Is there any change in licences distribution pattern during 2015-2018 and 2019-2022?*

An analysis of business licences and permit issued by the Toronto Municipal Licensing and Standards.

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Municipal Licensing & Standards (ML&S) issues licences to various types of businesses and trades in Toronto City. This licence dataset is used for the analysis to assess if there is any discrimination in issuing licences to various categories or not. The data set is analyzed and compared for the period of 2015-2018 and 2019-2022. Evidently, certain categories have licence durations that differ greatly from one another. For example, categories were granted licences for longer periods of time during the 2015–2018 period than they were during the latter period.

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*Code and data are available at: https://github.com/geunchulshin/licences_distribution_patterns

1 Introduction

To investigate the trends in the distribution of licences and permits across different categories, a thorough investigation was carried out for two different time periods: 2015–2018 and 2019–2022. The selection of the time periods, 2015-2018 and 2019-2022 was purposeful, taking into account the occurrence of municipal elections, which transpire every four years (Toronto Elections 2023). This deliberate choice allows for a comprehensive exploration of licensing and permitting distribution patterns, considering the potential influence of electoral cycles on regulatory activities and administrative decision-making within the municipal landscape. The City of Toronto Council appoints seven citizens to the Tribunal, an autonomous quasi-judicial body, to serve four-year terms. The Court Services Division of the City of Toronto provides administrative support to the Tribunal. Unless otherwise specified, public hearings are held every Thursday. The Tribunal makes rulings free from commercial or political influence (Toronto Tribunal 2023).

When comparing these patterns, it is being considered that there are numerous factors, including both legislative and larger social-economic dynamics, that play a role in licencing choices. Those factors could be related to regulatory compliance, public safety and welfare, applicant qualification, land use and zoning, economic impact, environmental considerations, and social/political priorities. Hence, the difference in the pattern could be because of those influential factors, that leads to change in the policy decisions.

There are some categories for which most applications are received for permits and licenses. Building permits are for construction, film permits for making movies, lottery licenses for charitable events, marriage licenses for weddings, and taxi licenses for driving taxis (City of Toronto 2024). These permits help ensure things are done safely and responsibly, making sure activities like building, filming, fundraising, getting married, or driving taxis follow the rules that keep everyone safe and organized in the community.

The purpose of this paper is to identify if there are any significant changes or trends in the number of licences and permits issued in various categories during the last two terms by municipal administrators. The remainder of this paper is structured as follows. Section 2 elaborate on the data-set used for the analysis. Section 3 shows the result of the analysis. Section 4 explains and discusses the results in detail. Section 5 concludes the analysis: the findings of this paper.

2 Data

The data set used in this analysis is obtained from the City of Toronto's Open-Data Toronto Library (Gelfand 2022). The data set is entitled with the name "Municipal Licensing and Standards - Business Licences and Permits" (City of Toronto 2024). Data was collected and analyzed with the utilization of the programming software, R Studio (R Core Team 2022).

Table 1: Sample of cleaned Municipal Licensing & Standards data set (Issue Duration in Months)

Category	Num Endorsements	Issued year	Issue duration
PRIVATE TRANSPORTATION COMPANY	1	2018	10.61104
PRIVATE TRANSPORTATION COMPANY	1	2017	15.04599
PRIVATE TRANSPORTATION COMPANY	1	2018	45.53219
PRIVATE TRANSPORTATION COMPANY	1	2017	71.41919
PRIVATE TRANSPORTATION COMPANY	1	2020	33.31143
PRIVATE TRANSPORTATION COMPANY	1	2021	20.00657

Along with that, the following packages are also used, ggplot2 for plotting (Wickham 2016), tidyverse for data frame manipulation Wickham et al. (2019), knitr for pdf rendering (Xie 2014) and kableExtra for styling tables (Zhu 2021).

The raw data set contains 32000 observations each having 18 features. However, for the analysis, only a few of the features are needed. The data set is cleaned by removing the unnecessary variables Also feature engineering is performed to generate a couple of variables These will be discussed further in detail. A sample of the cleaned data set is shown here Table 1.

In the data cleaning process, several steps were undertaken to refine and prepare the dataset for analysis. Initially, a set of specific columns deemed unnecessary for the analysis, such as "_id," "Licence No.," and others related to contact details and record updates, were identified and removed. Additionally, to enhance clarity and ease of analysis, columns containing text-based information, such as "Conditions" and "Endorsements," underwent processing. A custom function was applied to calculate the number of words in each entry of the "Endorsements" column. Furthermore, date-related columns such as Issue_date and Cancel_date were modified to extract the year and month of issuance and cancellation, and a new column, "Issue_duration," was created to represent the duration between issuance and cancellation in months. Finally, several columns containing redundant or sensitive information were dropped to streamline the dataset for subsequent analysis. These meticulous data cleaning steps ensure a more focused, structured, and standardized dataset, laying the foundation for the subsequent stages.

As the data-set contains data when licenses issues during 1969 to 2024. It is worth to consider the entire data set as the population data, which can be useful during statistical analysis. The table shows category wise percentage of licenses issued during this period. The overall distribution is shown here Table 2. Additionally, tables Table 3 and Table 4 provide insights on specific intervals offering more in dept view of the data (2015-2018 and 2019-2022 respectively).

Table 2: Licenses issued during all years

Category	Percentage(%)
ADULT ENTERTAINMENT CLUB	0.184375
BILLIARD HALL	0.640625
BOATS FOR HIRE	0.009375
BODY RUB PARLOUR	0.390625
BOWLING HOUSE	0.146875
CARNIVAL	0.059375
CIRCUS	0.015625
DRIVE-SELF RENTAL OWNER	1.593750
DRIVING SCHOOL OPERATOR (B)	2.390625
HOLISTIC CENTRE	6.709375
LIMOUSINE SERVICE COMPANY	0.718750
PERSONAL SERVICES SETTINGS	1.959375
PLACE OF AMUSEMENT	1.131250
PRIVATE PARKING ENFORCEMENT AGENCY	0.665625
PRIVATE TRANSPORTATION COMPANY	0.037500
RETAIL STORE (FOOD)	81.393750
SHORT TERM RENTAL COMPANY	0.009375
SMOKE SHOP	1.337500
TAXICAB BROKER	0.378125
TAXICAB OPERATOR	0.109375
TEMPORARY SIGN PROVIDER	0.118750

Table 3: Licenses issued during 2015-2018

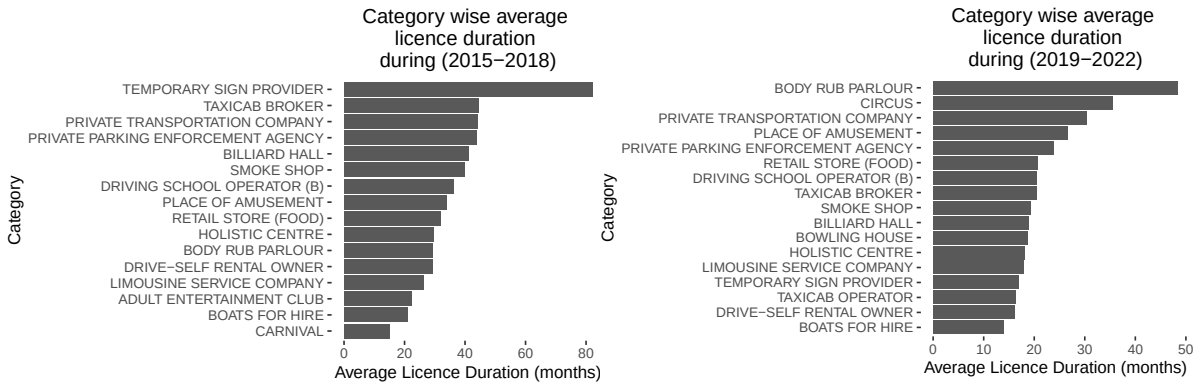
Category	Percentage(%)
ADULT ENTERTAINMENT CLUB	0.0420168
BILLIARD HALL	0.2941176
BOATS FOR HIRE	0.0420168
BODY RUB PARLOUR	0.4621849
CARNIVAL	0.0630252
DRIVE-SELF RENTAL OWNER	1.3445378
DRIVING SCHOOL OPERATOR (B)	1.7857143
HOLISTIC CENTRE	6.9537815
LIMOUSINE SERVICE COMPANY	0.5042017
PLACE OF AMUSEMENT	1.1134454
PRIVATE PARKING ENFORCEMENT AGENCY	1.4075630
PRIVATE TRANSPORTATION COMPANY	0.1470588
RETAIL STORE (FOOD)	84.7689076
SMOKE SHOP	0.8613445
TAXICAB BROKER	0.1470588
TEMPORARY SIGN PROVIDER	0.0630252

Table 4: Licenses issued during 2019-2022

Category	Percentage(%)
ADULT ENTERTAINMENT CLUB	0.0729572
BILLIARD HALL	0.2431907
BOATS FOR HIRE	0.0243191
BODY RUB PARLOUR	0.1702335
BOWLING HOUSE	0.0729572
CIRCUS	0.0486381
DRIVE-SELF RENTAL OWNER	1.6050584
DRIVING SCHOOL OPERATOR (B)	2.6021401
HOLISTIC CENTRE	3.9153696
LIMOUSINE SERVICE COMPANY	0.2675097
PLACE OF AMUSEMENT	0.8025292
PRIVATE PARKING ENFORCEMENT AGENCY	0.5593385
PRIVATE TRANSPORTATION COMPANY	0.1215953
RETAIL STORE (FOOD)	87.6945525
SHORT TERM RENTAL COMPANY	0.0729572
SMOKE SHOP	0.4863813
TAXICAB BROKER	0.3891051
TAXICAB OPERATOR	0.8025292
TEMPORARY SIGN PROVIDER	0.0486381

3 Results

The analysis of licenses issued during the periods 2015-2018 Table 3 and 2019-2022 Table 4 reveals dynamic patterns in the distribution across various categories. In the earlier period, "Retail Store (Food)" dominated the licensing landscape with an overwhelming 84.77%, while categories like "Holistic Centre" and "Driving School Operator (B)" also made significant contributions. In the subsequent period, "Retail Store (Food)" maintained its prominence, now constituting 87.69% of licenses issued. Categories like "Holistic Centre" and "Driving School Operator (B)" exhibited notable growth, reflecting evolving trends. Additionally, new categories, including "Short Term Rental Company" and "Taxicab Operator," emerged in the later period. These shifts highlight the dynamic nature of licensing activities, providing valuable insights for stakeholders and policymakers into the evolving business landscape in the municipality.



(a) During (2015-2018)

(b) During (2019-2022)

Figure 1: Category wise average licence duration (Months) for reference

Notably, in the earlier period Figure 2, the categories with the longest average duration include "Temporary Sign Provider" (82.0 months), "Taxicab Broker" (44.5 months), and "Private Transportation Company" (44.0 months). Conversely, in the subsequent period (2019-2022), categories such as "Body Rub Parlour" (48.5 months), "Circus" (35.5 months), and "Private Parking Enforcement Agency" (23.8 months) exhibit relatively higher average durations. Interestingly, some categories, like "Adult Entertainment Club" and "Short Term Rental Company," have missing values (NaN) in the 2019-2022 period. The comparison highlights variations in the average durations of licenses across different categories between the two specified time periods, suggesting potential shifts or trends in licensing dynamics over time.

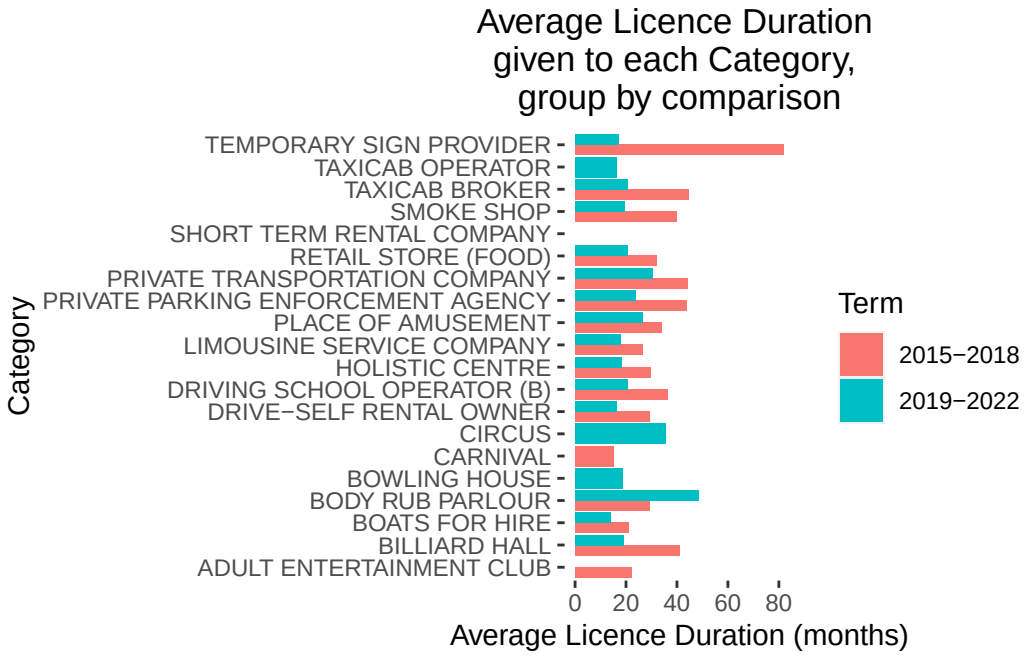


Figure 2: Category wise average licence duration (Months)

Examining the data set focusing on the Average Number of Endorsements Figure 3, it provides insights into the endorsements frequency for various categories during the periods 2015-2018 and 2019-2022. In the earlier period, categories such as "ADULT ENTERTAINMENT CLUB" and "BILLIARD HALL" have relatively low average endorsements numbers, with values of 3 and 2.2, respectively. The category "TEMPORARY SIGN PROVIDER" had the highest average number of endorsement (1) in the 2015-2018 period. In the subsequent period (2019-2022), the pattern shifts, with "ADULT ENTERTAINMENT CLUB" and "BILLIARD HALL" experiencing an increase in average endorsements numbers (2 and 1.9, respectively).

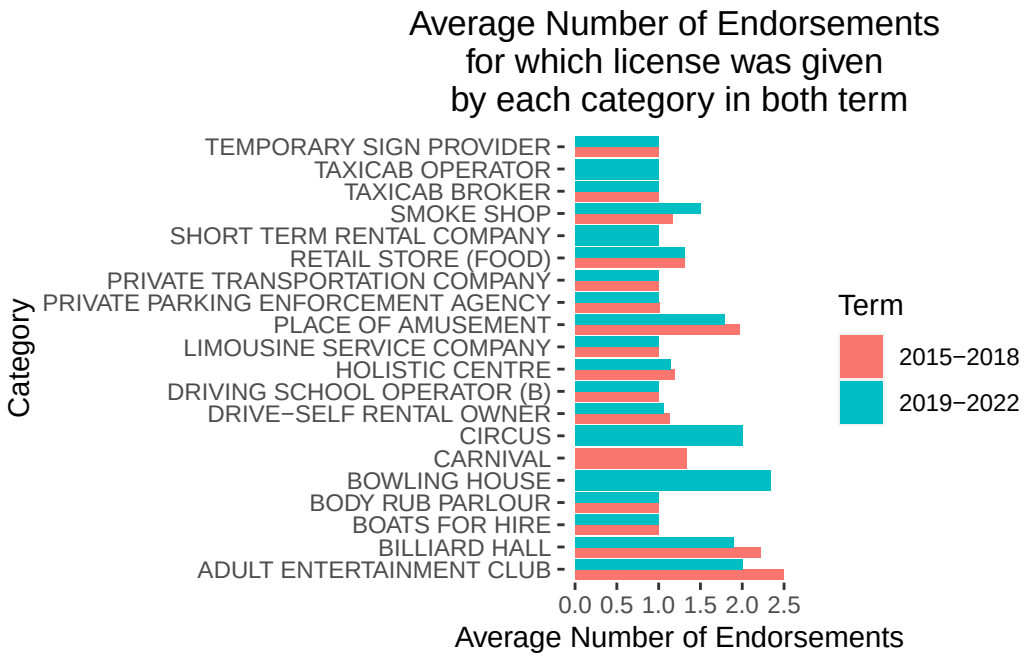


Figure 3: Category wise average number of endorsements

Comparing both datasets, it appears that certain categories, such as "DRIVE-SELF RENTAL OWNER" and "PRIVATE TRANSPORTATION COMPANY," consistently have lower endorsements frequencies, reflecting potential operational trends or regulatory considerations. The variations in endorsement numbers between the two time periods underscore the dynamic nature of endorsement activities across different business categories, suggesting changes in regulatory focus or industry dynamics over time.

4 Discussion

Analyzing licenses and permits in Toronto shows interesting trends in how businesses operate. Some types of businesses, like those dealing with temporary signs, taxi brokering, and private transportation, seem to have longer-lasting licenses.

The analysis of average license duration across different categories in Toronto sheds light on intriguing trends and variations between two distinct time periods, namely before and after 2018. In the earlier period, specific categories stood out with notably extended average durations. Noteworthy examples include "Temporary Sign Provider," "Taxicab Broker," and "Private Transportation Company," indicating a prolonged adherence to licensing requirements within these sectors. These findings suggest potential stability and sustained compliance within these businesses, aligning with the idea that certain industries may operate with consistent licensing practices over the years.

Conversely, examining the subsequent period (2019-2022) reveals shifts in the categories with higher average durations. “Body Rub Parlour,” “Circus,” and “Private Parking Enforcement Agency” emerge as categories demonstrating relatively longer durations during this timeframe. These observations point towards dynamic changes in licensing dynamics, possibly influenced by evolving regulatory frameworks or industry trends. This comparison underscores the importance of adapting licensing policies to the evolving landscape of businesses, ensuring that regulatory frameworks remain responsive to the needs and dynamics of various industry sectors.

Looking at how often businesses get endorsements or approvals, reveals changes in attention from regulators. Businesses like adult entertainment clubs and billiard halls had shifts in the number of endorsements over time. For example, adult entertainment clubs had a 33.3% increase in endorsements from 2015-2018 to 2019-2022. On the other hand, businesses involved in temporary sign provision had consistent endorsement numbers, showing that some rules stay the same. These insights help both the government and businesses make informed decisions and understand the factors shaping licensing and rules in Toronto.

5 Conclusion

In summary, the analysis of licensing data in Toronto unveils dynamic trends in both the duration and distribution of licenses across diverse business categories. The examination of average duration highlights distinct patterns, with certain categories demonstrating prolonged adherence to licensing requirements, indicating a sense of stability and compliance. Conversely, shifts in categories with higher average durations during subsequent years suggest evolving dynamics within specific sectors. The findings emphasize the significance of periodic assessments to ensure licensing policies remain effective and aligned with the diverse and dynamic nature of the city’s industries. Moreover, it is evident that some categories have significantly different license durations i.e. during the 2015-2018 period categories were given licenses for a longer period as compared to the later period.

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