

Web Usage Analysis



“Making Money on the Internet”



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Introduction

Since the inception of the Internet, the ability to closely track the behavior of web site visitors has been considered one of the most promising facets of this new medium. Internet offers a number of advantages for e-marketers. E-businesses using the Internet as a communication channel are able to collect and analyse an overwhelming flow of information continuously, fast, and at relatively low costs. Basically, there are three types of data: (1) basic, personal information provided via self-completion questionnaires; (2) purchasing history and habits; and (3) click-stream data. In this whitepaper I describe some experience with the various possibilities of click-stream analysis.

A paradox

Many companies invest a lot of money in market research. The outcomes of market research contribute to the development and the optimization of products and services. Web sites are important channels for the communication towards customers and prospects. A web site server logs each and every mouse-click. The data reflect visitors' behavior on the site on a microscopic level. The term 'click-stream' denotes the path a visitor takes through a web site. This pathway reflects a series of choices made within a web site. Although expensive market researches are conducted, the free click-stream data of visitor's behavior on the web site are still rarely analyzed. The development of web sites is based on *state of the art* ICT-knowledge, but is generally lacking clear insight in visitors' surfing behavior.

Benefits of click-stream analysis

The possibilities of click-stream analysis are relatively new. The benefits of click-stream analysis are:

- optimizing the profit of the web site
- ample opportunities to direct customers' behavior
- creation of customer focus (in an environment that traditionally might have been product and technology-driven)

In an entrepreneurial environment click-stream analysis provides an opportunity not to be missed. Compared to 'average' IT-projects it is relatively cheap, but can result in a considerable competitive advantage. All powerhouse internet companies are known for their top notch analytical capabilities.

In this whitepaper I describe how click-stream analysis can be implemented, and what the benefits are. I will formulate 5 steps towards implementing click stream analysis. Each step provides it's own useful results. This type of research may be used whenever Internet, Intranet or Extranet are used to communicate with customers and/or prospects.

5 stages in click-stream analysis

Stage 0 - Make click-stream data available

To implement click-stream analyses, the click-stream data have to be made available. Based on the experience from previous analyses, we have experienced advantages from gathering click-stream data via an Application Service Provider (ASP). Another whitepaper on the three possible ways of web data collection methods is available on this site. This step requires an appropriate infrastructure because of the sheer volume of data, which may easily exceed 1 Gb per month for a busy web site.

Stage 1 - Analyze time series of web site usage

It is adamant that e-marketers monitor the usage of the web site. Monitoring means to track the number of page views, sessions and visitors. The result is a time series in which the site's usage per month, per day or even per second is visualized. Time series of the number of visitors on the web site have proven to be very sensitive indicators for:

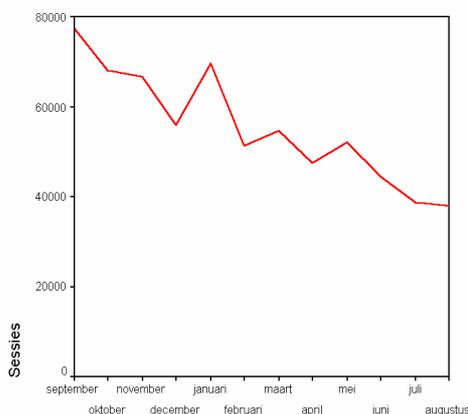
- market developments
- commercial campaigns
- alterations in the design of the web site

Time series are great evaluation tools. It was shown that changes in the design of the web site could strongly manipulate visitors' surf behavior. Besides this, it is

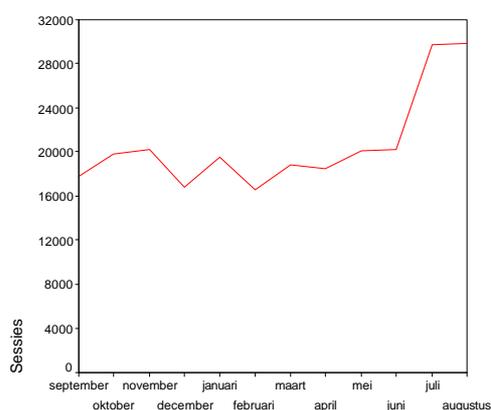
example of time series

Click-stream data of the corporate site 'www.ingbank.nl' in the period September 2000 until Augustus 2001 are analysed. Figure 1a shows a decline in the amount of sessions during the period. What's going on here? If we analyse the total amount of sessions but exclude all sessions related to trading stocks another tendency is observed (figure 1b).

1a. total amount of sessions



1b. total amount of sessions excluding stocks



possible to measure desired and non-desired effects of commercial campaigns in a very early stage (basically in real time) as campaigns are launched. With the proper infrastructure, monitoring the web site is possible on a daily basis or even in real time.

example of time series (continued)

It appeared that the stock brokerage part of the web site was responsible for the decline in user sessions. The content manager together with a researcher found out what might be the explanation. Based on further research they considered appropriate actions to counteract the decline.

At an operational level, click-stream analysis can be used as an early warning system for the performance of a site. When the number of page requests suddenly drops or the amount of errors generated by the server increases, it signals that the web site faces performance difficulties. The customers can not enter the on line store. Click-stream analysis may not only contribute to commercial, but also to operational benefits. As a result it aligns client focus with the daily operation.

Summary stage 1

problem: lack of timely knowledge of market developments, campaign results and effect of alterations of the web site

action: continuous monitoring of the relevant time series

result: timely information

benefit: no waste on unprofitable actions, appropriate response to market changes, feedback on web-design

Stage 2 - Specify and track a system of Key Performance Indicators (KPI)

There are many different types of surf behavior on a web site. Depending on the strategy of the web site, only a limited number of visitors' actions result in a profitable outcome. These actions are measured by "Key Performance Indicators" (KPI). KPI's are important determinants of a successful web site, and basically follow from the business process that is being supported by the site. It is possible, for instance, to specify different types of desirable on line banking behavior. E-marketers or content managers, together with researchers, must make a list with KPI's for each web site they have. From explorative click-stream analysis useful and interesting KPI's can be found. KPI's should then be measured continuously.

example of KPI's

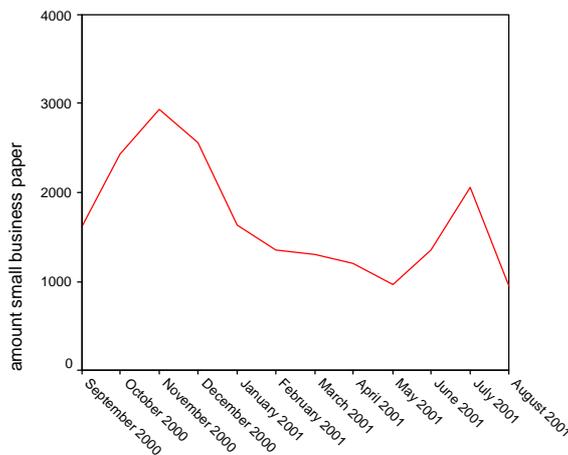
Down here is a list with examples of KPI's for a corporate web site and for a web-banking site. These KPI's should be measured continuously.

- average duration per session
- percentage 'click-throughs' before the requested page has been completely loaded
- number of on line payments and savings
- total amount of page requests investigating saving rates
- average on line stock deposit
- total amount of page requests for a mortgage quotation

Again, it is necessary for e-marketers to monitor the usage of the site. Therefore time series of the specified KPI's are needed to visualize the site's usage in time perspective. It is a good idea for E-marketers to set themselves explicit targets for the KPI's, and make the marketing process as accountable as possible.

example of a KPI time series

On the corporate site of ING Bank 'www.ingbank.nl' small business customers can order a commercial newspaper of ING Bank for small businesses. Below is an example of total number of requests for the small business newspaper (= KPI) in the period September 2000 until August 2001.



It appears that the total amount of requests for small business newspaper has declined. With the help of click-stream analyses the drop would already have been discovered in January 2001. E-marketers and content managers counter-acted immediately to stop the decline. As a consequence the amount requests for the newspaper increased once again in July 2001.

Time series are suitable to visualize the usage of a web site, and the different types of surf behavior on a web site. The time series could be automated and displayed in any desired format to end-users, for instance on a designated intranet page.

Summary stage 2

problem: lack of insight in the nature of KPI's and of monitoring KPI's

action: determine KPI's, construction of monitoring system of KPI's

result: insight in what really is important on web sites, KPI's and appropriate targets

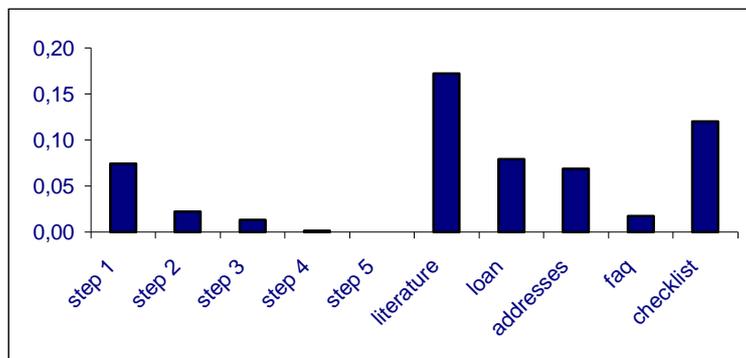
benefit: no waste on useless goals, higher accountability of staff and targets

Stage 3 - Analyze the relation between surf behavior and KPI's

Every company tries to improve on their KPI-targets. How does one improve and adjust the web site to reach or even exceed the targets? Step 3 analyses how the design of the web site contributes to realizing the KPI-targets. Detailed analysis of visitors' surfing behavior detects which parts of the web site are more or less important for the KPI's.

example of the relation between visitors' surfing behavior and the KPI

On the corporate site 'www.ingbank.nl' there is a section of the site exclusively for small businesses. The figure below shows what page visits contribute to the visitor's on line request for the small business newspaper (a KPI).



y- axe contains regression-coefficients, which indicate the probability of request for the newspaper

It turned out that literature and the checklist were the most important pages (an unexpected finding!). The other pages hardly increased the likelihood of the request for the newspaper. Content managers might wonder if it is reasonable to maintain these relatively unimportant pages.

Based on the outcomes of click-stream analysis the relation between visitors' surfing behavior and KPI's, ING Bank decided to optimize the benefits of the web site.

Experience with our clients shows that click-stream analysis offers ideas for new content. The consequences of changes on the web site are then evaluated. Click-stream analysis functions as a monitor for a system of KPI's as well as a tool for optimizing the structure, design and content of a web site.

Summary stage 3

problem: lack of knowledge on how to construct the web site to optimize KPI's; waste of effort on useless goals/pages

action: analysis of how the web site contributes to the realization of KPI's

result: improved web site construction

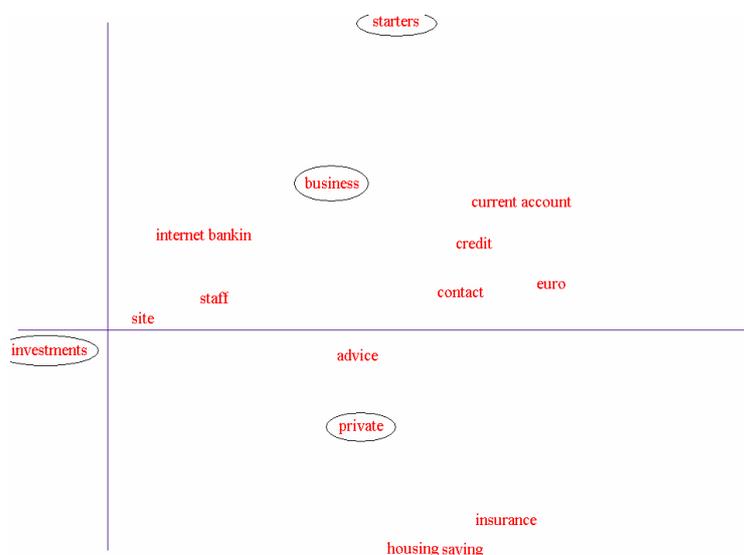
benefit: increase of KPI's, higher ROI from efforts

Stage 4 - Segmentation of user sessions and customers

Which combinations of pages are most often found within a visitor's session? If there are distinct clusters of pages, then there is also a segmentation possible of surf behavior of visitors.

example of page clusters

What combinations of pages within a visitor's session were found on the corporate site of ING Bank 'www.ingbank.nl'? In the figure below, pages that are requested more often within the same session are plotted close to each other. Pages that are not combined in the same session are lying far apart.



We found four distinctive clusters on the corporate site of ING Bank: private, business, stocks ('investments'), and start-up small businesses ('starters'). Inspired by these findings, four corresponding entries were made in the navigation menu on the home page of the corporate site.

Clusters of requested pages provide information about how to steer customers directly to the KPI's. It also clear that this information helps content managers to decide which parts of the web site justify more development, and which parts don't. Click-stream analysis operates here as a tool for optimizing the web site as well as directing customers through the web site.

The design of the web site should match visitors' needs. We assume that a visitor begins a session with a specific need for information. Therefore, a segmentation of visitors' sessions (information needs) is absolutely necessary for the optimization of the web site. One needs to cater to diverse groups of customers as best one can.

example of segmentation of sessions

A segmentation of all visitors' sessions was discovered. The table shows the nine segments.

	Segment	percentage (%)
Payments and Savings	(1) looking	44,6
	(2) send a payment	21,5
	(3) prepare a payment	14,5
	(4) address list	4,8
Stocks and Financial Channel	(5) stocks trading	7,4
	(6) financial information	3,3
	(7) prospects	2,5
	(8) investment funds	0,8
	(9) products	0,7
	<i>total</i>	<i>100%</i>

In 45% of the sessions, visitors come to just briefly watch and check the balance on their account. It is also clear that visitors rarely show an interest in "investment funds" and in "products".

In order to analyze customers' surf behavior it is extremely useful to link the click-stream data with the customer information from the marketing database (Data Warehouse). Then you can learn *when* and *how* the web site is used as well as by *whom*. Subsequently, it also becomes possible to set up multi-channel KPI's, for example the proportion on line stocks trading versus off line stocks trading. It also becomes possible to provide suitable feedback to the visitors via the web site, or even via direct mail. Click-stream analysis enables ample opportunities for marketers to direct customers' behavior through multiple channels.

Summary stage 4

- problem: lack of knowledge of *purpose* of sessions and need of visitors on the web
- action: segmentation of sessions and customers into 'need clusters'
- result: improved construction of the web site; targeting of customers based on behavior within a single session or over multiple sessions
- benefit: more traffic on web site, increased sales

Stage 5 - Longitudinal research of customers' behavior

The final step is analyzing customer behavior over time. The following business issues might be of concern:

- ◆ do we observe routine behavior on the web site?
- ◆ how do new users on the web site develop routine behavior?
- ◆ how can we detect a change in customers' behavior that eventually leads to inactivity?
- ◆ how can one break this impending behavior?

Longitudinal research of customers' behavior is applicable when customer information from the marketing database is linked with the click-stream data. With this kind of research various types of routine behavior on the web site can be assessed. It is particularly interesting to analyze and evaluate behavior of new users during their first visits on a web site. What are the problems that first time users experience on a web site? Perhaps content managers can attempt to resolve these problems on the web site. What can be done to speed up the learning curve in the first few visits to a site? E-marketers can come up with interventions to break routine behavior or to stimulate desirable behavior. Click-stream analysis is a workable methodology to support state-of-the-art customer contact strategy.

Summary stage 5

problem: lack of knowledge on customer development on the web

action: longitudinal analysis of customer behavior

result: knowledge of how to guide new customers, how to intervene in undesired routine behavior or pending inactivity

profit: higher customer retention, increased sales

Conclusion

Click-stream data is extremely sensitive to every change in customer behavior. XLNT Consulting endorses click-stream analysis to enhance client focus. Of course it can be employed as a stand-alone activity, but much greater rewards are possible.

The opportunities for click-stream analyses are many and far-reaching. We are looking forward to sharing ideas and co-operating in these projects.

example of observed change in customer behavior due to cross-channel action

Figure 1b on page 2 showed the total amount of sessions on the corporate site, excluding all sessions related to trading stocks. In June 2001 there was an increase in the amount of sessions. What causes the sudden growth? The table below shows the average amount of sessions per month for various parts on the corporate site during the period September 2000 until June 2001 and between July 2001 and August 2001 (excluding all sessions related to stocks trading).

Type of session	average per month		difference	
	September-June	July-August	amount	%
Internet banking	2429	13087	10658	438.8
Saving	1070	2080	1010	94.3
Business	4073	7591	3518	86.4
Euro	51	87	36	69.9
Advice	4294	7030	2735	63.7
Contact	1992	3144	1152	57.8

The number of visitors' sessions related to 'internet banking' on the corporate site has increased enormously as a consequence of a commercial mailing to customers for the web-banking site in June 2001. Experience has shown that clickstream analysis is highly sensitive to monitor *off-line* campaigns.

- ◆ The benefits of click-stream analysis are:
 - optimizing ROI from the web site
 - ample opportunities to direct customers' behaviorClick-stream analysis offers myriad possibilities to integrate the Internet into a comprehensive marketing strategy.
- ◆ Tracking each and every mouse-click of customers will ultimately increase the awareness of customer behavior adding to client focus. By creating a culture of interest in customer behavior, one is able to improve the communication with and the service towards customers. This will eventually lead to an increase of Share or Wallet.
- ◆ Click-stream analysis is a big step forwards to create one integral and complete picture of customers through different channels (360° customer view). Few competitors are in to this relatively new line of research yet. Therefore, this is a unique opportunity to gain a competing advantage!