Successful interaction with products, tools, and technologies depends on usable designs accommodating the needs of potential users, and does not require costly training. In this context, *Advances in Usability Evaluation, Part II* discusses emerging concepts, theories, and applications of human factors knowledge, focusing on the discovery and understanding of human interaction with products and systems for their improvement.

Features:

- Reports on new and improved methods and tools for advancement in the efficiency of usability studies
- Provides studies that cover everything from checklists and heuristics development to kansei and biometrics measurement techniques
- Explains use of tools, including eye tracker, virtual reality, and augmented reality
- Discusses approaches concerned with modeling and simulation to explain changes in human performance and accidents
- Presents studies that focus on aesthetic, affective and emotional design, corporate and inclusive design

Informative and thought-provoking, the book details development and application of methods and tools to improve the design of products and systems. It builds a foundation for examining questions, developing applications, and finding solutions in the process of creating good designs for all.
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<table>
<thead>
<tr>
<th>Page</th>
<th>Title</th>
<th>Authors/Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>57</td>
<td>Evaluation of the user's emotional interactions in the use of washing machine</td>
<td>A. Neves and M. Okimoto, Brazil</td>
</tr>
<tr>
<td>58</td>
<td>Juicy Salif – affective or functional design</td>
<td>J. van der Linden, A. Lacerda, R. Porto, L. Basso and M. Seferin, Brazil</td>
</tr>
<tr>
<td>59</td>
<td>Ergonomics and emotional values in design process: The case study Daciano da Costa</td>
<td>A. Moreira da Silva, Portugal</td>
</tr>
<tr>
<td>60</td>
<td>Function versus emotion in a wheelchair design</td>
<td>P. Costa, F. Moreira da Silva and C. Figueredo, Portugal</td>
</tr>
<tr>
<td>61</td>
<td>Materials emotional profile from the point of view of graduation design students in Portugal</td>
<td>P. Oliveira and F. Moreira da Silva, Portugal</td>
</tr>
<tr>
<td>62</td>
<td>Ergonomics as an important factor of change in women’s clothing at “Belle Époque” period</td>
<td>M. Albuquerque, Portugal</td>
</tr>
<tr>
<td>63</td>
<td>Cars interior design customization as an ergonomics major factor</td>
<td>P. Dinis and F. Moreira da Silva, Portugal</td>
</tr>
<tr>
<td>64</td>
<td>Color in urban furniture: A methodology for urban mapping and wayshowing</td>
<td>M. Gamito and F. Moreira da Silva, Portugal</td>
</tr>
<tr>
<td>65</td>
<td>Perceptive and ergonomics concerns in corporate visual identity</td>
<td>D. Martins and F. Moreira da Silva, Portugal</td>
</tr>
<tr>
<td>66</td>
<td>Touristic information: The wayfinding and signage systems contribution for an inclusive design</td>
<td>J. Neves and F. Moreira da Silva, Portugal</td>
</tr>
<tr>
<td>67</td>
<td>Ergonomic garment design for a seamless instrumented swimsuit</td>
<td>G. Montagna, H. Carvalho, A. Catarino, F. Moreira da Silva and H. Albuquerque, Portugal</td>
</tr>
<tr>
<td>68</td>
<td>Impact of background music on visual search performance</td>
<td>R. Yu and Y. Cheng, China</td>
</tr>
</tbody>
</table>

Index of Authors
CHAPTER 63

Cars Interior Design Customization as an Ergonomics Major Factor

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ABSTRACT

This article refers to an ongoing investigation that has as main objective the identification, development and implementation of new concepts of products tailored to individual niche vehicles.

The Portuguese car components industry has adapted to new paradigms of production and is focused in particular on the needs of segment market.

The redesigned product development and / or custom integrators to the brands can be seen as an economic opportunity for designers and project-oriented and business.

Coupled with the customization of the components related issues arise with the interior in the car and the resulting adjustments to the needs of different users, genders, ages, etc.,

Flexibility, innovation and responsiveness of small and medium-sized Portuguese components, allow integration of new projects in the area of mobility, incubation and testing of new segments, taking into account the future needs of cities and their users.

Keywords: Portuguese car components industry, ergonomics, car customization, car design individual segment.

1 THE INDUSTRY OF PORTUGUESE CAR COMPONENTS

The car is now an inescapable presence in people's lives, having a key role in economic activity and organization of society itself.

In the last two decades we have witnessed the globalization of markets and information. The brands of the world need to operate in a global market and design centers tend to be conceptually oriented to the demands and culture of the market they target.

Today we talk about design developed for the European, Asian or American, meaning a style guide for each of the markets, regardless of country of origin of the mark (Marcelino, 2008).

The Portuguese sector of car industry is characterized by its mainstreaming and has assumed an overwhelming importance in the recognition and development of Portuguese industry, reflecting a positive trade balance. This business sector has to restructure itself in a progressive manner, in order to monitor and respond effectively to new challenges imposed by internationalization and globalization (AFIA, 2008).

In the Portuguese car history, there are few significant examples of a complete car production, as well as few automotive products and brands that hold their own. In most cases, the design or improvement of a product is defined previously by integrating brand, leaving no room for companies to create their own products (Marcelino, 2008).

According to António Castro Guerra (2007), Portugal has shown significant growth in the export of technology and higher value products with growing domestic know-how. The country has sent to the big brands the ability to adapt to new paradigms of production car with a flexible supply chain and the potential for production oriented market niches.

The use of research and development also identified opportunities for the design sector. (Marcelino, 2008).

We need factories and small workshops. (Papanek, 1995, p.70).

According to Kunde (2010), small and medium enterprises should invest in a component parallel market, where they could compete with the big car brands through customized production. Large companies have difficulties in changing their mode of production to respond to a small order from a customer. This is where small and medium sized businesses can take advantage of getting quickly adjust their equipment, production lines and assembly to be able to respond to customer needs. The speed and efficiency in a short period of time requires these companies to seek quick, efficient, creative and profitable, generating new products not only for that customer as well as for future projects.

If the products produced result in unexpected success, the company must negotiate with another company in the same sector distinct geographical area. Thus, the products are produced and marketed without travel costs and the aggravated range of companies will remain. Another advantage for the sharing of projects
characterized by the ability to adapt to local conditions of use (gender, environment, function, culture, etc.) (Papanek, 1995).

Portugal offers good conditions to serve as a living laboratory for experiencing new concepts of production and mobility. The small size of the territory joins the propensity of the Portuguese for innovation, bringing together the ingredients to make Portugal one area of testing and experimentation. (Pinto, 2011). According to Victor Papanek (1995), young people from around the world spend millions of dollars annually to personalize their cars. This expression of "vernacular like" and popular culture reinforces the paradigm that car manufacturers and their designers are unimaginative and that cars suffer from this monotony.

_The average individual anywhere in the world is better informed and more aware of their needs than any designer (...) is quite obvious that the creative needs of most people are best met through collaboration between users and designers._ (Papanek, 1995, p.220).

For Gonçalo Quadros (2011), young people were instrumental in major changes in society due to his irreverence and his ability to think "outside the box". The future users require that the projects result in diversified products, which offer differentiated and varied forms of mobility - car, motorcycle, bicycle, other. Future generations are demanding and creative, and daring the rule for new proposals (Borroni-Bird, 2011).

![IKEA present: NEW V GOLF](image)


The concept terms of product optimization:

- The consumer variety of process requirement
- Learning experience apparatus

Build from more inventive

In the 60 p.

- so-called "Law of fully constructing assembling vehicle"

- This legal first law is percentage of imported.

- As a result of nationally through The manufactured market by the

Based on Portuguese are assembled, in company - we have to production of services, instal...
The concept—"do it yourself"—has been growing steadily for economic reasons in terms of product assembly at the factory and transport with its reduction and optimization of space.

The consumer/user has been forced to become an owner/builder for the variety of products you buy a kit or small parts to finish assembly. However, this requirement produces side effects beneficial to the user, since it enriches the client learning experience and becomes easier to understand the functioning of the subject/apparatus. On the human level, this practice produces a feeling of satisfaction and self-esteem on participation in the construction of your product.

Build from kits allow people to improvise, devise workarounds and become more inventive and creative in adapting the car to their own needs, (...) (Papanek, 1995, p. 223)

In the 60 policy guidance on imports in the automotive sector was marked by the so-called "Law of the assembly," which restricted the import of vehicles (CBU) 1 "fully constructed, "and liberalized imports of vehicles (CKD) 2 "kits for assembling vehicles".

This legal framework has remained almost unchanged until 1972. However, the second law is assumed as a solution for continuity, establishing minimum percentage of incorporation of the components disassembled vehicles national imported.

As a result of this policy has seen the proliferation of several assembly plants nationally through the operations of foreign direct investment or licensing contracts. The manufacture of motor vehicles in Portugal destined mainly for the domestic market by the end of the 70 (Vale, 1999).

Based on these statements about the industry, economy and consumption Portuguese and the evolution of how the products are offered for sale now - fully assembled, in kit form to be completed by the user; and kit to be assembled by a company - we can expect a continuous increase in the number, scale and complexity of products sold, but also allow the growth of small and medium enterprises with production of niche market and their customization as well as provide distribution services, installation and maintenance.

---

1 Completely built up
2 Completely knock down
2 CAR MARKET SEGMENTATION

The economists Carlos Miguel Coutinho and White (2001), the car market has a high level of competitiveness and dynamism compared to other market sectors, demonstrating the production capacity, quality, technology and advertising. The automotive industry currently faces many challenges as:
- Surplus production;
- Harmonization of prices across Europe;
- Reduction of pollutant emissions;
- Slaughter and recycling of end-of-life;
- New automobile distribution strategies;
- Use and dissemination of new communication technologies.

Manufacturers tend to predict the demand for vehicles in terms of volumes, types and models, versions or options. This type of product exists since the beginning of the automotive industry.

The segmentation of products is made by identification of subsets with characteristics similar to each other and are distinguished from other subsets. Among the different types of criteria to define the segment of each passenger car, you can distinguish them by characteristics such as dimensions, powertrain, body, function, price.

The segmentation of the body of a passenger car is distinguished by:
- Two doors, cabrio, coupe, sedan;
- 3 ports: sedan, station wagon (van), hatchback;
- 4 ports: sedan;
- 5 ports: hatchback, station wagon (van), MPV, SUV.

The segmentation of the customers are grouped by:
- Private customers, fleet operators, state and local authorities, public utilities, members of the diplomatic and consular corps, small and medium-sized domestic companies, multinational companies and international organizations;

*The main target of customization is to produce a large variety of products or services so that nearly everyone finds exactly what they want at a reasonable price.* (Kunde, 2010).
In the case of the automotive sector is already possible to order via internet the brand, model, color, interiors, equipment, accessories and other components of the car according to the needs and tastes of each user.

Figure 2 Mini, 2010, accessed 02 Feb 2012,
< http://www.aprancheta.com/tag/customizacao/page/2/ >

Figure 3 Fiat 500, accessed 27 Oct 2009
< http://cinquecento.fiat.com.br/ >
3 INTERIOR CAR

The ergonomics of the product focuses on the interface of an object or machine to Man, where there are requirements of the Human Being as a user of a product or service elements such as security, adaptability, practicality, robustness, suitability and comfort (Marcelino, 2008).

According Larica (2003), the car is no longer understood merely as a means of locomotion and also became part of the home and work, due to the increase in distance and time people spend in cars. For this it is necessary to consider several factors in the project such as comfort, safety and ergonomics.

The appearance of a new aesthetic consisting of ecological and environmental considerations will be unpredictable in terms of shape, color, texture, and range, while exciting remarkably since, unlike all the new styles the last one hundred and twenty years handler will not be a restatement of what belongs to the past (Papanek, 1995, p.272).

In the last decade the major car brands have invested in technological innovation within the vehicle in response to the changing needs of drivers. The car became an extension of their homes and new consumers also became more critical, demanding, informed and multiple choice (Larica, 2003).

Munchies (2003) lists some key items to create a layout for the interior of the car:
- Modeling of interfaces between man and the automobile;
- Visual aspects (shape, color and texture);
- Materials (adequacy and security);
- Banks of the vehicle (comfort);
- Positioning of the whole wheel, pedals and quadrant commands (handling);
- Visibility (security);
- Sound insulation (comfort);
- Free internal space (comfort and safety);
- Entry and exit of the vehicle (circulation);
- Storage spaces (multiple use);
- Global factors (society, culture, economy, etc.).

The factors to guide the design of the interior of the car is not just for the anthropometric and ergonomic aspects of the human body, but also by the ability of the signals, the preparation of the recognition of situations and the decisions that volunteer to share. The vehicle has to reassure the user, confidence, ensuring that the components behave according to the specifications of its operation.

Papanek says that designers and users should communicate more and allow people to participate in seeking solutions to their problems. As an example of this practice, Papanek, identifies a target group in need of services consumed by industry and designers, the elderly, whose share in world population has increased considerably in recent years.

For this group, the number of opportunities for the future user will provide to highlight the area of automotive customization future users: in the second phase mobility, products with the incorp...

4 EXP...

It is anticipated that opportunities for the area of automotive user will provide to highlight the two phases of customization of future users: in the second phase mobility, products with the incorp...

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For this group of users, in the case of cars leads to an optimization to seek the feasibility of driving the vehicles due to the difficult conditions of access to cities, the number of vehicles and the ability to drive is increasingly reduced with advancing age (Borroni-Bird, 2011).

4 EXPECTED RESULTS

It is anticipated that this project would enable information to cross to explore opportunities for attracting investment to the Portuguese automobile industry in the area of automotive customization. The rapprochement between the designer and the user will provide a faster response, effective and aware of user needs. It is intended to highlight the importance of design and ergonomics national automotive industry, focused on developing niche projects such as the redesign, exterior and interior customization and testing of new segments, centering your target audience on the future users: new generation of young users vs. new generation of elderly users. In the second phase, the exploration of strategies for the incubation of projects in Portugal, will test solutions for international markets in the area of individual mobility, production of individual vehicles and production of niche vehicles in kits with the incorporation of custom components Portuguese.

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