website is running split testing, run a contest on the winner page; hold internal conferences to educate employees about Web Analytics; encourage colleagues to ask questions and look to you to solve data problems.

1. CONCLUSIONS

The big question is: how can a website manager convince surfers to buy a product or read an article? And the answer is: look at the data and understand what is happening in the website, listen to customers' voices and optimize the website to better serve them; after all they are the reason for the website's existence. **Customers should tell us what to do, not consultants, friends or feelings; data and online surveys are the place to look for customers' needs.**

In the second part of this article we will discuss the importance of additional sources of data to understand customers' behavior and the overall website performance as compared to competitors. While clickstream analysis is an important source to understand customer behavior, it explains only what is happening. In the following article we will focus on the "how much", the "why", the "what else" and, finally, the "gold"! **It is a new way to think about web data, a new way to think about new sources of data, which builds the complete picture of customer behavior in websites.**

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