

Perceptions and Discussion of IQOS on Twitter within the United States versus the United Kingdom

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Abstract

IQOS is a popular heated tobacco device used all around the world. It gained popularity with multiple social media discussions on the product in recent years. This study examines the public views of the product in two different countries, one where the product has little to no regulations (United Kingdom) and one where it is currently banned from being imported (United States). Tweets from Twitter were collected using crawled data from March 9, 202 – June 10, 2022. Sentiment analysis was used to analyze each post individually and sorted into small categories of Positive, Neutral, and Negative sentiment. From the sorted data there were a handful of peaks in both countries, in the United States, there was a peak on May 3, 2021, due to a court ruling on a patent infringement case for the IQOS product. Our results imply that there are more positive perceptions of the IQOS product in the United Kingdom. At the same time, in the United States, there are still a lot of neutral feelings toward the product as consumers try to gather more information.

Introduction

Philip Morris International introduced its IQOS product to the United States in 2014 [1] IQOS is a heated tobacco product that has gained lots of popularity around the world in recent years. IQOS was marketed as a non-combustible product that works by heating tobacco sticks mixed with glycerin [2], creating less harmful smoke than traditional smoking methods. IQOS was authorized by the FDA on April 30, 2019, as a modified risk tobacco product, but was later banned in the United States on Sept 29, 2021, due to a patent infringement [3]. In contrast, the United Kingdom has no policies restricting the use of any type of Heated tobacco products [4].

IQOS, which stands for “I Quit Ordinary Smoking”, was first launched in Japan and Italy and is now available in more than 40 countries [5]. Although IQOS tries to get users to quit traditional tobacco products there are still significant health risks associated with the product. While IQOS emits significantly lower concentrations of harmful chemicals such as nitrosamines [6], it was found to release eight volatile organic compounds and 13 polycyclic aromatic hydrocarbons (PAHs). Additionally, acenaphthene was found at levels 295% of that released from traditional smoking, and

studies show exposure to IQOS smoke is as harmful as cigarette and electronic cigarette smoke for human lung cells [5]. Other research shows that IQOS also impairs myocardial systolic and diastolic functions in the same way as regular cigarettes [7]. This information makes it clear that while IQOS may be less harmful than tobacco smoking on paper, it is still able to negatively affect your health and is similarly addictive.

The digital age started in the mid-2000s, creating the technology that later produced social media. Social media is a way to discuss and share life events or local/world news. Twitter is a social media platform that allows users to share text and images with a 280-character limit, with millions tweeting daily about their thoughts and opinions on current events. Previous research has shown that most discussions of IQOS on Twitter were in relation to online advertisements for IQOS or anecdotes related to IQOS use [8]. Additionally, for the United States specifically, tweets became more favorable after the FDA enforcement policy on flavored e-cigarettes was announced [9]. Given this information, we are interested in seeing if the import ban of IQOS in the United States significantly impacted conversations about the product on Twitter. For our purposes, we strictly limited the posts to those about the IQOS product and heated tobacco. Using Twitter data, we aim to compare the perceptions and discussion of IQOS on Twitter between users in the United States and the United Kingdom. Our study contributes to the growing knowledge of differences in IQOS perceptions and discussions in countries with different regulatory policies.

Materials and methods

Data Collection/Data Sources

The Twitter data set was crawled through the dates of March 10, 2021, to June 10, 2022, resulting in a total of 1,915,260 tweets. We used induction to narrow down our dataset to 16,646 relevant tweets that mentioned IQOS or heated tobacco products by using the keywords 'iqos', 'heatnotburn', 'HeatNotBurn', 'heatedtobacco', 'iqo', 'heatstick', 'iqos3', 'iqos3duo', 'iqos24plus', 'heetstick', and 'heatsticks. Additionally, we applied a geolocation program that listed all the major cities, states, and regions that filtered out any tweets from outside the United States or the United Kingdom.

Sentiment Analysis

Using sentiment analysis, we were able to create a code book to sort all the tweets into categories of promotional, positive, neutral, or negative sentiment. With these categories, the tweets were further sorted into subcategories based on similarities in the subject matter of the sample tweets. We also added topics related to the research, for example, quitting smoking and switching to a heated tobacco product or vice versa.

Categorization of Tweets

Using 352 randomly selected tweets from the overall data set (176 from both the United States and the United Kingdom), two coders manually categorized the tweets based on 67 agreed-upon sentiment topics. After calculating the kappa and receiving a value of 68 .46, the two coders reviewed all 352 to resolve any differences in our understanding of 69 in the codebook. With those tweets already coded, an additional sample of 200 tweets to 70 recalculate the kappa. After obtaining a kappa of 0.73, indicating substantial agreement 71 between coders, the remaining 2,971 tweets were split and hand-coded independently.

Sentiment	Topics
Positive	Financial aspects of IQOS Quitting smoking/vaping and switching to IQOS Supporting the FDA approval of IQOS Positive testimony Other positive
Neutral	Information about IQOS Information about the FDA policy Import ban of IQOS Neutral testimony Other neutral
Negative	Health caused by IQOS Switching from IQOS to another product Financial cost of IQOS Against the FDA approval of IQOS Combustion in relation to IQOS Lack of education/information about IQOS Negative testimony Other negative

Table 1. Displays the respective topics to the Positive, Neutral and Negative sentiments.

Results

Trend Analysis

Figure 2 shows the longitudinal trend of tweets made about IQOS in both the United States and the United Kingdom. Both countries show a peak the week of September 29, 2021, which is when the import ban for IQOS was announced, with the peak for the United States being understandably larger. There is a peak for the US only during the week of May 3, 2021, due to a ruling by the judge on the patent infringement case. The second peak occurs around December 1, 2021, which is the day after Altria suspended the sale of IQOS in the United States. While this peak occurs for both countries, the number of tweets for the US is much higher.

Public perceptions of IQOS on Twitter

The US showed a higher percentage of tweets overall independent of sentiment and both the United States and the United Kingdom both have significantly more neutral tweets than those of other categories as shown in figure 3. To compare the proportions for both countries, a two-tailed two-sample z-test was conducted for each sentiment, with all three categories yielding a p-value below .05, indicating the differences in the two proportions are significant.

Topics of IQOS discussed on Twitter

From figure 3 a clear peak on September 30, 2021, is shown, which is the day after the IQOS import ban in the United States was announced. From this peak we produced figure 4, highlighting that 75% of all tweets that day were in relation to the FDA or the import ban. Figure 5 displays the number of tweets among categories related to the FDA, showing that the US had more discussion overall, with a significant increase in tweets about FDA policy. The top 3 topics in the United States were “Import ban for

IQOS” at 28.65% of tweets, “Other neutral” at 27.00%, and “Information about IQOS” at 12.33%. For the United Kingdom, they were “Promotion of IQOS” at 43.23%, “Other neutral” at 22.61%, and “Information about IQOS” at 8.09%.

Figures and Tables

Fig 1. Data processing procedure.

Discussion

By studying tweets related to IQOS in both the United States and the United Kingdom, we saw that the 2021 FDA ban in the U.S. increased the number of negative tweets in the country, while most tweets for both countries were neutral. We observed three peaks in tweets during 2021 that all coincide with updates in the court case surrounding the ban. For the United States, the top tweet categories are “Import ban for IQOS” at 28.65% of tweets, “Other neutral” at 27.00%, and “Information about IQOS” at 12.33%. For the United Kingdom, they were “Promotion of IQOS” at 43.23 “Other neutral” at 22.61%, and “Information about IQOS” at 8.09%. We believe that the prevalence of neutral tweets could be explained by the short character limit on Twitter. Additionally, the increase in negative tweets was discussing the partial combustion verdict that is inconsistent with IQOS advertising.

Previous findings studying tweets from 2019 to 2020 [10] showed an increase in positive IQOS-related tweets related to IQOS as a harm reduction device, as well as a decrease in negative tweets following an announcement surrounding the FDA ban on flavored tobacco. Together our results suggest that the perception of IQOS on Twitter has shifted significantly in the United States following the 2021 import ban, specifically shifting the majority of tweets from positive to neutral and negative. Additionally, other studies [8] covering tweets from 2020 in the U.S. found the majority to be marketing or personal testimonies. While we did not observe many testimonial tweets, we believe that the decrease in promotional tweets can also be explained by the U.S. import ban.

Limitations

First, we exclusively collected data from Twitter, which only analyzed English-language tweets from public accounts. Next, we only looked at tweets that had valid geolocation for our countries of interest, limiting our data set. Additionally, we only looked at tweets from March 10, 2021, to June 10, 2022, so the perception could not be accurate throughout time. Lastly, we analyzed all text in a tweet but did not analyze web links that could possibly change how a tweet is categorized. This also leaves out any tweets that are part of a thread or replies as tweets were categorized individually. Collectively, this means that our results could not be an accurate representation of the U.S. population.

Fig 2. Longitudinal trends of the number of tweets related to IQOS in the US and UK sorted by week.

Fig 3. Sentiment chart for overall tweets with corresponding p values.

Fig 4. Topics discussed about IQOS on September 30, 2021.

Conclusion

Through data analysis from IQOS tweets from March 10, 2021, to June 10, 2022, we determined that most of the tweets from both countries were neutral. We believe that one of the reasons for this is due to the short nature of tweets that don't always allow the user to express much sentiment. However, there were a lot of informative tweets about the FDA policy, the patent infringement case conducted about the IQOS product, and the import ban resulting from the lawsuit. Overall, there seems to be more negative sentiment toward IQOS in the United States than in the United Kingdom. Additionally, most of the negative tweets from both countries discussed how the product is marketed as non-combustible, despite the patent case revealing that there was the least partial combustion in IQOS devices. Lastly, the United Kingdom does not have regulation on IQOS, which resulted in significantly more tweets advertising the product than in the United States.

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Sentiment	Topic	UK Tweets	UK Proportion (%)	US Tweets	US Proportion (%)
Positive	Financial aspect of IQOS	5	0.42%	5	0.22%
	Quitting smoking/vaping and switching to IQOS	20	1.65%	6	0.26%
	Supporting the FDA approval of IQOS	7	0.58%	19	0.82%
	Positive testimony	11	0.91%	4	0.17%
	Other positive	25	2.06%	61	2.64%
Neutral	Information about IQOS	98	8.09%	285	12.33%
	Information about the FDA policy	23	1.90%	215	9.30%
	Import ban of IQOS	85	7.01%	662	28.65%
	Neutral testimony	13	1.07%	28	1.21%
	Other neutral	274	22.61%	624	27.00%
Negative	Health caused by IQOS	1	0.08%	37	1.60%
	Switching from IQOS to another product	5	0.41%	4	0.17%
	Financial cost of IQOS	1	0.08%	13	0.56%
	Against the FDA approval of IQOS	6	0.50%	52	2.25%
	Combustion in relation of IQOS	21	1.73%	120	5.19%
	Lack of education/information about IQOS	6	0.50%	12	0.52%
	Negative testimony	4	0.33%	27	1.17%
	Other negative	19	1.57%	27	1.17%

Fig 5. Displays the respective topics to the Positive, Neutral and Negative sentiments.

Sentiment	Topic	Example
Positive	Financial aspect of IQOS	"... I started on a vape, not the ones with loads of smoke. It's called iqos, and the wee smoke things are a fiver for twenty, HEETS it's called. I've went from spending £130 a week on cigs to £20 on these. Feels like a real cig, plus within two weeks I'm onto the lowest strength"
	Quitting smoking/vaping and switching to IQOS	"i replaced ciggies with iqos. Feeling healthier"
	Supporting the FDA approval of IQOS	"...control need to be stopped. IQOS has the potential to save countless lives as long as you get out of the way and just let them sell it. We would get to a smoke free world much faster without tobacco control stopping any progress as if their careers depends on it."
	Positive testimony	"Ex-smokers! Look at this Iqos thing. Yes, tobacco, but it doesn't burn it, just heats it. As close to smoking as you can get. Vaping just never cut it for me so I'm going for the least bad option, and it's adorably tiny as well. Marlboro make the tiny cigs so they taste good."
Neutral	Other positive	"...has the most momentum of the group. IQOS is taking over where available, people love it."
	Information about IQOS	"Findings suggest that IQOS may be understood as a less harmful alternative to vaping and combustible cigarettes and suggest IQOS is likely to be used to avoid clean air policies or used in areas in which smoking is restricted..."
	Information about the FDA policy	"F.D.A. Permits the Sale of IQOS, a New Tobacco Device The New York Times..."
	Import ban of IQOS	"Philip Morris International lost the first round of a battle in which British American Tobacco is trying to block imports of its IQOS heated-tobacco sticks to the U.S..."
Negative	Neutral testimony	"...Hello my IQOS 3 duo is only charging on the holder on one side."
	Other neutral	"...Are you talking about iqos? Doesn't Altria have right to sell in the US through partnership?"
	Health caused by IQOS	"...Also, I've tried switching to Juul, just ended up on rolies and Juul at the same time, Iqos, worked okay but made my chest feel funny after a while, patches really made me go full space cadet, snus which again sent me weird and nicotine spray which was too harsh on my throat :"
	Switching from IQOS to another product	"...Done the vape, done the iQos now I'm just on the 12mg ecig"
Negative	Financial cost of IQOS	"The IQOS system SUCKS. I tried it. Its expensive as HELL. With the amount the IQOS is I can set up 2 or 3 people vaping for a few months. That's e-juice, coils/wire, (homemade basic ones) cotton, a mod, batteries, charger, atomizer(most likely a rta), teach, and a few tools."
	Against the FDA approval of IQOS	"I'm all for banning iQos. If I wanted to smell farts on a regular basis I'd try myself in Dutch porn. At least there would be some pleasure from it."
	Combustion in relation of IQOS	"Fact: combustion occurs in iQOS. Fact combustion reaction requires fuel, oxygen, & ignition source. All happening in #iQOS."
	Lack of education/information about IQOS	"@InsidePMI Example: "Misinformation on IQOS no burn/combustion will come back and bite you in the a**". \$HCMC"
Negative	Negative testimony	"...How is Juul, Vuze, Iqos, allowed to advertise on radio. And why does this upset me."
		"..."

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