

Beer diversity all over the world

A GOOD OVERVIEW | The 12th Trends in Brewing took place in Ghent from April 3rd to 7th, 2016 (see BRAUWELT International 3 2016, pp. 192-195). The leading theme of the event was “Diversity of Beers and Beer Styles”, and the keynote speeches from *Prof. Ludwig Narziß*, TUM-Weihenstephan, Germany, *Chuck Skypeck*, Brewers Association, USA, *Chonlada Manakul*, Boonrawd Brewery, Thailand, and *Christian von der Heide*, Newlands Systems, Canada, provided a good overview on beer diversity in the various continents. The four speeches are summarised below, exclusively for our readers.

TO START WITH, Prof. Narziß explained why the topic of beer, in all its variations, is a success story on the European Continent, with numerous rather traditional styles. Chuck Skypeck described the enormous success of craft brewers in the United States, Chonlada Manakul gave the audience an insight into the Asian market divided into three very different regions, and Christian von der Heide spoke about beer diversity in Africa and Canada.

Development of beer styles in Europe

Prof. Ludwig Narziß, TUM-Weihenstephan, Freising/Germany



Belgium, Germany, the UK and the Czech Republic can be referred to as Europe's big beer nations. These countries have provided beer drinkers with typical beer styles for many decades or even centuries. These beer styles also made the magnificent success story of the beverage beer happen. English ales, Porters, Stouts and, in particular, the Indian Pale Ale, are known and revered all over the world. Belgian Trappist beers are nowadays brewed even in Italy, a typical wine country. German beers, initially top-fermented and later on bottom-fermented, the latter ones originally dark beers, are currently sold as pale lager and Export beers worldwide. And the Czech Pils has conquered the world as the most successful beer type and style.

Why have the various beer styles developed in Europe? What triggered this development? There are certainly many reasons, above all the different raw materials available (mostly barley malt but also wheat malt and other cereals, water quality and hops) as well as the climate (available cooling). “External” reasons include historical events such as wars or secularisation, later technical progress and new insights by brewers.

Inventions

Numerous inventions have been made that are based on brewing technology but that can also be useful in other sectors. When Antoni van Leeuwenhoek (17th century) invented the microscope, fermentation was no

longer regarded as a “magical event” but as the work of living organisms. Without this invention, the fundamental work of the “Father of Microbiology” Louis Pasteur would not have been possible. His work was continued by Hansen resulting in pure culture brewers' yeast. Temperature had a major influence on bottom fermentation as natural ice cellars could be built with ice collected from ponds and lakes and, later on, from ice gallows in winter. As this could not always be guaranteed, a “summer brewing ban” between April 24th and September 29th was decreed in the 16th century. Beer brewed before that date had to “survive” the summer, it was stronger and contained more hops to increase microbiological stability (“Märzen”). When Carl von Linde invented the refrigerating machine in 1873, beer could be brewed all year round, with a uniform quality. Human power or horse power and use of horse capstans to operate pumps and stirrers were replaced by the steam machine invented by James Watt in 1712. At the beginning of the 20th century, Prof. Theodor Ganzenmüller (“Steam Theo”) of Weihenstephan utilised exhaust steam from the steam machines to heat brew coppers, replacing “fire coppers” that are more difficult to operate. This power-heat coupling saved labour and energy and was widely used up until the 1960s. It has again become state-of-the art with the introduction of “co-generation plants”. Developments related to Industry 4.0, regarded as the “fourth technical revolution”, make their way into breweries, aiming at linking industrial production and modern information and communication technology.

England

In England in the 18th and 19th century, new beer types were developed that substituted original ale (hopped for the first time in about 1700). This was blended in the pub from at least three different beers just ahead of drinking. In the early 18th century, “Porter” (Entire) was the first dark beer being sold and being dispensed without blending.

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Certain beer types were influenced by hard water, e.g. from Burton with mainly non-carbonate hardness, or even the water from the River Thames in London with its common salt content (coming from the North Sea). Porter became popular very quickly and paved the way from home to industrial brewing. Based on commercial considerations, prompted by the possibility of extract measurement using a saccharometer, dark malt that was lower in extract and more expensive was replaced by pale malt. Use of colouring additives adulterated the character of Porter, losing much of its popularity in the 1830s. This marked the beginning of the pale ale boom and the weaker stout, another dark beer, rose in significance. Colonisation of exotic countries, with long shipping routes into, in some instances, tropical climate zones, called for a beer with high storage stability. The specially developed "India Pale Ale", a strong, highly hopped beer with high alcohol content, was originally meant to be re-diluted at the destination. To raise stability, hops were added to the transport vessel, imparting a distinct hop flavour and a pointed bitterness. This beer type was even exported to Russia but, during the Napoleonic wars, it was increasingly shipped to the Colonies. Resulting from the upgrading of the inland transport routes, demand for stronger hopped beers also rose in England.

Germany

As of the Purity Law having been promulgated, bottom-fermented beers that could be stored for longer times (e.g. over the summer) took over in Bavaria. However, the Duke of Bavaria reserved the right to brew top-fermented Weizen beer in his breweries. Wheat was usually meant to be a bread cereal in order to avoid bottlenecks in cases of crop failures. The original lager beer was dark. Malts were made of rough barleys high in proteins, requiring intensive malting (depending on degree of steeping, germination time and germination temperature). They were most likely well modified due to the high kilning temperatures between 100 and 105 °C, but enzyme content was relatively low. They were digested with the mostly carbonate-containing water using a three-mash method and boiled for about three hours with the "rough" hops.

The English "maritime" barleys had clearly lower protein contents. They were modified to the tips on the threshing floor and kilned at about 90 °C to a medium colour. All that was needed was a mash rest for

about 1 h at a temperature of 65-66 °C and then a relatively tedious lautering process followed. The brew was usually cooked in three batches so that the hops added to the first wort brew, generally pollinated hops, were re-used for the last batch. Both the malts and brewhouse operation for both styles differed.

In the North of Germany, top fermentation was widely used up to the mid-19th century as cooling was not an option. In 1857 in Dortmund, the switch to bottom fermentation was made. These beers were paler than the Bavarian ones though pale lagers were introduced in Bavaria in 1895. They gained acceptance very slowly. Carbonate waters had to be softened in order to brew pale beers; this was done by boiling or by precipitation of lime water, subsequently by means of ion exchangers. Using current membrane plants, it is possible to adjust the desired hardness in a simple manner by blending with raw water. Even in 1939, pale lager or Export beers still accounted for less than 50 % in Bavaria. After World War II, dark beers dropped to 5 %. Pale beers were successfully exported all over the world, also Weizen beers. It is worth mentioning that the Hanse towns exported top-fermented beers already in the Middle Ages. They were stronger beers, thus containing more alcohol, so they seemed to have good stability.

Production of paler beers also triggered an interest in hops. The land varieties Hallertauer, Spalter, Hersbrucker and Tettnanger were developed into varieties with improved resistance against plant diseases and pests by way of cross-breeding. Adopted English bitter varieties were developed into high- α -varieties at the Hüll Hop Research Institute. The new flavour hops for dry hopping made popular again by craft brewers were another addition.

Pilsen

Classical top-fermented beers were of such bad quality in Bohemia that the Magistrates ordered that they be destroyed. As a result of the success of Bavarian lager beers, the Bavarian Master Brewer Joseph Groll was called to Pilsen in 1842 in order to brew bottom-fermented beer according to his recipe. The soft water in Bohemia, low-protein, fine-husked malts pale due to the kilning conditions as well as (possibly to avoid infections) high additions of noble Saazer aroma hops made the beer brewed extremely popular. This "Pilsener" spread from Bohemia via Russia, Prussia (where it was copied) to other German and European

countries and then all over the world where it became a synonym for pale beer and called accordingly. Unfortunately, these beers had and have very little in common with the original beer and it is unfortunate that this distinctive beer type is frequently devalued somewhat today due to addition of 30-40 % rice or maize and low bitterness units of 12-15 instead of 30-40 still common in Central Europe.

Belgian beers

Diversity is the name of the game, from Geuze/Lambic and quite a number of sour beers with spontaneous fermentation up to the "Trappist" beers. The latter originated in France where the monks left their monastery "La Trappe" during the French Revolution, found asylum in a Carthusian monastery in Switzerland until they fled to various European countries after French troops occupied Switzerland. Though the monastery "La Trappe" was re-opened in 1814, some monks stayed in the countries to which they had emigrated. Today, 6 monastery breweries operate in Belgium, 2 in the Netherlands and one each in the US, Italy and Austria. There are more than five different categories of standard alcohol contents up to those above 10 %. These beers have an enormous fullness of flavour and diversity attributable to (top-fermenting) yeasts, to the respective "home flora" from the coolship to fermenting rooms and storage cellars. Meantime, dry hopped beers are also produced. A problem relating to exports seems to be taste stability. But lovers of these specialities do not take a very critical view.

The new trend is diversity: craft brewing in the USA

Chuck Skypcek, Brewers Association, USA



In the late 1970s and early 1980s, the United States beer market had essentially compressed into two styles: American-style lagers and American-style light lagers. Fast forward to today and, although American-style lagers and light lagers are still the majority of US production, the US is arguably the most diverse beer market (stylistically) in the world. At the 2015 Great American Beer Festival (GABF), there were 96 style categories, each of which received at least 20 entries – and 59 style categories received at least 50 entries.

It is only natural to expect diversity from a country with 4500+ brewers (a number that's growing at about 2/day) across numerous regions with distinct beer and culinary traditions. A great portion of American beer diversity is driven by the preferences of the American beer lover, who increasingly craves flavor and variety. A survey of craft drinkers completed by Nielsen found that 99% factored "flavor" into their purchase decision, and a majority said that the desire to "experiment with different styles and flavors" was a reason that they purchased craft.

Even with so much stylistic noise, a few clear signals have emerged in recent years.

First, Americans love strongly hopped beers and that passion is expanding. American-style IPA has been the most entered category at GABF for numerous years running, and the reason is obvious: it's the most popular craft style in the marketplace. In 2015, IPAs represented ¼ of craft volume, and were still growing at a rate of 40% year over year. That means IPAs are now about 3% of the total U.S. beer market and growing. Additionally, Pale Ale is the third largest craft style (the catch-all "seasonal" is #2), meaning that highly hopped beers represent 35% of the craft segment.

Secondly, the pendulum between high ABV, extremely flavored beers and more sessionable styles (lower ABV) may be swinging back toward the more sessionable styles. Many of the fastest growing styles in the US in 2015 were lighter in alcohol, including pilsner, blonde and golden ales, kolsch, and session IPAs (the fastest growing sub-style within IPA, which as Victory Brewing's *Bill Covalleski* recently remarked, is no-longer a single style and more a platform for innovation). There are a multitude of reasons for this, including: craft moving into mainstream beer markets, craft consumers aging and looking for sessionable options, and less of a need for brewers to stand out by rejecting mainstream lager.

Finally, Americans' willingness to experiment with sour and fruit flavors in beer has increased, and the number of breweries producing sour and/or fruit beers – styles formerly quite alien to the US market – have begun to skyrocket. Sessionable sours such as gose and berlinerweisse have been showing up across the country, and may be the next styles adopted by American brewers that becomes more popular in their adopted country than in their country of origin.

However, if there's a single word that captures the diversity of the U.S. beer market, it's unrestrained. American brewers are increasingly moving beyond clear style boundaries. What do you call a barrel aged, dry-hopped, kettle-soured ale made with multiple yeasts and fermented on seasonal fruits? Brewers are mixing styles and ingredients with a creative fervor, recognizing brewing traditions while simultaneously adding a dash of spontaneity.

■ The need for differentiation

All of this stems from the need for differentiation, the necessity for businesses to offer products that don't already exist in the market or that offer a "better" version of what already exists – better is in quotes since that's in the eye of the beholder. Differentiation is important in any niche, value-added market, because you need to give consumers a reason to pay more for your good than for a lower-priced good produced with greater scale. It's probably even more important in craft brewing than in most markets given the variety-seeking nature of craft's clientele. And craft lovers want more variety. Even with all of the options in the marketplace, 33% of craft drinkers said they would purchase more craft if there were "more variety" (source: Nielsen).

Forty years ago standing out was easy in the United States. In the 1980s, variety meant 'I don't make what the large brewers make, aka lager or light lager'. Making all-malt beer was enough to be totally different than the vast majority of the U.S. beer market. As breweries proliferated, brewers needed more variety and greater differentiation to stand out. For a few years, this seemed to take the form of, "I make an IPA, but mine has [insert absurdly high number] IBUs". That's no longer the case.

So what does differentiation mean today? Increasingly, there isn't a single answer. Some breweries will rely on flavors or styles. Others will rely on being local, a factor that clearly matters to beer drinkers, but with

nearly 4500 breweries and another 2000 in planning, how long can any brewery stay the small, local choice?

Trends are general movements, where a group of actors does similar things. In an era of niches and differentiation, trends mean being restrained by the crowd rather than standing out, and that's a dangerous proposition. Unless you can do it first, better, or cheaper than your competitors, following a trend means hoping your competitors don't have any of those advantages either.

The only thing that remains is to be different. Different in branding, in innovation, in a brewery's DNA. Because so many American brewers are recent entrants, there is nothing holding them back from pursuing difference with extreme purpose. Styles are just guideposts on this journey that help brewers delve deeper into the uncharted portions of the map. In the words of Tolkien, "not all those who wander are lost", and American brewers are continue to wander to new places across the beer world.

Beer trends in Asia

Chonlada Manakul, Boonrawd Brewery, Thailand



Alcoholic beverages produced from grain dating back 6000 years were found in Asia in Sumer, Mesopotamia (today Iraq). At the same time, there is also evidence of alcoholic beverage from grain found in China and India. These two countries played an important role in influencing Asian culture. In India, the Vedas mentions alcoholic beverages made from rice called "sura". Today, the same word "sura" still refers to liquor or spirits in Thailand. The Ancient Chinese were brewing beer-like alcoholic beverages made

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with rice, honey etc. and the beer-like beverage called Lao Li.

Production and consumption of modern beer in Asia was introduced to Asia in the 18th century during the European colonialism. The first modern brewery was established in British India by Edward Dyer in 1830. The brewery in Kausali produced Lion beer. During that period, Edward Dyer built several more breweries across India, Burma and Sri Lanka. Lion beer is still available and produced by the Lion Brewery in Sri Lanka.

Brewing beer has become a growth industry in Asia, with China leading as the world largest beer producer since 2001. Asia is the largest beer-producing region in the world since 2009. However, Asia still trails Europe on a per-capita consumption rate, with Asia at 23.5 liter per capita per year compared to Europe at 77.1 liters (2014). Figure 2 gives an overview of consumption growth in Asia between 2012 and 2014.

The economies of Asia comprise more than 4.4 billion people (60 % of the world's population). Asia is the fastest growing economic region and the largest continental economy by GDP PPP in the world. In Asia, three distinct growth areas are emerging: Northeast Asia, South Asia and Southeast Asia. This article will not focus on Central and West Asia due to the absence of reliable information.

■ Northeast Asia

Northeast Asia is the largest beer producer in Asia. In terms of output, China leads but Japan has the highest per-capita consumption, followed by South Korea. Based on 2014 figures, Northeast Asia consumed 655 million hectoliters. The dominant beer type is pale-colored light lager with an alcoholic strength of around 3-5 % ABV.

Chinese beers tend to be pale lagers, with relatively low alcohol contents (ca 3.5 % ABV). Apart from malted barley, they

often contain rice, sorghum and sometimes rye. Of the top ten beer brands in the world, four are Chinese (Snow, Tsingtao, Yanjing, and Harbin.)

The Japanese beer market is very well developed and the varieties of brewed malt beverage are categorized according to the Japanese taxation system. The distinction is made based on the amount of malt used relative to grain adjuncts, and the term Happoshu describes low-malt brews. Japanese regulations do not permit brews containing less than 67 % malt to be called beer (permitting up to 33 % adjuncts including rice, corn, sorghum, potato, starch and sugar). Since 2004, Japanese breweries have been brewing non-malt brews made from soybeans and other ingredients, these do not fall under the classification for beer or happoshu and are, therefore, taxed at a lower rate. These brews are officially classified as "other miscellaneous alcohol or liquor" or "third-category beers".

■ South Asia

The British introduced modern beer to India during the colonial era. It started with imports of pale ale and Burton ale to India from England. Bow Brewery revamped Indian Pale Ale in about 1787. The beer was brewed with high alcohol contents and also massive amounts of hops to protect the beer from spoiling during long journeys.

Although India was introduced to beer long before any other country in Asia, beer as an alcoholic beverage did not become as popular as whiskey. Indians prefer the taste and high alcoholic content of whiskey. Modern Indian beers are mainly lager and generally have a high ABV, typically ranging from 6.5 % - 8 % ABV but with a relatively low bitterness to keep the taste similar to whiskey or sometimes even adding whiskey flavor.

Growth of per-capita beer consumption in South Asia dur-

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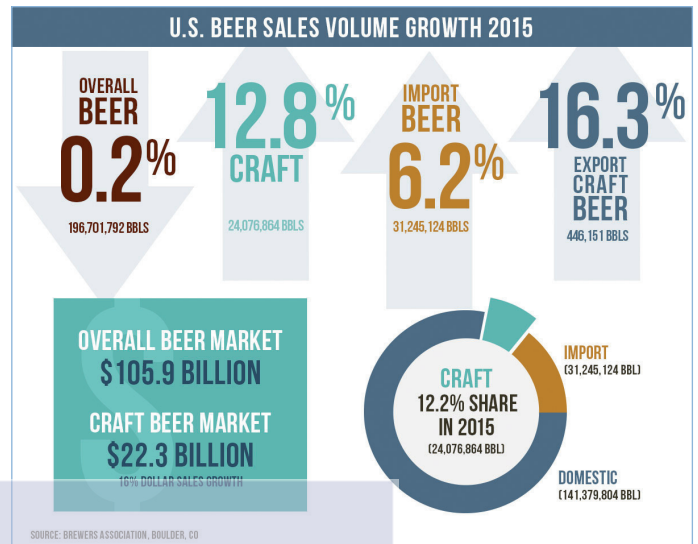
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Fig. 1
US Beer Sales 2015



ing 2012-14 was below 2% per year. But between 2014 and 2015, the beer market in India grew by 6% to 22.3 million hectoliters. However, beer consumption in India is still very low, at 1.6 liters per capita. The beer industry has been increasing over the last few years and this increase can be mainly attributed to the growth of the Indian middle class.

■ Southeast Asia

The establishment of the ASEAN Economic Community (AEC) in 2015 was a major milestone in the regional economic integration agenda of the ASEAN, offering opportunities in the form of a market of US\$ 2.6 trillion and a population of 622 million. In 2014, the AEC as a whole was the third larg-

est economy in Asia and the seventh largest in the world.

Southeast Asia has currently one of the fastest growth rates of consumption according to a study by market researchers Euromonitor. The survey predicts that beer consumption is expected to grow 4.5 per cent per year over the next five years. The top beer-drinking nation in ASEAN is Vietnam, where it is forecast that per-capita consumption will peak at 49.8 liters in 2019. Thailand is the second largest beer market. The Thai Government is going further than other governments in regulating the growing demand for alcohol by, for example, banning alcohol sales in the vicinity of universities and technical colleges and by raising taxation of alcohol. Vietnam, the Philip-

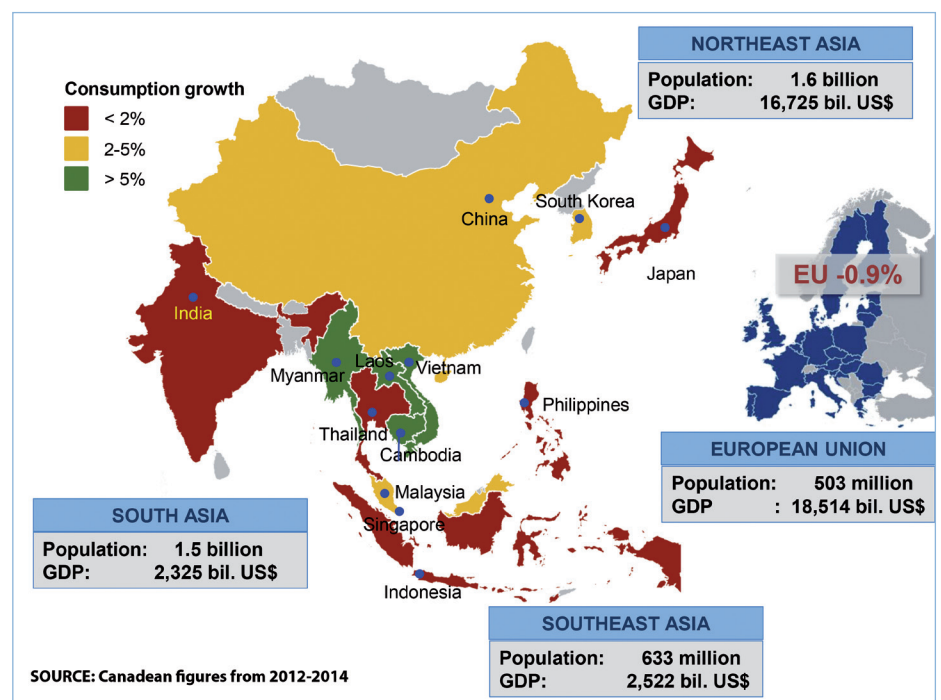


Fig. 2 Overview of consumption growth in Asia between 2012 and 2014

pires, Indonesia, China and some Indian Federal states have also introduced policies over the past few years to stem the increased demand for alcohol.

Multinational brewers have pushed hard to acquire regional brands. However, Southeast Asian consumers still prefer local beers. Brand names are often symbolic for a country, such as in Laos, where the number one beer brand is Beer Lao and in Myanmar, where the number one beer is Myanmar Beer.

In tropical climates, heat and humidity conditions require beer to have high drinkability and that it can be accompanied by spicy foods. Most local brewers produce beer with a blend of adjunct such as rice, the main cereal in Southeast Asia. The blend of adjuncts creates a smooth and lighter body compared to 100 % malted barley. The main type of beer is lager with 4.5-5.5 % ABV. Together with the smooth body, the beers have a relatively low bitterness (12-16 BU vs 18-22 typical for European lagers).

■ Demographic trends

As mentioned, beer was introduced to Asia by the Europeans in the 18th century. It quickly became a symbol of civilization. The demographic trends driving beer consumption growth are the degree of urbanization and the proportion of young population. Figure 3 shows the demographic trends and their correlation with per-capita consumption.

Beer per-capita consumption rates have a strong correlation with the degree of urbanization in a country. In Asia, the degree of urbanization varies from 100 % (Hong Kong and Singapore) to 13 % (Papua New Guinea). Per-capita consumption is highest in countries that have high degrees of urbanization, such as Japan, South Korea. However, the increase in beer consumption each year is related to the rate of urbanization. For example over the past 30 years in China, about 600 million people have moved to the cities each year. This is the equivalent to building a city the size of London every year for 30 years. The degree of urbanization in China was 54 % in 2015, up from less than 20 % in the early 1980's.

The age structure of each country is an indication of beer consumption and growth. For example, Japan is already a super-aged society where beer consumption rates have been stagnant or in decline over the last 5 years. China, South Korea, Thailand, Taiwan, Singapore and Hong Kong are heading towards becoming mature societies where

moderate growth should be anticipated. Forecasts predict that China will continue to be the biggest single growth market in the world, due its sheer size. The other primary trigger for growth of the beer business in Asia will be young markets such as Vietnam, Myanmar, Cambodia and Laos where large sections of the population are under the age of 25. Although Indonesia and Malaysia are not mature societies, beer does not form part of their diet due to their main religious beliefs, and growth will be quite low.

The middle class is defined as having a disposable income of USD 16-100 per day.

The middle class earns the largest share of the nation's income. It is mainly characterized as shown in Figure 4.

When looking at the young, middle-class generation, beer consumption behavior has slowly changed. They are still proud to drink local beers but they are also increasingly seeking trendy and new experiences, looking for new beer types, new tastes and also sharing experiences on social networks. Thus, the changing character of the emerging middle class population poses challenges to the beer industry to offer more beer diversity.

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■ Craft beer trend in Asia

As mentioned, the young, middle-class generation is changing its beer consumption patterns. This opens the market for international imports as well as local craft brewers and microbrewers. However, it is still a niche market in most countries as the consumer price is often 3–4 times higher than that of mainstream beer.

As a result, craft beer is increasing mainly in the region's major cities such as Shanghai, Tokyo, Singapore, Hong Kong, Kuala Lumpur and Bangkok. Again, the middle class and expatriates are the key drivers of the craft beer culture in those cities.

Asia started to adopt beer as an alcoholic beverage in the 18th century. Each region has perceived and adopted beer in its own way, depending on preference in taste and the unique selling proposition. Three key demographic trends, together with the overall economic development in Asia, are the main factors driving the increase in beer consumption.

Last but not least, the craft beer trend in Asia is limited to megacities such as Tokyo, Shanghai, Singapore, Hong Kong, Bangkok and Kuala Lumpur.

Beer diversity in Africa and Canada

Christian Riemerschmid von der Heide,
Newlands Systems, Canada



Understanding African beer styles and rating the degree of diversity requires one to understand the geographic and climatic relevance in a historical context including a more situational and social demographic one. Sounds complicated. It is not. You may also wonder why we link African beer diversity to Canadian diversity? Well, the

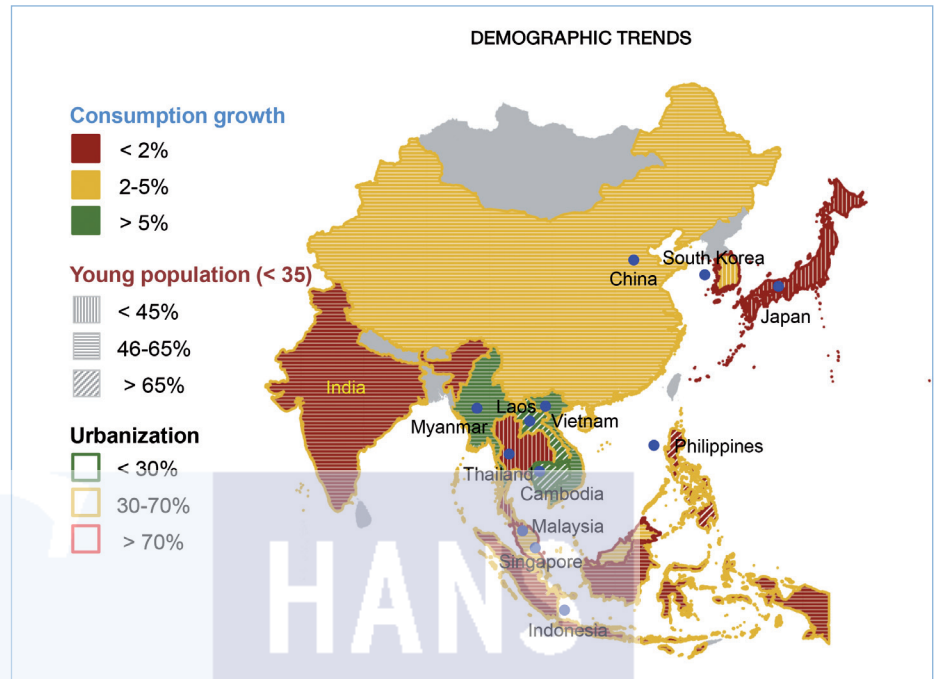


Fig. 3 Demographic trends and their correlation with per-capita consumption

only link is the author's career path and relocation but, on looking closer, we find indigenous brewers creating the platform for diversity in Africa and the Americas. The British Commonwealth did the rest, sending its highly hopped Imperial Stouts and Pale Ales with its soldiers, settlers and politicians into Sub-Saharan Africa and on the American continent.

■ Informal beer in Africa

Less than 20 % of annual alcohol consumption on the African continent is accounted for by beer or beer styles that are common throughout the continent. The average per-capita consumption of alcohol hovers below the 10 liter/annum mark. There is a significant shadow segment of "informal" beers, beer styles ranging anywhere from 30 – 60 % of all beer consumed (formal and informal). The informal beer styles and volumes are not captured by classic market data, simply because they are not taxed and therefore not recorded. They are estimated.

Please note, we are not talking about beers with illicit alcohol or doubtful ingredients, but about beers brewed with local raw materials, such as maize, sorghum, cassava and homemade malt. They are consumed from Tetra Pack-like cardboard or clay pots and through long straws, while the brew is still fermenting, and they remind me of fermented oatmeal breakfast cereal. They are nutritious and probiotic too, I guess. The microflora is a combina-

tion of wild yeast, baker's yeast and a variety of aerobic and anaerobic bacteria like *Lactobacillus*, *Gluconobacter* etc. The styles differ by region, ingredient and alcoholic strength. Africa is diverse, as are its climate conditions and selective growth patterns of local raw materials. Malting barley varieties grow in some select regions but those are limited to e.g. Rift Valley in Tanzania, the Mount Kenya region in Kenya and they are impacted by annual precipitation and a high risk of total crop loss. Sorghum grows in many locations, on small and large plots, and even in drought conditions, and will bear a crop sufficient for making beer. Cassava has evolved as the new base for brewing beer, it is as affordable as it is available. Fascinating to know, only 1/3 of cassava tubers or roots are harvested, the major part of the fruit stays in the fields and provides a last opportunity for an inexpensive starch source. In some countries such as Rwanda, fruit beers based on banana puree are adding to the diversity. The incubator for diversity is again linked to local raw materials and geographic and climate-related realities. And, if we are honest, does the pattern not apply to specialty beers from Franconia stored at mild temperatures in sandstone cellars with low carbonation? Or Belgian Wit beers with coriander, or Kriek with local cherries? Another soundbite relating to beer style diversity is the fact that the act of brewing informal beers is often a community and social gathering rather than "fabrication" of beer. The ritu-

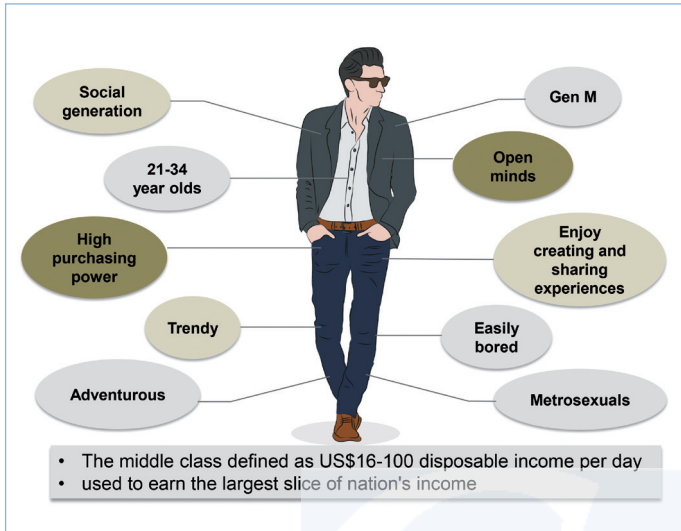


Fig. 4 The Asian middle class earns the largest share of the nation's income

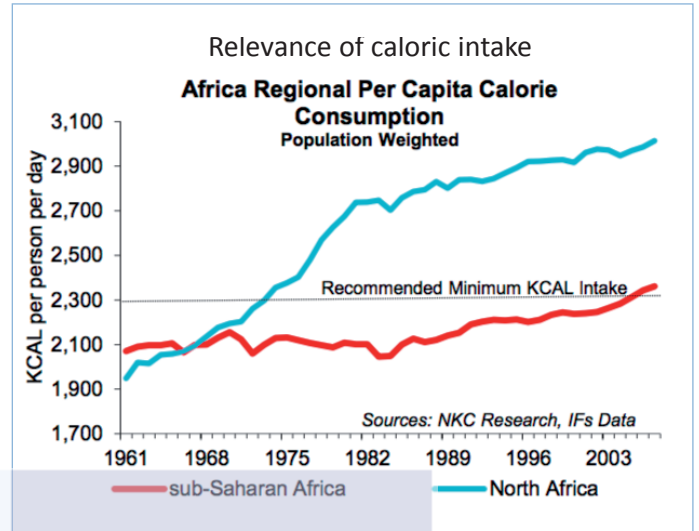


Fig. 5 Africa – regional per capita calorie consumption

als, the influence of female brewers, drying and malting in the sun next to the main street in a village is adding to the flavor profile like no other ingredient. Last but not least, the calorie consumption and need for nutrition is a key influencer for beer styles (see fig. 5).

■ Other beer styles in Africa

Let's move from the informal sector to the other beer style categories. Innovation is blending into the mix, just as mainstream lagers are, and new trend-setting blends of beer that shake up the classic definition of what a beer is. Africa offers more than classic beer varieties, a fascinating diversity of local raw material derived beer styles that combine the need for nutrition with com-

munity rituals and drinking events. I group the beer styles in 4 diverse categories: Informal, Refreshment and Celebration, Nutrient and Hybrids.

■ Beer styles in Canada

Beer has been brewed in Canada for more than 450 years, and most likely much longer. While the Jesuit Brother Ambroise is usually referred to as the first brewer in Canada (the Jesuits established a brewery in Sillery, Québec, in 1647), Louis Hébert, Canada's first farmer, is claimed to have brewed beer in 1627 to celebrate a birth. Canada's First Nations had already been brewing spruce beer, most likely for generations. In fact, Jacques Cartier and his crew could have died from scurvy, had they not

been shown how to make this brew when they were staying near Stadacona (now Québec City) upon their arrival in North America, in 1535, according to Stephen Beaumont's research.

■ Craft beer

Canadian beer styles see a renaissance and evolution due to the significance of craft brewing, with a share of more than 25% of the total beer segment, divided between the flavor profiles of European beer styles and heavy hopped American West Coast IPA. Quebec is the leading province, with Belgian style specialties. As the trend continues, new styles are developing and classic styles are newly interpreted, e.g. Sour Beer Gose with elderflower blossoms. ■