INNOVATIVE PACKAGING DESIGN

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Abstract: Packaging has a very important thesis in industry. Furthermore, packaging has a major role in winning in-store market, where the customer makes some sort of assessment decision and compares multiple brands. In recent years, the enviromentelly design approach of packaging has been widely considered and a number of commercial brands have switched to more environmentally friendly packaging formats. These design approach appears to cater to some special market target groups and can become a deciding factor in their final decisions. Industry of cosmetics products is growing very fast. It is important to note that, only a small percentage of the company's use sustainable packaging. Nowadays, on the market there is a wide range of the identical cosmetic packaging. The main purpose of the research is to redesign a package of skin care products. Finally, the paper focuses to innovative approach of product development.

Key words: Conceptual design, packaging design, cosmetics, prototyping, sustainability

1. INTRODUCTION

The proposed paper investigates a packaging example from the product development point of view. Furthermore, the development of the package is based on design thinking principles. The design thinking process follows a number of steps with an aim to develop product design concepts according to end-users' experience. On the other hand, commercial packages are now seen in a radically different perspective with the growth of social media (i.e., Facebook, Instagram, Pinterest, etc.) and online shopping as integral parts of customers' everyday lives. Nowadays, wherever an individual might be, they can see what a specific product's packaging looks like. For many shoppers, one great factor is not only luxury, but also sustainability: and the packaging needs to be just as natural as the beauty product's ingredients. Refillable and recyclable packaging made of environment-friendly materials is high up on the wish list. Some of the research questions of the present paper are, a) how to include biomimicry in design of cosmetics packaging, b) how sustainability of the cosmetics packaging effects on the customers, and c) the expectation from the new design.

The proposed design was developed by using a set of design thinking methodologies (i.e., empathy maps, persona, product design) and creative tools (i.e., mindmaps, moodboards, sketches, storyboards, and modelmaking). The research discusses the possibilities for redesign the packaging design for cosmetics in relation to the design thinking process and CAD-based tools at the same time. Finally, the proposed products provide an innovative framework of art and novel technology methodologies for extensive production of conceptual biomimicry-based products.

2. LITERATURE SURVEY

The main purpose of the proposed study is to discuss the constraints of packaging for cosmetic industry and to propose a novel packaging solution. On the market there are many different types of the cosmetics packaging according to product shape, material, and usage application. The main core of the presented idea is to develop sustainable innovative packaging. According to Brondy, design thinking is a non-linear iterative activity that is implicit in the process of design, involving five separate stages, a) empathize, b) define, c) ideate, d) prototype and e) test (Brondy and Kazmierczak, 2017). Design thinking is a design methodology used to understand end-users, redefine problems and create innovative design directions (solutions). Furthermore, design thinking process involves the ability to synthesize knowledge from variety of sources – an ideal tool in a holistic product design approach. According to Kyratsis et al. (2019), the main aspect of Conceptual Product Design methodology is based on the design thinking principles. The creative approach of this process followed by a number of industrial designers, and it incorporates several meetings of creative processes similar to design

thinking tools (i.e., mindmap, moodboard, sketching, CAD representations, photorealistic digital models, and prototyping) with an aim to find alternative ideas for each product. Gopinathar et al. (2016) noted that packaging must be seen as an advantage to be maximized rather than as an expense to be reduced, in support of the slogan of the World Packaging Organization, *"Better quality of life, better packaging, for more people"*. Calver (2004) observed that packaging has always played a significant role in the differentiation of similar products. Furthermore, graphics, shape, materials, and surface finish may have predominant role at diversifying products. Silayoi and Speece (2007), in their research approach, examined of packaging attributes. Based on the gathered research data, they argued that the most effective packaging is required to clearly provide the information of package and have more traditional graphic design, colors, and morphology.

Carli Lorenzini & Olsson (2019) presented a study about medication and health care products packaging. Authors proposed the constraints that accur during the design process of such packaging concepts. Kyratsis et al. (2015) used a design thinking approach in nature-based methodology. Authors used similarities based on natural forms inspired from flora and fauna. Kouveli et al. (2016) presented a number of product packaging case studies according to the importance of concept design in the olive oil industry. Furthermore, the market trends were presented, and a case study was proposed at a conceptual level using design thinking tools. Moutaftsi (2016) explored the benefits of a customer, based approach on food packaging design. A case study of a small production honey brand is used. Manavis et al. (2019) proposed a nature-based conceptual product design framework and included in their work some design examples - digital prototypes based on CAD modelling methologies, of in-store displays. Kovačević, Brozović & Itrić Ivanda (2019) investigated the influence of the eco-mark on the product packaging to the perception of the product and the attractiveness of its packaging by carrying out two different types of experiments. Efkolidis & Kyratsis (2012) focused on the development of a novel methodology called "Ecology Push". The "Eco-Push" framework aims to help designers to educate customers through their work and motivate them towards a more sustainable way of life. This innovative methodology takes into consideration the two basic pillars of sustainable design, a) economic and b) environmental aspect.

3. DESIGN METHODOLOGY

The paper presents a packaging case study from the design thinking point of view. The proposed case study aims to design an innovative package for cosmetics industry. The creation of the suggested application was developed by following the steps of the Design Thinking methodology. All stages include creativity methologies and CAD-based tools. Furthermore, the designers examined the procedure by using information from end-users' experiences and their consumption habits. The final proposed design methodology involves a number of crucial stages of a holistic product development: a) design thinking tools, b) creativity tools, c) branding and packaging identity, d) CAD-based tools and prototyping and e) concept evaluation (Figure 1).
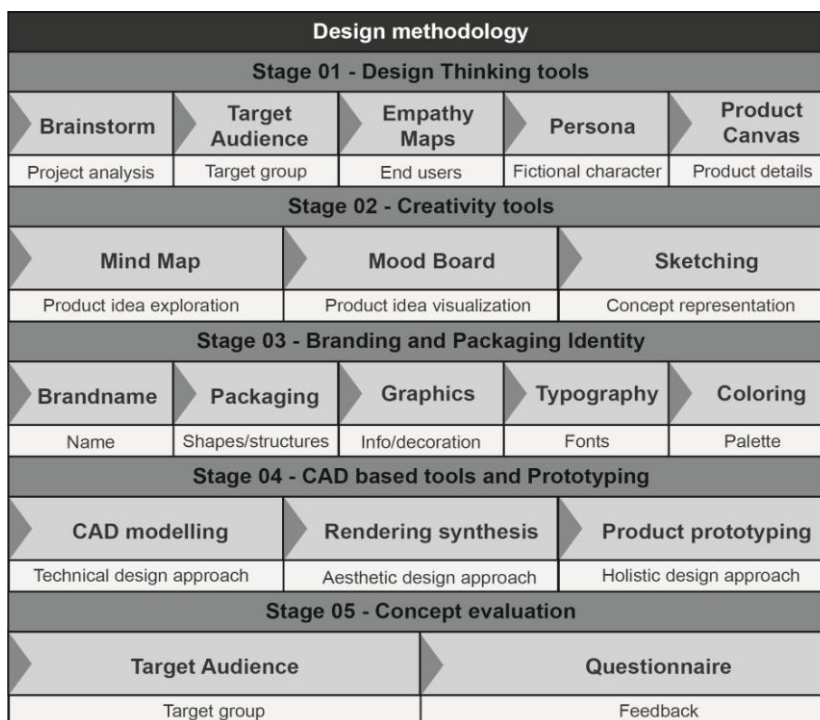

Fig. 1. The proposed design methodology

Moreover, the Research and Design framework includes a number of steps in order to result in novel and alternative ideas development. Specialized:

- Exploration of findings from literature survey (i.e., customers' needs and demands, design, packaging new technologies, 3d printing, shapes and forms, labels).
- Usage of design tools and techniques (i.e mind map, persona, mood board, industrial sketching, empathy maps, questioner, to develop initial idea list and explore specific ideas).
- Creation of C.A.D. models (i.e., 2D vectors, 3D solid modeling, 3d free form modelling).
- Creation of final render images and presents holistically the proposed concepts.

3.1 Design thinking tools

The first step is about Design Thinking toolkit that it focuses to end-user's examination. The exploration of end-user's profile needs, and ambitions have become an important part in the design thinking methodology. The tools that were used by designers are empathy maps, persona creation and product canvas (Figure 2).

Fig. 2. Design thinking tools

The step of brainstorming includes a review of the market research, types of skincare packaging and final, the statement of the design problem. All steps mentioned above are a good base for designing a new packaging and record all potential problems. Furthermore, the result of mind map is branched into the following sectors: biomimicry, target audience, ergonomics, sustainability, and aesthetics. Each of these points are equally important for the product design. Target group is class of specific people for which the product should be developed. To build good and successful product, designers need to be informed about attitude and interests of people who are in the target group. That is why identifying the target audience is important. The target group for the proposed product is women from 18 until 55 years old (i.e., students, businesswomen and housewifes). Furthermore, through the empathy map tool, a research has been conducted by interviewing three different types of women. Figure 2 shows an organized template that it was created for this purpose. Empathy map questionnaires were included general guiding questions about

women's awareness, thinking, concerns, behaviours, goals, and hopes, in order to discover possible fields in design space for innovative products. The persona that came up from the combination of empathy maps refers to a woman – her name is Anna. Anna is thirty years old Anna from Athens, Greece. Her profession is economist. Furthermore, the fictional persona of Anna is described as a passionate and optimistic person. Furthermore, Anna is a lover of fashion and nature. Some Anna's thoughts about cosmetic packaging products are, a) to avoid products with harmful chemicals that are tested on animals, b) to find product with innovative, luxury packaging, c) using pipette to apply the product on her face. On the other hand, some pain points are as follows: a) trial and error to find the product that works for her and b) a lot of similar face skin products on the market. In the product canvas board, were firstly recorded some basic characteristics of a potential product that emerged from this stage. The product canvas included requirements about the product's main goal, and its special features, i.e., primary, and secondary packaging, package for 30-day night face repair cream, nature-based morphology of packaging and rechargeable package mechanism.

3.2 Creativity tools

At the second stage, designers use creativity tools (i.e., mind map, mood board, sketching, storyboard, and prototype) to explore and design the final concept of the product. All creativity tools were used as design techniques in order to explore the different types of the ideas that they were developed in the previous stages. The next tool that was used from product developers - which it helps designers during the brainstorming process is called mood board. Developing a mood board helps them to visualize their ideas. A mood board is a collection of textures, images, photographs, and physical materials related to the basic concept of the final design. The presented mood board includes the color palette and things from nature which could be helps in different ways in the design. This mood board was the guide through the design process. The main idea was to design packaging for "30-day night face repair cream". The packaging includes applicator to dab the cream. The shape of the packaging follows the honeycomb morphology. The basic ingredient of the cream is honey, so using this shape we very clear indicate that cream consists of the honey. The packaging is rechargeable. That means one time when the cream is used up, we need only to buy the recharge and put it in the previous packaging (cosmetic jar). Rechargeable part includes 30 holes filled with the cream. Each hole is for each day from 30 days treatment. Figure 3 presents all the implementation tools.
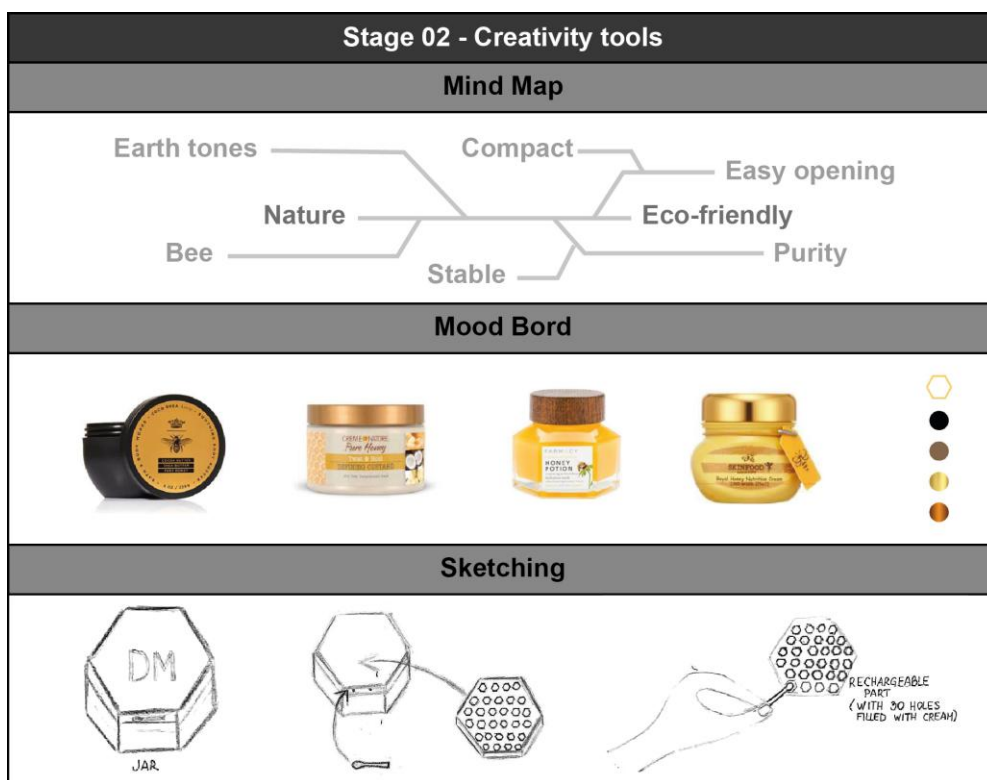

Fig. 3. Creativity tools for conceptual stage of product development

3.3 Branding and packaging identity

A brand name selection was considered indispensable for proceeding in the design concept generation (Figure 4). However, the procedure of the name selection will be analyzed in the theoretical context of this research. The name of brand is "MD", which refers initials letters of the cream maker. The idea was to build elegant and sophisticated branding logo which will be simple and memorable. Innovative shape is chosen because is limited edition and it should be unique. Moreover, the packaging is limited edition. Packaging consists of four parts, the jar, lid, part with the cream and applicator. The main shape of package is polygon that it links to hive concept. The colors palette consists of "bee and hive" tones that combined create the unique and timeless colors of gold and black pallete. Combination of those two shades looks very elegant and gives one note of luxurious. For the typography were used two fonts, sans-serif, and serif.

Fig. 4. Branding and packaging identity

3.4 CAD-based tools and prototyping

Forth stage involves Computer-aided Design tools and methodologies upon to creation of final design for proposed product. The proposed product designed from technical and aesthetic design approach (CAD-based modelling, rendering synthesis and product visualization). Computer aided design is proved to be a key factor in exploring and representing much more complex forms and a helpful way for designers to better communicate their ideas (Figure 5). The implementation tool of CAD that it was used for the product development was Solidworks™. The materials that were planned to be used for the product are environmentally friendly. The MD cream is designed to be reloadable. The jar is made from glass and the refill part from plastic. The most common plastic for cosmetics packages is PP (Polypropylene). The jar and lid are designed to be conserved, while a plastic refill containing the formula is replaced after use. The applicator for the cream or spatula is made from zinc alloy and is 100% recyclable. The proposed type of spatula's material is suitable for cosmetic products. It can withstand everyday use and can be cleaned regularly.Concept prototyping is a process that involves questions about concepts and ideas for a product before actually launching it. For the better understanding of the form and in order to test ergonomic usability we created physical model from the plastic using 3D printer (FFF technology by using Cubicon Single 3D printer). Figure 5 is presented cosmetic jar which consists of a base, a lid, a part with the cream and an applicator. The applicator is located on the cream lid. The part with the cream, which can be removed and replaced with a new one is in a glass jar. The logo is engraved on the lid of the cream. Furthermore, it was developed a limited-edition secondary package from wood (MDF wood material for the prototype). Last but not least, a limited-edition Box, or alternatively a gift box, is designed in order to address the market need for a more versatile package that functions as an object itself. The concept idea derived

basically of the typical wooden gift boxes. For the production of this item was used a CNC - laser cut and end engraving machine (VLS 4.75 Universal Laser Systems^{TM}). A vector design software was used to design the box and then laser cutter to cut the wood (VLS 4.75 Universal Laser Systems^{TM}). The logo is engraved on front. Also, a pattern of small polygons wraps around the box and then close on top with two big polygons.
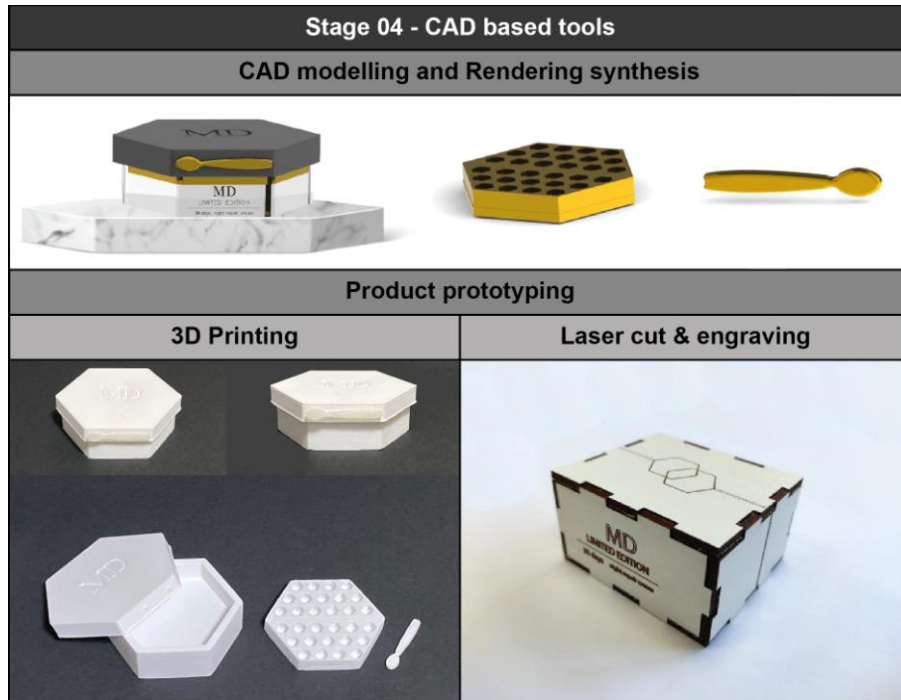

Fig. 5. CAD based tools and product prototyping.

3.5 Concept evaluation

For the concept testing questionnaire were used photos of the rendered product presented above. We chose random womens different ages from 18 untill 55 in order to cover all ages from the target group. The questions with the photos were sent by e-mail. In the survey 80 women participated. Some of the questions are:

- **Product innovation:** choose 1 to 5 (1 is for less innovation – 5 is to more innovation).
- **Product material:** choose wood of cardboard.
- **Product reusal:** Do you like the idea about rechargable packaging?
- **Product brand:** Comments about logo, colors, and packaging morphology.

Regarding to the results most of the respondents are satisfied with the product. The majority of the respondents (65%) rate with 5 the innovation of the product. The 70% prefer to have wooden box unlike the cardboard box. Furthermore, all respondents (98%) like the idea about rechargable packaging. It is an indicator that people pay more attention to product sustainability than before. According to the issues of branding, the majority of the respondents (88%) like the logo. The rest of them (12%) think that the font should be more bold and stronger than the chosen one. Finally, the overall answers about the holistic approach of the proposed package are, half of them (50%) rated it with 5, 40% with 4, 5% with 3 and 5% with 2. To sum up 90% of respondents like the product, other 10% is not very satisfied.

Fig. 6. Concept evaluation

4. CONCLUSIONS

The present paper investigates the Design Thinking process in an attempt to reconsider a package for cosmetics industries as an innovative product that was created based on user's needs and experiences. The research examines the aspect of cosmetic package as an environmentally friendly product and the same time, as a luxurious item.

The main core of the concept was to redefine the nature-based design according to graphical, coloring, and textual elements on packaging applications. The proposed methodology that includes design thinking, creativity and CAD based tools could offer a series of great design and marketing advantages to designers that would be willing this design procedure. At the end, designers did the survey in which participated 80 women from different backrounds.

Based on the results, designers make decision to include in our packaging a wooden box for the cosmetic jar. The use of wooden box as packaging for our product is a good choice, as it can be recycled and highly sustainable. There are several factors that must be considered in designing a product package, such as consumers increasingly aware of the environment, and consumers are also getting smarter to choose environmentally friendly packaging. This research concludes that the consumer and the packaging are two crucial parameters that can assist designers in the packaging design process and marketers in the development of marketing strategies. Certainly, the proposed design development approach tries to conceptualize the way human experience is integrated into the design process.

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