



Status Quo Analysis of Web-based Configurators within the House & Garden Industry with Focus on Tiny House & House Configurators

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Abstract: *The growing significance of individuality, customization, and sustainability, particularly among younger demographics, underscores a pivotal shift in consumer behavior. Against the backdrop of an impending climate crisis marked by resource scarcity and environmental degradation, imperative actions toward sustainability emerge. This necessitates a reevaluation of various aspects of life, including living arrangements and consumption patterns. Configurators may be part of the solution, as individualized products are likely to be used and appreciated longer than mass-produced products. This paper takes a look at the status quo of web-based product configurators included in the Configurator Database. Furthermore, the largest industry, namely "House & Garden" with focus on "Tiny Houses" and "Houses", will be analyzed in detail.*

Key Words: *Product Configurator, Industry Trends, Tiny House, House, Sustainability*

1. INTRODUCTION

Our world is facing significant environmental challenges, and it's increasingly important for people to reconsider their lifestyle choices and reduce greenhouse gas emissions. In addition to improving the energy efficiency of buildings, adopting a more conscious and minimalist way of living is becoming essential. Product configurators can assist individuals in designing and shaping their ideal living spaces with these principles in mind. This paper gives insights into the status quo of web-based Tiny House & House Configurators and may show potentials for the construction industry.

1.1. Aim of this paper

The aim of this paper is to give an overview of the status quo of available web-based product configurators within the Configurator Database Project according to predefined criteria. In addition, the quantitative research will provide a deeper insight into the largest industry - measured by the largest number of configurators - namely *House & Garden*. Furthermore the most common product

types in this industry - "Tiny Houses & Houses" - are analyzed, with a focus on configuration options such as floor plan, visual appearance, sustainability and delivery.

The results are intended to provide established companies as well as start-ups with an orientation in the world of online product configurators especially with a more detailed status quo of configurators for the product type "Tiny House & House".

1.2. Structure of the research

The following paper is divided into two parts. The first part comprises a quantitative analysis of 1470 web-based product configurators listed in the Configurator Database Project. Statistics are collected on the top countries, top industries and top product types as well as on the use of device optimisation. The second part takes a closer look at the largest industry *House & Garden* and the product type "Tiny House & House"; also by means of a quantitative analysis.

2. RESEARCH SETTINGS

The findings of the following paper are based on data extracted from the Configurator Database Project, which has been available online since 2007 on www.configurator-database.com [1].

The database lists more than 1450 web-based product configurators. Each of the configurators is assigned to one of 17 predefined industries and then again to a predefined product type. The graphic below shows all 17 industries, namely *Accessories Apparel, Beauty & Health, Footwear, Food & Packaging, Electronics, Games & Music, House & Garden, Motor Vehicles, Kids & Babies, Industrial Goods, Office & Merchandise, Paper & Books, Pet Supplies, Sportswear & Equipment, Printing Platforms* and *Uncategorised* - all including a brief description [2].

 <p>ACCESSORIES</p> <p>Everything that can be worn (except clothing and footwear) e.g. jewelry, bags, hats, belts, cases, glasses, watches, gloves</p>	 <p>APPAREL</p> <p>All kinds of clothing & fabrics (except footwear) e.g. T-Shirts, pants, mixed clothing, underwear, socks, jackets, bikinis</p>	 <p>BEAUTY & HEALTH</p> <p>Care products and cosmetics e.g. make up, lipsticks, shampoos, soaps, lotions, perfumes</p>
 <p>FOOTWEAR</p> <p>Everything that is worn on the feet e.g. sneakers, flip flops, high heels, boots</p>	 <p>FOOD & PACKAGING</p> <p>All kinds of food and beverages e.g. beers, wines, chocolates, cookies, candy, cereals, tea, coffee, snacks, labels</p>	 <p>ELECTRONICS</p> <p>Electronic devices and applications e.g. computers, notebooks, usb sticks, cables</p>
 <p>GAMES & MUSIC</p> <p>Everything for music and gaming e.g. musical instruments, boardgames, puzzles, playing cards</p>	 <p>HOUSE & GARDEN</p> <p>All kinds of products for house and garden e.g. kitchens, garages, elevators, fences, furniture, doors, windows, saunas, tables, lamps, carpets, door knobs, light switches</p>	
 <p>MOTOR VEHICLES</p> <p>Cars and other vehicles e.g. trucks, motor bikes, yachts, campers, trailers</p>	 <p>KIDS & BABIES</p> <p>Products designed specifically for babies and children e.g. blankets, bottles, diapers, dolls, children's books, playgrounds, soft toys</p>	 <p>INDUSTRIAL GOODS</p> <p>Different products mainly for manufacturers e.g. steel, chemistry, medicine, safety systems</p>
 <p>OFFICE & MERCHANDISE</p> <p>All kinds of office supplies and merchandise e.g. folders, pens, business cards, stamps, pencils</p>	 <p>PAPER & BOOKS</p> <p>Printed products and photo products e.g. books, cards, calendars, wallpaper, photo canvases, notebook, wrapping paper</p>	 <p>PET SUPPLIES</p> <p>Products for pets e.g. pet food, pet accessories, aquariums, riding equipment</p>
 <p>UNCATEGORIZED</p> <p>Products which do not fit in any other industry e.g. tissue boxes, swords, gemstones, signs, locks, coins</p>	 <p>SPORTSWEAR & EQUIPMENT</p> <p>Equipment and clothes for sports e.g. skateboards, bicycles, snowboards, golf balls, diving suits, jerseys</p>	 <p>PRINTING PLATFORMS</p> <p>Platforms which offer products of various industries e.g. giftware, photo products, 3D products, engraved products</p>

Fig. 1. Industries of the Configurator Database [2]

The first part takes a closer look at the status quo of configurators listed in 2021/2022 by analyzing the top industries, top countries and top product types. The second part deals with the biggest industry *House & Garden* and furthermore with “Tiny House & House” configurators.

3. MASS CUSTOMIZATION AND THE POTENTIAL OF SUSTAINABLE LIVING

Basically mass customization can be applied to any product as long as the customization process is specified in advance and well thought through. It should offer customers a set of requirements, namely a configuration space that helps them to fulfill their configuration successfully and to meet their exact needs, without causing confusion [3].

The current economic system is unsustainable and constrained by numerous limitations. One concept gaining attention for achieving long-term sustainable economic development is the "Green Economy." This approach seeks to align economic growth with environmental responsibility, rather than viewing them as incompatible [4].

The dynamic interaction between product manufacturers and customers, central to mass customization, also offers a learning opportunity regarding the expected use of resources. This learning relationship can reveal potential savings in both costs and resources, promoting a more sustainable production approach [5].

The Tiny House Movement focuses on living a lifestyle that is as minimal as possible. With this an alternative is rising to the promotion of a consumption and growth society that was promoted by politics and companies for decades [6]. Tiny Houses consume less energy compared to conventional houses. As a result, they reduce global energy consumption and thus greenhouse gas emissions. One study even calculated that Tiny Houses produce at least 70 % less greenhouse gas emissions compared to conventional houses [7]. Tiny Houses and Tiny Living affirm sustainable, minimalist living and provide affordable housing in densely populated cities [8].

An online survey with 100 participants, focusing on Generation Y and Z, in terms of their attitudes towards sustainability and housing as well as Tiny House configurators confirmed an ongoing mindshift especially in young generations. For the consumers of the Generation Y and Z environmental protection and climate catastrophe are important topics and influence their purchasing decisions. At the same time, it is important for them to co-design, create and innovate products and services together with companies [9].

The most interesting results of the study are that the term Tiny House is familiar to almost all people of Generation Y and Z and that 65% have already configured a product online. Although both generations have grown up with smartphones, they would not configure a Tiny House on a smartphone, but prefer a laptop. The most important components for both generations within a configuration process are a summary of the configured results and a large, appropriate visualization of the customized product [9].

4. QUANTITATIVE ANALYSIS OF STATUS QUO WEB BASED PRODUCT CONFIGURATORS

4.1. Development of industries within a year

This part shows the development of configurators within the 17 previously described industries within one year [10]. In 2019/2020 the configurator database covered 1400 web based configurators [2], whereas in 2020/2021 1470 configurators have been listed [1].

Ranking industries 2019/2020 to 2021/2022.

Figure 2 illustrates a comparison of the number of configurators within each industry from 2019/20 to 2021/22. Overall, there is a decrease in configurators in 9 industries and an increase in 8 industries.

The industries with the largest growth from 2019/20 to 2021/22 are *House & Garden* (+68) as well as *Electronics* (+43), whereas *Food & Packaging* (-29) and *Apparel* (-24) record the biggest decline from 2019/20 to 2021/22.

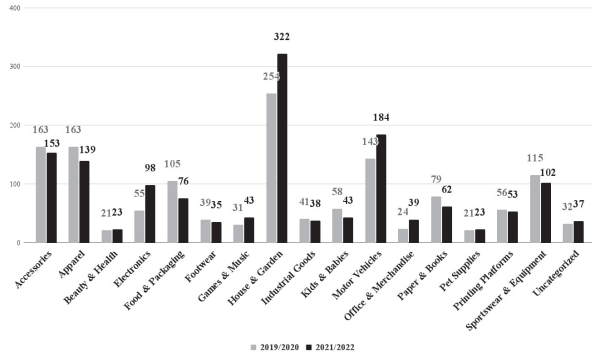


Fig. 2. Number of product configurators per industry in the Configurator Database in 2019/20 (n=1400) and in 2021/22 (n=1470)

4.2. Top countries, industries and product types offering web based product configurators

This chapter provides an overview of top countries, industries and product types of the configurators listed in the Configurator Database.

Ranking of top 5 countries in 2021/2022.

The companies offering web-based configurators are located in different countries. Figure 3 depicts these top 5 countries, namely led by Germany (40,5%), followed by the United States (28%) and Austria (7,5%).

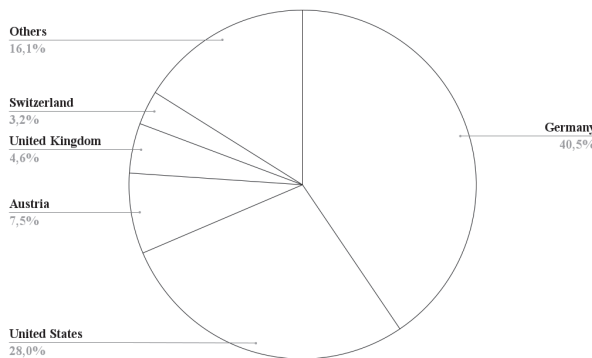


Fig. 3. Ranking countries (n=1470)

Ranking of top industries in 2021/2022.

The Configurator Database Project lists various web-based product configurators which are clustered in 17 different industries. Each industry contains a different number of configurators. Figure 4 shows the ranking of the industries in terms of the number of configurators included in one industry. *House & Garden* (322) is the industry covering most configurators, followed by *Motor Vehicles* (184) and *Accessories* (153). *Pet Supplies* (23) and *Beauty & Health* (23) are the industries with the fewest number of configurators. [11]

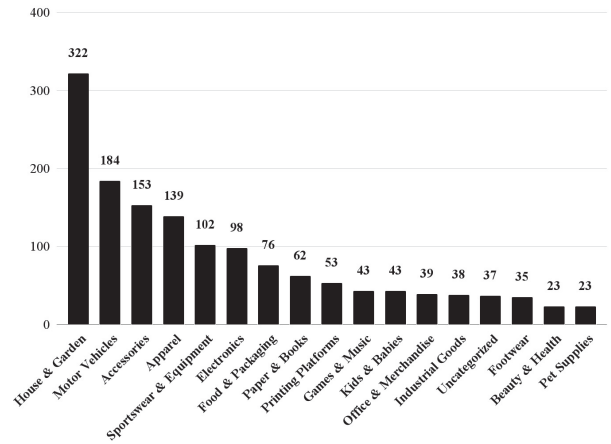


Fig. 4. Industry Ranking 2021/2022 (n=1470)

Ranking of top 20 product types in 2021/22.

Each configurator in the Configurator Database is assigned to a product type, which in turn is subordinated to one of the 17 industries. Figure 5 depicts a ranking of the top product types of all industries. The product type *Car* leads the ranking with 105 configurators, followed by *T-Shirts* with 63 configurators and *PC* with 47.

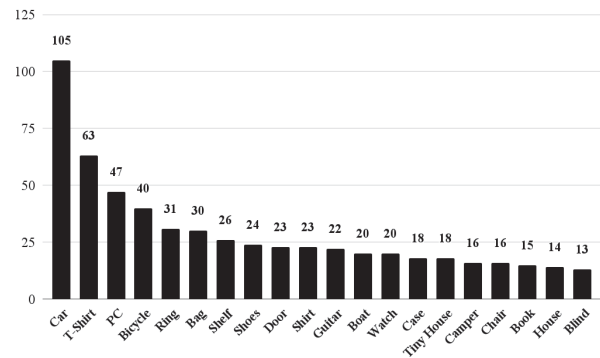


Fig. 5. Ranking of top 20 product types (n=1470)

4.3. Device Optimized Configurators

Device optimization in this context means that web-based configurations adapt to different devices such as laptops, smartphones and tablets in the portrait or landscape view and allow users to configure products on each device without restrictions. There is an increase of device optimized configurators from 2019/20 to 2021/22 in each industry. Fig 6. shows the change of device optimized configurators within one year. *Games & Music* recorded the largest growth from 16,1% to 74,42%, followed by *Office & Merchandise* from 41,7% to 92,31% and *Food & Packaging* from 43,8% to 86,84%. The industries *Industrial Goods*, *Pet Supplies* and *Electronics* have the lowest growth concerning device optimized configurators within one year.

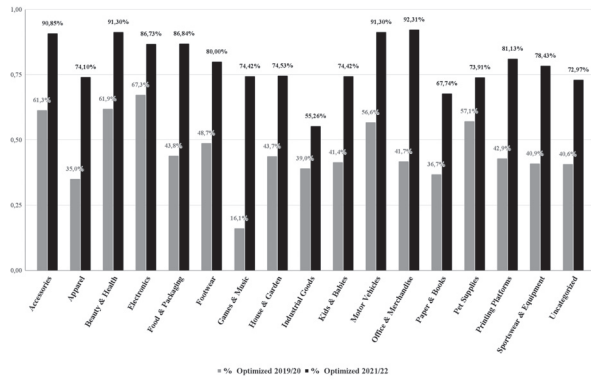


Fig. 6. Device optimization by industry, comparison 2019/20 (n=1400) to 2021/22 (n=1470)

5. HOUSE & GARDEN INDUSTRY WITH FOCUS ON TINY HOUSES AND HOUSES

As the industry *House & Garden* registers the most configurators (n=322), this part will take a closer look at its most popular configurators. Figure 7 depicts the top 5 product types, listed in the industry *House & Garden*. The product types *Tiny House & House* (32) is ranked first followed by *Shelf* (26), *Door* (25), *Blind* (13) and *Sofa* (12).

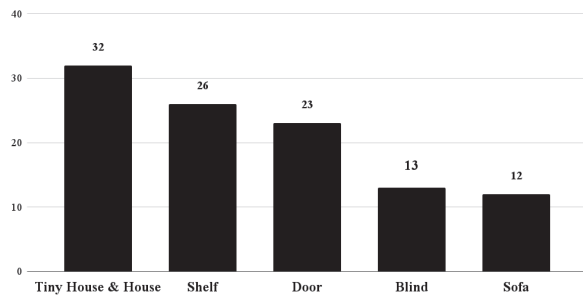


Fig. 7. Top 5 products of the industry *House & Garden* (n=322)

To get a better insight into the most common configurators, namely *Tiny House & House* (32), some parameters of them were analyzed. In the following analysis, 30 of the 32 configurators are considered, as two do not meet the required criteria.

A crucial customization option within the configuration process of *Tiny House & House* configurators may be the floor plan, as it can be assumed that it is important for customers. Almost all configurators offer a customizable floor plan. Even 6 of the 30 configurators allow customers to create their own individual floor plan without restrictions, which is depicted in figure 8.

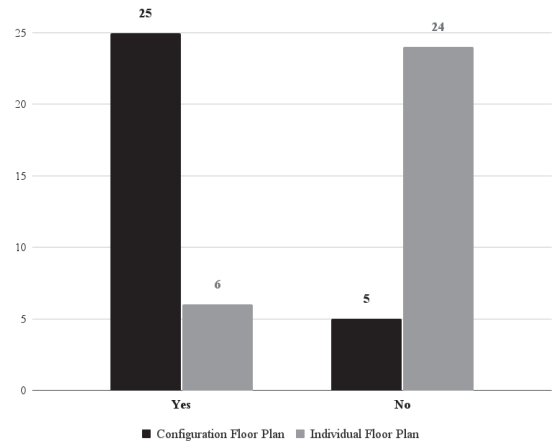


Fig. 8. Floor plan options of *Tiny House and House* configurators (n=30)

A visualization of the configurable product or parts of it is a crucial usability factor within a customization process. Half of the analyzed 30 *Tiny House and House* configurators show the visual appearance of the exterior (n=15) and a bit more the interior (n=18).

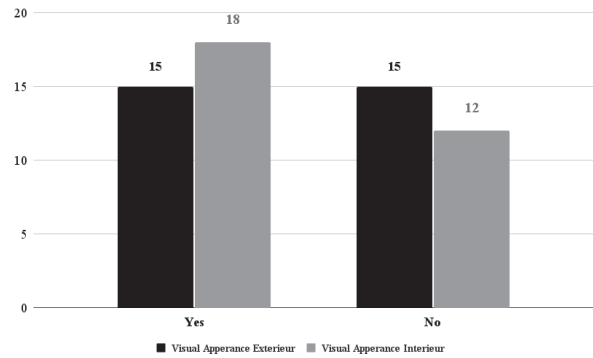


Fig. 9. Visual appearance interior and exterior of *Tiny House and House* configurators (n=30)

Sustainability, green energy and the reduction of greenhouse gas are becoming increasingly important in the construction industry. Therefore, the companies that offer customizable *Tiny Houses & Houses* are analyzed for their environmental and social responsibility. 40% provide customers with no information about sustainable production. 6,7% produce ecologically sustainable, 10% energy efficient and 13,3% offer an ecological construction.

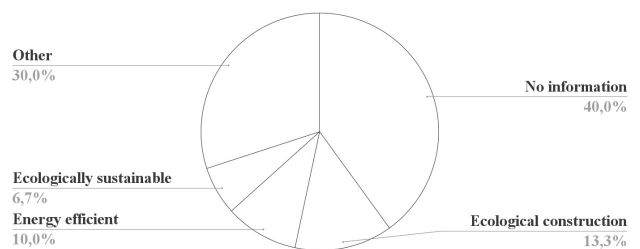


Fig. 10. Existing sustainability in production of the *Tiny House and House* configurators (n=30)

The delivery period of customized *Tiny Houses & Houses* may be a crucial selling point for companies and

significant for customers. The majority of companies do not specify a delivery time. Only 7 out of 30 companies show the delivery time; at 4 companies the delivery times can be selected by the customer.

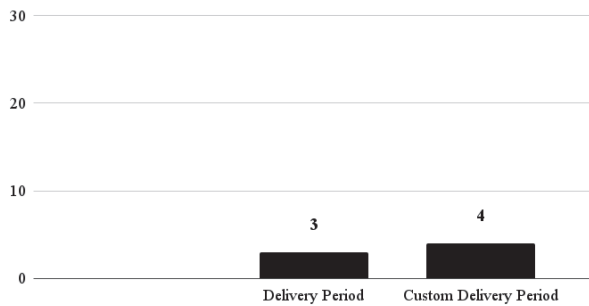


Fig. 11. *Delivery Period of Tiny House and House configurators (n=30)*

Tiny House & House configurators have several Infrastructure options as depicted in figure 12. To sum up, 23 of 30 configurators provide customizable options like “Floor Amount”, “Heating” and “Energy/Electric”; 19 configurators give “Lightning” and “Sanitary Equipment” options; 18 “Bath Options” and 16 “Kitchen Options”.

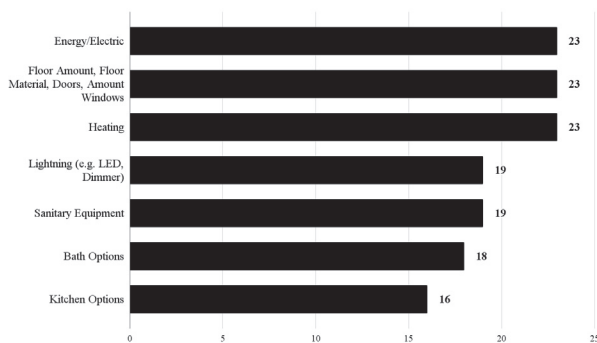


Fig. 12. *Infrastructure options of Tiny House and House configurators (n=30)*

6. SUMMARY AND CONCLUSION

In summary, web-based configurators are increasing in half of the listed industries and decreasing in the other half. This means that there is a steady movement in the field of mass customization. The industry with the most listed configurators is *House & Garden*, with the most common product type being Tiny House & House. Almost all Tiny House & House configurators already allow a choice regarding the floor plan. However, only half of the configurators offer a visualization of the interior and exterior. Companies currently do not disclose much about sustainability in their production of Tiny Houses & Houses. Not only sustainable living, but also sustainable production are certainly a selling point. Therefore, there will certainly be many more opportunities in the future to market web-based configurators in the field of living more sustainably and to support the customization process with more visualizations.

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