Questioning the cluster imperative: Why Danish craft beer firms choose not to cluster geographically, and what (not) to do about it.

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Abstract.
We investigate location factors of craft beer firms in the North Jutland region of Denmark and find that firms are located far away from each other, rather than agglomerate. These location patterns seem better explained by traditional theories on firm location, compared to theories that prescribe that small, resource-constrained firms should cluster to leverage on knowledge exchange and other agglomeration advantages when they source knowledge for innovation and business development. We contribute to the constructive criticism of the universal application of the idea of clusters in regional development policy. We discuss special features of the beer market and -products that contribute to explaining why firms in this industry seem to abstain from clustering. We forward the proposition of breweries simultaneously locating according to a 'sharing of market' logic and still pursuing knowledge exchange activities through 'temporary clustering', however, the latter being located away from the physical production facilities.

Keywords: beer industry, Denmark, clusters, location, regional embeddedness, regional policies

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Introduction.

The drivers and consequences of local concentration of specialized economic activity and related firms is a century-old topic in economics (Marshall, 1920). Co-location of potentially competing firms operating at the same production stage, is referred to as horizontal co-location (Brenner & Greif, 2006). Conventional wisdom on location of industries (Weber, 1929, Hoover, 1948, Moses, 1958) has been dominated by a perception of location choices that follows a logic of locating close to low cost and/or high-quality production factors, close to customers, and collusively agreeing among each other to share geographical markets (not to approach each other's customers or sell to those in a particular area). The market sharing logic is predominant in horizontal co-location thinking.

Contrary, more recent theories within industrial dynamics and economic geography prescribes small firms to co-locate to leverage on scale advantages of clusters such as supply-side benefits related to knowledge exchange, shared resources, access to local, specialized labour (Porter, 1998, 2000, Malmberg and Maskell, 2002, Maskell and Malmberg, 1999, Asheim et al., 2006, Bathelt et al., 2004). Whereas clusters are often described, measured, and identified by their horizontal co-location it is part of cluster theories to also incorporate buyer-supplier collaboration and interaction, and both types of theories emphasize the importance of institutions that facilitate links between actors and their formal and informal interaction. Recent perspectives on economic development, specifically address the role of interactive learning and innovation as critical (Lundvall, 2016). Similarly, the dominant view on location factors is that the co-location approach has gained relative more importance (Christensen and Drejer, 2005). Hence, according to the established view, resource-constrained firms compensate for liabilities of newness and smallness (Stinchcombe, 1965) by engaging in resource pooling and external collaboration often with other small, young firms, rather than solely internal build-up of this knowledge (Hewitt-Dundas, 2006), and they co-locate to facilitate smooth exchange of both codified and especially tacit knowledge.

Although spatial analyses and mapping show actual locations in a specific point in time, they do not reveal explanations behind location choices (Dennett and Page, 2017). Moreover, the dynamics of location are rarely studied, that is, to what extent do location decisions in an industry vary over time? To capture what links the general descriptive picture of locations to the underlying choices by individual actors, their interactions and consequences of these interactions, more fine-grained analyses of location decisions are called for. Consequently, we follow a call for studies that allow us to capture the individual

firm (micro) foundation of spatial (macro) conditions and events (Ylikoski and Zahle, 2019). It leads us to complement spatial descriptions with qualitative methods for further investigation of what is behind location decisions of craft beer firms that we observe.

Firms in this industry are all small, innovative, and often resource constrained, which would prescribe them to co-locate according to the above-mentioned established belief.

We contrast underlying assumptions in the above-mentioned general theories on location with stylized facts on the craft beer market in a region in Denmark. We map location and co-location of main microbrewing[1] firms in the craft beer industry in the North Jutland region in Denmark. Contrary to what cluster theories prescribe, these firms locate geographically far away from each other, hence, do not seem to search knowledge for innovation through co-location and clustering. This apparent paradox spurs a discussion on whether the imperative that firms should cluster holds for this industry, or if traditional location theories are still valid in the context of our study and in the industry, we focus on, by implication, perhaps in other industries as well.

Based on firm-level interviews, we reveal that the location decisions seem to follow traditional location choice parameters, whereas more recent perceptions of how small firms tend to cluster appear at first sight to have little support. We point out why the craft beer industry case may deviate from these general theories on small firm concentration and clustering[2]. Interestingly, we also find that firms do pursue activities resembling what produces the knowledge exchange facilitated by physical co-location, specifically what the literature denotes 'temporary clusters' (Bathelt and Schuldt, 2008, Maskell et al., 2006). These activities, which comes in a broad variety, but supports trust-building, vicarious learning, and knowledge exchange purposes, typically also discussed in the co-location literature, compensate for the lack of physical proximity that could facilitate face-to-face interaction and knowledge exchange.

Our exploration of location decisions of Danish craft brewers contributes to a sparse literature on location and co-location factors and drivers in this particular industry. More generally, we contribute to the economic geography literature by proposing explanations why firms may deliberately choose to not co-locate even if they recognize the need for knowledge sourcing and knowledge exchange for innovation. We propose a novel

[1] The definition of 'microbrewing' is often following the brewery size and/or ownership. Moreover, the term is used to characterize the mode of brewing, related to the fact that microbreweries in many cases define and market themselves in opposition to the large breweries (Verhaal et al., 2015). The self-perception of microbreweries is therefore related to their creativity, originality, heterogeneous products, ingredients, and flavors (Verhaal et al., 2015, Mathias et al., 2018, Pozner et al., 2022). The term also covers brewing of other beverages, but in our case, we focus on beer production.

[2] The terms agglomeration, co-location and clustering is often used interchangeable in the literature. In this paper we distinguish between a cluster of firms located in a specific geographical area and collaborating and exchanging knowledge (Porter, 1998, 2000). Contrary, firms can be co-located without having strong and frequent interactions.

conceptualization of the simultaneous distant location and 'cluster' leveraging that we observe in this industry.

We organize the paper as follows. The second section provides a description of the context, the Danish beer market. Section three outlay theoretical explanations of firms' location choices with an emphasis on location decisions as portrayed in recent literature. This is followed in section four by an explanation of our empirical methodology. The fifth and sixth section explains our results, respectively reasons behind location choices and disadvantages of clustering, before discussion, implications, and conclusion in section seven.

The Danish beer market – structure, evolution, innovation, and location of firms.

2.1. Evolution and market structure

The number of breweries is a key indicator in studies of the beer industry. The Danish microbrewing industry has seen a remarkable development since the 1950s, when Denmark had numerous small breweries, however, in the year 2000 the number of breweries had dropped to only 12. Subsequently the total number of breweries increased. Figure 1 displays the development from the year 2000 to the end of 2022 in the number of breweries[3]. The dotted line illustrates all breweries, including 'ghost'-breweries, 'contract'-breweries, those who do not themselves have production facilities but instead use established breweries' equipment. The solid line indicates breweries with physical facilities.

Insert fig. 1 around here

In Denmark there was a relatively small number of breweries and a slow industrial growth after the beginning of the century. In the period between 2000 and 2004 the number of breweries went up from 12 to 26, however from 2004 to 2008 the number went up from 26 to 114 existing firms. This was followed by four years of stable, slow growth but from 2012 there was another period with high growth in the number of breweries. By the end of 2022 there are 270 breweries.

[3] We thank Martin Emtekjær Andersen and Trine Olesen Østergaard, both Aalborg University Business School, for assistance with data collection.

Another market characteristic is the size of firms. The structure of the Danish market resembles an oligopoly as it is dominated by a few strong incumbents, in particular Carlsberg and Royal Unibrew, who are both among the largest 40 global breweries, Carlsberg being number three measured by produced volume of beer in 2021, Royal Unibrew number 38 (https://www.craftbrewingbusiness.com). They have a combined market share of 80% of the Danish beer market. Despite the dominance of these two large breweries, Denmark has the second-largest number of breweries per million inhabitants in Europe (Hana et al., 2020).

Figure 1 could indicate that the market is growing over the whole period, but this is not the case when measured in volumes rather than the number of breweries. Throughout the period covered in Figure 1 total beer consumption decreased (in the same period wine consumption remained constant). However, the specialty beer share of total beer sales increased from 6-10% of the total market. Hence, the beer specialty market remains relatively small but has an increasing share of the total beer market. A similar development has occurred in other countries (Baiano, 2021).

Earlier studies, such as Audretsch and Feldman (1996), point out that a high heterogeneity and innovation can postpone industry maturity and decline. Structures and behaviors such as clustering and firm regional embeddedness enhance adaptability and building firm-level resilience depends on managerial recognition of the resource mobilization possibilities linked to specific places and geographies. This accentuates the present study of possible clustering (or not) in this industry.

2.2. Location patterns

Figure 2-3 shows locations of breweries in the North Jutland region in 2022 distributed on size (Fig. 2) and type (Fig.3). The number of observations in our sample is too small (25) to justify robust statistical CSR (Complete Spatial Randomness) -analyses. For robustness we instead produced maps for every second year and with different samples (e.g., excluding nano-breweries). We found no changes in the overall conclusions from either of these other forms of disaggregation (available upon request).

The maps provide a visual impression rendering the conclusion that the location of these firms seems to be geographically dispersed, hence, to follow a market sharing logic.

Insert fig 2 and 3 around here

As a second step we mark breweries that in addition to production facilities also have a brewpub, tap room or similar at the location. We do so because the literature (Cabras, 2018, Dennett and Page, 2017) has mentioned that this is an important parameter in location decisions, brewpubs being more inclined to locate in urban areas and to co-locate because they can benefit from the fact that customers will often choose to visit brewpubs if they are in walking distance from each other. The conclusion also holds for this disaggregation, as the brewpubs are also dispersed geographically.

We included relatively small breweries in Figure 2. One could argue that small businesses do not contribute to representing the market as their production volume is marginal, but as we are interested in location decisions (and all large breweries started small) it is just as (or even more) interesting to include new, small firms than older, well-established firms that perhaps are embedded in the regional context for historical, owners' personal reasons, and who faces large switching costs if re-locating. Again, for robustness we also map locations without the very small firms and do not find differences.

In the following section we search established, general theoretical explanations for location of firms, and we link these to the specificities of breweries' location choices.

Theoretical background and earlier literature on location and the beer industry

3.1. Traditional location and co-location theory

The choice of location of production is a classic problem in economics. Theories in this domain (Weber, 1929, Hotelling, 1929, Hoover, 1948, Moses, 1958) generally link the location to the costs of transporting raw inputs to production facilities, transportation of goods and distance to the consumers at the market, and relative prices and qualities of inputs and labor. For example, addressing an essential balance between the costs of transportation of inputs to production facilities and costs of transportation of final goods to the market Weber (1929) and Hoover (1948) modelled this trade-off by pointing out that in industries with heavy, costly to transport inputs this would be an important location factor, whereas location would rather be close to market if final products are relatively costly to distribute. Stigler (1951) specifically linked transportation costs with the extent of the market, as illustrated below.

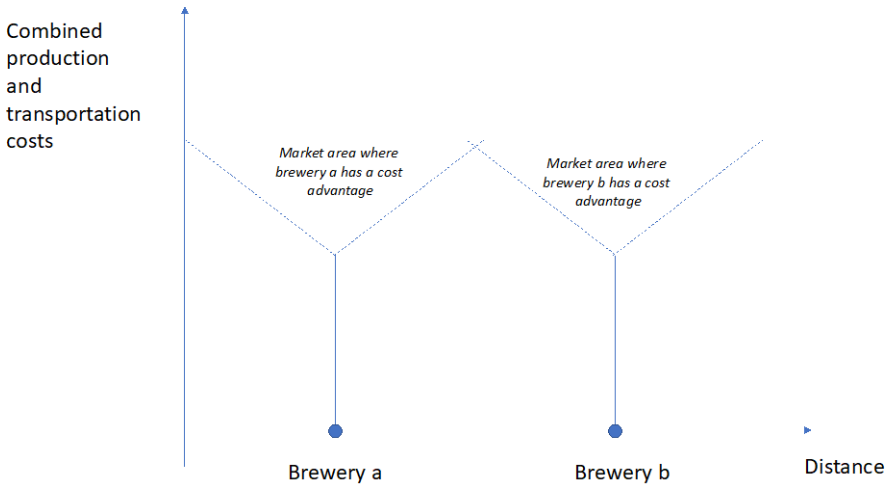

Figure 4: An illustration of market scope in traditional location theory

Another influence of co-location comes from the assumed scale and scope benefits of co-location on inter-firm cooperation (Storper & Harrison, 1991). According to Porter (1998, 2000), co-location in clusters entails a form of social glue where the proximity of firms ensure commonality and increases the frequency and impact interaction. Also, co-location may enhance chances of repeated face-to-face interaction, observation, and learning (Maskell, 2001). Related, physical co-location of entrepreneurs strengthens social ties and reduces the risk of moral hazard (Dei Ottati, 2002). For instance, Kristensen (1994) underscores the role played by local social sanction mechanisms among co-located entrepreneurs, in cases where the consequences of business behaviour are transparent.

Even if transportation costs have very recently increased significantly then observers regard this as a temporary phenomenon, and over the longer-term costs of transporting goods have decreased substantially. Moreover, although heavy goods are still moved over distance and used in production, resources have generally become increasingly knowledge-based, hence easily transferred over distance and less restricted in space. These two stylized facts should both indicate a relatively smaller explanatory power of the traditional location theories compared to more recent theories in economic geography emphasizing agglomeration and clustering.

3.2. Clusters and agglomerations

As explained above, it was previously regarded self-evident that an industry is in close affiliation with its natural endowment bases. However, in economic geography recent

theorizing has emphasized that co-location can create positive spillovers, but also that the reverse causality is in place, the agglomeration effects have a role as factors for location, especially for certain types of firms. New, small firms compensate for liabilities of newness and smallness (Stinchcombe, 1965) by engaging in external collaboration with other small, young firms rather than internal build-up of this knowledge (Hewitt-Dundas, 2006). By pooling resources, they alleviate the challenges of knowledge sourcing and innovating. For some firms, these possibilities in certain locations are important for their choices of location / re-location (think of IT-firms flocking to Silicon Valley or film production concentrating in and around Hollywood) (Scott, 2005).

The cluster literature suggests several reasons for why firms cluster in space. It is generally assumed that firms enjoy strategic benefits from belonging to a geographically defined cluster, comprised of potential rivals, suppliers, customers and complementors (Porter, 1998, 2000). Potential benefits include among other things, critical mass for attracting and growing specialized resources and skills, knowledge exchange through collaboration and face-to-face interactions, non-traded inputs, access to lead users and to supportive local institutions, local markets as test beds for ideas, vicarious learning, and other forms of knowledge spillovers (Krugman, 1991, Porter, 1998, 2000, Malmberg and Maskell, 2002, Maskell and Malmberg, 1999, Asheim et al., 2006, Bathelt et al., 2004).

Although the horizontal co-location of business actors has been proposed a part of the rationale for agglomeration advantages arising from clusters (Malmberg & Maskell, 2002), the extent to which empirical evidence generally support that cluster advantages for the individual firm hinges on close physical co-location to competitors, has also been questioned (Felzenszteinet al., 2010, Duranton, 2011). For instance, it is questioned whether the relative communication benefits of physical co-location fades in importance with the adaptation of digital technologies (Ganesan et al, 2005). Issues related to population density and possible saturation and fading of co-location benefits have also been pointed out, suggesting a reverse u-shaped rather than a linear association between agglomeration benefits and co-location (Chang & Park, 2005). Some parts of the literature challenge whether the potential benefits of competitor co-location are a catch-all for all business activities and across all sectors. A similar question can be raised with respect to variations in cluster co-location benefits across industries and sectors, given their differences in technology forms, factor endowments, and knowledge independencies (Andersen, 2006; Bucuini & Pisano, 2018). Such industry differences justify a closer look at the location patterns in our case industry.

3.3. Location and co-location of breweries – a special case?

It was indicated above that location decisions and -patterns may be industry dependent. With a focus on the craft beer industry, location studies are sparse. Overall research finds

that microbreweries benefit from clustering and do in fact cluster in space (Nielsson et al., 2018, Dennett and Page, 2017, Moore et al., 2016, Wojtyra et al., 2020). It has also been shown that business closures occur relatively more often outside clusters (Nielsson et al., 2019), although the literature generally is inconclusive regarding whether beer firm clustering increases the likelihood of survival (ibid.). When it comes to location-based resources and benefits, more microbreweries often mobilize cultural representations from the local space to support and differentiate their beer brand narratives (Bowen & Miller, 2022; Gatrell et al, 2018; Taylor and DiPietro, 2020). This does not necessarily contribute to co-location benefits, in fact it can be argued that on the contrary, breweries may take provenance and ownership of being the unique representative from a specific social terroir (Bowen and Miller, 2022).

However, consistent with general cluster theory, co-location benefits for microbreweries include improved access to knowledge and learning opportunities, access to resources, equipment, and specialized labor (Brown, 2015; Nilsson et al, 2018). Barajas et al. (2017) shows that the strongest predictor of a craft brewery entering a neighborhood is the presence of an already existing brewery. Tremblay et al. (2005) ascribe this to the informational opacity of breweries' financial performance, which leads to stronger second waive entry. In addition, research has pointed out that horizontal co-location can create demand-side benefits. For instance, helping customers to sample among offerings by foot is considered an important co-location benefit for the so-called brew mile in London (Wallace, 2019). This point is consistent with our separation of breweries in production facilities only and combined brewpub/restaurant/tasting facilities.

As the sparse evidence shows, there is no consistent line of research unilaterally documenting horizontal co-location of brewery clusters. In fact, an argument can be made, that inconsistencies in the research and the partly exclusive access to some of the local affordances (such as branding a space), combined with possible restriction in the ability to branch out and reach alternative customers with acquired skills from co-location, speaks for more mixed benefits and challenges from physical co-location. Research on co-location in other industrial contexts has shown similar results. Shaver and Flyer (2000), suggests that the net value (benefits – costs) derived from a co-location decision depends on the firm's own core competencies. Likewise, a study of the hotel business in the Manhattan area in New York, suggested that the growing density of middle-class hotels in the area reduced the chances of survival, due to increasing factor and market costs (Baum and Mezias, 1992). Hence, together research into both brewery co-location and co-location in clusters more generally shows that the net costs of positive and negative benefits from co-location are no panacea. In the following we seek to investigate this further.

Data and methodology

There is no established methodological convention to conducting cluster-based research (Komorowski, 2020). Rather, given their multidimensional nature, approaches that combine qualitative and quantitative data, reflecting the multidimensional nature of clusters seems to be the norm (Brachert et al, 2011). Consistent with other approaches to industrial field- and cluster-based research, we have followed a multi-method approach to triangulate between different panel data sets, interviews, and observations (Illeris, 1992; Staber, 1998). This approach has helped to develop a sufficiently and thick dataset to deeper explore the dynamics of location and clustering unfolding in the industry over time.

Above, in Fig.1 and in the maps of location of breweries, we used a database that entails detailed information on individual firms, including their products, location etc. to illustrate the evolution of the industry and the location of firms in the industry. We obtained these data from Statistics Denmark, from our own data collection, and from www.beerticker.dk, an independent consultant who monitors the Danish microbrewery industry and provides data to The Danish Brewer's association. Moreover, we searched specialized magazines, especially 'The Beer Enthusiast', that report on recent developments in the industry, including new establishments and closures. Our data has several advantages over other, existing data. One is that we combine as a criterion for being an active firm, not only the company register number but also that the firms have launched a beer on the market combined with having an operational approval as a producer of goods for consumption. By doing so we avoid the flaw in publicly available databases, such as that of Statistics Denmark, where several inactive firms are included. From the different data sources that we combine we have detailed information on all 316 firms in the industry during a 20-year period, including those who closed, and why they closed.

In addition to these data used to map where breweries are located, our primary empirical bases for digging deeper into what is behind the location decisions of breweries is data derived from interviews with managers and brewers in the industry. This fieldwork started in 2019 when we did nine semi-structured interviews at site with brewers (six interviews) and with key informants (3 interviews), each interview lasting more than an hour. The interviews were conducted at their location, with owners and executive brewers who had detailed insights into their companies' history and operations. Interviews were recorded, transcribed, and subsequently thematically grouped and coded. When processing the data, we focused particularly on parts of interviews with information on location decisions.

Traditional location theories encompass both input factors and output factors. At the input side there are few restrictions to location in the Danish craft beer industry. Inputs include access to high quality water, hops, yeast, and malt. In Denmark water quality is good allover and other ingredients are easily transported through developed transport facilities. In some cases, and localities, it can be questioned if water is ubiquitous and of equal and sufficient quality. The chemistry of water differs between localities, but in Denmark it is

possible to adjust the water quality without influencing taste. Moreover, Nesse et al. (2019) report cases where breweries are restricted in their access to water due to draught in some areas, but these cases are from Western U.S. and not applicable to our case. Therefore, location decisions are to a large extent driven by output-/market logics and by history (non-economic factors (Gatrell, 2014)). Hence, these are our focus points in the analysis, although we generally 'keep eyes open' for unexpected inputs during interviews as these were planned as semi-structured but often deviated from the planned according to the respondents' stories.

Results

The spatial analysis and mapping indicated few incidences of co-location of microbreweries. In contrast to established literature this was also the case for breweries with a pub/restaurant/taproom associated with the production facilities. Based on our interviews, we find several explanations for why microbreweries do not co-locate. These explanations surface from conducting a grounded analysis of the interview data and organize our findings around three emergent themes, relating to factors influencing spatiality and location choice of microbreweries.

5.1. Territoriality and local branding

One theme related to location is a shared notion among microbrewers concerning market territory. Although we saw some variety of market categorizing efforts, markets and the consumers and resources they represent are typically described and delineated by microbrewers in spatial terms. The brewers interviewed brought up arguments suggesting several elements of territoriality that played a role in location choices. Both with respect to their choice of location and how that was influenced by the fact that all owners interviewed originate from the area or have a strong connection to it.

There was a general sense of localized microbrewing as a local signifier and microbrewing consumption as a localized social experience, that links to other local touristic events.

Brewer C: *"(…) links to tourism is also about attracting cruise ships, which we clearly feel in our shop when they come, hence we are very interested in supporting this."*
Brewer D: *"then some local summerhouse owners heard that the brewery went bankrupt, which spurred them to have a quick talk here, out on the parking lot, and they thought the brewery was a valuable place when they are here. Consequently, they invested."*

One issue frequently mentioned during interviews and reflected in our secondary data was the notion of a local microbrewery representing the specific location and drawing from its unique characteristics in terms of history or other localized affordances. Hence, the name of the microbrewery also typically reflects a strong presence of locational aspects in the

branding of beers. This is consistent with the fact that innovation in this industry to a large extent is marketing innovation.

But there is also an element of entitlement, which suggests that rivalry over differential advantages from localized microbrewing is also present along with the local support.

Brewer C: *"(…) one thing not to do, at least not in Aalborg, is when you have a restaurant associated with your brewery, then other restaurants are not particular interested in your beer. This obstacle for sales is something we did not foresee"*

Also, two microbreweries sharing the name of a location is so far not seen in our material. And there seems to be an element of entitlement here as well.

Owner B: *(…) the name of the beer and brewery is a local and regional speciality limiting the geographical scope of the market. If we tried to sell in Skagen or Fur or similar, it would be difficult, people buy the local brand when they are themselves regionally embedded. When we took over the brewery we knew very little about sales and distribution but we quickly learned that we should brew for the local market, penetrating markets in Skagen, Løkken or Thisted would be difficult.*

These considerations by the respondents also points to limits to expansion as home markets can be limited and entering other markets can be difficult. This is illustrated by Hadsund brewery, which is located in a small town with limited population in the surrounding towns. Attempts to sell their produce in the larger Aalborg city is pursued by naming the beers after areas in Aalborg city (Gug, Vejgaard,,).

5.2. Consumer hinterland and spatial distance to competitors

A second issue that came up in the interviews, related to the notion of a consumer hinterland for maintaining a viable production and sale of local beer. The general idea behind the espoused views is that a domesticated and sufficiently large local demand is required for a local microbrewery to thrive and prosper. One of the interviewees overheard the researchers in identifying which microbrewery in Denmark we thought would have the largest domesticated market attached with it and linked this directly to the survival chances and long-term viability of the brewery. Another brewery related the size of their hometown and number of visiting tourists to the case for a market.

Owner A: *there isn't space for more (breweries) in Frederikshavn, in fact we have two here as one is brewing to own consumption and a restaurant here. (…)We didn't have one, even if any town of a decent size have a brewery, in fact it is 70 years since we had one in Frederikshavn (…)*

Brewer D: *"(…) when I agreed with Lars that we should establish Frederikshavn Bryghus, we looked into how many arrive with the ferry every year and how many hotel nights sold in Frederikshavn municipality, which is*

1.8 million, hence there is a market potential. I know the saying goes that Frederikshavn is not a tourist town, on the other hand there are 1.8 million people potentially buying a beer, then this should be your brewery location. If you include the municipalities of Jammerbugt and Hjørring then you have 2.3 million, hence if I tell the local story here then tourists pay attention to it, whereas if I go and sell our beer in Aalborg I'll amend the storytelling, (…)."

An explicit reference to the spatial distance to competitors came from owners of brewery X when explaining location decision behind a new establishment.

Owner x: *'We thought there was a hole in the market. Our new brewery is 20 minutes' drive from nn, a little less than 30 minutes' drive from mm, 40 minutes' drive from bb, 30 minutes' drive from vv, and just under 60 minutes' drive from cc . (…)*

5.3. Use of limited resources to serve markets

A third issue that surfaced from the discussions with microbrewers, related to the limited branding, distribution, and marketing resources of microbrewers. Most microbreweries have restricted capacity and produce and sell in modest amounts. Maintaining a steady distribution flow represents a specific challenge, since an important part of the sales of microbrewing is based on creating variety and novelty, which calls for an ongoing sales and development activity. Stiff competition, particularly with the large breweries, who also have taken an interest in craft beer types and has resources to exclude smaller breweries from the pub taps, means that the resources needed for marketing and selling craft beer is increasing rapidly, as compared to heydays of the microbrewing "Movement". The intensified competition also affects the market relationship between the microbrewers who are increasingly fighting over access. Sales, in the form of maintaining relationships to local bars and pubs, canvassing beer and repleting the empty beer kegs is resource demanding, so there is also a natural geographical limit to the sales area covered.

Owner B: *This is in the periphery of Aalborg municipality and except for a few cases where people have special relations to our beer, we are in fact only active in a radius of 50 kilometers from our brewery*

6. Cons of considering clustering and alternatives

6.1. Disadvantages of clusters

The apparent paradox that sparked this paper, that small, resource-constrained firms do not seem to cluster, called for explanations why breweries locate as they do. In turn, viewed from a cluster perspective, one can ask what are the flipsides of the many benefits that clusters have been said to entail. For this industry we point to four such disadvantages.

First, clusters can create an oversaturation of demand and exhaustion of scarce resources in a local context if too many firms of the same type co-locate. In essence, this is a question of whether firms balance the location decision between on the one hand seeking to leverage on an agglomeration effect (supply side effects) and on the other hand the presence in the market (demand).

Secondly, we propose that many firms base their marketing and branding on local storytelling, ingredients, ownership, voluntary engagement of citizens, or history (Flack, 1997, Verhaal et al., 2015, Mathias et al., 2018, Hasman et al., 2022). This defines a limit to how many craft breweries can be in one place (Dennett and Page, 2017), two firms in one place needs two stories for marketing and outside large cities this limits the possible number of firms in the market.

Third, networking is one important cluster benefit, but firms consider the costs of networking, something often neglected in the established literature. These costs have to do with the fact that network activities are time consuming and involve the risks of myopia and lack of long-term planning spurred by herd mentality and groupthink. The gains from networking are outweighed against these costs, and alternative, 'cheaper' ways of obtaining knowledge and other network benefits are sought, cf. our explanations of these rationales later in the paper.

Finally, we point to that in addition to operational costs, networking requires investments in competences, trust-building, and recognition of reciprocity (Mcgrath and O'Toole, 2013, Ritter and Gemunden, 2003). In the literature on clusters, it is often implied that such investments are integral when companies physically co-locate. However, our research underlines that social interaction and co-location are not necessarily interdependent. This suggests that the craft brewing firms enjoy business advantages from social interaction, decoupled from physical co-location. An argument can be made here for a potential trade-off between the co-location benefits and the market sharing (and differentiation) logic being active. Among microbreweries there is a sense of competition but also of cooperation. Balancing these two interests depends on how close substitutes their brands, value proposals and products are from the consumers perspective.

6.2. Alternatives to clustering

The above explanations could leave the impression that Danish microbreweries do not need and seek the benefits of clustering such as knowledge sourcing through collaboration and informal exchange of information and knowledge and that cluster theories have no explanatory power in relation to location decisions in this industry. However, importantly, we find that firms do in fact also undertake network activities. Frequently, firms undertake some of the same activities as in 'ordinary' clusters, specifically informal knowledge sharing through participating in 'temporary cluster' activities (Bathelt et al., 2008, Maskell

et al., 2006) such as beer festivals and other, similar events. Often these events are attended by the brewers rather than the owners (where they are separate persons) as illustrated by this quote:

> Interviewer: *How is your network and collaboration with other breweries and owners of breweries? Owner: We honestly don't. I rarely talk to other breweries and owners. He does (pointing to his master brewer). He goes to fairs, network meetings, and informal exchange of brewing – and obtains relevant information, right?* (brewer confirming) (owner, brewery d)

These activities compensate for the lack of physical proximity that could facilitate face-to-face interaction and knowledge exchange. In this sense, network activities in the industry are often informal, and not associated with the physical location of the individual brewery. Brewers describe the main, international beer festival as a giant 'cousin-cousin party'. The knowledge obtained at these temporary clusters is useful for several things, not least innovation. What is learned in the interaction with customers includes observations of changes in consumer preferences, and they function as a testbed for ideas. In interaction with other breweries there is an exchange of experiences with brewing techniques, new apparatus, ingredients etc. This knowledge contributes to the incentives to raise quality, continuously change beers and introduce new processes and especially product innovations. Another example of an event-type that qualifies as a temporary cluster are the craft brewing competitions, typically organized by local chapters of craft brewer guilds. These serve as an additional place for knowledge exchange and vicarious learning specifically among brewers. Further research into the effects on knowledge generation of such events would be useful (Cabras et al., 2020).

Thus, even if we question the universal application of the idea of clusters of firms, we discuss special features of the beer market and -products that contribute to explaining why firms in this industry seem to abstain from clustering. On the other hand, we point out that firms, despite being physically distant – or perhaps because of this – pursue activities that resemble the close interactions seen in clusters. In this sense, we forward the proposition of breweries simultaneously locating according to a 'sharing of market' logic and still pursuing knowledge exchange activities supporting innovation activities, however, such activities are located away from the physical production facilities.

Discussion, implications, and conclusion

Our discussion derived from the results in this paper contributes not only to understanding beer industry dynamics and its economic geography, it also contributes to assessing the generalization of network and cluster theories and policies.

Our findings indicate that dispersed physical location does not rule out agglomeration effects, however, in our case the benefits normally associated with agglomeration are sought in a more 'footloose' manner than hitherto discussed in the literature. Danish microbreweries did not co-locate and did not to a large extent engage in formal collaboration, but we found indications that they nevertheless exchanged knowledge through temporary, distant interactions at beer festivals and similar events. We question if agglomeration effects, and physical co-location need to be tied together.

This provides an interesting avenue for further research; the off-location search for agglomeration effects seems to be widespread and important sources of buildup of social capital and knowledge exchange in this industry, even if not bounded in space. Extending the search for this perspective to other industries and researching motivations for participating in fairs and festivals would be one strategy to obtain more solid knowledge on this.

The conclusions from the studies reported in this paper are, of course, not independent of the context. For example, the Covid-19 pandemic spurred a higher consumer loyalty for locally produced beer (European Beer Consumer Association, 2022). Further on that case, the share of Danish microbreweries who sell their produce on cans tripled during Covid-19, which render new possibilities for distribution. This can potentially affect location decisions. The former trend, higher consumer loyalty, will point to larger importance of the local environment in location decisions the latter, the opportunity to reach remote markets through online sales and distribution, to less importance.

Our position in this paper is a skeptical perspective on the universal use of cluster theories, however, we are not opposing cluster thinking all together, in fact we show that even when firms do not cluster in space, they comply with the basic ideas in cluster theories regarding informal exchange of knowledge and the importance of geographical proximity in this.

Regional cluster policies have involved extensive discussions on what are the 'winning policies', often aided by policy consultants, and what would likely be expedient future focus areas. There has been much less attention towards identifying what contextual issues characterize different types of clusters, and consequently what policies to pursue or not by regional authorities. In an era where regional actors are flocking to embark on certain policy domains (Martin and Sunley, 2003, Duranton, 2011), spurred by fashion, consultants, even regulators (RIS3 etc.), it is timely to discuss when and why industries sometimes appear to not follow established logic and perceptions, and what this implies for conventional industry policy.

Cluster policies have been criticized (Duranton, 2011, Vom Hofe, and Chen, 2006) but generally they have been closely tied to localities. Related, proponents argue they are

important drivers of regional growth and innovation. We do not dispute the general assertion that clusters contribute to growth and innovation, and we recognize the importance of place and location for growth and resilience in this industry, but our study demonstrates that in some cases the positive agglomeration effects need not be locally embedded. This introduces a dilemma for regional development policies. Such policies are usually organized and governed by regional entities who have targets to enhance regional innovation and industry development, for example by stimulating networking and better knowledge flows inside the region. In a situation where important parts of the knowledge exchange are not regionally embedded, rather part of the way it takes place on an industry level, it becomes difficult for policy actors to engage heavily in such support (aside from the fact that policy organizations generally do not have a long tradition for promoting beer or other alcohol, neither regionally nor at a national level),

In a policy context, this paper provides a think-point for policy makers and policy consultants who by backbone reactions would tend to derive conclusions around that when location of firms is dispersed, there is a potential for policies to enhance co-location in this industry (as in other parts of the food and drink industry). The discussion above indicates that effective policy and rationales for support need not follow the crowd, rather there might be a case for non-intervention in this industry, at least regarding supporting regional clusters[4].

[4] This is not to say that regulatory changes and policies are not relevant to the industry, we only comment on the part that entails cluster policies.

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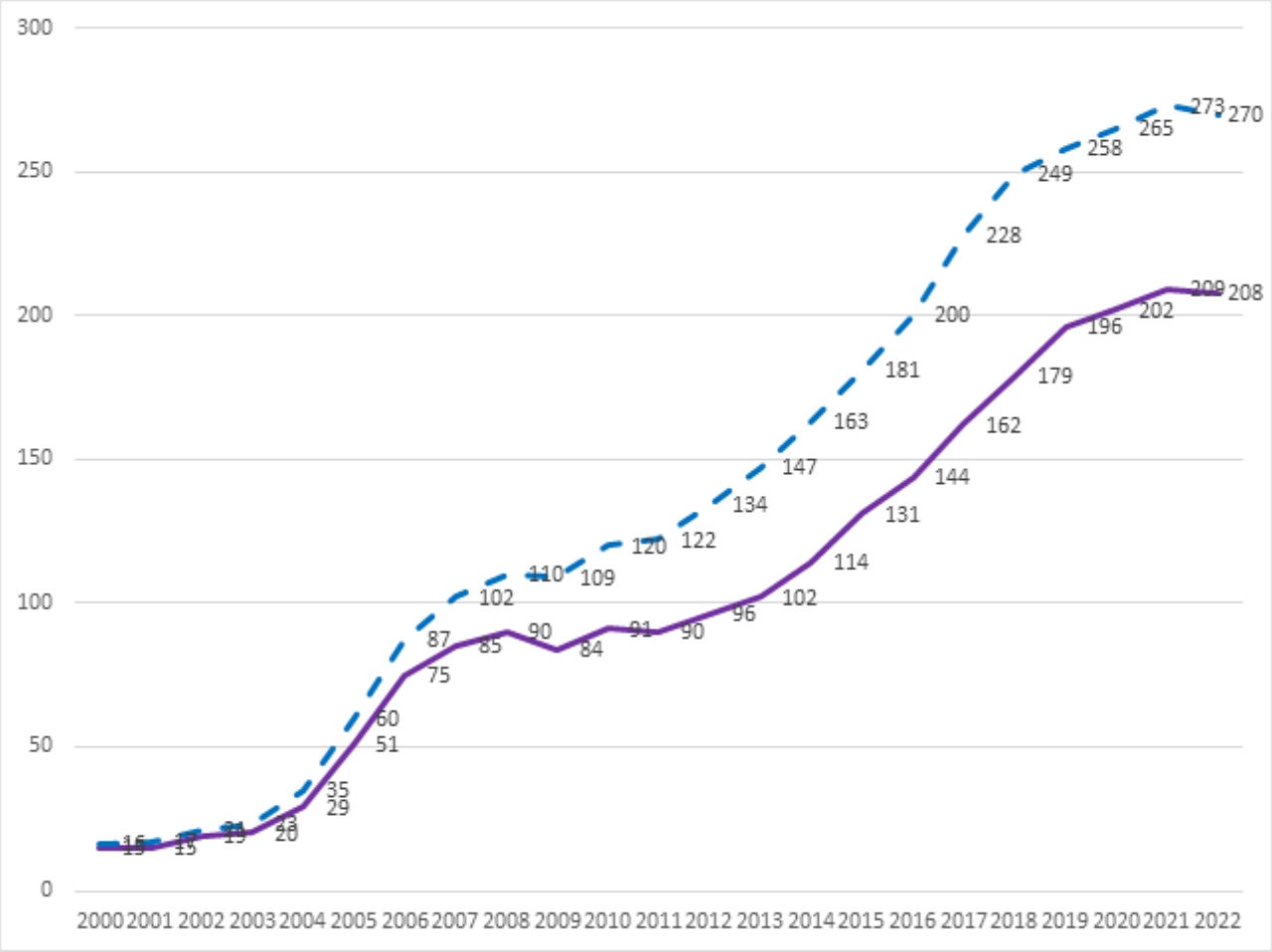

Figure 1: Development in the number of breweries in Denmark. 2000-2022. Contract breweries and total numbers (dotted line).

***Figure 2**: Breweries in North Jutland by size – Regional (blue), micro (red) nano (yellow).*

Figure 3: Breweries in North Jutland 2022 by type. Production only (purple), brewpub/-restaurant (green) ghost brewery (yellow).