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The social media response to the rollout of legalized cannabis retail in Ontario, Canada

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ABSTRACT

With Canada becoming the first G20 country to legalize the recreational use of cannabis, there has been increasing interest in the emergence of this new retail market. The research utilizes social media analytics to analyze the public's response to the rollout of the government-controlled cannabis retail stores: Ontario Cannabis Store (OCS). The research analyzes 17,162 tweets mentioning the OCS (@ONCannabisStore) on Twitter in the one-year period following the legalization of recreational cannabis. Using thematic analysis, 19 codes are identified and further categorized under six themes—i.e., consignment, product, retail model, policy, producers, and consumers. The research provides valuable insight into the public's perceptions of the newly legalized cannabis retail market on social media. As a practical implication of the research, key concerns and issues with the initial retail rollout are identified, which provides insight into the evolution of an illegal to legal retail market. The methods can be used by future researchers, policy makers, and emerging cannabis retailers to gather and understand cannabis consumers' opinions on social media. Furthermore, the findings can be leveraged to inform future government policies and decisions around the emergence of this new retail sector.

1. Introduction

On October 17, 2018, the Canadian government legalized the recreational use of cannabis by passing the *Cannabis Act* (Government of Canada, 2018a). This legislation provides the framework to control the production, distribution, sale, and possession of cannabis. The cannabis retail rollout occurred in two distinctive phases: (i) *Cannabis 1.0* outlined the early stages of cannabis legalization in Canada, which mainly focused on the sale and distribution of dried cannabis and cannabis oil; and, (ii) *Cannabis 2.0* which defined the period where legislation permitted the sale of edibles, topicals, vaporizers, beverages, and extracts (Deloitte, 2019). Considering that Canada is the first G20 country to nationally legalize the recreational use of cannabis, the issue has received significant media coverage in recent years (Gagnon et al., 2020; Shanahan et al., 2019).

While research has analyzed the traditional media response of cannabis legalization at the national level (Sznitman and Lewis, 2015), there is limited understanding of the cannabis-related social media discourse (van Draanen et al., 2019; Moreno et al., 2018). Daniulaityte et al. (2015) argue that active monitoring of social media is required to understand the emerging cannabis issues and to inform policy measures. Social media, specifically Twitter, has been used by various levels of the Canadian government to communicate information to and gather feedback from the public about cannabis-related policies (Yaqub et al., 2017) and to guide "regulations, for surveillance, and enforcement efforts" (Kim et al., 2018, p. 9). The availability of social media APIs and other data analytics tools afford access to, and analysis of, social media data; specifically, Twitter has a liberal data access policy, which has resulted in it being the most popular platform for academic research (Zimmer and Proferes, 2014). The vast majority of Twitter users have "public" accounts, which allows for ready access to their data, and results in Twitter being a useful platform to understand consumer issues (Zimmer and Proferes, 2014). Twitter is also an attractive platform for customer data mining (Okazaki et al., 2015; Saura and Palos-Sanches, 2019) due to the large user base (Yu and Hu, 2020; van der Tempel et al., 2016) and ability to identify direct two-way communication between various

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stakeholders (e.g., OCS and customers).

This research analyzes the public's social media response to cannabis legalization in the province of Ontario by examining tweets over the one-year period immediately following legalization: October 17, 2018 to October 17, 2019. The research analyzes 17,162 tweets mentioning the @ONCannabisStore, which is the official Twitter handle for the Ontario Cannabis Store (OCS).

The research focuses on the province of Ontario for three reasons. Firstly, Ontario is Canada's largest province with 38.8% of the Canadian population (Statistics Canada, 2020). Secondly, Ontario has liberalized cannabis regulations with a move towards a pseudo-private-sector retail model, which, prior research has shown, is connected to greater levels of cannabis-related social media activity (Daniulaityte et al., 2017; Demant et al., 2019). Finally, the OCS is a Crown agency (i.e., a provincially-owned enterprise) responsible for the sale of cannabis and serves as a centralized node for discourse, which affords a strong understanding of the public's perceptions of the newly legalized cannabis retail market on social media.

This research is important for cannabis policy as the analysis can help policymakers identify important areas of public contention (Yigitcanlar et al., 2020). Specifically, policymakers can gauge the public's approval around the regulations governing the cannabis retail industry after legalization. As evidenced in previous research (Daniulaityte et al., 2017; Kaminski et al., 2020; Kayser and Bierwisch, 2016), social media analysis offers policymakers an opportunity to identify required policy revisions. Therefore, they can use this form of public participation to identify new options and future solutions for cannabis retail that are more aligned with the needs of cannabis consumers in Canada.

This research adds to the small body of research that uses social media to analyze cannabis-related posts in a newly legalized market (Allem et al., 2020; van Draanen et al., 2019). The study has three main objectives: (i) to identify Twitter users' response to the OCS retail expansion; (ii) to explore the emerging themes on Twitter after the legalization of cannabis in the province of Ontario; and, (iii) to analyze the relationship between tweets mentioning the OCS and the government's cannabis retail-related policies.

1.1. The legalization of cannabis retail in Ontario

The two years following legalization were largely defined by policy rollouts that impacted cannabis users and businesses in the province of Ontario. Ontario's Liberal government opted for a fully government-controlled cannabis retail model on September 9, 2017. The initial retail structure outlined that the government-run Liquor Control Board of Ontario (LCBO) would operate 150 brick-and-mortar retail cannabis stores throughout the province (Government of Ontario, 2017a). The LCBO is a Crown corporation that is responsible for the retailing and distribution of alcoholic beverages in Ontario. A provincial election on June 7, 2018 brought in a Conservative government (Powers, 2018), and the original Liberal plan was replaced with a dual retail model: public (online only) and pseudo-private sector (offline only). By October 17, 2018, the first day of cannabis legalization, the more restrictive public online-only OCS retail platform was in operation as the only legal method to purchase cannabis during the initial days of legalization (OCS, 2018). The OCS holds a monopoly over the distribution of cannabis in Ontario (Government of Ontario, 2017a). This resulted in a restrictive retail model that limited the supply of cannabis products in the country's largest province. On December 13, 2018, the Conservative government announced that a pseudo-private-sector cannabis retail model would be implemented through a lottery system, to provide licenses for brick-and-mortar retail stores—capping the total number of licences at 25 locations (Government of Ontario, 2018a)—which further restricted the retail supply of recreational cannabis.

Private brick-and-mortar retail operators are required to hold three separate licences: (i) a Retail Operator Licence; (ii) a Retail Store/s Authorization; and, (iii) a Cannabis Retail Manager/s Licence. All three licences are subject to regulations set out in the Cannabis Licence Act (Government of Ontario, 2017c). The random lottery system of selecting private owners, which went through two rounds of lottery draws, was heavily criticized as not being sustainable from a business perspective nor in the best interests of Ontarians as it significantly underserviced market demand for cannabis stores. To address these supply issues, a market forces approach to the application for cannabis store operation was introduced in January 2020 with the province opting to remove the restrictive lottery system as a means to accelerate the cannabis expansion (AGCO, 2019). The less restrictive licensing rules, which was an election promise of the Conservative government, led to an influx of new applications to operate cannabis stores and resulted in the emergence of retail cannabis chain stores.

Although the federal and provincial levels of government introduced legislation to permit the legal operation of privately-owned cannabis stores, municipal governments in Ontario were provided with the option to "opt-out" of the legislation and not allow cannabis stores to operate within their municipal boundaries (AGCO, 2019). As of January 2019, the cut-off-date for municipalities to either "opt-in" or "opt-out," 73 of 414 (17.6%) municipalities in Ontario had elected to not allow the operation of private brick-and-mortar stores within their municipality. As a result, there was an uneven distribution of cannabis stores, which further compounded the supply issues.

2. Literature review

2.1. Social media and e-governance

There is extensive literature on e-governance that argues that the traditional role of online technology is information provision (Layne and Lee, 2001; Yildiz, 2007). However, as Auger (2013) argues, "long gone are the days when organizations could consider themselves technologically up-to-date simply because they developed a website" (p. 371). Instead, social media can be used as an effective platform for both the government (and businesses) and their customers to share and gather information and opinions in a public forum (Yaqub et al., 2017; Zhao et al., 2020). The use of social media platforms by government agencies, like the OCS, represents an evolution in e-governance.

This evolution has redefined the way that government agencies leverage the internet. The use of social media by the government has resulted in three key changes to discourse with the general public. Firstly, the introduction of social media has afforded a two-way flow of communication where people can both extract information from social media and contribute their own content and collaboratively share information with others (Bajic and Lyons, 2011). Secondly, the public's awareness and perceptions of various topics and emerging issues—like cannabis retail—can be influenced by access to this online information on social media (Lazard et al., 2016). Finally, social media data provides real-time insight into the public's opinions (Cherian et al., 2018). Therefore, analysis of social media can be used to capture, assess, and report on public opinion (Dubois et al., 2018; Sundararaj and Rejeesh, 2021).

More consideration, however, should be given to how social media is used, as its properties contrast with traditional web-based communication (Ketter and Avraham, 2012; Yaqub et al., 2017). With bi-directional e-governance, the public is able to directly communicate and provide feedback in a widely visible way (Auger, 2013; Milinillo et al., 2016; Ramanathan et al., 2019). In many respects, social media platforms "… are gaining popularity as social-media based citizen grievance management systems or platforms on which people can lodge complaints" (Agarwal and Sureka, 2017, p. 301). OCS customers can use social media to easily express and disseminate their opinions to large audiences, which both connects and empowers them (Malthouse et al., 2013; Djafarova and Bowes, 2020).

Monitoring social media provides a way for retailers to gain direct feedback on the strengths, weaknesses, and concerns of their customers.

However, organizations may find it increasingly difficult to manage the growth in the two-way flow of information (Schultz et al., 2012; Kawaf and Istabulluoglu, 2019). Therefore, social media analytics is often used to analyze social media posts in order for businesses to understand customer views (Ibrahim and Wang, 2019). Beyond commercial interests, social media data similarly provides insight into the public's perspective on various topics. This is particularly valuable as social media research captures the free-flow of the public's "information, ideas, and beliefs" (Cole-Lewis et al., 2015, p. 2) that could be missed or difficult to collect via traditional research methods, such as surveys (Murphy et al., 2014). This immediate feedback allows more rapid responses, either through marketing/communication or business operations/strategy. By reframing customers as active—rather than passive—participants, businesses, and governments can more effectively build and maintain profitable customer relationships by delivering customer value and satisfaction (Payne and Frow, 2005; Sen and Sinha, 2011).

2.2. Understanding public health on social media

Prior health-related research using social media data has embraced various analytical approaches, such as time series analysis (Ibrahim and Wang, 2019), sentiment analysis (Cole-Lewis et al., 2015; Daniulaityte et al., 2017; Ibrahim and Wang, 2019), visual analysis (Lee et al., 2017; Cavazos-Rehg et al., 2016), geo-location analysis (Daniulaityte et al., 2015, 2017; Lamy et al., 2016), retweet analysis (Chu et al., 2015), text mining (Lazard et al., 2016), and ethnographic analysis (Demant et al., 2019). Thematic and content analysis is commonly used to analyze textual social media data to identify common themes (Ramo et al., 2015; Laestadius et al., 2019; Cherian et al., 2018; Cole-Lewis et al., 2015; Chu et al., 2016; van Draanen et al., 2019).

A common approach in social media research is to analyze the public's sentiment on a variety of health-related topics. Research largely points to the public's positive sentiment across various categories. For example, hookah use is normalized on Twitter (Krauss et al., 2015); attitudes are largely positive towards cannabis edibles (Lamy et al., 2016) and cannabis use (Daniulaityte et al., 2017); codeine misuse may be becoming "normalized, commercialized, and ritualized" on Instagram (Cherian et al., 2018, p. 5); and e-cigarette tweets are largely positive (Cole-Lewis et al., 2015; Laestadius et al., 2019). This is important as the explicit marketing of cannabis on social media can influence the social norms of cannabis use (Cavazos-Rehg, 2016). A growing body of research is situated at the intersection of legalized drug use and social media. Prior research has used social media data to understand the public's experience and sentiment regarding health-related issues, such as prescription drug use (Alvaro et al., 2015), hookah use (Krauss et al., 2015), and vaping (Martinez et al., 2018; Laestadius et al., 2019). As a newly legalized retail product, cannabis is similar to other legalized drugs, such as alcohol and tobacco.

The vaping and e-cigarette market are strongly aligned with the cannabis market. Like cannabis, e-cigarette use has grown in popularity and represents a relatively new retail product (Government of Canada, 2018b). Twitter conversations about e-cigarettes have increased over the years, mainly revolving around issues with advertising (Kim et al., 2015). In a systematic review of tobacco-related research on Twitter, Lienemann et al. (2017) found that the majority of research was coded by topic and theme. The most common themes amongst e-cigarette tweets were advertisement/promotion, policy/government, and health/safety (Cole-Lewis et al., 2015). Interestingly, the themes coincided with several milestones, such as new government policies, which indicates how social media reflects the offline reality (Cole-Lewis et al., 2015). Communications about e-cigarettes are dominated by e-cigarette companies and there is an opportunity for public health to engage with the public using social media (van der Tempel et al., 2016). This is particularly important as Twitter can be used to influence the attitudes and behaviours of the public regarding e-cigarette use (Martinez et al., 2018). By analyzing retweets, Chu et al. (2015) found that e-cigarette tweets can spread rapidly and widely beyond the original audience. Beyond Twitter, e-cigarette consumers on Instagram act as brand ambassadors and frequently discuss taste, quality, and benefits (Laestadius et al., 2019). As such, research in this area suggests that people use social media to disseminate information, share experiences, and ask questions about e-cigarettes (Lazard et al., 2016).

Recognizing the popularity of social media amongst young people, another stream of research has focused on the negative implications of conversations about legal drugs on social media platforms. Exposure to alcohol advertising can contribute to underage use; similarly, young people exposed to alcohol advertising are more likely to model the behaviour in their own social media activity (Padon et al., 2018). Lee et al. (2017) analyzed the visual materials about e-cigarettes posted to Instagram and Twitter and found that visuals have persuasive power, which may be of particular concern in relation to youth. Barry et al. (2016) found that alcohol brands interacted with underage consumers, which violates their marketing code restrictions. Youth may be inadvertently exposed to information about drugs due to retweets, which easily spreads the information (Chu et al., 2015).

Specifically, in a cannabis context, research has provided a caution regarding the harmful effects of cannabis use by youth (Grant and Bélanger, 2017). Use of social media by cannabis companies exposes youth to cannabis messaging (Moreno et al., 2018). Given the increased public interest in cannabis, social media affords a unique opportunity to study the public's opinion on cannabis legalization.

2.3. Social media and cannabis

Using various analytical approaches to understand social media data, research in the area often seeks to analyze public discussions of cannabis-related topics, and the use of social media relating to cannabis by organizations or brands. Understanding how cannabis is discussed on social media can be used to identify consumer opinion; recent research in other contexts has analyzed the public sentiment of cannabis and has evidenced the public's positive response on Twitter (Thompson et al., 2015; Riordan et al., 2020; Cavazos-Rehg et al., 2016). From the user perspective, prior research has identified different communities of users: illicit, recreational, and medical (Baumgartner and Peiper, 2017). Recent studies have found heightened consumer attention around the medical benefits of cannabis (Allem et al., 2020; van Draanen et al., 2020). These studies found that Twitter users discuss cannabis usage to aid in the treatment of medical issues, such as cancer, pain, anxiety, depression, and post-traumatic stress disorder (Allem et al., 2020).

Other user-based research has analyzed the visuals of cannabis; for example, Cavazos-Rehg et al. (2016) analyzed cannabis-related posts on Instagram and found cannabis was largely presented in traditional form (e.g., buds) as compared to novel forms (e.g., concentrates). Furthermore, Cherian et al. (2018) and Allem et al. (2020) found evidence on Instagram and Twitter of polysubstance use (such as cocaine, heroin, ecstasy, LSD, methamphetamines, mushrooms, and Xanax along with cannabis). While people leverage social media to discuss cannabis use, others use social media to seek advice and support, and rely on specific online communities when seeking to quit cannabis (Thompson et al., 2015; Sowles et al., 2017). In analyzing tweets about cannabis edibles, Lamy et al. (2016) conclude that Twitter data can be leveraged to monitor the emerging drug use practices.

From an organizational perspective, research has analyzed government, public health, as well as cannabis companies' use of social media. van Draanen et al. (2019) analyzed how public health and governmental organizations tweet about cannabis; the authors identified eight prevailing themes, including: health-related topics; legalization and legislation; research on cannabis; special populations; driving and cannabis; population issues; medical cannabis; and public health issues. Moreno et al. (2018) analyzed social media posts of cannabis companies to assess policy compliance and found various instances of companies promoting

overconsumption, describing therapeutic benefits, and appealing to youth. Building on this emerging research base, this study analyzes the public's perceptions on Twitter after recreational cannabis was legalized in Canada.

3. Method

3.1. Data collection

The majority of social media research to date has focused on text-based analysis on platforms—such as Twitter (Widmar et al., 2020; Watanabe et al., 2021; Park et al., 2020; Cherian et al., 2018). As a microblogging service, Twitter-based research dominates this space reflecting the "… active nature of its users in sending messages regarding news and social issues …" (Lazard et al., 2016, p. 3). With approximately 330 million active monthly users in 2020, and about 7 million Canadian users (Rodriguez et al., 2020), Twitter is one of the most commonly used social media platforms allowing for direct peer-to-peer exchanges (Yu and Hu, 2020; van der Tempel et al., 2016).

The data used in this study was collected using Sysomos, a cloud-based social media management and analytics software program (Fig. 1). The data collection covers a one-year timeframe from October 17, 2018, to October 17, 2019 that mention the OCS Twitter handle (@ONCannabisStore). Sysomos was queried and the data was downloaded in a UTF-8 CSV file format. Analyzing one year of data specifically fits the context of this study to understand the initial rollout of cannabis legalization and is a common practice in social media research (Kirilenko and Stepchenkova, 2014; Benton et al., 2016; McNeill et al., 2017). Retweets (i.e., a repost of an existing tweet) are included in the analysis because they are viewed as a significant way information is propagated on Twitter (Chen et al., 2020). A total of 17,162 tweets were analyzed in this study.

The dataset includes both directed and undirected posts that mention @ONCannabisStore. On Twitter, a mention is when a username is included in a tweet (i.e., the @ symbol followed by a user's Twitter handle), which notifies the user that someone has mentioned them. Twitter mentions are commonly used to measure a brand's presence and provides a way for public conversations to be directed at specific people or organizations (Fang et al., 2020).

3.2. Data analysis

A thematic analysis of the Twitter posts was conducted using a framework approach (Ritchie and Spencer, 1994). Framework is a qualitative systematic process for managing, analyzing, and identifying themes in qualitative data. This method is well documented as being useful for large text files (Hacket and Strickland, 2018) and follows a five-step process. The work flow for data analysis is detailed in Fig. 1.

(i) *Familiarization*: Researchers became acquainted with and evaluated the 17,162 tweets mentioning @ONCannabisStore. The data was investigated in order to identify and document the key ideas and recurrent topics present.

(ii) *Recognition of the thematic framework*: Given the relatively large volume of data used in this study, a sample of 20% of the tweets (approximately 3500 tweets) was used to identify the preliminary codes. Customizable keyword matrices were constructed (in a text file format), which allowed the research team to identify which keywords would correspond with each of the codes. In an iterative process, the list of keywords was expanded by adding relevant cognates and synonyms of the initial word list. Variations in expression were also accounted for; for example, words containing the presence of symbols before or after keywords that could have been missed in the original classification were included. Potential keywords were identified that corresponded to one of the 19 codes. A full list of keywords was developed, including various permutations, resulting in a comprehensive codebook that was used to code the individual tweets.

(iii) *Indexing*: An automated process was undertaken using a Python script that evaluated each tweet and allocated the tweet to one or more of the 19 codes. Moreover, the script identified the tweets that included the individual keywords, which were identified in the recognition of the thematic framework phase. The keyword matrix was applied against all tweets, including a code for any tweets that did not have a match. A third party library, openpyxl, was used to read/write the contents into an Excel format. The

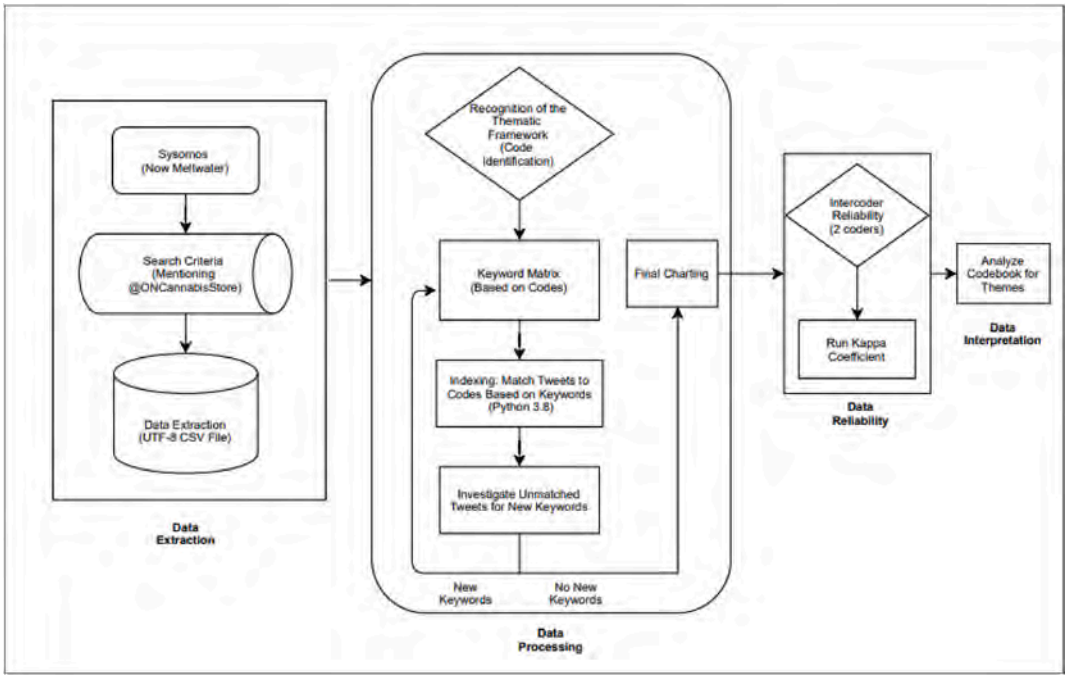

Fig. 1. Work flow for data analysis.

script outputs the results into text files, which were used for validation—i.e., unmatched tweets went into one text file and all of the matched tweets went into a separate text file. All unmatched tweets were then repeatedly examined in order to further refine the classification by adding missing keywords. After several iterations, it was determined that no additional terms would improve the codebook.

(iv) *Charting*: Using the finalized codebook, the final Python script was run so that each tweet was classified based on the presence of the keywords. Once the final charting was complete, the classification was validated for reliability. Four hundred random tweets were selected and evaluated for accuracy assessment for both errors of omission and commission. An omission error refers to a tweet that was not coded under an appropriate code, while a commission error refers to a tweet that was assigned to a code incorrectly. These two values were used to identify the Kappa statistic of reliability to assess the degree of agreement between the automated classification and the manual coding. The manual coding was completed by two independent coders. The coding had a 76% total accuracy and Kappa statistic of 0.73, which indicates substantial agreement between coders (Viera and Garrett, 2005).

(v) *Interpretation*: The coded tweets were examined by each coder to identify the frequently discussed topics, ideas, and patterns present. Descriptive statistics were analyzed to identify dominant codes (see Table 1). The codes were thematically organized and grouped based on similar content, which formed six themes. This was done by thoroughly investigating each code and identifying reoccurring ideas as well as the explicit and implicit meanings behind the groups of tweets (see Braun and Clarke, 2006; Fereday and Muir-Cochrane, 2006).

4. Results

Of the 17,162 tweets included in the dataset, 78% (n = 13,376) were categorized into at least one of the 19 codes. The remaining 22% (n = 3786) of tweets were coded as not applicable and not included in the analysis as these tweets typically lacked meaning and content. The data is presented as a percentage of the total number of tweets that fall within one of the 19 codes (n = 13,376).

Table 2 summarizes the prevalence of each code within the dataset. The majority of tweets (62.6%) were coded as being related to either the purchasing or process of obtaining products from OCS (*Order/Delivery*). Three other codes frequently appeared within the tweets analyzed: *Retail Model* (27.9%), which highlighted information referring to the point of sale; *Product Type* (37.9%) and *Product Quality* (21.3%) which highlighted the role of social media as an information-sharing resource.

Several codes that received moderate attention included *Governance* (16.9%), which related to the policies and decisions concerning the OCS retail rollout, and *Legal* (16.1%), which focused on the criminal activity such as theft, impairment while driving, and the illegal purchasing of cannabis products. The *Price* code appeared in 13.4% of the tweets, with tweets primarily focused on the difference between legal and "street" black market pricing. Notably, while *Product Type* and *Product Quality* were more common, tweets discussing cannabis paraphernalia or providing general information about products were less common (*Product*, 12.4%).

The less salient codes (all appearing in less than 10% of tweets) included: *Education* (7.8%) that focused on the dissemination of educational material related to the buying process, consumption, and history of cannabis legalization; *Packaging* (6.5%) that focused on direct references to the materials used to wrap or protect cannabis products; as well as the cannabis strains *(Brand)* and product availability (*Availability*) which were discussed in 6% of the tweets. Additionally, codes related to both *Privacy*—tweets about the anonymity of consumers and consumer-related data—and the *Manufacturing* of cannabis and related products each appeared in 5.1% of the tweets. Finally, the least prevalent tweets discussed the medicinal use of cannabis (*Medical*, 2.7%), cannabis store employees (*Employees,* 2.0%), the process of manufacturing cannabis (*Production*, 1.8%), the cannabis consumer (*User*, 1.7%), and the accessibility of retail stores (*Accessibility,* 1.2%).

Table 1
Codebook.

Theme	Code	Description
Consignment (T1)	*Order/Delivery*	Consumer purchase journey, including the process of obtaining products
Cannabis Product (T2)	*Product*	General product information, as well as information regarding cannabis paraphernalia
	Product Type	The variety and components of cannabis products (e.g., the ratio of THC/CBD, which refers to the most common cannabinoids found in cannabis products), as well as the method of ingesting cannabis
	Product Quality	Assessment of products fulfilling customer expectations and product standards
	Price	Cost of cannabis products
	Availability	Product availability and stocking of cannabis products
	Medical	Medicinal uses and medicinal properties of cannabis
Retail Model (T3)	*Retail*	Retail store environment, point of sale
	Employees	Persons employed by cannabis retailers, as well as those seeking employment
	Accessibility	Accessibility of retail stores to the public, including people with disabilities and those with mobility issues
Policy (T4)	*Governance*	Government policy, authority, influence, and decision-making
	Legal	Criminal activity and other legal issues
Producers (T5)	*Packaging*	Materials used to wrap or protect cannabis products
	Production	Processes related to the manufacture of cannabis and cannabis-related products
	Brand	Cannabis product names (i.e., strains of cannabis)
	Manufacturing	Manufacturer company name
Consumers (T6)	*User*	Attributes of cannabis consumers
	Privacy	The anonymity of consumers and consumer-related data
	Education	Educational material about the buying process, consumption, and history of cannabis legalization

Based on the 19 codes, six themes are identified that capture the public's response to cannabis legalization and rollout on Twitter: *Consignment; Cannabis Product; Retail Model; Policy, Producers;* and *Consumers* (see Table 1). In the following sections, we describe the thematic findings and highlight exemplary tweets by theme (see Sections 4.1. to 4.6).

4.1. Consignment (T1)

The "Consignment" theme focused on consumer purchases and the process of obtaining products from OCS (Code: *Order/Delivery*). These posts frequently exhibited consumer dissatisfaction with the Canadian Postal Service (i.e., Canada Post), which was directly mentioned in 808 tweets. When cannabis became available for purchase in the province of Ontario, the only way to legally obtain products was by ordering online via the OCS website; therefore, consumers were completely reliant on OCS to fulfill their orders and for Canada Post to deliver their orders in a timely manner. Consumers shared their distrust and frustration with their inability to receive cannabis products within, what they deemed, a reasonable timeframe. While OCS initially indicated that orders would arrive within 3–5 business days, delays due to high demand resulted in many customers waiting weeks for their purchases to be delivered. For example, numerous posts mentioned reservations about Canada Post

Table 2
Cannabis tweets by code and theme.

Code	Theme	Number of Tweets	% of Total Number of Tweets (including N/A) (n = 17,162)	% of Total Number of Tweets (excluding N/A) (n = 13,376)
Order/ Delivery	Consignment (T1)	8371	48.8	62.6
Product Type	Cannabis Product (T2)	5069	29.5	37.9
Retail	Retail Model (T3)	3731	21.7	27.9
Product Quality	Cannabis Product (T2)	2843	16.6	21.3
Governance	Policy (T4)	2263	13.2	16.9
Legal	Policy (T4)	2157	12.6	16.1
Price	Cannabis Product (T2)	1795	10.5	13.4
Product	Cannabis Product (T2)	1665	9.7	12.4
Education	Consumers (T6)	1046	6.1	7.8
Packaging	Producers (T5)	874	5.1	6.5
Brand	Producers (T5)	809	4.7	6.0
Availability	Cannabis Product (T2)	805	4.7	6.0
Privacy	Consumers (T6)	681	4.0	5.1
Manufacturing	Producers (T5)	680	4.0	5.1
Medical	Cannabis Product (T2)	363	2.1	2.7
Employees	Retail Model (T3)	265	1.5	2.0
Production	Producers (T5)	238	1.4	1.8
User	Consumers (T6)	229	1.3	1.7
Accessibility	Retail Model (T3)	165	1.0	1.2

being able to deliver the orders effectively:

> Lol, it's just weird. The mailman bring you weed@ONCannabisStore you'll lose business letting @canadapostcorp deliver. It's been in Ottawa since Saturday and still hasn't been delivered. #nothanks

This type of post and the subsequent dissatisfaction experienced by customers was important as online purchasing was the only means of legally obtaining product during the initial rollout; therefore, order fulfilment and delivery were critical to the public's initial impression of the OCS. Unfortunately, the OCS did not have the necessary fulfilment capacity to handle the large volume of online orders.

4.2. Cannabis product (T2)

The *Cannabis Product* theme focused on the different components and experience of cannabis products (Codes: *Product, Product Type, Product Quality, Price, Availability,* and *Medical*). Consumers commonly used Twitter as a way to communicate their experiences with different cannabis products, often acting as reviewers by sharing relevant product information. Consumers reviewed the potency and the physical effects of certain cannabis strains. The potency was often discussed in terms of the desired effects from consuming certain strains:

> First impressions of #JackHaze @ONCannabisStore Smells like lemon. I caught the wife smelling the can repeatedly while taking photos, it's that good. Tastes like a skunky floral bouquet, wrapped in lemony leather. Super strong. We're messed up.

The tweets also highlighted consumers wanting greater variety in product, mainly pertaining to consumption methods; customers explicitly wanted edibles, extracts, and topicals. When OCS initially started selling products in 2018, the largest product category available for purchase was dried cannabis; therefore, people who did not want to smoke or vape cannabis were left with minimal options. As such, consumers had the ability to legally purchase cannabis, but were not able to purchase products that aligned with their consumption preferences. Twitter users also shared experiences around product standards, and consumers expressed dissatisfaction with the products they received, often highlighting specific grievances with the OCS:

> Hey! The Tangerine Dream produced by San Rafael that I ordered from you is brown, moldy and smells bad. But your return policy states you'll only refund for unopened product. A little help here, please?

Users also shared opinions regarding OCS products being expensive. Consumers contrasted the high price of legal cannabis with black market cannabis, which was often described as higher quality at a better price. An example of this association can be seen in the following tweet:

> I've had to use the black market because I have been waiting for my weed. I called to find out what's going on and couldn't even reach anyone. Great start OCS. My drug dealers have better service.

Consumers commonly expressed concerns with supply issues, mainly shortages, of OCS products and expressed frustrations with their inability to purchase their desired products:

> This a major fail. Products are out of stock on the first day. They have still not been restocked a week later. A kid could produce a better online retail site. It's scary to think of OCS being the source of supply to retail stores in April!:(

Lastly, the medicinal uses and properties of different cannabis products also proved to be important in defining the buying preference for OCS customers. Several posts focused on the medicinal effects of CBD. The medicinal properties of cannabis products have been subject to significant research and media attention over the past decade. Consumers often indicated that they wanted to purchase products for medicinal reasons, but were unable to do so due to increased demand:

> When will you be restocking CBD oils? I'm in so much pain from my headaches.

This theme was largely comprised of consumers posting negative opinions and experiences with cannabis products being sold through the OCS. From a product perspective, consumers largely used Twitter as a grievance management system.

4.3. Retail model (T3)

The *Retail model* theme focused on the retailing framework adopted for the sale of goods and services through the OCS (Codes: *Retail, Employees,* and *Accessibility*). Within this theme, consumers commonly expressed concerns over the initial rollout, which only allowed for the online purchase of cannabis. Customers believed this limited their options to purchase goods and created issues regarding the ultimate receipt of products. Supply issues with limited point of sale (POS) options were commonly mentioned:

> Underprepared, under supplied, and too many online orders but no legal physical stores … ? You took people's money knowing you couldn't fulfill their orders.

Once brick-and-mortar retail stores opened, users shared their concerns regarding the limited number of stores available. For example, one post identified the limited number of stores expected to service the largest province in Canada:

> Why are you opening 25 stores in a province bigger than several states? how many liquor stores are there?

Recognizing that each province controlled the production and distribution of cannabis, users compared provinces in terms of POS options and how they differed in Ontario. Ontario consumers on Twitter expressed that they suffered from an underserved market when compared to other provinces, which was largely attributed to the restrictive licensing protocols in Ontario. Accessibility at POS was compounded by the shortage of retail options available for purchasers. Notably, individuals with physical disabilities were unable to readily access cannabis products. Consumers expressed that this was an issue as many of the first few brick-and-mortar locations were not barrier-free.

Finally, users also tweeted about employment opportunities available at the OCS and about current OCS employees. Notably, there was substantial criticism of current staff members at OCS being incapable of doing their job properly and issues with OCS being understaffed. Based on an analysis of the Twitter posts in this theme, consumers experienced concerns and dissatisfaction with the jurisdictional retail model adopted for the sale and distribution of cannabis. Consumers identified the retail challenges at the POS were often linked to provincial government's legislation to open brick-and-mortar cannabis stores.

4.4. Policy (T4)

The *Policy* theme focused on the legality, authority, influences, policies, and decisions concerning the OCS retail rollout (Codes: *Governance* and *Legal*). These posts largely fell into two categories: (i) information on store licensing, and (ii) criticism of the provincial and federal governments' retail models. Store licensing tweets primarily focused on providing information on the lottery and licencing process that was used in Ontario. For example:

> Last Friday was the entry deadline for # Ontario's 2nd cannabis retail license lottery. Applicants will know on Tuesday whether they're among the winners …

There was extensive criticisms of the government, which was often related to government decisions that consumers felt led to issues with deliveries, product type, and retail. Consumers expressed displeasure with the Conservative government not using the LCBO locations to sell and distribute cannabis products, which was the initial plan proposed by the Liberal government before losing the election. Tweets also highlighted the government's failure to issue licenses fast enough to open sufficient stores with enough products to adequately serve the market:

> Years to prepare, existing successful businesses to copy from, functional storefronts already existing in the form of the LCBO, and this is the best they could manage. Couldn't even ship the 4 products they had in stock.

This theme brought attention to the role that the black market will continue to play within the cannabis retail landscape. With clear consumer dissatisfaction with the government policies around the legal sale of cannabis, illegal retail models will continue to be viable options for purchasing goods.

4.5. Producers (T5)

The *Producers* theme focused on the manufacturing, production, branding, and packaging of cannabis products (Codes: *Packaging, Production, Brand,* and *Manufacturing*). Consumers identified the poor packaging standards adopted by the OCS, as well as the manufacturers and producers of cannabis. Notably, consumers highlighted the issues with cannabis packaging being non-environmentally friendly, and they vocalized their frustration with the plastic used in the OCS packaging. Consumers requested more eco-friendly packaging, which reflects a growing trend towards sustainability in retail. Beyond the packaging materials used, a significant issue with the packaging was linked to the fact that large containers are used even when purchasing small quantities of cannabis. In one instance, a user identified that they would refrain from making additional purchases until a more environmentally sustainable solution was adopted:

> Made my first OCS order and it was upsetting to see how much packaging is used. I'm not ordering until there is a system to resend the containers back to the manufacturers.

Additionally, consumers identified cannabis product names—more commonly referred to as the strains—which have different psychoactive effects. In some instances, these posts were meant to inform Twitter users of the different strains that are available through OCS. These posts provided customer reviews of the different strains and brands available via the different producers and manufacturers of cannabis.

4.6. Consumers (T6)

The *Consumers* theme focused on issues pertaining to cannabis users (Codes: *User, Privacy,* and *Education*). Issues with consumer privacy were discussed around a large data breach experienced by OCS in November 2018. This breach involved the shipping information of over 4500 OCS customers. Consumers expressed frustration that the OCS did not disclose the details of the data breach in a timely manner after they became aware of the issue. Furthermore, users criticized the privacy policies that OCS had in place in terms of third-party data sharing:

> You are concerned with privacy yet it took you seven days to share a data breach with your customers?? This is a mismanagement of a government-operated company and is further wasting taxpayer money. #onpoli #legalization …

Furthermore, many consumers shared their individual consumption experiences. Consumers often provided advice for safe usage, with a variety of educational materials and information about the buying process.

> … When you get products from your #LP or, after consuming, write down- how it made you feel, for how long, and was it a negative or positive experience …

While the data privacy issues were communicated due to the data breach, this theme identified how users were providing advice for safe consumption. With legalization resulting in an uptake in first-time cannabis users, consumers often turned to Twitter to ensure pleasant experiences when consuming cannabis.

5. Discussion and contributions

This research has identified Canadians' responses to cannabis legalization and associated government-controlled retail models on Twitter by analyzing the public's tweets mentioning the Ontario Cannabis Store (@ONCannabisStore) over a one-year period after the legalization of recreational cannabis in Canada. As social media can be used to support cannabis policy development (Yigitcanlar et al., 2020), this research uncovered some key issues with the retail model adopted in Ontario and significant consumer discontent with the government's approach to the retail introduction of recreational cannabis. Some of the dissatisfaction was linked to the rigid government policies and eligibility criteria for obtaining licenses required to sell cannabis products, which created consumer issues around ordering, delivery, and product availability. The stringent licensing protocols further resulted in an underserved market, which forced the OCS's website beyond capacity; higher than expected demand, coupled with limited brick-and-mortar stores, created significant issues with online sales and major delays in delivery. Twitter users identified that the restrictive purchasing options (due to government policy) created a shortage of point of sale locations leaving

consumers unable to purchase their desired products. Policymakers can use the findings from this research to understand the public's opinion of the recreational cannabis legalization in Ontario. Analyzing social media data, as evidenced in this research, can help policymakers identify policy adaptations that are required in order to support a positive retail experience for consumers.

Cannabis availability issues expressed by Twitter users can also be linked to the restrictive legislation that limits the number of cannabis growers and producers allowed in Canada. The rigorous producer licencing application process in Canada requires many steps to ensure health and safety standards and, as a result, has created a significant barrier to entry for many potential producers (Government of Canada, 2018a). Due to unprecedented demand for product, supply shortages have been well documented (Jeffords, 2018). As a result of these shortages, the province limited the number of retail outlets that were allowed to open in order to prevent stores being understocked. These and other governance-related issues can be further attributed to changes to the provincial policies, which occurred after the 2018 provincial election. The change from a Liberal to a Conservative government created a shift in the retail model in Ontario from provincially controlled retail outlets that would have piggybacked onto the well-established retail LCBO store network to a restricted private store system. The election that took place on June 7, 2018 resulted in the government having four months to implement a plan for the first day of legalization (October 17, 2018). This, along with the restrictive lottery system, created an underdeveloped retail market especially when compared to the retail models adopted by other provinces.

With limited options available for purchase and high demand for products, product availability was limited and resulted in items rapidly selling out. These issues were also compounded by the fact that municipal governments in Ontario were provided with the option to opt-out of the legislation, which meant they did not permit cannabis stores to operate within their municipal boundaries. With 17.6% of all municipalities in Ontario opting to not have brick-and-mortar stores, many consumers were left with no choice, but to purchase products online from OCS or from the black market.

Similar to other studies that analyzed Twitter posts for legalized drugs (Kim et al., 2015; Chu et al., 2016), this study found that Twitter was often used as a platform for reviewing products—mainly discussing the effects of certain strains, flavour composition, and quality. Due to federal advertising and packaging rules not allowing the medicinal properties, the effects, and terpene profile of cannabis products to be printed on packaging, consumers used social media to share and seek this type of information.

Similar to findings of Laestadius et al. (2019) related to e-cigarettes, it was clear that OCS consumers on Twitter also acted as brand ambassadors, frequently discussing taste, quality, and benefits of certain cannabis products. As highlighted in the thematic analysis, almost half of the tweets (46.1%) were about *Product Quality* or *Product Type*. While these product reviews can be beneficial for OCS customers, there can be some inadvertent consequences with tweets of this nature. Specifically, this creates potential risks for youth exposure to cannabis as Twitter can easily spread information about favourable and appealing aspects of cannabis use. This concern is amplified by the fact that social media is widely used by young people (Barry et al., 2016).

Much of the Twitter discussion was dominated by consumers sharing their perceived issues regarding the legislation governing recreational cannabis. With the buying experience being one of the most important aspects of retailing, it is important for the cannabis retail industry to monitor consumer feedback in order to help mitigate issues and improve the level of service that is provided. With social media platforms, being used by people to lodge complaints, an opportunity exists for government entities (e.g., OCS) to maintain a dialogue with consumers to improve the customer experience and to identify areas of improvement (Agarwal & Sureka (2017)).

Since cannabis legalization in October 2018, Canadian provinces and territories have introduced a varied regulatory framework to manage the distribution and sale of recreational cannabis across the country. The enactment of the Cannabis Act has resulted in a unique opportunity to examine the creation of a new retail industry. By understanding the thematic content of tweets mentioning the OCS, this research provides valuable insights into customer opinions and has identified some key concerns and issues with the initial program rollout. With government agencies widely adopting Twitter to communicate with constituents and to disseminate information to the public (Daniulaityte et al., 2015), social media can be beneficial to understand the emerging cannabis issues and trends, as the insight can be used to help inform policy measures.

The findings can be further used by policymakers to identify the public's perspective on the regulations governing the cannabis retail industry in Ontario. The shortage of point of sale options can be attributed to government interventions restricting and controlling the sale, production, and distribution of cannabis. The research suggests that Twitter consumers may have a preference towards a more free market cannabis economy approach. The government's role in the newly emerging cannabis industry has resulted in well documented inequalities around product access and product quality. As Ontario was the only province in Canada to adopt a pseudo-private/-public sector cannabis retail model, this research can help policymakers understand the advantages and disadvantages of both public and private control in the cannabis market.

6. Conclusion

For Ontario—as well as the rest of Canada and other jurisdictions in developed countries —cannabis retail is becoming a legitimate part of the retail system. It is important, therefore, to understand how this emerging sector is perceived by potential customers (i.e. strengths, weaknesses, complaints, key nodes of discourse). Indeed, this research highlights the success and failures of the retail roll out in the province of Ontario for both Ontarians and the provincial and federal government. The retail rollout in Canada brought about many conversations around the advantages and disadvantages of government intervention over the control and sale of cannabis. Additionally, this research provides a rare opportunity to look at a retail market that has moved from an illegal retail model to a more traditional one.

The research highlights the successes and failures of the retail rollout in the province of Ontario for both Ontarians and the provincial and federal government. The retail rollout in Canada brought about much debate around the advantages and disadvantages of government intervention over the control and sale of cannabis. This research has taken advantage of a rare opportunity to analyze a retail market that has moved from an illegal retail model to a more traditional one.

Ontario's hybrid public-private retail model provided a lens to investigate the perceived public benefits pertaining to the role of both market forces and government intervention around the sale and distribution of cannabis. The analysis presented here provides insight into one model, in one jurisdiction; however, the codebook provided in this study can also be leveraged and used as a benchmark to draw comparisons between different retail models (i.e., pure public or private models) and regulatory environments (i.e., other provinces and jurisdictions) in order to better understand whether or not other retail models experience similar opportunities and challenges. While Canada is one of the first countries to legalize recreational cannabis at a national level, it will not be the last. With 33 US states and several European countries (e.g., Italy, Portugal, and the Czech Republic) looking to legalize recreational cannabis, this study also provides a framework for international comparison (WeCanHealth, 2021).

Key concerns and issues with the initial retail rollout are identified, which provides insight into the evolution of an illegal to legal retail marketplace. This research is seen to have many practical benefits for both the government and private businesses. The research findings

outlined in this paper can act as an effective platform for both the government and emerging cannabis retailers to share and gather information around the opinions of cannabis consumers. As a practical implication, the findings can be leveraged to inform future government policies and decisions around the emergence of this retail model. For retailers entering this retail space, the research also provides insight into customer opinions around cannabis legalization and the retail rollout.

6.1. Limitations and future research

Future research is needed to examine the emergence of cannabis retail in other jurisdictions—both in Canada and globally. Within Canada, the provincial flexibility around the sale and distribution of cannabis has created a diverse retail market across the country, consisting of public, private, and hybrid systems through both brick-and-mortar and online stores. While this research explored the emerging themes on Twitter after the legislation of recreational cannabis in Canada's largest province, there is a need to investigate how other systems compare—particularly as more legal stores open in the United States and Europe in the coming years. An exploration of the jurisdictional differences in the consumer experience could produce a framework to identify the opportunities and challenges posed by contrasting retail models. The methods and codebook can be used by future researchers, policy makers, and emerging cannabis retailers to gather and understand cannabis consumers' opinions on social media.

This study does have some limitations. With a focus on Twitter, the data captured in this study only focuses on the experiences of a subset of the market, which could lead to a biased sample (i.e., demographics). Furthermore, the research exclusively focused on tweets that mentioned the OCS Twitter handle. By expanding the inclusion criteria a broader understanding of the public's reaction to cannabis legalization and the subsequent retail expansion could be identified.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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