

GLOBAL TRENDS IN NICOTINE

Prepared by the Foundation for a Smoke-Free World



THE FOUNDATION FOR A SMOKE-FREE WORLD

is an independent, philanthropic organization with the purpose of improving global health by ending smoking in this generation.

To learn more about our organization, visit us online at
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EXECUTIVE
SUMMARY

Advancing Industry Transformation

The purpose of the Foundation for a Smoke-Free World is to improve global health by ending smoking in this generation. Ending smoking means eliminating the use of cigarettes and other forms of combustible tobacco worldwide. As we pursue this goal, we will also identify and provide support to address the unique needs of the developing world associated with global efforts to end smoking. Our task is urgent. More than a billion people still smoke worldwide, and more than seven million smokers die each year.

The Foundation's goal is to attain transformation of the entire global tobacco industry and nicotine ecosystem. In support of this objective, the Foundation is calling for proposals to develop and implement the means to (1) critically evaluate industry progress, and (2) assess actions taken to undermine progress toward a smoke-free world. The findings and analyses will be reported in an annually published **Smoke-Free Index**[©] beginning in 2020. Awarded grantee(s) will provide

quantifiable evidence of how companies are addressing industry transformation. As part of this process, we anticipate the collection and compilation of verifiable metrics on research and development (R&D), shifts in capital expenditures and marketing spending, investments aimed at phasing out cigarette production—and much more. The awarded grantee(s) will also deploy a systematic approach in collecting verifiable data and specific examples of illegal actions or those incompatible with good corporate practices.

This report contributes to laying the groundwork for the Foundation's work in this area. Specifically, the report identifies the major players in nicotine delivery, outlines their product organization and geographic focus, and quantifies their output primarily on a relative basis. The intention is for the **Smoke-Free Index**[©] going forward to evaluate approximately fifteen to twenty-five of the largest nicotine delivery companies in the world.

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CURRENT STATE OF THE NICOTINE MARKET

Cigarettes remain the dominant global nicotine delivery vehicle. Because the tobacco industry is highly concentrated, the global nicotine ecosystem is also highly concentrated. We define the nicotine ecosystem as the major players in the business of nicotine delivery through: (1) tobacco products, including cigarettes, cigars and cigarillos, smoking tobacco, and smokeless tobacco; (2) vapor products, including open and closed vaping systems, as well as heated tobacco products; and (3) nicotine replacement therapy (NRT) smoking cessation aids.

We estimate total global retail sales associated with the nicotine ecosystem during 2017 were approximately \$785 billion USD. Cigarettes made up about 89.1% of the global retail nicotine ecosystem by sales value. Combustible tobacco products (cigarettes, cigars and cigarillos, and smoking tobacco) constituted 95.8% of the nicotine ecosystem by retail sales in 2017. Smokeless tobacco products made up about 1.6% of the nicotine ecosystem; followed by open and closed vaping systems, 1.5%; heated tobacco products, 0.8%; and NRT smoking cessation aids, 0.3%. Retail sales figures include taxes applied to the final purchase price.

Approximately 5.4 trillion retail cigarette sticks were sold during 2017. By our estimates, this figure nears 5.9 trillion cigarette sticks when illicit trade is accounted for and potentially 6.4 trillion sticks when locally manufactured combustible tobacco products, such as bidis in India, are included. Global retail cigarette unit volumes decreased at a compounded annual growth rate of about 2.4% between 2014 and 2017. Performance varies widely by country due to several factors, such as local taxation changes, regulatory enforcement, consumer tastes, etc.

In this report, we utilize a volume-based methodology to present nicotine ecosystem share by company. The measure for comparison is the cigarette stick equivalent. On the basis of cigarette stick equivalents across the multiple product categories, we estimate total retail volume of approximately 6.1 trillion for 2017. Factoring in illicit trade and locally manufactured combustible tobacco products yields a global total approaching 7.1 trillion cigarette stick equivalents.

Increases in retail sales of the tobacco product categories of cigarettes, smoking tobacco, and smokeless tobacco are being driven by pricing rather than retail sales volumes, which are generally stable to declining. The cigars and cigarillos category has exhibited retail sales volume growth during recent years. Vaping and heated tobacco product categories are demonstrating strong sales and volume growth, albeit from relatively low share position. Based on 2017 data, vapor product sales grew at a rate that is about an order of magnitude greater than of most of the other nicotine-related product categories. However, the performance of both vaping and heated tobacco products is heavily country-specific and does not reflect a global trend to date. Sales of NRT smoking cessation aid products are modestly increasing from a small market share position.

MAJOR PLAYERS IN NICOTINE DELIVERY

We estimate that the six largest tobacco companies generated approximately 80% of the nicotine-related product retail volume (in cigarette stick equivalents) globally during 2017. China National Tobacco Corporation is the largest producer at 38% volume share, followed by the five publicly traded tobacco companies headquartered in Europe, Japan, and the U.S.:



British American Tobacco Plc, 13%; Philip Morris International Inc, 13%; Japan Tobacco Inc, 9%; Imperial Brands Plc, 4%; and Altria Group Inc, 3%. Although these companies also appear among the top producers across the various tobacco and vapor product categories, they are joined in the nicotine ecosystem by a range of others including major state and semi-state tobacco monopolies in Asia and Africa, smaller privately held and publicly traded companies from across the globe, e-cigarette manufacturers centered primarily in Shenzhen, China, and several global pharmaceutical companies.

REGIONAL CHARACTERISTICS

Regionally, the nicotine ecosystem offers some variations, but the basic patterns remain—cigarettes are the primary nicotine delivery mechanism, and production is dominated by the large global tobacco companies and, in some cases, the regional and/or state-owned tobacco companies. Nevertheless, the underlying dynamics are in flux owing to technological innovation, particularly in the e-cigarette category. For example, we find that the innovation driving the e-cigarette market allowed it to surpass NRT's by retail sales value several years ago.

We focus on the World Health Organization (WHO) regional structure. Based on our analysis, the respective nicotine ecosystems in the European, Western Pacific, and Americas Regions are relatively large compared to their underlying populations. This is not surprising, given that the regions are home to some of the largest nicotine markets in the world—China, the U.S. and Western Europe. Conversely, the nicotine ecosystems in the South-East Asia, African, and Eastern Mediterranean Regions are relatively small compared to their underlying populations. This result is caused, in part, by the nature of the data—retail sales data do not capture illicit trade or locally manufactured combustible tobacco products. On the basis of total world population percentage share and retail value nicotine ecosystem percentage share in USD for 2017, we estimate the following respective share positions by region: African, 14%/2%; Americas, 13%/21%; Eastern Mediterranean, 9%/3%; European, 12%/30%; South-East Asia, 26%/6%; and Western Pacific, 26%/38%. That said, with regard to cigarette sales volume, the Americas, European, South-East Asia, and Western Pacific Regions are shrinking. The African and Eastern Mediterranean Regions are demonstrating cigarette volume characteristics that are relatively stable to increasing.



Regionally, the nicotine ecosystem offers some variations, but the basic patterns remain—cigarettes are the primary nicotine delivery mechanism.

Introduction

Establishing a complete data set that encompasses the companies that produce nicotine-based products is a necessary precursor to developing effective policies that promote the Foundation's purpose of smoking cessation and harm reduction globally. To date, research focuses primarily on parts of the nicotine ecosystem. Many reports highlight the role of the publicly traded, multinational tobacco companies headquartered in Europe, Japan, and the U.S. Few consider the impact of the major state and semi-state tobacco monopolies in Asia and Africa. Even fewer include the role of companies that produce cleaner forms of nicotine, such as those in the pharmaceutical industry and in non-tobacco companies that produce non-combustible forms of nicotine.

This report, which focuses on the companies that constitute the nicotine ecosystem, is an initial step in the Foundation's research program. The companies we intend to analyze and report on over time include the major global players across multiple nicotine-delivery products. The purpose of this report is primarily to identify the major players, describe their product organization and geographic focus, and quantify their output on a relative basis.

The Foundation's ultimate goal is to attain transformation of the entire global tobacco industry and nicotine ecosystem. We believe the transformation of the tobacco industry can provide an enormous and crucial accelerant to the process of eliminating combustible tobacco. In support of this objective, the Foundation is calling for proposals to develop and implement the means to (1) critically evaluate industry progress, and (2) assess actions taken to undermine progress toward a smoke-free world. The findings of such evaluations and assessments will be reported in an annually published **Smoke-Free Index**®. Through this program, the awarded grantee(s) will provide quantifiable evidence of how companies are addressing industry transformation.



IDENTIFYING THE MAJOR PLAYERS IN NICOTINE DELIVERY

This report identifies the major players worldwide in nicotine delivery for additional analysis in the future, but it does not evaluate the potential risks and benefits of the various products. We analyze here available data for nicotine producers from two points of view: (1) product type, and (2) geographic market (global, regional, and selected country level). Future reports will (1) independently index selected company performance toward accelerating global efforts to reduce health impacts and deaths from smoking, and (2) publish independent ratings and rankings of the major tobacco/nicotine delivery companies.

WHY NICOTINE? THE RECENT HISTORY

The perception of nicotine has evolved over time. Tobacco companies have been aware of the importance of nicotine to cigarette consumption for more than 50 years, using nicotine as an instrument of addiction to smoking and for propagating the idea of nicotine as a stress reliever.

- “Nicotine is addictive. We are, then, in the business of selling nicotine, an addictive drug effective in the release of stress mechanisms.” – July 17, 1963, Brown & Williamson

General Counsel/Vice President Addison Yeaman.

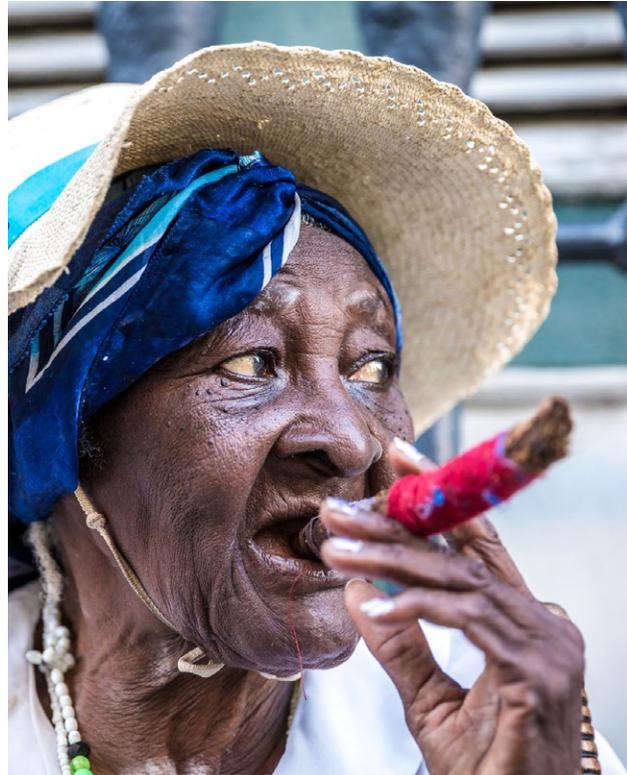
- “It is my conviction that nicotine ... both helps the body to resist external stress and also can as a result show a pronounced tranquillizing effect ... under modern conditions of life people find that they cannot depend just on their subconscious reactions to meet the various environmental strains with which they are confronted ... smoking has considerable psychological advantages and a built-in control against excessive absorption. It is almost impossible to take an overdose of nicotine in the way it is only too easy to do with sleeping pills.”
– May 29, 1962, British American Tobacco memo ‘The Smoking and Health Problem’

Likewise, the dangers associated with smoking have been understood for decades. That said, the conventional cigarette remains the dominant nicotine-delivery vehicle worldwide, with important cultural exceptions such as India, Sweden, and Norway.

- The tobacco industry has understood the carcinogenic nature of its product since the 1950s, as is well documented by *Tobacco Explained*,¹ which cites thousands of internal tobacco industry documents released through litigation and whistleblowers.
- The Royal College of Physicians report of 1962 and the U.S. Surgeon General’s report of 1964 are commonly regarded as turning points in the recognition of the health harms from smoking.
- In 1976, the late Professor Michael Russell wrote, “People smoke for the nicotine, but they die from the tar.” In 1978, Professor Russell’s group ran the first large-scale clinical trial of nicotine gum as a means of switching smokers to a clean form of nicotine, thereby initiating the concept of *clean nicotine*.

Nicotine replacement therapy (NRT) products were first approved for medicinal use in the United States in 1984. Today, nicotine replacement products are on the WHO Model List of Essential Medicines² that includes the most effective and safe medicines in a health system. To date, the U.S. FDA has approved two types of prescription NRT products (nicotine nasal spray and nicotine inhaler) and three types of over-the-counter NRT products (nicotine gum, transdermal nicotine patch, and nicotine lozenge). Transdermal patch is a slow sustained-release form of nicotine delivery. Other products like gum, nasal spray, oral inhaler, and tablet are acute dosing forms of nicotine. They provide craving and withdrawal relief with the immediate release of nicotine. All of these products have different levels of efficacy and variable rates of nicotine absorption, and they are most effective when the consumer receives parallel cessation counseling.

One example of the potential of reduced harm nicotine



products is the success in Sweden of Swedish snus.³ While snus has been used in Sweden for hundreds of years, its use was in decline by the 1970s. However, in part because of evidence-based regulation, Sweden has since realized an increase in the number of snus users and a concomitant reduction in the number of daily smokers. Smoking rates in the country as of 2015 were 11% for women and 10% for men, well below the rest of the European Union where snus is banned. The Swedish pattern of increasing snus use and declining smoking prevalence has also occurred in Norway.

The realization and evidence of the harms caused by smoking cigarettes led to the adoption of world’s first health treaty negotiated under the auspices of the World Health Organization Framework Convention on Tobacco Control (WHO FCTC).⁴ The ratification of FCTC by 181 countries ushered in a new era of coordinated efforts to tackle a major global health threat. Public health professionals and other experts believed that a full implementation of WHO FCTC would address the scourge of smoking. Faced with limited resources, WHO and the parties to WHO FCTC developed a prioritized package of demand side interventions—MPOWER. The concept of MPOWER received funding from organizations including Bloomberg Philanthropies and the Bill and Melinda Gates Foundation. Progress led by WHO under MPOWER has been encouraging, but as the *WHO Report on the Global Tobacco Epidemic 2017*⁵ indicates, much

more needs to be done especially in the area of supporting smokers to quit.

Harm reduction was not addressed by WHO FCTC. Cessation has received little attention even under MPOWER because WHO-recommended cessation services are only available in about 26 countries, which are mainly high-income countries.

While generally relegated to research and development, aerosolized nicotine-delivery devices have been investigated since the 1960s. It was not until about 2003 when what would become the first commercially successful electronic cigarette was created in China by pharmacist Hon Lik. By 2007, e-cigarettes were introduced to Europe and the U.S., and they have experienced increased consumer acceptability and market share since.

Heat-not-burn (HNB) tobacco products heat tobacco to a temperature lower than that at which a conventional cigarette burns. HNB products first came to market in the late 1980s, but they were not commercially successful. Since 2014, HNB products are being introduced by several of the large tobacco companies.

Harm-reduction devices are a relatively new phenomena, but the use of clean nicotine is still being debated in public health circles. Currently, harm reduction is a debate that has divided the tobacco control community; countries are developing policies with very diversified views. Some countries have completely banned harm-reduction products, while others like the United Kingdom are incorporating them into National

Health Services to help smokers either quit or reduce the harm caused by smoking.

On July 28, 2017, the U.S. Food & Drug Administration (FDA)⁶ announced a comprehensive plan that places nicotine and the issue of addiction at the center of the agency's tobacco regulation efforts. A key piece of the approach is demonstrating a greater awareness that nicotine, although highly addictive, is delivered through products with different levels of risk. As a first step in this process, the FDA has started a dialogue about potential regulations that would reduce the level of nicotine in combusted cigarettes.

Given that the tobacco industry is highly concentrated, the global nicotine ecosystem is also highly concentrated.





Current State of the Nicotine Market

Cigarettes remain the dominant global nicotine-delivery vehicle. Given that the tobacco industry is highly concentrated, the global nicotine ecosystem is also highly concentrated. We define the nicotine ecosystem as the major players in the business of nicotine delivery through (1) tobacco products, including cigarettes, cigars and cigarillos, smoking tobacco, and smokeless tobacco; (2) vapor products, including open and closed vaping systems, as well as heated tobacco products; and (3) Nicotine Replacement

Therapy (NRT) smoking cessation aids.

In evaluating the availability and limitations of the data, we present nicotine ecosystem *company share* primarily using a volume-based methodology for identification and comparison. The measure of comparison is the cigarette stick equivalent, as defined in the **Appendix** for Sources and Methods. Retail sales measures, as related to the product categories and geographic regions, are also instructive, and they are discussed throughout the report as noted.

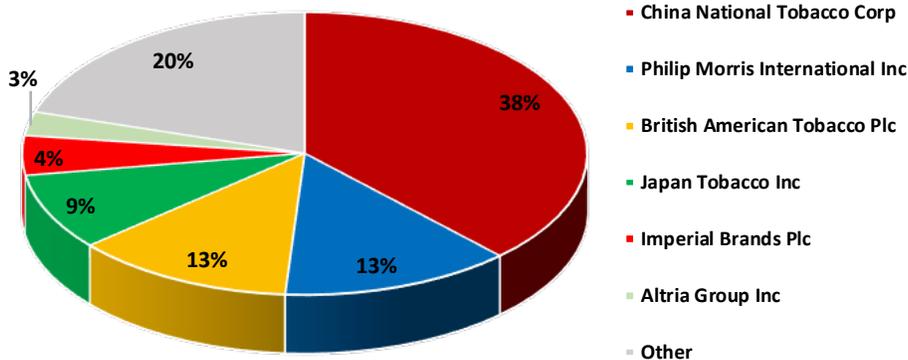


CHART 1

Global Nicotine Ecosystem Company Volume Share in 2017

Source: Company volume share of cigarette stick equivalents based on Euromonitor Passport for World by Retail Volume and Value; and Foundation estimates. Refer to Appendix for Sources and Methods.

British American Tobacco pro forma acquisition of Reynolds American.

Japan Tobacco pro forma acquisitions of Mighty Corp and Donskoy Tabak.

We estimate that total retail sales associated with the nicotine ecosystem during 2017 were approximately \$785 billion USD, based on an estimated retail volume of approximately 6.1 trillion cigarette stick equivalents. Retail sales figures include taxes applied to the final purchase price but do not capture illicit trade or locally manufactured combustible tobacco products, such as bidis in India. According to Euromonitor,⁷ in 2017 the volume of duty-not-paid cigarettes consumed around the world was approximately 450 billion sticks, which represents about 8% of global retail cigarette unit volume.

We estimate that the six largest tobacco companies (China National Tobacco Corporation, British American Tobacco Plc, Philip Morris International Inc, Japan Tobacco Inc, Imperial Brands Plc, and Altria Group Inc; see *Chart 1*) generated approximately 80% of the nicotine-related product retail volume (in cigarette stick equivalents) globally during 2017. China National Tobacco Corporation is the largest producer.

Based on 2017 reports for retail sales value, cigarettes made up approximately 89.1% of the global retail nicotine

ecosystem—a figure that is greater than 90% when illicit trade is included. Combustible tobacco products (cigarettes, cigars and cigarillos, and smoking tobacco) constituted about 95.8% of the nicotine ecosystem by retail sales in 2017 (see *Chart 2*). Smokeless tobacco products contributed to about 1.6% of the nicotine ecosystem, followed by open and closed vaping systems, 1.5%; heated tobacco products, 0.8%; and NRT smoking cessation aids, 0.3%.

CIGARETTE VOLUMES IN DECLINE

Cigarette retail volumes are falling globally, although retail sales are increasing because of price increases. According to Euromonitor, cigarette volume in 2017 declined by approximately 1.4% from the previous year.

As we identify the major nicotine producers worldwide, it is important to note the relative levels of scale across the products, as well as the rates of change (see *Table 1*). Based on the data, one can observe that the retail sales value is

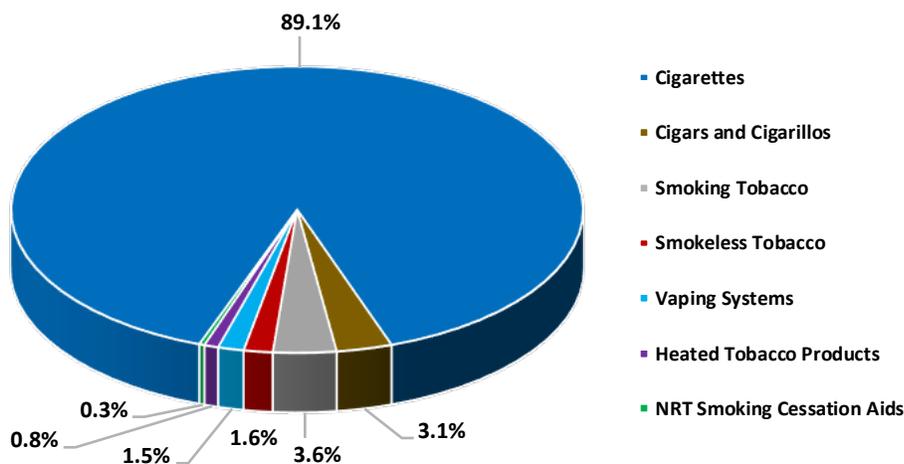


CHART 2

Global Nicotine Ecosystem by Product Category Retail Sales Value in 2017

Source: Euromonitor Passport by Retail Value for World at current prices, USD.

Product Category (2017)	Retail Value (USD million)	% Retail Value	Retail Value		Retail Volume	
			% Change 2017/16	3-Year CAGR	% Change 2017/16	3-Year CAGR
Cigarettes	\$ 699,434	89.1%	2.8%	3.0%	(1.4%)	(2.4%)
Cigars and Cigarillos	24,655	3.1%	10.1%	7.8%	8.5%	6.4%
Smoking Tobacco	27,990	3.6%	4.7%	4.5%	(0.3%)	0.4%
Smokeless Tobacco	12,848	1.6%	6.2%	6.0%	(1.5%)	(0.6%)
Vaping Systems	11,441	1.5%	18.2%	25.4%	15.8%	21.8%
Heated Tobacco Products	6,309	0.8%	200.6%	466.0%	193.5%	529.8%
NRT Smoking Cessation Aids	2,369	0.3%	4.0%	4.1%	2.5%	3.0%
Total	\$ 785,045	100%	3.9%	3.7%	(0.6%)	(1.7%)

TABLE 1

Global Product Category Retail Value and Volume Summary for 2017

Source: Euromonitor Passport for World by Retail Value in current prices, USD million. Retail Volume in cigarette stick equivalents based on Euromonitor Passport for World by Retail Volume and Value, and Foundation estimates. Refer to Appendix for Sources and Methods. CAGR=compounded annual growth rate.

dominated by cigarettes. The retail value of the cigars and cigarillos category is roughly comparable to that of the smoking tobacco category—which in turn is comparable to the total of the smokeless, vaping, and NRT smoking cessation aid categories.

Throughout this report we will evaluate trends in terms of both retail value and retail volume. While retail sales value measures are instructive regarding product categories and geographic regions, in our view, several factors exist that may skew results. Retail sales figures are a function of volume and pricing, inclusive of taxation changes and company price changes. Taxes constitute a significant component of the cost of tobacco products in many countries. According to WHO reports,⁵ total taxes of the weighted average retail price of the most sold brand of cigarettes in 2016 globally were 56.2% of pack price expressed in Purchasing Power Parity (PPP) adjusted dollars or international dollars to account for differences across countries. Taxation rates vary by country, with high-income, 65.1%; middle-income, 54.6%; and low-income, 37.2%, as of 2016. Regarding the volume implications, tobacco products have a well-documented history of a negative price elasticity of demand. Further, retail sales figures, presented in this report in USD, are in part a function of foreign currency conversion, which can distort retail sales trends compared to those at the local level.

Clearly, dynamics that occur at the country level are obfuscated by the global totals. For this reason, we present a summary of cigarette volume trends in the largest 30 markets in the world according to Euromonitor estimates. To smooth out some of the annual variances, we present the three-year compounded annual growth rates (CAGR) for the top 30 cigarette markets by volume from 2014 to 2017 (see Table 2).

Global retail cigarette unit volumes decreased at a CAGR of about 2.4% during that period. Market sizes vary greatly across the selected countries. We include estimates for retail volume and retail plus illicit trade volume. The differences between the growth rates associated with retail volume and retail plus illicit volume are due to the rate of change in estimated illicit trade activity relative to retail trade. Both retail and illicit trade

Year 2017 Rank	Country	Retail Volume (million sticks)	Retail + Illicit (million sticks)	3-Year CAGR 2014-17	
				Retail	Retail + Illicit
1	Iraq	24,632	32,929	7.2%	1.3%
2	Turkey	106,224	117,497	3.9%	0.8%
3	Egypt	93,105	96,690	3.8%	4.7%
4	Bangladesh	88,906	91,516	3.3%	3.2%
5	Vietnam	77,015	93,371	3.1%	3.4%
6	Algeria	30,985	33,708	2.4%	2.0%
7	Saudi Arabia	30,444	32,169	1.5%	1.7%
8	Mexico	30,925	36,699	1.5%	1.0%
9	Poland	41,616	47,748	(0.3%)	(0.5%)
10	Germany	78,977	86,006	(0.6%)	(0.6%)
11	France	44,261	53,415	(0.6%)	(0.5%)
12	Indonesia	308,173	332,513	(0.7%)	(0.3%)
13	Spain	47,950	53,400	(1.5%)	(1.8%)
14	Italy	69,325	73,859	(2.0%)	(1.9%)
15	USA	252,701	262,589	(2.3%)	(2.3%)
16	China	2,368,900	2,476,920	(2.4%)	(2.6%)
	World	5,415,582	5,871,153	(2.4%)	(2.3%)
17	Canada	29,000	36,064	(3.2%)	(2.8%)
18	Ukraine	66,610	67,674	(3.2%)	(4.6%)
19	Thailand	40,403	42,453	(3.7%)	(3.3%)
20	Belarus	22,088	22,183	(3.9%)	(3.9%)
21	Argentina	35,842	39,672	(4.3%)	(3.3%)
22	United Kingdom	33,479	37,696	(4.8%)	(4.7%)
23	India	81,285	106,946	(5.4%)	(3.4%)
24	Russia	258,914	271,411	(6.4%)	(5.9%)
25	Japan	151,401	151,464	(6.7%)	(6.7%)
26	Philippines	65,824	74,800	(7.2%)	(7.6%)
27	Pakistan	50,125	79,000	(7.2%)	(1.3%)
28	Taiwan	26,543	34,127	(7.6%)	(4.7%)
29	South Korea	68,353	68,998	(7.6%)	(7.4%)
30	Brazil	48,186	90,132	(12.2%)	(4.8%)

TABLE 2

Cigarette Volume—Three-Year CAGR from 2014 through 2017

Source: Euromonitor Passport by Cigarette Volume for top 30 countries by estimated Volume; modeled countries excluded.

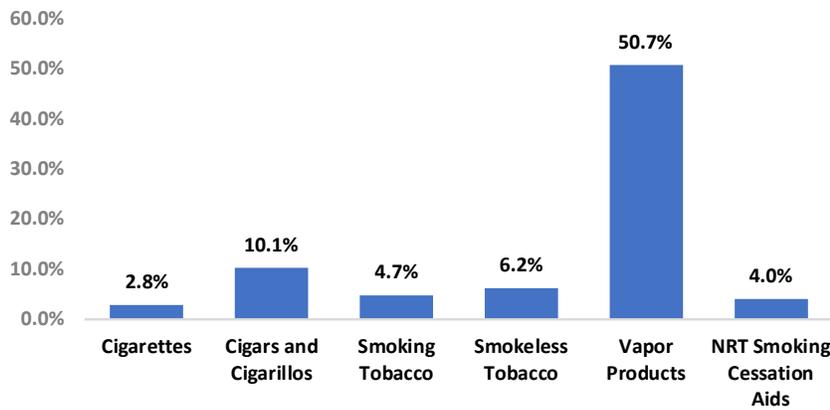


CHART 3
Product Category Retail Sales Value Growth Rates in 2017 (Year-over-Year)

Source: Euromonitor Passport for World by Retail Value in current prices USD.

factors may be influenced by changes in taxation, regulatory enforcement, and the macroeconomic environment of each country.

What has occurred since the end of 2017? In the first half of 2018, tobacco companies reported continued shipment volume declines on an annualized basis. British American Tobacco reported that its cigarette volume, adjusted for acquisitions, decreased 3.1% for the first half of 2018. Japan Tobacco reported an international shipment decline of 1.3% in the first half of 2018, excluding acquisitions and unfavorable inventory movements, while the domestic cigarette market in Japan decreased 13.8%, in part because of heated tobacco products competition. For the first half of 2018, Philip Morris reported a cigarette shipment volume decrease of 3.3%, excluding heated tobacco products. Altria reported for the first half of 2018 that, when adjusted for trade inventory movements, its U.S. cigarette shipment volume decreased by an estimated 5.5%, while industry volume declined 4.5%. Imperial Brands reported a tobacco volume decrease of 2.1% for half-year 2018 ending March 31 in stick equivalents.

In general, retail sales values are increasing across all product categories (see *Chart 3*). Sales increases in the tobacco product categories of cigarettes, smoking tobacco, and smokeless

tobacco are driven by pricing, whereas retail sales volumes are generally stable to declining. The exception to this trend is the cigars and cigarillos category, which has been exhibiting retail sales volume growth during recent years. Vaping and heated tobacco products (combined into the vapor products category for presentation purposes below) are demonstrating strong unit growth on the basis of our cigarette equivalent volume methodology, albeit from relatively low nicotine ecosystem share (see *Chart 4*). Based on 2017 data, vapor product sales grew at a rate that is about an order of magnitude greater than most of the other nicotine-related product categories. However, the performance of both vaping and heated tobacco products is heavily country-specific and does not reflect any type of global trend to date. Sales of NRT smoking cessation aids are modestly increasing.

Regarding unit volume changes, we estimate that global cigarette unit volumes decreased by approximately 1.4% in 2017 from the previous year. That said, approximately 5.4 trillion retail sticks were sold during 2017. This figure neared 5.9 trillion cigarette sticks when illicit trade was accounted for and potentially 6.4 trillion sticks when locally manufactured combustible tobacco products, such as bidis in India, were accounted for. Unit growth rates associated with the other

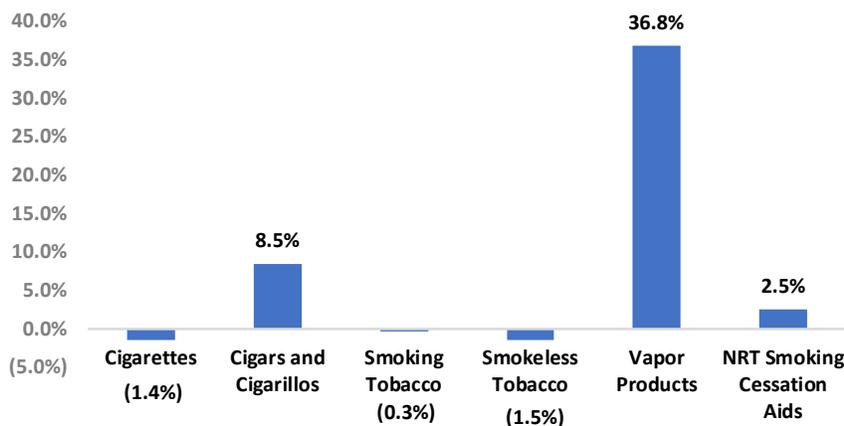


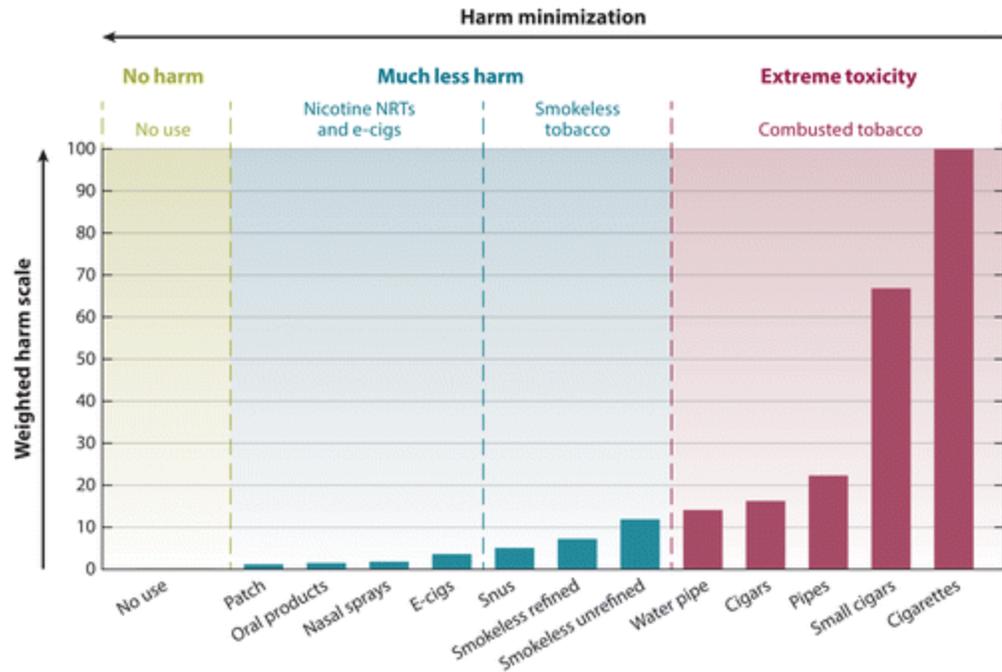
CHART 4
Product Category Unit Volume Growth Rates in 2017 (Year-over-Year)

Source: Retail Volume in cigarette stick equivalents based on Euromonitor Passport for World by Retail Volume and Value; and Foundation estimates. Refer to Appendix for Sources and Methods.

CHART 5

Products Along the Harm-Minimization Continuum

Source: Annual Rev Public Health. 2018;39:193-213. doi: 10.1146/annurev-publhealth-040617-013849. Epub 2018 Jan 11. Adapted with permission from Nutt et al. 2014.



product categories mainly varied from slightly positive to slightly negative—annual performance across categories may deviate to some degree due to variations by region and country pertaining to factors such as local taxation changes, regulatory enforcement, and consumer tastes. The major outlier regarding growth is the vapor products category, which consists of vaping and heated tobacco products.

BENEATH THE SURFACE—CHANGES ARE OCCURRING

It is easy to look at the data and surmise that the nicotine ecosystem remains primarily driven by cigarettes and, in turn, by the large tobacco companies, even though cigarette volume consumption is declining globally at a modest pace. However, in our opinion, this view is overly simplistic because changes driven by product innovation are occurring.

First, e-cigarette consumption is growing rapidly in selected markets. The issue here is that performance varies widely by market, in part because of differences in regulatory regimes affecting availability, taxation, sales channels, youth access, public vaping, product restrictions, and advertising. For example, according to ECigIntelligence,⁸ e-cigarette sales are effectively banned in some countries such as Brazil, Saudi Arabia, and Thailand. In Japan, e-cigarettes and e-liquids with nicotine cannot be marketed without a pharmaceutical license, which equates to effectively banning the products. In the U.S. and the U.K., the use and sale of e-cigarettes to adults are legal.

Second, e-cigarette producers are relatively fragmented and are often either privately held or are small components within much larger entities (i.e., the major tobacco companies). That said, we estimate the large tobacco companies represented only **about 21%** retail value share of the vaping category in 2017—primarily in closed vaping systems. Nevertheless, this fragmentation contributes to limiting publicly available data. In addition, e-cigarette sales occur through multiple distribution channels: retail stores, vape stores, and online. Sales via vape stores and online sites are more difficult to track.

Third, next-generation products, such as new forms of e-cigarettes and heated tobacco products, are coming to the market. These products are exhibiting technological innovation and change, which the tobacco industry has not experienced in many decades, perhaps since the inception of the factory-made cigarette more than one hundred years ago.

Consistent with our theme of identifying the major global players in nicotine delivery, a diverse class of alternative nicotine-delivery systems (ANDS) has in recent years been developed. These products do not combust tobacco and are potentially less harmful than cigarettes. ANDS have the potential to decouple nicotine consumption from lethal inhaled smoke. A developing view of Harm Minimization and Tobacco Control⁹ is represented in *Chart 5*. While it is not the purpose of this report to further elaborate on the potential merits of harm reduction, we believe it is appropriate for the reader to consider the weighted harm scale of the various products we discuss.

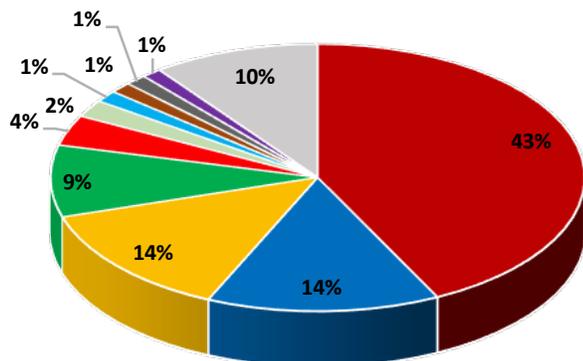
Major Producers by Product Category

Largest Global Producers of Cigarettes

We estimate that approximately 90% of cigarette retail volume globally is generated by the top ten tobacco companies represented in *Chart 6*. The largest producer by a wide margin is China National Tobacco Corporation, the Chinese state-owned manufacturer of tobacco products with virtual monopoly status. We estimate that China National Tobacco Corporation has approximately 43% of the global cigarette market share, based on retail volume for 2017. As of 2017, cigarettes comprised approximately 89% of the retail nicotine ecosystem by retail value, at approximately \$699 billion and 5.4 trillion sticks. The next five largest tobacco companies are publicly traded entities:

- Philip Morris International
- British American Tobacco (which acquired Reynolds American in July 2017)
- Japan Tobacco
- Imperial Brands
- Altria Group

The remaining companies, listed below, complete the top ten cigarette producers.



- China National Tobacco Corp
- Philip Morris International Inc
- British American Tobacco Plc
- Japan Tobacco Inc
- Imperial Brands Plc
- Altria Group Inc
- Gudang Garam Tbk PT
- KT&G Corp
- Eastern Co SAE
- ITC Ltd
- Other

CHART 6
Global Company Retail Volume Share of Cigarettes in 2017

Source: Euromonitor Passport for World by Retail Volume.

British American Tobacco pro forma acquisition of Reynolds American.

Japan Tobacco pro forma acquisitions of Mighty Corp and Donskoy.

- Gudang Garam Tbk PT is a publicly traded Indonesia-based company that primarily engages in manufacturing cigarettes.
- KT&G Corporation, originally a government-owned monopoly, was privatized and is now publicly traded. It manufactures and sells tobacco and tobacco products in South Korea and internationally. KT&G primarily exports its tobacco products to the Middle East, Southeast Asia, Africa, Europe, and America.
- Eastern Company SAE, considered the official cigarette manufacturer in Egypt, also produces brands for Philip Morris and British American Tobacco. Eastern Company SAE, a subsidiary of Chemical Industries Holding Company, is an Egypt-based joint stock company that engages in the manufacture and trade of tobacco, including cigarettes, cigars, pipe tobacco, and molasses tobacco.
- ITC Limited is an Indian conglomerate that offers cigarettes and cigars.

Largest Global Producers of Cigars and Cigarillos

We estimate that as of 2017, the top ten producers of cigars and cigarillos generated approximately 70% of retail volume globally (see *Chart 7*). Cigars and cigarillos comprise more than 3% of the nicotine ecosystem by retail sales value at approximately \$24.7 billion. Cigars represent approximately 83% of the retail sales value of the category, while cigarillos contribute 17% of the retail sales value. Euromonitor reports 26.4 billion units sold during 2017, 43% of which were cigars and 57% cigarillos. Among the top ten producers of cigars and cigarillos are four companies that are also among the largest cigarette producers: Imperial Brands, Altria Group, China National Tobacco Corporation, and Philip Morris International.

- The largest manufacturer of cigars, along with smokeless tobacco brands, is Swisher International Group Inc, headquartered in Jacksonville, Florida. The company has manufacturing facilities in Wheeling, West Virginia, and Santiago, Dominican Republic. It controls approximately

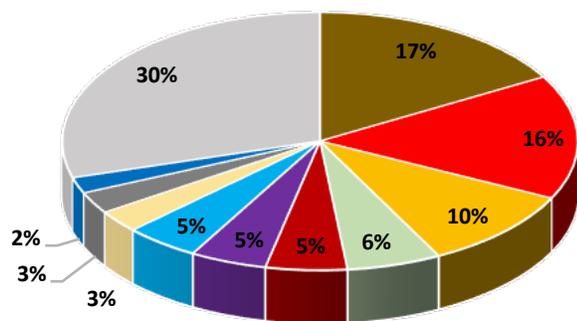


CHART 7

Global Company Retail Volume Share of Cigars & Cigarillos in 2017

Source: Euromonitor Passport for World by Retail Volume.

- Swisher International Group
- Imperial Brands Plc
- Scandinavian Tobacco Group
- Altria Group Inc
- China National Tobacco Corp
- Burger Group, The
- Swedish Match AB
- Villiger Söhne AG
- Royal Agio Cigars NV
- Philip Morris International Inc
- Other

17% of the global volume market share in the cigars and cigarillos category as of 2017. Swisher International Group exports its products to more than 80 countries.

- Scandinavian Tobacco Group is a publicly traded manufacturer of cigars and pipe tobacco, headquartered in Denmark. The company sells fine-cut tobacco products in more than 100 countries around the world.
- Burger Söhne AG is a privately held company that was incorporated in 2006 and is headquartered in Switzerland. It manufactures tobacco products, such as cigars, cigarettes, and snuff.
- Swedish Match AB is a publicly traded company headquartered in Sweden. Swedish Match operates in snus and moist snuff, and other tobacco products. More than one-third of total company sales and more than half of the operating profit come from snus and moist snuff.
- Villiger Söhne AG is a privately held company, headquartered in Switzerland. It manufactures and supplies cigars and cigarillos. It markets and sells its products through dealers and partners in Switzerland and internationally.
- Royal Agio Cigars NV is a family-owned company headquartered in the Netherlands. It manufactures and exports cigars to more than 100 countries.

Largest Global Producers of Smoking Tobacco

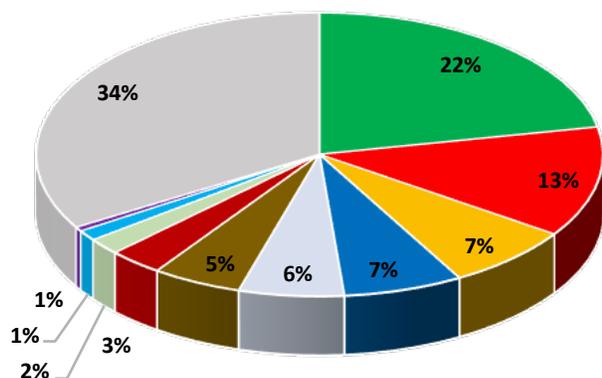
We estimate that the top ten producers of smoking tobacco, listed in *Chart 8*, generated approximately 66% of category retail volume globally in 2017. For the purpose of this report, the smoking tobacco category consists of fine-cut tobacco and pipe tobacco. Fine-cut tobacco includes roll-your-own (RYO), volume tobacco, and make-your-own/tubing tobacco. Pipe tobacco encompasses cut tobacco sold in packaged format for smoking in pipes and water pipe tobacco of the type consumed in the Middle East, known as *shisha*. Fine-cut

tobacco represents 81% of the category retail sales and 46% of the volume, while pipe tobacco represents 19% of the category retail sales and 54% of the volume.

As of 2017, smoking tobacco comprised about 3.6% of the retail nicotine ecosystem by retail sales, at approximately \$28.0 billion. The largest producers of smoking tobacco were among the largest cigarette producers: Japan Tobacco, Imperial Brands, British American Tobacco, Philip Morris International, as well as Eastern Company SAE. Scandinavian Tobacco Group is a manufacturer of cigars and pipe tobacco. Private label branding accounts for about 2.5% of global share. According to Euromonitor, as of 2017, smoking tobacco product volume was about 207 million kilograms.

- Al Fakher Tobacco Trading LLC was founded in the United Arab Emirates in 1999. The company produces shisha tobacco, the molasses-based tobacco product smoked in a hookah, infused with various flavors.
- The Pöschl Tobacco Group is a family-owned company headquartered in Germany. It manufactures smoking and snuff tobacco products and maintains sales relationships in nearly 100 countries.
- Al Zawrae Industrial Company is a privately held company headquartered in Jordan that has been operating since 2010. It manufactures and distributes tobacco and tobacco molasses brands globally.
- Landewyck Group Sàrl and its subsidiaries are privately held and headquartered in Luxembourg. They develop, produce, and market tobacco products. Landewyck Group has production plants in Germany, Luxembourg, Hungary, Belgium, and the Netherlands.

In some markets, the availability of fine-cut tobacco products introduces the concept of pricing arbitrage with factory-made or boxed cigarettes. Excise taxes are a direct method for governments to increase the price of tobacco products to encourage quitting or reducing consumption. However,



- Japan Tobacco Inc
- Imperial Brands Plc
- British American Tobacco Plc
- Philip Morris International Inc
- Al Fakher Tobacco Trading LLC
- Eastern Co SAE
- Pöschl Tabak GmbH & Co KG
- Al Zawrae Industrial Co
- Scandinavian Tobacco Group
- Landewyck Group Sàrl
- Other

CHART 8
Global Company Retail Volume Share of Smoking Tobacco in 2017

Source: Euromonitor Passport for World by Retail Volume.

British American Tobacco pro forma acquisition of Reynolds American.

some tobacco users may seek sources of lower-priced tobacco products, such as rolled cigarettes, in response to a tax-related price increase on cigarettes instead of quitting tobacco use or reducing its consumption.

According to the Organisation for Economic Cooperation and Development's *OECD Health Statistics 2017* (definitions, sources and methods),¹⁰ a cigarette typically weighs approximately 1 gram, of which the tobacco content can vary from 65% to 100% depending on the type of cigarette. The methodology of converting tobacco items into grams differs across countries.

According to Euromonitor, the average cost per cigarette stick across the various distribution channels for the U.S. and the U.K. markets in 2017 was \$0.57 and \$0.60, respectively. The average cost for fine-cut tobacco sold in pack sizes ranging from 18 to 50 grams (i.e., roll-your-own or RYO), across the various distribution channels for the U.S. and the U.K. markets, was \$444 and \$529 per kilogram, respectively. If we assume 0.7 grams of tobacco per cigarette, 1 kilogram of fine-cut tobacco produces approximately 1,429 cigarettes. We estimate an incremental tobacco cost of approximately \$0.31 and \$0.37 per stick, respectively, for the RYO cigarette variety. This increment does not include the cost of rolling papers, filters, and cigarette machine/cigarette injector. Suffice it to say, a smoker can, in some cases, reduce his or her cost of smoking by using the RYO method rather than purchasing boxed cigarettes. In the Foundation's State of Smoking global survey results from 13 countries,¹¹ we found 81% of the surveyed smokers who reported regular or occasional use of tobacco products smoked boxed cigarettes, and 23% reported they smoked hand-rolled cigarettes (implying dual use by some smokers). More than 50% of smokers in some markets (e.g., New Zealand, and the U.K.) reported smoking hand-rolled cigarettes.

The largest markets for smoking tobacco in retail value terms are listed in *Table 3*, which demonstrates total retail sale value and the retail sales value per capita smoker. Several countries are on both lists, including Germany, the U.K., Australia, the

Country	Retail Value (USD millions)	Country	Per Capita Smoker (USD)
Germany	\$ 4,423	New Zealand	\$ 1,177
United Kingdom	3,510	Australia	748
France	2,891	Norway	693
USA	2,409	Belgium	488
Australia	2,005	United Kingdom	456
Netherlands	1,464	Netherlands	436
Spain	1,268	Qatar	349
Italy	1,256	Ireland	344
Belgium	891	Germany	294
Saudi Arabia	857	Hungary	270

TABLE 3
Smoking Tobacco Retail Sales Value by Country for 2017

Source: Euromonitor Passport by Retail Value in current prices USD.

Netherlands, and Belgium. In our view, a major driver of smoking tobacco prevalence is taxation and the resulting price arbitrage pertaining to boxed cigarettes and RYO.

One such study in the U.S. was conducted after the Federal excise tax was increased for tobacco products on April 1, 2009. While excise tax rates before the increase were the same for RYO and pipe tobacco products,¹² after the increase, the tax on pipe tobacco was \$21.95 per pound less than that on RYO tobacco. The study concludes that marketing pipe tobacco as "dual purpose" and selling it for RYO use provided an opportunity to avoid paying higher cigarette prices. From April 2009 through August 2011, nearly 45 million pounds of pipe tobacco were sold for RYO use in the U.S., lowering Federal excise tax collections by \$985 million and reducing state sales and excise tax collections by more than \$374 million.

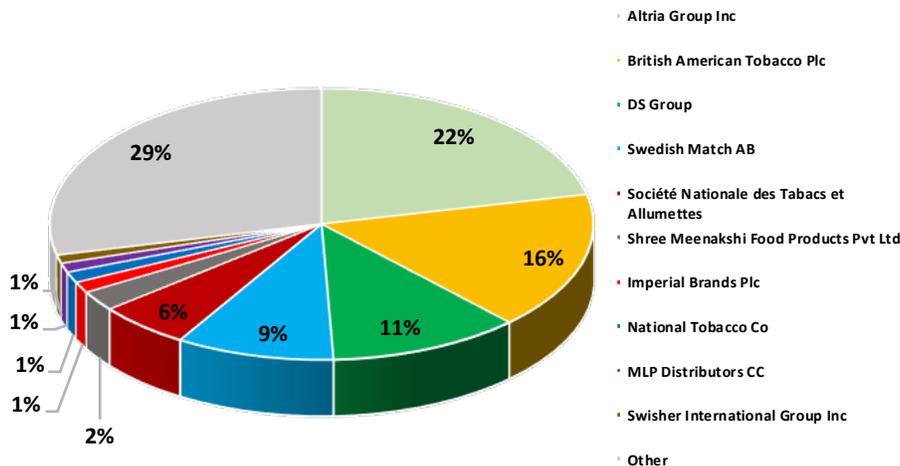


CHART 9

Global Company Retail Volume Share of Smokeless Tobacco in 2017

Source: Euromonitor Passport for World by Retail Volume. British American Tobacco acquired Reynolds American in 2017.

Largest Global Producers of Smokeless Tobacco

We estimate that the top ten producers of smokeless tobacco, as illustrated in *Chart 9*, generated approximately 71% of category retail volume globally in 2017. For the purpose of this report, the smokeless tobacco category consists of moist snuff and chewing tobacco. Moist snuff represents 90% of category retail sales and 58% of volume; chewing tobacco represents 10% of category retail sales and 42% of volume.

Historically, the smokeless tobacco category has been dominated by the U.S., Sweden, and India, although bans in India have resulted in shrinking retail volumes in recent years. As of 2017, smokeless tobacco comprised about 1.6% of the retail nicotine ecosystem, at approximately \$12.8 billion. Smokeless tobacco product volume is approximately 134 million kilograms as of 2017.

- The two largest producers of smokeless tobacco are among the largest cigarette producers: Altria Group and British American Tobacco (through its acquisition of Reynolds American in 2017). Imperial Brands is also a large cigarette producer. Swisher International Group is the largest producer of cigars and cigarillos (see *Chart 9*).
- DS Group is an Indian conglomerate with presence in several industry sectors, including food and beverage, hospitality, tobacco, packaging, and agroforestry.
- Swedish Match is a Swedish company that manufactures snus, moist snuff, and other tobacco products. Snus and moist snuff represent more than one-third of total company sales and more than one-half of the operating profit.
- Société Nationale des Tabacs et Allumettes was established in 1963 following the nationalization of the Algerian tobacco and matches industries, and it is headquartered in Algeria. The company manufactures and markets tobacco products.

Country	Retail Value (USD millions)	Country	Per Capita Smoker (USD)
USA	\$ 9,133	Norway	\$ 1,557
Sweden	1,248	Sweden	1,447
Norway	709	USA	257
India	549	Algeria	49
Algeria	249	Canada	44
Canada	198	Switzerland	16
South Africa	102	South Africa	15

TABLE 4

Smokeless Tobacco Retail Sales Value by Country for 2017

Source: Euromonitor Passport by Retail Value in current prices USD.

- Shree Meenakshi Food Products Pvt Ltd was founded in 1994 and is headquartered in India. The company's business lines include wholesale distribution of groceries and other products.
- National Tobacco Company is a manufacturer of tobacco products in the cigar, cigar wraps, moist snuff, loose leaf chewing tobacco, RYO cigarettes, and pipe tobacco categories. The privately held company is headquartered in Louisville, Kentucky.
- MLP Distributors CC is the leading producer of smokeless tobacco products in South Africa.

The largest markets for smokeless tobacco in retail sales value terms are listed in *Table 4*, which demonstrates total retail sales value and retail sales value per capita smoker. The four largest markets for smokeless tobacco by retail sales value are the U.S., Sweden, Norway, and India.

Trends encompassed by the smokeless tobacco category

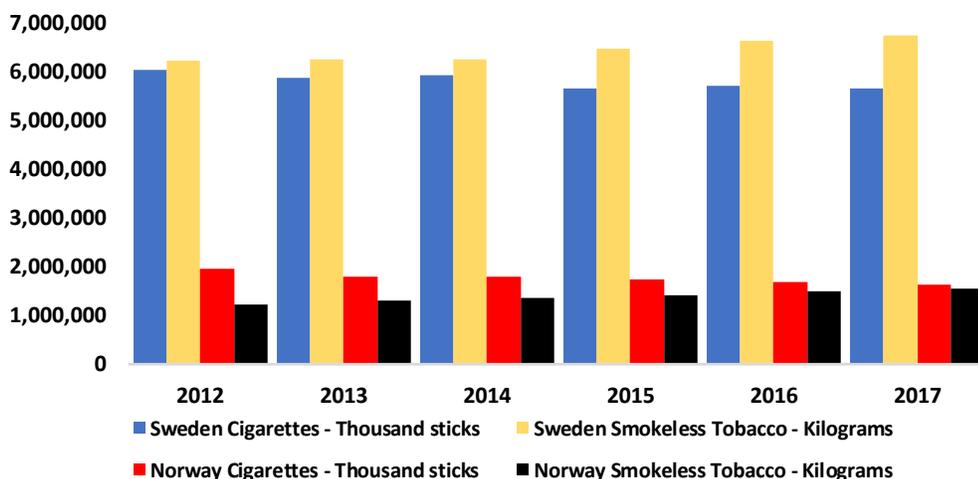


CHART 10
Market Sizes of Cigarettes & Smokeless Tobacco in Sweden and Norway 2012-2017

Source: Euromonitor Passport for Sweden and Norway by Retail Volume.

include the impact of snus. Snus has been popular in Sweden since the middle of the 19th century. Since 1992, snus sale is banned in European Union countries other than Sweden. Swedish snus is pasteurized, as opposed to dip, which is fire cured. Pasteurization takes the harshness out of the juice and allows the user to swallow. Snus is generally placed under the upper lip. Snus is also popular in Norway and Iceland.

According to the *Eurobarometer 2017* survey,¹³ Sweden has the lowest rate of adult smoking prevalence in the European Union. In northern parts of Sweden, smoking has almost been completely displaced by snus use. Norway has also achieved reduced smoking rates and secured an exemption from the snus prohibition in its European Economic Area agreement. Snus use appears to be displacing smoking across the Norwegian population; the change is particularly pronounced among young adults.

According to Euromonitor data, cigarette volumes are

declining in Sweden and Norway (see *Chart 10*), while smokeless tobacco volumes are increasing. This trend is occurring in the context of Sweden and Norway achieving relatively low rates of smoking prevalence. Although the total population of the two countries is approximately 15 million, a meaningful pattern appears to exist.

The smokeless tobacco category by volume in Sweden and Norway is almost entirely driven by Swedish-style snus. Within the category in those countries, consumption is trending toward the portion type of snus and away from the loose style.

The U.S. smokeless tobacco market is more diverse by volume, although share is shifting from chewing tobacco to moist snuff. Swedish-style snus is a small component of the U.S. smokeless tobacco market. Putting the relative market sizes into perspective, the U.S. smokeless tobacco retail value in 2017 was about seven times that of Sweden, which in turn was nearly twice that of Norway (see *Table 5*).

TABLE 5
Smokeless Tobacco Category Mix by Volume—Norway, Sweden, and U.S.

Source: Euromonitor Passport for Norway, Sweden & U.S. by Retail Volume.

Category	2012	2013	2014	2015	2016	2017
Norway - Smokeless Tobacco						
Chewing Tobacco	1%	1%	1%	1%	1%	1%
Moist Snuff	99%	99%	99%	99%	99%	99%
Swedish-Style Snus	100%	100%	100%	100%	100%	100%
Loose Swedish-Style Snus	43%	38%	31%	28%	25%	23%
Portion Swedish-Style Snus	57%	62%	69%	72%	75%	77%
Sweden - Smokeless Tobacco						
Moist Snuff	100%	100%	100%	100%	100%	100%
Swedish-Style Snus	100%	100%	100%	100%	100%	100%
Loose Swedish-Style Snus	44%	38%	36%	34%	34%	33%
Portion Swedish-Style Snus	56%	62%	64%	66%	66%	67%
U.S. - Smokeless Tobacco						
Chewing Tobacco	18%	17%	15%	14%	13%	12%
Moist Snuff	82%	83%	85%	86%	87%	88%
US-Style Moist Snuff ('dip')	98%	98%	98%	98%	98%	98%
Swedish-Style Snus	2%	2%	2%	2%	2%	2%
Loose Swedish-Style Snus	2%	2%	2%	2%	2%	2%
Portion Swedish-Style Snus	98%	98%	98%	98%	98%	98%

Largest Providers of Vaping Products

The vaping market is very different compared to the market for tobacco products; it is relatively fragmented, rapidly growing and comparatively fluid. Performance varies widely by country, in part due to differences in regulatory regimes. The category is **not** dominated by the large tobacco companies.

According to Euromonitor, the largest vaping market in the world is the U.S., followed by the U.K. E-cigarettes are also popular in several countries throughout Europe, including Italy, Germany, and France as of 2017. Vaping in China is increasing, but it remains a small fraction of the nicotine ecosystem there to date.

From the product standpoint, the e-cigarette ecosystem is relatively fragmented and somewhat difficult to track. To the extent consumption-based data are available, sales data associated with individual companies and brands are more limited. Further complicating the matter, e-cigarette sales flow through multiple channels—retail stores, vape stores, and online. Finally, the e-cigarette market is rapidly developing and changing.

According to Euromonitor, e-cigarette sales, including open and closed vaping systems, comprised about 1.5% of the nicotine ecosystem as of 2017 at approximately \$11.4 billion in retail sales value. Closed vaping systems consist of cig-a-like and non-cig-a-like closed systems. Open vaping systems consists of the charging and vaporizing device plus the e-liquid. By global retail sales, according to Euromonitor, the category mix is open vaping systems, 65%, and closed vaping systems, 35%. In other words, open vaping systems outweigh closed vaping systems globally by a factor of nearly two. That said, during the past couple of years, the mix is shifting incrementally from open vaping systems to closed vaping systems, in part due to the increasing popularity of proprietary pod-based products (i.e., JUUL Labs in the U.S.).

The types of e-cigarette products sold tend to vary by

distribution channel. For example, general retail distribution tends to sell simple products, often closed vaping systems. Vape stores and online channels tend to sell open vaping systems, which offer more functionality and features—interchangeable components, more powerful batteries, greater variety of liquid flavors and strengths, etc.

According to Euromonitor, open vaping system producers are highly fragmented and centered in Shenzhen, China. No producer has as much as 5% share of open vaping systems, based on retail sales, and the ten leading companies constituted only about 26% of retail share in 2017. Open vaping systems represent the majority at about 65% of e-cigarette retail sales globally. The large tobacco companies have little share in the open vaping systems category. According to Euromonitor, in 2017 British American Tobacco had approximately 4% global share in open vaping systems, and none of the other large tobacco companies exceeded 1% retail sales share.

The leading producers of closed vaping systems include JUUL and the large tobacco companies—British American Tobacco, Imperial Brands, Japan Tobacco, and Altria Group. The leading ten closed vaping systems producers accounted for approximately 67% of the retail sales value globally in 2017. Again, closed vaping systems represent only 35% of e-cigarette retail sales globally. Since 2015, the mix within the subcategory is shifting from cig-a-like products to non-cig-a-like closed systems.

On a global basis across both open and closed vaping systems, we estimate that the ten largest producers accounted for approximately 36% market share by retail value in 2017, as illustrated in *Chart 11*. Among that group, the large tobacco companies (British American Tobacco, Imperial Brands, Japan Tobacco, and Altria Group) represent about only 21% retail value share, primarily in the closed vaping systems category. Based on 2017 data, the large tobacco companies are not the major producers within the e-cigarette category.

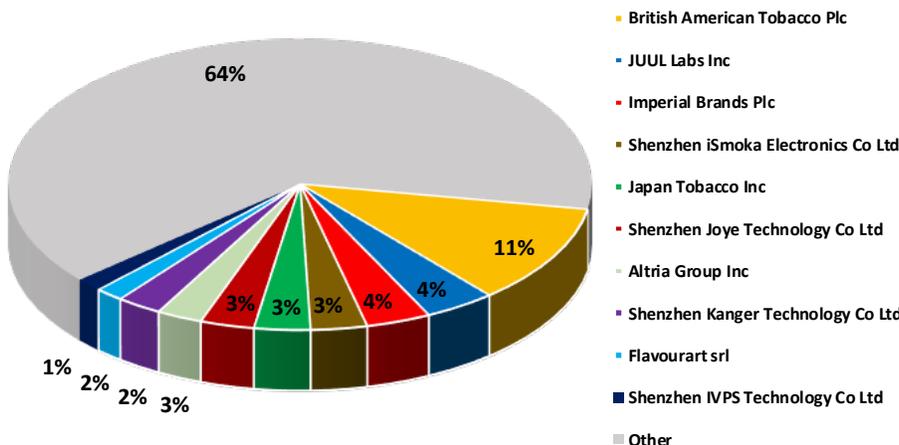
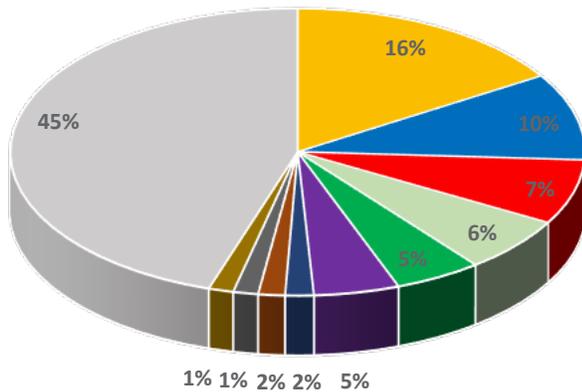


CHART 11
Global Company Retail Value Share of Open & Closed Vaping Systems in 2017

Source: Euromonitor Passport for World by Retail Value.

British American Tobacco acquired Reynolds American in 2017



- British American Tobacco Plc
- JUUL Labs Inc
- Imperial Brands Plc
- Altria Group Inc
- Japan Tobacco Inc
- Shenzhen iSmoka Electronics
- Shenzhen IVPS Technology
- Shenzhen Innokin Technology
- Shenzhen Kanger Technology
- NJOY Inc
- Other

CHART 12
Company Retail Value Share of Vaping Systems in U.S. 2017

Source: Euromonitor Passport for U.S. by Retail Value in current prices USD.

British American Tobacco acquired Reynolds American in 2017.

- JUUL Labs Inc is a privately held producer of e-cigarettes headquartered in San Francisco, California.
- Shenzhen iSmoka Electronics Co Ltd was established in 2008. The company markets its products in the U.K., Russia, U.S., Germany and other regions. iSmoka also provides distributors with a range of original equipment manufacturer (OEM) applications.
- Shenzhen Joye Technology Co Ltd manufactures e-cigarettes, vaporizers, vaping pens, tanks, and e-liquids. The company was founded in 2007.
- Shenzhen Kanger Technology Co Ltd is an e-cigarette brand based in China, founded in 2007. The company designs and manufactures vapor products including starter kits, atomizers, and mods.
- Flavourart srl produces flavored e-liquid, made in Italy.
- Shenzhen IVPS Technology Co Ltd specializes in e-cigarette research and development, production, and sales worldwide. The company was founded in 2010.

The U.S. Is the Largest E-Cigarette Market

The U.S. is the largest vaping market in the world. According to Euromonitor, e-cigarette sales were approximately \$4.6 billion in the U.S. during 2017, accounting for approximately 4% of the U.S. nicotine retail value ecosystem there. An important factor is that e-cigarette sales in the U.S. are increasing, while combustible cigarette volumes are declining. Over the period from 2014 to 2017, e-cigarette sales in the U.S. increased at a compounded annual growth rate (CAGR) of approximately 20%. This compares to a three-year CAGR of about 1% for cigarette sales over the same period. Cigarette volumes declined at a CAGR of approximately 2.3% over the

same period. In the first half of 2018, Altria Group estimated an industry volume decline of 4.5% in the U.S. The bottom line is e-cigarettes are gaining share.

The leading producers of vaping systems in the U.S. historically have included the large tobacco companies—British American Tobacco, Imperial Brands, Altria Group, and Japan Tobacco. Company sales by the large tobacco companies are primarily reflective of closed vaping systems. In the U.S. during 2017, according to Euromonitor, the mix of vaping systems retail sales was 66% closed and 34% open. The mix represents a shift from approximately 50% closed and 50% open during 2016, again according to Euromonitor. The share shift is driven in part by JUUL. The Shenzhen players listed in *Chart 12* are providers of open vaping systems.

The dynamic in the U.S. vaping market is that, first, share is shifting from open vaping systems to closed vaping systems—specifically the non-cig-a-like format. Second, JUUL is the significant recipient of the share shift. Based on the Euromonitor data for 2017, JUUL garnered approximately 44% of the incremental revenue growth associated with closed vaping systems and about 101% for all vaping systems. In other words, JUUL's incremental revenue for 2017 represented the entire vaping category increase in the U.S. due to share shifting from open to closed systems and JUUL taking the share within the subcategory of closed vaping systems.

When the shift from open to closed systems is coupled with the fact that JUUL introduced its product to the market in 2015, the growth rate demonstrated by JUUL is dramatic even within the context of the high-growth e-cigarette category. For example, according to Euromonitor, JUUL retail sales value increased by more than 700% in 2017, which compares to vaping systems retail sales value growth of approximately 9% (see *Chart 13*).

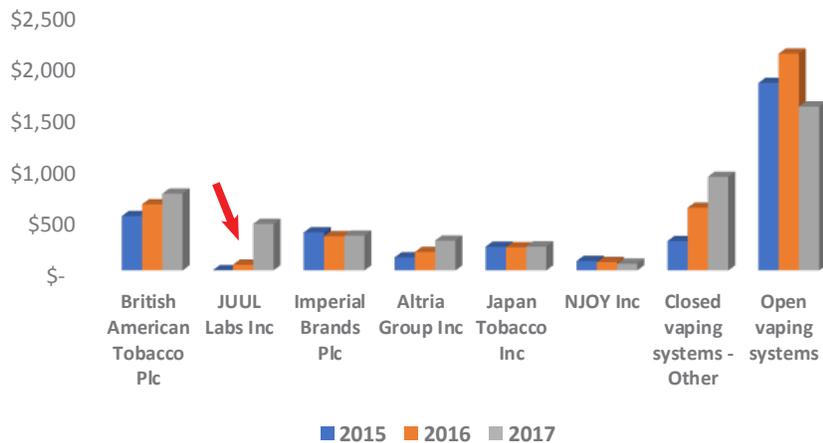


CHART 13

Company Retail Value (USD) of Vaping Systems in U.S. 2015 - 2017

Source: Euromonitor Passport for U.S. by Retail Value in current prices USD million.

British American Tobacco acquired Reynolds American in 2017.

While open vaping system distribution is relatively opaque, general retail surveys offer some visibility into primarily the closed vaping systems market. For example, according to Wells Fargo research, the Nielsen Tobacco 'All Channel' survey for the period ended September 8, 2018, demonstrates strong e-cigarette sales to the order of approximately 192% compared to the four-week period one year prior. The sales increase is driven by a mix of unit growth of +114% and pricing increases of +37% over the comparable periods. Note that the Nielsen channel checks capture only a portion of total distribution, namely general retail stores such as convenience stores, supermarkets, pharmacies, gas stations, etc. In other words, these particular channel checks exclude vape store and online distribution, thereby excluding for the most part open vaping system sales.

That said, the channel survey identifies e-cigarette sales growth during the last 52-week period as being driven by JUUL Labs, as illustrated in Chart 14. The next four largest producers, representing approximately 37% market share according to this particular survey, are among the largest tobacco companies.

Second in terms of market share is British American Tobacco's VUSE brand. British American Tobacco acquired the remaining stake of Reynolds American in 2017, which included VUSE. Third is Altria Group, which offers the MarkTen and Green Smoke products. blu is an e-cigarette brand owned by the Fontem Ventures BV, a subsidiary of Imperial Brands. The brand sells its products in the U.S., the U.K., France, and Italy. blu was acquired by Imperial Tobacco as part of the Lorillard acquisition by Reynolds American in 2015. Japan Tobacco acquired the Logic E-cigarette brand in 2015. NJOY Inc emerged from bankruptcy in February 2017. A company not listed by the survey is VMR Products. VMR Products designs, produces, distributes, and supports vapor products for its own brands and private-label marketers in more than thirty countries.

The chart below reflects only a portion of the story, primarily closed vaping systems sold through general retail channels during the last 52-week period. Over the most recently reported 4-week period, the category was led by JUUL at approximately 73% retail value share through retail channels.

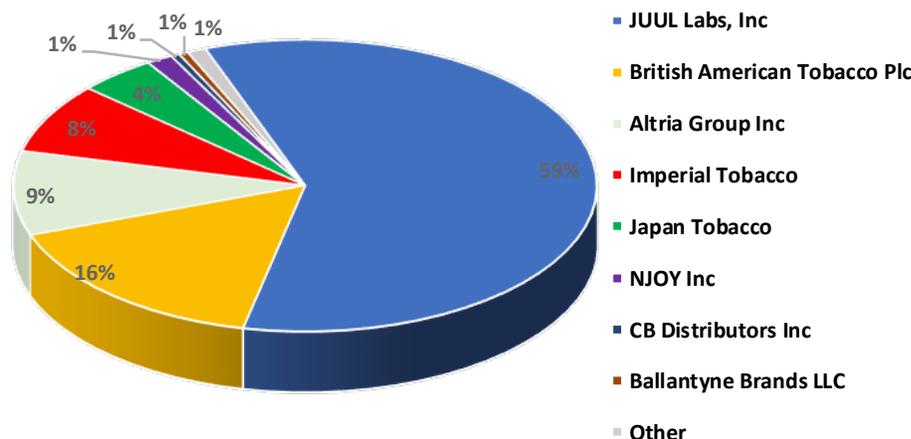
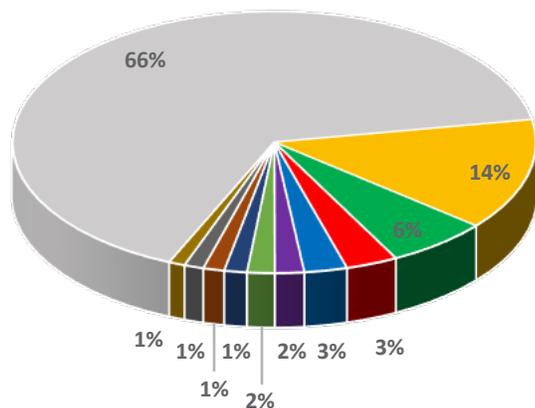


CHART 14

U.S. E-Cigarette Category Share 'All Channel' Data—September 8, 2018

Source: Nielsen C-Store Database, Wells Fargo Securities, LLC estimates. E-cig retail sales for last 52 weeks. Other non-tracked channels include tobacco-only outlets and other e-cig retail locations.



- British American Tobacco Plc
- Japan Tobacco Inc
- Imperial Brands Plc
- Philip Morris International Inc
- Shenzhen Eigate Technology
- Shenzhen Innokin Technology
- Shenzhen Kanger Technology
- Shenzhen IVPS Technology
- Shenzhen Smoore Technology
- Liberty Flights Ltd
- Other

CHART 15

Company Retail Value Share of Vaping Systems in U.K. 2017

Source: Euromonitor Passport for UK by Retail Value in current prices USD.

The U.K. Is the Second Largest E-Cigarette Market

The U.K. is the second largest vaping market in the world. According to Euromonitor, e-cigarette sales were approximately \$1.7 billion during 2017, making up approximately 7% of the retail value nicotine ecosystem there. Over the period from 2014 through 2017, e-cigarette sales in the U.K. increased at a compounded annual growth rate (CAGR) of about 45%. This compares to a three-year CAGR decrease of 1.1% for cigarette retail sales over the same period. Cigarette volumes declined at a CAGR of approximately 4.8% over the same period.

Euromonitor estimates that e-cigarette distribution in the U.K. is as follows: online, 50%; specialty stores (including independent vape shops), 20%; and general retail, 30%. That is, about 70% of sales occur through non-general retail channels. Euromonitor estimates that the open/closed vaping system category mix in the U.K. during 2017 was approximately 79%/21%, respectively, which is compatible with the distribution mix.

Commentary From the Tobacco Companies

To the extent several of the e-cigarette brands are controlled by the tobacco companies, the e-cigarette/vaping brands represent a small but generally expanding portion of the overall businesses. Listed below is a synopsis of company commentary from public filings. Frankly, some of the company commentary diverges from the Euromonitor estimates we use throughout this report. We believe this divergence reflects the fragmentation, relative lack of distribution visibility, and fluidity that is the nature of the e-cigarette category.

- **British American Tobacco.** In the vapor category, Vype is present in nine markets and remains the market leader in the U.K., with Vype and Ten Motives combined delivering around 40% share of measured retail in December 2017. In the U.S., the Vuse range of products continues to have a significant presence in the market. British American

Tobacco estimates that it controls approximately 6% of the global vapor market (although the Euromonitor estimates translate to a somewhat higher figure). British American Tobacco reports it has vapor category leadership positions in France, Germany, Italy, and Poland. Note that British American Tobacco differentiates the vapor product category from the tobacco heating products category.

- **Altria Group.** Altria's MarkTen e-vapor brand had a full-year 2017 national retail sales share of 12.5% in mainstream retail channels and is present in stores representing approximately 70% of e-vapor category volume in those channels.
- **Imperial Tobacco.** Imperial's blu operates in the U.S. and U.K., the world's two largest vaping markets and is managed by its subsidiary Fontem Ventures. In October 2017, Imperial enhanced its technical capabilities with the acquisition of the e-vapor innovation business Nerudia. Imperial states that in 2018 it is in the process of the international rollout of myblu and blu ACE. myblu is a pod-based platform, for which Imperial plans to incorporate nicotine salt liquids under the name "myblu intense." Imperial will be second to market in the U.S. (JUUL being the first) with a pod-based vaping device that has access to nicotine salts based e-liquids. myblu has also been launched in the U.K., France, Germany, and Russia and will be available in five more markets before the end of 2018. The company also plans to launch an open-system platform called blu ACE, which offers adult-focused juice ranges.
- **Japan Tobacco.** The acquisition of Logic in 2015 made Japan Tobacco a major e-vapor player in three of the world's largest markets in value—the U.S., the U.K., and France. According to Japan Tobacco, it holds a 12.4% share of value in the U.S., and it holds the number three position

in the U.K. with a 12.3% share. Japan Tobacco holds the number one e-vapor company position in Ireland and is the number one closed tank proposition in France with Logic Pro. Japan Tobacco expanded its presence in 2016, entering Austria, Germany, Italy, and Korea.

Manufacturers Centered in China

Most of the world's e-cigarette manufacturers are located in China, specifically, Shenzhen. A list of manufacturers of e-cigarettes in Shenzhen includes iSmoka, IVPS, Shenzhen Innokin Technology Co Ltd, Kanger, Shenzhen Eigate Technology Co Ltd, Joyetech, Teslacigs, Shenzhen Smoore, Sense, and others. In Shenzhen, analysts estimate that there are more than 600 e-cigarette factories. However, this figure includes counterfeits and clones.

Regarding the leading e-cigarette brands, JUUL Labs states that its products are designed in San Francisco, California, and manufactured domestically and internationally under the supervision of its engineering team. blu, the e-cigarette brand owned by the Fontem Ventures BV, a subsidiary of Imperial Brands, states that its products (packs, tank systems, batteries, chargers, etc.) are made in China. Liquids are made in the local market with domestic and imported ingredients. We believe these examples represent the common e-cigarette operating model; the hardware is manufactured in China, whereas the liquids are produced elsewhere and likely in-country. In the case of the retail e-cigarette brand companies, the brand owners determine product design and maintain some level of oversight of production in Shenzhen.

What about vaping in China? The state monopoly China National Tobacco Corporation to date has not launched an e-cigarette product. Although the vaping market in China is already quite large in global terms, the e-cigarette market is still a small portion of the overall Chinese nicotine ecosystem. According to ECigIntelligence in June 2018, China National Tobacco could be positioning itself to increase its involvement in alternative products, including both e-cigarettes and heated tobacco. ECigIntelligence reports indicate that the company could be willing to enter into joint ventures with foreign players to acquire the necessary technical expertise, along the lines established over the past two decades in the auto industry. Alternative products were discussed at the 2018 national tobacco workshop conference in Beijing.

An interesting question, in our view, is what are the potential catalysts that could ignite the growth of e-cigarettes in China? With nearly 2.4 trillion cigarettes produced there annually, monopoly control by China National Tobacco, and nearly 100% of e-cigarette device manufacturing occurring within the country, the signals are mixed but could become explosive once triggered on

the path toward harm reduction. We liken the potential to recent developments in the auto industry to replace the combustion engine vehicle with battery-powered electric cars.

Heated Tobacco Products—Diverging Strategies

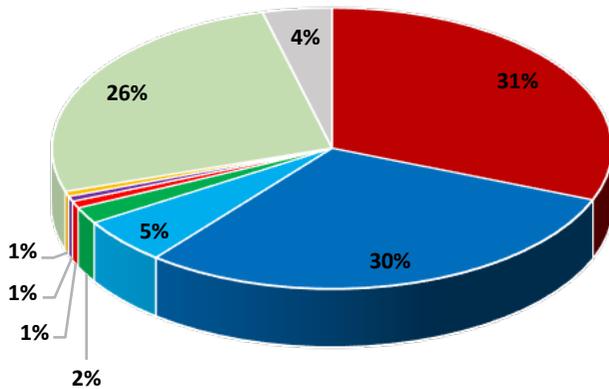
The major tobacco companies are adopting diverging strategies regarding next-generation products and, in particular, heated tobacco products. Philip Morris International is taking a relatively aggressive stance regarding the development and sale of heated tobacco products, namely its IQOS brand. As of August 2018, Philip Morris International reported IQOS was present in 43 markets worldwide.

Japan Tobacco is expanding the sale of its Ploom TECH product throughout Japan in 2018, with plans to offer nationwide sales. Ploom TECH is a tobacco vapor product that uses an indirect low-temperature tobacco-heating technology and granulated tobacco capsule, which was also made available on a trial basis during 2017 in three markets outside Japan. The company states that Ploom TECH's nationwide rollout in Japan started in June and expanded to convenience stores in July. Ploom TECH was made available on a trial basis in 2017 in three markets outside Japan—the U.S., Canada, and Switzerland. In the U.S., Ploom is sold by subsidiary Logic Technology under the brand name Logic Vapeleaf.

British American Tobacco offers its glo tobacco-heating technology, which heats tobacco at 240°C and forms a vapor through the heating process. British American Tobacco's glo product was rolled out nationally in Japan during 2017, and it was launched in another five countries—South Korea, Russia, Romania, Canada, and Switzerland. During 2018, British American Tobacco plans to launch glo in an additional 14 markets (Italy was added during the first half of the year).

Imperial Brands appears to be taking a relatively measured approach regarding heated tobacco products, instead focusing on the e-cigarette market through its blu brand. For that matter, Japan Tobacco and British American Tobacco also offer e-cigarette brands in the major vaping markets. According to Imperial Brands, heated tobacco is a smaller next generation product category, but one that is growing most notably in Japan. At the present time, Imperial does not sell heated tobacco products but continues to monitor their development. The company states it has developed options in heated tobacco that can be deployed if the category starts showing broader signs of significant and sustainable growth. Although Imperial is yet to launch a heated tobacco product, the company believes it may be in the position to do so by the first part of 2019.

According to Euromonitor, heated tobacco product retail sales were approximately \$6.3 billion in 2017, 85% of which occurred in Japan. Philip Morris International reports that at the end of the second quarter 2018, its IQOS HeatSticks



- Johnson & Johnson Inc
- GlaxoSmithKline Plc
- Perrigo Co, Plc
- Pierre Fabre SA, Laboratoires
- Walgreens Boots Alliance Inc
- Cipla Ltd
- British American Tobacco Plc
- Private Label
- Other

CHART 16

Global Company Retail Value Share of NRT Smoking Cessation Aids in 2017

Source: Euromonitor Passport for World by Retail Value in current prices USD.

British American Tobacco acquired Reynolds American in 2017.

product had 15.5% market share in Japan. IQOS was nationally deployed in April 2016, following its pilot launch in late 2014. Philip Morris reports national heated tobacco unit share at second quarter 2018 as follows: Korea, 8.0%; Greece, 4.1%; and Italy, 1.9%. Note that, according to the company, the marketing of IQOS in the European Union region is limited to select geographies within launch markets. In addition, the company reports relatively high IQOS switching rates, with full and predominant conversion generally ranging around 70% across markets. On the other side of this equation, cigarette volumes are decreasing at an unprecedented rate where heated tobacco uptake is strong.

The development of heated tobacco products also has implications for the tobacco manufacturing environment. For example, Philip Morris International reports that it began the second phase of its facility expansion in Bologna, Italy, and the partial or full conversion of its cigarette factories in Greece, Korea, Romania, and Russia. In March 2018, Philip Morris' Greek affiliate, Papastratos, ended the production of conventional cigarettes in its Aspropyrgos factory in order to exclusively produce heated tobacco units used with the IQOS system. This is the first full conversion of a cigarette factory by Philip Morris at an investment of €300 million. In June 2017, Philip Morris announced its plans to invest 2.49 billion rubles in modernizing its factory in the Leningrad region of Russia to become a base for manufacturing tobacco sticks for heated tobacco products. The company also announced investments in its Bologna-based factory totaling €1 billion toward the production of tobacco sticks. In June 2018, British American Tobacco announced it will invest €800 million over the next five years in its factory in Romania. The investment will support the expansion of the company's tobacco heating product (glo) in countries across Europe during the second half of 2018. Reports indicate that Japan Tobacco

plans to invest \$100 million in the production of Ploom TECH tobacco capsules in Poland.

Nicotine Replacement Therapy Smoking Cessation Aids—Modest Category Growth

The nicotine replacement therapy (NRT) smoking cessation aids product category has been modestly increasing in terms of global sales and unit volumes for the past several years. We estimate that global product sales of approximately \$2.4 billion during 2017 represent a three-year compounded annual growth rate of approximately 4.1%. On the other hand, according to Euromonitor, there is little doubt that vaping products are removing some consumers from the NRT category.

The Americas and European Regions accounted for about 88% of NRT product sales in 2017. The only crossover among the top NRT smoking cessation aids producers with the tobacco companies is Reynolds American, which was acquired by British American Tobacco in 2017. British American Tobacco markets Zonnica, a NRT gum, available in approximately 40,000 retail outlets across the U.S. In Sweden, Zonnica products include tobacco-free nicotine pouches.

Even at approximately \$2.4 billion in annual global sales, the NRT product category represents less than 1% of the global retail nicotine ecosystem. The largest producers, with approximately 61% share in total, are Johnson & Johnson Inc and GlaxoSmithKline Plc. About a quarter of the market is served through private-label branding (see *Chart 16*). In terms of NRT product categories, the mix during 2017 was as follows: gum, 53%; patches, 24%; lozenges, 18%; inhalers, 1%; and other, 4%.

While product sales of NRT smoking cessation aids are increasing modestly, sales of e-cigarettes have increased much more rapidly. On a global basis, as well as in two of the leading vaping markets (the U.S. and the U.K.), we estimate that

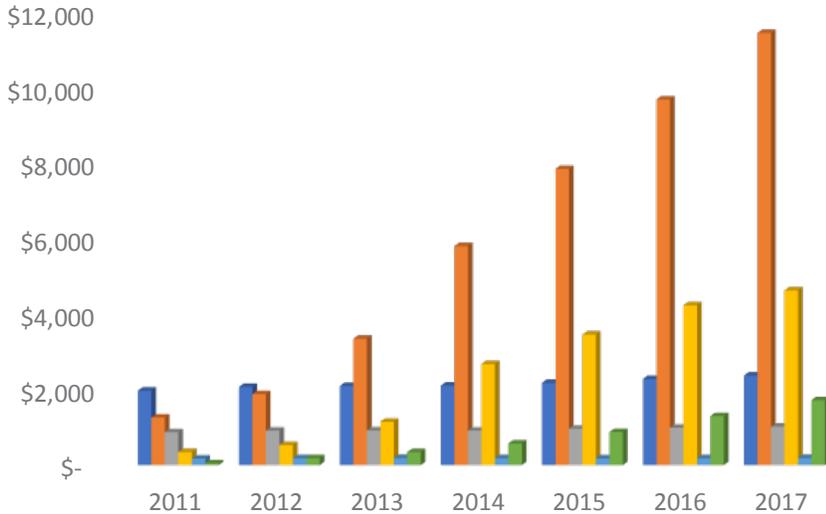


CHART 17
NRT Smoking Cessation Aids Versus Vaping Products—Retail Sales 2011–2017

Source: Euromonitor Passport for World by Retail Value in current prices USD million.

Vaping category includes open and closed vaping systems.

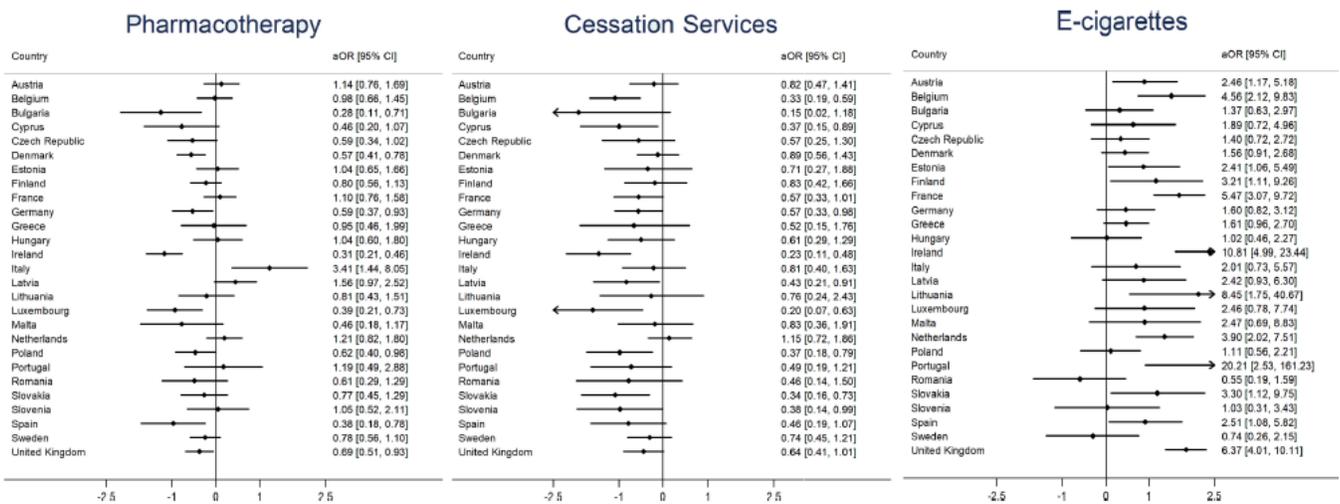
- World NRT Smoking Cessation Aids
- World Vaping Products
- U.S. NRT Smoking Cessation Aids
- U.S. Vaping Products
- U.K. NRT Smoking Cessation Aids
- U.K. Vaping Products

FIGURE 1
Changes in Smoking Cessation Assistance in the European Union 2012–2017

Source: Changes in smoking cessation assistance in the European Union between 2012 and 2017: pharmacotherapy versus counseling versus e-cigarettes. Filippidis FT, et al. *Tobacco Control*. 2018;0:1-6. doi:10.1136/tobaccocontrol-2017-054117.

e-cigarette sales surpassed NRT-related sales during the 2013 period—and the trend continues (see *Chart 17*).

Research indicates that in the European Union between 2012 and 2017, use of e-cigarettes for smoking cessation assistance increased, while use of pharmacotherapy and smoking cessation services declined¹⁴ (see *Figure 1*). Younger people were more likely to have reported e-cigarette use for smoking cessation, but less likely to have used a cessation service. Use of medication and NRTs for smoking cessation can be influenced by factors such as the availability of new pharmaceuticals (i.e., product innovations), funding, and smoke-free legislation. We believe it is clear that innovation in the e-cigarette category during recent years has far surpassed that of the NRT smoking cessation aids category pipeline, potentially contributing to the shifting trend. More research on whether e-cigarette use is indeed displacing standard cessation assistance and how this may impact long-term abstinence is needed, especially considering the increase in e-cigarette use.



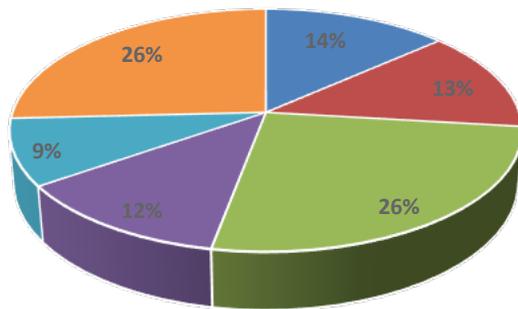
Regional Nicotine Ecosystems

SOME VARIATIONS, BASIC PATTERNS REMAIN

Analyzing the nicotine ecosystem on a regional basis offers some variations, but the basic patterns remain. Cigarettes are the primary nicotine delivery mechanism, and production is dominated by large global and, in some cases, regional and/or state-owned tobacco companies.

For the purposes of this report, we focus on the World Health Organization (WHO) regional structure. WHO Member States are grouped into six WHO regions: African Region, Region of the Americas, South-East Asia Region, European Region, Eastern Mediterranean Region, and Western Pacific Region.¹⁵ The WHO estimates a world population of approximately 7.4 billion for 2015, based on its 2017 Revision.¹⁶ We utilize the WHO regional structure (see *Chart 18*) to be compatible with WHO reporting. With regard to regional characteristics:

- We estimate cigarettes make up approximately 89% of the global retail nicotine ecosystem by retail value, based on 2017 reports. Among the regions, the product share for cigarettes among all categories is highest in the South-East Asia Region at greater than 98% and lowest in the Region of the Americas at just over 80%. Note that this estimate excludes non-retail and illicit sales. For example, we estimate consumption in India of bidis could represent an incremental 500 billion sticks annually or about 9% of global retail cigarette volume.
- In terms of the non-cigarette product category share, the Region of the Americas is the highest for cigars and cigarillos at approximately 8% and smokeless tobacco at 6%; the European Region is the highest for smoking tobacco at 8%.



- African Region
- Region of the Americas
- South-East Asia region
- European Region
- Eastern Mediterranean Region
- Western Pacific Region

CHART 18
Population by WHO Region Estimates

Source: United Nations, Department of Economic and Social Affairs, Population Division (2017). World Population Prospects: The 2017 Revision, DVD Edition. Total population estimates 2015.

As for the producers:

- China National Tobacco Corporation, the Chinese state-owned manufacturer of tobacco products, had an approximately 38% global nicotine ecosystem market share, based on retail volume for 2017 in cigarette stick equivalents by our estimates. With approximately 5.4 trillion cigarette sticks sold globally during 2017, China National Tobacco Corporation produced more than two trillion sticks.
- The next five global producers—Philip Morris International, British American Tobacco, Japan Tobacco, Imperial Brands, and Altria Group represent in total approximately 42% global nicotine ecosystem market share by cigarette stick equivalent volume.

In a heatmap format (see *Table 6*), it is apparent that the nicotine ecosystems in three regions are relatively large compared to their underlying populations—namely, the European, Western Pacific, and Americas Regions. This is not surprising, given the regions are home to some of the largest nicotine markets in the world—China, the U.S., and Western Europe. Conversely, the nicotine ecosystems in three regions are relatively small compared to their underlying populations—the South-East Asia, African, and Eastern Mediterranean Regions. This factor is due in part to the nature of the data. Recall that retail sales data do not capture illicit trade or locally manufactured combustible tobacco products, for example, bidis in India.

Across the product categories, the Americas and European Regions also tend to lead in terms of global market share. This

Product Category - 2017	WORLD Retail Value USD	WHO Region					
		African	Americas	Eastern Mediterranean	European	South-East Asia	Western Pacific
Cigarettes	\$ 699,434	\$ 10,752	\$ 130,685	\$ 24,058	\$ 199,668	\$ 48,032	\$ 286,079
Cigars and Cigarillos	\$ 24,655	144	12,474	139	6,004	81	5,813
Smoking Tobacco	\$ 27,990	489	3,171	1,833	19,601	15	2,867
Smokeless Tobacco	\$ 12,848	386	9,846	23	2,031	561	0
Vapor Products	\$ 17,750	270	4,960	155	5,492	176	6,697
NRT Smoking Cessation Aids	\$ 2,369	5	1,194	18	900	22	229
Total	\$ 785,045	\$ 12,045	\$ 162,330	\$ 26,227	\$ 233,696	\$ 48,887	\$ 301,684
Category share							
Cigarettes	\$ 699,434	2%	19%	3%	29%	7%	41%
Cigars and Cigarillos	\$ 24,655	1%	51%	1%	24%	0%	24%
Smoking Tobacco	\$ 27,990	2%	11%	7%	70%	0%	10%
Smokeless Tobacco	\$ 12,848	3%	77%	0%	16%	4%	0%
Vapor Products	\$ 17,750	2%	28%	1%	31%	1%	38%
NRT Smoking Cessation Aids	\$ 2,369	0%	50%	1%	38%	1%	10%
Total	\$ 785,045	2%	21%	3%	30%	6%	38%
% of World Population		14%	13%	9%	12%	26%	26%
Category share less % Population		(12%)	8%	(6%)	18%	(20%)	12%

TABLE 6
Regional Ecosystem Heatmap by Product Category Retail Value for 2017

Source: Euromonitor Passport by Retail Value in current prices USD million. Euromonitor estimate for World total retail value is not equal to the sum of the regions because of the inclusion of Kosovo (\$175 USD million); the WHO list¹⁷ of member states excludes Kosovo. Regional percentages are relative to regional total.

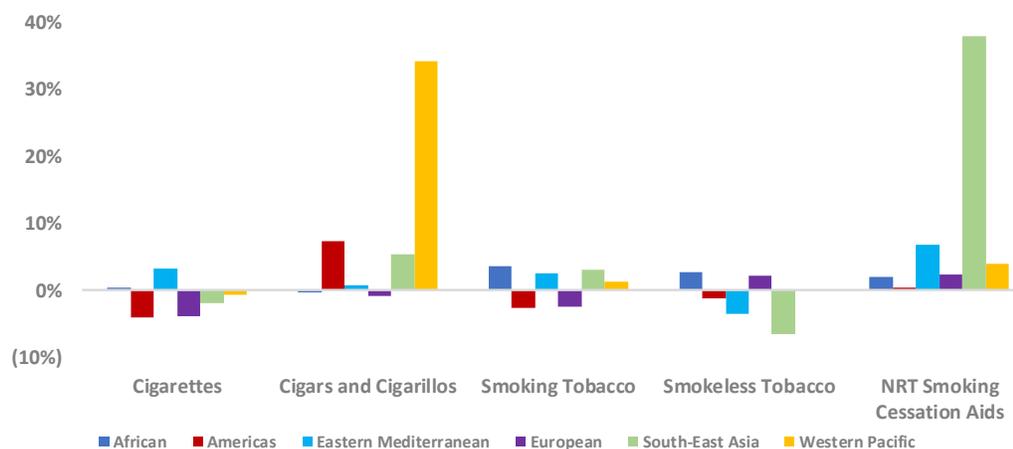


CHART 19
Product Volume Annual Percentage Change by Region for 2017

Source: Euromonitor Passport by Retail Volume and Foundation estimates.

is the case with the exception of the cigarette category, which is led by the Western Pacific Region (i.e., China). The vapor products category, which includes e-cigarettes and heated tobacco products, is influenced by the presence of heated tobacco products in Japan. However, with regard to cigarette sales volumes, the Americas, European, South-East Asia, and Western Pacific Regions are shrinking. The African and Eastern Mediterranean Regions are demonstrating cigarette volume characteristics that are relatively stable to increasing (see *Chart 19*). Some of the larger growth rates displayed in the chart below are reflective of relatively small volume positions.

According to Euromonitor, illicit trade during 2017 accounted for about 8% of global unit cigarette volume. Illicit trade share appears to be greatest (relative to total cigarette consumption) in the African, Americas, and Eastern Mediterranean Regions at more than 10%. Estimates for illicit trade share, based on Euromonitor data, are in the mid-single digit percentage range for the European, South-East Asia, and Western Pacific Regions.

Western Pacific Region— Nicotine Ecosystem Dominated by China

With a total population of approximately 1.9 billion or 26% of world population, the nicotine ecosystem of the Western Pacific

Region is dominated by China. After China, the next largest markets in terms of retail sales of nicotine-related products are Japan, South Korea, Australia, and Taiwan.

Cigarettes constituted approximately 95% of the retail nicotine ecosystem in the Western Pacific Region as of 2017, with cigars and cigarillos at 2%, smoking tobacco at 1% and vapor products at 2%. Smokeless tobacco products are not prevalent within the region. NRT smoking cessation aids products make up a small fraction of the ecosystem (see *Table 7*). On the basis of retail value in current USD terms, we estimate that the Western Pacific Region represents about 38% of the global nicotine ecosystem by retail value—the largest among the regions.

In China during 2017, retail volume of cigarettes increased by about 1%, after declining 6% during 2016. According to Euromonitor, more restrictive government regulations on public smoking in 2016, along with the residual effect from the increase in the cigarette tax during 2015, impacted the consumption of cigarettes there. The volume growth in the regional cigar category is driven by China from a relatively low share position. The limited growth in the smoking tobacco category, with regard to the three-year CAGR, is driven by Vietnam. Smoking tobacco was once widely

TABLE 7

Western Pacific Region—Product Category Retail Value Summary for 2017

Product Category	Retail Value (USD million) % Retail Value		Retail Value % Change 2017 vs. '16 3-Year CAGR		Retail Volume % Change 2017 vs. '16 3-Year CAGR	
	USD million	% Retail Value	2017 vs. '16	3-Year CAGR	2017 vs. '16	3-Year CAGR
Cigarettes	\$ 286,079	94.8%	2.2%	1.7%	(0.6%)	(2.9%)
Cigars and Cigarillos	5,813	1.9%	33.9%	23.1%	34.2%	25.7%
Smoking Tobacco	2,867	1.0%	14.1%	14.2%	1.3%	0.3%
Smokeless Tobacco	0	0.0%	NA	NA	NA	NA
Vapor Products	6,697	2.2%	145.6%	123.9%	NA	NA
NRT Smoking Cessation Aids	229	0.1%	3.9%	2.5%	4.0%	2.5%
Total	\$ 301,684	100%	4.1%	2.8%	NA	NA

Source: Euromonitor Passport by Retail Value in current prices USD million and Retail Volume. CAGR=compounded annual growth rate. Vapor products consist of open and closed vaping systems, and heated tobacco products. Heated tobacco products represented approximately 86% of the vapor products retail value in the Western Pacific Region in 2017.

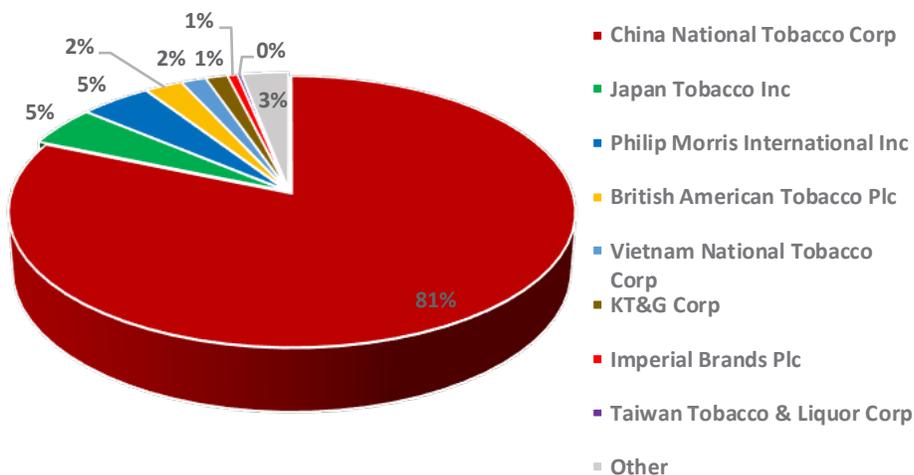


CHART 20

Western Pacific Region Company Share of Nicotine Ecosystem in 2017

Source: Company Volume share of cigarette stick equivalents based on Euromonitor Passport for World by Retail Volume and Value and Foundation estimates. Company share estimates are available for countries covering approximately 98% of the Western Pacific Region population and 99% of the nicotine ecosystem by retail value. Refer to *Appendix* for Sources and Methods.

consumed in Vietnam, but its popularity has diminished in recent years as many smokers have switched to machine-made cigarettes. The second largest market for smoking tobacco within the region is Australia, for which volume of the fine-cut variety is steadily increasing.

China National Tobacco Corporation dominates production with an approximately 81% share of the nicotine ecosystem by retail volume in the region—predicated on its 97% market share in China (see *Chart 20*). China National Tobacco Corporation, the state-owned manufacturer of tobacco products, produced approximately 2.3 trillion cigarette sticks in 2017.

Recall we estimate that China National Tobacco Corporation had approximately 38% share of the *global* nicotine ecosystem by volume for 2017. Five large publicly traded multinational producers are players in the region, as are large tobacco producers in Vietnam and Taiwan.

Japan Tobacco is the market leader in Japan, and it reported a nearly 61.9% market share as of June 2018. That said, market dynamics in Japan are changing. Japan Tobacco reports that its domestic cigarette sales volume declined by 13.8% year-over-year during the first half of 2018, in large part due to consumer adoption of heated tobacco products. Japan Tobacco, British American Tobacco, and Philip Morris offer heated tobacco products in Japan.

Likewise, in South Korea, KT&G reported domestic cigarette total market volume decreased by 10.9% year-over-year in the first half of 2018, in part due to the impact of heated tobacco products. KT&G, along with British American Tobacco and Philip Morris, offer heated tobacco products in South Korea. By retail value, heated tobacco products in the Western Pacific Region represented approximately 86% of the vapor products retail value of \$6.7 billion in 2017.

South-East Asia Region— Nicotine Ecosystem Skewed by Non-Retail Products

The South-East Asia Region has a total population of approximately 1.9 billion, or 26% of the world population. The largest country within the region by population is India, followed by Indonesia, Bangladesh, and Thailand. However, pertaining to the retail nicotine ecosystem, it is important to note that retail sales data do not capture locally manufactured combustible tobacco products, such as bidis in India.

In India, cigarettes have traditionally been sold by the stick. Therefore, the majority of sales in the category are made without packs. However, the ban on the sale of loose cigarettes, which now applies in some Indian states, is pushing the category towards organized retail sales. Although retail sales of cigarettes increased by 11% in current value terms in 2017, according to Euromonitor, volume declined by 4% to 81 billion sticks. In addition, while India has the second largest tobacco-using population in the world after China, smoking prevalence historically has been relatively low in part because of the popularity of smokeless tobacco, mainly gutkha and paan masala. That said, retail sales of smokeless tobacco in India have dropped precipitously during the past several years since many states of India banned the sale, manufacture, distribution, and storage of gutkha and its variants. As of May 2013, gutkha was banned in 24 states and 3 union territories. Euromonitor reports that smokeless tobacco retail sales decreased by more than 90% in India since 2011. Reports indicate that the gutkha ban in certain states¹⁸ has reduced gutkha consumption, although the product remains available. Products resembling gutkha have also become available.

Conventional cigarette smoking prevalence in India remains relatively low. For example, based on WHO data, India’s population represents approximately 18% of the world total.

TABLE 8

**South-East Asia
Region—Product
Category Retail Value
Summary for 2017**

Product Category	Retail Value		Retail Value		Retail Volume	
	(USD million)	% Retail Value	% Change 2017 vs.'16	3-Year CAGR	% Change 2017 vs.'16	3-Year CAGR
Cigarettes	\$ 48,032	98.3%	8.7%	8.8%	(2.0%)	(1.1%)
Cigars and Cigarillos	81	0.2%	10.3%	9.4%	5.4%	4.4%
Smoking Tobacco	15	0.0%	7.5%	5.8%	3.1%	2.6%
Smokeless Tobacco	561	1.1%	(5.4%)	(5.0%)	(6.5%)	(6.7%)
Vapor Products	176	0.4%	69.8%	201.6%	NA	NA
NRT Smoking Cessation Aids	22	0.0%	33.4%	32.4%	38.0%	38.1%
Total	\$ 48,887	100%	8.7%	8.7%	NA	NA

Source: Euromonitor Passport by Retail Value in current prices USD million and Retail Volume. CAGR=compounded annual growth rate. Vapor products consist almost entirely (>99%) of open vaping systems in the South-East Region in 2017.

However, according to Euromonitor data, cigarette retail volume of approximately 81 billion sticks in India during 2017 constituted only about 1.5% of global volume—less than 2% including illicit cigarette trade. An important factor in this equation is bidis. Bidis are an alternative type of low-cost, hand-rolled cigarette, locally made in India. Bidis consist of finely ground, sun-dried tobacco rolled in a brown tendu leaf. The leaf is from a broad-leafed plant native to India. Traditionally, bidi sales in India have been taxed at a much lower rate than conventional cigarettes or have evaded taxation altogether. As a result, bidis are the inexpensive, dominant nicotine delivery vehicle in India. Bidis are physically smaller than cigarettes, meaning they contain less tobacco. However, according to the Centers for Disease Control and Prevention (CDC), bidis have higher concentrations of nicotine, tar, and carbon monoxide than conventional cigarettes.

Given the nature of bidis, reliable volume estimates are historically problematic. Some studies estimate that bidi production topped one trillion during the decade of the 1990s. A report, which triangulates tendu leaf and bidi trade, estimates that nearly 605 billion bidis were made in 2007 to 2008.¹⁹ Another study, evaluating more recent data, finds that cigarette smoking is displacing bidi smoking in India.²⁰ According to the report, during the period from 1998 to 2015, cigarette smoking became about two-fold more prevalent in men at ages 15 to 69 years and four-fold more prevalent in men at ages 15 to 29 years. By contrast, bidi smoking among men at ages 15 to 69 years fell modestly. That said, assuming a “modest” decline in bidi smoking in the range of 1% to 3% per year applied to the estimate of more than 600 billion bidis produced in 2007 to 2008 yields a current annualized estimate of around 500 billion bidis. This compares to approximately 81 billion cigarettes consumed in India during 2017 and about 107 billion including illicit trade. Using this thought process implies that bidis represent more than 80% of total cigarette (retail, illicit, and bidis) volume (i.e., stick) consumption in India. Another implication is that the global nicotine ecosystem is effectively underreported by potentially 8% due to undercalculation of bidi consumption. According to Euromonitor data, approximately 5.4 trillion retail

volume sticks were sold during 2017 (about 5.9 trillion including illicit trade), not including bidis.

Indonesia is the fifth largest cigarette market in the world by retail volume. The smoking culture in Indonesia is based around the kretek, a clove-flavored cigarette. Indonesia is a unique cigarette market because of kreteks and the substantial cottage sector that produces hand-rolled cigarettes. According to reports, Indonesia possesses a few very large companies and hundreds of small producers, some of which are contracted by the large tobacco companies.²¹ Machine-made kreteks account for 68% of domestic consumption, hand-made kreteks and white cigarettes for another 26%, and machine-made white cigarettes for the remaining 6%. Euromonitor estimates that illicit trade in Indonesia represented about 7% of cigarette volume in 2017. In retail value terms, we estimate that the nicotine ecosystem in Indonesia is about twice the size of that in India. With regard to retail cigarette volume, the Indonesia market is nearly four times the size of the Indian market. Because of these and other factors, on the basis of retail value in USD terms, we estimate that the South-East Asia Region represents only 6% of the global nicotine ecosystem by retail value (see *Table 8*).

Cigarettes constituted more than 98% of the retail nicotine ecosystem in the South-East Asia Region as of 2017 by retail value, which is the highest among the regions. In Indonesia, Philip Morris International subsidiary HM Sampoerna, which was acquired in 2005, has a leading position in the cigarette category, which covers both hand-made and machine-made cigarettes. In 2017, HM Sampoerna led with a 33% volume share in overall cigarettes, followed by local player Gudang Garam with a 24% volume share. The local company Djarum PT was in the third position with a 13% volume share. HM Sampoerna and Gudang Garam are publicly listed companies, while Djarum is privately held. British American Tobacco has an approximately 7% share of cigarette volume in Indonesia. Nojorono Tobacco International manufactures cigarettes under several brands and is based in Indonesia (see *Chart 21*).

Retail sales of cigarettes in India are dominated by the

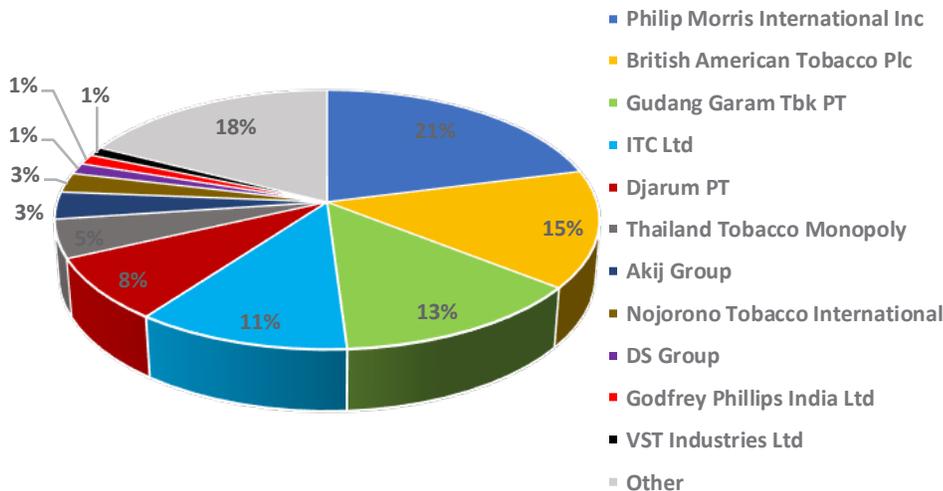


CHART 21

South-East Asia Region Company Share of Nicotine Ecosystem in 2017

Source: Company Volume share of cigarette stick equivalents based on Euromonitor Passport for World by Retail Volume and Value and Foundation estimates. Company share estimates available for countries covering approximately 85% of South-East Asia Region population and 87% of the nicotine ecosystem by retail value. Refer to *Appendix* for Sources and Methods.

category's three leading players, ITC Ltd, Godfrey Phillips India Ltd, and VST Industries Ltd. ITC led the cigarette category in 2017 with a retail volume share of 77%, followed by Godfrey Phillips at 9%, and VST with 8%. The largest non-Indian investor in the Indian tobacco industry is British American Tobacco. British American Tobacco holds approximately 30% interest in ITC, along with one Board seat. The Indian government owns less than 10% of ITC after selling a 2% stake in February 2017. British American Tobacco also holds a 32% stake in the third largest company, VST. Philip Morris International owns 25% of the second-largest Indian tobacco company Godfrey Phillips. In the smokeless tobacco category, DS Group is an Indian conglomerate with presence in several industry sectors, including food and beverage, hospitality, tobacco, packaging, and agroforestry.

In August 2018, Japan Tobacco announced that it agreed to acquire the tobacco business of Akij Group, the second largest tobacco company in Bangladesh with approximately 20% cigarette market share. Thailand Tobacco Monopoly is the state-run tobacco company in the country.

Eastern Mediterranean Region—Nicotine Ecosystem Is Expanding

The Eastern Mediterranean Region has a total population of approximately 650 million, or 9% of world population. The largest countries within the region in terms of the retail nicotine ecosystem are Egypt, Saudi Arabia, Morocco, and Pakistan. Note that this company analysis is based on markets that represent approximately 76% of the nicotine ecosystem (and 56% of the population) in the region, as company share data associated with some countries are limited.

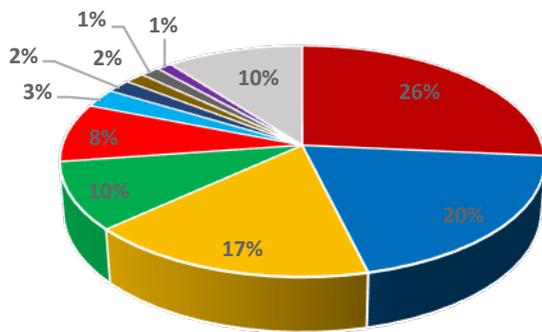
We estimate that cigarettes constituted approximately 92% of the retail nicotine ecosystem in the Eastern Mediterranean Region as of 2017 (see *Table 9*), with smoking tobacco at 7%, and the remaining categories below the 1% mark. On the basis of retail value in USD terms, we estimate that the region represents about 3% of the global nicotine ecosystem.

A unique factor regarding the Eastern Mediterranean Region is that it demonstrates among the highest growth rates in retail sales value and cigarette volume among the regions. The retail value increases are due, in part, to underlying volume growth. For example, according to Euromonitor, cigarette retail volume in 2017 increased 3% in Egypt and 2% in Morocco. This

TABLE 9
Eastern Mediterranean Region—Product Category Retail Value Summary for 2017

Product Category	Retail Value (USD million) % Retail Value		Retail Value % Change 2017 vs. '16 3-Year CAGR		Retail Volume % Change 2017 vs. '16 3-Year CAGR	
	USD million	% Retail Value	2017 vs. '16	3-Year CAGR	2017 vs. '16	3-Year CAGR
Cigarettes	\$ 24,058	91.7%	9.4%	11.1%	3.3%	1.3%
Cigars and Cigarillos	139	0.5%	10.1%	9.5%	0.8%	3.0%
Smoking Tobacco	1,833	7.0%	12.7%	15.4%	2.5%	3.5%
Smokeless Tobacco	23	0.1%	17.5%	11.2%	(3.4%)	3.4%
Vapor Products	155	0.6%	33.7%	36.2%	NA	NA
NRT Smoking Cessation Aids	18	0.1%	9.7%	8.2%	6.9%	(0.8%)
Total	\$ 26,227	100%	9.8%	11.5%	NA	NA

Source: Euromonitor Passport by Retail Value in current prices USD million and Retail Volume. CAGR=compounded annual growth rate. Vapor products consist almost entirely (~99%) of open vaping systems in the East Mediterranean Region in 2017.



- Eastern Co SAE
- Philip Morris International Inc
- British American Tobacco Plc
- Japan Tobacco Inc
- Imperial Brands Plc
- Régie Nationale des Tabacs et des Allumettes
- Al Fakher Tobacco Trading LLC
- KT&G Corp
- Régie Libanaise des Tabacs et Tombacs
- The General Tobacco Company
- Other

CHART 22

Eastern Mediterranean Region Company Share of Nicotine Ecosystem in 2017

Source: Company Volume share of cigarette stick equivalents based on Euromonitor Passport for World by Retail Volume and Value and Foundation estimates. Company share estimates available for countries covering approximately 56% of East Mediterranean Region population and 76% of the nicotine ecosystem by retail value. Refer to Appendix for Sources and Methods.

compares to a global rate of decline in cigarette unit volumes of around 1.4% in 2017.

Eastern Company SAE, which manufactures and trades tobacco products in Egypt, is a leading producer, followed by four of the major global producers. Eastern Company dominates the cigarette category in Egypt with a 92% share of retail sales volume (see Chart 22).

In Tunisia, tobacco is a state monopoly dominated by two state-owned companies. In 2017, Régie Nationale des Tabacs et des Allumettes held a 57% volume share of cigarettes, and it was the only importer of cigarettes in Tunisia.

Al Fakher Tobacco Trading produces shisha tobacco, the molasses-based tobacco product smoked in a hookah, infused with various flavors. KT&G Corp, headquartered in South Korea, exports its tobacco products to the Middle East and Africa. The Régie Libanaise des Tabacs et Tombacs is a public organization controlled by the Lebanese Ministry of Finance. Régie Libanaise aims to manage the growing, manufacturing, trade, and transport of tobacco across Lebanon. The General Tobacco Company manufactures and markets cigarettes, cigars, snuff, chewing tobacco, and other tobacco products. The company is based in Libya.

African Region—Smallest of the Retail Nicotine Ecosystems

The African region has a total population of approximately 1.0 billion or 14% of world population. With regard to company data, our survey is based on five countries: Algeria, Cameroon, Kenya, Nigeria, and South Africa. These markets represent approximately 74% of the retail nicotine ecosystem and 35% of the population in the region.

Cigarettes constituted approximately 89% of the retail nicotine ecosystem in the African Region as of 2017 (see Table 10), with smoking tobacco, 4%; smokeless tobacco, 3%; vapor products, 2%; and cigars and cigarillos, 1%. On the basis of retail value in USD terms, we estimate that the region represents about 2% of the global nicotine ecosystem by retail value, the smallest among the regions. The nicotine ecosystem in the region is generally stable to growing on a volume basis.

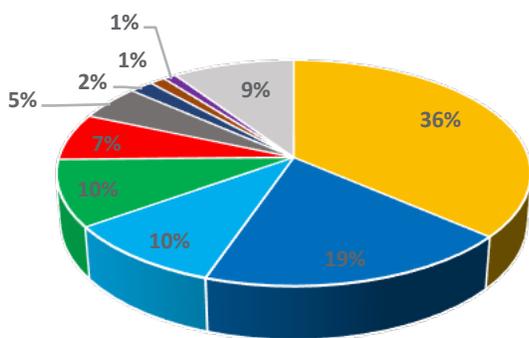
The tobacco industry in Algeria is controlled by international players Philip Morris International, Imperial Brands, British American Tobacco, and Japan Tobacco, as well as state-owned Société Nationale des Tabacs et Allumettes, which is the national producer. In smokeless tobacco, Société Nationale controlled 86% of smokeless tobacco retail volume

TABLE 10

African Region—Product Category Retail Value Summary for 2017

Product Category	Retail Value (USD million) % Retail Value		Retail Value % Change 2017 vs. '16 3-Year CAGR		Retail Volume % Change 2017 vs. '16 3-Year CAGR	
	USD million	% Retail Value	2017 vs. '16	3-Year CAGR	2017 vs. '16	3-Year CAGR
Cigarettes	\$ 10,752	89.3%	6.7%	6.0%	0.4%	0.6%
Cigars and Cigarillos	144	1.2%	7.8%	11.1%	(0.2%)	1.5%
Smoking Tobacco	489	4.1%	43.5%	11.7%	3.5%	(4.2%)
Smokeless Tobacco	386	3.2%	8.1%	8.1%	2.7%	2.5%
Vapor Products	270	2.2%	130.1%	64.0%	NA	NA
NRT Smoking Cessation Aids	5	0.0%	7.5%	7.7%	2.1%	3.1%
Total	\$ 12,045	100%	9.2%	6.9%	NA	NA

Source: Euromonitor Passport by Retail Value in current prices USD million and Retail Volume. CAGR=compounded annual growth rate. Vapor products consist of open and closed vaping systems, and heated tobacco products. Open vaping systems represented approximately 76% of the vapor products retail value in the African Region in 2017, followed by heated tobacco products (23%) and closed vaping systems (1%).



- British American Tobacco Plc
- Philip Morris International Inc
- Société Nationale des Tabacs et Allumettes (SNTA)
- Japan Tobacco Inc
- Imperial Brands Plc
- National Tobacco Enterprise Ethiopia
- Mastermind Tobacco (K) Ltd
- MLP Distributors CC
- Gold Leaf Tobacco Corp Pty Ltd
- Other

CHART 23

African Region Company Share of Nicotine Ecosystem in 2017

Source: Company Volume share of cigarette stick equivalents based on Euromonitor Passport for World by Retail Volume and Value and Foundation estimates. Company share estimates available for countries covering approximately 35% of the African Region population and 74% of the nicotine ecosystem by retail value. Refer to Appendix for Sources and Methods.

sales in Algeria as of 2017 (see Chart 23).

In South Africa, British American Tobacco had the leading share in cigarettes with a 73% volume share in 2017. Similarly, in Nigeria, British American Tobacco dominated the cigarette category with a retail volume share of 79% in 2017. The manufacture and distribution of tobacco products in Kenya are also concentrated, with British American Tobacco controlling a 78% retail volume share of cigarettes as of 2017. In Cameroon, sales of cigarettes are consolidated among a handful of international brands, led by Imperial Brands at 55% volume share.

National Tobacco Enterprise Ethiopia partakes in the producing, processing, manufacturing, distributing, importing and exporting of tobacco and tobacco products, with the goal of being a cigarette exporter subsequent to the satisfaction of national demand. In 2016, Japan Tobacco purchased from the Ethiopian government a 40% stake in National Tobacco Enterprise Ethiopia. Mastermind Tobacco Kenya Ltd is the only indigenous tobacco company in Kenya with its headquarters in Nairobi. Mastermind Tobacco Kenya is involved in tobacco growing, cigarette manufacturing, and marketing. MLP Distributors CC is the leading producer of smokeless tobacco

products in South Africa. Gold Leaf Tobacco Corporation Pty Ltd manufactures cigarettes in South Africa for both the South African and export markets.

European Region—Nicotine Ecosystem Over-Indexes Relative to Population

The European Region has a total population of approximately 900 million, or 12% of world population. On the basis of retail value in current USD terms, we estimate that the region represents approximately 30% of the global nicotine ecosystem. With regard to nicotine ecosystem retail sales value, the largest markets in the region were Germany, Russia, United Kingdom, Italy, and France in USD terms for 2017. The largest markets in the region pertaining to cigarette retail volume were Russia, Turkey, Germany, Italy, and Ukraine. Cigarette volumes are declining in the region, as are volumes in the cigars and cigarillos category as well as smoking tobacco. The smokeless tobacco category is growing, led by markets such as Sweden and Norway.

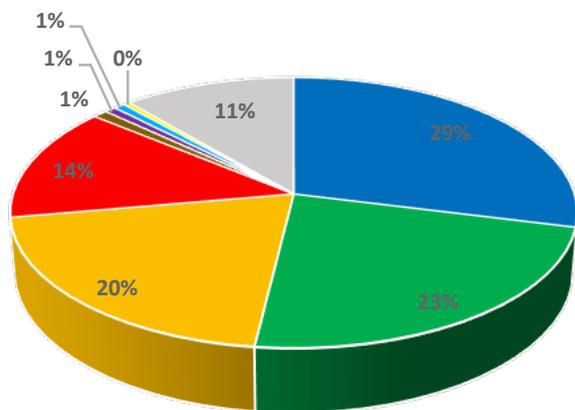
Cigarettes constituted more than 85% of the retail value nicotine ecosystem in the European region as of 2017 (see Table 11). Smoking tobacco represented 8% share, which is relatively high among all regions. The balance primarily consists of cigars

TABLE 11

European Region—Product Category Retail Value Summary for 2017

Product Category	Retail Value (USD million) % Retail Value		Retail Value % Change		Retail Volume % Change	
	2017	% Retail Value	2017 vs. '16	3-Year CAGR	2017 vs. '16	3-Year CAGR
Cigarettes	\$ 199,668	85.4%	2.4%	2.9%	(3.8%)	(2.9%)
Cigars and Cigarillos	6,004	2.6%	2.0%	1.3%	(0.8%)	(3.0%)
Smoking Tobacco	19,601	8.4%	3.1%	3.3%	(2.3%)	(1.0%)
Smokeless Tobacco	2,031	0.9%	5.6%	7.2%	2.2%	3.1%
Vapor Products	5,492	2.4%	29.4%	33.0%	NA	NA
NRT Smoking Cessation Aids	900	0.4%	4.7%	4.3%	2.4%	2.6%
Total	\$ 233,696	100%	3.0%	3.4%	NA	NA

Source: Euromonitor Passport by Retail Value in current prices USD million and Retail Volume. CAGR=compounded annual growth rate. Vapor products consist of open and closed vaping systems, and heated tobacco products. Open vaping systems represented approximately 78% of the vapor products retail value in the European Region in 2017, followed by closed vaping systems (13%) and heated tobacco products (9%).



- Philip Morris International Inc
- Japan Tobacco Inc
- British American Tobacco Plc
- Imperial Brands Plc
- Neman Tobacco Factory Grodno
- Pöschl Tabak GmbH & Co KG
- Scandinavian Tobacco Group
- Swedish Match AB
- Other

CHART 24

European Region Company Share of Nicotine Ecosystem in 2017

Source: Company Volume share of cigarette stick equivalents based on Euromonitor Passport for World by Retail Volume and Value and Foundation estimates. Company share estimates available for countries covering approximately 96% of European Region population and more than 99% of the nicotine ecosystem by retail value. Refer to Appendix for Sources and Methods.

and cigarillos, 3%; vapor products, 2%; smokeless tobacco, 1%; and NRT smoking cessation aids, <1%. Several countries in Western Europe are among the largest vaping markets in the world, including the U.K., Italy, Germany, and France as of 2017. In Sweden, we estimate that smokeless tobacco, led by Swedish-style snus, constituted about 36% of the ecosystem by retail value there in 2017.

Four producers, Philip Morris International, Japan Tobacco, British American Tobacco, and Imperial Brands control approximately 86% market share of the nicotine ecosystem by retail volume (see *Chart 24*). In August 2018, Japan Tobacco completed the acquisition of Donskoy Tabak companies in Russia and Greece. We estimate that Donskoy Tabak is the fifth largest tobacco company in Russia with a cigarette market share of approximately 6% as of 2017. Donskoy Tabak is also the largest domestic tobacco product manufacturer in Russia.

Neman Tobacco Factory Grodno is the largest cigarette producer in Belarus. The company manufactures its own cigarettes as well as international brands under license in collaboration with its main partner British American Tobacco. Pöschl Tabak, together with its subsidiaries, manufactures and distributes tobacco products throughout Europe and

internationally. Pöschl Tabak is based in Germany and offers pipe tobacco, fine-cut tobacco, and cigarette products. Scandinavian Tobacco Group operates primarily in the cigars, cigarillos, and smoking tobacco products. Swedish Match makes smokeless tobacco products, such as snus, moist snuff, and chewing tobacco.

Americas Region—Nicotine Ecosystem Driven by the U.S.

With a total population of approximately 1.0 billion or 13% of world population, the U.S. dominates the nicotine ecosystem of the Americas Region. We estimate that the U.S. market accounts for about 76% of the nicotine ecosystem in the region by retail value. After the U.S., the next largest markets in terms of retail sales of nicotine-related products are Canada, Brazil, Argentina, and Mexico.

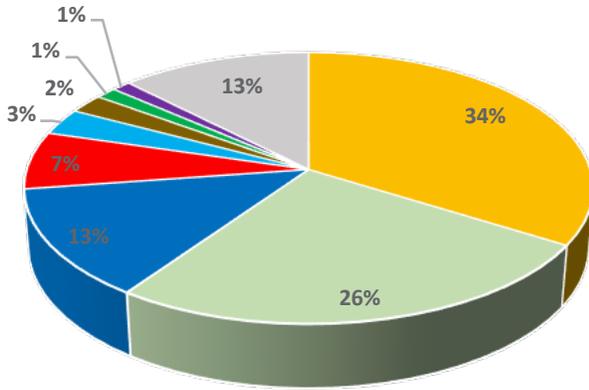
Cigarettes constituted more than 80% of the nicotine ecosystem by retail sales value in the Americas Region as of 2017—the lowest among the regions (see *Table 12*). Cigars and cigarillos made up nearly 8% of the retail nicotine ecosystem, which was the highest among the regions due to prevalence of this category in Latin America and the U.S. The remaining

TABLE 12

Americas Region—Product Category Retail Value Summary for 2017

Product Category	Retail Value		Retail Value % Change		Retail Volume % Change	
	(USD million)	% Retail Value	2017 vs. '16	3-Year CAGR	2017 vs. '16	3-Year CAGR
Cigarettes	\$ 130,685	80.5%	1.4%	2.5%	(4.0%)	(3.9%)
Cigars and Cigarillos	12,474	7.7%	5.4%	5.9%	7.4%	6.4%
Smoking Tobacco	3,171	2.0%	(1.1%)	(0.8%)	(2.7%)	(2.2%)
Smokeless Tobacco	9,846	6.1%	7.0%	6.5%	(1.1%)	0.5%
Vapor Products	4,960	3.1%	10.9%	21.4%	NA	NA
NRT Smoking Cessation Aids	1,194	0.7%	3.0%	3.8%	0.4%	2.1%
Total	\$ 162,330	100%	2.2%	3.3%	NA	NA

Source: Euromonitor Passport by Retail Value in current prices USD million and Retail Volume. CAGR=compounded annual growth rate. Vapor products consist almost entirely (>99%) of vaping systems. Closed vaping systems represented approximately 62% of the vapor products retail value in the Americas Region in 2017, followed by open vaping systems (38%).



- British American Tobacco Plc
- Altria Group Inc
- Philip Morris International Inc
- Imperial Brands Plc
- Swedish Match AB
- Swisher International Group
- Japan Tobacco Inc
- Liggett Group
- Other

CHART 25
Americas Region Company Share of Nicotine Ecosystem in 2017

Source: Company Volume share of cigarette stick equivalents based on Euromonitor Passport for World by Retail Volume and Value and Foundation estimates. Company share estimates available for countries covering approximately 91% of Americas Region population and more than 97% of the nicotine ecosystem by retail value. Refer to *Appendix* for Sources and Methods.

categories were comprised of smokeless tobacco, 6%; vapor products, 3%; smoking tobacco, 2%; and NRT smoking cessation aids products, 1%. Cigarette volumes are declining in the region, although unit volumes are increasing in the cigars and cigarillos category.

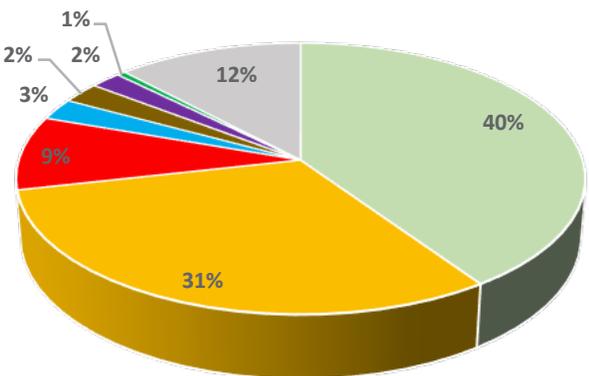
Historically, the smokeless tobacco category has been dominated by the U.S., Sweden, and India. The U.S. is the largest vaping market in the world. On the basis of retail value in USD terms, we estimate that the Americas Region represents about 21% of the global nicotine ecosystem by retail value.

The top four producers have an 80% market share of the nicotine ecosystem in the Americas Region by volume (see *Chart 25*). In Latin America, two producers, British American Tobacco and Philip Morris International, control approximately 83% market share of cigarette volume. Likewise, in Canada, two producers, British American Tobacco and Philip Morris

International, control approximately 84% market share of cigarette volume.

Swedish Match makes smokeless tobacco products, such as snus, moist snuff, and chewing tobacco. Swisher manufactures cigars and smokeless tobacco brands, and the company is headquartered in the U.S. Liggett Group is a privately held North Carolina based manufacturer of cigarette brands.

The leading producer in the U.S. market is Altria Group, which completed the spin-off of Philip Morris International to shareholders in March 2008. British American Tobacco completed its acquisition of the remaining stake of the number two player, Reynolds American, in 2017. The vast majority of cigarettes sold in the U.S. are produced in the country by the leading players (see *Chart 26*). In the U.S. during 2017, cigarette volume declined 2.3%, while retail sales value increased by about 0.7%.



- Altria Group Inc
- British American Tobacco Plc
- Imperial Brands Plc
- Swedish Match AB
- Swisher International Group
- Liggett Group
- Japan Tobacco Inc
- Other

CHART 26
U.S. Company Share of Nicotine Ecosystem in 2017

Source: Company Volume share of cigarette stick equivalents based on Euromonitor Passport for World by Retail Volume and Value; and Foundation estimates. Refer to *Appendix* for Sources and Methods.

Appendix

SOURCES AND METHODS

Our primary data source is Euromonitor, which provides data as of 2017. Euromonitor and additional sources, such as ECigIntelligence, company reports, and other research, are referenced as noted throughout this report. Euromonitor data are organized across multiple nicotine delivery products (tobacco, vapor, and NRT smoking cessation aids) by country. For the purpose of identifying the major companies, data are available in the format of product retail volume, product retail sales value, and company share by volume. In this report, we represent retail sales value in U.S. Dollars (USD) at fixed 2017 exchange rates. On a regional basis, we employ the World Health Organization (WHO) format for organization and comparison.

In evaluating the availability and limitations of the data, we present nicotine ecosystem **company share** utilizing a volume-based methodology for identification and comparison. The measure for comparison is the cigarette stick equivalent. While retail sales measures are instructive and are discussed throughout the report regarding product categories and geographic regions, several factors exist that create the potential for skewing the company share results. First, Euromonitor provides volume share for tobacco products by company, which does not generally equate to retail value share because of product mix. For example, a company portfolio may skew toward the premium end or to the economy end of the price spectrum. Second, employing currency conversion for sales values at USD fixed 2017 exchange rates can distort retail sales trends at the local level. Third, retail sales figures are a function of volume and pricing. The focus of this report is identification and comparison of companies by production, rather than differentiation by pricing strategy or government taxation policy. On the other hand, Euromonitor provides retail value share only for vapor products. Vapor products consist of e-cigarettes and heated tobacco products. We differentiate

between vaping systems and heated tobacco products as noted throughout the report.

The decision to utilize a volume-based approach for the nicotine ecosystem company share analysis requires conversion of various product volumes into the cigarette stick equivalent format. We were unable to identify a common source for such purposes, so we developed the following volume-conversion methodology. Because the objective of this report is the identification and comparison of major companies in nicotine delivery primarily on a relative basis for additional research in the future, we are tolerant of the margin of error offered by this methodology.

• Tobacco products

- **Cigarettes.** According to *OECD Health Statistics 2017* (definitions, sources, and methods),¹⁰ typically a cigarette weighs approximately 1 gram, of which the tobacco content can vary from 65% to 100% depending on the type of cigarette. The methodology to convert tobacco items into grams differs across countries. In this report, we utilize tobacco weight of approximately 0.7 grams as the cigarette stick equivalent, the lower end of the OECD range, based on the observation that tobacco weight per cigarette has decreased over time. It has been established that human exposure to tobacco smoke does not reflect package yield characteristics because of a variety of factors.²² In commercial tobacco products, nicotine concentrations range from approximately 6 to 18 milligrams per gram (mg/g).²³ The typical dose of nicotine systematically absorbed from each cigarette is approximately 1 to 2 milligrams. Another survey of nicotine yield finds that mainstream smoke deliveries varied from 0.5 to 1.6 mg nicotine per cigarette.²⁴
- **Cigars and Cigarillos.** According to the Centers for Disease Control and Prevention (CDC), a cigar is a roll of tobacco wrapped in leaf tobacco or in a substance that contains tobacco.²⁵ A large cigar typically contains at least one-half ounce of aged, fermented tobacco (i.e., as much as a pack of cigarettes) and usually takes 1 to 2 hours to smoke. A cigarillo is a short (3 to 4 inches) and narrow cigar that typically contains 3 grams of tobacco and usually does not include a filter. A little cigar is a small cigar that typically is about the same size as a cigarette and usually includes a filter. The Euromonitor cigar category is the aggregation of large, standard, and small cigars only. Cigarillos are defined as miniature cigars weighing less than 3 grams each.
- **Smoking Tobacco.** Euromonitor defines the Smoking Tobacco category as consisting of cut tobacco sold in packaged format for smoking either in pipes or for use in

roll-your-own (RYO) cigarettes. The fine-cut designation translates to RYO cigarettes. Pipe tobacco also includes water pipe tobacco of the type consumed in the Middle East, known as *shisha*.

- **Smokeless Tobacco.** As we consider non-combustible forms of nicotine delivery, research indicates that nicotine absorption varies across tobacco products.²⁶ In addition, nicotine levels vary by product, including smokeless tobacco products.²⁷ In general, chewing tobacco products have lower levels of nicotine (mg/g) than moist snuff and snus. Research indicates that approximately 10% to 20% of the nicotine present in a pinch of snus is absorbed via the mucous membrane and reaches the systemic circulation.²⁸ This means that only 1 to 2 milligrams of nicotine is absorbed into the blood from a 1 gram pinch containing approximately 10 milligrams of nicotine. Euromonitor defines smokeless tobacco as chewing tobacco and moist snuff. Chewing tobacco consists of Asian-style (also referred to as *betel*, *areca*, *gutkha*, *paan masala*, and often unbranded) and U.S. style (leaf or plug). Moist snuff consists of U.S. style moist snuff (dip) and Swedish-style snus, both of which are available in loose and preportioned form.

- **Vapor products**

- **Open Vaping Systems.** The open vaping system consists of the charging and vaporizing device plus the e-liquid. For the purpose of this exercise, for open vaping systems we extrapolate retail sales share to retail volume share in cigarette equivalents. That is, for example, we translate a 1% retail sales share to a 1% retail volume share. We selected this approach, frankly, because we were unable to identify a preferable methodology for several reasons. One, translating nicotine delivery of e-cigarettes into a cigarette stick equivalent is problematic given the broad diversity of products and strengths, particularly those associated with the open vaping systems category. Two, e-cigarette consumption patterns, habits, and rationale likely vary widely, again making extrapolation problematic. A risk factor is that we are effectively under-representing nicotine consumption from open vaping systems on a volume basis. However, we believe the potential skewing of analysis results is limited because open vaping systems retail sales value represents less than 1% of total retail sales value, and, in general, the major players identified by this report have little market share within the category. We estimate that greater than 90% of the open vaping systems market share in our methodology resides in the Other company designation (i.e., outside of the major players to be identified for future analysis).

- **Closed Vaping Systems.** Closed vaping systems consist of cig-a-like and non-cig-a-like closed systems.

Cig-a-likes encompass single-use (i.e., disposable) and rechargeable (including starter kits) types. Cartridges are the consumable element of the rechargeable cig-a-like, with a more limited nicotine strength and flavor range than bottled e-liquid. Cartridges are usually available in packs of three or five.

Non-cig-a-like closed devices (including starter kits) are available such that the device is the primary element of purchase, with bundled refill pods included. The cartridge category consists of prefilled pods or capsules for use with the non-cig-a-like closed device. Currently, the cartridges are proprietary in nature and usable exclusively with specific device hardware.

In the U.S. (the largest vaping market in the world) and in the U.K. (the second largest), average pricing for single-use cig-a-likes in 2017 was approximately \$4.89 for 200 puffs (as advertised) or about one pack of cigarette equivalents. Studies of human smoking patterns²² across multiple references find puffs per cigarette in a range of 8 to 16 with a mean of 11. A number of factors affect the lifespan of the disposable cig-a-like, including individual characteristics such as length of draw, strength of draw, and frequency of use. Regarding rechargeable cig-a-likes, we extrapolate cartridge retail sales to cigarette equivalents. In other words, we exclude the device purchase from the conversion. According to Euromonitor data, the average price of a cig-a-like cartridge in the U.K. was \$3.84 per unit in 2017. Again, we approximate that the unit reflects the estimated number of puffs related to a pack of cigarettes.

Across the U.K. market, according to Euromonitor, the average unit prices for non-cig-a-like closed systems (including starter kits) and cartridges were \$24.81 and \$2.87, respectively, in 2017. Vendors are stating between 300 and 1,200 puffs per cartridge. In the U.S. market, JUUL states that depending on use patterns, one JUUL pod yields about 200 puffs. The unit price of the JUUL pod at about \$4 is greater than the U.K. average cartridge price referenced above.

The downside with this approach is that translating nicotine delivery of closed vaping systems into a cigarette stick equivalent can be problematic given the broad diversity of products and strengths. In addition, as mentioned previously, e-cigarette consumption patterns, habits, and rationale vary widely. That said, we utilize this behavioral approach in modeling cigarette stick equivalents associated with closed vaping systems as described above, as being preferable to the retail sales extrapolation utilized for open vaping systems.

Cigarette stick equivalents	Conversion factors
Tobacco products	
Cigars	15 per unit
Cigarillos	2 per unit
Pipe	1,429 per kilogram
Fine cut	1,429 per kilogram
Chewing	500 per kilogram
Moist snuff	1,000 per kilogram
E-cigarettes	
Single Use Cig-a-likes	\$ 0.24 unit price/stick
Cig-a-like Cartridges	\$ 0.19 unit price/stick
Non-Cig-a-like cartridges	\$ 0.10 unit price/stick

TABLE A-1

Summary of Cigarette Stick Conversion Factors

Source: Euromonitor and Foundation estimates.

Again, we believe potential skewing of analysis results is relatively limited because closed vaping systems retail sales value represents approximately 0.5% of total retail sales value, although the major players do have material market share in the category. In addition, the category is growing. On the other hand, this approach to an extent under-reports the volume equivalent by excluding equipment sales and relying on cartridge sales. Finally, the methodology potentially skews the data by using pricing data from two markets, namely the U.S. and the U.K. However, we feel this risk is mitigated because, according to Euromonitor, nearly 90% of closed vaping systems retail sales value is derived from the U.S. and Western European markets.

- **Heated Tobacco Products.** Euromonitor reports retail sales for the heated tobacco products category, which consists of tobacco heating devices and heated tobacco. For the purpose of cigarette stick equivalents, we focus on the heated tobacco stick volumes based on company reports for in-market sales during 2017.

- **NRT smoking cessation aids**

NRT smoking cessation aids are nicotine-based products such as gum, lozenges, patches, and inhalers used to aid smoking cessation. Euromonitor reports retail sales and unit volumes by NRT type. In converting to cigarette stick equivalents, we contemplated the bioavailability and amount of nicotine absorbed per unit dose and time.²³ The data show that bioavailability per dose for gum, inhaler, and spray forms approximate that of a cigarette in the range of 1 to 2 milligrams (i.e., approximately one cigarette stick equivalent per unit). Nicotine bioavailability associated with the patch form is greater, and the nicotine is dispensed over a longer period.

Our cigarette stick equivalent conversion methodology is summarized in Table A-1.

The conversion in application of the volume methodology shifts product category share to a slight degree compared to the Euromonitor retail value share (see *Table A-2*). Specifically, the smoking tobacco category, which is generally a discount price product, has an increased volume share by about 120 basis points relative to retail sales share. On the other hand, vaping systems and heated tobacco products lose about 20 and 40 basis points, respectively, in volume share in part because we do not credit device sales in our volume methodology. Other changes are not material, in our view. Nevertheless, because a primary objective of this report is to illuminate relative company share within the nicotine ecosystem, we believe the resulting analysis is acceptable in applying the available company share estimates from Euromonitor to our cigarette stick equivalent volume estimates.

The major shortcoming of this approach is degree of precision. We are applying a cigarette stick equivalent conversion methodology based, in part, on selected market averages to underlying estimates made by Euromonitor at the country level rolled up into regions. That is, we are applying estimations to estimates. We recognize the margin for error associated with this method. That said, the main purpose of the report is identification, along with establishing a sense of relative quantification, for additional research in the future. The purpose of this report is not to make judgments based on absolute quantities or even minor differences in relative measures. The final determination of companies to be evaluated by the corporate index program will occur at a later date, following consultation with stakeholders and determination of processes and organization.

Finally, our analysis focuses primarily on retail sales and retail volumes. The Euromonitor definition of cigarettes is duty-paid, machine-manufactured, white-stick products. This excludes the volume of non-machine-manufactured products,

TABLE A-2

Comparison of Methodologies— Retail Sales Versus Cigarette Stick Equivalents 2017

Source: Euromonitor and
Foundation estimates.

Product Category (2017)	Cigarette Stick		
	Retail Sales	Equivalents	Difference
Cigarettes	89.1%	88.2%	(0.9%)
Cigars and Cigarillos	3.1%	3.3%	0.2%
Smoking Tobacco	3.6%	4.8%	1.2%
Smokeless Tobacco	1.6%	1.7%	0.1%
Vaping Systems	1.5%	1.3%	(0.2%)
Heated Tobacco Products	0.8%	0.4%	(0.4%)
NRT Smoking Cessation Aids	0.3%	0.3%	0.0%
Total	100.0%	100.0%	0.0%

such as bidis (India), kreteks (Indonesia), papirosy (Russia), and other smoking products. The machine-manufactured portion of kreteks in Indonesia is included in the data. While we call out the impact of illicit trade in selected locations, the effects of counterfeit products and cross-border smuggling are not included in our company retail share analysis. Additionally, substitute products such as bidis in India are likewise not incorporated into the company share analysis. For example, Euromonitor estimates that approximately 5.4 trillion cigarette sticks were produced and consumed on a retail basis during 2017. This figure does not include the approximately 500 billion bidis we estimate were potentially produced and consumed outside retail channels in India and the approximately 450 billion illicit cigarette sticks estimated globally by Euromonitor. In other words, the retail cigarette volume figure could underestimate total global production and consumption by some 15%.

Euromonitor collects its data through a series of global sources—governments, companies, trade press, and other. It relies on the regional knowledge of analysts based in 12 global offices. In addition to the utilization of its proprietary database, it employs a range of international sources, consumer surveys, and online trends under the direction of a team of specialist editors that implement quality control.

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