



Exploring innovation perceptions and practices among micro and small craft breweries: A three-country study

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Abstract

Purpose – The purpose of this study is to examine how micro and small craft brewery operators perceive and operationalise innovation. Moreover, in adopting the theory of innovation, the study addresses two under researched areas, namely, innovation among micro and small firms, and innovation in the context of the emerging craft brewing industry.

Design/methodology/approach – The perspectives of 163 craft brewery operators located in Italy, Spain, and the United Kingdom were gathered through online questionnaires. 24 face-to-face and telephone interviews with operators from the three nations complemented the data collection process. Thus, in total, 187 operators participated.

Findings – Development of new craft beer styles, new recipes, exploring with various ingredients, improving quality, or involvement in social media and culinary tourism were predominant forms participants perceived innovation. Various differences regarding innovation adoption were noticed, particularly based on participants' country, and on their role at the brewery. Furthermore, associations between the findings and the dimensions of the theory of innovation were confirmed.

Originality/Value – This study is original in that it represents a first effort in comparing perceptions of craft brewery operators across various countries. This comparison identifies ways in which craft brewery operators could maximise the potential of their firms. For example, the manifested interest in innovating through new craft beer recipes, or blending gastronomy and craft beer underlines alternative forms of adding value to craft brewing production. Importantly, some of these innovating practices differ based on participants' country; such differences could also be considered by craft brewery operators.

Keywords: Innovation, theory of innovation, craft brewing, micro and small craft breweries, owners/managers, Europe.

Introduction

Among its many interpretations (O'Dwyer, Gilmore, and Carson, 2009), innovation has been conceptualised as “an information process” (Nonaka and Kenney, 1991, p. 67) enabling the generation of new information, and demonstrated in the final product. Similarly, innovation is the acceptance, implementation, and generation of processes, new ideas, services, or products (Kanter, 1983). Moreover, while not all adoptions of new ideas may qualify as innovations (Downs and Mohr, 1979), they can nevertheless be associated with processes of bringing any problem-solving, new idea into use (Kanter, 1983). As these definitions suggest, innovation and innovative activities can provide important benefits to many firms, including those small and medium in size (Lee et al., 2010). Indeed, innovation has been found to benefit small firms in terms of competitiveness and profitability (Oksanen and Rilla, 2009).

Despite this empirical evidence, many knowledge gaps regarding innovation among micro and small and medium enterprises (SMEs) still remain. First, innovation research mainly focuses on large enterprises, overlooking small ones (Berends, Jelinek, Reymen, and Stultiëns, 2014), as well as micro-size firms (de Mel et al., 2009). Second, the potential application of open innovation to the SME sector remains “excluded from mainstream

literature” (Lee et al. 2010, p. 290). Third, so far, the association between diversification and open innovation among SMEs has been neglected (Colombo, Piva, and Rossi-Lamastra, 2014). Fourth, few or no studies have examined ways in which “small firm new product innovation unfolds over time” (Berends et al., 2014). Finally, there is limited comparative research of outcomes of innovation between small and medium non-family and family enterprises (Classen, Carree, Van Gils, and Peters, 2014).

Similar to the field of innovation, authors also identify knowledge gaps in craft brewing research (Danson et al., 2015; Maye, 2012; Murray and Kline, 2015). Craft breweries are typically small operations focusing on production of unique styles or flavours of beer (Bastian et al., 1999). In the last decade, the craft brewing industry has experienced major growth in numerous countries (Brewers Association, 2015a; Brewers of Europe, 2015; Fastigi et al., 2015; Kroezen and Heugens, 2012). Indeed, as Cabras et al. (2011) explain, there is an increasing number of small independent craft breweries in the UK and the USA, and most Western countries now have craft breweries competing with larger beer companies. Cabras et al. (2011) also underline the dearth of knowledge related to micro and small brewing firms, arguing that the wide variety of businesses, including brew pubs and individual firms, may be a fundamental reason for such limitation. In a clear suggestion of the complexity of these firms’ demographic nature, these authors also recognise the challenges of conducting research in this burgeoning industry.

Literature Review

Innovation and the theory of innovation

Different authors have contributed to the development of the theory of innovation (Barras, 1986; Litz and Kleysen, 2001; Nelson and Winter, 1977; Schumpeter, 1939; Sundbo, 1998; Tornatzky and Klein, 1982). In summarising Schumpeter’s (1939) pioneering work, Sweezy (1943) explains that innovation is a function or activity among entrepreneurs; hence, one of the characteristics of entrepreneurs is appreciating the possibilities of innovation. More importantly, entrepreneurs must have leadership qualities, by being capable of overcoming social and psychological resistance standing in their way (Sweezy, 1943).

Aligned with these notions, Nonaka and Kenney (1991) present two Japanese corporations as model cases of innovation, emphasising the role of a leader, arguably an individual with strong entrepreneurial traits, who catalyses and seeks to maximise the creation of information. Nonaka and Kenney’s (1991) reflections also suggest the reconceptualisation of the innovation process, namely, as human activities based on information creation. Furthermore, they theorise that emphasis should be placed on synthesis and emergence, whereby analogies or metaphors can be more useful than proofs or syllogisms. Nonaka and Kenney (1991) agree that, should this theorisation be correct, the task of firms’ management is to create an environment where information creation and innovation can develop and grow, followed by enabling its transition throughout the organisation. Moreover, the transformative capability or “burst of energy [of innovation]... is a powerful stimulus to propelling the company forward” (Nonaka and Kenney, 1991, p. 81).

The work of Downs and Mohr (1976, 1979) is very significant to this research; it proposes a clear theoretical foundation attempting to facilitate the understanding of firm innovation. First, these authors conceptualise innovation “as a quantified dimension of behavior” (Downs and Mohr, 1979, p. 395). Concerning the adopting agent or organisation, behaviour underlines ‘innovativeness’, whereas “as a property of the diffusing idea” (Downs and Mohr, 1979, p.

395), behaviour emphasises 'adoptability.' Hence, it could be suggested that organisations are innovative when they are quick or extensive adopters of new ideas (Downs and Mohr, 1979).

Downs and Mohr (1979) refer to earlier contributions (Rogers and Shoemaker, 1971; Zaltman et al., 1973) when they recommend the theoretical separation of two key stages in innovation processes, namely, 'diffusion' and 'adoption.' The diffusion stage concludes when prospective adopters have become aware- or have heard- of a new idea which might benefit their organisation. The adoption stage starts at the initial moments of awareness, and remains until a decision has been made regarding the actual adoption by the organisation (Downs and Mohr, 1979).

Another key construct in the work of Downs and Mohr (1979) concerns the 'fair-trial point', which highlights the level or degree of use at which adopters may have accumulated sufficient experience with the innovation, and are able to accurately assess its benefits and costs. In emphasising a benefit-cost approach, Downs and Mohr (1979) suggest that, based on previous research, resources are very important in innovation related studies. For example, when costs are associated with innovation, resources can become stable and better predictors; therefore, in the innovation decision process, costs must be taken into account "in the list of descriptors" (Downs and Mohr, 1979, p. 391). At the same time, Downs and Mohr (1979) highlight the usefulness of various dimensions in innovation processes, with clear implications for theory development. Indeed, the authors hypothesise innovation as a function of:

1) *Benefits*: while the motivations behind innovation at organisational or individual level are numerous, invariably, benefits appear to fall into the following categories:

Programmatic: these benefits highlight increased efficiency and effectiveness in completing externally related objectives. In the private industry, these types of benefits are often related to profit (Downs and Mohr, 1979).

Prestige: benefits of approval and recognition that organisations or their members can gain by becoming earlier- as opposed to later- adopters of new technologies and/or programs.

Structural: "purely internal benefits" (Downs and Mohr, 1979, p. 394), including improved internal relationships or higher employee satisfaction.

2) *Costs*, divided into:

Decision, or costs of making decisions to implement, or not implement, an innovation. Moreover, if a favourable decision was made, the rate or extent of such implementations should also be assessed. In terms of operationalisation, decision costs should be further divided into costs of managerial/technical skill time, costs of having access to new information, or those related to the disruption of a firm's status quo, labelled as "internal social costs" (Downs and Mohr, 1979, p. 397).

Implementation costs: these costs are intrinsically related to implementing the innovation and to the previously mentioned fair-trial level. Various sub-categories emerge within implementation costs, including manpower, equipment, or external versus internal social costs.

3) *Resources*: Downs and Mohr (1979) explain that many studies have acknowledged the relevance of resources in models of factors of innovation, and suggest five categories of resources to be considered: wealth, information, equipment, employees' tolerance for change, and manpower (time, expertise). From decision makers' points of view, the extent of available resources possessed by organisations critically depends on what changes are considered.

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4 4) *Discounting factors*: Downs and Mohr (1979) suggest that, even when two separate
5 organisations assess costs and benefits in equivalence, there is no certainty that their response
6 to innovation will be the same. In fact, the values that organisations attach to costs and
7 benefits tend to vary. The authors identify five key factors that decision makers need to
8 consider with regard to resources, benefits or costs: a) Risk: Extent of concern over potential
9 catastrophic outcomes, b) Average cost of discontinuing an innovation, namely, between no
10 adoption and fair-trial level of adoption, c) Uncertainty, or when the organisation lacks
11 confidence in its benefit-cost estimates, d) Instability in future streams of benefits: concern
12 that the benefit-cost estimates will fall below fair-trial levels due to obsolescence or
13 depreciation, and e) Venturesomeness: The propensity of organisations' decisions makers to
14 ignore uncertainty and risk.
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17 Finally, earlier research (Downs and Mohr, 1976) proposed two attributes of innovation:
18 primary and secondary. While the primary presents various characteristics, including cost of
19 the innovation (high versus low), secondary attributes include a firm's relative advantage and
20 compatibility, and may differ from one organisation to the other (Downs and Mohr, 1976).
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23 *Craft brewing and innovation*

24 Despite the increasing significance of craft breweries as an alternative to mass produced beer
25 (Bastian et al., 1999), research on innovation in this industry is almost inexistent. However,
26 various authors suggest aspects intrinsically related to innovative practices. For example, a
27 study conducted in the United States (Bastian et al., 1999) highlights craft brewers' emphasis
28 on originality and uniqueness, targeting a niche market through production for a small, yet
29 specialised consumer segment (Bastian et al., 1999). Not surprisingly, craft breweries'
30 volume share market has been consistently increasing (Brewers Association, 2015b).
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33 Further, research conducted among Spanish beer consumers (Calvo Porral and Levy-Mangin,
34 2013) reveals that, perceived quality, particularly of locally produced beers, is a key factor in
35 consumers' assessment of brand value. While unrelated to craft beer production, this finding
36 has nevertheless significant implications. Indeed, through innovative practices resulting in
37 perceived higher product quality, added to local production, craft breweries could
38 progressively grow market share and awareness among consumers. This notion is partly
39 supported by Tremblay, Iwasaki, and Tremblay (2005), who posit that domestic craft brewers
40 are able to provide fresher products to consumers, as opposed to imported products, and can
41 cater better to both local and regional tastes.
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44 Comparatively, two studies from the wine industry clearly highlight different ways of
45 innovating. The first, conducted in Germany (Harrington and Ottenbacher, 2008) identified
46 for instance, the incorporation of modern equipment and techniques, or generation of new
47 ideas. The second study (Doloreux, Chamberlin, and Ben-Amor, 2013) revealed strong
48 involvement in process, product, and organisational innovations among Canadian wineries.
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51 *The study's aims, research questions*

52 One fundamental objective of this exploratory study is to address some of the previously
53 identified knowledge gaps (e.g., Cabras et al., 2011; Murray and Kline, 2015). Second, in
54 examining the perspectives of owners, brewers, and directors/employees of micro and small
55 craft breweries on innovation-related aspects, the study seeks to contribute to the micro and
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small business and craft brewery literature. The following research questions (RQs) are addressed:

RQ1: What do participants understand by 'innovation' in the context of their industry?

RQ2: To what extent are they involved in innovative practices?

RQ3: To what extent does participants' involvement in innovation differ based on various demographic characteristics, including:

The country where the craft brewery is located?

The role of the participant (e.g., owner, brewer, director/employee)?

Given the identified paucity of research, new and added information emanating from addressing the questions above could be of value to different craft beer industry, government, and research stakeholders. For example, the extent to which participants may be involved in innovation, or the way they understand innovation, could be of relevant help to individual business owners, business associations, and/or representatives from other industries, advocacy groups, and government agencies. Moreover, this information could be considered by future micro and small entrepreneurs, or by business development agencies, in designing supporting plans and initiatives to help build micro-small firm entrepreneurship. In addition, the findings could encourage further investigations into under-researched areas of innovation. From a theoretical perspective, the adoption of the theory of innovation (Downs and Mohr, 1976, 1979) represents a further contribution, helping illuminate and facilitate understanding in this as well as in future research.

Methods

This exploratory study contributes to the literature on micro and small businesses, innovation and craft brewing entrepreneurship, investigating 187 craft brewery owners, managers, and directors/employees adopting the theory of innovation. The craft brewing industry is chosen for various reasons, including its recent significant growth. In fact, recent figures from Brewers of Europe (2015) document the rising number of breweries in European Union countries, including microbreweries. Such growth is also identified within the three studied countries; whereas in 2009 there were approximately 27 microbreweries in Spain, 240 in Italy, and 694 in the UK, by 2014 these figures grew to 314 (Spain), 585 (Italy), and 1,414 (UK).

The rapid expansion of micro and small craft brewing firms, resulting in the emergence of craft brewing entrepreneurship of the industry, the implications of these phenomena for innovation, coupled with the dearth of knowledge regarding innovation among these types of firms (de Mel et al., 2009), and the craft brewing industry (Danson et al., 2015; Murray and Kline, 2015) were key motivating factors to conduct this exploratory research. This investigation, however, is part of a broader project that addresses other areas of this industry. However, given their multiplicity, these areas are beyond the scope of this study and may be examined in future studies.

Given the international, cross-country focus of the study, a mix methods approach was deemed as the most applicable methodology. In this process, the perceptions of craft brewery operators were gathered via online questionnaires and interviews (telephone, face-to-face). According to Johnson, Onwuegbuzie, and Turner (2007), "Mixed methods research... is an approach to knowledge" (p. 113), attempting to consider multiple positions, standpoints (of qualitative and quantitative research), and perspectives. Further, mixed methods research

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3 includes both qualitative and quantitative methods to address research questions; moreover, it
4 constitutes a synthesis that encompasses ideas from quantitative and qualitative research
5 (Johnson et al., 2007).
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7 In the absence of existing (to the authors' knowledge) comprehensive, country-wide craft
8 brewery firm email listings, the research team collated a total of 926 addresses across Spain
9 (212), Italy (282) and the UK (432) through searches in various websites (e.g.,
10 www.mondobirra.org; siba.co.uk; www.cervezasnacionales.es). Importantly, these countries
11 are among the six with most microbreweries in the EU (Brewers of Europe, 2015). In
12 addition, the researchers' background knowledge of the country and industry, as well as
13 familiarity with local language and culture, especially in the cases of Italy and Spain, were
14 fundamental reasons for choosing the three nations.
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17 Group and individual messages were sent in May of 2015 to the identified email addresses in
18 the corresponding languages of each country. The body of the messages provided a summary
19 of the study, including its objectives, and formally invited recipients to follow a URL link
20 provided in the message. This link directed users to an online questionnaire, which was
21 divided into several sections, the first gathering demographic information (Table 1), the
22 second participants' definitions of innovation in the context of the brewery firm (Table 2),
23 and the third their level of agreement concerning items related to innovation and their craft
24 brewing operation (Table 3). Section 3 used scaled items, whereby 1 represented 'strongly
25 disagree', and 5 'strongly agree'. Various studies on innovation among micro and small firms
26 in the craft brewing industry (Cabras and Bamforth, 2015; Danson et al., 2015; Kleban and
27 Nickerson, 2012) were considered in the process of developing these last two sections.
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31 While different authors have discussed weaknesses in gathering data via online
32 questionnaires, particularly regarding low response rates (e.g., Bardach et al., 2015), given
33 time, human resource, and financial constraints, this approach was favoured over sending
34 paper questionnaires, or conducting telephone or face-to-face interviews with hundreds of
35 potential participants. However, interviews were adopted when gathering complementary
36 data. Indeed, the authors identified an additional 24 craft breweries in Spanish (8), Italian (6),
37 and UK (10) regions. Interviews with 24 individuals operating these firms were conducted
38 between July and September of 2015. Through the online questionnaires, 163 useful
39 responses were collected between May and July of 2015, while 106 messages (Spain: 33,
40 Italy: 44, UK: 32) were returned undelivered. Thus, a 19.9% response rate was achieved
41 (163/820). Together with the 24 interviews, 187 useful responses were gathered, a 22.2%
42 overall response rate (187/844).
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45 The collected quantitative data were exported into SPSS; different statistical analyses
46 (Scheffé post hoc, independent samples t-test) were used as applicable to test potential
47 statistically significant inter-group differences. The qualitative data were transcribed by
48 members of the research team, who are bilingual and trilingual (English, Italian, and Spanish).
49 Word association (Roininen et al., 2006) and qualitative content analysis (Hsieh and Shannon,
50 2005; Schreier, 2012) were used when identifying keywords and themes emerging from the
51 data. In the following sections, verbatim comments will be coded as P1SP (Participant 1,
52 Spain), P1IT (Participant 1, Italy), and P1UK (Participant 1, UK).
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55 *Demographic characteristics: participants and their firms*
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Table 1 illustrates that just over two-thirds of participants were owners, and that 73.1% of the firms produced 100,000 litres of craft beer or less. Nearly half (48.4%) were recently established, and only 16% have existed for 21 or more years, predominantly UK breweries. All participating craft breweries fit the ‘micro’ and small size according to the definitions of the European Commission (2015). Moreover, nearly three-fourths of the firms employed between one and nine people, and 95.1% nine or less. Clear differences were also identified in terms of the gender of participants, as well as regarding exports versus no exports. The demographic characteristics gathered from interviewees identified similar patterns, namely, in terms of participants’ role, the brewery’s volume of production, number of employees, years of establishment and involvement/no involvement in exports. In contrast, only one female operator participated in the interviews.

Table 1 Here

Results

RQ1: How participants define innovation

Using content analysis and word association, several common themes emerged between the country where participants operate, both from the online questionnaires and interviews, and their definitions of innovation in the context of their craft brewery (Table 2). In fact, participants from all three groups perceived innovation to include the development of new recipes, and exploration of new ingredients. Similarities were also noticed between Spanish and UK participants, with the development of new styles/flavours being much more significant than for Italian participants, who only indicated this element on three occasions. Interestingly, only Spanish and Italian participants mentioned quality improvements and/or product development as ways of innovating, whereas this definition was only considered by two UK participants. The quality aspect, as well as the range of craft beers on offer, were found to be significant elements in previous academic research (Cabras and Bamforth, 2015). Furthermore, whereas new production processes and methods appeared to be important for Italian and UK participants, these elements seemed to be rather marginal for Spanish operators.

Table 2 Here

As illustrated, participants from the three countries also provided different keywords and definitions of innovation. In fact, the Spanish group considered differentiating and uniqueness as their first definition/keyword, clearly suggesting the intention to avoid any product resemblance with industrial beers. Among these individuals, P1SP’s comment identified the operationalisation of innovation and how it was understood: “[We are innovating] through differentiation, with a product that has a different flavour and image to those fashions, yet is still attractive to consumers.” In addition, P2SP reflected: “[Innovation is] trying to provide a level of differentiation in all aspects: image, marketing, ingredients...”

While adoption of new technologies, mechanisation, and/or tools was perceived to be a way of innovating for Italian operators, they were not considered among the other two groups. P1IT, for example, emphasised the importance of these elements in combination with other notions of innovation: “Innovation is the search for qualitative improvements, the possibility to access transformational technologies, and new working tools.” Another comment (P2IT) also identified the aspect of technology (P2IT): “Innovation means technological improvements that allow for quality improvements due to a better control of the [brewing] process.” In contrast to Italian or Spanish operators, the marketing aspect of craft brewing,

namely, between the craft brewery and the end consumer, was highlighted by eight comments from UK participants, with P1UK, for instance, indicating: *“Awareness of the changing public tastes and being able to cater for that.”*

RQ2: Extent to which participants are innovating

A list of eight items that followed a Likert-type scale, where 1= strongly disagree and 5= strongly agree, was designed to ascertain ways in which the online participants were innovating (Table 3). As illustrated, only two means were close to the agreement level (mean= 4). Aligned with many participants’ definitions of innovation (Table 2), creating new beer recipes was the most agreed upon way in which firms were innovating. Importantly, while only occasionally mentioned in their definitions, the significance of social media as a marketing tool was clearly the second item participants agreed most upon. This finding was more noticeable (four cases) during the telephone interviews with UK participants, including P2UK: *“We use social media (Facebook and Twitter) for promotion of our products in the local area,”* and P3UK: *“We find that social media is a fantastic marketing tool and actually get orders through them.”*

The usefulness of social media as a marketing tool has been documented by various researchers in the craft brewing industry (Cabras and Bamforth, 2015; Kleban and Nickerson, 2012). Kleban and Nickerson (2012), for example, discussed the changing environment where nano, macro, and large breweries are competing. Whereas earlier financial resources were a key factor for a company to have the upper hand in terms of marketing efforts, today the social media phenomenon has brought breweries of all sizes “to a common battlefield” (Kleban and Nickerson, 2012, p. 74). Further, Kleban and Nickerson (2012) concluded that firms strategically using “these networking resources, will prevail” (p. 74).

Another important aspect was the consideration of tourism related activities within the context of innovation; this aspect was reflected in various comments:

P3SP: Now there is an increasing movement towards pairing food and craft beer. In fact, one of our beers is designed to be consumed with food pairings. We also work... with a chef who created a pairing guide with some of our beers...

P3IT: There are places [in Rome] where matching the beer with food is becoming common practice...

P4UK: Food pairing with beer initiatives are organised [at the brewery]. We collaborate with local restaurants.

At the other end, and given the micro-small size of the breweries, buying heavier machines/equipment appeared to be only a marginally considered way of innovating. However, purchasing equipment/machinery, such as copper tanks, applies in the context of craft brewing entrepreneurship, and is illustrated in a previous case study (Cabras and Bamforth, 2015).

Table 3 Here

RQ3: Involvement in innovation and inter-group differences

An analysis conducted for the eight-item scale (Table 3) measuring involvement in innovative practices resulted in a .777 Cronbach’s Alpha, and was therefore found to be reliable. Subsequently, tests were carried out to identify any potential statistically significant

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3 differences between the resulting means (Table 3) and the different demographic
4 characteristics shown in Table 1. The statistically significant differences illustrated below
5 (Table 4) clearly demonstrate a 'country divide.' Overall, UK participants appeared to agree
6 less than did participants from Italy and Spain. In fact, while various comments from UK
7 participants highlighted the value of combining craft beer and food/gastronomy, the mean
8 (2.85) underlines a rather low level of consideration. Similar outcomes were noticed regarding
9 developing new working processes and production techniques, and buying heavier
10 machines/equipment. In contrast, in terms of creating new recipes, and despite the lower mean
11 (3.62), the UK group was to some extent considering this aspect. Improving the label of the
12 beer bottles (mean=3.42) was an area in which UK participants agreed more than did their
13 counterparts, particularly the Spanish group.
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Table 4 Here

When the role of the participants and the same items were tested, Scheffé post hoc identified that the brew masters/brewers group clearly agreed more than the other groups (owner, director/employee) regarding four items. In particular, the group's consideration of developing new working processes was much higher (mean=4.06), and was followed by developing new production techniques (mean=3.88). Arguably, one reason for these results may be the higher level of awareness of brew masters/brewers of existing equipment needs, as well as of work flow organisation and process management-related activities, as opposed to owners, directors or employees, who may focus on other areas of the brewery instead. This assumption is partly substantiated by the lack of statistically significant differences in the four other items concerning involvement in innovative practices.

Those participants representing craft breweries established in the last three years indicated higher levels of agreement with regard to involvement in gastronomic activities. Based on this result, it could be assumed that individuals who started their craft brewing businesses more recently may be more aware of latest trends in this industry, including food and beer pairings, and may be more inclined to consider these. In addition, the higher the craft beer production, the stronger participants' agreement with improvements on the label of the beer bottles as a form of innovating (Table 5). This finding suggests that, as the volumes of trade or sales increase, the firms' ownership may pay more attention to the presentation and image of the craft beer bottles.

Table 5 Here

Statistically significant differences also emerged when ways of innovating were compared with involvement in exports. Participants exporting craft beer clearly agreed more (mean=3.45) concerning 'Buying new machines/equipment (heavier)' than those who did not export (mean=2.80) ($p<0.001$). Stronger agreement was also noticed within the exporter group (mean=3.61) compared to non-exporters (mean=3.24) regarding 'Developing new working processes' ($p<0.050$). The larger production batches to satisfy overseas demand for craft beer, and the need to have more rigorous, structured, or formal working processes may be factors justifying these findings.

Discussion

Various associations were identified between the findings, the literature on innovation, and the theory of innovation, highlighting the usefulness of the theory in enhancing the

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3 understanding of innovative initiatives and practices among craft brewery operators. Figure 1
4 proposes a refinement of the theory of innovation in the context of the study's findings.
5 Fundamentally, participants' own definitions of innovation (Table 2), particularly with regard
6 to the development of new styles/flavours, new craft beer recipes, new production processes,
7 methods, differentiating, updating or being aware of consumer trends and changes, and
8 exploration of new ingredients underline strong links with earlier literature. For example, and
9 in line with Sweezy (1943), while in many cases the definitions arguably represent a 'wish-
10 list' among participants, they nevertheless suggest an appreciation for the possibilities
11 provided by innovative initiatives and practices.
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14 The findings above also underline participants' involvement and interest in information
15 gathering, and information creation (Nonaka and Kenney, 1991). Further, the micro and small
16 size of the craft breweries in this study, which translates into only one or very few decision-
17 makers, provides a favourable environment where innovation and information creation are
18 generated, nurtured (Nonaka and Kenney, 1991), and operationalised, including through trial-
19 and-error activities. These key elements help equip firms with important tools that may lead
20 to the 'powerful stimulus' Nonaka and Kenney (1991) refer to.
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22
23 Figure 1 Here
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25 Concerning the theory of innovation, an association between the 'fair-trial point' proposed by
26 Downs and Mohr (1979) and the findings (Table 3) became evident, namely, in that craft
27 brewery operators appeared to be accumulating knowledge/experience through the continuous
28 development of new craft beer recipes. A similar point can be made regarding the use of
29 social media. In both cases, a cost-benefit approach must be considered, specifically in terms
30 of financial, time, human resources, opportunity costs, and even emotional investments/costs.
31 Miller and Le Breton-Miller (2006), for instance, refer to emotional attachment to describe
32 the devotion of many family executives, who are "deeply concerned about the future of their
33 enterprise" (p. 80). Given the small size of the participating businesses, and the argument that
34 micro and SMEs generally have very limited resources (Aragón-Correa et al., 2008; Kelliher
35 and Reinl, 2009), emotional investments/costs appears to fit in the context of the findings.
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38 Despite the rather low means (Table 3), the diffusion and adoption stages of innovation
39 (Downs and Mohr 1979), also emerged from the findings. In fact, the comments made by UK
40 participants of updating their knowledge and awareness of consumer trends, or the apparent
41 involvement in culinary/tourism activities, predominantly among Italian and Spanish
42 participants, illustrate alignments with the diffusion stage, as well as with the actual adoption
43 of these activities. Finally, the two attributes presented by Downs and Mohr (1976) also
44 became apparent. The primary attributes, for example, are postulated as those costs of
45 implementing different innovative initiatives, and are also linked to the cost dimension
46 (theory of innovation). Secondary attributes, on the other hand, are hypothesised as possible
47 outcomes from implementing those initiatives, and potentially contributing to differentiation
48 and competitive advantage.
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52 Overall, the findings are strongly associated with the four dimensions presented by Downs
53 and Mohr (1979). First, and based on the definitions of and involvement in innovation, as well
54 as on some of the comments (P1IT, P2IT), the programmatic perspective seems to fit with the
55 findings. In fact, future growth in sales and revenues, improvements in terms of higher
56 quality/volume of production, more efficiencies, and better product positioning/marketing are
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3 some of the most obvious benefits. Prestige benefits in the form of enhanced brand image
4 could be an important benefit from involvement in innovation, whereas, given the small size
5 of all participating firms, structural benefits do not seem to represent a significant factor.
6 P4IT's comment in part supports this point: *"We invested in new equipment for the*
7 *production cycle, and the brewery is now fully automatised, which means one person is*
8 *sufficient to control the whole production. Similarly, we have new bottling machinery, and*
9 *only one person suffices to oversee this process."*

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12 Second, participants' perceived ways of innovation differently (Table 2), and their actual
13 involvement (Tables 3-5) aligns with Downs and Mohr's (1979) conceptualisation of decision
14 and implementation costs. Moreover, from creating new recipes and making quality
15 improvements, to buying new machines/equipment, innovation as presented (Table 3) would
16 demand both of those costs. However, as suggested earlier, the significance of emotional
17 investments, and therefore costs, could also be proposed in this context. In addition,
18 emotional investments/costs **could be influencing factors that also align to** the costs
19 dimension.
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22 Third, and in agreement with Downs and Mohr (1979), the resources dimension is to a great
23 extent demonstrated. In fact, the face-to-face interviews allowed for on-site observations, and
24 for gathering extended comments from participants, demonstrating its significance, especially
25 regarding costs to gather information (consumer research), purchase equipment or expand into
26 larger spaces/facilities, or provide/pay for manpower. For example, P4SP highlighted the
27 opportunity costs craft breweries face after investing on key resources: *"Breweries have lots*
28 *of fixed costs... we brew some four days a month, and the other days the equipment is idle..."*
29 In this case, the owner (P4SP) was looking for new markets to fully utilise the available
30 resources.
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33 Wealth, one of the five categories of resources proposed by Downs and Mohr (1979) only
34 marginally appeared to be a factor in this study, with only on isolated case (P5SP) underlining
35 this category: *"We are different in the sense that we finance ourselves. My brother worked for*
36 *a large company, and I worked in the banking industry for 30 years..."* In contrast P5IT
37 commented on the financial commitments to start and operate his brewery (100,000 Euros),
38 with each business partner investing 20,000 Euros. This participant reflected: *"This [craft*
39 *brewery] is not only a financial commitment, but also a time commitment... see? Today is*
40 *Saturday, and rather than being at home with my young family I am here... I have to be here,*
41 *otherwise the work will not be done."*
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44 The last dimension, discounting factors, to a great extent also applies to this research. Indeed,
45 the findings (Tables 2-5) suggest associations with some of five factors proposed by Downs
46 and Mohr (1979), and are further complemented by observations and comments gathered
47 during the interviews conducted at Italian and Spanish breweries. For example, risk is
48 associated with the findings, as all firms are small, and, as previous comments illustrate, some
49 investments can be substantial (P5IT), or have no full utilisation (P4SP). For small **operators,**
50 **failure to recuperate** the investment could indeed spell financial disaster. Instability could also
51 be suggested in the context of the findings; several interviewees noted **increasing** saturation of
52 the emerging craft brewing market, with P5UK commenting: *"[There is] fierce competition*
53 *due to the amount of people setting us craft breweries... People think there is a lot of money*
54 *to be made from craft brewing; however, there is not."* **As PIIT's comment illustrates, there**
55 **is awareness of the contributions** to be made through innovation in this area: *"Innovation is*
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3 *also the capacity to open up new markets, and manage new commercial dynamics that are*
4 *created in these processes... ”*
5

6 **Conclusions**

7 This exploratory study contributed to the literature on innovation among micro and small
8 firms, as well as to the literature on craft brewing and the theory of innovation. The study
9 adopted a cross-country approach and the theory of innovation to examine participants’
10 definitions of innovation, actual involvement, and to contrast this involvement to various
11 demographic groups.
12

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14 The findings identify several associations between the definitions provided by the respondents
15 and the literature on innovation (Downs and Mohr, 1979; Nonaka and Kenney, 1991).
16 Similarities in the definitions provided by respondents of the three countries were identified;
17 for instance, the development of new craft beer recipes was common across the three groups.
18 **Differences were** also noticed, with the Italian and Spanish groups emphasising knowledge
19 creation (Nonaka and Kenney, 1991), new ideas and processes, and overall problem-solving
20 strategies (Kanter, 1983), including new production processes/methods, quality
21 improvements, product development, and exploration of new ingredients. Developing new
22 recipes, as well as involvement in social media and in gastronomy/tourism appeared to be
23 main areas where innovation **could be** operationalised. When comparing ways of innovation
24 against demographic characteristics (participants, breweries), various statistically significant
25 differences emerged, particularly based on the country of participants, and their role in the
26 brewery. These findings also highlight differences in perceptions and implementation of
27 innovative initiatives, with potential value for existing or new craft brewery operators.
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31 The findings also align with the dimensions of the theory of innovation Downs and Mohr
32 (1976, 1979), which led to the proposed refinement of the theory (Figure 1). Of all benefits
33 Downs and Mohr (1979) propose, programmatic (improved efficiencies, more sales) and
34 prestige (brand image) are clearly reflected in the findings. The cost dimension is suggested in
35 all the tangible (financial) as well as intangible (time, effort) investments participants
36 undertake to develop new recipes or purchase equipment. The different categories of
37 resources (Downs and Mohr, 1979) also become apparent in the findings, for example, in
38 terms of information, equipment, and manpower. Finally, the validity of discounting factors is
39 particularly visible in the suggested risks, uncertainty, and instability of future potential
40 benefits of innovation.
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43 *Implications*

44 From a practical perspective, the findings underline the creative, yet dynamic and challenging
45 nature of craft brewing, where production skills must be matched or balanced with quality
46 control, continuous exploration for ‘newness’ (novelty, ingenuity, creativity), or
47 marketing/promotional knowledge. This balance may not only provide a foundation for
48 differentiation, but also be a means to craft breweries’ long-term sustainability or even
49 survival. In fact, the phenomenal growth of the industry in many countries, whereby along in
50 the European Union a substantial growth in the number of microbreweries has been noticed
51 between 2009 and 2014 (Brewers of Europe, 2015), may mean that, while many craft brewery
52 operators may be capable of surviving in an increasingly crowded environment, many others
53 **may abandon.**
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Hence, a fundamental implication, which also emerges in the findings, is associated with the aspect of 'newness', or the continuous generating of new ideas, and focusing on problem-solving (Kanter, 1983), illustrated in the existing demands of this burgeoning industry. At the same time, the case of the craft brewing industry also has implications for micro and small enterprises in emerging as well as in more established industries. Implications include the need to continuously innovate through knowledge/information gathering, and further develop, evolve, and match the continuous challenges posed by an increasingly competitive business environment (Zhang, Barbe, and Baird, 2015).

From a theoretical viewpoint, through the adoption of the four dimensions proposed by Downs and Mohr (1979), the theory of innovation significantly contributed to the research, facilitating knowledge and understanding regarding innovative practices and initiatives considered by the participants. One illustration concerns programmatic and prestige benefits that find alignment in the context of micro and small business operators. Another illustration underlines the significance of decision and implementation costs, which are also associated with the findings.

However, an argument is made regarding the validity of considering emotional investments/costs as an important factor complementing decision and implementation costs. As previously suggested, micro and small enterprises may be exposed to financial and other forms of vulnerability, including from external sources (Aragón-Correa et al., 2008), which would inevitably have implications for operators' emotional investments/costs. Emotional investments/costs could also be considered in the resources dimension, also complementing Downs and Mohr's (1979) suggested five categories. Finally, the proposed refinement (Figure 1) could be considered as a point of departure when examining innovation among micro and small firms in emerging industries.

Limitations and Future Research

Various limitations are acknowledged in the present study. For example, the participants from each of the three countries only conform a fraction of the existing craft breweries. This limitation is further compounded by fluctuating numbers of craft breweries entering as well as leaving the industry during and after the study. The fact that other European countries with significant numbers of craft breweries (e.g., Germany, France, Switzerland) were not included represents an additional limitation. Therefore, the generalisability potential of this exploratory study with regard to both the participating countries or to other European countries may be limited. However, this study, which constitutes a first cross-country exploration into an emerging industry, provides useful insights into the field of innovation, as well as practical and theoretical implications.

Hence, future research could gather data from other countries where the craft brewing phenomenon is growing, not only from Western Europe, but elsewhere, including in emerging (e.g., Brazil, Russia, China), or established markets (e.g., United States). The further development of the theory of innovation in the context of craft brewing could also facilitate more understanding of this area and industry, particularly through case and comparative studies. These studies' findings may help inform students, researchers/academics, government development agencies, and practitioners. Studies could also extend beyond innovation to investigate other entrepreneurial aspects, such as resource allocation, particularly financing, and test or adopt other theoretical frameworks. Finally, emotional investments/costs could be

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3 tested and confirmed or disconfirmed as part of the costs and resources dimensions (Downs
4 and Mohr, 1979).

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6 Overall, the impressive growth of the craft brewing industry, with all the attached
7 implications in terms of long-term business sustainability and resilience, provides fertile
8 ground for a number of research streams that could positively and significantly contribute to
9 this and other emerging industries.
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Table 1: Demographic characteristics of participants and their businesses

Characteristics	Italy		Spain		UK		Totals	
	n	% *	n	% *	n	% *	n	% *
Role								
Brewery owner	32	57.1	51	75.0	41	65.1	124	66.3
Brewing master (not owner)	10	17.9	5	7.4	4	6.3	19	10.2
Other (director, employee)	14	25.0	12	17.6	18	28.6	44	23.5
	56	100.0	68	100.0	63	100.0	187	100.0
Production in litres								
Fewer than 20,000 litres	19	33.9	28	41.2	16	25.4	63	33.7
Between 20,000 and 100,000 litres	24	42.9	30	44.1	19	30.2	73	39.0
Over 100,000 litres	13	23.2	10	14.7	27	42.9	50	26.7
Missing responses	0	0.0	0	0.0	1	1.6	1	0.5
	56	100.0	68	100.0	63	100.0	187	100.0
Years since the brewery exists								
3 years or less	20	35.7	47	69.1	23	36.5	90	48.1
Between 4-20 years	26	46.4	20	29.4	21	33.3	67	35.8
21 or more years	10	17.9	1	1.5	19	30.2	30	16.0
	56	100.0	68	100.0	63	100.0	187	100.0
Number of employees								
No employees	6	10.7	29	42.6	5	7.9	40	21.4
Between 1-9	47	83.9	39	57.4	52	82.5	138	73.8
Between 10-19	3	5.4	0	0.0	6	9.5	9	4.8
	56	100.0	68	100.0	63	100.0	187	100.0
Gender								
Male	50	89.3	62	91.2	55	87.3	167	89.3
Female	6	10.7	6	8.8	8	12.7	20	10.7
	56	100.0	68	100.0	63	100.0	187	100.0
Exports								
Yes	18	32.1	25	36.8	13	20.6	56	29.9
No	38	67.9	42	61.8	50	79.4	130	69.5
Missing responses	0	0.0	1	1.5	0	0.0	1	0.5
	56	100.0	68	100.0	63	100.0	187	100.0

* Percentages are rounded to the next decimal

Table 2: Conceptualisations of innovation using word association and content analysis *

Spain participants		
	n	% **
Differentiating, uniqueness (e.g., from industrial beer)	17	34.0
Developing new styles/flavours of craft beer ***	12	24.0
Developing new craft beer recipes ***	11	22.0
Quality improvements, product development ***	10	20.0
Exploration of new ingredients ***	8	16.0
New market development, conducting research	8	16.0
Italy participants		
	n	%
Developing new craft beer recipes ***	17	28.3
Exploration of new ingredients ***	15	25.0
Introducing new technologies/machineries/tools	13	21.7
New production processes, methods***	12	20.0
Quality improvements, product development ***	9	15.0
Creativity (e.g. combining ingredients, matching food with beer)	7	11.7
UK participants		
	n	%
Developing new styles/flavours of craft beer ***	13	24.5
New production processes, methods***	11	20.8
Being able to update (awareness of consumer trends/changes)	8	15.1
Developing new craft beer recipes ***	7	13.2
Exploration of new ingredients ***	7	13.2
'Re-invent' old methods of craft beer production	5	9.4

* More than one definition/keyword was possible. ** Percentages are calculated from 60 (Spain), 50 (Italy), and 53 (UK) participants. *** This definition is also used by another group of respondents.

Table 3: Extent to which participants are innovating – Online questionnaire

Ways of innovating	n	Mean	STD.
Creating new beer recipes	161	3.90	.882
Using social media (e.g., Facebook, Twitter, Instagram)	161	3.58	1.010
More involvement in beer/culinary tourism activities	161	3.47	1.209
Developing new working processes	161	3.35	1.068
Buying new machines/equipment for the brewery (light/medium size)	161	3.29	1.015
Developing new production techniques	161	3.18	1.095
Improvements on the label of the beer bottles (e.g., more information, different design)	160	3.07	1.255
Buying new machines/equipment (heavier)	161	2.98	1.159

Based on a 5-point scale, where 1= strongly disagree, 2= disagree, 3= neither agree nor disagree, 4= agree, and 5= strongly agree.

Table 4: Extent to which participants are innovating – Inter-group comparisons (1) *

Country of participant versus innovation	Country	n	Mean **	STD	Sig.
Creating new beer recipes	Spain	59	4.03	.809	.045(1,3)
	Italy	49	4.04	.789	
	UK	53	3.62	.985	.045(3,2)
More involvement in beer/culinary tourism activities	Spain	59	3.81	1.090	.001(1,3)
	Italy	49	3.71	1.099	.001(2,3)
	UK	53	2.85	1.215	.001(3,1) .001(3,2)
Developing new working processes	Spain	59	3.59	.873	.009(1,3)
	Italy	49	3.45	1.156	
	UK	53	2.98	1.101	.009(3,1)
Buying new machines/equipment for the brewery (light/medium size)	Spain	59	3.25	1.044	
	Italy	49	3.69	.871	.001(2,3)
	UK	53	2.94	.989	.001(3,2)
Developing new production techniques	Spain	59	3.39	.983	.006(1,3)
	Italy	49	3.41	1.79	.007(2,3)
	UK	53	2.74	1.112	.006(3,1) .007(3,2)
Improvements on the label of the beer bottles (e.g., more information, different design)	Spain	59	2.68	1.265	.007(1,3)
	Italy	48	3.17	1.155	
	UK	53	3.42	1.232	.007(3,1)
Buying new machines/equipment (heavier)	Spain	59	3.00	1.130	.006(1,2) .004(1,3)
	Italy	49	3.65	.805	.006(2,1) .001(3,2)
	UK	53	2.34	1.126	.004(3,1) .001(3,2)

* Using Scheffé post hoc. ** Based on a 5-point scale, where 1= strongly disagree, 2= disagree, 3= neither agree nor disagree, 4= agree, and 5= strongly agree.

Table 5: Extent to which participants are innovating – Inter-group comparisons (2) *

Role of participants versus innovation	Role **	n	Mean	STD	Sig.
Buying new machines/equipment for the brewery (light/medium size)	Owner	109	3.28	.982	.045(2,3)
	Brewer	16	3.81	.655	
	Other	36	3.06	1.170	
Buying new machines/equipment (heavier)	Owner	109	2.96	1.146	.020(2,3)
	Brewer	16	3.69	.602	
	Other	36	2.72	1.279	
Developing new production techniques	Owner	109	3.16	1.115	.046(1,2)
	Brewer	16	3.88	.619	
	Other	36	2.94	1.094	
Developing new working processes	Owner	109	3.35	1.083	.040(2,1)
	Brewer	16	4.06	.772	
	Other	36	3.03	1.000	
Production in litres versus innovation	Production ***	n	Mean	STD	Sig.
Improvements on the label of the beer bottles (e.g., more information, different design)	1	55	2.69	1.373	.006(1,3)
	2	62	3.08	1.164	
	3	42	3.50	1.065	
Years since the brewery exists versus innovation	Age ****	n	Mean	STD	Sig.
More involvement in beer/culinary tourism activities	3 y. and <	78	3.92	1.042	.001(1,2)
	4 y.–20 y.	57	3.11	1.220	
	21 y.+	26	2.88	1.177	

* Using Scheffé post hoc; ** Role - Other: Director/employee; *** 1= Fewer than 20,000 litres; 2= Between 20,000 and 100,000 litres; 3= Over 100,000 litres; **** 1= 3 years or less; 2= Between 4 and 20 years; 3= 21 or more years.

Figure 1: Proposed refinement of the theory of innovation in the context of the study

