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Procedure for statistics realization
Workpackage 2 - Task 2.3

This document explains how to apply the Conjoint Trends Analysis method and to extract statistics.

Acronym	TRENDS
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0. INDEX

1 . GENERAL INTRODUCTION

This report corresponds to the third deliverable of WP2, D2.3 *Procedure for statistics realisation*.

1.1 WORK PACKAGE 2 OBJECTIVES: DESIGN OF THE SYSTEM ARCHITECTURE

The objective of WP2 is to design the overall architecture of the TRENDS system, starting from the Conjoint Trends Analysis (CTA) methodology and the WP1 results to implement and mix the three technologies into one homogeneous system able to adapt to each designer in every market (automotive, furniture, cosmetic, textile…).

1.2 DESCRIPTION OF WORK TASK T2.3

This report is related to the task T2.3.

After the *elaboration of the initial sociological and design trends database* (T2.1) and the *definition of a procedure for the identification of the sectors of influence and the websites for the extraction of sociological and design trends* (T2.2), the current task consisted mainly in the *definition of a procedure for the mono-sector mappings, ambiences, pallets definition and statistics module* (T2.3).

The resulting deliverable D2.3 is headlined *Procedure for statistics realization*. After the formalization of the Conjoint Trends Analysis procedure for the ambience and pallets realization, a statistical module will be defined. This module will be used to bring to the end users a possibility of quantification of the trends proportions and evolutions.

1.3 STRUCTURE OF THE REPORT

The following document will be organised into two main parts:

2. Procedure for the TRENDS identification and formalization (T2.3.1)

and

3. Procedure for statistics realization.

The understanding and integration of both procedures into the TRENDS project by all partners is of great importance because they constitute one of the main research challenges of the TRENDS project: the digitalization of the Conjoint Trends Analysis method.

2 . PROCEDURE FOR THE TRENDS IDENTIFICATION AND FORMALIZATION (PHASE 2 OF MANUAL CONJOINT TRENDS ANALYSIS (MCTAPH2))

2.1 PRESENTATION OF THE CONJOINT TRENDS ANALYSIS METHOD (CTA) [1]

Designers cognitive activity in the earliest phases of design was studied. The study outputs enabled the modelling of the Conjoint Trends Analysis method. The Conjoint Trends Analysis method makes it possible to enrich and to inspire the designers when designing a new product. It is positioned in the earliest phases of the design process, as follows:

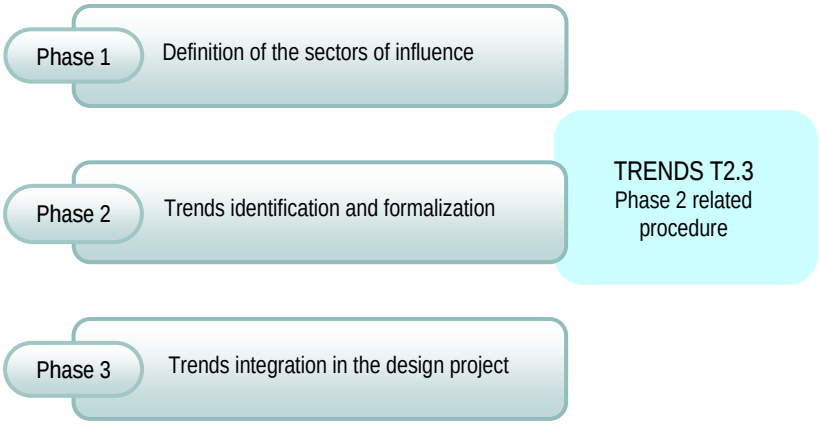

Figure 1: Conjoint Trends Analysis Method

The first phase was fully described in the deliverable D2.2 *Procedure for the extraction of sociological values with the list of specific web sources.* The phase 2 will be detailed in this document. The resulting procedure will provide relevant functionalities for the TRENDS system, whose usefulness was already validated on the car market through several studies led by the LCPI.

2.2 INTRODUCTION TO THE PROCEDURE FOR THE TRENDS IDENTIFICATION AND FORMALIZATION

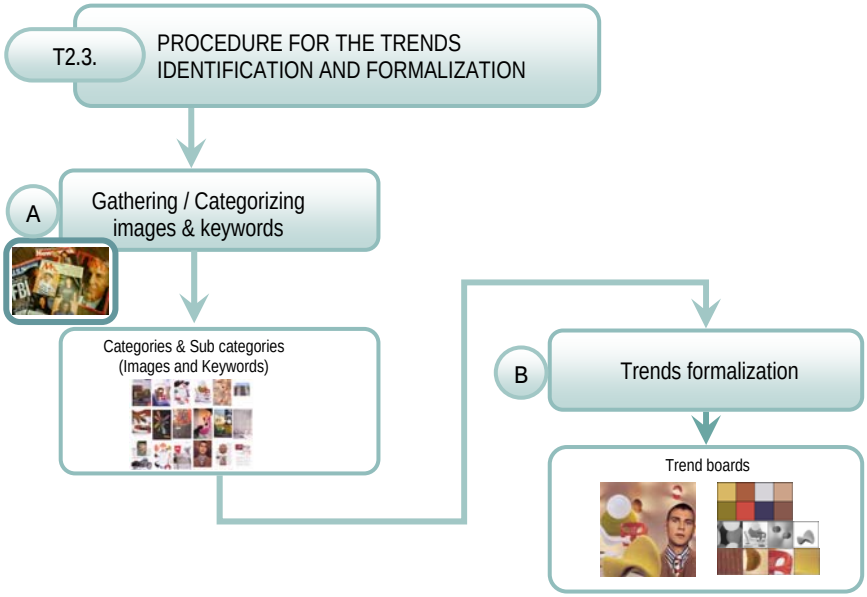

Figure 2: Procedure for the trends identification and formalization

The first input data for the Trends identification and formalization is the list of sectors of influence coming from the *extraction of expertise* by the designers or from the *semantic mapping* (see deliverable D2.2). A search of words and images is done in these sectors, taking into account the project's brief specifications (if any) and the values of the targeted population when the latter was specified. From this search, a categorization of the keywords and of the images has to be done. A specific name is then given to each category. The trends will emerge from some categories and sub categories, giving birth to explicit trend boards.

A- *Information gathering* (words and images) is carried out from an information search led into the sectors of influence. This step aims to generate categories and sub categories grouping together images and keywords from various sectors. These images and keywords are a member of the same homogeneous category which is characterized by a colour / form / values harmony.

B- The *formalization of a trend* is the composition of a homogeneous ambience with elements coming from a same category or sub category. In a second time, specific harmonies can be extracted under the form of shape/texture/colour/usage pallets (FTCU), also called FCTU pallets.

3 . PROCEDURE FOR STATISTICS REALIZATION

3.1 STATISTICS ALREADY DONE IN THE MANUAL APPROACH

Statistics are already done with the CTA manual approach, related both to the maturity level of the Trends and to the quantity of information used during the different steps. Currently the maturity level of a Trend is assigned by the CTA experts to each Categorization board after the composition of the ambiences. They do this assignation by experience and by the use of their previous knowledge of the Trends.

In fact the maturity level depends on the number of sectors where a specific Trend has been spread and on the level of consistency with consumer values. A function helping in the calculation of this level is of great interest for the end users, as well as and for their managers.

3.2 NEW STATISTICS MADE POSSIBLE BY A DIGITAL SYSTEM

New statistics will be made possible through the digital application of the CTA method. They are linked to the automatic calculation of specific dimensions (colour, number of words, number of words linked to images) under the form of mappings, histograms, representing the repartition of these dimensions in a particular corpus of data.

3.2.1 Mapping of co-occurences of words, values, semantic adjectives, attributes for a specific corpus

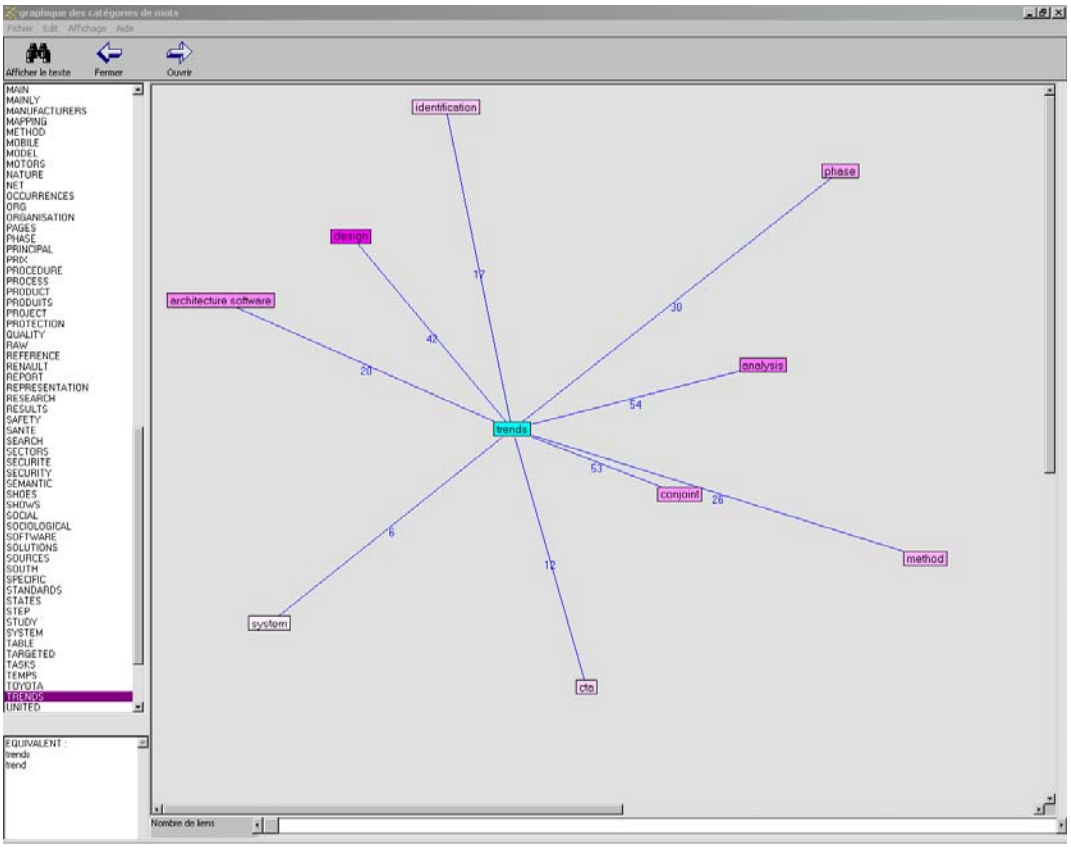

Figure 3: Mapping of verbal co-occurences

This kind of mapping gives an overview of the words being in a corpus and shows the intensity of the semantic relations between the words (by co-occurrence). Some existing tools are available, like Wordmapper from Question, and Wordnet.

3.2.2 Characteristics according to a date (% of presence of a colour / corpus, idem form, textures…)

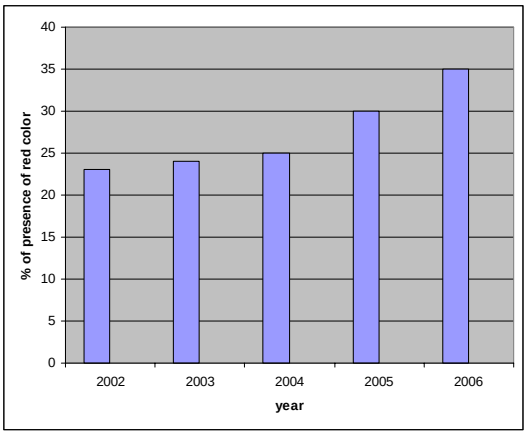

Figure 4: Characteristics / Date

3.2.3 Temporal histogram of the colours /corpus, per sector of influence, year, brand, or trend

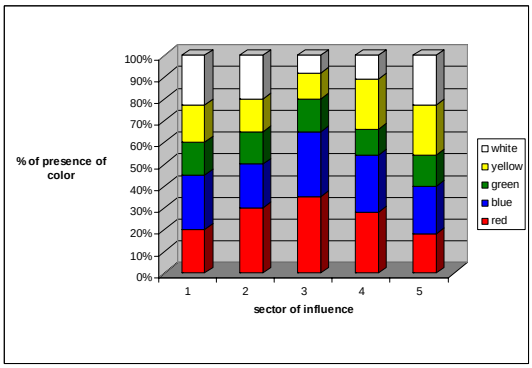

Figure 5: Colours quantification

3.2.4 Temporal histogram of the textures /corpus, per sector of influence, year, brand, or trend

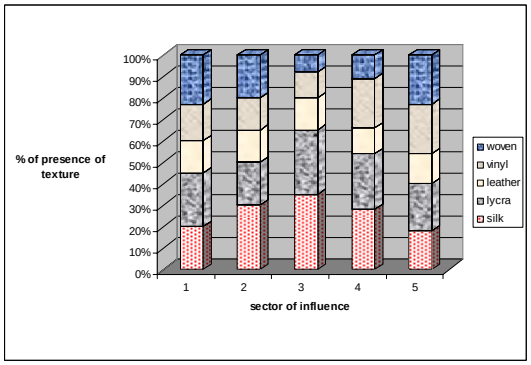

Figure 6: Textures quantification

3.2.5 Temporal histogram of the forms /corpus, per sector of influence, year, brand, or trend

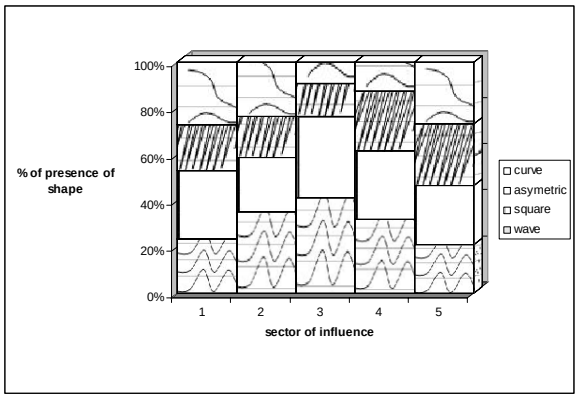

Figure 7: Forms quantification

3.2.6 Other proposed generic measurements

Quantification of the frequency of visualization of the images per image
Listing of the final used websites in the previous studies
Percentage of freshness of the TRENDS database, date of last updating

4 . CONCLUSION

The procedure related to the Conjoint Trends Analysis method was made explicit in this deliverable D2.3 *Procedure for statistics realisation*. Some key tasks appear in this approach, needing sometimes a high level of expertise:

- *the identification of the relevant sectors of influence*
- *the selection of the relevant images*
- *the generation of appropriate keywords*
- *the categorization of images and keywords*

Supporting some of these tasks will be very innovative and of great interest for the designers. It was decided to propose this support under the form of concrete functionalities of the TRENDS system, and to have them tested by the end-users of the TRENDS project. In fact a too-much-theoretical presentation of the CTA method to the end-users could have negative consequences and lead to a rejection of these functionalities.

The reactions of the end users will be so collected through following tests on the interface prototype, in order to provide design and ergonomics specifications for the real interface and architecture.

The understanding of the Conjoint Trends Analysis related procedures by all the partners is crucial for the TRENDS project because it will constitute partly the novelty of the TRENDS system.

5 . BIBLIOGRAPHY

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6 . LIST OF FIGURES AND TABLES

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7 . GLOSSARY

Ambience
An ambience in the context of the conjoint trends Analysis method is an iconic composition showing a specific trend by a homogeneous representation of colours harmonies, forms and values.

Attribute
This term is used for naming the characteristics of the future product. Physical attributes are mainly low level characteristics like colour, texture, form, or material.

Categorization
Categorization is the process in which ideas and objects are recognized, differentiated and understood. Categorization tasks in which category labels are provided to the learner for certain objects are referred to as supervised classification, supervised learning, or concept learning. Categorization tasks in which no labels are supplied are referred to as unsupervised classification, unsupervised learning, or data clustering. The task of supervised classification involves extracting information from the labeled examples that allows accurate prediction of class labels of future examples. This may involve the abstraction of a rule or concept relating observed object features to category labels, or it may not involve abstraction (e.g., exemplar models). The task of clustering involves recognizing inherent structure in a data set and grouping objects together by similarity into classes. It is thus a process of *generating* a classification structure. In conceptual clustering, this involves also generating a rule or description for each generated category. According to the classical view, categories should be clearly defined, mutually exclusive and collectively exhaustive.

Categorization Trendboards
The Trend boards are iconic compositions that enable to communicate a homogeneous atmosphere both in terms of style and consumers' sociological values. Particularly they highlight coherent representations with harmonies. Images and values words are selected and formalized under the form of ambiences. Global and discrete design elements are then extracted from these ambiences under the form of pallets. Then design elements are used for the generation of new design solutions. *Categorization Trendboards* aim to communicate a trend by the use of an aesthetic representation including a restricted number of sectors.

Conjoint Trends Analysis
The Conjoint Trends Analysis is a recent method based on the externalization and formalization of the cognitive activity of the designers in the earliest phases of design. What is most original in this approach is the identification and use of various domains of influence (nature, arts, industrial sectors, sociological end values) in order to enrich the design solution space. Finally it enables the identification of formal trends attributes (shape, colour, textures) linked to particular environments in order to use them in the early design of new products. It makes it possible to enrich and to inspire the designers and the design team when designing product. It is positioned in the earliest phases of the design process.

Design Trendboards
The Trend boards are iconic compositions that enable to communicate a homogeneous atmosphere both in terms of style and consumers' sociological values. *Design Trendboards* aim to generate exhaustive pallets used in the design phase. These representations include an exhaustive number of sectors.

Extraction of expertise (see D2.2)
Extraction of expertise is realized by questionnaires, interviews, observation and verbalization of experts in activity. By a content analysis it is then possible to extract expert knowledge and to model the main features related to their activity.

Pallets
Pallets are composed of the most significant discrete elements extracted from the ambience and enabling to recognize a specific trend in terms of colours, textures, forms.

Semantic Mapping
The semantic mapping is a 2D representation of a set of product images of the reference sector showing an overall view of the current products positioned according to the two most discriminating semantic axis defined each by antonyms.

Sectors of influence
« Tout univers connexe au secteur étudié, qui intègre des attributs produits (forme, couleur, usage, texture, …) pouvant être transférés en tant que nouvelles références dans le secteur étudié, et qui traduit les valeurs cibles des consommateurs tout en répondant au cahier des charges ».

Trend
Technical / technological and formal evolution led by a transverse inter-sector current which gives to a product its position in the obsolescence cycle.