

Acceptance of Local Production among Regional Stakeholders. Results of Qualitative and Quantitative Research of Producers and Consumers

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Abstract – Against the background of global warming as well as (impending) economic crises, local production models are becoming increasingly important. This is the starting point for the dtcc.bw-funded project „Digital, Urban Production” with its concept “Production Next Door”, which aims to establish a regional, digitally linked production network in the field of furniture manufacturing in Hamburg. The project is based on the idea of having customizable furniture manufactured by regional producers, thereby promoting the regional economy and circular economy initiatives. While the benefits of local production are already much discussed and known at the political and scientific level, it is questionable how they are perceived by regional actors, on whom the success of local production crucially depends. In order to explore to what extent regional actors accept local production, interviews with producers and a survey with consumers were conducted. This article presents the results of the interviews conducted so far and elaborates conditions necessary for the acceptance of local production. Barriers as well as conflicts of interest are also revealed and it is shown how ProNeD, as a concept for local production, plans to face them.

Keywords - *Local Production, Urban Production, Regional Stakeholders, Sustainable Production, digital business models*

I. INTRODUCTION

Both the Covid-19 pandemic and the war in Ukraine are a reminder of how dependent the economies of individual countries have become on global events. For some time now, however, there have been efforts to pay more attention to the regional economy again.

The aim is not only to reduce dependence on global developments which - by their very nature - are difficult to control, but also to support the resilience of the economy [1] and to promote (often) smaller, regional players and value creation structures [2]. Another key contribution is to reduce value cycles in order to strengthen the environmental sustainability of product manufacturing (e.g., by reducing transport distances) [3].

As part of the dtcc.bw project "Digital, Urban Production", the concept "Production Next Door" was developed, which aims to promote a local value creation process in the field of furniture manufacturing in Hamburg and thus to strengthen the regional economy.

With this approach three sustainability dimensions are addressed:

- the ecological sustainability (by shortening supply chains)
- the social sustainability (by supporting the regional manufacturers and value creation structures)
- the economic sustainability (refer to Krenz et al. in this volume)

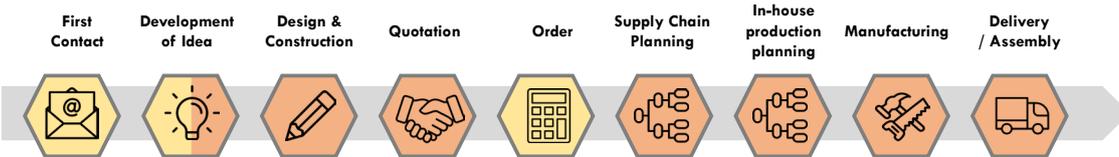
II. PRODUCTION NEXT DOOR

“Production Next Door” (ProNeD) refers to a new form of local production through regional, digitally connected value creation. The main objective is to strengthen the regional stakeholders and to contribute to social and ecological sustainability.

At the same time, the aim is to develop products globally in order to obtain innovative product design ideas and to give all interested parties the opportunity to contribute. The resulting designs are provided under a free license (open source hardware) and are thus available to the local value creation networks for marketing and manufacturing. The finished products are then offered in a webshop, where customers can select and personalize them according to their preferences. Once the order has been placed, the appropriate local producers will be contacted in order to manufacture the chosen product. These producers are typically small craft businesses (e.g. carpenters). Delivery and assembly are done by the businesses themselves. The value chain, from development and production to sales, is digitized end-to-end to ensure cost-efficient coordination between the stakeholders.

Since ProNeD involves supra-regional communities for product development, the value creation process for the producers changes (refer to FIGURE 1). Usually producers perform all the production steps themselves – they develop the products (in constant coordination with the customer) and handle the supply chain planning. Within the context of ProNeD, this step is performed by supra-regional communities. The customer adds his ideas via the customization options when purchasing in the web store and the technical system handles the involved cross-company planning processes.

Regular value creation process (producers)



Value creation process ProNeD (simplified)

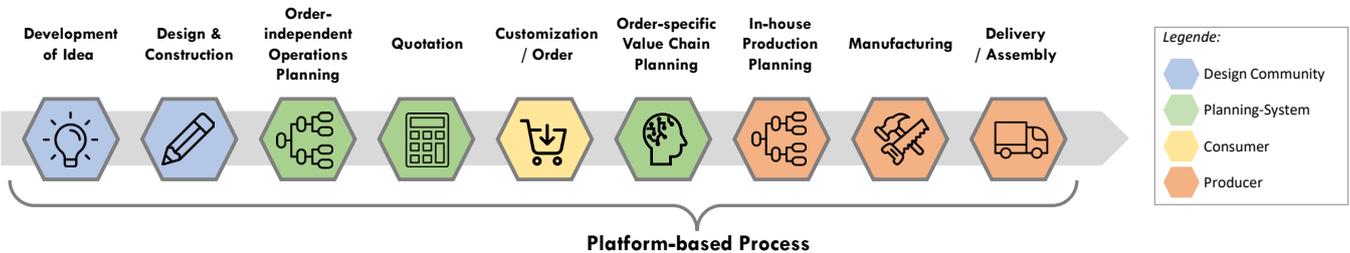


FIGURE 1: COMPARISON OF THE PROCESS MODELS.

In the case of carpenters, their usual value creation process begins with initiating contact, often includes a visit to the customer's home and the creation of sketches. Quotation preparation and design can go through several coordination loops with the customer. Then the manufacturing follows. Finally, the producer delivers the product and assembles it, if necessary.

In sum, ProNeD will shorten the producers' usual value creation process by relieving the carpenters of the initiation phase (see FIGURE 1). This gives the producers more time again for their core task - manufacturing.

III. AIM OF RESEARCH

Local Manufacturing aims to contribute to ecological sustainability by focusing on small production cycles. It also promotes the strengthening of regional actors, thus contributing to social sustainability and supporting regional resilience. Besides this, also economic sustainability is addressed by involving supra-regional communities in product development and optimizing value chains through an AI-based system. However, it is questionable to what extent the mentioned value creation process of ProNeD is of interest to the regional actors.

In the case of ProNeD, the focus is primarily on small craft businesses. However, their order situation is currently very good. They have a shortage of staff rather than a shortage of orders. This is why the following questions arise:

- Why should/would producers want to be part of a local production network (e.g. ProNeD) even though their business is doing well?
- What would other concepts and business models of local production (e.g. ProNeD) have to offer them in order for them to participate?
- What could potentially stop them from participating?

On the demand side, most customers usually buy furniture from industrial production. In the well-known stores they have a wide variety and can buy furniture at moderate prices.

Although sustainable and regional consumption in case of groceries (as a typical *consumer* good) is becoming increasingly important to consumers, it is not clear, if this trend also applies to products that are not *consumed* daily but *used*, like furniture.

This leads to the following questions:

- Are customers even interested in buying furniture locally?
- And under what circumstances would they be willing to do so?
- What is preventing them to buy locally produced furniture?

To answer precisely these questions, we interviewed the main actors of a local production - producers, more specifically carpenters, and consumers. The answers we found are helpful both for the establishment of local production in general and for the elaboration of ProNeD's business model.

IV. METHOD

In order to find out if and under which conditions the producers are willing to participate in a regional manufacturing network we interviewed them first, since the concrete design of the local production network depends on their skills, equipment, availability and pricing habits. The consumers could therefore only be meaningfully interviewed after the findings from the producer interviews had been incorporated into the development and the configuration of the concept for local production.

A total of ten two-hour interviews were conducted with producers, six of whom are based in Hamburg, four in the surrounding area and all interviewees specialize in furniture construction. As the number of employees ranges from three to about 35, they can be classified as micro and small enterprises. The interviews took place at the respective carpenteries and usually included a tour of their production facilities. With one exception, the interviews were conducted with the business managers.

The consumer survey was conducted digitally about six months after the interviews with the producers using an online panel from a market research company. 300 consumers living in Germany were surveyed. All of them had to have bought furniture in the last three years and had to be able to imagine buying furniture either from a carpenter or online in general. Another criterion was a monthly household net income of at least 3000 €. The online questionnaire contained 20 questions and took approximately ten minutes to complete.

V. FINDINGS

Within the results of the interviews and the survey, we have identified four main topics that are important for the establishment of local production in general, as well as for the different actors. In the analysis process, conflicts of interest between the consumers and producers emerged that need to be resolved if local production is to be successful. In the following, these four main topics and conflicts of interest will be presented, as well as how ProNeD as a concept of local production intends to respond to them.

1) Pricing

As the producers perform a craft, they are in a different market segment than industrial furniture production. This is also accompanied by higher prices. In the interviews we found that competition among the carpenters themselves is also high. In some cases, they spend a lot of time initiating the ordering-process with the customer, only to be undercut by a competitor that the customer then chooses.

It is therefore not surprising that the carpenters have concerns that a local production network could lead to a price competition between the producers. The companies know they cannot compete with industry in terms of price and are concerned that they would have to lower their prices as a result of the network and would therefore no longer be able to cover their costs adequately.

Consumers usually buy industrially manufactured furniture – in our survey 76 % said they buy from big well-known furniture stores. Price is a decisive purchase criterion for them (for 87 of our respondents, it was very important or important). That is why for consumers the high prices of carpenters are a barrier to purchase (for 52 % it was a reason not to have bought from a carpenter so far). The willingness to pay for furniture increases only partly as net household income rises.

Therefore, pricing is a very sensitive topic for the producers as well as for the consumers and leads to the dilemma, that the prices of the products a local production (i.e. ProNeD) offers must address the expectations of the consumers on the one hand and on the other, secure that the participation in the network is financially worthwhile for the carpenters. Otherwise customers would continue to buy industrial products and producers would not participate in the network.

Local production must therefore offer additional benefits apart from price for which customers are willing to pay (more). In general, customers appreciate options of individualization and a regional origin of the products. The majority of our respondents (56 %) would be willing to pay between 6 % and 20 % more if the product was regional and designed according to individual wishes. But also, almost a fifth would spend nothing or up to 5 % more in this case, and only a third of respondents would spend between 20 % and

50 % more. So there need to be other aspects that motivate customers to buy locally produced furniture.

For this reason, a special purchasing experience would be a chance, as well as very distinctive products. In the survey, we found that consumers are willing to pay more if a piece of furniture fully meets their requirements and is very special. However, this is precisely one of the strengths of ProNeD: The outsourcing of the design process, that includes idea-contests, promises special pieces of furniture, which can be produced unproblematically due to the high skills and flexibility of carpenters and can still be adapted to the individual wishes of customers.

In addition, a price advantage can be realized by relieving the carpenters of the initiation activities, such as customer contact, measuring the customer's space, writing an offer etc., and thus costs. For the carpenters it also minimizes the risk of not being awarded a contract after already having invested time and potentially money for preparation.

Beside this, price competition between producers must be avoided by all means to ensure not jeopardizing the goal of strengthening the regional economy and promoting regional companies. This is to be achieved by working out a pricing system that is acceptable to all, in cooperation with the producers.

2) Level of individualization

The manufacturing of individualized products is the core business of all carpenters, which are focused on complex, highly individual furniture. Their market segment lies in personalized/unique production, with which they can distinguish themselves from industrial furniture production. Especially the manufacturing of these unique, very special products is also often a pleasure of their job and they appreciate facing new challenges in craftsmanship.

Although customers usually buy industrially manufactured products, developments such as mass customization show that the trend towards individual products is increasing and that today's technology allows more and more personalization, also in the mass market. It is therefore not surprising that for almost half of the respondents (47 %), the possibility of individualizing the products is the most interesting aspect of ProNeD. Thereby the majority of respondents is interested in being able to have an impact on the size (73 %), colours (67 %) and materials (65 %) of the product. Other options of personalization (shape, engravings, technical features) were not very interesting to the consumers. This fits with the fact, that too much effort in the ordering process is a reason to cancel a purchasing process or refrain from buying (e.g. at a carpenter).

In conclusion, a degree of individualization must be found that serves as a distinction from industrial furniture production (and also inspires the carpenters), but does not increase the costs of manufacturing or overwhelm the customers in terms of choice.

ProNeD can meet the requirements for individualization by offering more options for customization than the furniture industry, which often only offers two to three different sizes and two to three different colours.

In the context of ProNeD, the customers can specify three main attributes of the products:

- the sizes of their furniture pieces (in exact cm),
- choice of a variety of colours (exact number to be determined)
- choice of a variety of different materials (exact number to be determined).

In addition, customers can choose between different criteria that determine which producers are considered for production. These can be criteria of sustainability (such as that the producers are particularly socially committed or use green electricity) as well as criteria relating to delivery time or price. Both customization aspects thus strengthen the customer's attachment to his/her product.

Further options of individualization (e.g. changing the shape) are not included, because these would run the risk of overwhelming customers.

Producers benefit from the fact that the externalization of designs gives rise to new product ideas that provide them with new challenges. In addition, the producers themselves are free to participate in product development if they wish to do so.

3) *Contact to customers*

As shown above, the usual value creation process of a carpenter includes contact with the customer, especially in the initiation phase. During the interviews it became evident that the carpenters value this contact with the customer and also see consulting as an important and identity-forming part of their work. The carpenters themselves see their role as someone whose main task is to provide advice. They enjoy customer contact and do not want to miss it. In addition, customer contact often forms a basis of trust through which the customer base is secured. Securing their customer contact is important because not every inquiry that reaches the carpenters actually becomes an order. That is why some carpenters are sceptical about passing the initiation process to the platform.

The survey showed the regionality (as a part of sustainability) of ProNeD is a key factor of interest for the consumers. Besides this, they like the idea of knowing where their products come from and it also seems to give them a feeling of control. Some said they liked the opportunity of visiting the producers as well. Nevertheless, customers are reluctant to buy from a carpenter because they worry that it will take too much effort (in our research it was a reason for one quarter of those who have not bought from a carpenter yet). On the other hand, when buying furniture, customers also appreciate personal advice – 30 % of those we have asked in our survey.

Consequently, for the carpenters, customer contact has been a crucial part of their daily work. Customers (especially online-shoppers), on the other hand, like to be independent [4] and only wish for contact when they need advice (as illustrated by the example of curated shopping). It is enough for them to know that the carpenter would be within reach if necessary.

Maintaining customer contact between carpenter and customer is not an option at ProNeD. In the case of online purchasing, there is very high competitive pressure, it is imperative to avoid overwhelming the consumer. To this end, any potential for abandonment during the purchase process

must be minimized. It is therefore important to make it clear to the carpenters that forgoing customer contact does not mean a loss for them. ProNeD is not meant to be a replacement for their regular business, but an additional offering. Also, the contact between the customer and the carpenter is maintained, because the latter continues to carry out the delivery and assembly. The presentation of the value creation process by ProNeD as well as the option to choose between criteria for the value chain (customization of value chain) create a connection between consumer and producer. ProNeD offers a potential to facilitate the accessibility to the carpenter's craft and meanwhile reduces what consumers perceive as inconvenient or complicated when buying from a carpenter.

4) *Online-Purchase*

Producers usually receive inquiries and orders by mail or telephone. They do not have an actual online sales department. For carpenters, it is common that their customers are not able to see or touch the product before it is manufactured or delivered. They can usually only provide a sketch or examples of their work.

This very fact of not being able to see the product before buying it is what keeps many customers from buying furniture online (in our survey 56 % of those who have not yet bought furniture online indicated this). This may also be a reason for not buying from a carpenter. Although furniture is still mainly purchased offline, the online sales market for furniture is becoming increasingly important [5]. To see or touch a product is especially important for customers in the case of furniture, because these are usually expensive and long-term purchases which are also difficult to return [4]. Warranty and return policies in particular are often a barrier to customers buying online as our survey showed (20 %).

For online purchases, it is important to build trust due to the lack of opportunity to see and touch the products [6, 7]. For this purpose, consumers must receive meaningful information about the product so that they can imagine it as well as possible. As mentioned before, customers expect a purchase to be unproblematic and quick, which is a main reason for online shopping [7, 8]. Thus, in online shopping, it is common and easy to compare products [4, 5]. Moreover, consumers often buy online because they can save money. For this purpose, they often use price comparisons [5,8]. On the internet a larger selection can be found, so the competition is higher and thus creates more pressure (e.g., regarding a special offer, price, very professional appearance, etc.)

As an online-retailer, ProNeD faces the problem of customers not being able to touch the product or see it in real life before buying. To address this issue, ProNeD will provide its offers on the website with detailed and appealing information about the products, especially to compensate for the lack of haptics [9]. The information about the products include the exact sizes, all functionalities, as well as statements about the materials used and, if necessary, care instructions. Pictures or sketches will be presented in a professional layout, in order to generate an attractive and trustworthy appearance. A professional website, with self-explanatory usability based on e-commerce benchmarks, is another mandatory requirement for this (see e.g. [9]). Furthermore, offering material samples could be an option that makes it easier for consumers to buy furniture online. It would also be possible to set up a showroom in which examples of furniture are presented. Quality assurance and warranty rights can also be used to generate trust.

Furthermore, to generate the necessary trust in its products ProNeD aims to make the manufacturing process as transparent as possible. For each product, the story of its creation is told (including design process, actors involved, origin of materials, etc.). This also creates a shopping experience that the usual furniture retailers do not provide.

The differences between online and offline purchasing suggest that the typical customer of ProNeD will be different from the one that carpenters usually serve. This means that customers who otherwise have no contact with craftsmanship can be reintroduced without having to change their usual buying habits. This may open up a new target group (online-shopper) for the producers and thus also expand the level of awareness for their own business.

These conflicts are briefly summarized in TABLE 1.

TABLE 1: CONFLICTS OF INTEREST AND PRONeD'S PROPOSED SOLUTIONS.

| Conflict and Perspective | | Interest | Actions by ProNeD to solve the conflict |
|----------------------------|----------|---|---|
| Pricing | Producer | Absence of price competition | Development of a pricing mechanism in cooperation with the producers; relieving producers from development and initiation phase |
| | Consumer | Moderate prices | Additional benefit for customers (customization, regionality); reduction of development and initiation costs |
| Level of individualization | Producer | Manufacturing of individual products, new challenges in manufacturing | Product development with community generates new/innovative designs and therefore challenges for the producers |
| | Consumer | Getting individual products, but without having too much effort with them | More but not too many customization options (customization of product) than in regular retail; impact on value chain (customization of value chain) |
| Contact to customers | Producer | Solid customer relationship | Customer gets information about the producer who manufactured his/her product; producer gets contact to customer when delivering and assembling the product |
| | Consumer | Independent and uncomplicated way of purchasing | |
| Online-Purchase | Producer | Focus on core activity (manufacturing) and not on new distribution channels | Sales are achieved via the platform (web store), producers do not have to take care of distribution and can still reach new target groups |
| | Consumer | Valid impression of the product before buying | Professional website with meaningful images and information; transparency of value creation process creates trust |

VI. CONCLUSION AND OUTLOOK

It is worth promoting local production because it can contribute to environmental and social sustainability. However, that does not automatically cause appreciation by local stakeholders on-site. This very acceptance is the subject of this paper and was evaluated using the example of the project "Production Next Door".

As we have demonstrated, local production generates some concerns among stakeholders that may hinder participation in local value creation. For the producers, competition on prices and the loss of customer-contact are such reasons. Barriers for consumers regarding local production are the high prices of the products as well as the time and effort of the ordering process.

However, the case of ProNeD shows, that local production also offers potential for regional actors. In the case of ProNeD, producers get the chance to reduce their initiative activities and costs and get the chance to manufacture extraordinary products or to enter a new target group by using another distribution channel. By efficiently integrating local competencies to serve the needs of customers (sustainability, individualization) and at the same time creating a special purchase experience and proximity to the producers, consumers' willingness to pay higher prices is ensured.

Consumers get products that they can customize to their preferences while meeting their desire for more regionality (whether due to wishes for control or sustainability efforts). In addition, they can have their products customized to a greater extent than in industrial retail. Also, the desire for better quality, which is often associated with durability, and good materials, is met through the manufacture by carpenters. At the same time, they get their products as easily as through usual online-shopping and therefore more easily compared to buying from a carpenter.

Nevertheless, the results showed that pricing is the most sensitive topic and is the factor on which the success of a local production strongly depends. Therefore, it is very critical to ensure that no competition in prices between the carpenters appears, especially since the goal of local production is to strengthen small and micro enterprises.

It is clear that ProNeD's service is not an alternative for everyone, because the prices will still be higher than those of the market leaders of the industrial furniture production. To achieve this, further approaches would need to be developed and implemented (e.g. cost-efficient small-scale production by local companies through modern manufacturing technologies, / digitalization of internal manufacturing processes). In addition, the framework conditions would have to change in order to promote local production (such as increasing costs for logistics or increasing requirements for constant environmental and labor standards along the value chain).

However, for those who appreciate supporting regional actors, working on the protection of the environment and innovative products, local production (e.g. in the form of ProNeD) is a suitable alternative. This applies to both consumers and producers.

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