Impact of the Craft Beer Revolution of the American Hop Industry

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Presentation to the 10th Annual Hop Seminar, Hillsboro, WI, February, 16 2019
Outline

• Background
• Growth of Craft Beer
• History of Hops in Wisconsin
• Hops Today: The Big Trends
• The Future?
Background

- 1985 – University of Glasgow – MA
- 1987 – Miami University – MA
- 1991 – Arizona State University – PhD

- Economic Geographer

- Since 2014 – interest in the craft beer industry
Craft breweries, adaptive reuse, and neighborhood revitalization

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Abstract
In recent decades, the number of craft breweries in the United States has increased dramatically, increasing from around a thousand in 1996 to over six thousand today. In order to minimize start-up and initial operating costs, many craft breweries have located in older buildings in economically dis-

Creativity, Community, and Growth: A Social Geography of Urban Craft Beer

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Received: 15 July 2016/Accepted: 10 March 2017
Background

• 2003-2010

• Worked with NW Ohio greenhouse industry

• Helped them address competitive challenges by organizing as an industrial cluster

• Co-founded Maumee Valley Growers
Background

• Not an expert on brewing
• Not an expert on hops
• Student of the brewing industry
• Consumer of Beer
Growth of Craft Beer
The Growth of Craft Beer

<table>
<thead>
<tr>
<th>Year</th>
<th>Share of Five Largest Firms (%)</th>
<th>Share of Ten Largest Firms (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1947</td>
<td>19.0</td>
<td>28.2</td>
</tr>
<tr>
<td>1954</td>
<td>24.9</td>
<td>38.3</td>
</tr>
<tr>
<td>1958</td>
<td>28.5</td>
<td>45.2</td>
</tr>
<tr>
<td>1964</td>
<td>39.0</td>
<td>58.2</td>
</tr>
<tr>
<td>1968</td>
<td>47.6</td>
<td>63.2</td>
</tr>
<tr>
<td>1974</td>
<td>64.0</td>
<td>80.8</td>
</tr>
<tr>
<td>1978</td>
<td>74.3</td>
<td>92.3</td>
</tr>
<tr>
<td>1981</td>
<td>75.9</td>
<td>93.9</td>
</tr>
</tbody>
</table>


Source: The Beer Institute and The Brewers Association
Beer Consumption Trending Down

U.S. Per Capita Beer Consumption
2010 to 2015 Gallons Per LDA Persons

Do you most often drink liquor, wine, or beer?
Based on those who drink alcohol

% Beer  % Wine  % Liquor


Gallup
Who’s drinking craft beer?

**WHO ARE THE DRINKERS IN 2016?**

**Millennials continue to account for a majority of the drinkers**

<table>
<thead>
<tr>
<th></th>
<th>Total Population 21+</th>
<th>Weekly Beer Drinkers</th>
<th>Weekly Craft Beer Drinkers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Millennials</td>
<td>29%</td>
<td>41%</td>
<td><strong>57%</strong></td>
</tr>
<tr>
<td>Gen Xers</td>
<td>25%</td>
<td>27%</td>
<td>24%</td>
</tr>
<tr>
<td>Boomers</td>
<td>35%</td>
<td>27%</td>
<td>17%</td>
</tr>
<tr>
<td>Matures</td>
<td>10%</td>
<td>5%</td>
<td>2%</td>
</tr>
</tbody>
</table>

**Women continue to be seriously under-represented**

<table>
<thead>
<tr>
<th></th>
<th>Total Population 21+</th>
<th>Weekly Beer Drinkers</th>
<th>Weekly Craft Beer Drinkers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>49%</td>
<td>74%</td>
<td>75%</td>
</tr>
<tr>
<td>Female</td>
<td>51%</td>
<td>26%</td>
<td><strong>25%</strong></td>
</tr>
</tbody>
</table>
Diversity is important
# The Craft Beer Drinker

<table>
<thead>
<tr>
<th>Explorer</th>
<th>Enthusiast</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Not interested in educating themselves on</td>
<td>• Strong appreciation for the brewing</td>
</tr>
<tr>
<td>craft beer</td>
<td>process and its history</td>
</tr>
<tr>
<td>• <strong>Wants to try new styles and flavors</strong></td>
<td>• Strives to educate themselves on all</td>
</tr>
<tr>
<td>• <strong>Makes an effort to visit many breweries</strong></td>
<td>aspects of the industry</td>
</tr>
<tr>
<td>• Experience of going to the brewery is</td>
<td>• <strong>Wants to try new styles and flavors</strong></td>
</tr>
<tr>
<td>second only to the quality of the beer</td>
<td>• <strong>Makes an effort to visit many breweries</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Loyalist</th>
<th>Novice</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Loyal to certain beers or brands</td>
<td>• New to the craft beer scene</td>
</tr>
<tr>
<td>• Know what they like</td>
<td>• Learning about craft beer</td>
</tr>
<tr>
<td>• Does not strive to try new styles and</td>
<td>• Influenced by friends</td>
</tr>
<tr>
<td>flavors</td>
<td></td>
</tr>
<tr>
<td>• Convenience important – local retailers</td>
<td></td>
</tr>
</tbody>
</table>

Source: Carpenter at al. 2013
Local is important

22% of beer drinkers said they think the importance of being made locally has grown over the last couple of years.
Neolocalism

• “the conscious attempt of individuals and groups to establish, rebuild, and cultivate local ties, local identities, and increasingly, local economies (Schnell 2013, p. 56)

• Craft breweries
  • are partly a response to the “smothering homogeneity of popular, national culture” (Schnell and Reese 2003, p. 46)
  • represent a desire on the part of increasing numbers of people to “reestablish connections with local communities, settings, and economies” (Schnell and Reese 2003, p. 46)
  • represent a “rejection of national, or even regional culture, in favor of something more local” (Flack 1997, p. 49)
History of Hops in Wisconsin
Early Hop Production

- Domesticated hops brought to the New World by
  - Dutch – brewing in New Amsterdam by 1624
  - British – brewing in Massachusetts by 1637

- Early commercial production
  - Early 1800s–late 1840s: Eastern Massachusetts & southern New Hampshire
  - 1840s-1910s: Central New York
    - 1860: New York accounted for 90% of American hop production (Vang 1996)
Hops in Wisconsin

• 1840-1910: Wisconsin had a thriving hop industry

• Many of the hop farmers were migrants from New York and New England

• 1850 census
  • 10 breweries, producing 18,820 barrels and 33,000 bottles of beer (Walsh 1972)

• Late 1860s
  • Wisconsin was producing 5,000,000 pounds of hops per year (US Census of Agriculture)
Hops in Wisconsin
Hops move west

• 1860s: Hop production started in the Pacific Coast states

• By 1909: western United States was the established leader (Edwardson 1952)

• 1910-1937: three primary hop-producing states were Oregon, Washington, California
  • Oregon – 50%
  • Washington and California – 25% each (Landis 1939)

• Factors driving decline in the East
  • Disease - downey mildew in 1909 and aphids in 1914
  • Wild fluctuations in prices
    • eastern farmers less risk averse; opted for “safer” commodities such as dairying, corn, & potatoes
  • Smaller hop farms could not achieve economies of scale
  • Changing consumer tastes – from English ales to German lagers – shrunk demand for Wisconsin hops
  • West coast – “fresh soils, cheap labor, and intercontinental railway connections” (Rumney 1997/1998)
Hops Today: The Big Trends
Craft brewers use more hops

- Macro-beer: 4 to 5 ounces per barrel
  - Craft beer – 5x(+) more
  - Style driven
  - Popularity of IPAs
- Craft brewers purchase about half of US hops
Hop Volume

Hops Stocks Held by Growers, Dealers, and Brewers, United States on March 1 (1,000 Pounds)

Sources: USDA 2014, 2016, 2018
"the level of bitterness in American beers has decreased in the last 10 years by maybe 20 percent and the whole flavor level has come down", making it “easier to drink large quantities without feeling full” (Joseph Owades, Director of the Center for Brewing Studies, 1982).

Source: Choi and Stack 2005
Increasing hop diversity

19 varietals reported

30 varietals reported
Increasing hop diversity

Four Hop Concentration Ratios, Washington, 2007 and 2017

<table>
<thead>
<tr>
<th>Hop Varietal</th>
<th>2007 Production (1,000 pounds)</th>
<th>Hop Type</th>
<th>2017 Hop Varietal</th>
<th>2017 Hop Production (1,000 pounds)</th>
<th>Hop Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zeus</td>
<td>13,448</td>
<td>Alpha</td>
<td>Cascade</td>
<td>10,399</td>
<td>Aroma</td>
</tr>
<tr>
<td>Columbus/Tomahawk</td>
<td>8,465</td>
<td>Alpha</td>
<td>Centennial</td>
<td>7,331</td>
<td>Dual Purpose</td>
</tr>
<tr>
<td>Williamette</td>
<td>5,881</td>
<td>Aroma</td>
<td>Simcoe</td>
<td>6,725</td>
<td>Dual Purpose</td>
</tr>
<tr>
<td>Galena</td>
<td>5,381</td>
<td>Alpha</td>
<td>Citra</td>
<td>6,371</td>
<td>Aroma</td>
</tr>
<tr>
<td>Total</td>
<td>33,167</td>
<td></td>
<td>Total</td>
<td>30,826</td>
<td></td>
</tr>
<tr>
<td>Percent of Total Production</td>
<td>71.1%</td>
<td></td>
<td>Percent of Total Production</td>
<td>39.1%</td>
<td></td>
</tr>
</tbody>
</table>

Source: USDA 2007, 2017
Shifting demand

• Alpha versus Aromatic/Dual Purpose Hops
  • Macro-brewers use primarily alpha hops
  • Craft brewers use more aroma and dual purpose hops

<table>
<thead>
<tr>
<th>Hop Type</th>
<th>2007</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alpha</td>
<td>73.2%</td>
<td>26.0%</td>
</tr>
<tr>
<td>Aroma</td>
<td>19.6%</td>
<td>40.0%</td>
</tr>
<tr>
<td>Dual Purpose</td>
<td>2.8%</td>
<td>25.9%</td>
</tr>
<tr>
<td>Experimental</td>
<td>0%</td>
<td>1.0%</td>
</tr>
<tr>
<td>Other varieties</td>
<td>4.4%</td>
<td>6.5%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source: USDA 2012, 2015, 2017
Geographic expansion of production

U.S. States Growing Hops, 2017

Top Six States Outside Pacific Northwest by Acres of Hops Harvested, 2013-2017

Source: Hop Growers of America, 2018
Wisconsin Hop Farms

Wisconsin Hop Farms

Source: Wisconsin Hop Exchange
Wisconsin Hop Customers

Source: Wisconsin Hop Exchange
Challenges

• Hop farming slow to take off
  • No state university-coordinated effort among brewers and growers to break down potential barriers to business
  • No research underway to determine best varieties for Illinois farmers to grow that might give them a competitive edge
  • Local farmers tend to grow more popular varieties that can be imported more cheaply from Pacific Northwest
    • Demand might exist for proprietary varieties of hops unique to the region
    • Local hops allow craft brewers to differentiate their product
  • Hop farmers and brewers have to communicate and collaborate
  • Must produce hops of sufficient quality in sufficient quantity

Despite craft beer boom, not much hoppin’ on Illinois farms
The Wisconsin Hops Harvest Partnership

• Brought together five experienced Wisconsin hops farmers (3 farms) in North Central WI to test the technical and economic feasibility of designing, building and sharing harvesting equipment specifically customized for small-scale hops production (2010-2012)

• Designed, built and tested small scale harvesting innovations
  • Developed and tested three custom harvesting machines that are affordable to build and reduce harvest labor
  • Piloted the use of shared harvesting equipment

• Results
  • Harvesting can be improved with small-scale harvest machine innovations, while maintaining consistent quality
  • Harvest times were reduced by more than 75%.
  • Sharing harvesting equipment is technically feasible
    • However, the economic and logistical issues make sharing equipment across spans of geography difficult and impractical
    • The sharing of equipment may still be viable, but the model of bringing equipment to more than one farm proved cumbersome

Source: USDA Sustainable Agriculture Research & Education
Northwest Ohio Greenhouse Collaboration Model

- Threats and Opportunities
  - Bottom-up Engagement
    - Open Membership
    - Democratic Decision Making
    - Shared Economic Responsibility

- Social Capital
  - Collective Efficiency
    - Absorptive Capacity
    - External Economies
    - Joint Action

- Common Economic Interest
  - Local Buzz
  - Global Pipelines

- Strengths and Weaknesses

- Higher Level of Competitiveness
Growth is Slowing

Annual growth of craft beer market in U.S. since 2008

Chart: KUNC • Source: Brewers Association • Get the data • Created with Datawrapper
Taprooms Key to Growth

"I think that’s one of the reasons why we see brewpubs and taprooms growing in popularity, because not only is it fresh and local, but you can look over the bar and see where it’s made (Bart Watson, Brewers Association)"

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**Tracking the Slowdown of In-Store Craft Beer Sales**

<table>
<thead>
<tr>
<th>Period</th>
<th>% Sales Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>52 weeks ended 11/7/2015</td>
<td>12</td>
</tr>
<tr>
<td>52 weeks ended 11/5/2016</td>
<td>10</td>
</tr>
<tr>
<td>52 weeks ended 11/4/2017</td>
<td>8</td>
</tr>
<tr>
<td>52 weeks ended 11/3/2018</td>
<td>2</td>
</tr>
</tbody>
</table>

Source: Nielsen Retail Measurement Services (XAOH + Liquor Plus + Convenience + Military)

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**Visitation to Nontraditional Food/Drink Establishments in the U.S. is on the Rise**

<table>
<thead>
<tr>
<th>Venue Type</th>
<th>Visitation Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>More</td>
<td>42%</td>
</tr>
<tr>
<td>About the same</td>
<td>47%</td>
</tr>
<tr>
<td>Less</td>
<td>11%</td>
</tr>
</tbody>
</table>

Respondents answered this question: “Have you visited the venue type more than in the previous year?”
Source: Nielsen CGA On Premise User Survey (Fall 2018)
Is the future hyperlocal?

We’ve seen the future, and it is hyperlocal craft beer

Austin's craft beer world is getting smaller: New breweries launch with hyper-local focus

TOP TRENDS FOR 2019

1. Cannabis/CBD-infused drinks
2. Cannabis/CBD-infused food
3. Zero-waste cooking (elevated cuisine using food scraps)
4. Globally inspired breakfast dishes
5. Global flavors in kids’ meals
6. Hyper-local (e.g. restaurant gardens, onsite beer brewing, house-made items)
7. New cuts of meat (e.g. shoulder tender, oyster steak, Vegas Strip Steak, Merlot cut)
8. Veggie-centric/vegetable-forward cuisine (e.g. fresh produce is star of the dish)
9. Chef-driven fast-casual concepts
10. Craft/artisan/locally produced spirits

Source: National Restaurant Association

Rolling Meadows Farm Brewery Brews Unique and Hyper-Local Craft Beer in Central Illinois

The family-owned brewery grows wheat, hops and more to produce beers like blood orange hefeweizen and strawberry-basil ale.
“A lot of our regulars are people who live within 10 blocks. It’s their local hangout. [Drinkers are saying] ‘I want that beer that’s made right down the street.’”

—Andy London, co-founder and brewmaster,
Good City Brewing, Milwaukee, Wis.

Hyper-local
Local is Better?

“the higher the percentage of sales that are local, the better the microbrewer’s performance” (p. 400).

“successful microbreweries are geographically focused, often producing specialized products with a strong local flavor”

“A possible limitation of the paper is its generalizability” (P. 401).
Hops and Terroir – An Opportunity?

Brewing Terroir: Unearthing the distinct regional flavor of hops
February 26, 2018 by Cezar Schenke

THE MIKKELER HOP TERROIR BEERS

Hop variety: Amarillo/Cascade
1. IPA - Terroir Series Amarillo Idaho
2. IPA - Terroir Series Amarillo Washington State
3. IPA - Terroir Series Cascade Australia
4. IPA - Terroir Series Cascade Germany
5. IPA - Terroir Series Cascade Washington State

Hop variety: Centennial/Sorachi Ace
1. IPA - Terroir Series Centennial Washington State
2. IPA - Terroir Series Centennial Belgium
3. IPA - Terroir Series Sorachi Ace Belgium
4. IPA - Terroir Series Sorachi Ace Northwest US

Harvest Date: Oil Content by Location 2010 Harvest

MIKKELER LAUNCHES TERROIR SERIES
December 12, 2017
- OFFICIAL PRESS RELEASE -
THE BREWERY EXPLORES DIFFERENT HOP VARIETIES AND THEIR DISTINCTIVE CHARACTERISTICS WITH THE NEW HOP TERROIR SERIES.
Communicate with the consumer
Thank You
www.thebeerprofessor.com