ROI Calculator

Nielsen clients want to understand the relative value of their marketing efforts. One way to present this information is through “Return On Investment”, or ROI.

An ROI is a ratio of revenue to spend. A value greater than one indicates that revenue exceeded spending and the effort was profitable; a value less than one indicates revenue was less than spending and the campaign was unprofitable.

# Basic Computation of ROI

The formula for ROI can be expressed as

As an example, the following table describes the elements of the above formula

|  |  |  |  |
| --- | --- | --- | --- |
|  | Description | Data type | Example |
| Sales | The number of items sold, e.g. cases of soda | Client defined unit | 1000 |
| Margin | Profit margin for each unit sold | $ / client defined unit. | $8.20 |
| Adjustment | Adjustments to sales measurements | Ratio | 1.05 |
| Marketing Cost | Amount of money spent on marketing | $ | $8000 |

We would calculate ROI to be

The ROI value of 1.08 means that for every $1 on this particular marketing activity we have received $1.08 in revenue.

# Hierarchy

ROI is computed at each level in a hierarchy. For example, while there might be many TV Campaigns each with their own ROI we cannot simply sum or average those values to determine an ROI for all TV. We need to compute the total sales for each TV campaign, and compute the total advertising spend for each TV campaign. Conversely we can only compute and work with adjustments at the campaign level.

Much of the complexity of this project is in the hierarchy traversal. This process needs to work on hierarchy of variable depth, and must perform well.

## Typical hierarchy

Media is stored as a single root hierarchy. The top level of the hierarchy is ‘All Media’.

Under the root ‘All Media’ node are delivery channels, such as ‘TV’, ‘Radio’, ‘Print’, and ‘Digital’. These are simply groupings over campaigns by their delivery mechanism.

Children of these channels are campaigns. For example, the TV channel might have campaigns like ‘Most Interesting Man in the World’, or ‘I’m a Mac, I’m a PC’, etc. The Print channel might have campaigns like ‘Roger Federer Rolex’, or ‘Tiger Woods Rolex’.

## Hierarchy Traversal

When we want to compute ROI for a channel, we need to compute the numerator value (the *SUM[Sales \* Margin \* Adjustment]*) for every hierarchical child of that channel.

So, in the case above, the ROI for TV would need to consider the Sales due to the ‘Most Interesting Man in the World’ campaign and the Sales due to the ‘I’m a Mac, I’m a PC’ campaign.

For each of these campaigns we will need to take the raw sales value, multiply it by the *Margin* and *Adjustment*, and sum the values.

## Margin & Adjustment

Both Margin and Adjustment values are able to be provided at any level in the hierarchy.

For example, the Margin (the profit per item sold) may be specified

* At the root All Media node so that the margin is the same for all campaigns, regardless of channel, for the simplest configuration, or
* At the channel node (TV and Print), so that TV campaigns have a different margin than Print, in the case when Print campaigns may all have a discount coupon attached, or
* At the campaign node (‘Most Interesting Man in the World’), when the TV ad itself may say ‘Say you saw this ad for a 10% discount!’

Similarly, the Adjustment can be specified at any level (and it is usually specified at the channel level).

When computing the *SUM[Sales \* Margin \* Adjustment]* for each campaign, the algorithm should be

* Check whether a Margin has been specified for this campaign; if so, use it, otherwise
* Check whether a Margin has been specified for this channel; if so, use it, otherwise
* Check whether a Margin has been specified for All Media.

## Hierarchy computation: example

To compute ROI for all TV campaigns, we will need to

* Look at ‘Most Interesting Man in the World Campaign’, and compute revenue
  + Get the sales value
  + Find the most applicable Margin value (first check for campaign-level Margin, then channel, then All Media). Apply that Margin to the sales value.
  + Repeat above step for ‘Adjustment’
* For all other campaigns, sum adjusted sales as above.
* Sum the total spend for all campaigns
* Divide sales by spend