Special session title:

Big Data Analytics and Artificial intelligence in business and marketing

Paper title:

LOCATION BASED RESTAURANT PREFERENCES IN BANGALORE

Big Data Analytics and Artificial intelligence in business and marketing

LOCATION BASED RESTAURANT PREFERENCES IN BANGALORE

Dr. Anupam Bhatia

Chair Person, D.C.S.A

C.R.S.U, Jind,Haryana(India)

anupambhatia@crsu.ac.in

Ms. Sneha*

Research Scholar, D.C.S.A

C.R.S.U, Jind,Haryana(India)

shining.jind@yahoo.com

Abstract

Bangalore is the hub of Information Technology (IT) in India. In most nuclear families, the couple is working. Therefore, there is a huge demand for restaurants. Seeing the scenario opening a restaurant is a viable business opportunity, but choosing the right location to open a restaurant is one of the most effective parameters in its success. Review of Literature emphasizes location analysis. Hadoop ecosystem is integrated with HIVE data warehouse infrastructure for research query and analysis. Zomato dataset for Bangalore restaurants is collected from Kaggle.com. After the analysis of data, it is found that 50% of people prefer the food to be delivered at home whereas about 35% people prefer to dine out. The pattern is found true on 29 out of 30 locations analyzed.

Keywords: Restaurant Preferences, Location Analytics, Big Data Analysis, Business Analytics.

1. Introduction

The location has a significant impact on the success of the restaurant and also the sites are expensive to change, therefore location selection is a critical decision for restaurant owners. In this work, we have chosen a restaurant as a business representative and have empirically investigated to analyze how the success of a restaurant can be affected by its location and address. We have investigated the impact of restaurant type and location on the restaurant's success. To address this question, we analyzed the Zomato restaurant data-set of Bangalore - also called The Silicon Valley of India, Bangalore has a population of 10 million and is the country's third most populated city. It is not only the home to Information Technology in India but is also extremely popular for educational and research institutions. Catering industries from all over the world can be found here with all types of Cuisines, Pubs and Bars, Delivery, Dine-out, Buffet and interestingly once it is named - it is available in Bangalore. Bangalore is one of the best places for foodies, currently has 12,000 restaurants and the number hasn't saturated yet. The idea behind the analysis of the Zomato dataset is to urge a fair idea about various factors which can affect the establishment of restaurants. Above all, it will help the owners of new restaurants in finalizing their theme, menus, cuisines, costs, etc. at a particular location and for a particular age group. With this, the similarity between neighbors of Bangalore could also be found on basis of food and culture.

This paper aims to analyze the types of restaurants available in a particular locality of Bangalore. The rest of the paper is organized in the following manner. First, the literature is reviewed on restaurants, various factors affecting the success or failure of restaurants like location, cuisines, local business, etc. Then research methodology is explained which includes various commands which were used to

analyze the data and graphically represent the empirical results.

2. Motivation

The most relevant parameter to our work i.e. Location is found as an important criterion in the success or failure of a restaurant business [1-4]. Tayeen et. al. worked on it by integrating two data sets one from Yelp to gather reviews and business information and the second is the location Dataset collected from city-data website for location-based information. They have adopted two different methodologies to analyze the impact of a given location namely relative location and parameterized location.

J. Wang and X. Yan [1] explored the performance-related characteristics of restaurants in different regions using three subsystems including location segmentation, restaurant clustering, and regional business performance. For this Getis-ord Gi* statistical tool is used. The authors emphasized on two main areas in location analysis namely "location selection and location evaluation". For the location selection, critical evaluation of location data should be done including several other parameters. Whereas such research by D. L. Widaningrum et. al.[2] focused on Geo-visualization, issues related to geographical information system utilization, and its visualization using various data formats to visualize spatial data from various sources, so that decisions could be made more effective for restaurants success.

J. Hanaysha [4] examined the direct effect of price fairness and restaurant location on the equity of a brand in the Malaysian market. The author concluded that a location that is visible and accessible to customers (distance to the location) plays a significant role in the determination of business success.

3. Methodology: -

Hadoop framework as the suite comprises of various components and services that enable processing of huge datasets. Sensitive datasets and that require efficient handling are selected for current research. Hadoop ecosystem is integrated with the HIVE data-warehouse infrastructure tool for data querying and analysis. HIVE resides on top of Hadoop that is used to handle data within the Hadoop Distributed File System. HDFS is used as a repository to store large datasets. Hive-QL processes structured data that is stored inside HDFS.

The Bangalore restaurant that as it is collected from Kaggle.com and dataset is accurate until March,2019 to that available on Zomato website. The dataset is 547.48 MB in size and is in xlsx format. It consists of 56,251 rows and 17 columns. Initially, dataset contained lots of clutter and empty fields which need pre-processing to make it usable for accurate analysis through HIVE tables. So, to use this data inside the Hadoop hive it was pre-processed in Excel to remove duplicate rows and columns. After the removal of junk data, 51713 rows were loaded in HIVE tables. According to research question, only two columns namely - restaurant type and city location are kept and the rest were deleted. Then this file is converted into CSV Format. The converted file is then stored on HDFS using the below command:

hadoop fs -put '/home/cloudera/Downloads/rest_rq1.csv'/ zomato

This command stored the file rest_rq1.csv containing restaurant data into Hadoop HDFS directory named as

Zomato. Table was created inside hive for handling this data and for that following command is used:-

CREATE EXTERNAL TABLE IF NOT EXISTS rest_rq1(rest_type string, city string)
ROW FORMAT DELIMITED
FIELDS TERMINATED BY ‘,’
LINES TERMINATED BY ‘\n’
STORED AS TEXTFILE
Location ‘/home/cloudera/Documents/restaurant_file’
TBLPROPERTIES(‘skip.header.line.count’= ‘1’);

After table creation, the data is loaded into the hive table rest_rq1 using below query: -
LOAD DATA INPATH ‘zomato/rest_rq1.csv’ OVERWRITE INTO TABLE rest_rq1;

4. Information Extraction: -

The data has been analyzed in order to get answers to the following questions related to ourbusiness data.

RQ1:- What is the restaurant count of a particular type in Bangalore?

The HIVE query for this is:-

```
SELECT rest_type,count(rest_type)
FROM rest_rq1
GROUP BY rest_type;
```

With this query we get to know about the total number of restaurants of a particular category located in Bangalore.

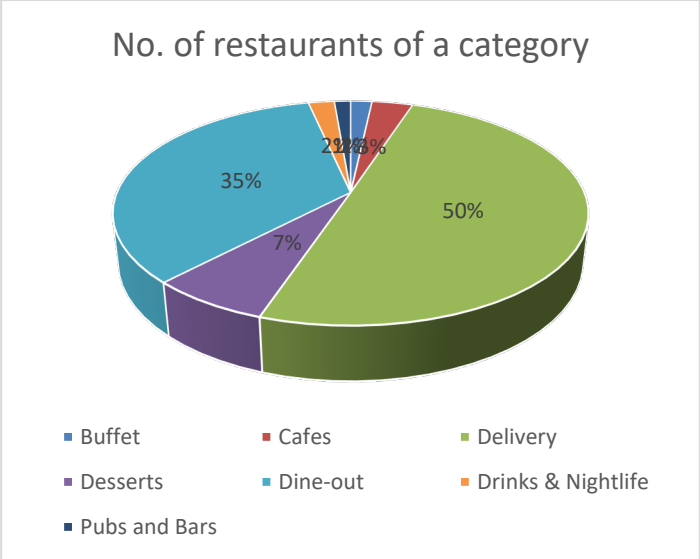

Fig:1 Number of restaurants of a particular category in Bangalore

Inference:- In Bangalore Delivery and Dine-out type restaurants were preferred over other types of restaurants. It shows that majority of people in Bangalore order food either at home or went outside. Whereas, Buffet, Drinks and Nightlife and Pubs and Bars type of services were offered by few restaurants.

RQ2:- What is the restaurant count of a particular type for each locality in Bangalore?

With this query we get a fair idea about the number of restaurants of particular types located ina different locality of Bangalore. The HIVE query for this is:-

```
SELECT city,rest_type, count(*)FROM rest_rq1
GROUP BY city,rest_ type;
```

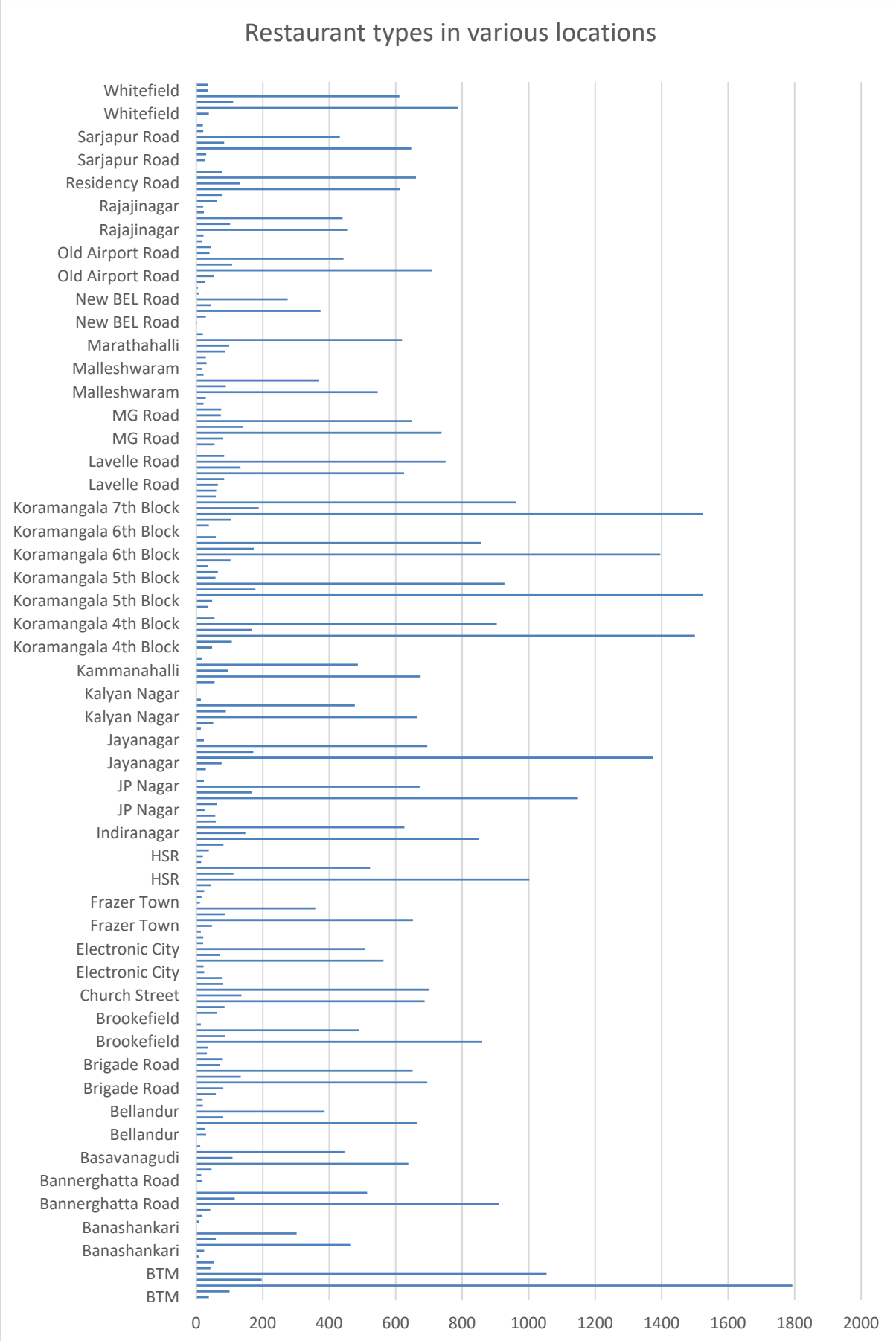

Fig: 2 The number of restaurant types at various locations

4.1 BTM:- In BTM Delivery type restaurants were preferred over other types of restaurants, followed by Dine-out. Buffet types are least preferred.

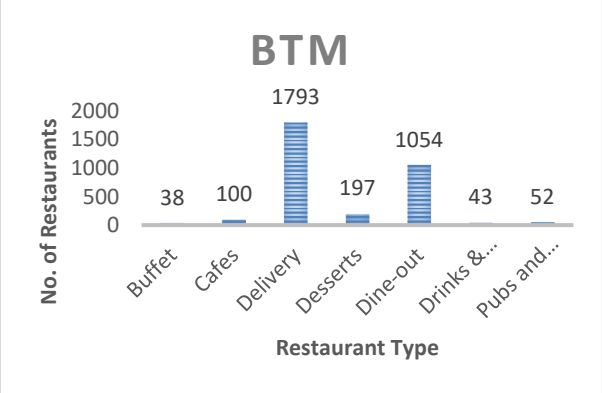

Fig:3 Number of different types of restaurants in BTM, Bangalore

4.2 Banashankari:- In Banashankari Delivery type restaurants were preferred over other typesof restaurants, followed by Dine-out. Buffet types are least preferred. Pubs and Bars facility was not provided by any restaurant.

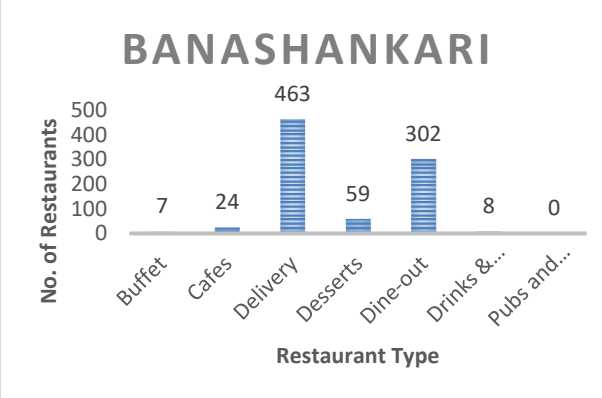

Fig:4 Number of different types of restaurants in Banashankari, Bangalore

4.3 Bannerghatta:- In Bannerghatta Delivery type restaurants were preferred over other types of restaurants, followed by Dine-out. Buffet types are least preferred. Pubs and Bars facility was not provided by any restaurant.

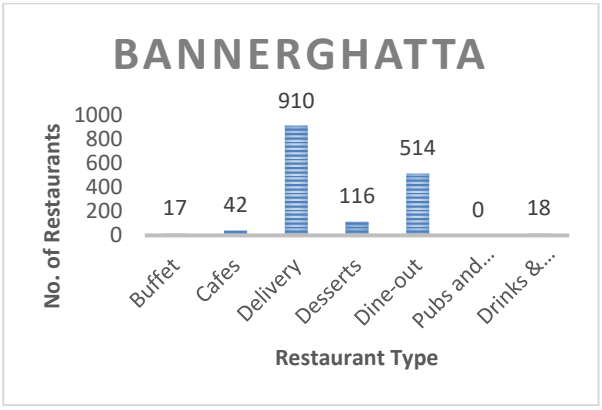

Fig:5 Number of different types of restaurants in Bannerghatta, Bangalore

4.4 Basavanagudi:- In Basavangudi Delivery type restaurants were preferred over other typesof restaurants, followed by Dine-out. Drinks & nightlife types are least preferred. Pubs andBars facility was not provided by any restaurant.

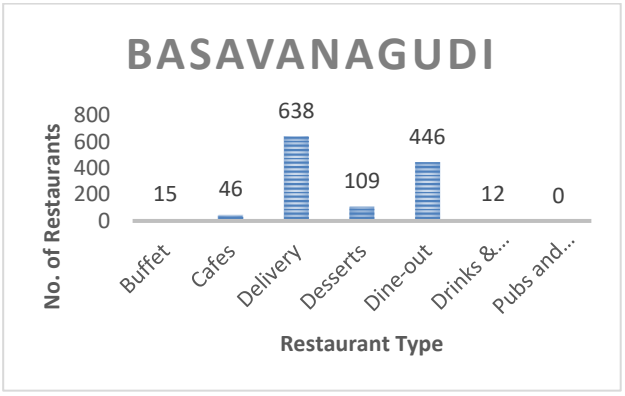

Fig:6 Number of different types of restaurants in Basavangudi, Bangalore

4.5 Bellandur:- In Bellandur Delivery type restaurants were preferred over other types ofrestaurants, followed by Dine-out. Pubs and Bars types are least preferred.

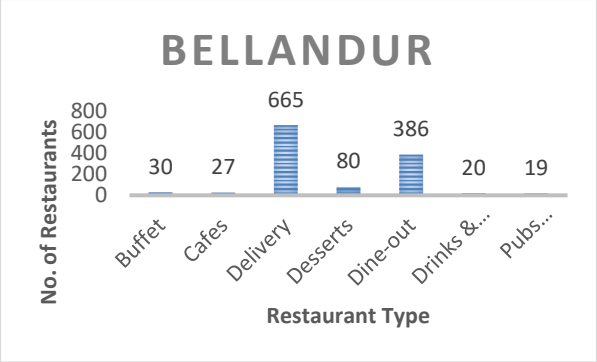

Fig:7 Number of different types of restaurants in Bellandur, Bangalore

4.6 Brigade Road:- At Brigade Road Delivery type restaurants were preferred over other typesof restaurants, followed by Dine-out. Buffet types are least preferred.

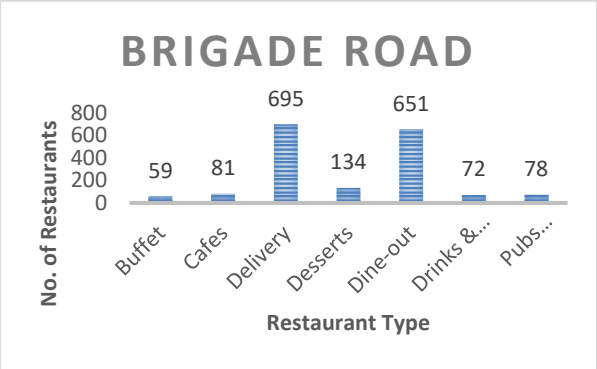

Fig:8 Number of different types of restaurants in Brigade road, Bangalore

4.7 Brookefield:- In Brookfield Delivery type restaurants were preferred over other types of restaurants, followed by Dine-out. Drinks & nightlife types are least preferred. Pubs and Barsfacility was not provided by any restaurant.

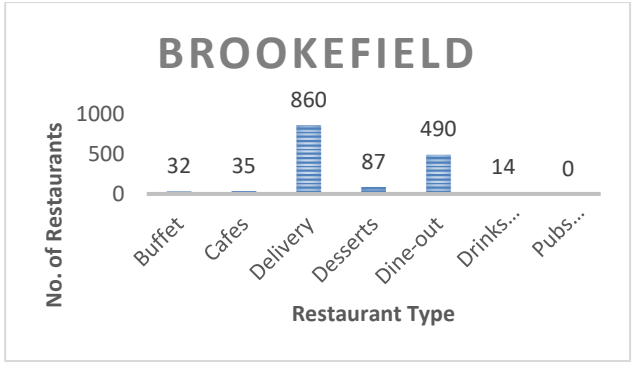

Fig:9 Number of different types of restaurants in Brookefield, Bangalore

4.8 Church Street:- At Church Street Dine-out type restaurants were preferred over other typesof restaurants, followed by Delivery. Buffet types are least preferred.

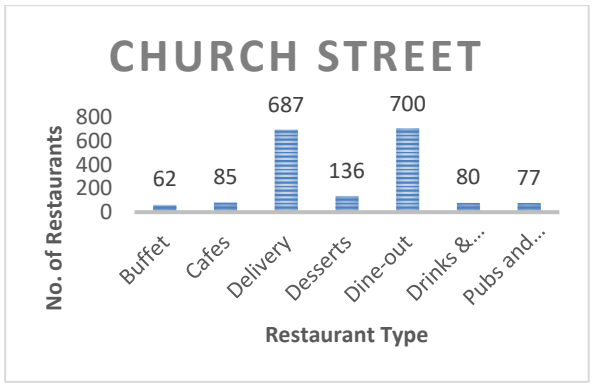

Fig:10 Number of different types of restaurants in Church Street, Bangalore

4.9 Electronic city:- In Electronic city Delivery type restaurants were preferred over other typesof restaurants, followed by Dine-out. Drinks & nightlife, Pubs & Bars type are least preferred.

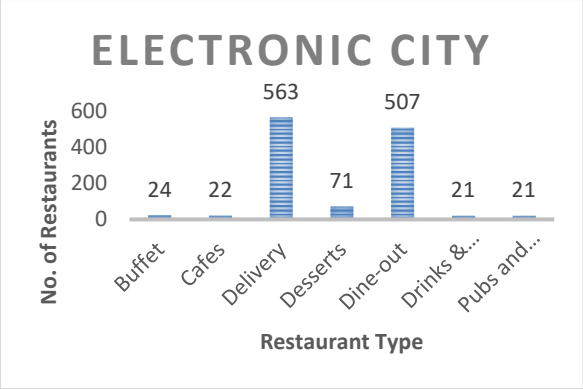

Fig:11 Number of different types of restaurants in Electronic City, Bangalore

4.10 Frazer Town:- In Frazer town Delivery type restaurants were preferred over other types ofrestaurants, followed by Dine-out. Drinks & nightlife types are least preferred.

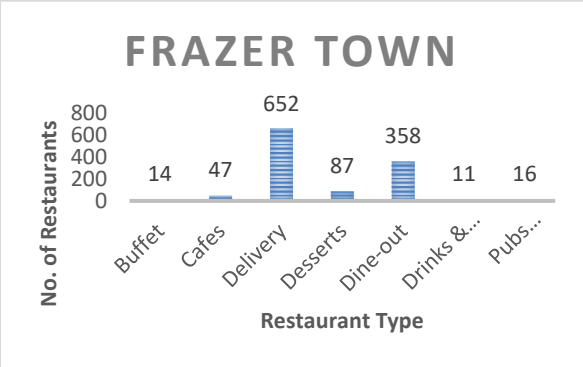

Fig:12 Number of different types of restaurants in Frazer Town, Bangalore

4.11 HSR:- In HSR Delivery type restaurants were preferred over other types of restaurants,followed by Dine-out. Drinks & nightlife types are least preferred.

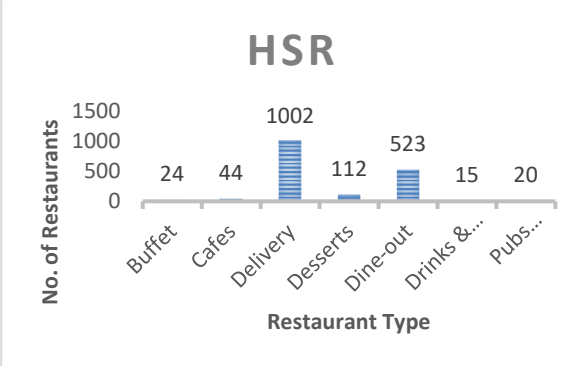

Fig:13 Number of different types of restaurants in HSR, Bangalore

4.12 Indiranagar:- In Indiranagar Delivery type restaurants were preferred over other types ofrestaurants, followed by Dine-out. Buffet types are least preferred.

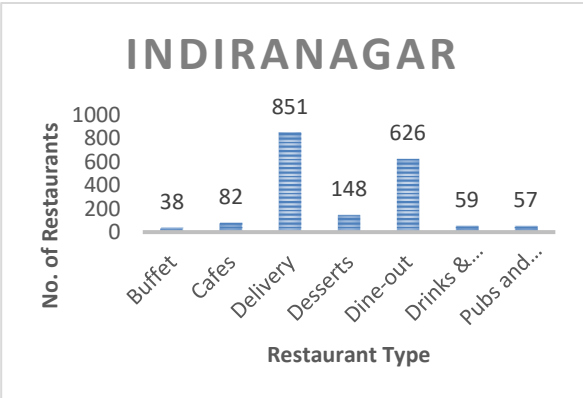

Fig: 14 Number of different types of restaurants in Indiranagar, Bangalore

4.13 JP Nagar:- In JP Nagar Delivery type restaurants were preferred over other types of restaurants, followed by Dine-out. Drinks & nightlife types are least preferred. Pubs and Barsfacility was not provided by any restaurant.

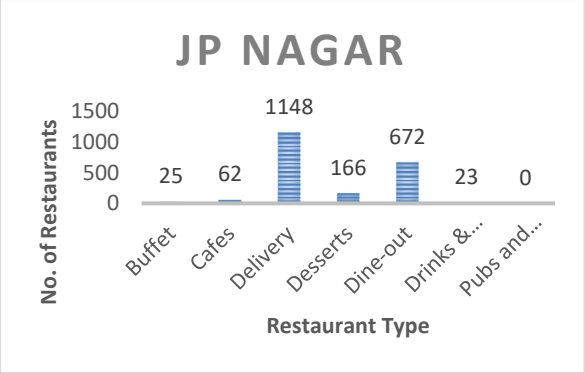

Fig:15 Number of different types of restaurants in JP Nagar, Bangalore

4.14 Jayanagar:- In Jayanagar Delivery type restaurants were preferred over other types of restaurants, followed by Dine-out. Drinks & nightlife types are least preferred. Pubs and Barsfacility was not provided by any restaurant.

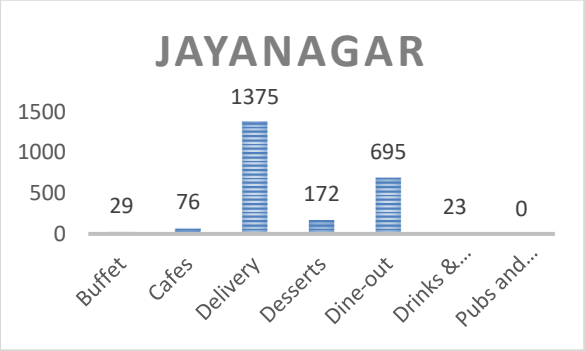

Fig:16 Number of different types of restaurants in Jayanagar, Bangalore

4.15 Kalyan Nagar:- In Kalyan Nagar Delivery type restaurants were preferred over other typesof restaurants, followed by Dine-out. Drinks & nightlife, Buffet types are least preferred. Pubs and Bars facility was not provided by any restaurant.

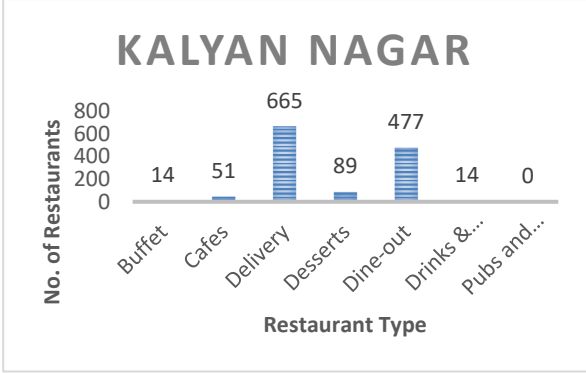

Fig: 17 Number of different types of restaurants in Kalyannagar, Bangalore

4.16 Kammanahalli:- In Kammanahalli Delivery type restaurants were preferred over other types of restaurants, followed by Dine-out. Drinks & nightlife types are least preferred. Pubs and Bars, Buffet facility was not provided by any restaurant.

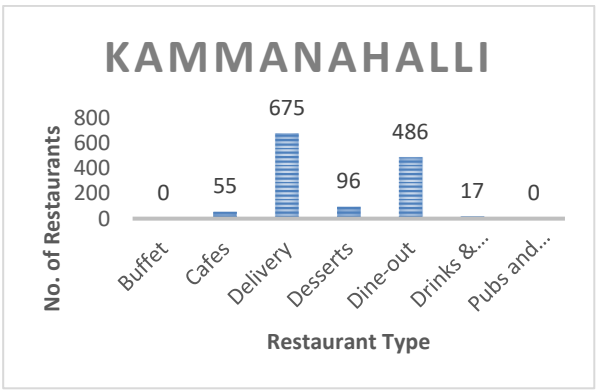

Fig:18 Number of different types of restaurants in Kammanahalli, Bangalore

4.17 Koramangala 4th block:- Delivery type restaurants were preferred over other types of restaurants, followed by Dine-out. Buffet types are least preferred. Pubs and Bars facility wasnot provided by any restaurant.

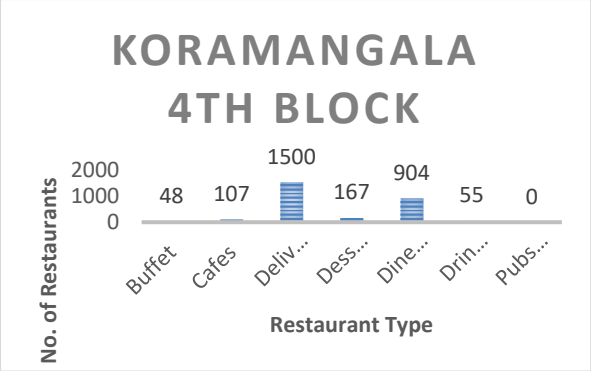

Fig:19 Number of different types of restaurants in Koramangala 4th Block, Bangalore

4.18 Koramangala 5th block:-

Delivery type restaurants were preferred over other types ofrestaurants, followed by Dine-out. Buffet types are least preferred.

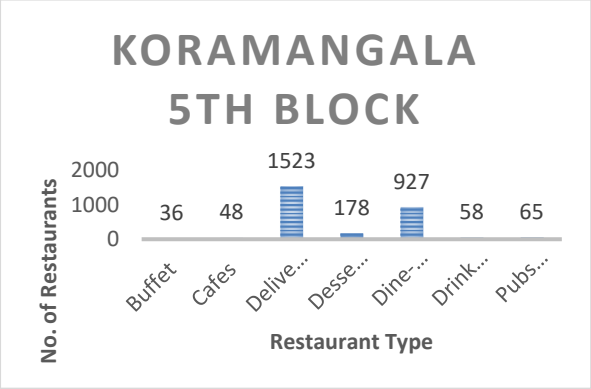

Fig:20 Number of different types of restaurants in Koramangala 5th Block, Bangalore

Koramangala 6th block:- Delivery type restaurants were preferred over other types of restaurants, followed by Dine-out. Buffet types are least preferred. Pubs and Bars facility was not provided by any restaurant.

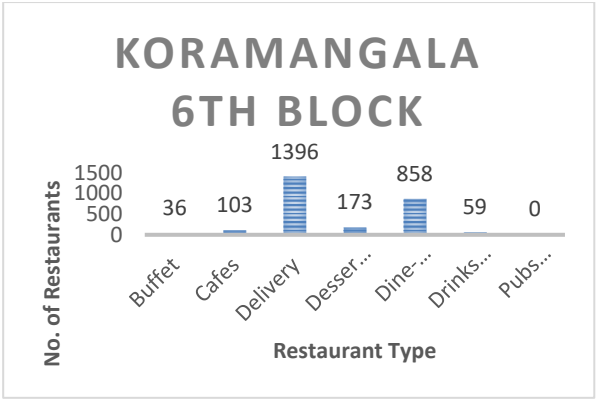

Fig:21 Number of different types of restaurants in Koramangala 6th Block, Bangalore

4.19 Koramangala 7th block:-

Delivery type restaurants were preferred over other types ofrestaurants, followed by Dine-out. Buffet types are least preferred.

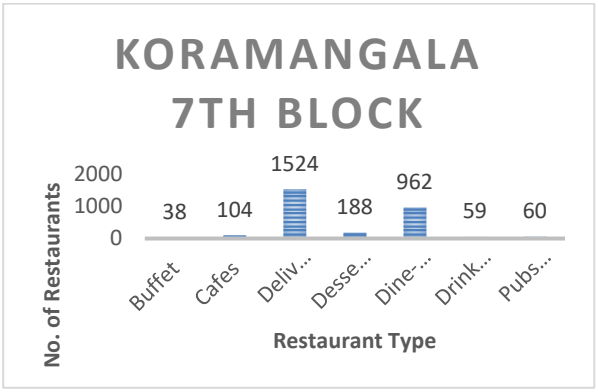

Fig:22 Number of different types of restaurants in Koramangala 7th Block, Bangalore

4.20 Lavella:- In Lavella Delivery type restaurants were preferred over other types of restaurants,followed by Dine-out. Buffet types are least preferred. Pubs and Bars facility was not provided by any restaurant.

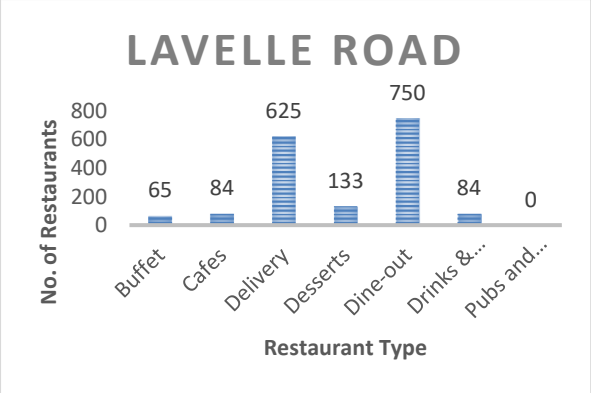

Fig:23 Number of different types of restaurants in Lavella, Bangalore

4.21 MG Road:- At MG Road Delivery type restaurants were preferred over other types ofrestaurants, followed by Dine-out. Buffet types are least preferred.

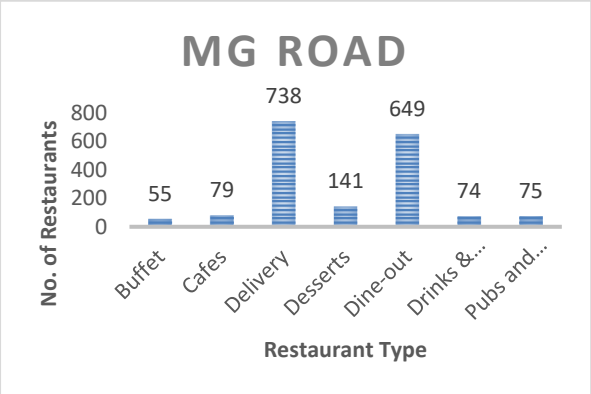

Fig:24 Number of different types of restaurants in MG Road, Bangalore

4.22 Malleshwaram:- In Malleshwaram Delivery type restaurants were preferred over othertypes of restaurants, followed by Dine-out. Pubs and Bars type of restaurants are least preferred.

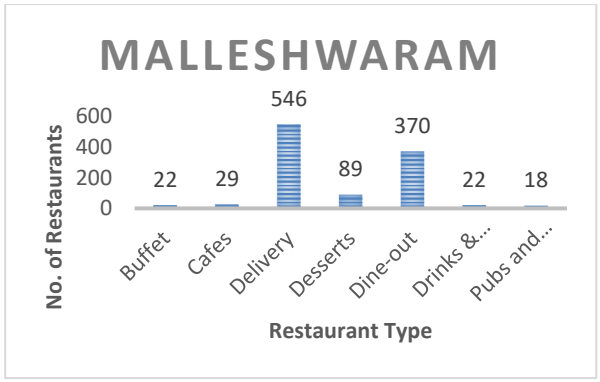

Fig:25 Number of different types of restaurants in Malleshwaram, Bangalore

4.23 Marathahalli:- In Marathahalli Dine-out type restaurants were preferred over other types of restaurants, followed by Desserts. Drinks & nightlife types are least preferred. Pubs and Bars facility is not provided by any restaurant.

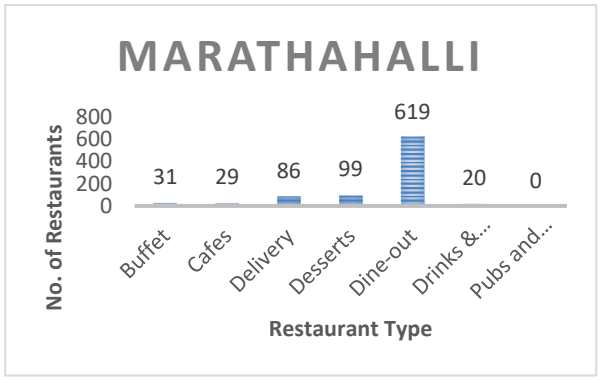

Fig:26 Number of different types of restaurants in Marathahalli, Bangalore

4.24 New BEL Road:- At new BEL Road Delivery type restaurants were preferred over othertypes of restaurants, followed by Dine-out. Buffet types are least preferred.

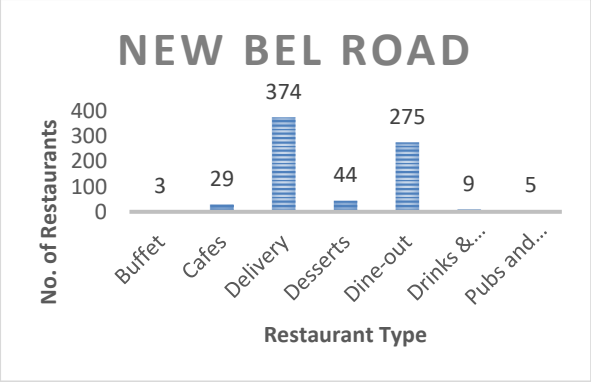

Fig:27 Number of different types of restaurants in New BEL Road, Bangalore

4.25 Old Airport road:- At Old Airport road Delivery type restaurants were preferred over othertypes of restaurants, followed by Dine-out. Buffet types are least preferred.

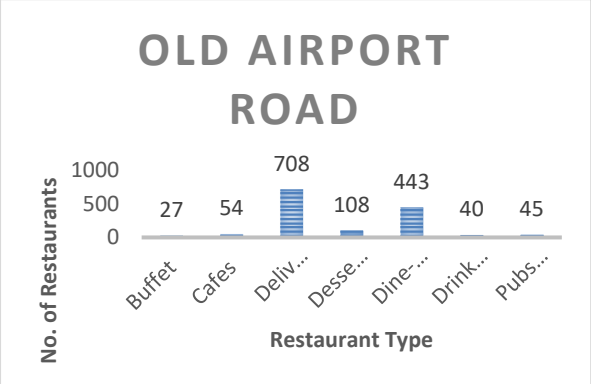

Fig:28 Number of different types of restaurants in Old Airport Road, Bangalore

4.26 Rajajinagar:- In Rajajinagar Delivery type restaurants were preferred over other types ofrestaurants, followed by Dine-out. Pubs and Bars types are least preferred.

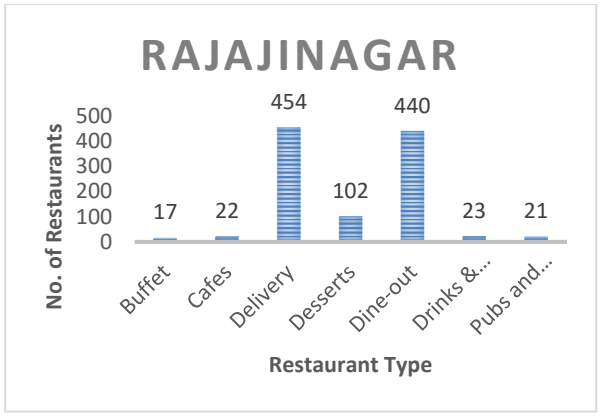

Fig:29 Number of different types of restaurants in Rajajinagar, Bangalore

4.27 Residency Road:- In Residency road Dine-out type restaurants were preferred over other types of restaurants, followed by Delivery. Buffet types are least preferred. Pubs and Bars facility was not provided by any restaurant.

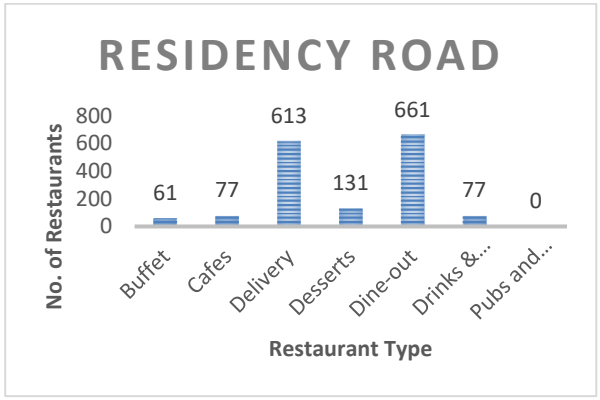

Fig:30 Number of different types of restaurants in Residency Road, Bangalore

4.28 Sarjapur Road:- In Sarjapur road Delivery type restaurants were preferred over other types of restaurants, followed by Dine-out. Pubs and Bars types are least preferred.

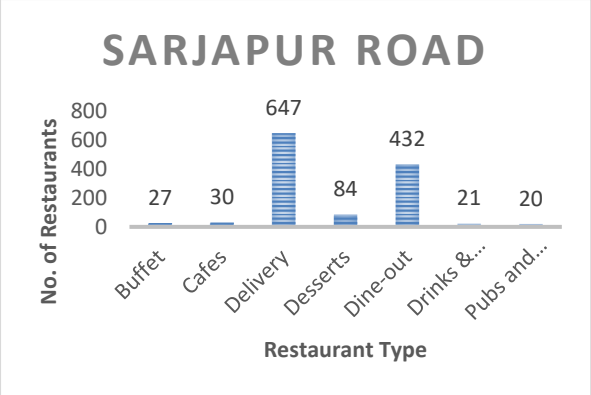

Fig:31 Number of different types of restaurants in Sarjapur Road, Bangalore

4.29 Whitefield:- In Whitefield Delivery type restaurants were preferred over other types of restaurants, followed by Dine-out. Only a single Buffet type restaurant was found and is least preferred.

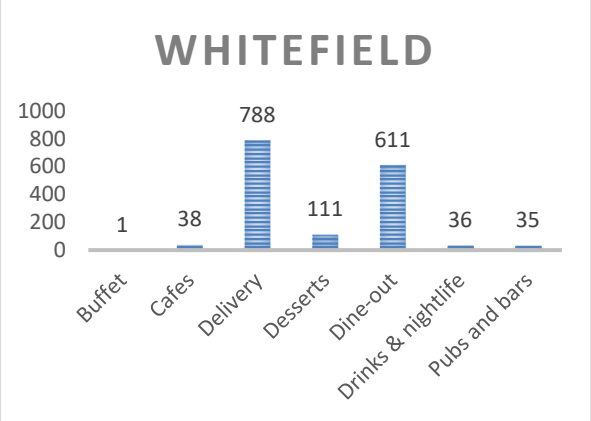

Fig:32 Number of different types of restaurants in Whitefield, Bangalore

5. Discussions & Conclusions

Bangalore, officially known as Bengaluru is the capital of Karnataka and has a population of more than 10 million around the metropolitan population which makes it the third-most populated city. Bangalore has a unique food culture. Restaurants from all over the world can be found here. The growing number of restaurants is, what attracts the most to get some useful insights and interesting facts.

Most of the restaurants provide a similar facility. Seven types of restaurants through Zomato Dataset were analyzed spread over 30 locations in Bangalore. More than 50% of people prefer the food to be delivered at their place (home/office/business) and approximately 35% of people want to go out and dine. A significantly low population favors Buffet and cafes, which points that people don't want to spend time outside and are very particular about taste. The people who want to dine out naturally seem that they don't want to spend time cooking. Moreover, a very low percentage of people want drinks and nightlife, and that is the reason Pubs and Bar facility has a significantly low contribution. In Marathalli, the Delivery kind of restaurants ratio has a significant decline and dine-out type restaurants are preferred.

From the analysis of the dataset, it is found that people of Bangalore prefer a delivery and dine out as compared to other options available at the restaurants. This pattern is found true on 28 out of 29 locations analyzed for the Zomato dataset. Hence, it may be concluded that a combination of delivery and dine out could be a preferred type of restaurant in Bangalore. Further research could be carried out by taking other measures like cost, cuisines, reviews under consideration.

6. References

1. Wang, Jing and X. Yan.(2017) "How Location Matters in Restaurant Success?" *PACIS*.
2. D L Widaningrum[1], I Surjandari[1] and A M Arymurthy.(2018) "Visualization of Fast Food

Restaurant Location using Geographical Information System." IOP Conference

Series: Earth and Environmental Science

3. Abu Saleh Md. Tayeen, Abderrahmen Mtibaa, and Satyajayant Misra. (2019.) Location, location, location! quantifying the true impact of location on business reviews using a Yelp dataset. In Proceedings of the 2019 IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining(ASONAM '19). Association for Computing Machinery, New York, NY, USA, 1081-1088. DOI:https://doi.org/10.1145/3341161.3345334
4. Hanaysha, Jalal.(2021) "Restaurant Location and Price Fairness as Key Determinants of Brand Equity: A Study on Fast Food Restaurant Industry." *Business and Economic Researeh* [Online], 6. 1 (2016): 310-323. Web. 30 Mar. 2021