

# ConsuNaut™: Consumer analysis in place and time

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An established component of market research is the assessment of people's use of time: how many minutes per day are spent in different activities. New technologies such as sensors and GPS enable collecting data on locations. We present a method which combines the time and location dimensions in analysing the behaviour of a group of people. In addition to time and place, the method allows observation of moment-related moods and attitudes of people. Furthermore, the impacts of external factors can be included in the methodology analysis.

The method is built around the ConsuNaut™ tool which is a program consisting of a MySQL database and a graphic user interface in Flash. The interface presents subject groups as one hundred circle symbols, each one representing one percent of the group. We can cluster subject group members into various segments which are indicated with different colours. The hundred circles are placed on the ConsuNaut grid which has five different locations, four in the corners and one between the others acting as a transition area. The locations can be either physical places or mental states of the subject group members. One grid view shows the situation of an hour, and the tool can present a series of these time slices of selected hours, e.g. each hour of one week or one month. We can add visual symbols on the circles to describe selected characteristics of the subject group members, these can be e.g. state of each percentage which can have options such as sleeping, eager to learn, and awake but not interested. The colour of cells of the grid can be changed to describe the current circumstances in different locations, e.g. if in one location the competition in providing services for the consumers is fiercer than on the other locations, the appropriate cells may have different colour.

Background data for ConsuNaut™ tool can be collected either from statistics, questionnaires, or more innovatively through mobile phone applications, where participants of the research submit their status report regularly through their mobile terminals. A status report contains a couple of indicators depicting their state of mind, mood or some other characteristics relevant to the study being undertaken. Their location can also be registered in the database. A GPS-enabled phone can store this information; with a phone lacking this ability, coding can be used (e.g. store, home, transit). One example of data editing is the case where we can combine two complementary data sets by building an optimisation model in a spreadsheet computation to match the data in the most accurate manner. Another example is that we use Theme (by Noldus) [1] or SOM (Self-Organising Map, a neural network) [2] to find patterns in human behaviour from the data of a group, and based on these regularities we can convert the data to ConsuNaut™ format.

We implement the analysis phase after finishing the dataset compilation. The motions of groups have previously been

animated for instance by simulating behaviour of birds by using distributed behavioural model by Reynolds [3] and by simulating urban crowds based on individual and collective geospatial intelligence by Torrens [4]. The ConsuNaut™ tool simulates group motions simultaneously with mental states of a group, based on the data analysis. The tool enables watching all selected time slices in a row as a slide show, or picking one time slice at the time and taking another time slice next to it for a comparison. The main idea of this kind of analysis is to view large amounts of data at a glance and perceive behaviour patterns visually. This makes it possible to use the inbuilt human perception abilities to convey understanding of a very complex issue: the behaviour in space and time of groups of consumers. The objectives of the analysis depend totally on the definition and the scope of the study. The question to be solved can be e.g. understanding what kind of people are in the transition space at different times of the day or week. Another example is to see where and when a company should market its products, where potential customers are and when they are in the right mood.

The analysis can also contain an assessment of external factors or possible trend impacts on the behaviour of people. This type of assessment naturally requires extra calculations with the background data. We create response functions for each subject group category and use them to produce migration coordinates for the population studied – be it coordinates on the 5-area map of ConsuNaut™ or e.g. coordinates of mood. New locations and other characteristics for each time slice are the output, when input is a selected external change. We can compare a certain time slice before and after the external change to see the impacts or we can view the whole time period in a new situation to see if the patterns have changed. In some cases it is also possible to use the above-mentioned SOM to analyse the behaviour transitions.

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## References

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