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BUILDING A SUCCESSFUL NANOBREWERY



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OPENING A NANOBREWERY TIPS FROM THE PROS

BY DAWSON RASPUPZZI

BREWER: NICOLE CARRIER THROWBACK BREWERY NORTH HAMPTON, NEW HAMPSHIRE

After homebrewing for a decade, Annette Lee, Head Brewer and Co-Founder of Throwback Brewery got her certificate in brewing from Siebel Institute while also doing an internship at Smuttynose Brewing in Hampton, New Hampshire. After that, she convinced me that with her aptitude for brewing and problem solving, and my background in marketing and business and my love of spreadsheets that we should open a brewery. It didn't take too much convincing.

We decided to start with a 3-barrel (93-gallon/350 L) system that Annette fabricated together from used tanks with the help of a local welder. We made that decision for several reasons. First of all, we wanted to bootstrap our business ourselves, so spending judiciously was always top of mind. Second, we wanted to test the market's appetite for our beers and our story. Finally, not to say that we had low expectations, but we certainly didn't expect to sell as much beer as we did! We were extremely and very pleasantly surprised as to how customers and our community supported us.

The biggest differences we found going from homebrewing to professional brewing were around yeast, packaging, and safety. How the yeast acts in 5-, 100-, and 500-gallons (19-, 380-, and 1900-L) is very different. It's not a direct scale up, and the same goes for pretty much all ingredients. When we were homebrewing, we would re-use yeast, but if you've never done that before, then you would need to learn about yeast management practices such as harvesting, tracking, and cell counting. I could spend hours talking about packaging! There is quite a difference from brewing a batch of beer and filling up your pony keg or gravity feeding into bottles for personal consumption versus packaging beer for distribution. Part of the learning curve around packaging



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One of the major advantages of being a small brewery is the freedom to explore various styles, ingredients, and specialty recipes across the spectrum in the world of beer

includes how to pour consistent fills, dealing with minimizing dissolved oxygen, labeling on wet bottles, and even choosing packaging equipment. Then there are new concerns like best practices around cleaning and maintaining that equipment. There are also safety concerns that homebrewers might not think about. Instead of a pot on the stove and pretty safe sanitization chemicals, you have hundreds of gallons of boiling wort, dangerous chemicals circulating in tanks much bigger than you, and high pressure along with a dozen other concerns.

My last pieces of advice to anyone looking to open their own nanobrewery is to get some professional brewing experience under your belt, even if it is just volunteering one day a week at a brewery where you are watching the brewing process, helping to dig out the mash tun, or bottling. Also, remember that opening a brewery is much more than just making great beer. Make sure you spend a significant amount of time on your brand — what do you stand for, what makes you different, why should customers want to buy from you? Be prepared for when the press calls. Finally, invest some time in social media. We've found that that is a very easy and cost-effective way to connect with our customers.

BREWER: SAM HARRIMAN SISYPHUS BREWING MINNEAPOLIS, MINNESOTA

I was sick of my corporate job and wanted to do something I enjoyed everyday, which is how I decided to open a nanobrewery. We started with a 2-barrel system. I wanted to create a system and business that my wife and I could manage on our own. We had been to enough nanobreweries around the country and our own state to know that this concept can work, despite what many people who have been in the industry for a long time may say.

There was definitely a learning curve, and I'll honestly say that we were lucky to overcome it. You can never have enough working capital when you are starting up. Factor in many, many months of working expenses. There will always be something to buy that will make your brewery better/more productive. It's important you have the cash in the bank to not worry about the day-to-day expenses and being able to focus on putting your cash flow to work for you right away. I've also learned that I would not want to work this type of brewery model if we were distributing. We are lucky to have enough business in our taproom that we don't need to explore the distributing business.

Anyone considering opening a brewery needs to understand the amount of work and time it takes. I think a lot of people do back of the envelope estimations, thinking "I'll brew two batches a week, and be open for this many hours, and everything will be great." People seem to overlook that each batch not

only needs to be brewed, but put into a brite tank or kegs, and carbonated, then you have to clean those tanks, order ingredients, maintain the books/paperwork. I was all-in from the start, and working 80- to 100-hour weeks for well over the first two years.

There are advantages to being small – one being that it lets us constantly change and rotate up our beers. We don't have the same tap list from week

**BREWER: JOHN ADKISSON
IRON JOHN'S BREWING
TUCSON, ARIZONA**

We have a 2-barrel system yielding 62-gallon (235-L) finished batches. It is fabricated from commercial soup kettles for our mash tun and hot liquor tank with 100-gallon (380-L) boil kettles and 80-gallon (300-L) stainless steel conical fermenters. My partner and I had a goal of keeping our startup

constantly changing lineup, only making a few beers more than once per year. We were trying to appeal to that part of the market always in search of something new. By the end of our second year, we had also introduced ten standard beers to meet expectations of the more traditional market elements. Now we pace our production to maintain the ten standards and release up to 40 different specialty beers, including our Belgian,

“ With the advantage of hindsight, I'd have made it a priority to start with twice the capital we did so marketing and staffing needs wouldn't be squeezed so tight the first three years. ”

to week, and that was one of my goals for the place when we opened. I like walking into a place I haven't been to in a week or two and finding new things to try. I think a lot of people appreciate that.

Hopefully we will sell 500ish barrels of beer this year, and then keep doing that year after year until I'm ready to retire.

costs to a minimum while still being able to produce enough product to be a viable business. In all my years of teaching brewing, I have always said that the ingredients don't care how much you spent on the equipment. Good brewing is based on process control, regardless of your budget.

We initially took advantage of our small batch size by producing a con-

cask-aged, and sour series.

With the advantage of hindsight, I'd have made it a priority to start with twice the capital we did so marketing and staffing needs wouldn't be squeezed so tight the first three years. Holding back on merchandising and marketing slows down growth and while guerilla techniques can help, marketing is a beast that must be fed. 

STRIKE: 352 gal [27"]
SALTS: 176 g
SPARGE: 123 gal* [9½"]
COLLECT: 325 gal [30½"]

60' Mosaic 6#
 20' ↓ 15# ← +SM +saccharomyces (10g)
 5'
 0'

BK"	BBL
15.25"	7
20.5"	10.5
46"	14

Vorlauf P2=60% Sparge: P1=60% P2=60%
 * 0.16 gal #

IBU calculation:
 AAU = Weight (oz.) × % Alpha Acids
 IBU = $\frac{AAU \times Utilization \times 75}{BK \text{ volume}}$

Sparge = $\left(\left(0.14 \times \frac{\text{Grain}}{\text{Bill wt.}} \right) + BK \right) - \text{Strike vol.}$
 Sparge = $\left((0.14 \times 597) + 325 \right) - 225 = 183 \text{ gal}$

HLT sight glass: $\frac{13.06 \text{ gal}}{\text{in}}$ (212 gal to bottom of glass)
 BK sight glass: $\frac{7.04 \text{ gal}}{\text{in}}$ (110 gal to bottom of glass)

HLT 50 gal. 120-140F 760
 BEER SCIENCE

HLT CIP ext. **BK** PBW = $\frac{1 \text{ oz}}{\text{gal}}$ (32 gal total) **Carbonation** Stone wetting pres

10 KEYS TO NANO SUCCESS

BY ASHTON LEWIS

A nanobrewery is generally defined as a brewery with a brewhouse up to 5 barrels in size (1 barrel or beer barrel is equal to 31 gallons/117 L), and these smaller-scale businesses offer many opportunities to brew, market, and share your great beers with your local community. Although the craft beer market may feel bloated, nanos fit the hyper-local niche, require less capital and space to launch than other brewery business models, and, unlike packaging breweries, do not battle for tap handles and shelf space. Here are some tips to consider if the idea of opening a nanobrewery has crossed your mind.

1. BEGIN WITH A PLAN

All businesses require a plan, and nanobreweries are no different. A good plan will clearly define the vision, mission, objectives, strategies, and action plans of a new business. Although most business plans are written to raise money from potential investors, you should consider your own needs when penning the plan. Use it like a map to help the business stay on course, and reference it periodically.

Plans patterned from boilerplate templates are oftentimes boring and generally uninformative. One-page business plans are a popular alternative because they can be meaningful, concise, and are easier to write than longer versions. Format aside, two important sections of a nanobrewery plan are the Vision and Mission sections.

A clear and meaningful focus helps a business stay centered. If the vision is to brew exceptional German-style lagers to serve in a locale with a strong German heritage, you may want to rethink that kumquat cream ale recipe you have been tweaking. Don't like the way this restriction feels? Change your plan. But make the major changes before opening. A business that constantly changes directions can confuse its consumers.

You also need to plan for profits. While most new businesses are launched to turn a profit, some nanobreweries are conceived as a way to

subsidize a hobby and the profit goals are quite different. Whatever the objective, the business performance should be compared to the plan.

2. FOCUS ON HIGH-MARGIN BEER SALES

Successful boutique businesses maintain market focus on high-margin sales and purposefully avoid distractions from the macro-market because the temptation to satisfy all consumers can kill the ideal niche business. This type of focus requires dedication and absolute confidence in the business plan, and it is a philosophy that is fitting with the nanobrewery. Small batch beers are expensive to brew, a nanobrewery has a limited number of sales opportunities, and each of those sales need to generate a healthy margin for the business. Don't be wooed by higher volume, lower margin sales.

The easiest way to stay focused on high margin beer sales is to brew beers that can demand a higher price. Most beer consumers are simply unwilling to pay premium beer prices for ordinary beer. Does this mean that nanobreweries cannot serve a golden-colored, regular strength, Pilsner? Of course not, it just means that the Pilsner cannot be ordinary. Despite the obvious nature of this advice, it is surprisingly difficult to always follow after your business doors have been opened.

3. RUN FROM THE ALLURING EGO BOOST THAT CAN COME

Local bars and restaurants love special beers from small, local breweries, and it can be a huge ego boost when these businesses want to feature your beer on one of their taps. Seeing your tap in another venue feels great, but does it make good business sense? Not usually. When beer is sold through distribution channels, even with self-distribution, the sales margin is eroded because the consumer is typically unwilling to pay more for your beer simply because it is being sold in another venue. The successful nanobrewery should sell every possible drop of beer in their own brew-

ery before ever considering beer distribution. Period. And even then, the sales revenue may not be worth pursuing.

4. STAY TRUE TO YOUR BUSINESS MISSION

Nanobreweries are way too small to be everything to every beer consumer. Know who you want to be in the market, let your patrons know your identity, and stick to it. All breweries are guaranteed to be asked to brew beers that are not a good fit with the brewery. Examples may include mango wheat brewed in a Michigan brewery dedicated to fruit beers using locally farmed crops, a cask-conditioned ale in a brewery specializing in funky Belgian styles, or a nitro-stout in a brewery that only produces bottle-conditioned and keg-conditioned ales. When this happens, you must be prepared to clearly, unequivocally, and calmly say "no thanks," and remain true to your path. Your core customers will respect the business for staying true to its mission.

5. CREATE A BRAND IDENTITY THAT FITS YOUR BREWERY

The look and feel of your brand can be as important as the quality of your beer for the first-time visitor. Many small businesses downplay the importance of brand identity, and many small brewers take the position that great beer speaks for itself. The look and feel of a brand helps establish impressions about a brewery and its beers before the consumer tastes that first drop. And positive first impressions help to reinforce the quality of great products. Conversely, a weak brand identity can negatively influence an otherwise great beer. If this sounds like psychological mumbo-jumbo, consider your own consumer behavior and how you respond to various beers simply based on brand identity.

Since few nanobreweries start out selling beer in bottles or cans, the brand investment is typically limited to the company name, the look of the name if it is separate from the company logo, company logo, and a way to com-

municate what beers are being offered. Decorative chalkboards are a popular and effective method used to announce the beer selection in a taproom. Although these often look great, they require talent and skill to maintain. If the nano team does not include artistic talent, consider other vehicles for your beer list. A good designer can develop all of these materials and get the business off to a strong start with a rock-solid identity. Not in the budget? Consider bartering for future purchases in your taproom.

6. LOCATION, LOCATION, LOCATION

Anyone who has ever considered opening a retail business has heard this expression. The exciting thing about brewery taprooms is that there are no clear rules about what works. Since nanobreweries are small, the population surrounding the nanobrewery can also be relatively small. Residential neighborhoods with the right zoning have become a very popular place to establish a nano, and these businesses provide something that has disappeared from many residential districts over the years. Light industrial complexes are another popular location, and if located in an area with congested commutes at the end of the workday, the tap room may swell with employees from neighboring businesses who want to wait before embarking on the commute home. Think outside of the box when considering your location.

7. DEVELOP A STYLISTIC THEME

Let's face it, there are many tap rooms around the country that lack originality. Some have a total lack of décor and feel sterile when partially full, and others have a formulaic feel that gives the feeling of déjà vu. Without question, the most memorable taprooms have original stylistic themes. The nano brand is largely based on the taproom, so make it special and consider all of the sensory inputs that your guests receive. Color, artwork, music, glassware, cleanliness, information about the brewery team, and how you interact with your guests all fit into style and help define the taproom.

Close your eyes and think of a memorable bar. Sights, smells, sounds, and

the glass of beer in front of you are likely parts of your recollection. And this place is cool! Make your nanobrewery a cool place that folks remember, and return to for more great memories.

8. DON'T FORGET ABOUT THE FOOD

But nanobreweries are all about the beer! Seriously, who really needs food? Like it or not, tap rooms need a food program because a good chunk of the beer drinking population wants something to eat with their beer. Matching the food program with the look and feel of the tap room is a great place to start. If the focus is on a wide array of beer styles that show off your brewing skills, consider working with local food producers to offer tasty bites that do not require cooking, and do not take the focus away from your brews.

Think locally made sausages, cheeses, breads, pickles, fruits, and mustards for an A+ ploughman's platter/brotzeit board. Or team up with local food trucks if you have the space for a food truck during key business hours. If these simple food options don't fit your vision, having your own kitchen may be the best route for your concept. But adding that kitchen just turned your business into a restaurant and immediately increased your staffing requirements and operational complexity.

Most brewers who own and operate a brewery-restaurant employ at least one brewer. If your dream is to sell the beer you brew in your own taproom, think long and hard about building a kitchen. And think even harder about adding tables to your taproom.

9. PUT ON YOUR ENGINEERING HAT

Designing the brewery is what brewers are really keen about doing. The best designs begin from the end and work backwards to the front. Some of the things you need to know to begin designing include: The number of beers served at any one time, preferred serving method, annual sales volume, beer varieties, process philosophy, raw material types, and your DIY skills.

The question about volume is critical because it drives brewhouse sizing. There are plenty of nanos that began with a brewhouse that was too small

and quickly realized the need for a bigger kit. Sounds simple, but if the facility was not designed with expansion in mind, expanding may not be a viable option. And there are many examples of "nanos" with 7-10 BBL brewhouses matched with 1,000-square-foot taprooms that simply brew batches that are a misfit with their sales volume. Beer is best when fresh, so large batch sizes coupled with a large selection results in old beer.

Setting the number of taps is another challenge. The trend these days is to maximize selection, but this must be balanced with batch size and projected sales volume. Sometimes less is more in tap rooms with good turn-over because a limited selection helps ensure fresh beer, keeps your consumers excited about future beers, and makes for reasonable batch sizes. Want 20 beers on tap all year? Be prepared to brew 2-3 batches per week.

Sour-beer programs require a place for barrel storage, step or decoction mashing requires specialized equipment, whole hops require a hop back, and malt mills may require explosion-proof rooms. Defining what your brewery can and cannot do is a critical part of the design process. And your DIY skills may influence your equipment purchasing decisions. Equipment selection will probably represent your single largest investment, so you may want to consider working with a consultant to guide this process.

10. SKETCH OUT AN ORGANIZATIONAL CHART

Your nanobrewery dream may include shedding baggage from the corporate business world, but some things must not be ignored. An organization chart, even if you simply sketch one out on a bar napkin, is extremely important to even the smallest of businesses. An organizational chart matches job titles and names with the daily tasks associated with business operations, and helps shape the team. One of the more important responsibilities in a brewery is preparing and paying taxes. Keep in mind that a major part of U.S. brewery legislation was crafted to prevent folks like Al Capone from ever again running breweries! ☺

NANO OPERATIONS

RECIPE DESIGN ETHOS

BY MICHAEL TONSMEIRE

There are different considerations when designing a recipe for a craft brewery compared to a home brewery. I'm not talking about adjusting for mash efficiency or hop utilization, two things every brewer should do regardless of scale. This article describes techniques that craft brewers use to make brewing easier, and their results consistent year-to-year! Only some of these techniques have potential value for homebrewers, while others only have value when planning to scale a recipe for commercial production. Over the years I've collected advice while consulting, collaborating, and drinking with a wide variety of brewers, the lessons included here reflect what I've put into practice now that I'm brewing professionally.

ROUNDING TO PACKAGE SIZE

Most homebrewers write grain bills with nice round percentages – 85% pale malt, 10% Munich, and 5% crystal 20. Commercial brewers are lazy (in a good way), so it makes sense to use an entire 50- or 55-lb. (22- or 25-kg) sack of malt even if the resulting recipe features 9.4% or 11.3% Munich malt. A deviation of a couple percentage points is unlikely to create a noticeable flavor difference in the finished beer. The exception is dark grains, which due to their intensity need more precision. In those cases ideally a half-sack can be used. If the beer comes in lower than the target gravity on the first iteration, the next will get an extra bag of base malt (rather than a little more of all the malts).

Similarly, many craft brewers try to avoid saving open packages of aroma hops for extended periods. Ideally, an 11-, 22-, or 44-lb. (5-, 10-, 20-kg) box is added as a single addition, or across multiple additions on a given brew day. This is good advice for homebrewers as well – unless you have a vacuum sealer. This approach also avoids a large

number of leftover hop bags cluttering the freezer . . . a lesson I could stand to learn. If you do have older hops, then using them in the boil (rather than dry hopping) is preferred.

As a homebrewer brewing 11-gallon (42-L) batches, I often use one-third or half a sack of base malt, and specialty malts in pound increments (or half pound if needed). For hops I'll buy by the pound, using up last year's leftovers for hot-side additions while the freshest hops are reserved for dry hopping.

BLENDS OF HOPS

My preference is to use a simple ratio of two hops for aroma (1:1 or 2:1). This simplistic approach represents the sweet spot for me in terms of adding nuance to the hop character without creating a muddled-generic "green" hoppiness. This approach works for many craft brewers as well, in addition single-hopped beers have even gained traction as one-off or rotating releases. However, if a craft brewer is designing a year-round flagship IPA, best practice is to include three or more aroma varieties. This allows the brewery to swap out one variety for another if scarcity, agronomics, or demand causes supply issues. Although hop contracts help minimize shortfalls, swapping varieties can address uncontrollable issues that endanger the viability of a recipe, especially helpful for relatively new hop varieties.

When a substitution is required, it is easier to get away with replacing a quarter of the hops in a beer than it is to replace half or all. While using a hop-oil calculator (my Sapwood Cellars' partner Scott Janish has a nice one here: <http://scottjanish.com/hop-oils-calculator/>) to mimic the oils of the replaced variety is a great start, confirming pilot batches are required as small oil fractions can alter the perceived aroma of the beer. It may be that for a given hop, one variety is better as a hot-side substitute and

another for dry hopping as both timing and temperature determine which aromatics survive into the finished beer. See my article "Hop Oil Analysis and Blending," *BYO* December 2015.

Even if all hop varieties remain available from the same farms, aroma could change thanks to annual weather differences or harvest timing. This variability can again be dampened by a larger blend of hops. For craft brewers this variability is further mitigated by traveling to Yakima, Hallertau, or Nelson for hop selection. The goal is not necessarily to pick the "best" lots, but rather the ones that provide continuity of flavor.

As a homebrewer, I'd rather brew the best batch I can today . . . and not worry about making that identical beer again. I'll buy Citra®, Galaxy, and Nelson Sauvin when I can find them, and create something unique with other varieties when I can't. This approach has become more common for NEIPA-focused breweries that do heavy cansales on premises; they simply won't brew a particular IPA if the relevant hops are not available.

CONSISTENT INGREDIENTS

One of my favorite aspects of homebrewing beer compared to other fermentations I've tried (e.g., sourdough bread, kombucha, and ginger beer) is that I only have to brew when I'm in the mood. I don't have to "feed" brewer's yeast on a weekly basis. Craft brewers don't always have this luxury. A commercial pitch of liquid yeast costs hundreds of dollars, a not-insignificant percentage of the total price-tag. On a commercial scale, quick-repitching is also essential because large volumes of yeast slurry generate heat, leading to quicker reduction in cell viability. As a result, most craft breweries have one or at most two house yeast strains that they use to ferment their core beers. Thanks to their low price-point and high shelf-stability, dried yeast is an

appealing option for breweries without a schedule that allows harvesting.

Homebrewers derive important benefits from learning about a strain from repeated brews, but starting out I'd value variety to discover a few favorites for focus. Still, there can be pleasant surprises with minimalism. JC Tetreault from Trillium Brewing (Boston/Canton, Massachusetts) mentioned that at first he used an English yeast in his IPAs because he had selected it for the porter. The results were delicious, unexpectedly hazy, and people loved the subtle addition of yeast character to the hoppiness, so he rolled with it. A limited color palette sometimes produces the most beautiful and unique paintings!

When a craft brewer orders a special yeast strain, they'll often string a few batches together with increasing gravity and bitterness. For example: Hefeweizen, to hoppy wheat, to weizenbock. This pattern works well for homebrewers as well, and supports more brewing with less time making starters. Another option that we are experimenting with at Sapwood Cellars is blending dried yeast strains for added variety, and at a price-point that doesn't require repitching (see Ziparillo recipe on page 97).

The parallel for grain is that, as breweries grow, they often add a silo of their base malt of choice. This is usually a compromise that suits all of the beers well enough. Our first few test batches for Modern Times (San Diego, California) Black House coffee stout used Maris Otter as the base. I was surprised how much depth and richness the beer lost when we switched to North American standard 2-row malt to suit the hoppy beers. Luckily once the production brewers took over they restored that lost depth by adding biscuit and pale chocolate.

Many breweries use a single hop for bittering all of their beers. This allows for a consistent and predictable amount of IBUs. CO₂ hop extract has become popular as well, see "Hop Extracts" in the July/August 2018 issue of *BYO*. As a brewery expands it may grow big enough to get an entire hop lot pelletized . . . but not big enough to get several. You may notice growing breweries have a year or two where they seem to use one hop variety in most of their beers for this reason. More breweries

are also using a limited selection of less expensive high-oil hops for whirlpool additions (Columbus, Chinook, Nugget, Bravo etc.), dry hopping with more expensive varieties to add the unique character.

CARE ABOUT SOURCE

When I talk to other professional brewers about ingredients, they usually specify which maltster, yeast lab, or hop provider they prefer or are referring to.

Despite the names, Briess roasted barley (~300 °L) isn't a substitute or even a similar product to Muntons roasted barley (~500 °L). Their flavor and color contributions are completely different, so you need to be aware of which you are using. You'd be better off with Briess black barley or even black malt if you needed to substitute for Muntons because the color and flavor contributions are more similar than the names suggest. Similar story for various °L-designated caramel/crystal malts, and base malts. At the very least, start asking your homebrew supplier who the maltster is when you buy from the bulk bins if it isn't listed. Note the specific products in your recipe so you can recreate it.

There are concordance charts showing which commercially available yeast strains are from the same source. By the very nature of yeast as a lifeform it changes. Even if the two labs have done a perfect job preventing genetic drift in their stock, they may have taken their samples at different times and the culture at the brewery may have shifted in the interim. Jeffrey Stuffings from Jester King (Austin, Texas) related the differences between tasting the yeast character of their original Le Petit Prince with only French saison (it now also includes indigenous wild cultures) compared to a version brewed at Brasserie Thiriez with their house strain (the original French saison):

[W]hen I drink Le Petit Princesse from Thiriez . . . I get strong bitterness, firm malt character, plenty of green bottle "Euro-skunk," and a little interesting spice character from fermentation in the background. When we made Le Petit Prince with pure culture French Saison yeast, we got much stronger fruit, spice, bubble gum, estery charac-

ter. Maybe this is just my bias talking, but when French Saison made its way stateside, it somehow got Americanized and became more aggressive in terms of traditional (or stereotypical) Belgian fermentation character.

As a result, many brewers have a preference for one lab's strain compared to others. I'd take Wyeast 1728 (Scottish Ale) over White Labs WLP028 (Edinburgh Scottish Ale) for example as it is more cold-tolerant, which seems to allow it to finish cleaner. There are some strains that are especially finicky, like Conan, for which I've had vary wildly in flavor and attenuation between pitches from East Coast Yeast, The Yeast Bay, Omega, GigaYeast, etc. Likely depending on which "generation" they harvested for their original stock.

Don't think of brewing ingredients as a commodity. There are real differences in the same products from different sources!

LESSONS LEARNED

It is great to see more breweries acting like homebrewers. Brewing a Citra®-heavy DIPA when they can get Citra®, and one loaded with Mosaic® when Mosaic® is more plentiful or better quality. Ten years ago, seemingly every brewery had four core-beers, four seasonals, and a handful or special releases. Now more are starting and staying with a model of just producing delicious beer without as much repetition!

Homebrewers aren't small-scale craft breweries, just as craft breweries aren't scaled up homebrewers. While there are lessons and techniques that can be applied in both directions, there are others that only make sense at each scale. As a homebrewer, don't get hung up on a percent on the grain bill or a few IBUs on the hop schedule. The human palate isn't nearly as precise as we'd like to think. As a homebrewer you don't have to worry much about consistency, you can strive to brew the best beer each batch! 

FERMENTATION SYSTEMS

BY ASHTON LEWIS

A beer fermenter is any vessel used by brewers to hold wort during fermentation. Fermenters may or may not have cooling attachments, inlet/outlet valves, insulation, covers, pressure ratings, cleaning devices, temperature probes, and wheels. And fermenters are made from a variety of materials including plastic, glass, stainless steel, wood, carbon steel, and concrete. Put all of these variables into a matrix and the number of permutations is vast. Nanobrewers, or those commercial brewing operations brewing less than 5 barrels (BBL) (155 gallons/587 liters/5.9 hl) per batch, have many options when it comes to fermenter selection because their small batches can be contained in a wide variety of easy-to-obtain vessels. This column will cover what is typically accomplished during fermentation and aging in a fermentation system, examples of fermentation systems used by commercial brewers, and strategies available to nanobreweries.

WHAT IS A FERMENTATION SYSTEM?

A fermentation system is the total process used by brewers to house and control the process of fermentation and maturation, and sometimes includes conditioning. The first stage of this process is the actual fermentation step. During this stage, carbon dioxide, ethyl alcohol and heat are produced, the fermenting liquid usually foams, and there is an increase in yeast cell density. The removal of heat is important because fermentation temperature directly affects beer flavor by its influence on the biochemical pathways that generate esters, higher alcohols, aldehydes, organic acids, and other flavor active compounds.

As a practical note, yeast produce about 280 BTU/pound of extract fermented (per ASHRAE Handbook). This means that 3 BBLs of beer fermenting at the rapid pace of 4 °Plato/day, produces 8,812 BTUs/day. This heat load



Photo courtesy of MoreBeer.com

can be used by brewers to help size refrigeration equipment.

Small beer fermenters, such as 5-gallon carboys, are often air cooled and rely on the transfer of heat from the surface of the fermenting beer to the environment. This method of fermentation works best when the surface to volume ratio is large. The famous, and often photographed, open lager fermenters at the Anchor Brewing Company in San Francisco, California have no cooling jackets or coils, and are examples of larger fermenters of this type (each vessel contains approximately 100 BBLs of beer).

The problem with shallow fermenters is space, so as fermenter volume

increases tanks generally become taller. Cylindrical fermenters usually have an aspect ratio (liquid height divided by vessel diameter) ranging from about 1:1 to 3:1, and sometimes as tall and skinny as 5:1. With this change in geometry comes a change in where the area is located. The open fermenters at Anchor, for example, have approximately 63% of the total surface area exposed directly to the atmosphere, compared to only 16% in a cylindrical fermenter with a 1:1 aspect ratio and 90° conical bottom. This means that cylindrical fermenters, even open versions exposed to a cool atmosphere, have a very large surface area in contact with the tank wall. Since tanks are made from materials that



The term cellar is used to describe the space where beer tanks are located.



have relatively low thermal conductivities, more wall area translates to more heat retention. The take away message is that cylindrical fermenters need to be cooled.

Shallow fermenters, both open and closed, can be air cooled if the fermentation “cellar” is cool; this choice will always result in fermentations that show a rise and fall in temperature as the rate of fermentation changes. However, most fermenters are equipped with cooling jackets or coils used to actively remove the heat of fermentation from the vessel using chilled water or glycol. One advantage of coiling coils, especially in repurposed vessels, is that they can be relatively inexpensive. But coils are not easy to clean and they require considerable length to provide much area. Most tanks equipped with cooling jackets are designed to be quickly cooled (crash cooled) following fermentation. Crash cooling requires about 10 times more cooling capacity than maintaining temperature during fermentation.

Tanks equipped with cooling jackets or coils will sweat when water from the air condenses on cool tank surfaces, especially exterior heat transfer surfaces, so it is typical to insulate and clad tanks with stainless steel. This is especially common when the fermentation cellar lacks environmental conditioning. Although a nicety, insulation and cladding adds cost to tanks and is not required.

The term cellar is used to describe the space where beer tanks are located. In the days before commercial refrigeration, cellars were a literal description of underground rooms. Breweries continue to use terms like fermentation, lagering, aging, conditioning, and package release cellars to designate parts of a brewery. A brewery’s cellarman (or cellarperson) is the person who oversees the fermentation process, from active fermentation through conditioning, transfers, packaging, cleaning, and up-keep of the cellar.

The fermenting system may include some method of skimming. Many traditional fermentation systems were self-skimming, and examples include Yorkshire Squares, Burton Unions, and lager

fermenters with so-called foam chambers. Open fermenters can be skimmed during fermentation, and this practice is still used by some brewers using these traditional vessels. The purpose of skimming is the removal of cold trub and very bitter hop resins, sometimes called *braun hefe* (brown yeast) or *brandt hefe* (burnt yeast), that rises to the surface of fermenting beer. Skimming systems can also be used to top-crop some ale yeast strains.

Most fermenters these days are closed, so these systems must have a vent to allow carbon dioxide to escape during fermentation. This same vent can be used to bring carbon dioxide into the vessel when the beer is transferred out at the end of the process. Closed fermenters should be rated for pressure. This is a serious safety consideration and the pressure rating of a tank should not be exceeded; period. If the fermenter pressure rating is sufficiently high, natural carbonation can easily be performed by attaching a special pressure relief valve called a spunding or bunging valve to the vent line.

While open fermenters are usually cleaned by hand, closed fermenters, especially stainless steel tanks, are equipped with spray balls to permit so-called clean-in-place, or CIP, cleaning. CIP balls are typically attached to the tank with a line running down the side of the vessel to make hose attachment easy. Cleaning solution can be added to the vessel and recirculated through the spray ball using a properly-sized process pump.

FERMENTATION SYSTEMS USED IN COMMERCIAL BREWING

The unitank fermenter (also known as the cylindroconical tank, CCT, cylindroconical vessel, and CCV) has become the de facto standard for most breweries around the world over the last 40 years. The unitank system combines the functions of fermentation, beer maturation, carbonation (sometimes), crash cooling, and yeast collection into a single vessel. Although the modern CCT has a cone bottom, the original unitank de-

sign had a flat, sloped bottom. Dished bottom tanks can also be used for unitanks. Breweries of all sizes use this fermentation method for the production of all sorts of beers. But breweries with older equipment continue using their other systems.

Prior to the spread of the unitank, brewers used specialized tanks for each major step of the brewing process, including some brewhouse functions that have largely been replaced by the whirlpool. If we could travel back in time 150 years and walk through a typical lager brewery (I am referencing lager practices because lager breweries were principally responsible for the global spread of beer and for most of the accompanying technological developments) we would probably see a hop strainer, a coolship to pre-cool wort from the brewhouse, and a falling film chiller or “Baudelot cooler” to further chill wort going into the fermentation cellar. Many brewers of this time also used cold wort settling tanks and/or flotation tanks for trub removal, dedicated fermentation vessels for fermentation, and lagering tanks for clarification and conditioning. With the advent of pressure rated, glass-lined steel tanks, and later stainless steel tanks, brewers could completely finish the aging and conditioning (also known as carbonation) portion of the process in a single lagering tank.

The ale tradition was similar in many aspects where fermentation was conducted in fermentation vessels and conditioning occurred in the cask. Cask conditioning is not too different from lagering in that clarification, carbonation, and flavor maturation all occur in the same vessel. The main difference between cask ales and traditional lagers is that lagers were racked out of the lagering tank into the barrel after aging was complete.

NANOBREWING STRATEGIES

Nanobreweries have the size advantage of really being able to choose from a wide variety of fermentation strategies to accomplish the goals of fermentation while also keeping with the DIY tradition of homebrewing. Like larger craft

breweries, many nanobrewers use CCTs because these vessels are very handy and readily available on the small equipment market.

But if you want to build a cellar that is more akin to old school brewery design, options abound. Simple fermenters can be fashioned from food-grade plastic containers, stainless steel drums, and stainless steel portable tanks (IBC or intermediate bulk containers). All of these vessels have flat bottoms, so yeast harvesting can be a challenge if there is not a low-point outlet. But harvesting and re-using yeast is a general challenge with low-volume production and many nanobrewers prefer using liquid and/or dried yeast strains that are not re-used. These vessels can be used with or without cooling jackets or coil depending on the cellar design. Open vessels are easily equipped with removable coil systems that resemble immersion wort coolers, and also can easily be covered with a simple lid to keep dust and debris out of the vessel. If you build your own cooling coils, make sure to use stainless steel tubing instead of copper, as copper can impart a metallic flavor to beer and can also lead to oxidation if exposed for too long (copper is fine for wort cooling though).

Whether using a CCT or repurposed vessel with cooling coil, the nanobrewer can locate these fermenters in any clean, tidy environment without having to worry much about the environmental temperature. If the fermenters are not equipped with cooling provisions, the smaller fermenters can be placed in a controlled environment, such as a walk-in cooler. And these small vessels can easily be moved using wheel kits, pallets and pallet jacks, and hand trucks.

Brewers not using CCTs or some other type of unitank usually rack their beer into another vessel for a variety of purposes including maturation, carbonation, or priming for transfer to bottle or keg. If flavor maturation occurs in the fermenter, a single secondary vessel may be sufficient for packaging preparation. For brewers who filter their beers, this vessel is often referred to as a bright beer tank (BBT) and can typically be turned around in a couple of days. Depending on the batch size, kegs can be used for maturation vessels, and can be stored on a wooden rack that keeps the

kegs tilted so that clear beer can easily be racked out of the aging keg into another keg or bottle for serving.

The nice thing about all of these methods is that transfers are not much different from homebrewing. Small pumps, gas pressure, gravity and racking canes can all be used to transfer beer from one tank to another, and short hoses with relatively low cost connection types, like beer nuts, can be used for transfer operations. Things change as the batch size approaches 10 barrels (11.7 hectoliters) where sanitary process pumps and beer hoses with tri-clamp or the threaded DIN (Deutsche Industrial Norm) connections are more commonly used. Although similar to operate, these tools are more expensive.

MY DREAM CELLAR CONFIGURATION

I spent 20 years working for a stainless steel fabrication company and worked on a wide range of brewing tank projects for brewers small and large. It became apparent to me early on that CCTs are under-utilized for every step of the brewing process. The real benefits of these relatively expensive vessels is the reduced cost associated with filling, emptying, and cleaning, and lower risk of contamination and oxidation that comes with multiple tank transfers. These benefits are significant to commercial brewers and explain the popularity of CCTs. However, artisan brewers can certainly mitigate the microbiological and oxidation risks that come with multiple transfers by using good brewing practices and paying attention to details.

So why are CCTs under-utilized during use? For starters, they require a relatively large headspace when used for fermenters because of their skinnier aspect ratios (foam sticks to surfaces, so tall tanks require more extra volume in comparison to shallow fermenters). But when the CCT is being used as a fermenter it has a pressure rating that is usually not required, more cooling surface area than needed, and insulation and outer cladding that is unnecessary.

Now look at the CCT after the beer has been chilled. It has excess volume that is no longer occupied with beer foam, and has way more cooling surface than required to simply keep the beer

cold. CCTs have cones that are pretty handy for both fermentation and maturation, but the cones are not absolutely required.

My dream cellar is one where fermenters are designed to maintain temperature (remember small tanks do not require cooling jackets if the air temperature is sufficiently cool), keep the beer from over-foaming, and equipped with a cone to make yeast harvesting easier. After fermentation, beer is transferred to mobile, pressure-rated tanks where flavor maturation, carbonation, and gravity clarification occurs. The tanks are mobile because I want to mature and carbonate at fermentation temperatures, and clarify/chill stabilize at cold temperatures. This is where the portable part is important.

This means that my dream cellar is an appropriately sized walk-in cooler with a portion or portions controlled to fermentation temperature(s) and another portion that is held at about 32 °F (0 °C). The whole unit is cooled in the cold section and the fermentation cellar(s) is cooled by a fan that thermostatically blows cold air into the cellar with the return air flowing through a controlled louver that closes when the fan does not run. All tanks are optimized for their specific duty, and the total tank cost is reduced. Since there are lots of used walk-in coolers that can be purchased for a pretty low price, the additional cost of the cellar is offset by the reduction in tanks cost. This idea is just an example of how nanobrewing fermentation solutions can be customized to satisfy brewing philosophy, brewing dreams, and brewing budgets. Think big and brew small!

CLOSING THOUGHTS

Fermentation cellars are the most expensive part of most brewing operations and have a profound influence on how wort is transformed into beer. The practical brewer needs to consider the things that will or may occur in the cellar in order to design a cellar that is efficient, practical, flexible, and cost-effective. All good designs begin by listing the functional requirements of the system and choosing equipment that satisfies these demands, rather than modifying the brewing process around avoidable equipment limitations. 

FREEDOMS OF NANOBREWERS

BY ASHTON LEWIS

Nanobreweries tend to be opened by brewers transitioning from homebrewing as a hobby to brewing as a profession. While this is still the trend with most new craft breweries, there are more large companies and investment groups investing in the general business of craft brewing. Somehow I don't envision corporate buyouts and consolidation of businesses in the future of nanobrewing. Right or wrong, this is my view, and along with this view are some thoughts about what I would do if I were to have a nanobrewery. Oh, to retire and open a nanobrewery to serve just a small handful of beer loving friends, that would be cool! The following article is about brewing, so if you are hoping for a great short story about great beer, famous musicians stopping by for unannounced jams, and crazy food truck creations, this is not your story!

So here is the basic premise of my thinking. Most breweries these days are striving for efficiency in every facet of the business, because brewing is business. And the US beer scene has arguably been the world's most vibrant for the better part of 30 years. Along the way, we have seen massive improvements in the technology of brewing, yet, some of these tremendous advances potentially, and quite unintentionally, dampen beer diversity. A nanobrewery should differentiate itself from other breweries because without a point of real difference, a nano may just be a smaller version of another brewery doing the same thing. So here are my views on how ingredients can help lend beer diversity. Oh, and a note about diversity; the modern brewery needs to be bilingual, so I will use the metric system for units in this article without conversions!

IT'S THE WATER!

Water tanks are great for water and energy storage in larger breweries. Go to any brewery brewing more than about 1,000 hectoliters (852 barrels) annually, and you will likely see an ambient

or cold water tank to store water prior to wort cooling, and a hot water tank to store hot water generated from the wort cooling process. This system just makes sense, and it's how things are done. One of the convenient things that can be done to a system like this is to treat the water going into the ambient/cold water tank so that the brewing water is consistent. Consistent water used to cool wort, leads to consistent water in the hot water tank, and that leads to the perfect water for brewing! Right? Perhaps it is right if all of the beers brewed benefits from the same water. Need something different, simply add brewing salts and this problem is solved.

But does a small brewery really benefit from storing hot water after wort cooling? Let's assume that a 3 hL nanobrewery produces 360 liters of hot water when wort is cooled; this is a good ratio that produces a nice balance of water that can be totally used in the next brew. If the water is heated from 20 °C to 80 °C (70 °F to 175 °F) during wort cooling, this system captures 90 megajoules of energy, which equates to about \$3 (USD) based on the average price of electricity in the US (\$0.12/kilowatt-hour). The hot water is now stored in a hot water tank and used in the next brew. What's not to love about this?

The water generated from wort cooling needs to stay hot, so hot water tanks are well-insulated and equipped with heaters to offset heat loss to the environment. That hot water just required investment in equipment and energy to prevent it from cooling. You can complete the financial analysis of this problem or simply take my word that hot water recovery in a nanobrewery is not a great investment if the goal is to save energy. I am not suggesting that water should be wasted; the hot water from wort cooling can be recovered and used for cleaning or other uses, but the energy value is minimal. A much better fit for many nanos with limited space in the brewery is the use of instant hot water heaters. If you go this route, make

sure the heaters are properly sized and installed to permit acid de-scaling; this means that you need to have stainless water lines before and after the heater because acid cleaning will corrode copper water pipes.

Now that we have eliminated the hot water tank, the water used to cool our Cookie Monster Pastry Stout wort does not need to be compatible with that Brutally Dry Pilsner that is scheduled as the next brew. My suggestion here is to uncuff yourself from worrying about the next brew when it comes to water. Take advantage of the small size of the brewery and treat water as a specialty ingredient. Eliminating the "traditional" type of hot water will really help in this pursuit. It also reduces equipment cost and saves space.

BASE MALT ≠ BLANK CANVAS

I have heard other brewers describe base malt as a blank canvas for so many years that I sometimes forget how wrong that analogy really is. There are so many exceptional beers brewed from limited grist bills that clearly demonstrate the fallacy with this argument. What is true, however, is that changing base malts can indeed have a very profound effect on beer flavor, yet many larger breweries only use one, sometimes two, because of the cost and logistics required to use multiple base malts. And because malt stored in silos represents a huge cost savings for breweries brewing enough beer to justify the investment in equipment and inventory cost, there is a real motivation to choose a base malt that can be used for most beers. Nanobrewers, by definition, do not use enough malt to make this an option, and should not restrict themselves to only a few base malts.

Experimenting with base malts is fun because there are so many options. If a brewery decided to brew rotating helles lagers with different pilsner malts from around the globe, several years of experiments could be brewed. Add ale malts, more highly kilned lager

malts, like Vienna and Munich, and heritage varieties to the mix and a brewer could make a career specializing in this type of brewing. Larger breweries simply cannot resist the temptation to settle on a base malt or two and to seek other malt colors and flavors from specialty malts. Take advantage of being small!

Consumers love stories, and great base malts often have great stories. Tell the story of the barley field, the climate of that field, and ultimately how your beer flavor is influenced by these environmental factors. Also tell the story of the maltster; who converted that great barley into the malt used for your brews? Those are all very real connections that consumers enjoy having with their products, so explain the source of your base malts to get people interested in tasting your special beers.

HOP LIKE A CHEF

The cool chefs with their own TV shows are often seen shopping for food before cooking. They don their Crocs and smocks, go to the market, choose what is fresh and available, and get down to business. In contrast, many brewers make decisions about hops well before brewing, sometimes years, because of the relationship between brewer and hop farmer. Few hop farmers are real keen on planting hop varieties that may not sell, so hop contracting is the way that most brewers secure their hops for the future.

While hop contracts are good for both brewer and hop farmer, the thought of having to choose what hop variety you will want to use next year or the year after is daunting for nanobrewers who are more interested in going with the flow than building a rigid brand portfolio. Add to the equation the relatively small amount of hops required for the typical nanobrew batch, and hop contracting becomes even less attractive. So hop like a chef and design your beers around what hops you can find in the market. One of the really great things about modern hop processing is shelf life; pelletized hops that are properly processed, packaged, and stored have the ability to retain their brewing value (bitterness and aroma) for several years (up to 5 years based on research by the German Hop Growers

(HVG) group).

So where are some good places to look for hops? Hop growers, cooperatives, and merchants sell hops in two basic ways; through hop contracts and on the “spot market.” The spot market is where brewers without contracts go looking for hops, and most hop merchants these days have spot hops posted on a website. If you live near hop growers, the spot market may be the hop farm. Another place to shop for hops is through the Lupulin Exchange website. This exchange allows brewers, hop growers, hop merchants, and others who want to buy and/or sell hops to make connections. The Lupulin Exchange was started in 2014 by John Bryce, Shane Kunkle, Jesse Pappas, and Darren Kopp and is a great contribution to the commercial brewing world.

Although Lupulin Exchange is an awesome trading space, some breweries don't want to mess around with selling boxes of hops to other breweries when shipping is required, but are happy to sell excess inventory, usually as a result of over-contracting, to local brewers who will pick up the hops. Brewers don't normally have issues becoming friends with fellow brewers, and there are many times when having brewer friends just makes good sense. Searching for hops on the open market is a great example. So be nice to your neighbor, you may benefit too!

THE INVISIBLE ARMY

You got it; the last section of this focus on ingredients is about the invisible troops that convert wort to beer. Just like a brewery could choose to riff on base malts, a brewery could easily do the same thing with yeast strains. And if the strains are different enough, the same wort could be used for dozens of different beers that may be fun to rotate through a handle or two. Although throwing caution to the wind is a relatively low risk proposition when experimenting with water, malt, and hops, it is not so with yeast and bacteria. Indeed, brewers using new equipment and selling beer for the first time are best advised to take a conservative approach with yeast and bacteria until the kinks are worked out of a new system.

The great thing about brewing today is the excellent selection of yeast

strains from yeast suppliers all around the globe. For the majority of the readers of *BYO* in the US, we have liquid yeast labs in all major regions of the country, as well as diverse and high-quality options for dried yeast. The bottom line is that there is no reason for a brewery to feel restricted by the lack of selection when it comes to yeast. And the nice thing about nanobrewing is that buying enough yeast to pitch a full batch of wort is not going to break the bank. It is also easy to use your old homebrew kettle to make a starter from DME and grow up a homebrew pitch. The 10-fold multiplier is a good rule of thumb; divide your batch size by 10 and that is your propagation volume.

A couple of things that I would hold off doing in a nanobrewery are growing yeast from slants, feeling the need to harvest and re-pitch yeast, and using bugs that are capable of causing problems. These suggestions deserve a bit of a defense, so here goes. Growing yeast from slants is serious work, and there is plenty of work to go around when brewing with a limited staff; the payback is simply missing and there are bigger issues that deserve full attention without running your own yeast lab. As far as harvesting and re-pitching, it is best to harvest yeast within a few days following the end of primary fermentation and to re-use as soon as possible to prevent loss in vitality and viability. If you only use a couple of strains and brew frequently, this may be an option. And now onto funky bugs; don't bring these into your brewery unless you really know what you are doing. This includes *Brettanomyces*, lactic acid bacteria, diastatic and lactic acid yeast strains. There is nothing wild and spontaneous about how to operate a brewery that brings wildfire into the cellar.

So those are some of my thoughts about exploring beer through ingredients in a nanobrewery. I did not cover ingredients outside of malt, hops, water, and yeast/bacteria, and there is a whole world of beer that includes fruit, spices, nuts, etc., so there is no real limit to this exploration. The commonality with these ideas is experimentation, embracing small batch size, wandering from technological advances that may curtail creativity, and to tell stories. 

NANO MARKETING

MARKETING AND BRANDING

BY CAMERON JOHNSON

It's 1995. An obsessive, quirky homebrewer approaches his state's Senate armed with a passionately-produced product and a dream to open Delaware's first brewpub. Like many who have tripped, jumped, or leaped with reckless abandon into the world of craft beer, Sam Calagione quickly diverged from his degreed track focusing on fiction writing upon his exposure to great beer, commencing a romance of Shakespearean proportions (minus the tragedy).¹ From the beginning, Dogfish Head set itself apart with everything from its tagline to its products, embracing some inherent quiriness and a masterful way with words, Calagione's beer quickly became a household name. While the story of Dogfish Head is one many are familiar with, the lessons we can glean from the brand, and similar entities in the market, are somewhat more obscure, but nonetheless inspiring.

Unfortunately, marketing your brewery is often seen as a "necessary evil" – an uninspiring necessity of keeping your name out there and on your customers' minds. Brewers are largely creative types who like to have their hands involved in making, rather than recording or promoting. But I would encourage my fellow brewers to consider marketing as simply another tool of the trade, alongside the mash paddle and carbonation stone. Marketing is an opportunity to share your unique story with your customers. In this respect, you can think of your daily social media postings much like you would consider a beer festival – share things that interest and intrigue, and make people remember you by. Dogfish Head has mastered this component of marketing their brand, adorning themselves with everything from an "Intergalactic Bocce Tournament" to limited-release product packages with Miles Davis. At first glance these elements may seem like silly promotional games, however



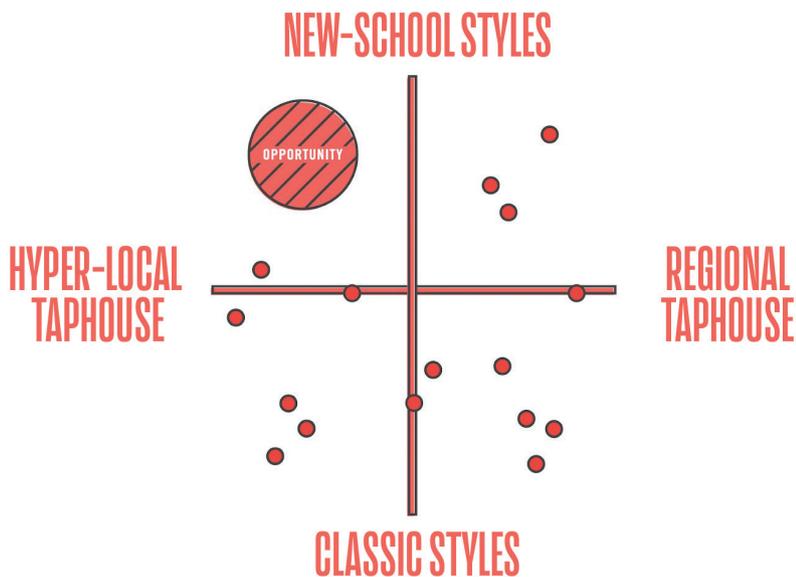
Photo courtesy of Shutterstock.com

Calagione makes sure to tie them back to the brand image thereby bolstering its fandom and legitimizing its claims.² Indeed, he is quoted in reference to his Miles Davis-inspired beer release (which he listened to while writing the company's business plan), "I wanted Dogfish Head to be a maniacally inventive and creative brewery, analog beer for the digital age."³

In many ways, branding is like the artistic expression of the business plan – the delayed accompaniment to the mission statement. You have a specific goal or message you are trying to communicate, and that message should be at the foundation of what your company stands for. Your brand is an ongoing manifesto about what is important to you, and what your company represents. Be honest. Yes, you must of course tailor the message to your audience and understand your market and your place within it, but the public can spot BS a mile away. Take a moment and consider the brands that you follow or admire the most, be they breweries or otherwise. Why are those brands worthy of your valuable time? Do they make you

laugh? Do they challenge you? Do they share the same values that you care about? Good branding is genuine. Good marketing shares that trait, but includes elements of "call and response." You're trying to get your customers to think about something, or to share their opinion, or to remember you. Good marketing is like good beer – it sticks with you.

One of the most helpful marketing tools that has stuck with me over the years is the *Craft Beer Branding Guide*, an incredibly detailed and endlessly useful reference, created by the awesome folks at CODO Design, a branding and web design company out of Indianapolis, Indiana. This guide begins with one of the most often-cited metrics of our tumultuous industry: In the past year in the U.S. alone, we saw an average of about three new breweries opening every day.⁴ Let's let that sink in a bit – that's at least 12 brand new, never before seen beers available (albeit, most likely in a highly localized market) every day. That's a lot of proverbial noise to compete against in an already crowded arena. But CODO outlines a succinct, yet detailed, plan of attack for defining and



defending your space within the larger market. According to them, effectively branding your brewery is the culmination of four main building blocks: Defining your brand's core values, positioning your brand, communicating your brand's essence, and establishing your brand identity system. Let's distill their concepts down for the nanobrewer-to-be.

Brand values: They're the intrinsic and immutable principles at the heart of your company. In this respect, nanobreweries are uniquely situated to provide for, and appeal to, a hyper-local market, meaning that your values are more than a set of perfunctory bullet points in a business plan. Instead, these values are how you relate to your direct consumers, and what those individuals will come to associate with your brewery. The general public may not always mirror your beliefs, but they will most certainly note when you fail to adhere to them, or if they are insincere.

Brand positioning: In order to identify and sell to your market, you need to first define who you will cater to and what kind of brewery you are. This is reinforced through almost every business decision you make, from taproom design and ambiance to your beer style selections and pricing.

CODO suggests the use of a matrix composed of two axes, representing opposite extremes of two values, seemingly related or not. They created their own matrix, but for our purposes, we borrowed their concept, tweaking it slightly . . . something you can do to fit your purposes.

Let's say you're opening your new

venture in a small city that already has a few other breweries and you want to ensure that you stand out. Like most of us, you probably love just about every beer style (as long as it's well-made), but maybe you're deeply fond of milkshake IPAs and pastry stouts. After a survey of your area, you find that the majority of the other local taprooms are producing beers within a more classic range of styles (e.g. amber, blonde, porter, pale). You also know that you want to be a small company (at least to begin with), as it allows you to start with a limited amount of capital, a lower amount of risk, and ability to control quality. As I'm sure you're a rabid and dutiful reader of *BYO*, being a nano operation means that you're focused on low-volume, high-margin sales, so you're focusing on in-house sales . . . getting people in your door. Let our y-axis represent our "Style" data set, with one extreme being exclusively producing classic beer styles, and the other being new school styles, while our x-axis, representing "Taproom Focus" spans between local draw versus regional draw. You develop a list of your local competitors, collecting data for these two sets (styles and focus), and plot them on your matrix. You can then see what you are up against in the market. This may also be a great visual to bring to potential investors. Exploring some similar markets from other cities in your region may be a great exercise as well. With any luck you'll find your love of new-school styles matched with a desire for a local taproom lands in a fairly empty quadrant.

Now, as with any good business

planning strategy, this should be an iterative process. Ask yourself why there isn't another brewery in this quadrant. Do the customers in your area simply not desire these "new school" styles? Or perhaps they simply don't know about them? This might indicate that customers in your area prefer to drink at regular bars or in their own homes, rather than at a brewery-taproom. Maybe your nano should be looking to sell kegs to get on tap lists at these bars. Asking yourself these questions leads to creating other matrices for comparison of two variables. The more of these you develop, the better informed you will be about your local market, your competition, and how you can best fit in.

Communicate the brand: Your brand's essence is the culmination of who you are, what you offer, and why people should care. It is communicated through your brand's personality, and reinforced by your communications. CODO first suggests considering your brewery as a person. How do they behave? What activities do they enjoy? What music do they like? What's their favorite book? Are they irreverent or serious? Outdoorsy or metropolitan? It's completely alright to be an odd mix of traits, but your personality must reinforce your brand's core values. The second step is telling – letting your audience know who you are and why they should care about you and your products. Your voice is how you communicate your brand's values. As with brewing, voice consistency is key. In addition, you need to know your audience, and have a plan to keep them engaged with your message. You'll hear constantly reiterated the importance of firmly establishing your essence and values before tackling the typical fun pieces that we all tend to grasp at, like a name, logo, or core beers. So in order to create a sustainable and profitable business, your brewery's personality needs to stand out in the crowd.

Brand identity system: Once everything else is established, we finally get to the components that are used singularly, or combined, to create a visual representation of your brand essence. It includes a main logo, a secondary logo (a modified version, or versions, of your main logo for other formats or mediums), your color palette, and typography. Here again, CODO warns against focus-

ing too much on this visual or tactile component of your brand before developing your values and position in the market. “A lot of companies make the mistake of aligning their personality with what they believe their audience wants . . . It’s far better to build off of your core values and messaging to define a set of true, authentic, and ownable brand personality traits.”⁵

To conclude, and in an effort to provide a more contextualized point of view in these pieces, I like to end my articles with a Q&A session, enlisting the aid of others in the industry to shed some hands-on experience for the topic at hand. In my November 2019 column “Nanobrewery Models: Exploring three business plans,” I leaned on Sam Holloway for his business expertise. This time, I turn to my friend Michael Perozzo, Founder of ZZepellin, a creative agency supporting brands like Grains of Wrath, Pelican Brewing, and others.

Q: With social media playing such a large role in any brand’s image, what is your main advice for engaging with customers on these platforms?

A: Consistency is key. Consistency in

visuals, when you publish content, and the voice that the content speaks in. It’s important to put out quality content at the rate it can be consumed best. That can mean different things for different platforms. A Facebook post, for instance, can continue to reach and engage people for 5–8 hours. An Instagram image can continue for 1–2 days. Meanwhile, most tweets exist for a mere 30–60 minutes. All in all, it takes a plan to be consistent. Consistency doesn’t happen by shooting from the hip. That’s how you shoot your eye out.

Q: What are some alternative/inventive ways that you have seen marketing work for a brewery brand (e.g. generating revenue, building customer base, expanding market reach, etc.)?

A: It’s a noisy world out there. A brewery needs to stand out to be heard and there are a number of ways to do that. For one brand, it may be a sweepstakes to garner attention. Pelican Brewing Company is a great example of this strategy. You can win a 2-night trip to the beach just for following their Facebook page, and 210,000+ people have done exactly that.

For another, it’s striking imagery. Putting time and effort into consistently looking different than everyone else can lend a distinct advantage. I feel like Wayfinder Beer does this very well. The short animations and graphics of their can label, along with witty, in-your-face captions, have combined to make some strikingly beautiful magic. [®]BYO

REFERENCES

¹ <https://www.americanexpress.com/en-us/business/trends-and-insights/articles/sam-calagione-dogfish-head-craft-brewed-ales/>

² <https://www.stephenzoeller.com/building-authentic-brand-dogfish-head/>

³ <https://www.dogfish.com/brewery/beer/bitches-brew>

⁴ <https://fortune.com/2019/08/06/new-craft-breweries-2019-data/>

⁵ <https://craftbeerbrandingguide.com/defining-brewerys-brand-personality/>



Photo courtesy of Michael Tonsmeire/Sapwood Cellars

MARKETING LIKE THE PROS

BY CAMERON JOHNSON

It's 1995. An obsessive, quirky homebrewer approaches his state's Senate armed with a passionately-produced product and a dream to open Delaware's first brewpub. Like many who have tripped, jumped, or leaped with reckless abandon into the world of craft beer, Sam Calagione quickly diverged from his degreed track focusing on fiction writing upon his exposure to great beer, commencing a romance of Shakespearean proportions (minus the tragedy). From the beginning, Dogfish Head set itself apart with everything from its tagline to its products, embracing some inherent quirkiness and a masterful way with words, Calagione's beer quickly became a household name. While the story of Dogfish Head is one many are familiar with, the lessons we can glean from the brand, and similar entities in the market, are somewhat more obscure, but nonetheless inspiring.

Unfortunately, marketing your brewery is often seen as a necessary evil – an uninspiring necessity of keeping your name embedded in your customer's minds. Brewers are largely creative types who like to have their hands involved in making, rather than recording or promoting. But I would encourage my fellow brewers to consider marketing as simply another tool of the trade, alongside the mash paddle and carb stone.

Marketing is an opportunity to share your unique story with your customers. In this respect, you can think of your daily social media postings much like you would consider a beer festival – share things that interest and intrigue and make people remember you. Dogfish Head has mastered this component of marketing their brand, adorning themselves with everything from an "Intergalactic Bocce Tournament" to limited-release product packages with Miles Davis. While these elements may, at first glance, seem like silly promotional games, Calagione makes sure to tie them back to the brand image, thereby bolstering its fandom and legitimizing its claims. Indeed, he is quoted in refer-

ence to his Davis-inspired beer release (which he listened to while writing the company's business plan), "I wanted Dogfish Head to be a maniacally inventive and creative brewery, analog beer for the digital age."¹

Unfortunately, marketing your brewery is often seen as a necessary evil – an uninspiring necessity of keeping your name embedded in your customer's minds.

In many ways, branding is like the artistic expression of the business plan – the delayed accompaniment to the mission statement. You have a specific goal or message you are trying to communicate, and that message should be at the foundation of what your company stands for. Your brand is an ongoing manifesto about what is important to you, and what your company represents. Be honest. Yes, you must of course tailor the message to your audience and understand your market and your place within it, but the public can spot BS a mile away.

Take a moment and consider the brands that you follow or admire the most, be they breweries or otherwise. Why are those brands worthy of your valuable time? Do they make you laugh? Do they challenge you? Do you they share the same values that you care about? Good branding is genuine. Good marketing shares that trait, but includes elements of "call and response." You're trying to get your customers to think about something or to share their opinion or to remember you. Good marketing is like good beer – it sticks with you.

In an effort to provide a more contextualized point of view in these pieces, I'm enlisting the aid of professionals (all far more successful than I) to shed some industry-tested light on the topic at hand. In my November issue piece "Nanobrewery Models: Exploring three business plans," I leaned on Sam Holloway, Founder and President of Crafting a Strategy, for his business expertise. This time, I turn to my friend Michael Perozzo, Founder of ZZepellin, a creative

agency supporting brands like Grains of Wrath (Camas, Washington), and Pelican Brewing (Pacific City, Oregon), among others.

Q: With social media playing such a large role in any brand's image, what is your main advice for engaging with customers on these platforms?

A: Consistency is key. Consistency in visuals, when you publish content, and the voice that the content speaks, all of which matters. It's important to put out quality content at the rate it can be consumed best. That can mean different things for different platforms. A Facebook post, for instance, can continue to reach and engage people for 5–8 hours. An Instagram image can continue for 1–2 days. Meanwhile, most tweets exist for a mere 30–60 minutes. All in all, it takes a plan to be consistent. Consistency doesn't happen by shooting from the hip. That's how you shoot your eye out.

Q: Aside from promoting your brand, what are some alternative/inventive ways that you have seen marketing really work for a brewery brand (e.g., generating revenue, building customer base, expanding market reach, etc.)?

A: It's a noisy world out there. A brewery needs to stand out to be heard and there are a number of ways to do that. For one brand, it may be a sweepstakes to garner attention. Pelican Brewing Company is a great example of this strategy. You can win a 2-night trip to the beach just for following their Facebook page, and 210,000+ people have done exactly that.

For another, it's striking imagery. Putting time and effort into consistently looking different than everyone else can lend a distinct advantage. I feel like Wayfinder Beer (Portland, Oregon) does this very well. The short animations and graphics of their can label, along with witty, in-your-face captions, have combined to make some strikingly beautiful magic.

Q: What is/are your favorite beer brands

to follow? What is it about their marketing that keeps you coming back for new content?

A: I mentioned Pelican and Wayfinder already. I really enjoy Cerebral Brewing in Denver, Colorado. They have great image quality and their beer releases are often quite long and very detailed. It plays very well with their lab/library/book nerd vibe. Normally brevity is better, but they've made me want to read their longer format.

Cloudburst Brewing in Seattle, Washington is a super fun follow. Their brand says, "we don't care." It's in stark contrast to their beer – which they obviously care very much about. Their marketing pokes fun at marketing itself

and flies in the face of our corporate beer overlords. Hilarious stuff.

Brothers Cascadia Brewing in Vancouver, Washington is a great example of a brewery using video storytelling. Their videos are well done and oozing with personality whether they're tongue-in-cheek or very serious. Either way, there's attention to quality and they're very watchable.

Other brands (that I don't personally work with) who have been very consistent, and therefore successful, include Pfriem Family Brewers (Hood River, Oregon), Left Hand Brewing (Longmont, Colorado), Fort George Brewery (Astoria, Oregon) and Reuben's Brews (Seattle, Washington).

REFERENCES:

<https://www.dogfish.com/brewery/beer/bitches-brew>

<https://www.americanexpress.com/en-us/business/trends-and-insights/articles/sam-calagione-dogfish-head-craft-brewed-ales/>

<https://www.stephenzoeller.com/building-authentic-brand-dogfish-head/>



Photo courtesy of Pagosa Brewing Co.

CRUNCHING THE COGS

BY AUDRA GAIZIUNAS

When I was hired by Dogfish Head a decade ago, one of the first trips I took was a research vacation to the Pacific Northwest to immerse myself in and learn as much as I could about the business behind craft beer. I had very few beery numbers peers back then, and most worked for breweries the size of New Belgium, Sierra, and Allagash. I recognized the importance of learning from smaller-scale operations, to understand their growth patterns and costing methodologies, but I needed to build a database in order to map those patterns. Over a period of a week I visited 26 breweries and brewpubs, and the results of my findings were astounding. At that point, 25 of the 26 didn't know how to cost out one run of their beer. Very few to none were implementing any cost accounting practices, and most were using averages as estimates. Estimates at *best*. The cash was rolling in, and each was generating enough sales to pay all the bills and payroll, so that was viewed as good enough. Being an accountant, this was a challenging mindset for me to accept. It was also quite eye-opening and provided me the inspiration to eventually launch my own consultancy focused on small-scale operations.

Over the past decade I've had many conversations with aspiring brewers as they've explored the financial and emotional feasibility of running a nanobrewery. "Could one support oneself and/or his or her family with a 1-BBL or 3-BBL operation in 1,500 square foot (140 sq. m) space?" "Could that 1-BBL brewery grow into a 7-BBL or 10-BBL operation pretty easily with unique branding and quirky styles? Others have done it in the past, so could I?" These brewers would hand me their numbers, and I'd poke holes through their assumptions. Where are the production and taproom losses

factored in? Why are you using average cost when the most expensive style will be your flagship? Where are your credit card processing fees? Time and time again full cost has been misunderstood as another startup would venture forth undercapitalized. Small-scale brewers need to understand how to cost not only our beers, but our entire operation as well. Let's start with the type of costs that fold into each batch we create.

TYPES OF COSTS

Within our operation we have fixed costs and variable costs. Fixed costs do not change with our level of production, while variable costs do. Some examples of fixed costs would include our monthly lease of our space, liability insurance, and our head brewer's salary (unless he/she is paid hourly). Variable costs would include our raw materials (malt, hops, adjuncts), carbonation, and packaging. Some costs are a mix of fixed and variable, such as certain utilities, where you are charged a fixed monthly account fee and a separate usage fee per kilowatt, gallon, etc.

All our costs can also be labeled as direct or indirect. Direct costs can be traced back to each batch of beer produced, such as raw materials, which are traced by pounds per batch produced or the head brewer's salary, which are traced by hours spent brewing each batch. Indirect costs cannot be easily traced back to each batch of beer produced; thus, they are allocated based on a certain level of activity. In most cases in brewing, that activity is number of gallons produced and include such costs as carbon dioxide, which is used in many processes within the brewery, from carbonating our beer within our fermentation vessels (FVs) to moving beer through the lines in the taproom and through our canning line while

packaging via mobile canner. Other indirect costs would include insurance on the brewery equipment, our lease on the production space, and management oversight.

Each cost can be categorized as fixed or variable and direct or indirect, so start your analysis by labeling each of your costs by those two categories, then grouping those categories together. This exercise will help you determine which costs you can and can't control as you launch and grow your operation.

So how does one calculate full cost per batch of beer produced? Create a spreadsheet with tabs for each of your recipes. In these tabs you will capture your direct costs: Direct materials and direct labor. Then add a tab to capture your total indirect costs, which we numbers nerds call overhead. Overhead is an accounting term that refers to all ongoing brewery expenses not including or related to direct labor, direct materials, or third-party expenses that are billed directly to customers. A brewery must pay overhead on an ongoing basis, regardless of whether it is producing a high or low amount of barrelage. It is important not just for budgeting purposes but for determining how much a brewery must charge for its products or services to make a profit.

Overhead expenses can be fixed, meaning they are the same from month to month, or variable, meaning they increase or decrease depending on the brewery's production level. For example, our rent payment may be fixed while shipping and mailing may be variable. Overhead expenses can also be semi-variable, meaning that the brewery incurs some portion of the expense no matter what, and some portion depends on the level of production activity. Overhead can be general, referred to as company overhead, meaning that it applies

to the brewery's operations as a whole. A brewery can allocate overhead to a specific project or department as well (production versus sales or administrative). Your overhead costs can be broken down annually, quarterly, or even monthly, but most start with quarterly to ensure they can keep up with adjustments. From the nano perspective, overhead costs will include marketing, depreciation on production equipment, insurance, and utilities. Estimate the amount of beer you will produce over a defined time period (quarterly, annually, etc.) in gallons, then divide your total overhead costs by number of gallons you're producing to determine your overhead rate per gallon of beer.

DEVELOPING A PRICE POINT

Once you understand the full cost to produce each beer, assign a price to each batch to ensure you're making an adequate margin. Most nanobreweries operate using a taproom-focused model to maximize profitability, so the vessel sold is a 16 oz. pint (473 mL). Each gallon consists of 128 oz., or 8 pints, or 3.8 L, but I've completed enough research to understand that only 65–75% of sellable liquid is actually realized as revenue. The rest is lost due to foaming, taplines, and comps. Therefore, assume each gallon (3.8 L) translates into roughly 6 sellable pints (96 oz. or 2.8 L). Multiply your pint price by 6 to arrive at total revenue. Subtract your per gallon (3.8 L) cost from that revenue and make sure that number is positive. If it isn't, revisit your pricing and cost structure until it is.

Another way to look at cost is by calculating your breakeven point. The breakeven point is the level of sales where your profit is zero. The breakeven formula is sales minus variable cost minus fixed cost. You multiply your sales per unit by units sold. You also multiply the variable cost per unit by the same units sold. The sales level that makes the formula equal to zero is the breakeven point. Illustrated, the breakeven formula looks like this:

$$P(x) - VC(x) - FC = 0.$$

FC = fixed cost

P = price per unit

VC = variable cost per unit

x = units

Say that our sales price per case is \$20. Rent is \$100. Utilities total \$50. Barley and hops cost \$3 per case. Packaging runs \$2 per case and hourly labor runs \$1 per case.

First, what's fixed versus variable? Our fixed costs include rent and utilities (\$150 total). Our variable costs include our raw materials, hourly labor, and packaging (\$6 total). Let's now solve for x.

$$\$20(x) - \$6.00(x) - \$150 = 0$$

$$\$14x - \$150 = 0$$

$$\$150 = \$14x$$

x = 10.7 or 11 cases (round up to nearest whole case)

Our operation would have to sell 11 cases to break even.

THE IMPORTANCE OF COGS

What is COGS anyway? COGS is cost of goods sold, or the accumulated total of all costs used to create a product (in our case: Beer), which has been sold. We match the time period we recognize revenue for the beer we have sold with the cost it took to produce those goods in the same period. For example, say we brewed a beer in May and then sold it in pints in June. During the month of May, the beer is sitting in our inventory on our balance sheet. When we sell the beer in June, we move that cost from the balance sheet to the income statement as cost of goods sold to match up with the sales we have recognized for that same beer. It is only in using this matching principle that we can understand our true profit.

When evaluating your total cost of goods sold (COGS), I highly recommend using a weighted average cost of goods for your pro forma modeling versus a plain (mean) average. In other words, estimate how much sales you anticipate per style, and assign that same percentage of cost. For example, let's say you plan on four flagship styles: An IPA, a Pilsner, a Berliner, and a stout. You expect your sales to be 40% IPA, 25% Pilsner, 20% Berliner, and 15% stout (for a total of 100%). Looking at your recipe costs, apply 40% to your IPA cost, 25% to your Pilsner cost, 20% to your Berliner cost, and 15% to your stout cost, then add those four up. The total will be your weighted average cost of goods. Use that weighted average for your cost

projections. What if you don't know your cost per style with any great degree of precision? Then determine your most expensive style and apply that cost to your entire model. In this example, the IPA will cost you the most between those four (just the hops alone), so apply your IPA cost to your entire financial model. The point here is that using a plain average versus weighted average when modeling numbers for the craft beer industry is a dangerous beast. On a nano scale you set yourself up for challenges in cash flow management and production planning that may become too difficult to surmount early on. The more accurately you calculate your gross margin, the better your chances of charting a financially feasible course for your nano's future.

One final point to address here is excise taxes. Excise taxes are a cost of sale versus a cost of production. You do not incur excise tax until the finished beer is removed for consumption or sale. Therefore, it is not included as part of a cost of production, but rather as a part of sales, general, and administrative costs.

FINAL THOUGHTS

Startup breweries, especially nanos, tend to spend too little time planning for the business side of their operation. The equipment costs significantly less compared to a 15-BBL brewhouse with distribution aspirations, so the barrier to entry is quite low. Couple that with aspirations of pint sales profitability, and all of a sudden we are led by romantic aspirations of a lifestyle business versus pragmatic thinking. Make sure you spend enough time planning for all your anticipated fixed and variable expenses, understanding the relationship between the two and calculate your breakeven range before diving right in with your TTB application. Remember that hope is not a strategy. A well-crafted understanding of your COGS is a much better place to start. 

CASH FLOW MANAGEMENT I

BY AUDRA GAIZIUNAS

When nanobrewers create business plans and subsequently open, their tendency is to focus almost exclusively on their income statement. What are our revenue streams? What are our recipe costs? What will it take to keep the lights on in our little establishment? While these are certainly important questions, many business owners seem to miss asking the questions pertaining to the other two financial statements: The balance sheet and the cash flow. What is our monthly debt payment? Should we order a specific quantity of grain based on a price break? If our local accounts can order on credit, what are our payment terms? When should we order our next set of fermenters? These questions are just as critical (if not more) for our brewery's survival.

One of the most common misconceptions I witness when working with breweries is the confusion that exists between the income statement and cash flow statement. Often these two statements are viewed as one and the same, when they are not. Profitable breweries can fail to adequately manage their cash flow and close. Likewise, breweries showing losses but mindful of cash flow management can pivot and succeed. I can walk through the list of brewery closures from 2019 and 2020 (prior to COVID-19) and state with a high degree of certainty poor cash flow management as the top culprit responsible for the demise of those entities.

I was working with a California client who wanted to buy out a nano that had been open for about three years. He asked that I run a valuation on their financial position to ensure the asking price was reasonable. The seller insisted his operation was worth more, as he had shown a profit every year and had adequate cash in the bank. He truly believed his operation was successful. Yet upon closer inspection, I discovered he kept taking out additional debt to pay his bills, so the cash in his bank account was there not from his own internally generated earnings, but rather by loans. He was showing a profit be-

cause he neglected to include such key figures as interest expense and credit card processing fees from his point-of-sale. When I analyzed the number of barrels he was brewing and subsequently selling over the past three years, then projected forward for the next five years, the worth of this business was dramatically different than what he had calculated it to be. It was worth significantly less. "But I'm showing a profit; it's worth at least three times that!" he insisted. His entire focus was on the income statement. I showed him the cash flow statement and explained how the high debt payments eroded his cash position to the point he couldn't pay his day-to-day operational costs; therefore, had to take on more debt. His nano was catapulting down a loan-fueled spiral it wouldn't be able to climb out. I walked him through his balance sheet. At this point he had a higher degree of debt than his assets were worth; his equity position was negative. There wasn't enough growth in his sales for the asking price he wanted. The buyer and seller ended up working out an agreement, and once the buyer took ownership of the equipment we created a budget for his oper-

ation. I taught him the fundamentals of each of the three major financial statements, and the budget was built tying all three together. We could discuss the point in time he'd be able to afford additional fermenters based on his own internally generated earnings and at what point it made financial sense to add his first and second employees. Two years later, he's still clicking down that path with the cash flow statement driving his major business decisions.

The cash flow statement serves as a bridge between the balance sheet and the income statement – it ties them together. The first section of the cash flow statement is cash flow from operations, which includes transactions from all operational business activities. The cash flows from operations section begins with net income, then reconciles all noncash items (such as depreciation, amortization, and interest expense) to cash items involving operational activities. So, in other words, it is the brewery's net income, but in a cash version. This section reports cash flows and outflows that stem directly from a brewery's main business activities, which include buying and selling inventory and experiences, as well as



Image courtesy of Shutterstock.com



One of the most common misconceptions I witness when working with breweries is the confusion that exists between the income statement and cash flow statement.



paying employees (if there are any other than the owner) their salaries.

This investing section for a brewery typically includes cash spent on property and equipment required. It also includes the sale of any property or equipment.

The financing section measures cash flow between the brewery and its owners and its creditors and includes such items as debt payments on long-term notes, dividend payments, owner draws, and SBA loan proceeds.

The cash flow statement is believed to be the most intuitive of all the financial statements because it follows the cash made by the nano in three main ways – through operations, investment, and financing. The sum of these three segments is called net cash flow.

Most breweries use accrual accounting, which means the company's income statement is not the same as the company's cash position. Let's say a brewery delivers beer to a local restaurant on payment terms of net 15 (payment is due in 15 days time). In other words, the brewery is extending credit to the restaurant for 15 days. Even though the brewery recognizes that sale as revenue at the time the beer is delivered, the brewery may not re-

ceive cash until up to 15 days later. The brewery earns a profit on the income statement and incurs excise taxes the month the beer was removed for sale, but the brewery may bring in more or less cash than the sales or income figures, and it may not line up with the same month the sale was recognized. Revenue and expenses may be incurred in one month, but the payment for or receipt of cash may be another month, so the key to wading through and mastering the cash inflows and outflows to offer clarity to your brewery's operations is understanding and controlling the timing of those inflows and outflows.

Here are some other best practices for cash flow management over the short term?

• **Understand your fixed overhead.** What are your expected monthly cash outflows despite any level of production, whether 0 BBLs or 200 BBLs? Which bills will you have to pay? Items such as a lease, insurance, music licensing fees (if you have music in the taproom), Quickbooks Online subscription, and debt payments are a few examples. Know your fixed overhead because it tells you how much cash (and more specifically, profit) you have to gener-

ate to pay for those costs to stay open.

• **Focus on generating working capital.** Working capital is the cash you need to meet the obligations of your day-to-day operations. On your balance sheet, it is calculated as current assets minus current liabilities. The excess you have left is working capital. The cash you generate from your own operations comes with no stipulations nor interest expense; thus working capital is the cheapest way to grow your nano. Building your cash reserves will also help keep you nimble.

• **Manage your inventory, accounts receivable, and accounts payable.** One of the most effective ways to master the timing of inflows and outflows are through these operational channels. Analyze these amounts on your balance sheet at least quarterly. Collect funds owed you as quickly as possible. Delay paying invoices until they are due. Review inventory balances, looking for slow-moving products, outdated hops or grain, or amounts that creep up over time. Oftentimes we find Easter eggs of cash bumps here.

Let's take a look at faux brewing company that I've name ABC Brewing that is bleeding money (Chart 1 below).

Before investigating their accounts

	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12
Cash Flow From Operations												
Net Income	\$12,106	\$14,462	\$15,959	\$15,477	\$14,486	\$12,418	\$13,356	\$13,364	\$12,539	\$12,548	\$13,389	\$5,398
Depreciation & Amortization	\$4,999	\$4,999	\$4,999	\$4,999	\$4,999	\$4,999	\$4,999	\$4,999	\$4,999	\$4,999	\$4,999	\$4,999
Interest Expense	\$7,121	\$7,113	\$7,105	\$7,097	\$7,089	\$7,081	\$7,073	\$7,064	\$7,056	\$7,048	\$7,039	\$7,031
(Additions)/Depletions of Inventory	\$0	\$0	\$3,412	\$1,444	\$306	\$414	\$2,022	\$0	\$514	\$0	\$0	\$1,743
Net Cash From Operating Activities	\$24,226	\$26,573	\$24,650	\$26,128	\$26,879	\$24,911	\$23,405	\$25,427	\$24,080	\$24,594	\$25,427	\$15,684
Cash Flow from Investing Activities												
Purchase of Property & Equipment	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$216,885
Purchase of Distribution Vehicles	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Deposits on Kegs	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Net Cash From Investing Activities	\$0	\$216,885										
Cash Flow from Financing Activities												
Line of Credit Borrowing	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Dividends	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Long Term Liability Repay	\$8,346	\$8,346	\$8,346	\$8,346	\$8,346	\$8,346	\$8,346	\$8,346	\$8,346	\$8,346	\$8,346	\$8,346
Net Cash From Financing Activities	\$8,346											
NET CASH FLOW	\$15,879	\$18,227	\$16,304	\$17,782	\$18,533	\$16,565	\$15,059	\$17,081	\$15,734	\$16,248	\$17,081	\$209,547
Beginning Cash	\$175,541	\$191,420	\$209,647	\$225,951	\$243,733	\$262,266	\$278,830	\$293,889	\$310,970	\$326,704	\$342,951	\$360,032
Ending Cash	\$191,420	\$209,647	\$225,951	\$243,733	\$262,266	\$278,830	\$293,889	\$310,970	\$326,704	\$342,951	\$360,032	\$150,485
Months of Cash	5.3	6.1	6.8	7.3	7.6	7.7	8.2	8.7	9.0	9.4	10.1	3.4

Chart 1: A doomed brewery.

ABC Brewing						
Cash Flow Statement						
For the 6 months ended November 30, 2020						
	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6
Cash Flow From Operations						
Net Income	(17,440)	(16,812)	(16,302)	(16,772)	(16,752)	(14,771)
Depreciation & Amortization	3,477	3,477	3,477	3,477	3,477	3,477
Interest Expense	1,170	1,150	1,130	1,109	1,089	1,069
(Increases)/Decreases in Accounts Receivable	0	24,100	500	2,200	0	0
(Additions)/Depletions of Inventory	0	0	0	0	0	0
Increases/(Decreases) in Accounts Payable	11,650	22,300	0	0	0	0
Net Cash From Operating Activities	(1,143)	34,215	(11,195)	(9,985)	(12,185)	(10,225)
Cash Flow from Investing Activities						
Purchase of Property & Equipment	0	0	0	0	0	0
Sale of Property & Equipment	0	0	0	0	0	0
Deposits on Kegs	0	0	0	0	0	0
Net Cash From Investing Activities	0	0	0	0	0	0
Cash Flow from Financing Activities						
Line of Credit Borrowing	0	0	0	0	0	0
Dividends	0	0	0	0	0	0
New Current Borrowing - Additional Loan or Equity	0	0	0	0	0	0
Long Term Liability Repay (Principal Only)	(4,830)	(4,850)	(4,870)	(4,891)	(4,911)	(4,931)
Net Cash From Financing Activities	(4,830)	(4,850)	(4,870)	(4,891)	(4,911)	(4,931)
NET CASH FLOW	(5,973)	29,365	(16,065)	(14,876)	(17,096)	(15,157)
Beginning Cash	37,645	31,672	61,037	44,972	30,096	13,000
Ending Cash	31,672	61,037	44,972	30,096	13,000	(2,157)
Months of Cash	1	1	1	1	0	0

Chart 2: Still cash poor, but an improved financial situation for ABC Brewing.

ABC Brewing						
Cash Flow Statement						
For the 6 months ended November 30, 2020						
	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6
Cash Flow From Operations						
Net Income	(17,440)	(16,812)	(16,302)	(16,772)	(16,752)	(14,771)
Depreciation & Amortization	3,477	3,477	3,477	3,477	3,477	3,477
Interest Expense	1,170	1,150	1,130	1,109	1,089	1,069
(Increases)/Decreases in Accounts Receivable	0	24,100	500	2,200	0	0
(Additions)/Depletions of Inventory	5,200	4,400	1,600	0	0	600
Increases/(Decreases) in Accounts Payable	11,650	22,300	0	0	0	0
Net Cash From Operating Activities	4,057	38,615	(9,595)	(9,985)	(12,185)	(9,625)
Cash Flow from Investing Activities						
Purchase of Property & Equipment	0	0	0	0	0	0
Sale of Property & Equipment	0	0	0	0	0	0
Deposits on Kegs	0	0	0	0	0	0
Net Cash From Investing Activities	0	0	0	0	0	0
Cash Flow from Financing Activities						
Line of Credit Borrowing	0	0	0	0	0	0
Dividends	0	0	0	0	0	0
New Current Borrowing - Additional Loan or Equity	0	0	0	0	0	0
Long Term Liability Repay (Principal Only)	(4,830)	(4,850)	(4,870)	(4,891)	(4,911)	(4,931)
Net Cash From Financing Activities	(4,830)	(4,850)	(4,870)	(4,891)	(4,911)	(4,931)
NET CASH FLOW	(773)	33,765	(14,465)	(14,876)	(17,096)	(14,557)
Beginning Cash	37,645	36,872	70,637	56,172	41,296	24,200
Ending Cash	36,872	70,637	56,172	41,296	24,200	9,643
Months of Cash	1	2	1	1	1	0

Chart 3: Now ABC Brewing has balanced their cash flow statement.

receivable, accounts payable, and inventory balances, ABC Brewing appears it will run out of cash three months from now.

By taking the effort to call their customers to collect amounts due to the nano and changing payment terms from 15 days to cash-on-delivery, ABC Brewing brings some additional cash in the door. They also delay paying some of their invoices and set notifications to pay others the day they are due. This buys ABC Brewing some additional time to work through their loss slump (see Chart 2). Now they aren't forecasted to run out of cash until month 6.

And finally, ABC Brewing sells some of their older malt to local homebrewers and brews a few collabs using ingredients that are slow moving or no longer part of their normal recipes. They also offer a bundled sale for some of their bottled barleywines to get them out the door. Now look at their cash flow. They've bought themselves an additional 3 months to get profitable and figure out a plan of action. By understanding their cash flow statement and the levers they have to push, ABC Brewing is on its way to a sustainable position (see Chart 3).

The operations section of the cash flow should be our primary area of focus for short term planning and decision making. The investing and financing sections are where we look over the longer term.

In the next part of this series we will explore best practices to take over the long term and witness where it leads ABC Brewing. We will also explore cash flow financial ratios, creating a financial contingency plan, and delve into diversification of resources to ensure survival. Until then, cheers! 

CASH FLOW MANAGEMENT II

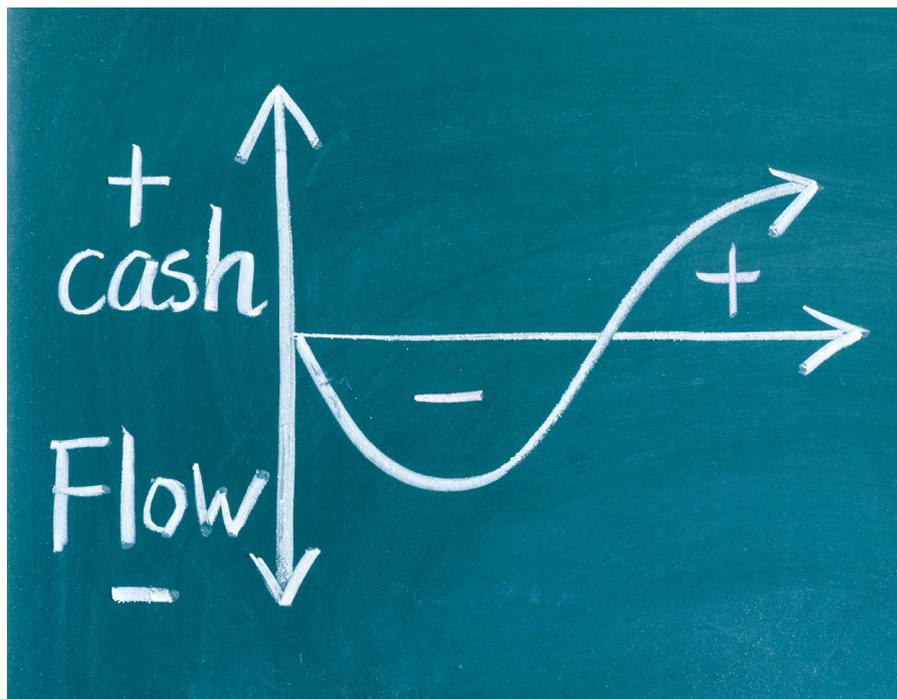
BY AUDRA GAIZIUNAS

In my previous column, “Cash Flow Management I,” we learned that the cash flow statement serves as a bridge between the balance sheet and the income statement. We also learned best practices to follow over the short term as they relate to the operating section of the cash flow statement. We then followed a fictional brewery as they focused their attention on short-term planning while optimizing their accounts receivable, accounts payable, and inventory. In this column we turn our attention to the investing and financing sections of the cash flow statement. These are our areas of focus over the longer term.

The cash flow from our **investing activities** involves the purchase and sale of fixed assets; assets whose useful lives extend past one fiscal year. It is through this section we plan the purchases of additional fermentation capacity, upgrade to a more robust canning solution, or sell that hand bottler we’re no longer using.

The cash flow from our **financing activities** is where we find our payments for our long-term loans, our dividends or profit-sharing payouts, and any sort of short-term line of credit borrowing we may need. It is important to note that repayment of debt is not reflected on the income statement, but rather on the cash flow statement and balance sheet. Therefore, it can be easily missed when one is creating a budget to plan for purchases of new assets over the upcoming year or having a valuation completed as a part of selling shares of the business.

When I took several nanobreweries’ financials to the bank to help them apply for a bridge loan this past summer of COVID-19 while waiting for Economic Injury Disaster Loan or Payroll Protection Plan funds to roll in, I noted the banker’s first area of focus for viability was the nano’s current debt state. Before looking at any sort of projections or planned use of funds, as reflected within the income statement, the banker calculated the nano’s debt service coverage ratio. This ratio, also known as the debt coverage ratio, is a critical benchmark used in the mea-



Managing and properly assessing your cash flow in both the short term and long term are critical to keep your brewery in a profitable place and growing in a healthy manner.

surement of a nano’s ability to produce enough cash to cover its debt payments. To calculate it, divide the net operating income (obtained from your income statement) by the annual debt, both principal and interest (obtained from the financing section of your cash flow). If that figure is 1.25 or higher, the banker will then move forward with their analysis. However, it doesn’t matter how rosy your projections look if that figure is less than 1. That’s been a hard stop for most this past year. Therefore, calculate your debt coverage ratio and spend some time improving it before approaching a bank if that figure isn’t where you expected it to be.

We explored some best practices for cash flow management over the short term in my previous article. Now let’s look at some best practices for cash flow management over the long term, the actions we can take to positively impact the investing and financing sections of our cash flow statement:

1. Align overhead spend with future demand. Overhead costs are the ongoing costs of running your nano that exclude direct materials (hops, malt, adjuncts) and direct labor (both brewing and packaging) to create each batch of

beer. Overhead includes such items as your monthly lease payment, utilities, dues and subscriptions, and insurance. Sum your overhead costs for a particular time period (I suggest annually first, then quarterly as you refine your operating model), then choose your activity driver as the divisor. I typically recommend using barrels or gallons produced. That pool of costs divided by gallons (or hectoliters) produced will give you an overhead rate per gallon (or hectoliter). Once you have that overhead rate, use that to help with your future cash flow forecasting needs. If you plan to produce 150 more barrels of beer over the course of 2021, and your overhead rate is \$3.42 per gallon ($\times 31 = \106.02 per barrel), be sure to plan for $150 \times \$106.02 = \$15,903$ more in cash outflow, whether in brand building and overall marketing or an increase with indirect labor to help support the additional production. While lease rate, insurance rate, and dues may not increase by any material amount, failing to account for the support it takes to sell that additional beer, especially when we may not have a dedicated sales staff, is often a pitfall

Photo courtesy of Shutterstock.com

nanos experience that puts them in a deficient cash flow position.

2. Review contracts. Take some time to periodically review all your contracts, as often vendors will build in small increases over time once they feel they have earned your loyalty through the perception of a high switching cost. This equates to small amounts of cash per transaction, but could add up significantly over time. Look at hops contracts, mobile canning contract, your merchant services fees contract tied to your point-of-sale, and even your solid waste removal contract.

capacity versus expanding the taproom space, analyze the certainty of the return you will receive from additional cash inflows over a defined period of time (say 3–5 years; with how rapidly our industry evolves, I rarely assign a life cycle of any initiative greater than 5 years). If we purchase additional tanks, let's look at the contribution margin received from each additional pint sold or keg filled each year over a period of the next three years. If we choose to invest in additional taproom space, let's look at contribution margin received from each

than we would spend on that initial capital outlay.

5. Minimize pricing erosion. Price erosion occurs when you lower your price, and thereby, the perceived value of your product, for the sake of increasing volume sold. While it may be tempting to permanently lower your pint price from \$6 to \$5 with the hope of selling more beer, usually the increase in volume sold doesn't make up for that loss in price realization. It is often more challenging to increase that price later down the road without some degree of pushback versus keep-

“ Price erosion occurs when you lower your price, and thereby, the perceived value of your product, for the sake of increasing volume sold. ”

Ensure the service being provided is aligned with your future needs in such a way you can begin recognizing efficiencies of scale. In some cases you will have to pay more per transaction based on the total volume of transactions incurred, so be prepared to pay or ditch that contract.

3. Eliminate, automate, and consolidate. Review your processes regularly to eliminate unnecessary steps. How many of your tasks truly need to be done? Do they have to be done in the same way that you've always done them? Automate your systems as much as possible to minimize the potential for human error, and consolidate your data repositories for accuracy and efficiency. Can your inventory management system integrate with your financial management system? Can your point of sale integrate with your financial management system? Working more won't necessarily coincide with more results; it does you no good to be efficient in tasks that are not effective. Never automate something that can be eliminated, and never delegate something that can be automated. The more efficient you become, the more cash you'll save over the longer term.

4. Evaluate all capital projects and purchases from the cash flow perspective versus the income statement. When faced with making an either/or decision based on limited funds, such as purchasing additional fermentation

additional seat we haven't been able to serve in the past that now we'll be able to serve over the next three years. It's not sufficient to simply look at additional revenue we expect to receive; we must understand the margin per unit brought in as it relates to our cash flow. We can then take things a step further by weighting each outcome by probability. For example, if we can't keep up with demand of our beers and are constantly running out, we can attach a certainty of 85–100% when analyzing the contribution margin we expect to receive from that additional tank. It's extremely likely we will sell all the additional beer we produce. On the other hand, if we live in a rural town and want to expand our taproom, we may be trying to cater to too small a demographic to create an impactful change on our cash flow by investing in a larger space. In that case, we could attach a 40–65% certainty when analyzing the contribution margin we expect to receive from each additional seat we'd be able to fill by adding new seats. If the contribution margin is the same from each, we'd choose the one with the higher degree of certainty. If the amount of incremental cash we expect to receive is relatively small, we can use the net present value (NPV) function in Excel to calculate total cash inflow expected over a three-year time period and compare it to project cost to ensure we don't generate less cash over that three-year time period

ing your price on the higher end out of the gate and steady. If your beers are good, the consumer will pay for it. Don't undervalue the work you've put in and the results you've achieved for the sake of potentially wrangling a few more dollars. Keep your pricing in line with the brand value you'd like your consumer to perceive.

Aside from these best practices, remember to use divisional accounting to track profitability by each arm of business of the nano, periodically review and revise your chart of accounts to ensure it still lines up with your business model's success metrics, review your point-of-sale entry (or mapping from your point-of-sale to your financial management system if they are integrated) as it relates to the accounts in the master chart of accounts, and embrace a holistic view of the enterprise when it comes to decisions affecting your cash flow.

When we control the peaks and valleys of our short-term cash flow, we have a longer line of sight and can plan our expansion and owner distributions with greater confidence. 

A BETTER BUSINESS FRAMEWORK

BY AUDRA GAIZIUNAS

Over the past decade I've worked with several dozen nano startups, and often the beginnings may sound familiar: Homebrewer who's been in their corporate career "too long" or almost-but-not-quite-ready to retire, financially secure, feeling the lure of self-employment calling. They're ready to inject their savings into their startup, and they'd like to move quickly. The problem with moving quickly, however, is the lack of time put in to think strategically about the brewery's purpose, goals, and intentions. Who are you? What is your business model? How will you define success? What role will you play in the local economy and how?

Without appropriate planning to answer questions like these, you end up devising workaround solutions, whether with brewhouse standard operating procedures (SOPs), financial reporting, or long-term goal setting. Reactionary thinking results in haphazard actions that ultimately cost the nano valuable resources, including time and profits.

With a nano's size, one small seemingly innocuous action can throw the operation into a cash deficient position. So how do we step back and plan appropriately by thinking more openly, big picture about our operation? I'd like to introduce a strategic framework for every aspect of the planning process, and it applies to every facet of operations. This framework follows a cyclical, circular flow in four phases: **Define, design, implementation, and understand**. Let's look at each phase in greater detail.

STAGE ONE: DEFINE

All planning, whether with financial management, marketing, or production begins at this first stage. It is during this stage we define who we are, our goals, and most importantly, *our success metrics*. So let's take a look.

From the marketing perspective, we should be asking:

- Are we going to be a local lifestyle brand selling 100% over the bar, or do we want to eventually launch

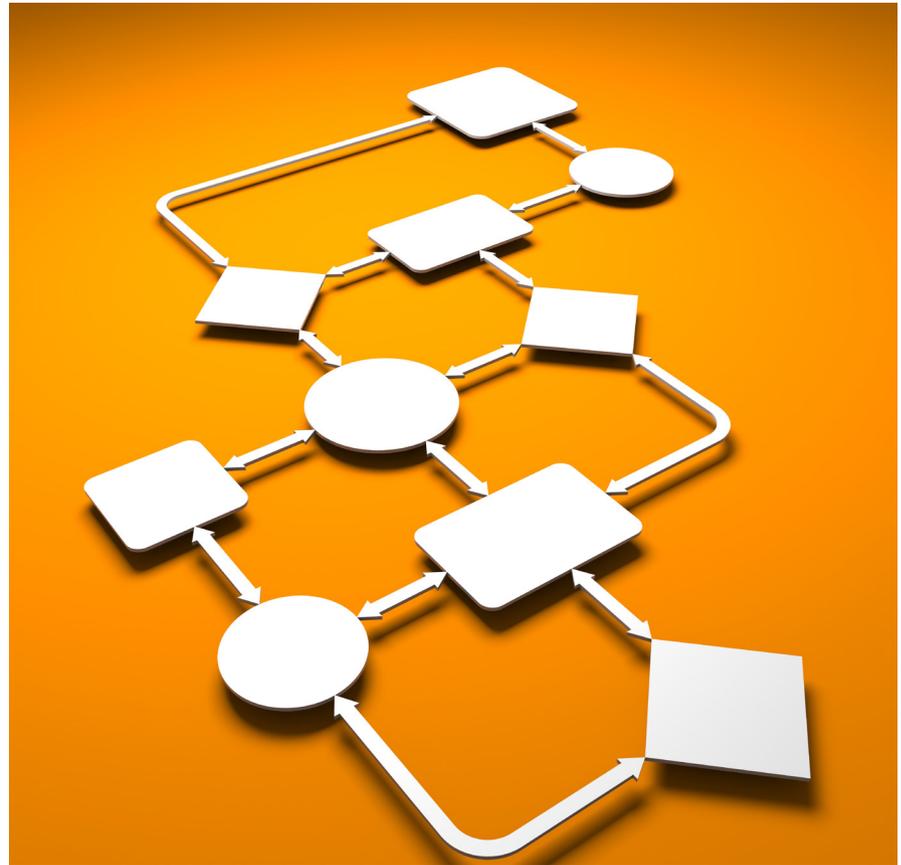


Image courtesy of Depositphotos.com

into local distribution?

- What will that distribution strategy look like, and how do we set or define those goals?
- If we choose draft-only distribution, how do we want to define success based on tap handle acquisition versus retention?
- What will our distribution footprint look like?
- Will we be packaging our beer, in bottles, crowlers, or cans?
- How many interactions via social media or e-newsletter will we post daily, weekly, monthly?
- Who will respond to the public's comments, and how quickly?
- How often will we release new label art?

From the financial perspective, we should be asking:

- Are we going to set ourselves up with an LLC or simply report earn-

ings via our personal Schedule C?

- What will our annual production goal in barrelage be over the upcoming 3-5 years?
- How do those goals translate into sales dollars and growth percentages year-over-year?
- What are our goals in terms of net income and retained earnings?
- How many months of working capital will we target when it comes to our cash account?
- At what point (month, year) will we as the owner be paid (this is important), and how much? What is our pricing structure?

From the production perspective, we should be asking:

- How will we measure and control our losses and brewhouse efficiency year-over-year?
- At which point(s) of production will we measure losses: From brewhouse

- to brite tank to package, or simply from brewhouse to package?
- How will we measure losses in the taproom?
- How quickly do we plan to cycle through our fermentation tanks?
- How will we measure our keg turns in order to ensure we have enough

develop the stages of our label design process and choose to use a particular communication channel such as Slack or project management tool such as Asana to hold people accountable and on track. (It's okay to use a white board or Post-It notes as a temporary solution, but these methods leave no paper or digital trail.

day. We design our brew log to capture as much of this information as possible while also creating the least amount of additional work to complete the monthly excise tax returns and the quarterly TTB Brewers Report of Operations. We design our daily journal entry from our point-of-sale that tells us the exact amount of

“ The environment you create must be comfortable, memorable, and reflect what your brand is about. ”

cooperage?

As we define our operational strategy by answering these questions, we want to be sure we are setting *specific, measurable, realistic benchmarks bound by time*. For example, in year 1, we could say we plan to produce 225 barrels at no more than a 15% loss through the brewhouse and 10% loss through the taproom. We will sell 100% of our beer through the taproom in order to prove our concept and build our cash reserves the most quickly. We will release new beers every Thursday and communicate via post through all social media channels Wednesday evenings at 7p.m. EST. We will make no less than 76% profit margin (net sales less cost of goods sold) per pint in order to buy a crowler machine and an additional fermenter in month 6 of year 2.

A best practice is to set your long-term goals first, then build shorter-term goals based off that long-term vision. What is your end game? What do you want to accomplish with your nano? Then revisit those goals, both long- and short-term on a regular basis; at the very least, annually.

STAGE TWO: DESIGN

By taking the time to plan the big picture in specific and measurable terms (such as in the example above), this will allow us to design our systems and processes to complement our strategy. It is here where we use the success metrics we have defined earlier in our framework in order to design our financial management systems, inventory management systems, and our SOPs.

From the marketing side, we design our language and tone we will use in our posts to ensure they stay on brand. We

They tend to disappear. If it's just you and you alone responsible for 100% of the operation, things could quickly break down.) We decide to respond to all questions and comments on social media within 24 hours.

From the financial management side it is during this stage that we create our chart of accounts (COA) and ensure we have captured all our revenue streams, each related cost of goods stream, and all our sales, general, and administrative categories. Assistance from an accountant may be something to consider. As attaining a 76% profit margin per pint is our goal in the earlier example, we must make sure we design our accounting and point-of-sale systems to readily present that information. As we are going to be measuring brewhouse efficiency and loss through packaging to keg, we must make sure we have variance accounts included in cost of goods portion of our chart of accounts to capture those losses. For a COA template, I can share one as an example. You can find that chart at https://byo.com/wp-content/uploads/COA-Template_Audra-Gaiziunas.xlsx

From the operational and production side, we design process flow by department and between departments. Production versus non-production sides of the business apply to every nanobrewery and are two distinct departments. We design the process for receiving inventory. We design our protocol for the clean-in-place (CIP) and sanitation cycle. We set the last day of the month as the day we take physical inventory counts and adjust the books to actual numbers. We design our process in tracking keg turns without sophisticated technology. We choose Tuesday morning as our administrative paperwork and bill paying

sales tax we owe the state at month-end.

Examples of filings that need to occur monthly include federal and state withholding and federal and state unemployment for all your employees (if any), state excise tax reporting, and state sales and use tax reporting. Examples of filings that need to occur quarterly include the Federal TTB Brewers Report of Operations, federal excise tax reporting, and state unemployment and contribution report. Examples of filings that need to occur annually include the Federal 940/941, the W-2 and 1098 (for all your contractors filing 1099 status) and the brewery's state personal property detail. Most of this reporting averages 3–5 hours per month with appropriately designed systems or 6–8 hours without appropriately designed systems.

As we walk through all our defined success metrics, it is during the design phase that we develop our systems that will tell us consistently at any defined time interval whether or not we are meeting those success metrics.

STAGE THREE: IMPLEMENT

Once we have designed our systems and feel they are well-matched with our success metrics, we *implement* them to ensure our systems provide us the information we are seeking. This is the equivalent of a beta test run to see what information sticks versus drops out, what creates bottlenecks and frustration versus ease, and what simply doesn't work as intended, despite best efforts put forth. It is during this stage creativity with data collection plays a part, especially with such actions as brewhouse mishaps and causes, key cycle times, and packaging losses. You may also realize that tracking information in spreadsheets based on



Photo by Christian Lavender

your model is too laborious and prone to error; therefore, you decide to purchase inventory management software instead.

Ideally, the implement phase takes place well before you're open to the public to give you time to redefine and redesign until your processes match up to your success metrics and compliance requirements. Be sure to develop and design a communication strategy with all outside parties, even if you're just a nanobrewery of one. You'll be much better prepared should emergencies happen. Once you're open to the public, periodically review your processes to make sure they're still relevant. With our industry being so rapidly evolving and entrenched in constantly changing legislation, you want to ensure you're keeping on track with those changes, adapting as quickly as possible, and not wasting needless effort and resources on a process or metric that no longer fits your model.

STAGE FOUR: UNDERSTAND

As you continue to analyze the data you're receiving from the *implement* phase, you understand what worked and what didn't, which metrics of success you can track, and how the information

will all come together for compliance reporting. You keep those processes you designed that work and go back to the *design* phase for those that didn't for revisions and a new round of testing. This is your time to reflect on what works for your brewery and where improvements can be made in all business aspects.

Finally, consolidate all the feedback and metrics involved throughout this strategic planning process into an annual plan, a budget. It is here we lay out sales goals: Mix by brand and package type and volume, marketing spend, production losses and variances, and general/administrative overhead for the year ahead. It shows us how much profit we'll be able to roll back into retained earnings and gives us valuable insight into our cash flows to help us decide on whether we want to take out a future loan, or whether we're investing too much cash in our inventory. This plan becomes our roadmap holding us accountable to our goals, and it also forces us to revisit our self-defined success metrics on a regular basis. We may not get that annual plan right the first time, but it's more about the process than the result. Be forgiving. Be flexible. The more often you go through this process, the stronger

it will become, but just like any sport, you can't expect to master it the first time you attempt it. 

NANO QUALITY CONTROL

VETTING YOUR BEER

BY AMY TODD

How many of you want to start a lab, but have no idea where to start? You begin to look into it, but there are so many different aspects of a lab you get overwhelmed and put the project on the back burner. Starting a quality control program may feel like a very daunting task, but it doesn't have to be. I'll walk you through the initial steps to get you started.

This article is not going to cover specific equipment needed, or how to run tests, but it will walk you through what you need to think about to start planning your quality control program. Every brewery is different and for some breweries this may include a designated lab, for others it might not. Regardless of experience or budget, everyone can, and should, implement a quality program in their brewery.

By the end of this article I want everyone to feel empowered to take the next steps in starting their own lab or quality program. It's perfectly okay to start small, in fact, that's one of the best ways to start. I'll even cover what to do with no budget.

Here's a little recap on why you should start a quality control program. First off, having a good quality program is going to help you ensure the consistency of your product, you'll be able to identify inefficiencies, improve your process control, and it's going to reduce wasted product and wasted time. It's also going to instill a sense of pride and ownership in you and your employees. The hardest part of starting a quality program is just starting in the first place.

PLANNING STAGE

Your very first task should be to plan out the logistics of your quality program. To help break it down into manageable chunks, I like to start by thinking about who, what, when, where, and why. These are all going to ultimately determine



Photo by Amy Todd

what your quality program will look like and where you're going to start. As you work through this you'll see that most of these are interconnected. Every brewery is different and everyone will start out at whatever point is best for their brewery.

Why – I like to start with why. Why do you want a quality program in the first place? Do you already have an issue you want to address? Maybe you're looking to avoid off-flavors, or maybe improve your brewhouse efficiency, or the consistency of your product. Maybe then you want to focus on packaging and micro as you enter new markets. Having a solid why is going to help you focus and find the best place to start for your brewery.

Who – Who is going to run the lab? Just you? Your brewer? Are you hiring

someone just to do quality? Will that be full-time, part-time? If you only need a few hours a week, maybe it's best to outsource some testing to start. Don't forget to think about time commitments and associated labor costs.

What – This is a two-part section. What is your budget? And what is going to go in your lab? This is a really big one. Ultimately your budget will determine what's in your lab. You'll want an initial budget, a yearly budget for new equipment, as well as a monthly budget for consumable lab supplies and chemicals. This will help determine what's in your lab and what you're testing for.

Don't forget labor costs when you decide what you're testing for. Again, you might want to outsource some tests if you can't afford equipment or addi-

tional employees right now. \$30–\$40 added to the cost of a batch of beer might make a lot more sense than thousands of dollars in lab equipment at this time. Your why will help determine what's in your lab as well.

When – I say start your program right away! It's easier to slowly add tasks as you grow than to play catch up if you start growing too fast. Even something small, like starting with cell counts, is way better than nothing. You don't want to put this on the back burner and never

with added expense.

You may want to start by focusing on only one of these categories, like sensory, then as you expand your quality program you can add another category. Some may decide to do a little of each.

Sensory – A sensory panel will help you identify off-flavors or troubleshoot problems in the brewhouse. Making sure your beers are true to brand and taste how they are supposed to taste is another key part of a sensory panel. A beer may hit all its desired specifica-

come these with a little patience and planning.

Time – One of the biggest hurdles to overcome when setting up your quality program is time. Most of us are already trying to cram too many things into one day, and adding something new may sound impossible. Everyone is going to handle this differently but some suggestions are to start by taking 10–15 minutes each day to start planning out your quality program. If you work better by having a solid chunk of time, sched-

“ A quality program can save money indirectly, and some of the biggest savings are when you prevent bad beer from going out in the market place. ”

get to it. Start planning for your future too. When are you going to start testing IBUs or dissolved oxygen (DO)? Just as you plan for your brewery's growth, plan out the lab's growth.

When are you going to have time to work in the lab? This will affect what tests you are able to do. If you don't have time personally, do you need to hire someone?

Where – Where is your lab going to be? When you're first starting out, a countertop with room for cell counting, pH and gravity readings, and some storage space is all you really need to get started. Make sure you keep future growth in mind. 10–15,000 barrels (bbls) and you'll want a separate space. Maybe a 10 x 12 ft. space. At 30,000 bbls you might want double that. Don't forget space for employees, computer stations, sinks, hoods, eye wash stations, and lots and lots of outlets. The bigger you get, the bigger the lab you'll need.

Once you answer these questions you can look into some specific tests and areas of focus for a quality program.

QUALITY CONTROL CATEGORIES

Next I like to break a quality control plan down into four basic categories – sensory, chemistry, micro, and packaging. I want to mention safety here too as you should always be thinking about safety in your brewery. Each of these categories are going to have their own safety concern, some of which will come

tions but still not taste how you want it to.

Chemistry – Tracking values such as gravity, pH, IBUs, color, FAN (free amino nitrogen), alcohol, haze, etc. can help us ensure everything is going according to plan. Tracking this data can also alert you when something isn't going according to plan. The quicker you notice something isn't right, or trending towards out of spec, the quicker you can look into the root cause and fix the problem before too many other batches are affected.

Micro – We like to think we're in control of the brewing process, but ultimately it's all those little yeast cells, (and bacteria in some cases, whether intentional or not) that are making the final beer. We want to do everything we can to make sure our yeast are happy and healthy. We also need to make sure there are no unwanted wild yeast or bacteria lurking around our brewery trying to take over.

Packaging – You spend all this time making the perfect beer and it can be instantly ruined if not packaged properly. Dissolved oxygen and CO₂ testing are critical measurements here. Checklists are a great way to assure date codes are legible and correct, labels are straight, and boxes are sealed.

MAJOR HURDLES

As you start planning out your quality program, you're most likely going to face some hurdles. You can easily over-

ule two hours one week to work on it. Schedule it as a meeting, even if it's just you, and commit to it. Go through your who, what, why one category at a time. Once you start, you might find yourself making time to work on this. If you can't make time for quality, how are you going to ensure you keep making great tasting, high-quality beers?

Money – Money is another big hurdle for most breweries, especially small ones and start-ups. A quality program can save money indirectly, and some of the biggest savings are when you prevent bad beer from going out in the marketplace. It can be very hard to calculate these theoretical savings and it may feel like you're just spending money and not getting anything in return. How do you measure increased quality and consistency to sales? It can be hard to show the correlation. Think about how much will it cost you to dump a batch of beer? This is a cost you are potentially avoiding by implementing a quality control program. How much will bad reviews cost you?

Time is money and being able to react quickly, or having the peace of mind that everything is performing as intended, can save you a lot of hassle and headaches. Yes, actually making the beer is important, but if you're constantly rushing and aren't taking the time to be proactive about quality, you'll find yourself reacting to something later on that will take even more time to handle.

Failure to Plan – The best way to

implement your quality control plan is to draft it out and actually plan it. Go slow and add things as you grow, do what works for you. Go back to your business plan, or if you haven't started a brewery yet, make sure you have a section on quality control and how and when you're going to grow your lab. What will your lab look like at 5,000, 15,000, 50,000 BBL? But even if you don't plan to grow capacity-wise, what would your lab look like in 1 year or 3 years as your brewery matures?

When you have a plan in place it's much easier to focus on it and work towards that goal. You may be tempted to invest in growth and more space or brewing equipment, but always keep quality in mind and you'll last longer than your competitors who grow too quickly but can't keep up with quality.

Check out the American Society of Brewing Chemists (ASBC) guide to starting lab. This is a great resource with information on what type of lab equipment you should have at different stages of growth.

Fear — Some people are scared of what they might find. Ignorance is bliss, right? The thing is, you want to find issues, because then you have the opportunity to fix them and make better beer! Some people are also hesitant to start a lab or quality program because they don't have a science background. Yes, it's helpful, but it's not necessary. Anything

can be learned and you don't need a science background to start a lab. Remember, there was once a day when you didn't know how to brew either.

Budget — What if you have no budget? Just because you don't have a budget for quality improvements now, doesn't mean you can't get started. You should still go through the process of thinking about why, who, what, when, and where to come up with a list of things you want to start implementing in your quality program. Without any expenses, you can make sure your hydrometers are calibrated. Check out the ASBC video on how to do this. Plot out your daily gravity readings during fermentation. Different batches of the same beer should follow a consistent curve. Any improvements you can make there? Plot out pH as well and make sure you're recording final pH values on all your beers.

Start a sensory program. Start by tasting your beers and ingredients. Come up with descriptions and expected intensity levels for hop aroma, malt sweetness, body, etc. Use Googleforms to keep track. Once you have a bigger budget to work with, purchase some off-flavor training kits.

Write out Standard Operating Procedures (SOP) to make sure all your brewing steps are being performed the same way every time. Make sure you're collecting useful and actionable informa-

tion when you're brewing. Implement checklists so you don't forget anything.

While you're making all the free improvements, start saving! Come up with an exact budget of what you want to have in your lab. Utilize the acronym SMART for your goals: Specific, measurable, achievable, relevant, and time-based. You're much more likely to follow through with a goal of: "Save \$500 in the next six months to spend on a microscope, hemocytometer, scale, glassware, and pipettes so I can perform cell counts and produce cleaner, more consistent beers" than if you had a vague goal of "save some money for a lab this year." If your budget is too small to afford any testing equipment right now but you have a long list of data points you want to collect, use a 3rd-party lab to supplement your own in-house quality program.

If you want repeat customers and continuous growth, you need a quality program in place. Be proactive about your quality, not reactive. With over 7,000 breweries in the US, craft-beer consumers can choose to be very picky. If the beers they purchase from your brewery are inconsistent, they can go elsewhere. Don't just tell your customers you care about quality, show them. Want to set up your own quality program? I've provided a planning & starting worksheet found on the next page. 



QUALITY PROGRAM WORKSHEET

BY AMY TODD

Content courtesy of Zymology Labs, LLC
Amy@zymologylabs.com
802-735-2277

WHY DO YOU WANT TO START A QUALITY PROGRAM?

WHO WILL RUN YOUR QUALITY PROGRAM?

WHEN DO YOU WANT TO START A QUALITY PROGRAM?

WHERE WILL YOUR LAB BE?

WHAT IS YOUR QUALITY BUDGET?

WHAT WILL BE IN YOUR LAB?

WHAT ARE THREE STEPS YOU CAN TAKE THIS MONTH TO START OR IMPROVE YOUR QUALITY PROGRAM?

TOP 5 WAYS TO A QUALITY PROGRAM

Starting a quality program can be overwhelming. There are so many different directions you can go in, and then there's the training and cost of equipment. It's hard enough opening a brewery, let alone setting up a lab. Luckily, getting started doesn't have to be expensive or complicated. Here are the top five things a nano brewer can do to get started with quality control and quality assurance.

1. ORGANIZE PAPERWORK AND USE BATCH CODES

Start by organizing all your paperwork. Write everything down on your batch records, use brewing software or GoogleDocs to keep everything together. Write down mash temperature, pH, gravity readings, when you added what and how much. If you deviate from your plan for whatever reason, write down what actually happened and why you made the change. Make notes when you try something new. Troubleshooting will be easier if all this information is organized and easy to read.

Include the lot numbers of all your ingredients. If your supplier issues a recall you'll want to know what batch those ingredients went into. Have a unique batch ID for each of your beers. Make sure you include a date code and batch number on your packages, including kegs. If you need to do a recall you won't have to recall everything, just the one batch.

2. CELL COUNTS

Cell counting and viability testing is one of the best things you can do to improve the consistency and quality of your beers. You can get everything you need for cell counting for under \$500. To count cells make a 1:100 dilution of your yeast slurry and put a drop on a hemocytometer; a specially designed slide with a chamber and counting grid. You then count how many cells are on your slide and calculate how many yeast cells are in 1mL of yeast slurry. You can then calculate how much yeast you need to pitch into your main batch based on volume, type of beer and starting gravity.

Performing cell counts and adjusting the amount of yeast you use based on results is one of the best things you can do to improve the quality and consistency of your beers. When you don't add enough yeast, they get stressed out and overworked. This can lead to off flavors and inconsistent fermentations. Adding too much yeast can also lead to off flavors and affect your fermentation rates.

3. SENSORY

Start a sensory panel. Get everyone involved and start by tasting and smelling your beers along with ingredients. Get some off flavor spiking kits and train on off flavors. Come up with true to brand descriptions for all of your beers. A sensory panel will help with off flavor identification, trouble shooting in the brew-house and making sure your beers taste how they're supposed to.

4. pH AND GRAVITY TRACKING

Make sure your hydrometers are calibrated and make a graph of your daily gravity readings. Every batch should follow a consistent fermentation curve for that beer. This can be the first step in identifying a process that could be improved. See how fermentation compares to last time you made that beer, and if you need to make changes next time to make it more consistent.

While you're taking gravity readings, take a pH reading as well. The pH should also follow a consistent curve throughout fermentation. A lower than normal pH can be an indicator of a problem in the brewery.

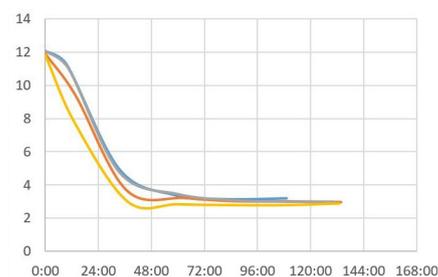
5. OUTSIDE TESTING

Get the ABV, color, IBUs, final and starting gravity tested at least once by an outside lab so you know where your beer actually falls compared to your calculations and gravity readings. Recheck on a quarterly or yearly basis to make sure you're brewing consistently. The more data you have, the easier it is to look for trends.

Whether you're just starting out or have been in the game for years, now is

the perfect time to focus on quality. Start with these simple steps and you'll make a huge impact on the quality and consistency of your beers. 

Fermentation Curve



pH Curve

