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Resilient SMEs and Entrepreneurs: Evidence from the UK craft brewing sector

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Resilient SMEs and Entrepreneurs: Evidence from the UK craft brewing sector

Nadine Waehning, University of York

Gary Bosworth, Northumbria University

Ignazio Cabras, Northumbria University

Ekatarina Shakina, Northumbria University

Franziska Sohns, University of Greenwich

ABSTRACT**Purpose**

The paper examines the sudden changes and challenges experienced by British craft breweries because of COVID-19. The purpose is twofold; firstly, to evaluate the overall growth trajectory of the craft brewing sector prior to the pandemic crisis and, secondly, to identify features of resilience and adaptability that aided business survival.

Design/methodology/approach

We conducted 24 interviews with a sample of craft brewers during 2020, supplemented with a focus group later in 2021, to understand the impacts of COVID-19 on their businesses. Inductive thematic analysis followed a flexible six-stage approach to generating codes. Qualitative findings were set in the context of the pre-COVID-19 industry trends which were analysed using panel data from the Society of Independent Brewers' (SIBA) Annual Surveys between 2015 and 2018.

Findings

Findings from our analysis reveal a range of factors influencing growth in the UK craft beer sector before the pandemic crisis, such as levels of investment and local network ties, and identify a range of strategies implemented by brewers in response to the crisis, including new packaging and supply channels, more intensive marketing, and greater online engagement with customers. Analysis of the intersection between aspects of individual and organisational resilience also revealed that dynamic responses to an external crisis depend on individual resilience characteristics before organisational strategies can be developed.

Originality

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10 The study provides fresh empirical evidence to practitioners and policymakers to help forecast and
11 future-proof the UK craft beer sector, as well as elucidating aspects of resilience that apply to SMEs in
12 the global industry who face similar challenges. Moving towards a post-COVID-19 economy, the paper
13 offers important theoretical insights into how the resilience of breweries, and other SMEs, is shaped by
14 complex interdependencies and networks and how their adaptive responses might strengthen future
15 business models.
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19 **1. Introduction**

20 Since the early 2000s, British craft breweries have progressively expanded their marketplaces and
21 sales channels and by 2019, there were over 2,000 craft breweries in the UK (SIBA, 2020). The sector
22 is growing internationally, and is characterised by artisanal production methods, autonomy from larger
23 corporations and a significant attachment to place (Dodd et al., 2021). The distinctive characteristics of
24 the sector offer new insights into the dynamic nature of SME resilience which was tested to the full by
25 the impacts of the COVID-19 pandemic.
26

27 Immediately before the COVID-19 outbreak, the UK craft beer sector had a positive outlook (SIBA
28 2020), however, the severity of COVID-19 and subsequent government response could not be
29 foreseen. This paper investigates the measures taken by craft brewers to survive the first lockdown
30 (23rd March – 4th July 2020) during which pubs, bars and restaurants were all closed except for
31 takeaway trade, and examines the factors that enhanced both personal and firm-level resilience in the
32 face of continuing uncertainty as the ramifications of the pandemic unfolded.
33

34 Many craft breweries reacted promptly by reconfiguring their business model, moving the packaging
35 of their production, shifting the bulk of their sales to private custom, often using online marketplaces,
36 and turning to local communities for support. With increasing pressure from new entrepreneurs moving
37 into craft and micro-brewing, and the competitive response from larger brewers, it is important to
38 understand the resilience and adaptability of individual businesses and the sector overall. This allows
39 the paper to assess the applicability of existing entrepreneurial resilience theories in the context of such
40 an unprecedented and wide-reaching set of circumstances impacting the business environment. The
41 paper also explores the longer-term scope for these adaptations to enhance the resilience of their
42 business models in the future.
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45 Two stages of research are employed to examine the impact of these sudden changes and
46 challenges experienced by UK craft breweries. Firstly, we analyse a panel dataset provided by the SIBA
47 Annual Surveys conducted between 2015 and 2018 to assess the state of the sector and evaluate
48 patterns of business growth/decline. Secondly, 24 in-depth interviews conducted with a sample of 18
49 craft breweries (6 of whom were interviewed twice) identify how breweries reacted to COVID-19 and
50 offer insights into the future impacts of the pandemic crisis on UK craft breweries.
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52 The study addresses the following research questions: *What factors were associated with the growth*
53 *of craft breweries in the UK prior to the COVID-19 outbreak? How did craft breweries, particularly*
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10 smaller ones, respond to the operational challenges brought about by COVID-19? What individual and
11 firm-level factors enhanced breweries' resilience? And lastly, what will changes imposed by the
12 pandemic crisis signify for the future of the sector?
13

14 The paper comprises six sections, including this brief introduction. Section two discusses the
15 theoretical background of the study, analysing the literature related to firm-level strategies in time of
16 crisis and focusing on the UK craft beer sector. Section three describes the data used and methodology
17 applied. Section four illustrates findings gathered from the data analysis, while section five explores
18 their implications for the UK craft beer sector. Section six concludes.
19

20 21 22 **2. Literature review**

23 **2.1. Craft breweries in the UK: an overview**

24
25 The Society of Independent Brewers (SIBA), an industry body representing about 40% of all British
26 breweries, identifies craft breweries as independent businesses that use traditional methods and
27 ingredients in the brewing process and operate autonomously from larger corporations. These
28 breweries usually produce less than 5,000 hectolitres (hl) per year and employ no more than ten
29 workers (Cabras and Bamforth, 2016). The number of UK breweries increased significantly in the past
30 decades, from approximately 140 to more than 2,300 between 1980 and 2019 (BBPA, 2020). This
31 growth was driven by new entrepreneurs incentivised by the increased affordability of more efficient
32 and cost-effective brewing equipment and fiscal support measures favouring smaller producers (Cabras
33 and Bamforth, 2016). The Progressive Beer Duty (PBD), also known as the Small Brewery Relief (SBR),
34 which was introduced by the UK government in 2002 to help newer breweries with a lower tax levy than
35 large brewers and provided a 50% discount on beer duty to any brewer producing less than 5,000 hl
36 per year. Three 1p duty cuts on beer sales introduced in the UK government Budgets between 2013
37 and 2017, also sought to support pubs and the brewery sector.
38
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40 Prior to March 2020, the UK craft beer sector was in a phase of plateauing. While the number of
41 new breweries registered a 64% increase in the period 2013-2018, more mergers and buyouts occurred
42 within the sector during the same period, with increasing business closures (Beeson, 2018). Increasing
43 competition at a time when pub numbers were falling forced brewers to find new market opportunities
44 beyond local niche markets. This included supplying distributors and customers across the UK and
45 overseas as well as diversifying their businesses to tap into growth opportunities in the related
46 gastronomy and leisure sectors (Ellis and Bosworth, 2015). Globally, the craft brewery market has been
47 growing based on local ingredients, place embeddedness and entrepreneurial strategies to differentiate
48 from, rather than compete directly with multinational producers (Argent, 2018; Dodd et al., 2021).
49 Capturing what Sjölander-Lindqvist et al. (2020) refer to as "social terroir", entrepreneurs in this sector
50 are "rooted and shaped by the specific cultural features that are associated with the region's identity"
51 (2020, p158). Through this research, we not only examine the economic dimension of business
52 resilience, but we draw on this socio-cultural positioning of craft brewers to understand how
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entrepreneurs might also draw on local networks and places as resources to help them navigate a crisis period.

2.2 Theoretical background

Several research studies into resilience focus on the regional scale, where it concerns the ability of a system to absorb disruption and bounce back to a previous growth trajectory (Pike et al., 2010). When translating this to an industrial or economic sector, such as craft brewing, the micro-economic activities of interlinked actors within the sector cannot be overlooked (Sohns and Wójcik, 2020) and organisational behaviour needs to be regarded as playing an integral role in sectoral resilience. In this regard, we consider studying the impact of the pandemic crisis on the UK craft beer industry an important case investigating how entrepreneurial actors adapt to uncertainty and disruption. Early analysis of the impact of COVID-19 for Small and Medium Sized Enterprises (SMEs) indicate a very uneven picture, both regionally and sectorally (Brown and Cowling, 2021). Resource constraints increase the vulnerability of SMEs to external shocks as their limited managerial and technological capabilities combined with greater dependence on suppliers and customers restrict their adaptive options (Laskovaia et al., 2018). Those without reserves of savings are especially vulnerable and even if government loans can defer the worst impacts, repayment of soft loans will still take away investment capital for some years to come (Cowling et al., 2018).

To set it apart from standard definitions of entrepreneurship, entrepreneurial resilience should be conceptualised as “an ex-ante, multi-level capacity, as well as a contextual embedded dynamic process of positive transformation under adverse conditions” (Korber and McNaughton, 2018, p.1142). This comprises both firm-level and individual level components. Organisational resilience requires a firm to be agile enough to quickly recognize and seize opportunities or to change direction in response to external conditions (McCann, 2004). To be resilient in the face of a crisis, firms must deploy resources as efficiently as possible, firstly to survive and then to accelerate their recovery (Dormady, 2019). Following the London riots in 2011, Doern (2016) observed the importance of external support, promotions, and publicity for overcoming the negative effects of the crisis and increasing resilience. In the more extreme case of COVID-19, the phases of resilience became more identifiable with an initial focus on making sure the business is functioning with minimizing losses being an essential precursor to attempts to plan ahead by deploying “tactical awareness” (Doern, 2021). Fundamentally the paper concerns the resilience of SMEs but as other have noted (e.g. Branicki et al., 2018) this cannot be done separate from considering the resilience of the entrepreneur.

For the individual, self-efficacy and controllability combined with the role of other stakeholders shape their ability to implement different mitigation strategies (Bressan et al., 2021). These qualities determine the resilience of individual entrepreneurs, who can turn smallness and adaptability into a positive feature of their business (Branicki et al., 2018), balancing the well-known vulnerability associated with the very early stages of business development (Stinchcombe, 1965). The rebuilding of confidence among entrepreneurs in the face of a crisis is a key variable in determining the business-level responses, and both government policy and business support schemes to promote individual resilience can each play

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10 key roles (Branicki et al., 2018; Doern, 2021). Other features that can enhance entrepreneurs' resilience
11 include a willingness to learn, optimism, self-efficacy, persistence, a degree of flexibility and the self-
12 motivation, confidence, and control to take informed action in the face of external threats (Korber and
13 McNaughton, 2018; Branicki et al., 2018). Additionally, there is always an element of "muddling through"
14 or "bricolage" that determines how resilient characteristics may play out since entrepreneurs must
15 sometimes act with incomplete information and rely on combinations of personal hunches and trusted,
16 often local, connections to get through (Korsgaard et al., 2021; Kuckertz et al., 2020; Branicki et al.,
17 2018).

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20 Where SME owners participate in different networks their so called 'double-layered' embeddedness
21 offers additional resilience as they are not tied into a single supply chain or institutional structure
22 (Greenberg et al., 2018). Such networks that comprise both strong and weak tie components are also
23 likely to be more resilient as they can combine trusting, loyal support with access to new opportunities
24 and collaboration that can differentiate them from their competition (Wall and Bellamy, 2019; Bosworth
25 and Atterton, 2012). Fundamentally, both individual resilience and organisational characteristics
26 contribute to SME resilience since individual entrepreneurs need to identify opportunities for renewal
27 and reinvention as part of the recovery phase, regardless of the underlying strength of the organisation
28 prior to a shock (Branicki et al., 2018).

29
30 Highlighting the interplay between the organisational and individual level, the decision to change
31 strategy or 'pivot' in the face of major unanticipated challenges, is clearly influenced by a combination
32 of available resources, personal motivations, and organisational factors. Pivoting is the act of changing
33 products, services, customers, or markets, which may be triggered by opportunity or necessity (Morgan
34 et al., 2020). The success of pivoting depends on the fit of the new activity with the capabilities of the
35 firm, the relative costs and the degree to which innovation can be integrated into the firm as part of a
36 continuing strategy rather than solely an emergency response. If, faced with such circumstances,
37 "entrepreneurs are able to develop and mobilize resources they often did not suspect they possessed...
38 resilience represents a real growth strategy for entrepreneurs" (Ayala and Manzano, 2014, p127).

39
40 Emerging research into COVID-19 responses among SMEs indicates that smaller and innovative
41 younger firms are better placed to adapt quickly as the necessary agility is closer to their routine
42 behaviour (Kuckertz et al., 2020). In the face of crisis, SME owners' survival mentality often sees their
43 agility directed towards cost savings, despite research indicating that firms which take action to invest
44 rather than conserve resources are more likely to have positive psychological and organisational
45 outcomes in the long-term (Thorgen and Williams, 2020). They are also described as "ambidextrous",
46 displaying greater capabilities to react to stressful disruptions (Iborra et al., 2019). Many factors that
47 support entrepreneurial resilience derive from personal and familial experience, often going back many
48 years (Duchek, 2018), so there is no quick solution at a time of extreme crisis. Resilience is also highly
49 contextual – both in terms of the nature of the shock and the resources on hand to develop a survival
50 strategy and plot a path to recovery (Linnenluecke, 2017), therefore any research must recognise the
51 wider market impacts as well as the local factors that influence behaviour.
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10 In previous economic crises, SMEs that push a revenue-seeking strategy have been more
11 successful (Smallbone et al., 2012) but, during the pandemic crisis, that option has been severely
12 compromised by the loss of many routes to market. Furthermore, individual brewers have been isolated
13 from their usual networks and customer interactions, and in some cases their furloughed staff, all of
14 which are important sources of innovative ideas. SMEs and micro-enterprises have traditionally been
15 championed for their agility (Cowling et al., 2018), but the severe limitations imposed by COVID-19,
16 especially on hospitality and related sectors, lead us to question the veracity of such assumptions. With
17 entrepreneurs more likely to explore 'nearby' pivots first (Morgan et al., 2020), the options for SMEs in
18 the craft brewing sector could be very limited. As such, the research conducted during this most
19 challenging of periods can reveal new insights into the resilience of craft brewers and their agility in the
20 face of extreme social and economic crises.
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24 **3. Methodology**

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26 To fully appreciate the factors affecting the resilience of craft breweries in the face of COVID-19, the
27 paper presents data from 2015-2018 as a point of comparison. Without time to collect new quantitative
28 data, and with a desire to understand both the personal as well as the firm-level responses, qualitative
29 approaches were considered most suitable for the later phases of the research.
30

31 **3.1 Data overview**

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33 In developing the study, we followed the mixed method approach by Tashakkori and Teddlie (2011)
34 more specifically the sequential design but with equal weighting of the quantitative data followed by the
35 qualitative data collection methods.
36

37 **3.1.1 Quantitative stage**

38
39 For the quantitative stage we utilized the SIBA Annual Membership Surveys that was conducted
40 each November/December between 2015 and 2018. The questionnaire provided a wide range of
41 information including: the location of the brewery; the year of business foundation; beer production in
42 hectolitres; employment and skills; business performance indicators such as annual turnover and
43 current routes to market; and breweries' involvement with community activities, local charities, and
44 initiatives.
45

46 In the 2018 survey, a total of 248 valid responses (no duplications, no missing information for
47 relevant variables) were obtained, accounting for 72.5% of the total responses received, and 33.0% of
48 total SIBA memberships. The number of valid responses in other years were 287 (2017), 279 (2016),
49 and 281 (2015). By combining the annual datasets, we created an inter-annual panel dataset that
50 covers a time-period of four years encompassing information for 544 breweries located in 234 local
51 authorities. Overall, the dataset comprises 1,026 observations and it is classified as unbalanced, as not
52 all breweries were surveyed in each year.
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3.1.2 Qualitative stage

To capture the impact of the pandemic crisis, we conducted in-depth interviews with 18 independent brewery owners to probe their attitudes and responses to the crisis and the ensuing challenges. Interviews were conducted with a balanced sample of breweries, using attributes such as production levels, employment size, annual turnover as a guide for the selection. The first round of interviews was conducted between April and May 2020, in the aftermath of the first measures introduced by the UK government to control the spread of COVID-19 across the country. Later, in September 2020, six interviewees were approached again to further understand how they re-adapted their businesses to cope with the crisis, bringing the total number of interviews to 24. These were sampled based on availability in a very challenging time for the sector and focused on those who had managed to continue trading in different ways.

Interviews were recorded and interviewees were asked to consent to our use of the information at the start of the audio-recording. Each interview lasted between 30 and 45 minutes and transcripts of the conversations were produced for the data analysis. Main attributes and characteristics of selected breweries are provided in Appendix 2; any association with specific locations is concealed to preserve confidentiality. The inductive thematic analysis was carried out manually in Microsoft Word following Clarke and Braun's (2017), six-stage approach. Besides the fact that Clarke and Braun is the most widely adopted method of thematic analysis within qualitative research (Kiger and Varpio, 2020) it also allows the researcher to adopt a non-linear, more flexible and data driven approach to the analysis stage (Clarke and Braun, 2017). Stage one familiarisation with the data, followed by the second stage which led to 32 codes naming a few, 9 different codes just related to shifts and changes in packaging, 5 different codes for new routes to market, 2 codes around different levels of online engagement. Those 32 codes were then aggregated into the 5 themes including beer portfolio, online sales, and market reach the inter-rater reliability was tested. Our themes can be described as "patterns of shared meaning, cohering around a central concept" (Braun and Clarke, 2021, p.331), which were identified by the two researchers through being engaged in the data analysis process. The generated codes relating to resilience (investment & innovation; adaptability – especially to new market channels; individual proactiveness; collaboration) and growth criteria (beer variety; market reach; local community support/engagement) which formed the main themes for subsequent analysis (Saldana, 2016). This initial descriptive coding informed the design of the second round of interviews which examined how some of these aspects changed over the course of the first re-opening of the hospitality sector in summer 2020, adding a further level of understanding about the responses of craft brewers. The final set of data collection was the focus group to further support findings from the second round of interviews.

3.2 The dataset

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10 The final panel dataset included ten variables; descriptive statistics for each variable are shown in
11 Appendix 1. The first focus was on brewery performance, which was treated as the dependent variable.
12 Brewery performance was operationalised as a dichotomous variable (0 for an annual turnover of less
13 than £50,000; 1 otherwise)¹, since the objective of this study is to identify factors enabling breweries to
14 passage from a low to a medium annual turnover, indicative of passing through the 'liability of newness'
15 phase but still having the flexibility of being an SME.
16

17
18 Nine independent variables were selected to describe a set of brewery characteristics. The six of
19 main interest to this study were: the size of beer portfolio; the share of on-trade beer sales beyond an
20 approximate 40-mile radius; the amount of sales directed to free trade; the number of pubs owned by
21 breweries; the number of local charities and initiatives supported by a brewery; and the age of the
22 brewery, indicated by its year of foundation. Three further variables were used as controls: beer
23 production volumes; number of employees holding a relevant industry qualification; and the number of
24 employees that do not hold a relevant industry qualification.
25

26 The first four variables were used as proxies to investigate breweries' expansion in terms of
27 increasing demand, supply channels, and beer sales. These variables also capture the ability of
28 breweries to enlarge their reach beyond the most immediate spatial proximity, an aspect seen as a
29 barrier to expand for many craft breweries due to transaction costs associated with production
30 equipment, transport fleet, and marketing costs (Garavaglia and Swinnen, 2018). The number of local
31 charities and initiatives supported by a brewery was used to measure their engagement within the local
32 community, an aspect frequently indicated as necessary for craft breweries to sustain their business
33 during challenging times (Cabras and Bamforth, 2016). The breweries' age was included with the
34 assumption that younger breweries face more difficulties in terms of settling into the market than older
35 ones (Carroll and Swaminathan, 2000), but also may be more adaptable in the face of an economic
36 shock (Kuckertz et al., 2020). The control variables were used as a proxy to capture the level of
37 investment made by surveyed breweries in relation to expanding their capacity and size such as buying
38 new equipment, hiring more staff, or investing into training workforce.
39

40 Table 1 shows correlations among variables within the four years considered. A significantly positive
41 correlation was found between annual turnover and variables associated with levels of employment,
42 the volume of sales beyond 40 miles, and the size of beer-portfolios. In contrast, the year the brewery
43 was founded demonstrated a significantly negative correlation with the breweries' performance in terms
44 of annual turnover. Younger breweries in our dataset seem to have a smaller workforce compared to
45 older ones, with the latter owning and/or managing more pubs and likely to sell more beer outside their
46 immediate spatial proximity.
47

48 The snapshot provided by the 2015-2018 period is useful to understand the craft beer market in
49 which surveyed breweries operated prior to the COVID-19 outbreak. In that context, younger breweries
50 seemed to face several barriers to growth, with many focusing predominantly on serving a limited local
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53 ¹ Thresholds in relation to annual turnover have been applied by following categorizations provided by SIBA (2019).
54

demand, while older breweries seemed better equipped to seize opportunities associated with the expanding demand for craft beers. These findings corroborate those provided by recent studies in the sector (e.g.: Garavaglia and Swinnen, 2018; Hoalst-Pullen and Patterson, 2020). The likelihood of very small, frequently very young breweries increasing their annual turnover in the timespan considered is the object of the econometric analysis developed in the next section.

INSERT TABLE 1 NEAR HERE

4. Data analysis

4.1 Modelling of brewery performance

The descriptive analysis confirmed our general assumptions and identified some relevant associations among selected variables. To investigate these relationships further, we developed a range of panel regression models, using breweries as subject observations for which measures are repeated annually (see Rabe-Hesketh and Skrondal, 2008). We treated the brewery performance as the dependent variable. Due to the nature of our dependent variable, we fit a logistic random-effects regression model, allowing us to analyse the logarithmic likelihood for a brewery to exceed a turnover of £50,000 (Hedeker and Gibbons, 1994). We applied a random-effects model as the reported likelihood-ratio test showed a significant variability among breweries, favouring a panel regression approach over standard logistic regressions (Rabe-Hesketh and Skrondal, 2008). In addition, we decided to estimate a random-effect panel regression rather than fixed-effect panel regression, as the Hausman Specification Test (see Paul et al., 2015) yielded an insignificant result (Prob > chi2 = 0.121).

We added the brewery characteristics - total annual production, number of brands, number of non-qualified and qualified employees, share of non-local sales, share of sales direct to free trade, number of owned pubs, and contribution to charities - to estimate the performances variation among different types of breweries. The resulting logistic random-effects model is shown by equation (1):

$$(1) \text{logit}[P(Y_{it})] = \beta_0 + \beta_p X_{pit} + \varepsilon_{it} + \eta_t$$

In equation (1), $\text{logit}[P(Y_{it})]$ represents the estimated logarithmic likelihood of brewery i in year t to exceed the £50,000 turnover threshold. In terms of coefficients, β_0 represents the constant term of the regression. Furthermore, β_p represents the coefficients of the independent variables representing the brewery characteristics (X_{pit}). We estimated robust standard errors to account for heteroskedasticity in the model's unexplained variation and to control for spatial autocorrelation between breweries nested within the same local authority (see Vogelsang, 2012). Moreover, we tested for multicollinearity between the independent variables, which, with an VIF of 1.26, was ruled out (see Akinwande et al., 2015).

The regression results indicate that the size of the beer portfolio, sales beyond an approximate 40-mile radius, the proportion of sales directed to free trade, the number of local charities and initiatives supported by breweries, and the number of qualified and non-qualified employees had a significant

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10 positive effect on breweries' likelihood to move into the £50,000 turnover threshold. In contrast, a
11 significant negative effect was found in relation to the number of pubs owned by breweries. The
12 regression also suggests a significant negative effect of the year of foundation on breweries likelihood
13 to grow beyond the £50,000 turnover threshold, with younger breweries less likely to exceed the
14 £50,000 turnover threshold in any given year compared to older breweries.
15

16 17 18 **INSERT TABLE 2 NEAR HERE** 19

20
21 Pre-COVID-19, larger and longer established breweries serving wider markets were prospering and
22 this data would indicate that scale and experience were business strengths. However, as discussed
23 above, substantial entrepreneurial literature recognises that younger and smaller firms can be more
24 agile (Iborra et al., 2019; Kuckertz et al., 2020), potentially boosting their resilience to an external shock,
25 so we now move to qualitative data to understand how different brewers responded the challenges of
26 pandemic crisis.
27

28 29 30 **4.2 Findings from in depth interviews** 31

32 Considering the findings above, we now turn to qualitative data to understand the impacts of the
33 very sudden implementation of a national lockdown that saw pubs and restaurants closing on 20th March
34 2020, removing key routes to market for majority of these businesses overnight. Although initially
35 planned to last for three-weeks, the sector did not reopen until early July 2020. Even then, several
36 restrictions were imposed and there was widespread uncertainty about the likely volume of sales that
37 would ensue. Most brewers were eligible for different loans and/or grants and were able to reduce costs
38 by furloughing staff, however such an unprecedented interruption to business inevitably created fear,
39 panic, and the need for urgent decision-making. Those caught with large stocks of cask beer had to
40 "pour it down the drain" (N1, 4G) or recycle it for alternative uses such as making hand sanitiser (9G).
41 In the worst cases, the losses absorbed a significant share of the government support offered, as
42 indicated by the quote below:
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44 *"the money was a drop in the ocean... £10,000 doesn't go far, we lost over £3,000 in stock before*
45 *you even started" (8G).*
46

47 The subsequent analysis of findings provides insights into strategies concerning the range of beers
48 produced; new online markets; implications for the geography of markets; local community
49 engagement; and issues relating to brewers' investment decisions. As Appendix 2 shows, the 18
50 participating breweries represent a range of sizes in terms of production (250-11,000hl), employment
51 (2-45) and range of beers produced (4-40) as well as different ages (the earliest founded in 1992, the
52 newest in 2017) and routes to market, including some that were almost entirely dependent on pubs and
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10 hospitality, the “on-trade”, and others with over half of their sales through other retail channels. The
11 interviewee codes attributed to quotations allow the reader to cross-reference the brewery
12 characteristics too.
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15 **4.3 Beer portfolio and online sales**

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17 While results from the regression model indicates a significant positive relationship between size of
18 beer portfolios and breweries' performance prior to the COVID-19 outbreak, interviews reveal that, since
19 March 2020, breweries adopted different strategies. Some reduced their variety due to the impact on
20 their workforce and sale channels, to manage costs, and improve production efficiency, but others opted
21 to enlarge the size and variety of their beers, seeing this strategy as a competitive advantage to keep
22 their customers engaged and to help their expanding e-commerce platforms:
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24
25 *“Pure can volume has probably decreased, but we have a much bigger variety of cans. So, instead*
26 *of having up to three hundred cases of one product, now we have got a minimum of four products*
27 *available at any given time. [...] the sales channels really appreciate that: (the beer) it's staying fresh*
28 *and then it's much easier to pick up sales when you have four different ones to offer.” (1F)*

29
30 *“for us it's kind of made us really realise what we need to prioritise... We wanted to have all formats*
31 *of beer, we wanted to have all our core range available all the time. And it's kind of made us realise*
32 *that maybe you know, as such a small business we can't do that. We need to be a bit narrower and*
33 *sort of be a bit more focused. (7G)*

34
35 Rather than an indicator of growth, brand variety became emblematic of breweries' preferred
36 routes to market. For those pursuing online routes or having to seek out new wholesalers, the
37 requirement to pivot production to serve new markets presented an immediate challenge, particularly
38 for the smallest breweries in our sample. These businesses frequently lacked a state-of-the-art website
39 or web-shop which, combined with inadequate transport for large scale deliveries, prevented them from
40 accessing a growing demand of private customers who were turning into 'click and collect' modes to
41 get beers from their local breweries. In some cases, better-equipped breweries allowed these
42 businesses to make their products visible to the wider public, enabling them to sell online. However,
43 this aspect of collaboration seems to be an advantage mainly for the service provider, as many
44 interviewees noticed a drop in sales if they did not have a high level of variety for beers for their
45 customers to choose from:
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47
48 *“One thing we and a number of [other] breweries have done, to increase our web diversity, is to*
49 *exchange beer. We have swapped beer with [another brewery], because, if you are swapping beer,*
50 *there is no cost to you, so selling one of their products is as safe as selling one of your own. Then*
51 *you have got a much broader offering on your website and that's key, because as soon as we have*
52 *reduced variety on the website, our sales just drop.” (F4)*
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11 *"I'm just looking across at other breweries that we have listed online, I think since we last spoke*
12 *we probably took on more breweries onto our web-shop. Largely on just an opportunity basis..." (F2)*

13 With the onset of lockdown, breweries with an already established online presence, including web-
14 shops and active social network engagement on platforms such as Twitter, Instagram, or Facebook,
15 proved most resilient. These features enabled them to enlarge their online consumer base almost
16 immediately, helping them to compensate the losses suffered from pub and bar closures. Some also
17 developed new interactive events online such as quizzes and beer-tasting events where those
18 registering were encouraged to pre-buy the associated beers (4N).

19
20 *"We used Facebook a lot more. We've got a lot of followers on Facebook, and that is the best*
21 *way that we can talk and communicate with our immediate local market." (9N)*

22
23 *"We're using that £1,000 grant with website developer to have improvements made to our*
24 *website, because as you've just pointed out there, it is the most critical and essentially only point*
25 *of revenue in the business now." (4N)*

26 Converting production from serving traditional physical premises to entirely online environments
27 was facilitated by existing bottled or canned production alongside direct sales channels to consumers.
28 The introduction of the lockdown saw these channels increase significantly in volume, accounting for
29 100% of total production within just a few days. This confirms that diversified routes to market offer
30 firms greater resilience in the face of extreme crises, which might be added to the organisational
31 resilience dimension of Branicki et al's (2018) model. In the wake of the pandemic crisis, the use of
32 online spaces to enhance sales and customer engagement has become a further source of SME
33 resilience, where they can be deployed autonomously and swiftly within the organisation.

34 35 36 37 **4.4 Investment**

38
39 Traditionally, investment to expand or modernise production equipment, transportation and/or
40 premises is a key predictor of business growth. However, interviews identified mixed responses to the
41 lockdown, ranging from scaling up production to cater for the growing demand in certain sections of the
42 market, to effectively mothballing the business until established markets reopened.

43
44 Responses indicate that investment has also been important to enable firms to adjust successfully
45 to new trading circumstances brought by the crisis. This included investment in equipment to package
46 beer in new formats for different markets, such as canning machines (1N, 4N, 5N, 7G) and mini-kegs
47 (1G, 2N), as well as investment to improve online shops (2N, 4N; 9N) and direct sales premises (9G).
48 Investments were generally filling gaps in business models that suddenly became essential for
49 maintaining sales. This encouraged some brewers to bring planned investments forward:

50
51 *"One of the things that made us go for the government loan was we wanted to invest in a larger,*
52 *more effective canning machine. Our canning machine is very manual labour intensive at the*
53 *moment and proved to be nigh on impossible with just two of us in the business." (7G)*

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"We've bought some more equipment so we can brew a bit more beer. We've bought a small brew kit so that we can do more interesting specials and things that don't take up the capacity that we need in other places ... it was always in the plan [but] it may have been brought forward" (4G)

"I jumped on my designer straightaway to get our e-shop finished. It's been something I've been meaning to do for a good year – 18 months now" (9N)

It appears that maintaining investments levels helped interviewees to adjust successfully to new trading circumstances. In the prevailing context, reaction time was crucial, and examples of quick action included investments focused on both production methods and marketing approaches. Where new investment was already planned, or at least under consideration, the importance of future business planning to create that agility became apparent. Even informal plans helped brewers to be more alert to opportunities and gave them confidence to act more quickly. Aligned to Branicki et al's (2018) model, the actions that aid resilience emerge from the individual's preparedness and willingness to redeploy resources to meet rapidly changing external conditions.

In relation to the longer-term trends in the sector, it is interesting to reflect on the ways in which the crisis led brewers to reassess their businesses, whether that was the need for improved production and packing facilities, better use of online spaces or simply to review the efficiency and profitability of different products and activities. Several brewers commented on the value of having time to stand back from the day-to-day routine and think more strategically about their business. One interview participant described how the crisis highlighted shortcomings in their business model with the lockdown period providing a catalyst for action:

"I wouldn't say complacency, but I would say contentment with the way things were going. Rather than borrowing money to expand, we were happy just going as we were. Making a nice little profit just doing okay, doing what we were doing ... there was a desire to expand and diversify but there wasn't a need. Now, there's an absolute need because we know that pubs are not going to be buying the same amount of beer that they were in 2019" (5G)

The split between immediate short-term needs and longer-term implications in terms of strengthening resilience could be seen in other aspects of craft breweries' responses. The second round of interviews, and focus group, highlighted that brewers were beginning to assess which of the reactive changes might continue as part of their business models as well as which markets and wider sources of support would continue to add value to the business.

4.5 Market Reach & Locality

Pre-COVID-19 data indicated that both local community engagement and a wider market reach was important for the development of breweries. The restrictions on mobility for producers and consumers heightened emphasis on local markets and community support for many businesses. For example, one brewer explained that he was concentrating on his home city *"because then you are using*

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10 *less petrol; your time, as well, because then you are out for a couple of hours on the road, as opposed*
11 *to a day” (F5). While this may have been a cost-saving, retrenchment response, that could be classed*
12 *as a form of bricolage such actions also helped craft brewers to strengthen connections with local*
13 *markets and communities, helping the resilience of their businesses. Examples gathered from*
14 *interviews include collaboration with other businesses outside of the brewing industry (e.g., shared*
15 *delivery with a coffee-roasting company), the creation of a new village shop facility to meet local*
16 *community needs for essential products, and a growth in direct sales to local communities facilitated by*
17 *new licences. In part, this community-mindedness was a collective response to the crisis where the*
18 *“support your local businesses” message was particularly strong at the outset. One brewer commented:*
19 *“we’ve been humbled by the local people that have week in week out been buying beer” (6N). As we*
20 *entered the second phase of interviews, however, it was clear that the immediate outpouring of support*
21 *could not be expected to last:*

22
23
24 *“...people are slightly fatigued... they’ve now got other priorities, other than we must support*
25 *that great bloke from the microbrewery or the local pub. That wave of support I don’t think we’ll see*
26 *it a second time around” (F3)*

27
28 While the longevity of local support will vary between breweries and places, it brings into focus the
29 importance of analysing local market opportunities, which themselves are variable due to the level of
30 local competition, the beer identity of the place and the spending power of the local population brand
31 identity also proved important for sustaining local support:

32
33 *“I knew that [we] had a really strong brand locally. So, I was quite confident that the drive-*
34 *through would work really well” (1N)*

35
36 *“So, we would take our beer out and their coffee and they would occasionally take our beer out*
37 *alongside their coffee. We’ve just loaded our online deliveries for today, that were going out today*
38 *and onto our pallet we bring down the stuff from the coffee roastery and stick it on our pallet to go*
39 *out. Now that’s merely an enhancement of the community we had before” (F2)*

40
41 Finally, we assumed that, in times of crisis, the level of collaboration and mutual support among craft
42 breweries, particularly smaller ones, would have increased in view of increasing efficiencies, reducing
43 costs, and benefiting from economies of scale. While growing demand for bottling facilities did create
44 new business opportunities for larger operators that were already offering this service commercially
45 (e.g., 6G), it was very much on a transactional basis that did not generate longer term collaborations.

46
47 However, only one new collaborative venture between two breweries emerged from interviews (e.g.
48 2G collaborating with 2N); instead, the need to look after one’s own business was predominant among
49 our interviewees, as shown by excerpts below:

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"That's obviously changed during the situation. With a much smaller economy, there is a lot more fighting for sales involved. So, I think everyone has respectfully backed down on asking for the assistance of the networks. I do mean that respectfully." (F1)

"But in terms of networking with other brewers, nothing. There's been no contacts other than from with our bottling customers [...] I'm very keen to develop local contacts if I can, but nobody's encouraging it and they've all got more important things on their mind, to be frank, so that's a real luxury." (F6)

5. Discussion

The information gathered from both the regression model and in-depth interviews with breweries provide valuable insights on the UK craft brewery sector before and after the COVID-19 outbreak. Focusing on smaller breweries in the sector, the research identified a marked pattern of growth in the four years prior to COVID-19. The regression results indicate that the age of the brewery, size of the beer portfolio, sales beyond an approximate 40-mile radius, the proportion of sales directed to free trade, the number of local charities and initiatives supported by breweries, and the number of qualified and non-qualified employees have a significant positive effect on breweries' likelihood to move into the £50,000 turnover threshold.

This pattern, however, changed dramatically with the COVID-19 outbreak in March 2020. With the hospitality and events sector suddenly closed, the only routes to market were through supermarkets, off-licence shops and direct sales – both at the brewery and online. Once the initial shock sunk in, a variety of strategies emerged. In terms of the breweries resilience, our analysis seems to indicate that those breweries that already had assets such as on-premises bottling and canning machines and an operative web-shop prior to the crisis were able to better absorb the disruption caused in the sector in the immediate aftermath of the lockdown. Under-used resources became valuable assets to strengthen resilience (Ayala and Manzano, 2014). These breweries could operationalise changes in a quicker and more flexible manner than others, corroborating findings provided by McCann, (2004) and Dormady (2019) in relation to high level of agility and resource efficiency needed by firms to change direction in response to external conditions.

Interviewees indicated three main actions characterising a short-term oriented response from breweries: a general re-think of packaging (e.g., bag in boxes and mini kegs) a review of the product range, and exploration of new routes to market (drive through, click and collect, online retailers). Initially, a lot of these responses were limited by the immediately available resources, the autonomy and bricolage in Branicki et al.'s (2018) model. Responses gathered from the second round of interviews indicated that several of these are translating into longer-term strategic opportunities, with continuing intensification of online engagement (e.g. building on the online events, podcasts and beer tastings that took place during periods of lockdown), a substantial shift in packaging (e.g. increase in canning, bottling and take-away sales in "growlers"), and a more strategic exploitation of new routes to market

(online subscriptions and local direct sales or direct sales to bottle shops, omitting the wholesalers). This represents more of the SME-level resilience factors from Branicki et al.'s (2018) model, essentially suggesting that only after the individual entrepreneur has demonstrate their resilience can organisational level resilience evolve.

To respond to short-term priorities, many breweries sought means of bringing forward investment plans to respond to the changing trading landscape and push for new areas of growth to aid survival. In contrast, others went into full or partial hibernation hoping for a rapid return to pre-COVID-19 normality. In such cases, the severe limitations on hospitality and related sectors and the remote working and furloughing of staff acted as a further constraint, hindering the agility particularly of smaller businesses operating in the sector (Cowling et al., 2018). As confirmed in our interviews, more established breweries may have benefited most from loans and grants made readily available by the UK government compared to smaller ones, contrasting evidence that bureaucracy that is often seen as a constraint to innovation-led growth among larger and older organisations (Greiner, 1998). It is likely that, within the craft beer sector, these breweries have the expertise and networks required to navigate the administrative burden of securing business support compares to younger, smaller ones.

We found that a robust local network represented a key-asset in view of enhancing breweries' entrepreneurial resilience – once again, this illustrates the intersection of the entrepreneurs and their business resources to shape their resilience response. While correlations before COVID-19 showed a higher involvement of larger breweries in local initiatives and charities compared than smaller ones, interviews indicated that smaller breweries were still likely to benefit most from their ties with local communities. As these businesses were mostly reliant on on-licences demand to place their beers, under lockdown they turned to their local customers to survive. Those already actively engaged with their local communities managed to shift the bulk of their sales toward private customers more effectively than others, confirming the significance of local networks for craft breweries success (Cabras et al, 2020).

Having a larger platform of followers online helped brewers to better understand customers' tastes and preferences in view of redesigning their production, for instance about enlarging or shrinking their beer portfolio. This aspect is likely to have helped increased brewers' confidence and control to take informed action in the face of the crisis (Branicki et al., 2018), and to differentiate them from other competitors (Wall and Bellamy, 2019). Particularly in view of beer portfolios, our findings showed how larger brewers decided to keep their range of beers unaltered to increase the appeal of their web-shops and to capture consumers' attitude towards variety seeking for craft beers (Olsen et al, 2015), with many offering their own websites and web-shops to smaller breweries to advertise their beer to further expand their offers. This aspect provides some evidence of successful pivoting strategy implemented by breweries in response to the crisis (see Morgan et al., 2020), which is likely to be part of a continuing strategy from many of the breweries approached in our study.

Finally, and contrary to the narrative that see high levels of collaboration in the craft brewing sector (see Hoalst-Pullen and Pattison, 2020); interviews provided weak evidence about breweries joining

forces to respond to the crisis. For instance, with on-license businesses closed, orders of fresh beer (predominantly in cask) from these channels dried up literally overnight, forcing breweries to package their products in bottles or most conveniently cans to survive. Although very few had bottling and canning machinery at their premises, we found only one example of collaboration in our sample in response to such a pressing issue. Instead of collective resilience, individuals followed a survival pattern that started by looking inwards to keep the business functioning and minimize losses, mirroring the early response phases identified by Doern (2021). Turning to the opportunity phase, as individuals looked for strategic opportunities, their actions were determined by combinations of personal attitudes (e.g., towards risk or willingness to invest or innovate) and business-level resources, capabilities, and market channels (Branicki et al., 2018). Social resources were also important, but these focused more on community-based and policy networks rather than closer industry collaboration because everyone was adjusting to compete for their share of a constrained marketplace.

6. Conclusions

This paper examined the sudden changes and challenges experienced by British craft breweries brought by COVID-19, identifying that the factors that generate growth were unevenly impacted by COVID-19 and its accompanying restriction for craft breweries. The mixed methods approach we applied confirmed important changes within the craft brewing sector, mainly in terms of the market reach of beer sales and in relation to breweries' beer portfolios.

The severity of the crisis required immediate responses to survive as well as longer-term planning, recognising that the recovery would likely see major transformations in the craft beer sector. The lockdown provided many breweries with the chance to reconsider the longer-term value associated with the development of their business and to reflect on their business strategies, addressing both immediate and future issues. Our findings revealed that online connection with customers grew in importance and new sales channels demanded agility in terms of packaging, delivery, and direct sales from brewery premises. Applying Branicki et al's (2018) model of SME resilience, we confirm the important intersection between the individual and the organisation, with examples of bricolage and optimism alongside creativity, autonomy, and the use of social networks to help brewers survive. We also noted that while the pre-conditions for resilience exist at both the individual and firm level simultaneously, the dynamic response to an external crisis begins with individual resilience responses before organisational strategies can be developed.

For craft breweries, embracing online tools and develop business models with suitable diversity of products to satisfy changing routes to market. Linking the short and long-term outcomes together, the shift to online sales is a good example of how enforced changes trigger new future-oriented strategies, in this case driving improved use of social media and other online platforms across the sector as online beer sales continue to grow. This finding, however, raises wider questions for the industry, and

Commented [GB1]: Maybe we add a line here to say, pre-COVID, the growth was driven by x, y and z... Our subsequent research has confirmed... and revealed important changes...

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10 particular for the resilience of pubs and bars, where a marked shift in packaging volumes from casks
11 and kegs to bottles and cans was already evident in the five years pre-COVID-19 (SIBA 2020).
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13 We also found that the availability of grants and 'soft loans' made available by the UK government
14 during the pandemic crisis has helped many breweries to keep afloat, although some of the smaller
15 breweries approached in our study appeared to be less alert to opportunities for investment or business
16 development were more limited in their agility when the crisis arose. Nevertheless, this support has now
17 finished. The Job Retention Scheme (furlough), which enabled employees to continue receiving up to
18 80% of their salaries with employers just contributing up to 20% of them, ended in September 2021.
19 Other forms of support such as the Restart Support grants, which provided £5 billion local authorities in
20 England, and enabled businesses in the hospitality industry, including craft breweries, to bid for up to
21 £18,000 per premises, have been also withdrawn in 2021 (SIBA 2021). At the same time, soaring prices
22 for transport and energy, and increasing costs of water supplies and packaging material such as cans
23 and bottles pose significant challenges to breweries recovering from COVID-19 (Thatcher, 2021).
24

25 In the 2021 Autumn Budget, the UK government introduced a 5% duty cut on draught beer and cider
26 mainly to support pubs and other licensed premises that have been hit hard during COVID-19. Industry
27 organisations such as SIBA and the British Beer and Pub Association (BBPA) welcomed the measure,
28 claiming it will generate a cost saving of 3p per pint, although the measure will most likely benefit large
29 breweries and pub companies that work on sale volumes, rather than small and craft breweries. In
30 addition, the government announced a new tax relief on beer containers over 40 litres, excluding smaller
31 sized containers such as 20 and 30 litres which are mainly used by small and craft breweries. The
32 Campaign for Pubs, a grassroots independent group funded by publicans and brewers, described this
33 measure as a 'direct discrimination against UK small brewers' (Demianyk, 2021). Whether this is the
34 case or not, findings from our analysis indicate that the commitment of the UK government towards
35 craft breweries will still be crucial for these businesses to recover and bounce back in a post-COVID-
36 19 world. More poignantly, and as demonstrated by our study, more targeted financial and logistic
37 support in the form of grants or schemes to smaller breweries seems to be needed, as these businesses
38 appear not to benefit from public sector support compared to larger ones.
39
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41 While this paper provides a timely contribution to the entrepreneurial resilience literature addressing
42 the impact of the pandemic crisis on the UK craft brewing sector, it also presents some limitations. For
43 instance, the information analysed relates solely to the period comprised between March 2020 and
44 September 2021, excluding more recent developments occurred in the UK beer and brewing industry.
45 While information collected by both interviews and focus groups proved to be consistent and robust
46 across the sample considered, we are fully aware that a larger number of interviews could have led to
47 more robust results in relation to craft breweries' behaviour and strategies during COVID-19. In addition,
48 and for reasons explained earlier in the paper, we could not analyse a larger timespan of data about
49 the situation pre-COVID-19. Again, we are aware that examining this information would have enhanced
50 the quality of our findings even further; due the difficulty in obtaining such information, we hope this
51 study can provide an incentive for other researchers.
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Given the significant impact the crisis will have on this as well as other related sectors, more studies in the field will help to predict future trends in the beer and brewing industry, and to better understand the potential of craft beers and breweries in terms of entrepreneurial resilience and local economic development.

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Table 1: Correlation table

	ATB	NC	ABP	NB	NNE	NQE	SB	NOP	S
Annual Turnover [ATB]									
Number Of Charities [NC]	0.22***								
Annual Beer Production (in hectolitre) [ABP]	0.11***	0.09***							
Number of Brands [NB]	0.18***	0.12***	0.02						
Number of non-Qualified Employees [NNE]	0.19***	0.14***	0.34***	0.09***					
Number of Qualified Employees [NQE]	0.15***	0.14***	0.20***	0.18***	-0.13***				
Sales beyond 40 Miles [SB]	0.17***	0.04	0.17***	0.04	0.19***	0.11***			
Number of Owned Pubs [NOP]	0.02	0.02	0.06**	0.06**	0.02	0.21***	0.03		
Sales Directed to Free Trade [S]	0.00	0.18***	-0.05*	-0.07**	-0.10***	-0.06*	0.08***	0.09***	
Foundation Year [FY]	-0.19***	-0.10***	-0.18***	-0.06*	-0.26***	-0.18***	-0.20***	-0.15***	0.08***

Table 2: Regression Results (dependent variable: annual turnover)

	odds ratio (standard error)
Beer production (in hundred hectolitres)	1.007 (0.008)
Size of beer portfolio	1.476*** (0.148)
number of non-qualified employees	3.883*** (0.939)
number of qualified employees	8.342*** (2.949)
sales beyond 40 miles (as %)	1.219** (0.122)
number of owned pubs	0.960** (0.016)
number of local charities and initiatives supported	1.344*** (0.109)
sales directed to free trade (as %)	1.010* (0.005)
foundation year	0.920** (0.034)
constant	0.000* (0.000)
Model Fit Statistics	
insig2u	1.815 (0.371)
sigma_u	2.478 (0.460)
sigma2_u	
rho	0.651 (0.084)
prob > chi2	0.000

Note: *** Significant at 1% level ($p < 0.01$), **Significant at 5% level ($p < 0.05$), *Significant at 10% level ($p < 0.1$). Source: Authors' own calculations based The Office for National Statistics (ONS, 2019), and the Society of Independent Brewers' Annual Membership Survey (SIBA, 2016-2019).

APPENDIX 1

Descriptive Statistics - Variables

Variable		Mean	St.dev	Min	Max	Observations
annual turnover (bivariate)	overall	0.805	0.396	0	1	N = 1026
	within		0.404	0	1	n = 544
	between		0.152	0.055	1.555	T-bar = 1.886
Brewery Characteristics						
number of charities	overall	2.830	3.544	0	12	N = 1026
	within		2.934	0	12	n = 544
	between		2.175	-6.170	10.830	T-bar = 1.886
annual beer production (in hectare litre)	overall	4011.596	15879.58	0	388000	N = 1026
	within		10970.39	0	132333.3	n = 544
	between		11044.6	-123821.7	259678.3	T-bar = 1.886
number of brands	overall	6.373	4.649	0	99	N = 1026
	within		5.639	0	99	n = 544
	between		1.353	-5.627	18.373	T-bar = 1.886
number of non-qualified employees	overall	2.650	6.223	-93	62	N = 1026
	within		6.729	-93	62	n = 544
	between		1.714	-22.017	30.983	T-bar = 1.886
number of qualified employees	overall	1.595	4.371	0	100	N = 1026
	within		5.310	0	100	n = 544
	between		1.232	-17.405	20.595	T-bar = 1.886
sales beyond 40 miles (as %)	overall	3.135	2.177	1	9	N = 1026
	within		2.028	1	9	n = 544
	between		1.187	-2.198	8.635	T-bar = 1.886
number of owned pubs	overall	1.163	7.199	0	140	N = 1026
	within		8.447	0	140	n = 544
	between		2.571	-32.171	67.829	T-bar = 1.886
sales directed to free trade (as %)	overall	44.985	31.612	0	100	N = 1026
	within		26.914	0	100	n = 544
	between		20.750	-28.265	118.735	T-bar = 1.886
annual investment (yes=0; no=1)	overall	0.327	0.469	0	1	N = 1026
	within		0.408	0	1	n = 544
	between		0.272	-0.424	1.077	T-bar = 1.886
foundation year	overall	2007.274	7.832	1979	2018	N = 1026
	within		8.001	1979	2018	n = 544
	between		0	2007.274	2007.274	T-bar = 1.886

Source: Authors' own calculations based The Office for National Statistics (ONS, 2019), and the Society of Independent Brewers Annual Membership Survey (SIBA, 2019).

APPENDIX 2: Main attributes and features of interviewed breweries

Codes for Round1 interviews	Total production (hl)	% On-trade vs Off-trade	Turnover In 2019	Years in business	No. employees	Owned or managed pubs	% Beer sold beyond 40 miles radius	Size of Beer Portfolio
1N/F1*	1,500 (2019)	90 ON 10 OFF	£100,000- £150,000	Since 2017	2 FT 0 PF	0	11-20%	1 Regular 3 Seasonal
1G	2,000 (2019)	90 ON 10 OFF	£250,001- £500,000	Since 2016	6 FT 4 PT	1	41-50%	1 Regular 4 Seasonal
2G/F2*	2,732 (2019)	60 ON 40 OFF	£500,001- £750,000	Since 2012	8 FT 6 PT	1	41-50%	6 Regular 30 Seasonal
2N/F3*	1,200 (2019)	70 ON 30 OFF	£150,001- £200,000	Since 2014	3 FT 2 PT	0	41-50%	6 Regular 0 Seasonal
3G	850 (2018)	80 ON 20 OFF	£150,001- £200,000	Since 2015	3 FT 2 PT	0	51-60%	7 Regular 14 Seasonal
3N	784 (2019)	80 ON 20 OFF	£150,001- £200,000	Since 2013	2 FT 2 PT	0	31-40%	6 Regular 10 Seasonal
4N/F4*	6,000 (2019)	60 ON 40 OFF	>£1M	Since 2016	22 FT 12 PT	2	31-40%	15 Regular 25 Seasonal
4G	11,000 (2018)**	30 ON 70 OFF	>£1M	Since 2014	30 FT 15 PT	0	71-80%	NA
5N	750 (2018)**	90 ON 10 OFF	£50,000- £100,000	Since 2014	2 FT 2 PT	0	21-30%	8 Regular 10 Seasonal
5G	1,195 (2019)	75 ON 25 OFF	£250,001- £500,000	Since 2010	2 FT 3 PT	0	11-20%	8 Regular 10 Seasonal
6N	7,781 (2019)	62 ON 38 OFF	>£1M	Since 1992	12 FT 1 PT	0	51-60%	10 Regular 34 Seasonal
7N	350 (2019)	99 ON 1 OFF	<£50,000	Since 2017	2 FT 0 PT	1	81-90%	NA
8N	10,500 (2019)	46 ON 54 OFF	>£1M	Since 2003	9 FT 1 PT	0	11-20%	4 Regular 30 Seasonal
9N/F5*	1,100 (2018)	90 ON 10 OFF	£50,000- £100,000	Since 2015	2 FT 2 PT	0	61-75%	4 Regular 7 Seasonal
6G/F6*	5,000 (2019)	65 ON 35 OFF	>£1M	Since 1999	7 FT 3 PT	0	21-30%	8 Regular 14 Seasonal
7G	1,200 (2018)*	80 ON 20 OFF	£50,000- £100,000	Since 2010	3 FT 2 PT	0	21-30%	NA
8G	250 (2018)**	99 ON 1 OFF	<£50,000	Since 2014	1 FT 1 PT	0	11-20%	NA
9G	650 (2018)*	80 ON 20 OFF	£50,000- £100,000	Since 2014	2 FT 1 PT	1	11-20%	3 Regular 6 Seasonal

*Follow up interviews conducted in September 2020 **estimated

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Resilient SMEs and Entrepreneurs: Evidence from the UK craft brewing sector

Dear Richard,

Thank you for the opportunity to make these final minor amendments to our paper. We have now addressed your comments and revised the text accordingly, please find our responses below.

1. While acknowledging that it's great to keep the introduction concise (see, Barney's 2018 fantastic advice which can be adapted towards empirical papers). It would be really useful for readers to include some references to which area of the resilience literature you plan to speak to, as it'll just allow you reader to know where you position yourself within the academic conversation.

We have moved some of the description of the sector into the literature review allowing the focus on resilience to come through more strongly in the first 2 paragraphs.

2. Very minor, but some sub-headings relating to the quantitative and qualitative aspects of the research design might make the section a little easier to navigate.

We have added the headings "Quantitative stage" & "Qualitative stage" to make a clearer distinction within the methodology section between the two.

3. The description of the coding stages would benefit from some examples of the codes identified, and some detail about the basis upon which codes were combined.

Examples of generated codes are at the end of Section 3.1.2: "The generated codes relating to resilience (investment & innovation; adaptability – especially to new market channels; individual proactiveness; collaboration) and growth criteria (beer variety; market reach; local community support/engagement) which formed the main themes for subsequent analysis (Saldana, 2016)". We added the following sentence:

"Our themes can be described as "patterns of shared meaning, cohering around a central concept" (Braun and Clarke, 2021, p.331) which were identified by the two researchers through being engaged in the data analysis process."

-which replaced the sentence:

"The themes were then reviewed and named which was done by two academics separately and the results then compared and discussed which lead to our final report"

4. The following sentence could usefully be revised to explain what it means for the themes to be named (were the themes different to the codes, e.g., aggregate dimensions?), to provide a reference for inter-rater reliability, and to remove reference to the final report - 'The themes were then reviewed and named which was done by two academics separately and the results then compared and discussed which lead to our final report' (p. 7).

Thank you for your suggestion. The terms "aggregated" and "inter-rater reliability" are now included/ replaced in the sentence: 'The themes were then reviewed and named which was done by two academics separately and the results then compared and discussed which lead to our final report' (p. 7)."

Many thanks once again for all your help and support during the review process; looking forward to hearing from you.

Yours faithfully

Nadine Waehning on behalf of co-authors