

Electronic Nicotine
Delivery Systems
(ENDS): an update
on a rapidly evolving
vapour market

Report 2

January 2017

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01 Introduction

Background to the study

In May 2016, EY published a report on trends in the market for e-cigarettes – sometimes known as electronic cigarettes, vaping products, or electronic nicotine delivery systems (ENDS). The study explored developments in the sale and use of these products, and focused on seven countries in particular (that collectively account for 75% of their global consumer price turnover (CPTO) excluding US and China).¹

This second report is an update of that study, and draws on the latest data, to assess how the market has developed in those seven countries over the past year. In addition, this report includes a separate section on the development of the market in three additional countries; Australia, Canada, and Malaysia, where there are restrictions on the general sale and use of nicotine-containing e-liquids.

Figure 1: Countries analysed as part of this study*



* Countries shaded in dark-grey are 'restricted-use' nicotine markets

'Core' markets

The seven 'core' countries included in this report are Germany, France, Italy, Poland, Russia, South Korea and the UK. The analysis presented in this report on the core markets was drawn from a survey on consumer behaviour from approximately 2,000 adults in each selected country, for each of the years from 2013 to 2016.²

'Restricted-use' markets

This report, as discussed above, also includes data for three markets where there are some restrictions on the general sale and use of vaping products. These are referred to as 'restricted-use' markets. They are Australia, Canada and Malaysia. The datasets provided by Kantar Group Ltd. include estimates for the restricted-use markets for the year 2016 only.

The methodology for this survey is explained in more detail in Appendix A. EY has calculated cross-country averages based on UN population data, and the proportion of respondents to the survey who identified themselves as regular consumers of vaping products. In addition to data from Kantar, market information has been obtained from recognised sources, such as the World Health Organisation, to provide further context and detail on the category.

¹ Nicoventures' estimate

² Field work for the 2016 survey was conducted between the period 9 May and 22 June, therefore all references to 2016 data sourced from the Kantar study relate to this period. Six of the seven countries were included in the survey between 2013 and 2016. South Korea was excluded from the 2013 survey, but included in 2014, 2015 and 2016

³ See Appendix B for further information on each 'restricted-use' market

Defining the vapour market

There are various terms used to describe these products, including e-cigarettes, vaping products and electronic nicotine delivery systems (ENDS). This report often uses the terminology ENDS to remain consistent with the terminology used by institutions such as the World Health Organisation and to reflect the fact that many of the devices themselves are not cigarette-like in appearance.

ENDS are battery powered devices which heat a solution (typically, but not always, containing nicotine) to create a vapour. A heating element is activated electronically which vaporises the liquid formulation (often referred to as the 'e-liquid') and the vapour condenses to form an aerosol. No combustion takes place; instead the user inhales the liquid's vapour rather than smoke. ENDS do not contain tobacco, however, where nicotine is used, it is derived from tobacco.

For the purposes of this report, ENDS devices have been grouped under three broad categories:

- ▶ Disposable – which can be used until the pre-filled cartridge of 'e-liquid' is emptied
- ▶ Rechargeable – where the user can replace pre-filled cartridges
- ▶ Modular – can be refilled by the user, but also allows the user to regulate the power delivered from the system's batteries to the atomizer

ENDS form part of a group of products that have been collectively referred to (by some industry participants) as Next Generation Products (NGPs). However, the NGP category also includes products that do contain tobacco (e.g. tobacco heating products). For the avoidance of doubt the data in this report only relates to ENDS.



02 Key findings

Key findings from our survey of seven core markets:

1. The market has more than doubled in size since 2013

The number of consumers using ENDS grew from an estimated 2.8mn in 2013 to 6.1mn in 2016, an increase of 120%.⁴ Total usage is highest in the UK and France, where it is estimated at 4.2% and 3.1% of the adult population respectively.

2. 'Regular' usage of ENDS is rising

Over 40% of consumers consider their use as 'regular' rather than occasional.⁵ This proportion has remained roughly constant since 2013 despite a rapidly growing market. South Korea (63%), the UK (52%) and France (49%) are the markets with the most regular consumers.

3. Sole-use of ENDS rises as smokers switch

The proportion of consumers using both traditional tobacco products and ENDS (so-called, 'dual-users') fell from 64% in 2013, to 43% in 2016. The 'ex-smoker' represents a growing proportion of consumers, nearly half (44%), which is a sharp increase from 29% in 2015.

4. ENDS most popular with the over-30s

The largest proportion of consumers (38%) are in the 30 - 44 age range, with another 37% between 45 - 64. The proportion of consumers who are between 18 - 29 varies between 19% in Italy and 33% in Russia.

5. The appeal of ENDS is evenly spread across men and women

The appeal of the new sector is broadly balanced between men and women. Their usage is similar, with 53% of consumers being men and 47% women. The prevalence of smoking, as opposed to vaping, among males is often greater than females.

6. Modular devices preferred choice for over two-thirds of consumers

In many markets 'modular' devices, which allow for greater customisation, have overtaken rechargeable models as the most commonly used type of device. Modulars are chosen by two-thirds (68%) of all consumers, up from 55% in 2013. The research findings also highlights that many consumers currently use more than one type of device.

7. Consumers opting for non-tobacco flavoured e-liquids

Evolving consumer taste is driving diversity in e-liquid flavours. Tobacco, botanical and fruit flavours are the most popular. Three quarters of consumers opt for non-tobacco flavoured e-liquids such as fruits (23%) and botanicals (21%).

8. Specialist 'vape' stores are the preferred channel for purchase

In 2016, 75% of consumers purchased their modular devices at a retail store, with the most common being specialist 'vape' stores. Retail stores were also the main purchase channel for rechargeable and disposable products. Online purchasing is slightly more common for users of modular devices

9. The biggest driver: ENDS are perceived to be 'safer'

The primary motivation for the consumer is a perception that ENDS offer 'a safer alternative to cigarettes'. It is closely followed by a similar motivation, namely that ENDS enable smokers to reduce their 'consumption of tobacco'. This is alongside the fact that ENDS have no unpleasant smell compared to cigarettes.

10. The biggest barrier: ENDS are perceived to be 'harmful'

One of the most commonly cited barriers to take-up is a view that ENDS 'might be harmful' to the health of the user. This was cited by 32% of people (smokers and non-smokers) who had not tried or did not intend to use these products.

⁴ Nicoventures' estimate

⁵ ENDS users were asked to self-define their usage as either 'regular' or 'occasional'

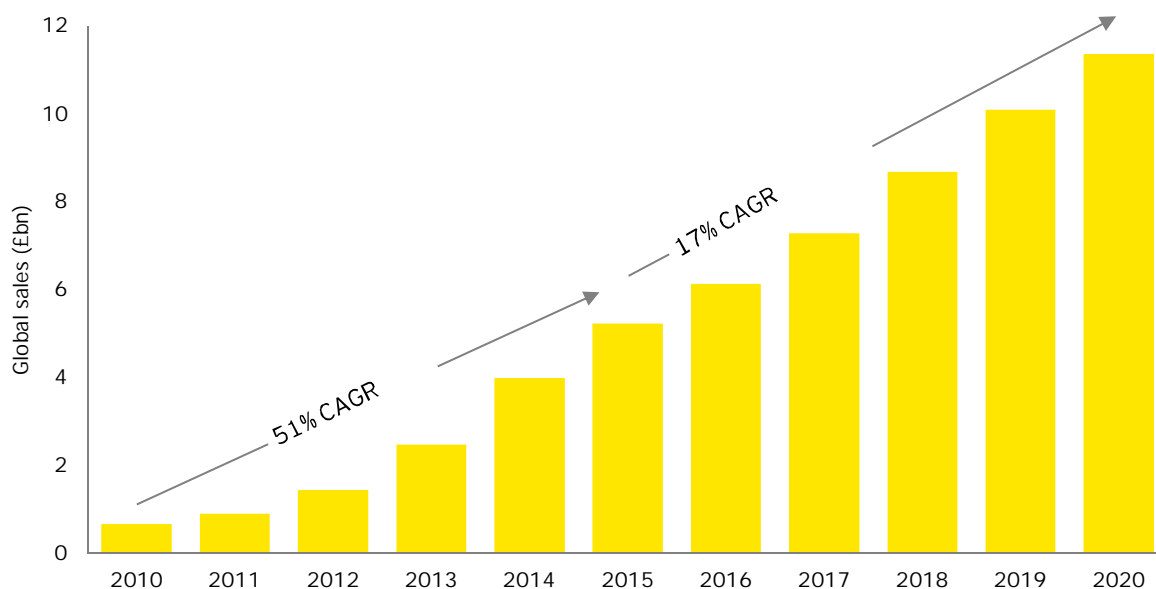
03 The market for ENDS

The market continues to grow rapidly, supported by relatively low barriers to entry which have allowed many businesses to bring a diverse set of products to consumers through a variety of channels. This section of the report offers an overview of some of the emerging trends within this market, providing an evidence-based comparison across countries and over time.

Growth in the market slowing, but remains robust

By year end 2016, sales of ENDS are expected to reach £6.1bn globally from just £0.7bn in 2010, an increase of around 800%. By 2020, sales are projected to rise to just under £12bn, increasing at a compound average growth rate (CAGR) of 17% per year.

Figure 2: Global sales of ENDS (£bn) and annual growth



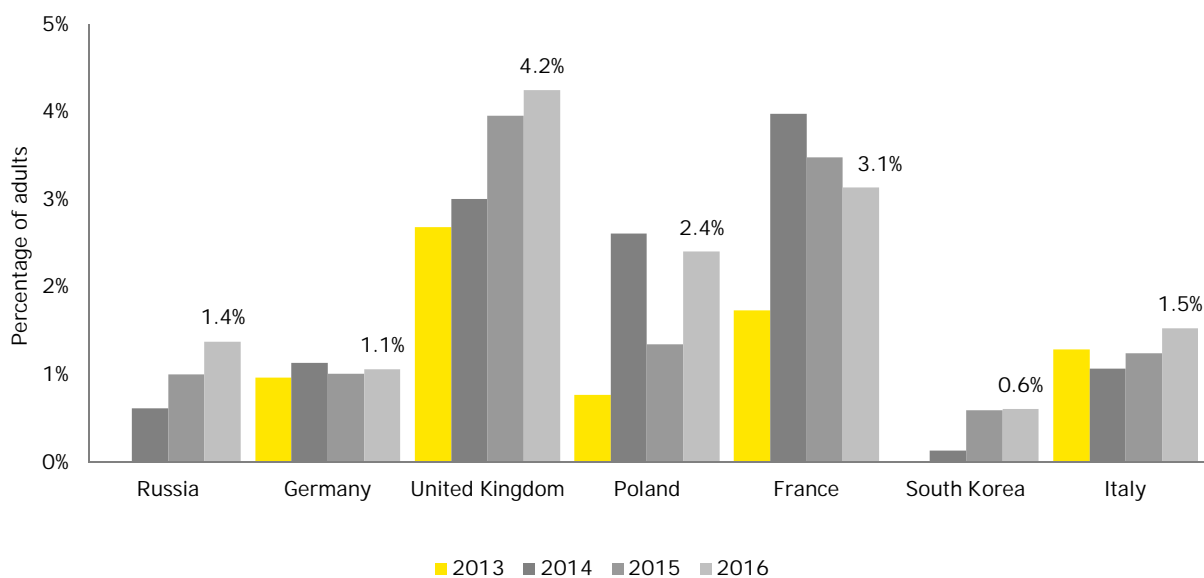
Source: Euromonitor

The market is most developed in the UK, followed by France

In 2016, the total number of regular consumers across these seven countries is estimated to be around 6.1mn, up from 2.8mn in 2013, an increase of 120%. As illustrated in Figure 3 below, in 2016, total usage across the core countries surveyed was highest in the UK (4.2%) and France (3.1%) and lowest in South Korea (0.6%) and Germany (1.1%).

In both Italy and Russia, usage has steadily increased in recent years. By contrast, in other markets the market size appears relatively more volatile, which may reflect the relatively nascent nature of the market, and hence the challenges in collating accurate usage data.

Figure 3: Consumers (both regular and occasional) as a percentage of adults, 2013-2016*



Source: Kantar, EY analysis

* Note that 2016 data for the UK and Germany are provisional estimates.

The most commonly cited driver of usage is that ENDS are perceived to be potentially 'a safer alternative to cigarettes'

This was followed by 'no smell or smoke compared to tobacco'.

Notably, the top five drivers, as reported by regular users, predominantly relate to the perceived potential health benefits of ENDS vs. traditional tobacco products. Beyond the top five drivers, consumers also see specific features related to product performance as important factors that influence their decision to use ENDS. The ranking is shown in Table 1 below, in which the standardised importance score is included to illustrate relative importance, where the total importance across all 16 drivers would sum to 100:

Table 1: Top 5 drivers of ENDS use ranked by regular users

Ranking	Reason	Standardised importance score
1	A safer alternative to cigarettes	8.0
2	No smell or smoke compared to cigarette	7.9
3	Reduce my consumption of tobacco	7.7
4	Satisfies my cravings	7.5
5	Value for money	7.0

Source: Kantar study of the global vaping product market. The standardised importance score is derived on the basis of Need statements. Respondents were provided with a set of "Need choices" and the responses were then analysed to derive a hierarchy and a score associated with each driver for consumers.

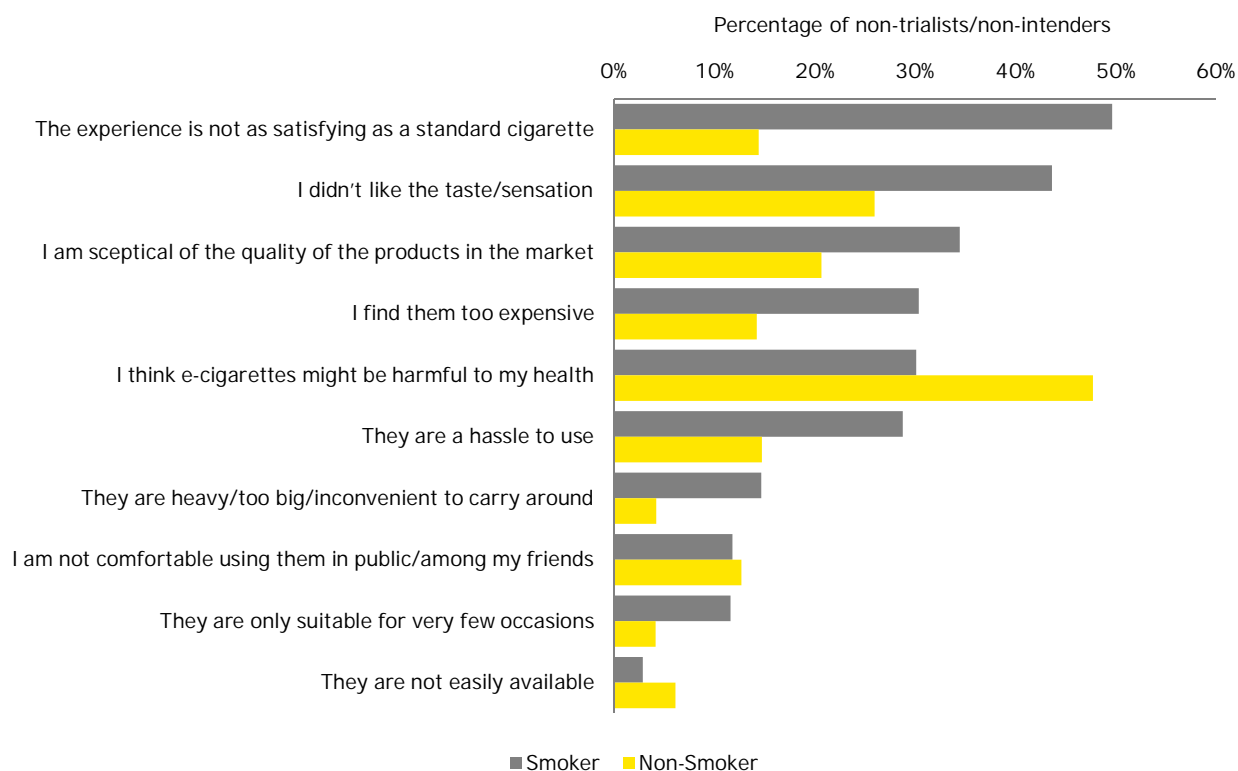
... but the perceptions of health risks are also a barrier to take up

One of the most commonly cited barriers to take up is a view that ENDS may cause harmful health effects. This was cited by 32% of people (smokers and non-smokers) who had not tried (non-trialists) or did not intend to use (non-intenders) of these products.

Amongst smokers and non-smokers, the reported barriers to adoption of the use of ENDS are quite different. As illustrated in Figure 4, the most common barriers to use, as reported by smokers who do not intend to use ENDS, relate to the experience of using the product itself – particularly in comparison to traditional cigarettes.

By far the most significant barrier for non-smokers, reported by almost half of those surveyed, is concern regarding the potential harmful effects on health. This was also a significant consideration for smokers, a third of whom cited this as a barrier to their use of ENDS.

Figure 4: Barriers to adoption (percentage of non-trialists/non-intenders*), 2016



Source: Kantar, EY analysis

* Note that for the purposes of the above analysis the 'non-Smoker' categories includes ex-Smokers as well as those who have never smoked tobacco products. The figures refers to the weighted average across seven core countries surveyed, three 'restricted-use' markets, the US and Japan.

People's views regarding ENDS and health, particularly in comparison to combustible tobacco products, are evidently a key driver for their use. As a consequence, the extent to which public health bodies and governments are able to clarify and advise on the relative health risks of ENDS vs. tobacco is likely to be highly influential on the growth of ENDS usage.

For example, in April 2016 a report released by the Royal College of Physicians found that the risk to health arising from long-term vapour inhalation from ENDS is unlikely to exceed 5% of the harm from smoking tobacco.⁶ In the two weeks following its release, sales of ENDS in the UK increased by approximately 13%.⁷

⁶ See Royal College of Physicians, Nicotine without smoke: Tobacco harm reduction, 2016

⁷ AC Nielsen market information showed weekly sales increased from approximately £2.86m to £3.22m

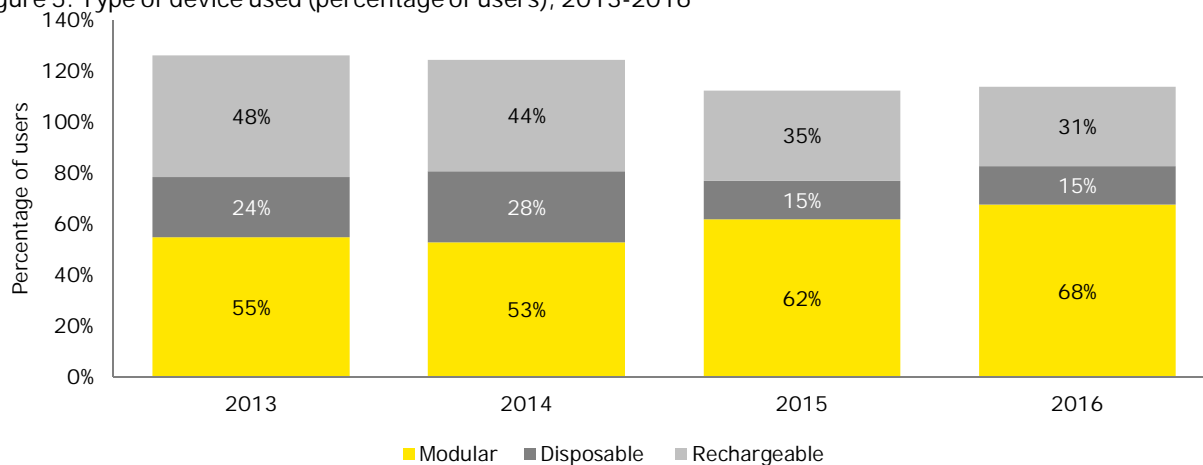
04 Devices and purchase channels

The continued growth of the category has given rise to a diverse range of products, made available to consumers through many retail outlets. This section of the report looks at the range of options available to consumers and recent trends in the popularity of the category.

Modulars are the device of choice for two-thirds of consumers

Modulars, which require the separate purchase of e-liquids, are increasingly the preferred choice of device amongst consumers. In 2016, more than two-thirds (68%) of consumers opted for modular devices in the seven core countries surveyed, up from 55% in 2013. Interestingly, a number of consumers continue to use more than one device type; e.g. the sum of modular, disposable and rechargeable device usage equalled 114% in 2016, up from 112% in 2015.

Figure 5: Type of device used (percentage of users), 2013-2016*

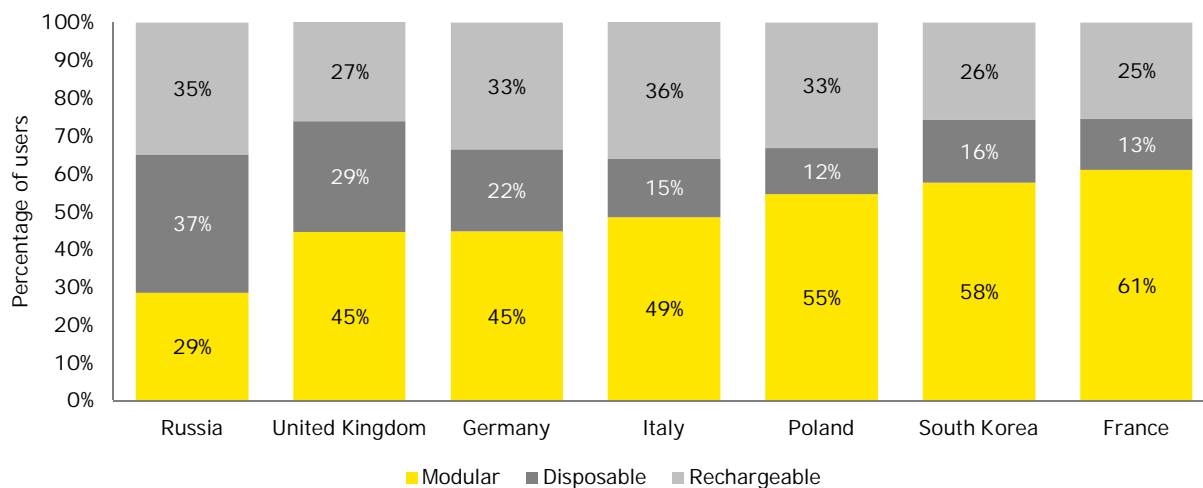


Source: Kantar, EY analysis

* Above analysis refers to the weighted average across seven core countries. Figures do not sum to 100 since some users may use more than one type of e-cigarette; 2014-15 percentages vary slightly to prior report due to the inclusion of South Korea, which was omitted previously due to lack of data

The popularity of modular devices is also reflected in the devices that consumers first use. In six of the seven core markets, modular devices are the most commonly first used device, as illustrated in Figure 6. This trend is most prominent in France, South Korea and Poland, where over half of users report modular as the first device used. Russia is the exception to the popularity of modular devices, where both disposable and rechargeable devices are reported as more common first devices. These differences may in part be driven by the most common purchase channels (for example the prevalence of specialist vaping stores versus traditional retail) and the variety of devices available to consumers (in part driven by the prevalent channel).

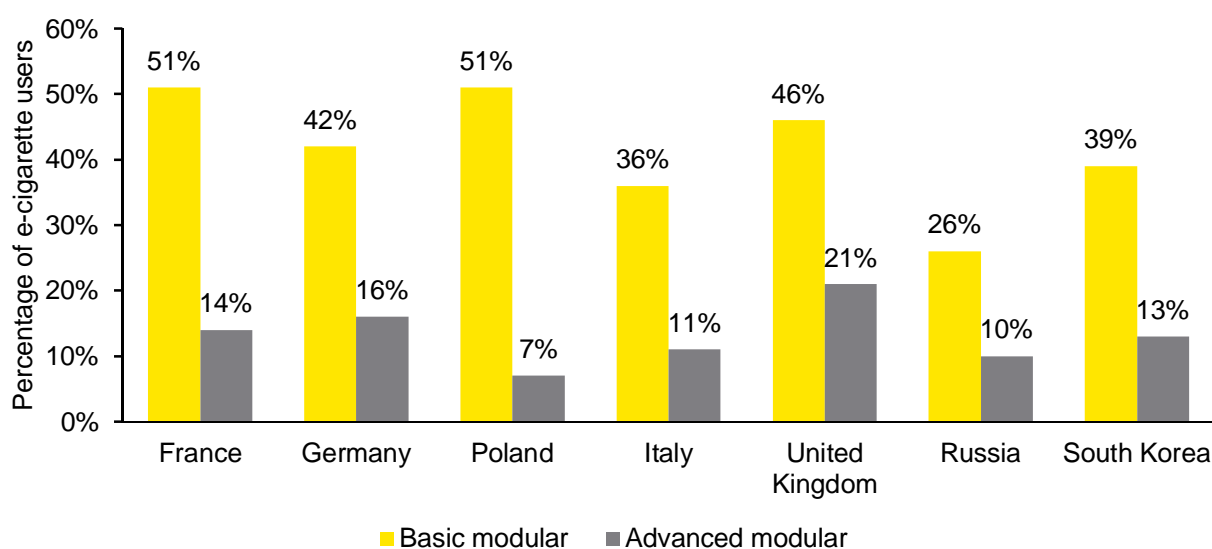
Figure 6: Type of device first used, percentage of users, 2016



Source: Kantar, EY analysis

Modular devices can be further divided into more 'advanced' devices (which are typically the most powerful devices available on the market, and allow the user to control the wattage of the device and the amount of vapour released) which accounted for 22% (of the 68%), and simpler 'basic' devices (which allow for customisation but are typically smaller and less powerful than the advanced devices), which made up the remaining 46%. Across the seven core countries, basic devices were most common in 2016, particularly in France and Poland where 51% of all consumers used a basic modular device. The weighted average of all core markets exhibited a larger percentage of advanced modular devices used compared to 2015, increasing from 8% to 13%.

Figure 7: Use of modular devices by type (percentage of users), 2016



Source: Kantar, EY analysis

Modular users prefer quality, durability and customisation over availability and convenience

The driver for choice of device varies; for modular users preferences were driven by better product performance. By contrast, users of disposables appreciated the convenience and availability of the device

Table 2: Users' reasons for switching to current format, 2016

Device	#1 reason	#2 reason	#3 reason
Advanced modular	Better quality/longer duration	Satisfying product experience	Scope for customisation
Basic modular	Better quality/longer duration	Available in different flavours/nicotine levels	Satisfying product experience
Rechargeable	Better value for money	Better quality/longer duration	Convenient usage
Disposable	Convenient usage	Compact design	Easy availability

Source: Kantar

This difference in drivers across device type reflects differences in consumer preferences around the role and purpose of ENDS. Users of more advanced modular devices value their higher quality and durability, alongside the potential to customise. This is reflected in the patterns of use of these products (see section 5 of this report), which are typically used more frequently (more than half of modular users report using at least once per day). There is therefore likely to be a greater incentive for consumers to purchase higher quality and more durable products that can be more readily tailored to personal preferences.

By contrast, in the disposable and rechargeable areas of the market, consumers appear to place greater value on convenience. The differentiator between the two categories appears to be the better quality and value for money offered by the rechargeable products, vs. the greater emphasis that disposable users place on convenience. This is reflected further in the preferred purchase channels of each device type (see Figure 9).

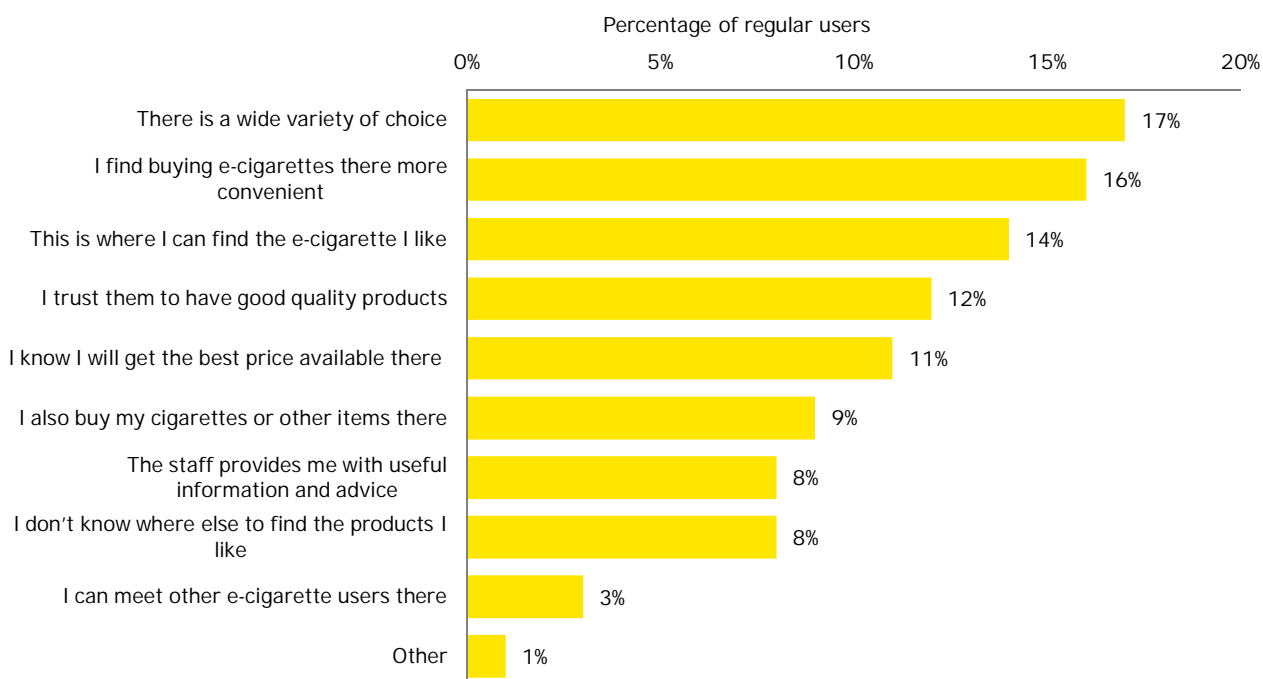
Specialist 'vape' stores are the preferred channel for modular purchases; other physical stores are preferred for disposables

The way a product is marketed, and the purchase channels made available to consumers, are likely to influence its growth trajectory; with greater awareness and ease of access to a product, consumers are more likely to engage with it. With this in mind, understanding differences in how consumers purchase their device of choice may provide some insight into the differences in the future development of the category.

Consumers identify a number of factors that influence their choice of purchase channel, as illustrated in Figure 8 below. Overall, users identified 'variety of choice' as the greatest driver (17% of users), closely followed by convenience and quality.

Consumers appear to be weighing up a range of different factors when making their choice of purchase channel. This may reflect the sharp contrast in consumer preferences across different devices, as noted previously in Table 2, which suggests that choice of device may also have a significant impact on preferred purchase channel.

Figure 8: Drivers behind purchase channel (percentage of regular users), 2016*



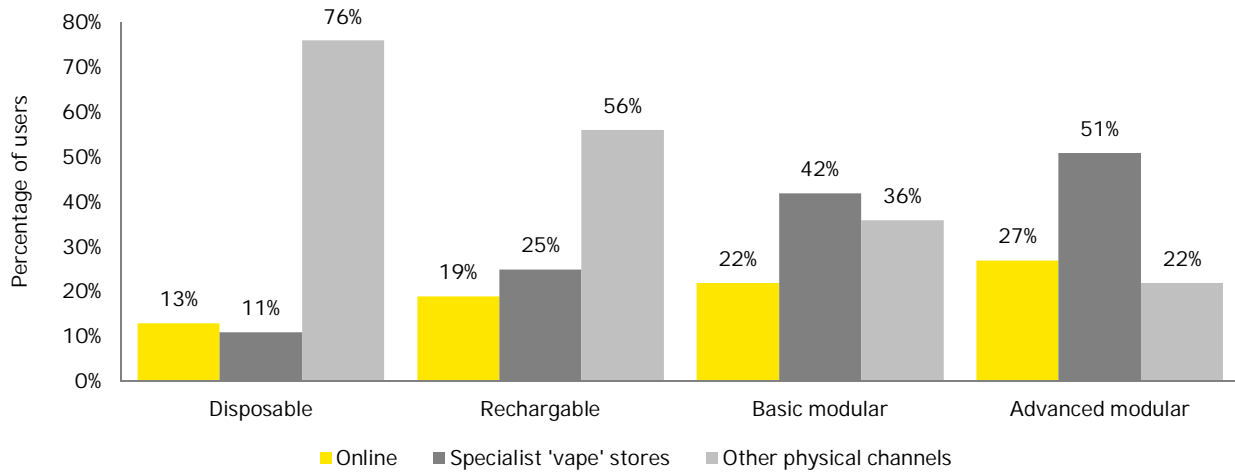
Source: Kantar, EY analysis

* Above analysis refers to the weighted average across seven core countries

In 2016, almost half of consumers surveyed purchased their modular devices at specialist vape stores, with one quarter purchasing online. The proportion of online and specialist vape store purchases were highest for the more advanced modular devices, pointing to the ability of these purchase channels to accommodate the needs of the higher quality products demanded by these consumers.

Specialist vape stores were also a popular purchase channel for re-chargeable devices, albeit to a lesser extent (25% of users). Disposables were most likely to be purchased through other physical channels, particularly supermarkets, convenience stores and tobacconists

Figure 9: Purchase channel for most often used format, 2016*



Source: Kantar, EY analysis

* Above analysis refers to the weighted average across seven core countries surveyed, three 'restricted-use' markets, the US and Japan

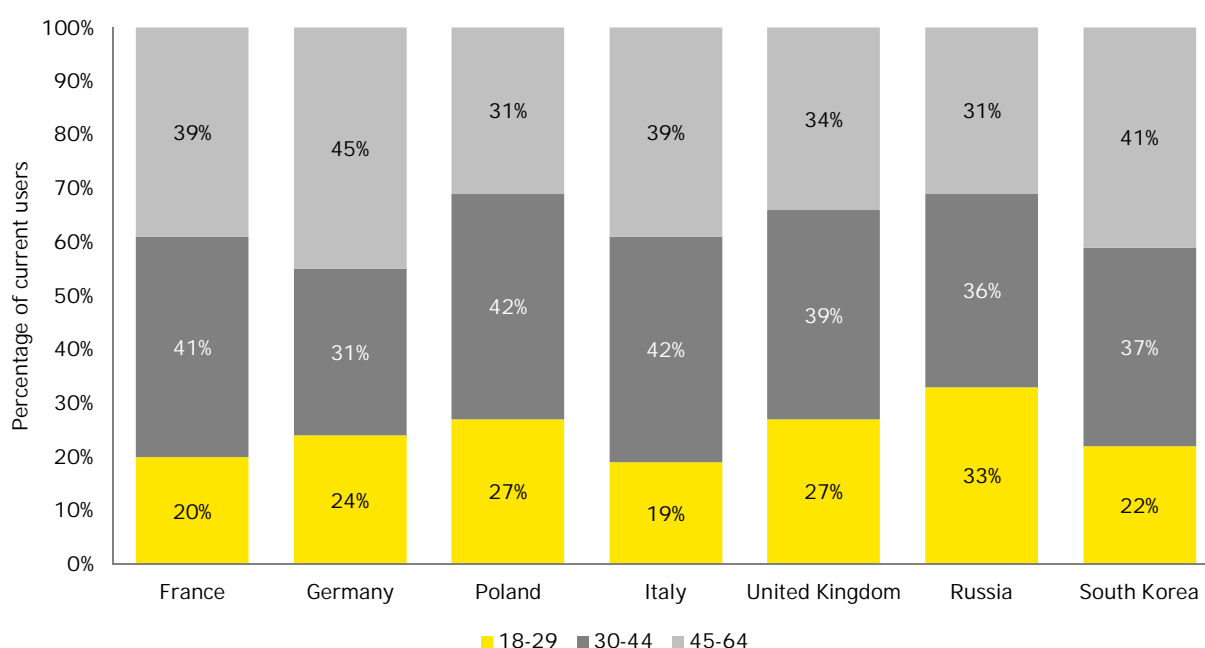
05 User demographics

To better understand the category it is useful to look at the different consumer segments and their characteristics in terms of age, gender and usage habits.

Users are typically over 30

The largest proportion of users (38%) are in the 30-44 age bracket, with another 37% between 45-64, with the overall demographic breakdown of regular usage relatively consistent across the core countries (see Figure 10). The country with the highest proportion of 18-29 years olds is Russia (33%), followed by Poland and the United Kingdom (27%).

Figure 10: Age breakdown of use (percentage of regular and occasional users), 2016



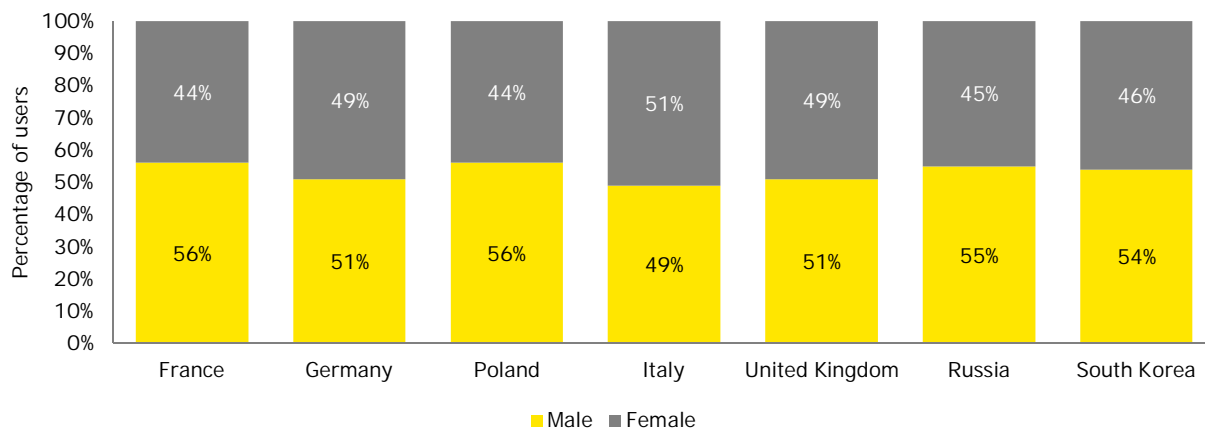
Source: Kantar, EY analysis

Consumption by gender is broadly in line with the underlying population, with 53% of consumers male and 47% female. This is similar to the trends typically seen in traditional tobacco consumption, where the prevalence of smoking among males is often greater than that of females. Italy was the only market in 2016 where females (51%) reported a higher percentage of regular and occasional users.

In South Korea, however, consumption of ENDS appears to be much more evenly balanced than that of traditional tobacco. While 54% of users of ENDS in South Korea are estimated to be male, traditional tobacco use is much more male dominated, with smoking rates among males estimated to be more than 10 times those of females.⁹

⁹ Based on WHO data on smoking prevalence, 2015.

Figure 11: Distribution of use by gender (percentage of regular and occasional users), 2016



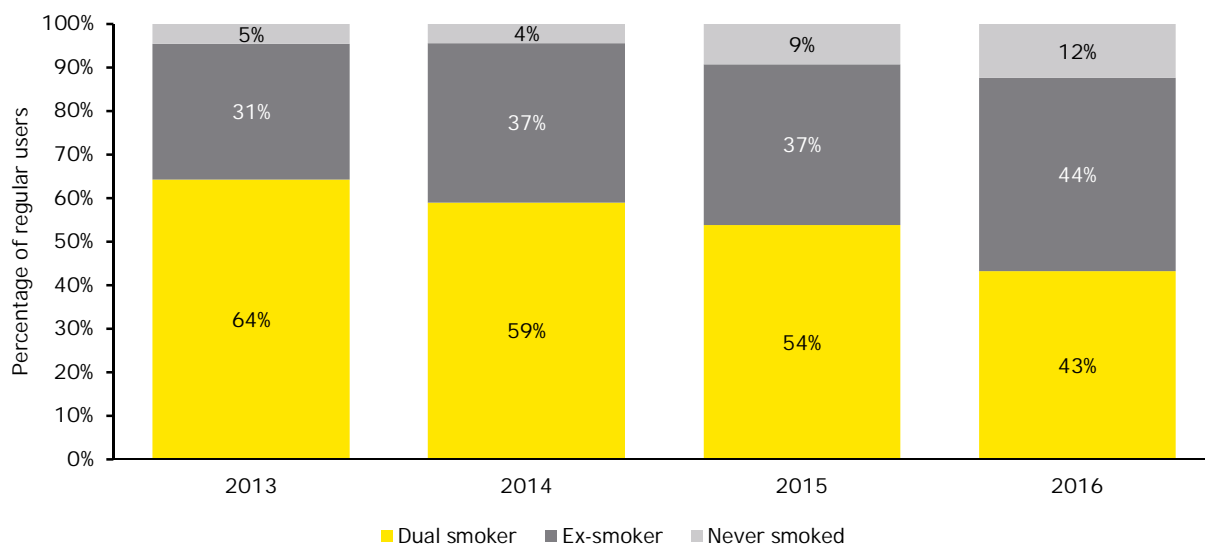
Source: Kantar, EY analysis

An increasing number of ENDS consumers are ex-smokers

Comparing use of ENDS with individuals' past or current use of combustible tobacco potentially provides an indication of the motivations behind consumers' choices. This comparison is presented in Figure 12, which separates consumers into those who also use traditional tobacco ('dual' users), those consumers who have stopped using traditional tobacco (ex-smokers), and those who have never used tobacco.

In 2016, 44% of consumers surveyed identified themselves as ex-smokers. This represents an increase from 31% in 2013 and highlights that an increasing proportion of consumers are 'sole' users, and do not use ENDS in conjunction with tobacco products. This data suggests that a large proportion of consumers see ENDS as part of a smoking cessation solution.

Figure 12: Consumers by tobacco smoking characteristics, (percentage of users)

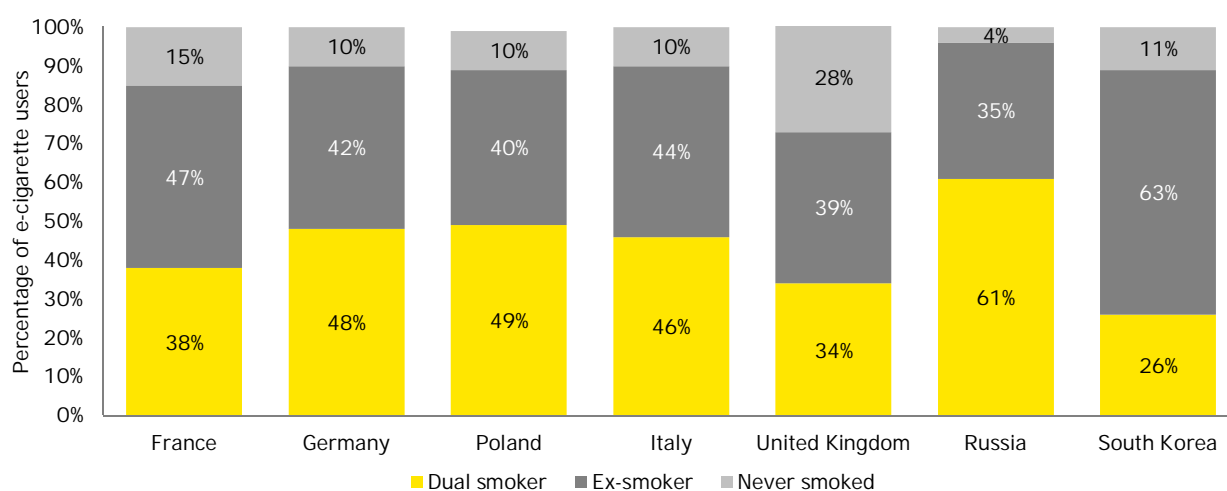


Source: Kantar, EY analysis. Note that "dual smokers" are defined as respondents who currently smoke tobacco products and are current users of ENDS. 'Ex-smokers' are ENDS users who do not currently smoke tobacco products but did previously.

There is some significant variation in usage by market. For example, South Korea had the largest proportion of consumers who identify themselves as ex-smokers (63%), with the next highest being France (47%), while in Russia the figure is 35%. Dual use is most common in Russia, with 61% of users, followed by Poland (49%) and Germany (48%).

The proportion of regular users who have never smoked remains relatively low, with France (15%) and the UK (28%) standing out as having the highest proportions across the core markets.

Figure 13: Consumers by tobacco smoking characteristics by country, 2016¹⁰



Source: Kantar, EY analysis

¹⁰The data for this chart is derived from relatively small populations of users in each market (between 300-500) and therefore care must be taken when extrapolating the results to the general population (the survey approach is explained in more detail in the Appendix A). For example, the 28% 'never smoked' result for the UK in 2016 appears to be an outlier. Further, the UK figure should be seen in the context of provisional data issued by the ONS, due to be updated in January 2016 (based on its Opinions and Lifestyle survey of 6000 individuals) which suggested that just 3% of current e-cigarette users have never smoked.

<http://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/healthandlifeexpectancies/bulletins/adultsmokinghabitsingreatbritain/2014#e-cigarette-data-2015-provisional-data>.

06 Patterns of use

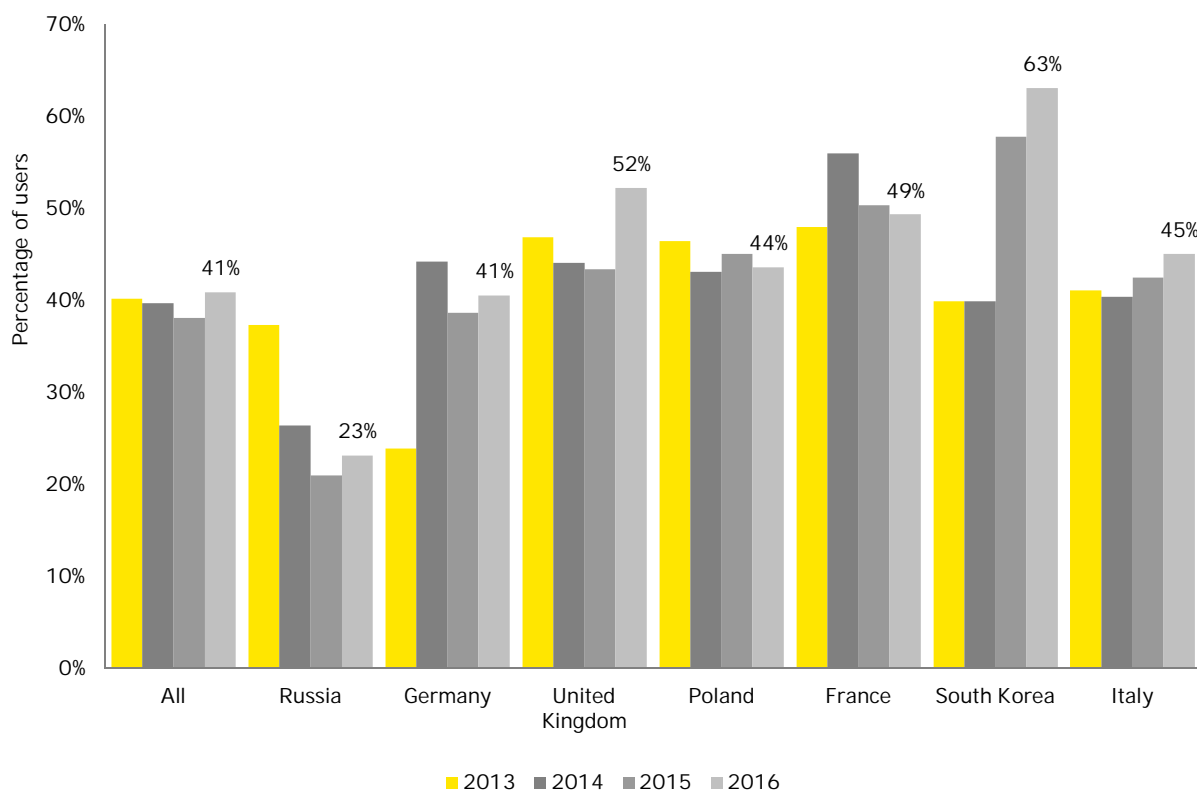
A diverse range of products, flavours and nicotine strengths provides many options for consumers. This section of the report explores how product variety and consumer preferences have resulted in different usage patterns.

Regular use is rising

Usage can be broadly segmented into 'regular' and 'occasional'. This provides a means of understanding how ENDS consumers view their patterns of use and their relationship with ENDS products.

Both across countries and over time, there is a degree of variation in the proportion of consumers who view their use as 'regular'. As shown in Figure 14 in 2016, 41% of consumers across the core countries viewed their use as regular (as opposed to occasional) reversing the decrease during 2015. Notably, South Korea and the United Kingdom were the only countries surveyed where more than half of consumers viewed their use as regular.

Figure 14: Self-reported regular users, (percentage of users), 2013-2016

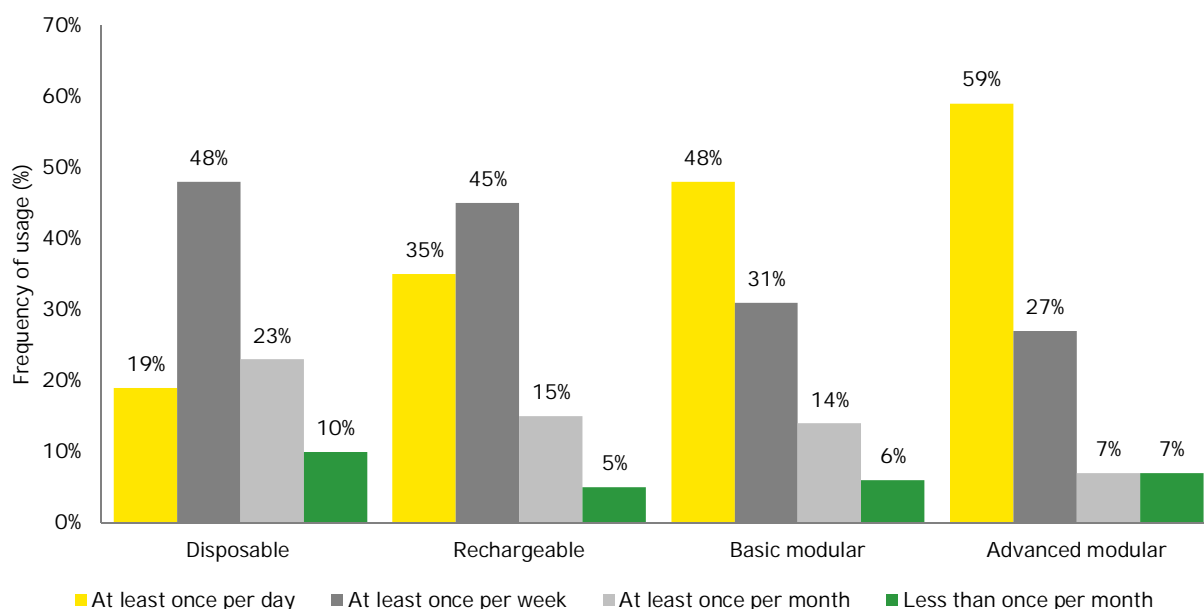


Source: Kantar, EY analysis

More frequent users typically possess more complex devices

Across the countries studied, there is a clear pattern of users with more complex devices using their devices more frequently. This is illustrated in Figure 15 below, which shows that 59% of users who opt for advanced modular devices, use their device at least once each day, compared to 48% of basic modular users, 35% of rechargeable users, and 19% of disposable users. This differential could reflect a more satisfactory user experience from a large modular device, or a device journey, in which users migrate from simpler disposable and rechargeable devices towards modular devices as they become more experienced with the category.

Figure 15: Frequency of usage by device, 2016*



Source: Kantar, EY analysis

* Above analysis refers to the weighted average across seven core countries surveyed, three 'restricted-use' markets, the US and Japan

Suppliers of 'e-liquids' provide a range of options for the levels of nicotine they contain. These nicotine strengths are generally expressed in terms of the amount of nicotine (in milligrams, mg) contained in every 1ml of e-liquid.

The strengths currently consumed across the seven countries surveyed are illustrated in Table 3 and Figures 16 and 17 below. In 2016, the most commonly used strengths were between 1-6 mg (43%), followed by 7-15 mg (32%).

It is notable that 14% of consumers used nicotine-free products most often. Comparing between core countries, Italy, Germany and South Korea had the highest use of nicotine-free e-liquids, reported by 16% of users. The United Kingdom had the lowest use of nicotine-free e-liquids, at 7% of users.

Table 3: Nicotine strength (mg) of most often used e-liquids (percentage of users), 2016

	No Nicotine	1-6 mg	7-15 mg	More than 16 mg
All*	14%	43%	32%	12%
United Kingdom	7%	43%	31%	19%
Poland	8%	35%	40%	17%
France	14%	39%	36%	12%
Russia	15%	51%	26%	8%
South Korea	16%	56%	23%	6%
Italy	16%	38%	33%	14%
Germany	16%	36%	39%	8%

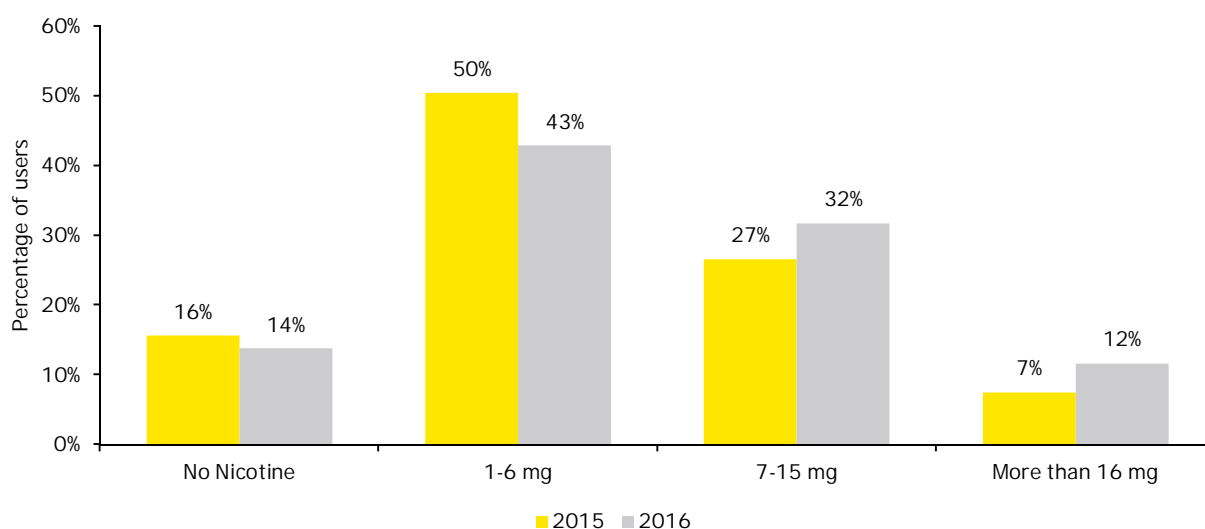
■ = most common nicotine strength

Source: Kantar, EY analysis

* All refers to the weighted average across seven core countries surveyed. Data may not sum to 100% due to rounding

Across the core markets, as illustrated in Figure 16 below, there was an increase in the proportion of consumers preferring the relatively higher strength e-liquids, compared to the previous year. Both the proportions of users using no-nicotine or 1-6mg e-liquids fell, while the proportion using 7-15mg and 16mg+ e-liquids increased in 2016, relative to 2015.

Figure 16: Nicotine strength (mg) of most often used e-liquids (percentage of users across all countries), 2015-2016*



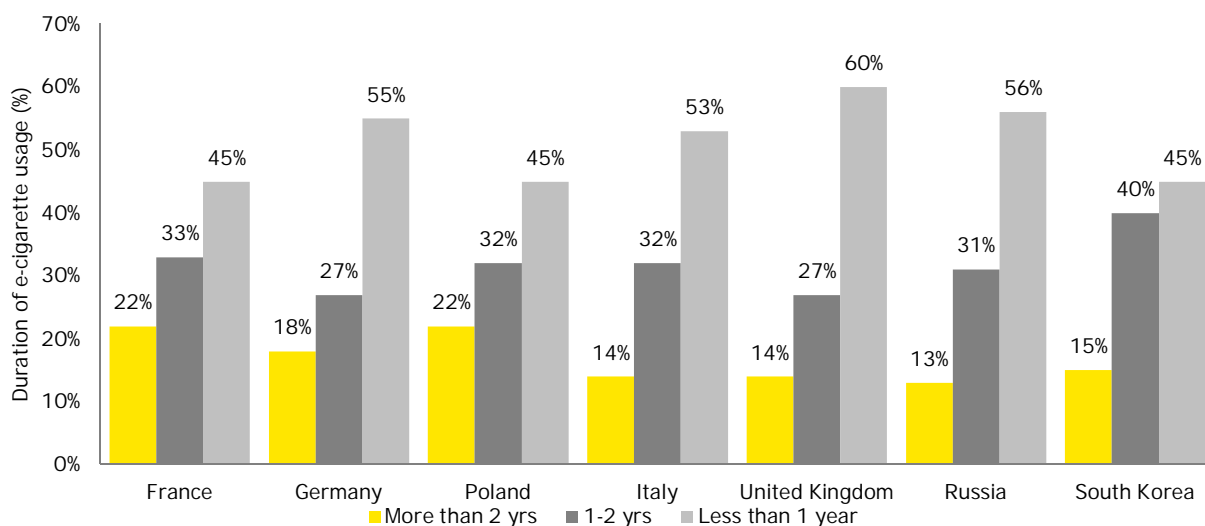
Source: Kantar, EY analysis

* All refers to the weighted average across seven core countries. Data may not sum to 100% due to rounding. The nicotine strength category ranges in the survey were changed in 2015, and hence data prior to that date has not been presented.

The majority of consumers are still relatively new to the category

The majority (83%) of consumers have been using their devices for less than two years. The proportion of consumers who have been using the devices for more than two years was highest in France (22%) and lowest in Russia (13%), potentially reflecting the relative maturity of the category in each respective market.

Figure 17: Duration of usage, 2016

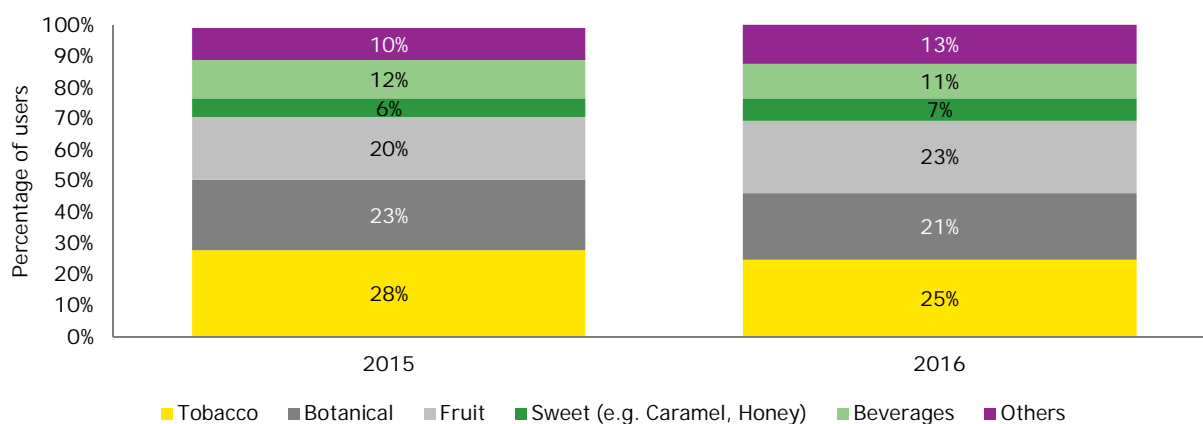


Source: Kantar, EY analysis

Consumer demand is driving innovation in the variety of flavours

In addition to the different types of device and nicotine strengths, an extensive range of flavours are evolving in response to consumer demand. The overall popularity of specific flavours remained broadly consistent in 2016 compared with 2015, however there was evidence of a further reduction in the use of tobacco flavours, with the use of fruit flavours increasing.

Figure 18: Most often used e-liquid flavour (percentage of users), 2015-16*

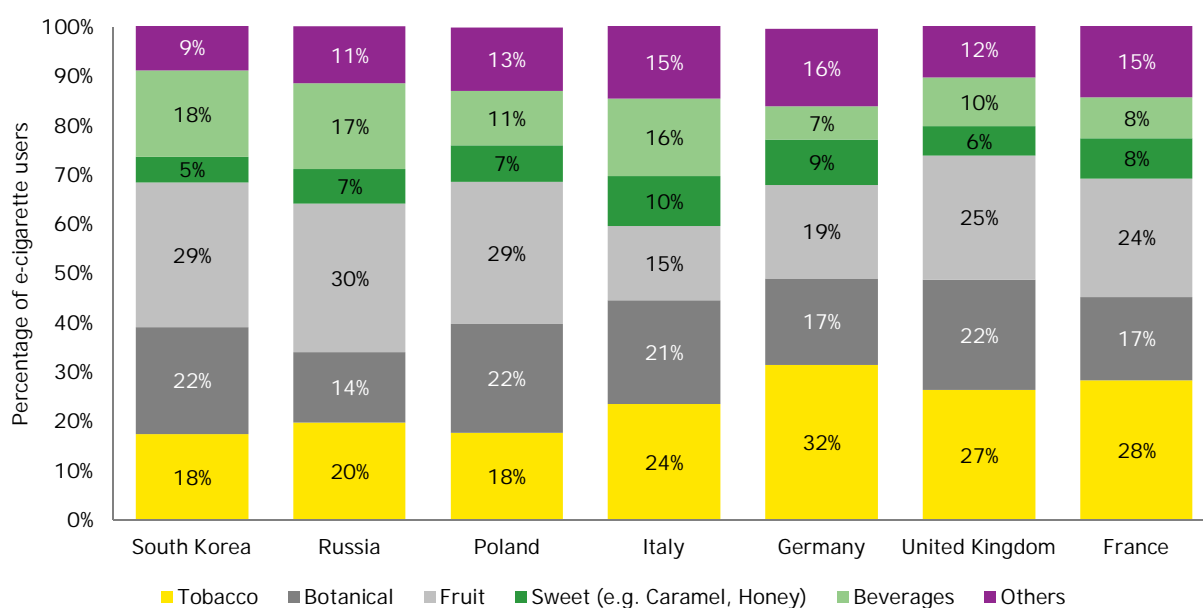


Source: Kantar, EY analysis

* Above analysis refers to the weighted average across seven core countries surveyed. Data may not sum to 100% due to rounding. The data collated prior to 2015 has not been presented as the range of flavours in the survey was expanded from 2015, making the results difficult to compare to earlier years.

The range of flavours available has allowed the market to develop notable differences. As illustrated in Figure 18, tobacco flavoured e-liquids were the most popular category in 2016, as reported by 25% of users across all core markets. This was particularly evident in Germany (32%), France (28%) and the UK (27%). However, tobacco flavours face clear competition from other flavours available on the market. Fruit-flavoured products were most popular in South Korea, Russia and Poland, accounting for approximately one-third of all e-liquids flavours consumed.

Figure 19: Most often used e-liquid flavour (percentage of users), 2016



Source: Kantar, EY analysis

07 'Restricted-use' markets

In this section we attempt to gain some insight into the current consumer dynamics of ENDS use (and non-nicotine containing vaping products) in three countries where there are restrictions on the sale of nicotine containing e-liquids.

The markets

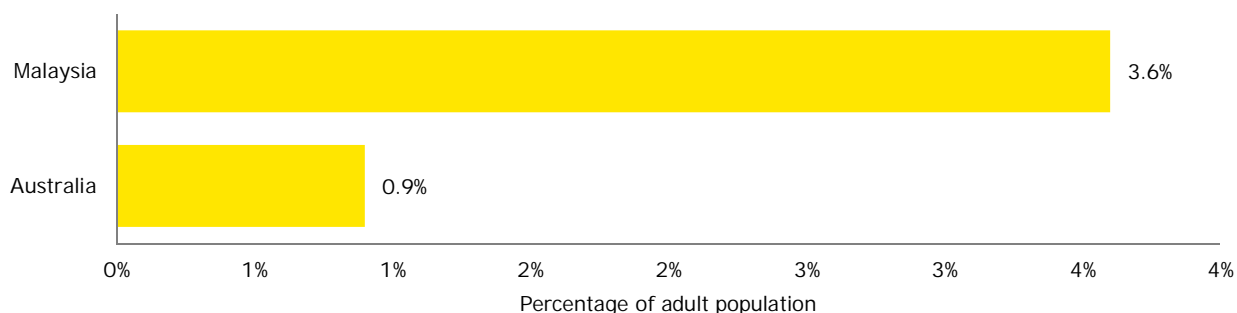
- ▶ In Australia, importing ENDS that contain nicotine (including by ordering them online), without a medical prescription, is against the law in every state and territory, and so is the possession and use of those products¹¹
- ▶ In Canada, whilst many people are using ENDS, the safety and quality of these products is unregulated. Nicotine containing liquids are not approved for general sale in Canada, as set out by a notice issued by Health Canada in 2009¹²
- ▶ In Malaysia, ENDS are considered medical devices and nicotine containing cartridges are considered medicinal products. They are available for purchase through a prescription-like system, through pharmacies which are able to obtain the required license allowing the sale of these products¹³

Please see Appendix B for further detail on the above restricted-use markets.

Malaysia has the highest usage amongst restricted markets

Across the restricted markets, Malaysia is estimated to have the highest incidence of usage (regular and occasional), estimated at 3.6% of the adult population. This is followed by Australia at 0.9%. While comprehensive usage data is not yet available for Canada, indications from other survey evidence suggest that the usage is likely to be lower than that of Australia.

Figure 20: Regular and occasional users as a percentage of adults, 2016



Source: Kantar

Modular devices are the most popular choice of device

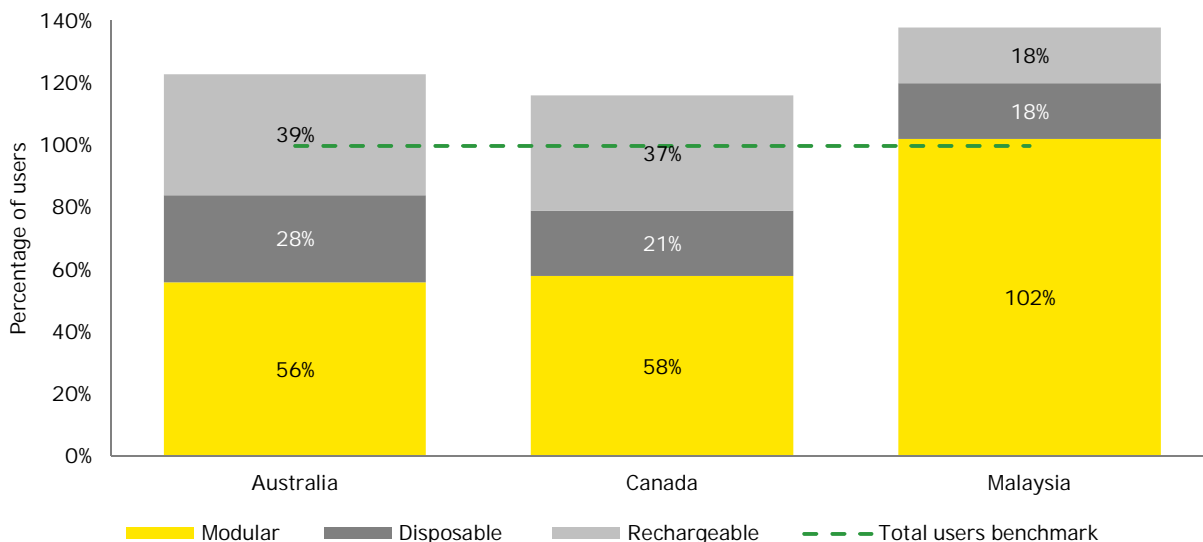
In a similar manner to core markets, modular devices are the most common device in all restricted markets. Use of modular devices was highest in Malaysia, where total modular use was equivalent to more than 100% of users, supported by the use of different modular devices in conjunction with other device types (within modular users, 33% use basic modulars, while 69% use advanced modulars). The spread across products was relatively similar in Australia and Canada, with roughly half of surveyed users choosing modular devices.

¹¹ 'Legal status of electronic cigarettes in Australia', Quit Victoria, June 2016

¹² 'Health Canada advises Canadians not to use electronic cigarettes', Health Canada, March 2009

¹³ 'E-Cigarette laws worldwide', E-cigarette politics

Figure 21: Use of device by type (percentage of users), 2016*



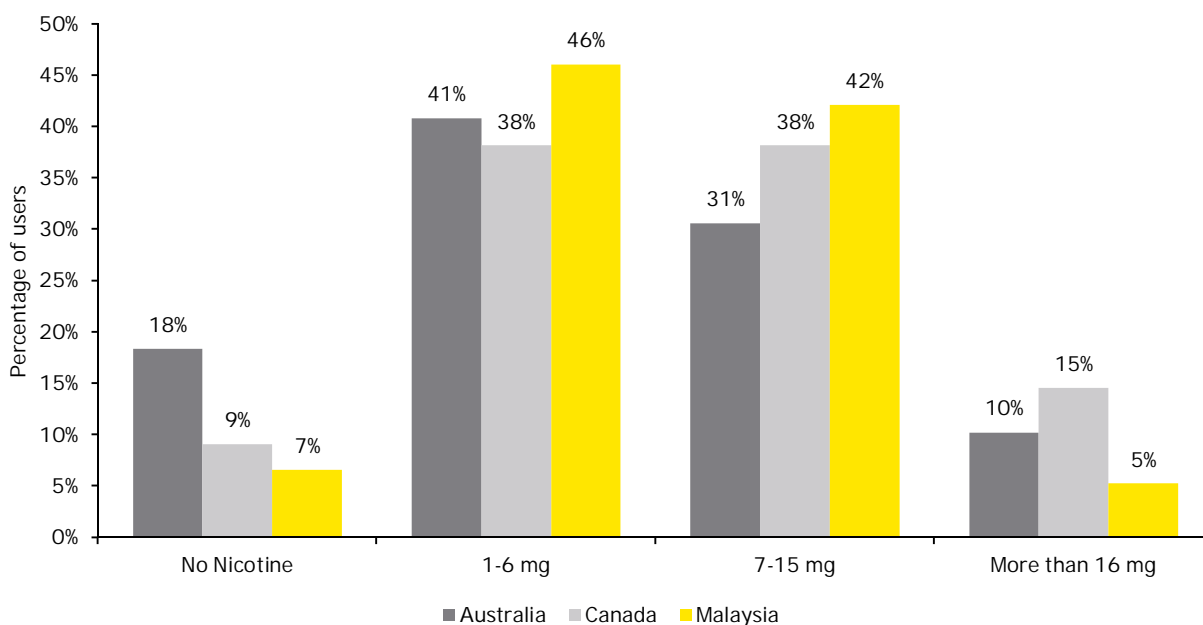
Source: Kantar, EY analysis

* Figures do not sum to 100 since some users may use more than one type of device

Highest use of no-nicotine vaping products reported in Australia

Across the restricted-use markets, the most popular nicotine level is typically between 1-6 mg, again this is consistent with the core markets. In Australia, 18% opted for non-nicotine e-liquids, while in Canada and Malaysia no-nicotine usage was below 10%.

Figure 22: Nicotine strength (mg) of most often used e-liquid (percentage of users), 2016



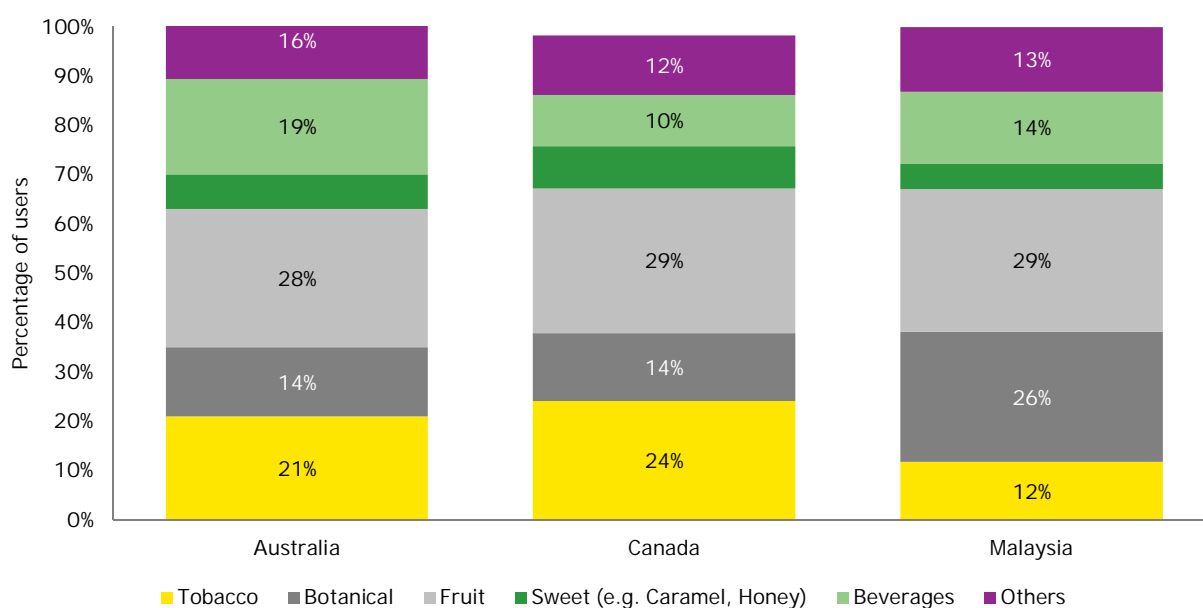
Source: Kantar, EY analysis

Canada demonstrates the strongest preference for tobacco flavours within restricted-use markets

In all three restricted-use markets fruit flavoured e-liquids were the most often used, with tobacco flavours being next most common in Australia and Canada.

In Malaysia, in contrast, only a small proportion of users opted for Tobacco flavours (12%), behind botanical and beverage flavours.

Figure 23: Most often used e-cigarette flavour (percentage of users), 2016



Source: Kantar, EY analysis

Appendix A: Kantar survey methodology

Overview of the survey

The survey was conducted in 2013, 2014, 2015 and 2016 across a number of countries, of which the results for seven countries are presented within this report. The survey used an online panel with the objective of understanding the ENDS product category in terms of Penetration, Usage (in terms of Formats, Flavours, Nicotine levels), Purchase Behaviour and Consumer Attitude. The field work for the 2016 survey was conducted between 09 May and 22 June 2016.

Methodology

The adopted approach was CAWI (Computer Aided Web Interviewing) using online panels in each country.

Coverage and Target Group

Adults in the age group of 18-64 years were contacted in seven core countries: UK, France, Germany, Italy, Poland, Russia and South Korea, and three 'restricted-use' countries: Australia, Canada and Malaysia. The minimum age was adapted as per legal restrictions in each country. The data was weighted on Age, Gender and smoker/non-smoker status. Russia also had additional weights for population strata.

Sample Sizes

Around 2,000 adults were randomly contacted in each market to gauge their interaction with vaping products.

The sample has been designed to represent the adult 18-64 population in each country by the use of quotas on age, gender and region, and attempts have been made to minimise bias through weighting of the resulting sample to known population characteristics. However, it should be noted that the sample of respondents is drawn from 'opt-in' online panels. The key characteristic of 'opt-in panels' is that the participant pool is not constructed with random selection. Rather, the group of participants is comprised of self-selected individuals who choose to sign up with a panel, participating at will. Because the sample is based on those who initially self-selected for participation (in the panel) rather than a probability sample, all estimates in this report that pertain to the underlying population within a country should be treated with caution.

In order to enable further analysis among users that we found within the above group, purposive sampling was also carried out to boost the user numbers in some countries. These user boosters were applied in UK, Germany, Poland, Russia and South Korea in 2014, and to South Korea in 2015.

Total user sample sizes within each market were (in 2016):

UK	France	Germany	Poland	Italy	Russia	South Korea	Australia	Canada	Malaysia
340	380	301	360	481	394	340	300	302	177

Research Agencies

Kantar was responsible for overall project coordination, setup, analysis and reporting.

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To the fullest extent permitted by law Kantar, its members, employees and agents do not accept liability for any direct, indirect or consequential losses arising from the findings and analysis as presented in the report.

Appendix B: Restricted-use markets

In this report, in addition to our core market analysis, we referred to a number of 'restricted-use' markets, where each individual country has certain restrictions on the sale of vaping products which contain nicotine:

- ▶ In Australia, without a medical prescription, importing vaping products or refill vials that contain nicotine (including by ordering them online) is against the law in every state and territory, and so is the possession and use of those products. Australia has this de facto ban on ENDS due to a historical classification of nicotine as a dangerous poison. Sale, possession and use of nicotine without approval in a vaporiser is an offence, and the sale of non-nicotine vaping products is illegal in some states.¹⁴ Despite the current legal barriers, the use of vaping products by Australian smokers has increased in recent years, supported in part by the complexity of the legal system between states.¹⁵
- ▶ In Canada, whilst many people are using vaping products, the safety and quality of these products is unregulated. Vaping products containing nicotine are not approved for general sale in Canada, as set out by a notice issued by Health Canada in 2009.¹⁶ ENDS, with or without a health claim, require market authorisation from Health Canada as new drugs before they can be imported, marketed or sold. However, since this regulation does not apply to non-nicotine vaping products, their use has increased, leading to several provinces and municipalities beginning to develop policies for the sale and marketing of non-nicotine-containing vaping products;¹⁷ and
- ▶ In Malaysia, vaping products without nicotine are considered medical devices and nicotine cartridges are considered medicinal products. They are available for purchase through a prescription-like system, through pharmacies which are able to obtain the required licence allowing the sale of these products.¹⁸ All sales and use of electronic cigarettes containing nicotine are subjected by law to the rules and regulations under the Poison Act 1952 and Food Act 1983 (Control of Tobacco Product Regulations 2004), prohibiting all distribution and usage.¹⁹ The government's policy towards vaping products is forecast to lead to widespread reduction in their use, as individual states look to limit their sale through a combination of price increases and restrictions on the number of outlets able to sell such products.²⁰

¹⁴ 'Legal status of electronic cigarettes in Australia', Quit Victoria, June 2016

¹⁵ 'Electronic nicotine delivery systems', International Tobacco Control four country study, 2013

¹⁶ 'Health Canada advises Canadians not to use electronic cigarettes', Health Canada, March 2009

¹⁷ 'Tobacco use in Canada: E-cigarettes in Canada', Centre for Population Health Impact, 2015

¹⁸ 'E-Cigarette laws worldwide', www.ecigarettepolitics.com

¹⁹ Ministry of Health Malaysia, November 2015

²⁰ 'New laws could spell end of Malaysia as 'vaping wonderland'', Southeast Asia Globe, July 2016

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