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AB InBev: Brewing Up Forecasts during COVID-19

COVID-19 had a profound impact on consumers, customers, and our business. It was imperative that we use advanced analytics to inform choices in terms of products, brands, and services, that would enable us to come out of COVID-19 stronger than we went in.

— Jason Warner, CEO Europe, Anheuser Busch InBev ("AB InBev")

In July 2021, Jason Warner, the CEO of AB InBev's European operations, joined forces with his executive team to forecast and analyze evolving market conditions, with the ultimate aim of strategically positioning the company for a successful resurgence upon the lifting of pandemic-related restrictions. Amidst the pandemic, the process of forecasting and planning became especially arduous, yet it remained crucial for the beer industry due to the inherent time it took to produce beer, the perishable nature of the product, and the distribution process. AB InBev was the world's biggest beer company with more than 500 beer brands, $46 billion in revenue, and 160,000 employees in 2020, the year the COVID-19 pandemic struck. Like other players in the industry, AB InBev had been strongly affected by the pandemic, as governments had taken exceptional measures, including lockdowns, to cope with the crisis. These restrictions were particularly impactful for AB InBev's business with on-trade customers, which included bars, restaurants, nightclubs, and other establishments where people consumed drinks on premises. However, by July 2021, vaccination rates across Europe were rapidly increasing, and many countries were in the process of lifting restrictions on public life, allowing nightclubs to reopen and removing limits on indoor gathering for pubs, restaurants, and cafes.

Due to nature of COVID restrictions, small restaurants and pubs across Europe were hurting. Warner was faced with the question of how best to predict demand during the reopening phase. To help guide their decision, Warner and Alexandre Pouille, his Financial Planning and Analysis (FP&A) Director for Europe, had been working with AB InBev's Growth Analytics Center (GAC) to forecast the recovery. AB InBev's GAC was established in India in 2016 to help incorporate cutting edge forecasting and analytics into AB InBev's business model. Based on the analysis he and Pouille put together using data from GAC, Warner needed to make a decision. Should AB InBev proactively bet on a fast recovery of its on-trade business, or should it take a more cautious wait-and-see approach?

Company Background

Although AB InBev's heritage stretched back over 800 years to a Belgian abbey, by 2021, AB InBev represented an amalgamation of brewing companies.[1] In 1987, Artois combined with another Belgian brewery, Piedboeuf, to become Interbrew.[2] In turn, Interbrew merged with Brazil's Ambev to form InBev in 2004.[3] Anheuser-Busch then joined them in 2008 to create AB InBev. In 2013, the group bought the remaining portion of Grupo Modelo, Mexico's marketer of the Corona brand.[4] AB InBev acquired the world's second-largest brewer, SAB Miller PLC, in 2016.[5]

AB InBev grew into the world's preeminent brewer. The group not only sold one in four beers worldwide; it also generated a third of the industry's global profits.[6] Its EBITDA margin was 40% in 2019, more than double the average for other listed peers.[7] See **Exhibit 1** and **Exhibit 2** for financial data. According to BrandZ, which estimated and reported the value of brands, AB InBev owned eight of the top ten most valuable beer brands in 2019, including Budweiser, Bud Light, Stella Artois, and Corona.[8] The firm was geographically diversified with a balanced exposure to developed and developing markets. Its 160,000 employees were organized into six distinct management zones: North America, Middle America, South America, Africa, Europe/ Middle East, and Asia-Pacific.[9]

AB InBev's distribution channel mix varied across countries, reflecting local market dynamics and consumer preferences. The firm's sales were usually divided into two big markets, the off-trade and the on-trade. The off-trade included retail outlets like supermarkets, convenience stores, kiosks, and alcohol stores. The on-trade entailed bars, restaurants, coffee shops, clubs, and hotels.[10] In Europe, on-trade sales accounted for a quarter of volumes while off-trade accounted for the remainder.

Forecasting and Analytics: AB InBev's Transformational Agenda

Historically, AB InBev approached data and insights in two ways. First, AB InBev interacted with 2 billion end consumers yearly, which created a wealth of consumer data. Market intelligence firms like Nielsen and IRI provided detailed purchasing statistics. Kantar added a layer of purchasing intent, switching, and shopping behavior. Marketing teams at AB InBev extensively surveyed consumers to track brand awareness, consideration, and participation. Data sets were analyzed across markets to make comparative analysis possible. AB InBev would use this data when launching brands in new markets.

Second, AB InBev developed market insights by interacting with wholesalers and retailers. AB InBev had been built through sales channels that matured into a huge B2B eco-system that served more than 6 million retail establishments and 5,000 independent wholesalers. Sales representatives made regular visits to bars, restaurants, and mom-and-pop shops to generate orders, promote new brands and packages, coordinate delivery of products, launch special promotional activities, ensure brand loyalty, and develop new business.[11] By meeting face-to-face, AB InBev was able to build relationships and grow its network.

Using its insights, AB InBev developed tools like a market maturity model in which the relationship between beer consumption and market maturity followed an S curve. **Exhibit 3** illustrates this model. In emerging markets, which were poised for higher growth, improvements in affordability were key to attracting new consumers.[12] As countries became wealthier, beer consumption increased until the market stabilized. In developed countries, pricing was less important, and instead the focus was on premiumization. Premium beers were made from the best ingredients and stood out for their authenticity, taste, brand story, experience, visual identity, novelty, and price. [13] [14]

AB InBev was still in the process of going through a digital transformation journey, which management believed would allow them to utilize their data and market insights more effectively. Led by Chief strategy and technology officer David Almeida, the company had begun to shift its mindset and pursue what Almeida called "business transformation enabled by technology. What was going to drive the future was the right analytics, the right data, powering faster and more successful decisions." Decision making could be enhanced by connecting consumer and customer insights into integrated modeling and forecasting.

Traditional Forecasting Approach

AB InBev used P&L forecasting as an effective checkpoint on its resource allocation decisions. Forecasting occurred at various levels of the organization including geographic and business unit segments. Forecasts were consolidated using advanced workplace tools like Anaplan.[a] AB InBev generated forecasts for two different time horizons: a ten-year long-term horizon and a one-year short-term horizon.

The ten-year forecast played a key role in an exercise the firm referred to as "the present forward." Almeida explained, "The present forward is basically taking our current business without any major strategic changes and projecting it forward. To do this, we are using detailed models and data on expected growth, demographics, and trends to project out what would happen in our business." The present-forward acted as a benchmark when making resource allocation decisions. It was rolled-forward annually taking into account the last year performance as well as macroeconomic, geopolitical, and other external factors.

The one-year plan aimed to align ten-year plan priorities into actionable 'how to win' drivers for the next year. Warner commented, "We focus on a simple scalable premium portfolio across the organization to minimize distractions." Sales teams made detailed assumptions such as the number of customers, volume of products, and unit prices by region and channel. Supply teams examined their own activities and predicted how raw material pricing, logistics costs, and other factors might impact future financial reports. Management noted that both groups could benefit from better access and synthetization of consumer and customer insights captured throughout the organization.

As to the company's forecasting process, AB InBev's senior global director for analytics strategy and transformation, Obrad Scepanovic, explained, "Each market, each zone, each region had their own version of the forecast." (See **Exhibit 4** for an illustrative example). To enhance consistency and minimize the impact of human bias in decision-making, AB InBev opted for a more coordinated approach.

Enhanced Analytical Capabilities

In 2016, AB InBev created the GAC in Bangalore, India. The GAC was staffed with 250 analytics professionals, and it collected and maintained data from a broad set of sources. It was capable of applying consistent forecasting techniques across different activities quickly. For example, the GAC generated baseline-demand forecasts in four to five days for more than 90 country, channel, brand, and category combinations. In some jurisdictions, the GAC produced forecasts at a very granular level, sometimes down to the SKU level, a task that had been very time-consuming for pricing portfolio managers in each country to perform. Having an impartial baseline forecast was critical for increased

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[a] Anaplan was a software as a service company that provided an integrated planning platform for businesses.

accuracy. Scepanovic said, "Under the leadership of Global VP Analytics, Felipe Aragao, we started doing forecasting for all countries centrally and in an objective way."

The GAC-produced forecasts typically did not account for things like promotions and unusual events. The GAC would first produce a constrained forecast, assuming variables such as pricing would remain constant. They would then produce an unconstrained forecast where they would account for things that AB InBev could control. The baseline forecasts the GAC generated were then further enriched by the FP&A department, marketing and sales, demand planning, and the logistics teams in each jurisdiction. This allowed local teams to refine forecasts so that they reflected not just macroeconomic and other trends captured by the GAC's analysis but also the impact of actions from managers in different markets.

Forecasts provided by the GAC were initially met with hesitation. AB InBev's director for forecasting and RGM analytics, Nitesh Bhardwaj, explained, "Local business teams not only like accurate forecasts but also detailed explanations. When GAC started, the focus was more on the sophisticated AI and ML-based models, which could give very accurate forecasts but were less explainable. We slowly had to transition towards a balance of model sophistication and forecast explanation with customized drivers across countries and different beer segments to establish credibility with businesses." The GAC focused on building analytical models that were transparent and allowed for discussion about what assumptions about the future were reasonable. As Scepanovic put it, "We wanted to follow a process in which we can discuss assumptions about inflation, population increases, consumption growth, income growth, tax increases, or other things that might affect us rather than just the overall projections."

Prior to the formation of the GAC, AB InBev had worked with several outside consultants that provided industry forecasts. The activities of the GAC allowed the firm to develop these forecasting capabilities in-house. This change gave managers a deeper understanding of what factors predicted demand and the ability to refine the models used. While there were some debates about the output of the GAC early on, forecasting had become a much smoother process over time. "Using the GAC really reduces a lot of the emotion in the discussion and makes it more mechanical," Almeida said. "It has really elevated all of our planning cycles."

On a ten-year horizon, the GAC focused on forecasting industry volumes. The GAC further enhanced AB InBev's market maturity model by identifying movements along the curve more accurately than before. As a result, beer consumption was viewed based upon the maturity of each market, and much of AB InBev's long-term planning was geared towards anticipating the evolution of each market. Managers within local jurisdictions enriched these forecasts. These forecasts were critical for helping management anticipate the evolution of the beer industry and set appropriate targets.

Short-term forecasts that focused on the next year were also an essential part of AB InBev's planning exercise. Forecasting at this horizon included forecasting volume, or demand planning, and forecasting revenues and costs, or financial planning. Scepanovic described this process, "In order to have the best possible latest estimate (LE), we start by working with the GAC team to construct forecasts month-by-month and country-by-country. We develop estimates of not only volumes but also EBITDA. We then work with the FP&A team to give a point of view of where we're going to end the year." There were efforts to forecast EBITDA, free cash flow, inventory, and working capital. The GAC also generated forecasts of the prices of specific inputs, such as the prices of barley or aluminum, to help guide AB InBev's hedging strategies. Aragao estimated that with the help of the GAC that their team's mean

absolute percentage error for forecasting one-year country-level volumes had fallen from 6% to roughly 2%.[b]

In addition to ten- and one-year plans, the detail-rich GAC datasets were available to deploy on even shorter time increments. Short-term forecasts helped the demand and supply network planning teams determine on a monthly, weekly, and almost daily basis how much beer AB InBev needed to produce. To construct these forecasts, managers supplemented GAC guidance with demand and supply data from local teams. The Vice President of Logistics for Europe, Ingrid De Ryck, described the way that the short term forecasts used to manage the supply chain were generated using a balance of analytics and managerial guidance, "We continue to work together with our team in India, which has a lot of the data analytics prediction capabilities that, together with the power of an AI tool, help us trump manual forecasting. Commercial teams know what is going on in their markets, such as the launch of certain products. It is hard to predict this just from past data. It's interesting to see that the data and the machine quite often beats the human being in forecasting." De Ryck estimated that they were able to supply reliably on time in full 96% of order volume.

AB InBev's enhanced demand forecasting capabilities enabled better management of the planning process. The costs and inefficiencies resulting from demand forecast errors, whether overly optimistic or pessimistic, presented management challenges that were difficult to handle. Overestimating demand for a specific brand or sku could be costly for several reasons, including unsold inventory, discounts, and the potential impact on capital budgeting decisions. Overoptimistic forecasts for a particular product could lead to investment in new production lines that would be underutilized or even idle, resulting in significant waste of resources and costs. Additionally, unsold beer had limited shelf life, and AB InBev would either have to destroy or heavily discount it, both of which incurred costs. Discounting beer could be costly because it diverted sales away from its full price beers and also potentially impacted the long-term behavior of consumers (e.g., consumers may begin to anticipate discounts).

Underestimating demand created its own set of costs and inefficiencies for the company, including the need to change the production process, hire additional staff, and procure extra materials. Additionally, the marginal costs of producing unanticipated units were typically higher than average costs, which further added to the operational costs of meeting unexpected demand. Moreover, stockouts resulting from unanticipated demand were particularly costly, as AB InBev was unable to sell beer that it had not produced. Given the immediacy of customer demands, such lost sales were often irreversible, and there was some chance that the customer may switch to another AB InBev brand.

The Covid-19 Pandemic

Grappling with a Crisis

In March 2020, Europe became the epicenter of the COVID-19 pandemic.[15] Many European countries went into nationwide lockdowns, closing all pubs, restaurants, bars, and schools.[16] Governments recommended working from home, forbade all non-essential outings, required social distancing, and encouraged households to designate one person to do the shopping.[17]

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[b] The mean absolute percentage error was a measure of how well a forecasting model performs and was calculated by taking the average of the absolute value of percentage forecast errors (=forecast error/actual value).

These restrictions led to changes in alcohol drinking behaviors.[18] To best navigate these changes, AB InBev focused on the consumer first. To help understand the impact that this crisis had on the consumer population, AB InBev sought out experts to explain the impact of deprivation, confinement, and isolation from normal communities. Quickly, places of consumption shifted from bars and restaurants to homes, which created a new set of logistical issues for management at AB InBev. Pouille described the problem as "the on-trade business was turned off while the off-trade business recovered some of this volume as consumption behavior changed. These channels require different pack types — kegs versus bottles and cans — and different investment levers." As Warner put it:

> When you moved your footprint out of those 50-liter kegs and translated some of that volume into cans and glass bottles, it became a challenge in terms of the amount of glass bottles and cans that were available in Europe. And also, where could you store them in a supply chain that is heavily optimized? The warehousing and the trucks used to transport them were completely different. Out-of-stocks appeared very quickly. Our focus was for the breweries to produce long, continuous batch runs of must-have products. For the first week or two, beer was not a priority for retailers. But within ten days, beer became the fastest-moving category in Europe.

Early on, AB InBev decided to leverage its existing analytics and forecasting capabilities to try to anticipate the extent and timing of waves of COVID-19 and their effects on beer sales and production. While its early focus was to react to the initial shock and address operational challenges in the off-trade market, AB InBev also had to simultaneously anticipate potential reentry needs in the on-trade channel. AB InBev's analysts quickly put together on-trade reopening predictions based on susceptible-infected-recovered (SIR) models to estimate the probability of various future trajectories for a set of countries. They took into account a number of factors, such as the rate of spread, transmissibility of the disease, hospitalizations, local preventive measures, and on-the-ground assessments.

The company organized weekly cross-functional consensus meetings, which involved experts from procurement, logistics, finance, data analytics, marketing, and sales, to discuss what actions to take. AB InBev's vice president for global sales of high-end products, Brian Perkins, elaborated on the process:

> We made sure to always represent different curves simultaneously that represented different opinions and assumptions. We had an unedited GAC baseline and then a commercial team overlay. We asked, 'Do we agree or disagree with the GAC?' If we disagreed, why? We found it more constructive to present a range of scenarios and outcomes. The thing about this is that it is not just a theoretical model. It has implications for key decisions, Should we be brewing more or less beer tomorrow? Should we be packaging the beer that we have? Should we be hiring more line workers or reducing the number of lines?

AB InBev identified a number of lessons learned from the initial phase of the pandemic, which helped them address new threats and opportunities. For instance, it was critical to ramp up production as early as possible to prepare for reentry and meet the post-COVID demand. Pouille said, "Beer is natural, inclusive, and local. Reopening a beer business, it's not like turning the lights on. You need to know about three to four weeks in advance to allow for maturation and fermentation time before you can start packaging and distributing."

Reopening the On-Trade Business

Starting in the spring of 2021, the European on-trade business showed signs of recovery as the pandemic waned and vaccination rates increased. Warner and Pouille were anticipating bars reopening and the resumption of the UEFA European Football Championship.
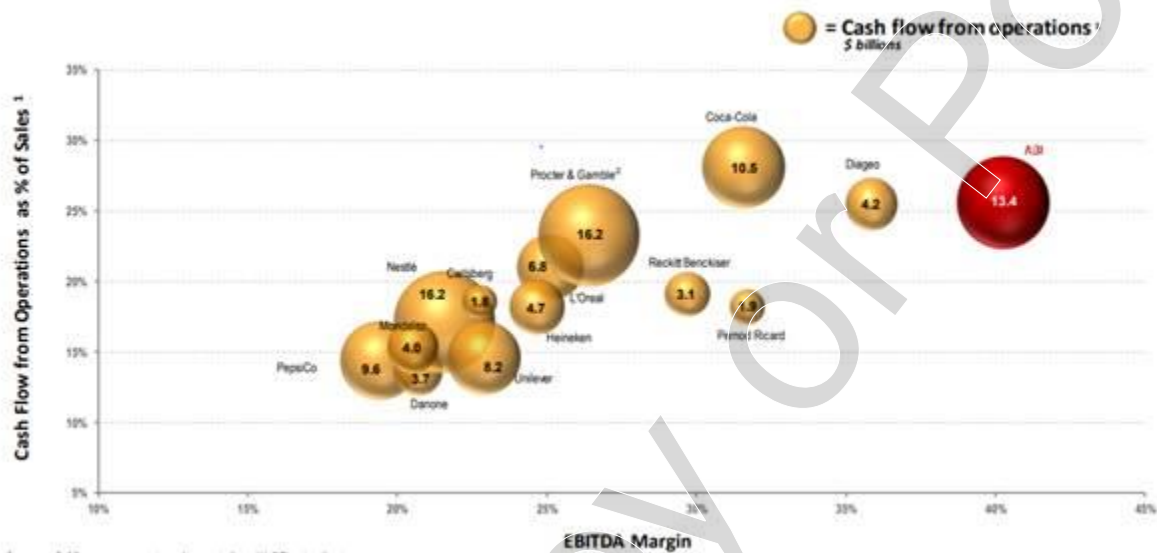
To help the restaurant and pub sector recover, Warner and Pouille believed a dual approach would be required. First, for cash-strapped wholesalers who physically distributed kegs and bottles to the on trade, it was vital to rebuild inventory taking into account working capital needs. Second, at outlet level, bar and restaurant owners needed to be convinced to reopen and take a bet on returning consumption, and therefore order from the wholesalers.

As Pouille put it, "Historically, on-trade in Europe is built by distribution at outlet level. Bar by bar, pub by pub, restaurant by restaurant. Our brands are our strongest distribution lever. Our customer and community centricity the next. Ultimately, we need to make sure our partners have the right outlook on future volume to be able to bet on our brands." The pandemic also added a new layer of risk for the On Trade — government mandated trading restrictions — that might be realized with little warning.

Investing in the Italian On-Trade Market

Pouille believed that the Italian market presented a real growth opportunity in Europe, "AB InBev's market share in the on-trade market in Italy was near 12%, substantially below its 23% share in France, 56% share in Belgium, and 24% share in the Netherlands." **Exhibit 5** displays the GAC-predicted susceptible-infectious-removed (SIR) curve for Italy, which was used to forecast COVID-19 infections. Under the GAC's baseline assumptions, Italy was nearing the herd immunity threshold, which was the share of the population that needed to be immunized to slow the transmission of COVID-19.

Warner and Pouille saw an opportunity in Italy and believed that if AB InBev was proactive in supporting the reopening of the Italian On-Trade sector, it might present an opportunity for the company. But would this support pay off, and which establishments should they support? What would happen if the next COVID-19 wave prompted a new round of lockdowns? Warner and Pouille knew that it was important to invest in the on-trade business, but, given the effects of the pandemic, they also needed to be particularly prudent in their capital allocation decisions.

Exhibit 1   AB InBev's Margin and Cash Generation vs. Peers, 2019

Source: AB InBev, "Full year and Fourth Quarter 2019 results," AB InBev Presentation, February 27, 2020, p. 27, https://www.ab-inbev.com/content/dam/abinbev/news-media/press-releases/2020/02/AB%20InBev%204Q19%20Results%20Presentation%20FINAL.pdf, accessed January 2022.

Exhibit 2 AB InBev's Key Financials

a) Income Statement, Million USD Unless Stated Otherwise, 2016-2020

	2016	2017	2018	2019	2020
Total Revenue	45,517	56,444	53,041	52,329	46,881
COGS	17,803	21,386	19,933	20,362	19,634
Gross Profit	27,714	35,058	33,108	31,967	27,247
SG&A	15,284	18,200	16,901	16,516	15,451
Other Operating Expense	(695)	(706)	(725)	(703)	(308)
Operating Income	13,125	17,564	16,932	16,154	12,104
Net Interest Expense	(4,167)	(4,619)	(3,896)	(3,863)	(4,011)
EBT Excl. Unusual Items	8,047	12,282	10,290	11,959	5,992
EBT Incl. Unusual Items	4,334	11,075	7,742	12,776	2,079
Income Tax Expense	1,613	1,920	2,585	2,786	1,932
Earnings from Cont. Ops	2,721	9,155	5,157	9,990	147
Net Income to Company	2,769	9,183	5,688	10,414	2,202
Minority Int. in Earnings	(1,528)	(1,187)	(1,318)	(1,243)	(797)
Net Income	1,241	7,996	4,370	9,171	1,405
Basic EPS	$0.72	$4.06	$2.21	$4.62	$0.7
Diluted EPS	$0.71	$3.97	$2.17	$4.53	$0.7
Dividends per Share	$3.86	$4.33	$2.06	$1.46	$0.61

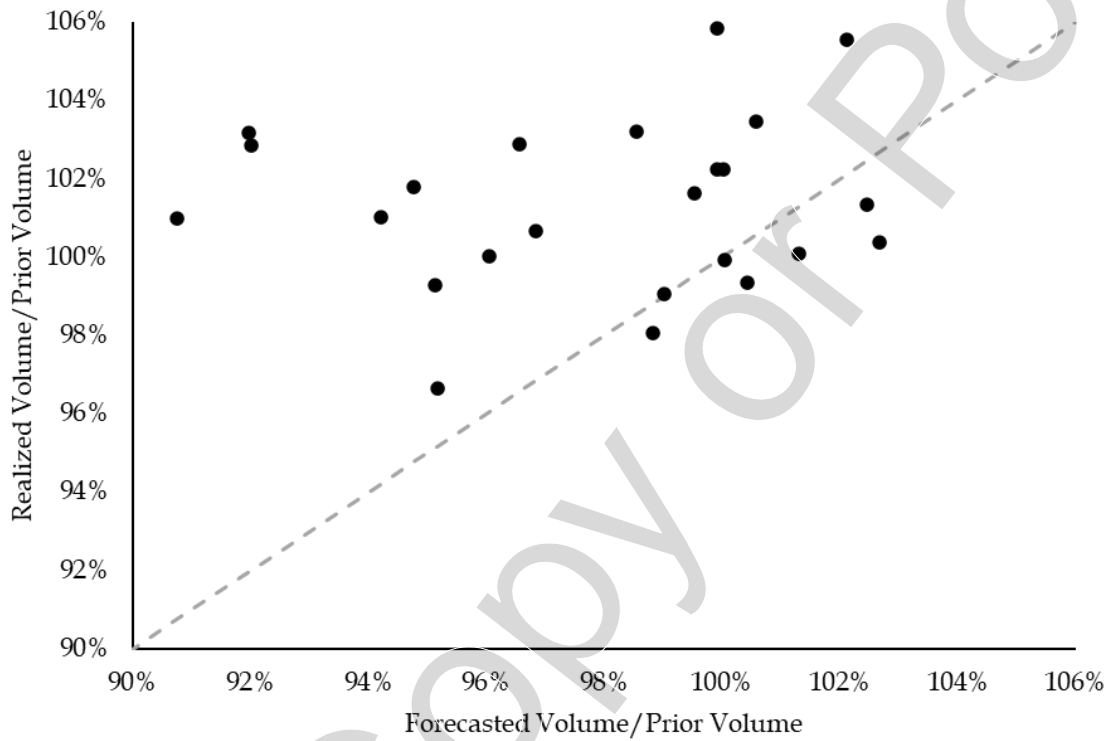Source: "Anheuser-Busch InBev SA/ND," Capital IQ, Inc., a division of Standard & Poor's, accessed February 2023.

b) Volumes and Revenue, by Region, 2018-2020

Region	Volumes (thousands hls)			Revenue (million USD)		
	2018	2019	2020	2018	2019	2020
North America	110,726	108,133	106,846	15,504	15,488	15,622
Middle Americas	128,803	133,538	120,800	11,614	11,912	10,032
EMEA	87,135	85,888	76,207	8,368	7,911	6,835
South America	135,618	139,664	144,209	10,238	9,790	8,092
Asia Pacific	96,116	93,168	81 649	6,735	6,544	5,648
Global Export and Holding Companies	1,422	1,036	933	582	685	652
AB InBev Worldwide	**559,819**	**561,427**	**530 644**	**53,041**	**52,329**	**46,881**

Source: Compiled by casewriters from: AB InBev, "Anheuser-Busch InBev reports fourth quarter and full year 2019 results," AB InBev Press Release, February 27, 2020, p. 3 and p. 23-24, https://www.ab-inbev.com/content/dam/abinbev/news-media/press-releases/2020/02/FY19%20press%20release_EN.pdf , accessed January 2022 and "Annual Report 2020 – AB InBev," AB InBev Press Release, February 24, 2021, p. 6 and p. 8-9,https://www.ab-inbev.com/content/dam/abinbev/news-media/press-releases/2021/02/European_Financials_2020_FINAL.pdf, accessed February 2023.

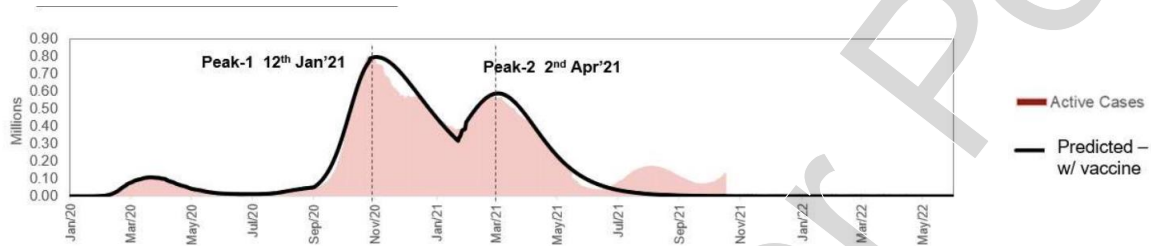**Exhibit 3**   AB InBev's Market Maturity Model, as of 2018

Exhibit 4   Forecasted and Realized Volumes by Country (Illustrative Example)
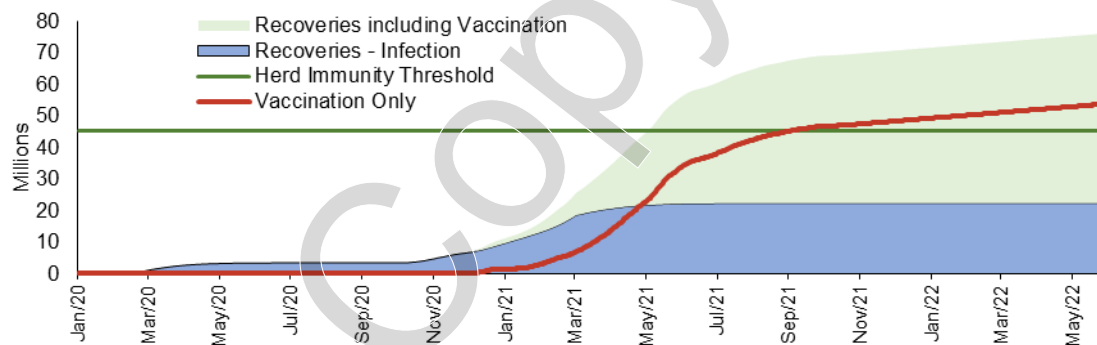

Source: Simulated data from casewriter.

Note: This exhibit displays a plot comparing forecasted volumes (projected one year ahead by regional sales teams) with realized volumes at the country level. Forecasted and realized volumes are normalized by last years' volumes. Please note that the data are simulated and serve as an illustrative example only; they do not reflect actual AB InBev sales or forecasts.

Exhibit 5   GAC SIR Projections for Italy (as of 21st November, 2021)

a)   Infection Curves: Active Cases

b)   Recovery Curves

Source: Company data.

Note: The projections are calculated under the assumptions that the vaccination rate is 0.1%-0.25% per day and that Italy
           does not impose any COVID- related restrictions moving forward (e.g., lockdowns, vaccine passports, etc.).

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