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Market Saturation Report on Restaurants in

Bengaluru (aka Bangalore), India

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UNCW BAN 530 APPLICATIONS IN BUS ANALYTICS

Market Saturation: Restaurants in Bengaluru, India

Objectives –

- o Analyze Current Trends in Cuisine by city using Tableau or JMP.
    - o What is the cuisine that appears most within a given city?
    - o What are the reviews about the restaurants in each city?
- o Explore Customer Preferences of attributes by city using Tableau or JMP.
    - o Do most restaurants have delivery in each city?
    - o Do most restaurants have online reservations in each city?
    - o What are the most common things Customer reviews talk about in each city?
- o Examine Types of restaurants in the area by city using Tableau or JMP.
    - o Which type of restaurant is most present in each city?
        - ➢ What happens if more of this type of restaurant is added?
        - ➢ What happens if some of this type of restaurant closes?
    - o Which type of restaurant is least present in each city?

Descriptive Analytics –

Data Cleaning and Understanding

- o Preprocessing Data Analysis (see previous assignment)

    Initial status of data – (see previous assignment)

    Creating Factors – (see previous assignment)

    Save new File for other Software Programs – (see previous assignment)

- o Exploratory Data Analysis

    Explore Outlier Data – (see previous assignment)

    Explore Type of Restaurants – Using R Studio, The Types of Restaurants in each location needed to be examined to determine which Types were missing in the city locations. It was determined that Pubs and Nightlife were only in 17 City locations which means it was NOT in 13 locations. Additionally, Buffets were not located in Whitefield or Kammanahalli. Only Kammanahalli was missing both. The most common type of Restaurant was by far the Delivery type and the second most common type was the Dine-out type, both reflecting what was seen as a result of the COVID-19 pandemic.

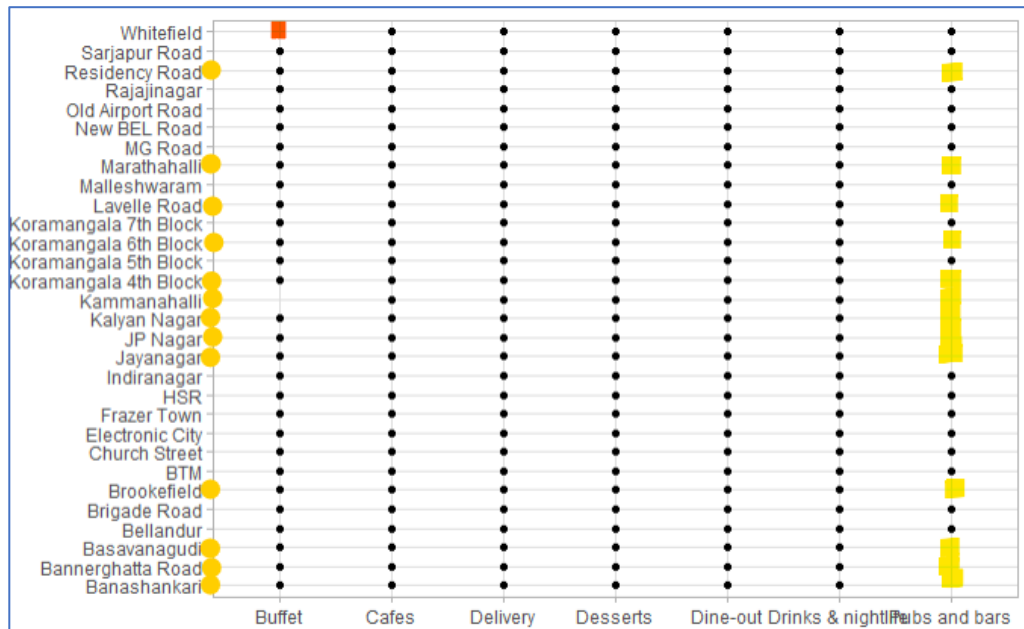# Market Saturation: Restaurants in Bengaluru, India

Figure 1 The Types of Restaurants shown by City Location.

Explore Approximate Costs - Using Tableau, a dashboard was created to look at what the Median Costs were for two people dining in a subset of restaurants. Considering that one US $1 is approximately equivalent to ₹82.23 Indian Rupees, you can tell that the US dollar is far more valuable.
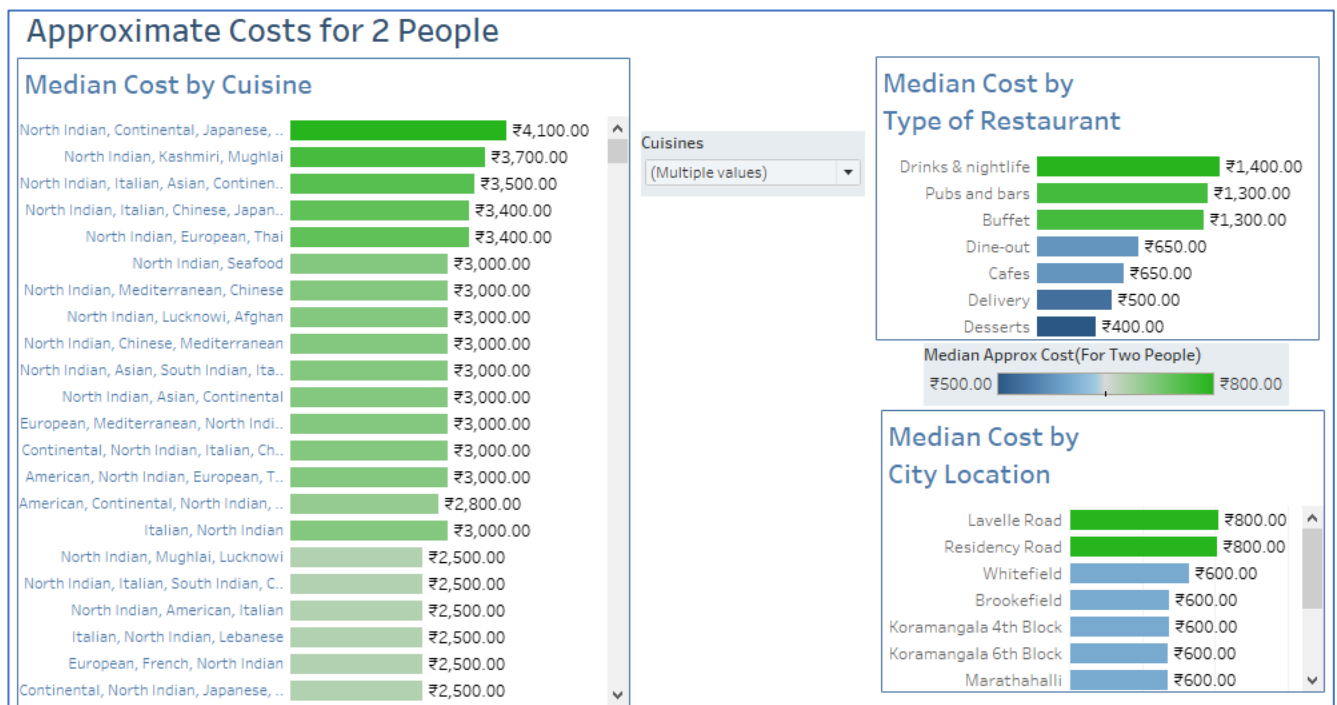

Figure 7 Dashboard looking at all cuisines with North Indian Cuisine as well as overall Median Costs

Market Saturation: *Restaurants in Bengaluru, India*

Approximate Cost per Type of Restaurant on the top right side of the dashboard (see Figure 7) clearly showing that the highest costs are associated Drinks & Nightlife as well as Pubs and Bars. This is most likely due to the high expenses related to purchasing alcohol. Cuban Mojitos are one example of a popular drink according to the dataset's favorite dishes. In Bengaluru, there is an annual increase in the alcohol excise tax, so expenses will keep growing. For August 2023, Indian-made liquor (IML) will surge by 20% on all slabs, while beer will experience a hike from 175% to 185%[1].
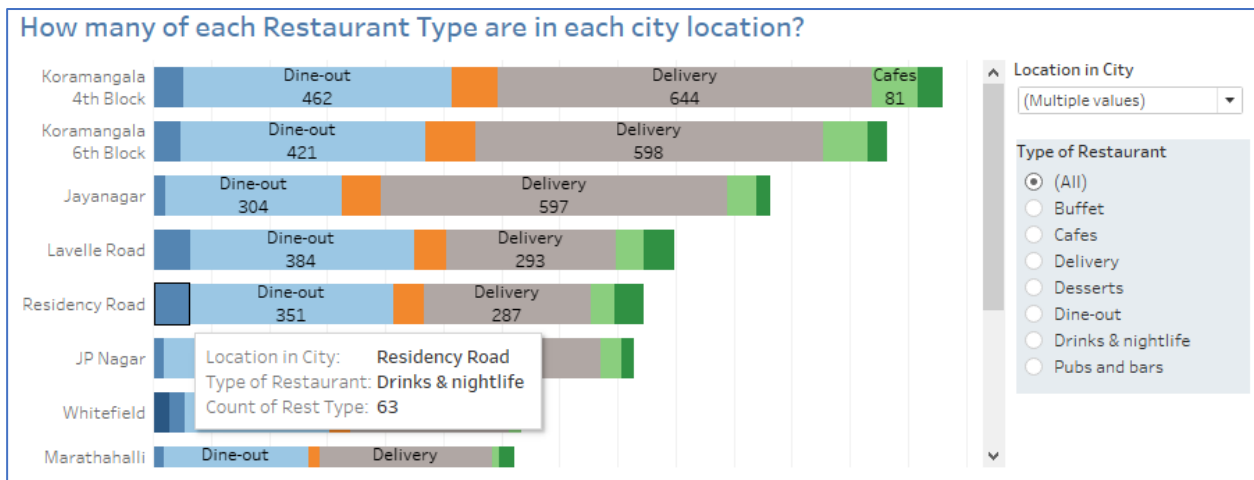

Figure 8 Dashboard showing the comparison of Types of Restaurants, highlighting Residency Road

Approximate Median Cost by City Location, shown in the bottom left of Figure 7, specifically highlights that the Lavelle and Residency Road locations cost the most at ₹800 for 2 people. Figure 8 shows the Residency Road has one of the highest number of Drinks & Nightlife restaurants out of the Types of Restaurants that do NOT have Pubs & Bars. Apparently, without the competition from the Pubs and Bars, they can increase the cost of drinks.

Approximate cost per cuisine were much more complicated because the data collected had 1,692 different descriptions for a restaurant's cuisine. The detail will be looked at later with JMP's Data Mining features. What is shown in Figure 7 relates to costs, specifically, and it shows that North Indian + Japanese costs approximately ₹4,100 which is the most for a North Indian Cuisine. Other

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[1] https://www.thehindu.com/life-and-style/food/bengaluru-pub-owners-brace-for-impact-as-alcohol-prices-to-reach-new-heights/article67093245.ece

cuisines like Kashmiri, Mughlai, Italian as well as Asian cuisines like Chinese or Thai are also up at the top of the expensive list. This likely has to do with seafood, which is hard to keep fresh for customers, yet very popular.
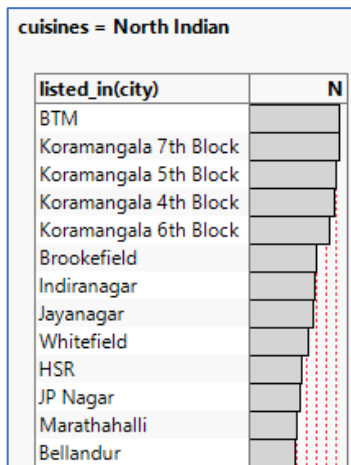
Figure 9 Overall Analysis shows North Indian and North Indian Chinese Restaurants far outnumber the others.
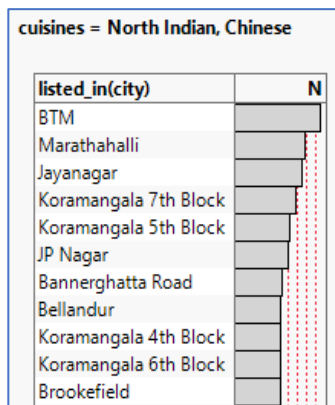
Figure 10 Cities where North Indian Food is most popular.

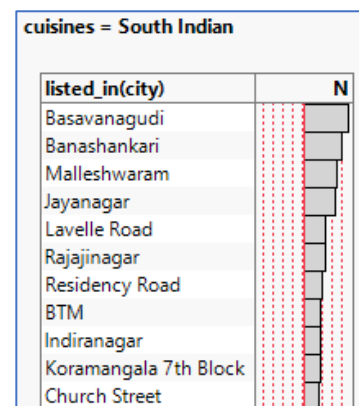*Figure 11 Cities* where North Indian, Chinese Food is most popular.
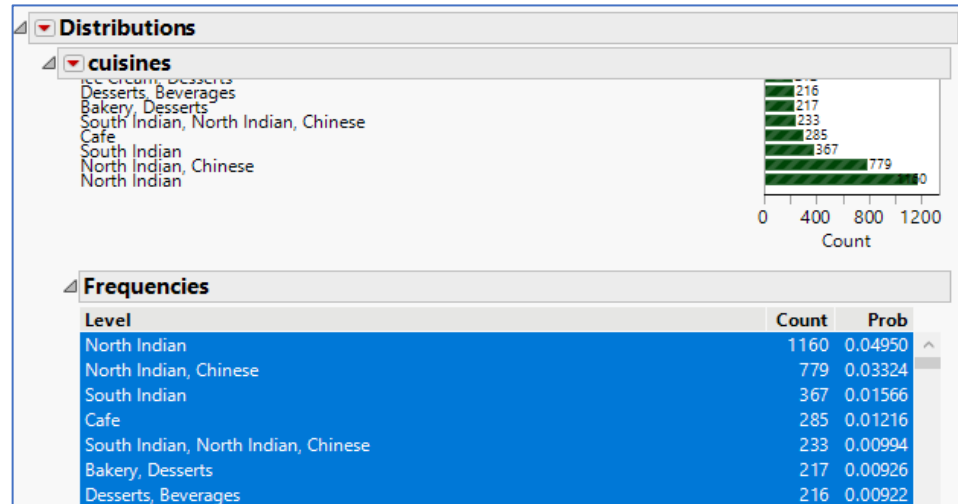
Figure 12 Cities where South Indian Food is most popular.

o Cuisine Segmentation Analysis

Viewing the general distribution of the types of Cuisines (see Figure 9 above), both the vertical bar chart and the Frequency table show that North Indian cuisine is the most popular by almost double that of North Indian combined with Chinese Cuisine (4.95% of the total restaurants reported). Chinese food is widely popular because commodity trading is prevalent due to being in the southern peninsula where a large portion of the population lives (3.32% of the total restaurants reported). This is followed in third place by South Indian cuisine. Considering where Bengaluru is in the densely populated southern area of the Indian Continent, this makes sense (1.57% of the total restaurants reported). (Note: the separation of North Indian and Nort Indian, Chinese cuisine is probably due to a customer survey where multiple cuisine options were allowed to be chosen creating dozens of instances of overlap in the cuisine categorical variable).

In JMP's Tabulate feature, with the appropriate Data Filter, it is easy to see in Figure 10 that North Indian Cuisine is most popular in the cities of BTM, Koramangala (4th, 5th, 6th, & 7th blocks), Brookefield, Indiranagar and

Jayanagar with a total of 1160 restaurants in Bengaluru. North Indian, Chinese cuisine was second most popular with 779 restaurants (see Figure 11). Additionally, South Indian cuisine was third most popular in Bengaluru with 367 restaurants (see Figure 12).

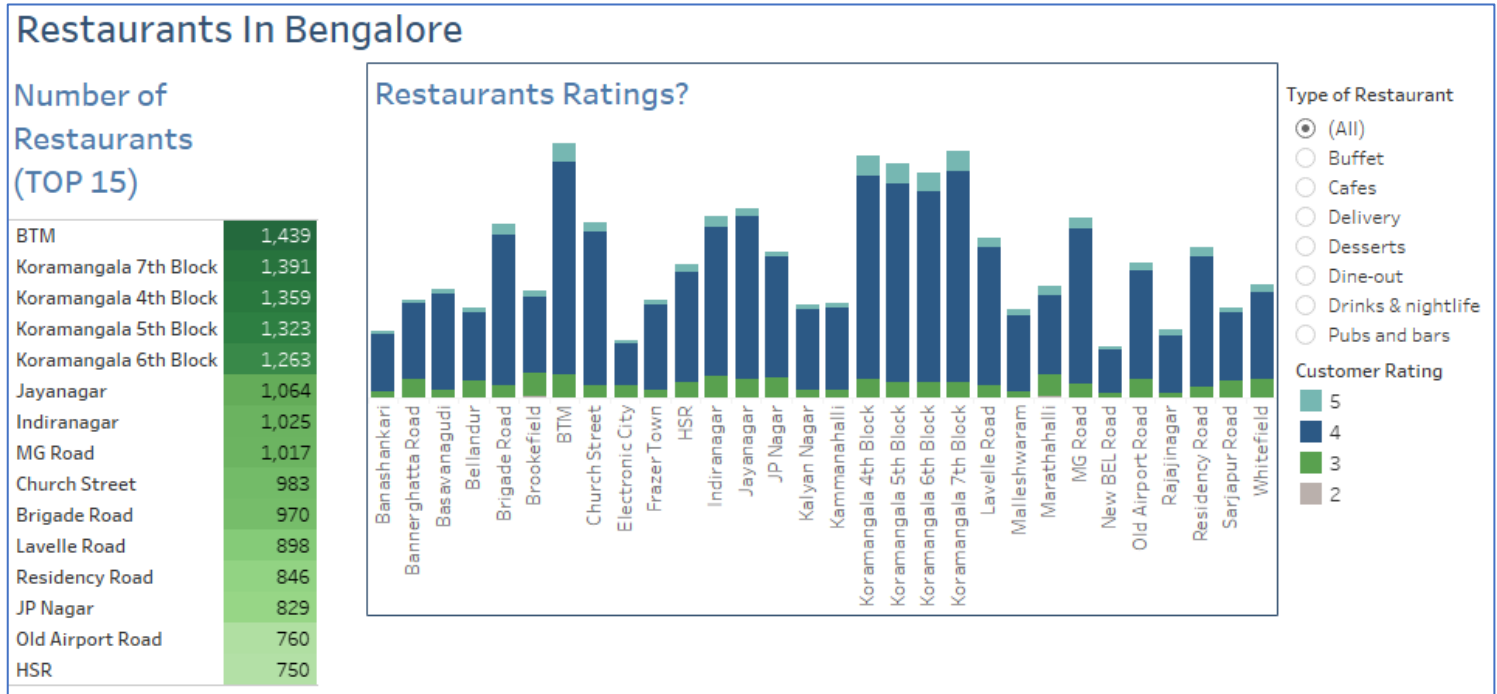- o   Customer Preferences Analysis

Figure 13 Dashboard created in Tableau to show most popular Neighborhoods.

Ratings - Which Neighborhoods receive the Highest ratings? Out of a scale from 1-5, more consumers give a rating of "4", as shown in the dark blue above. The neighborhoods receiving "5"'s are BTM and Koramangala's 4th, 5th, 6th, and 7th blocks. This corresponds with the actual quantity of restaurants in each of those neighborhoods. The dashboard created in Figure 13 allows the user to look at specific Restaurant Types. For instance, when looking only at Buffets, Koramangala 4th block has the most "5" ratings. It is also very popular in ratings for Cafés. Interesting to note that Lavelle Road has more "5" Ratings than Residency Road does.
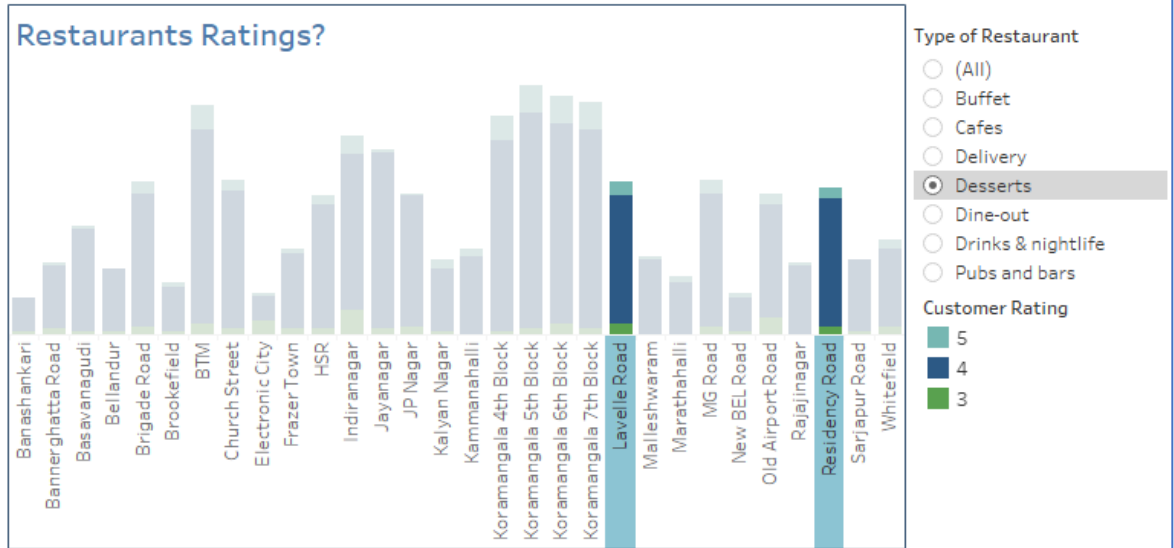
Market Saturation: *Restaurants in Bengaluru, India*

Restaurants In Bengalore

Number of Restaurants (TOP 15)

BTM	1,439
Koramangala 7th Block	1,391
Koramangala 4th Block	1,359
Koramangala 5th Block	1,323
Koramangala 6th Block	1,263
Jayanagar	1,064
Indiranagar	1,025
MG Road	1,017
Church Street	983
Brigade Road	970
Lavelle Road	898
Residency Road	846
JP Nagar	829
Old Airport Road	760
HSR	750

Restaurants Ratings?

Type of Restaurant
- (All)
- Buffet
- Cafes
- Delivery
- ⊙ Desserts
- Dine-out
- Drinks & nightlife
- Pubs and bars

Customer Rating
- 5
- 4
- 3

Continuing with our look at Residency Road and Lavelle Road, they fall into the upper middle for the number of restaurants and positive ratings. In looking at Buffets, they are at the top for the number of ratings but in the middle for the number of "5"'s. They are in the middle for the number of ratings for Cafés, Delivery, Dining Out, as well as Drinks & Nightlife. With desserts, however, they are in the middle of the number of ratings and the scores, but for desserts in Bengaluru, in general, there are a whole lot less ratings. Desserts are an area worth exploring.

Which Neighborhoods receive the Highest overall ratings? Out of a scale from 1-5, more consumers give a rating of "4", as shown in the dark blue above. The neighborhoods receiving "5"'s are BTM and Koramangala's 4th, 5th, 6th, and 7th blocks. This corresponds with the actual quantity of restaurants in each of those neighborhoods. The dashboard created in Figure 13 allows the user to look at specific Restaurant Types. For instance, when looking only at Buffets, Koramangala 4th block has the most "5" ratings.
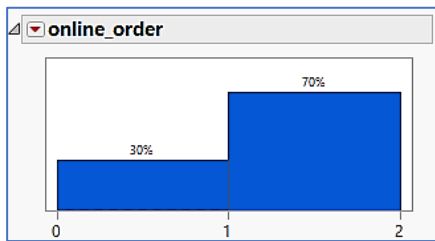
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Figure 14 Online ordering where "no" = 0-1 and "yes" = 1-2

Online Ordering – when the online ordering data was cleaned in the preprocessing step, values were transformed into binary values to easily visualize the results (see figure 14). It can be easily seen that 70% of the restaurants reported have online ordering. As the COVID-19 pandemic hit, citizens were ordered to stay at home and thus, more online ordering was demanded by customers. As shown on the right in Figure 15, the city HSR took this to heart and leads the other cities reported by a large margin with an 81% online ordering. However, cities such as MG Road, Church Street, Brigade Road, Lavelle Road, and Residency Road are falling behind with only 54% to 58% online ordering.

listed_in(city)		N	Mean	% of Total
BTM	online_order	1439	0.76	6.66%
Koramangala 7th Block	online_order	1391	0.71	6.04%
Koramangala 4th Block	online_order	1359	0.74	6.12%
Koramangala 5th Block	online_order	1324	0.73	5.85%
Koramangala 6th Block	online_order	1265	0.73	5.64%
Jayanagar	online_order	1090	0.77	5.12%
Indiranagar	online_order	1025	0.64	4.01%
MG Road	online_order	1017	0.57	3.51%
Church Street	online_order	983	0.56	3.36%
Brigade Road	online_order	970	0.58	3.41%
Lavelle Road	online_order	898	0.55	2.99%
Residency Road	online_order	846	0.54	2.76%
JP Nagar	online_order	829	0.76	3.83%
Old Airport Road	online_order	760	0.67	3.09%
HSR	online_order	750	0.81	3.69%
Whitefield	online_order	635	0.70	2.70%
Marathahalli	online_order	622	0.74	2.81%
Basavanagudi	online_order	606	0.75	2.76%
Brookefield	online_order	600	0.77	2.82%
Bannerghatta Road	online_order	550	0.76	2.54%
Frazer Town	online_order	546	0.77	2.56%
Kammanahalli	online_order	534	0.77	2.49%
Kalyan Nagar	online_order	521	0.78	2.47%
Bellandur	online_order	508	0.78	2.40%
Sarjapur Road	online_order	508	0.75	2.32%
Malleshwaram	online_order	498	0.69	2.08%
Rajajinagar	online_order	378	0.66	1.51%
Banashankari	online_order	373	0.78	1.77%
Electronic City	online_order	326	0.70	1.38%
New BEL Road	online_order	284	0.76	1.32%
All	online_order	23435	0.70	100.00%

Figure 15 Online ordering where the larger the mean, the more online ordering is used by city.

As shown in Figure 16, Lavelle Road outnumbers Residency Road in Online Reservations (309 to 293). There is room for either location to grow these services.
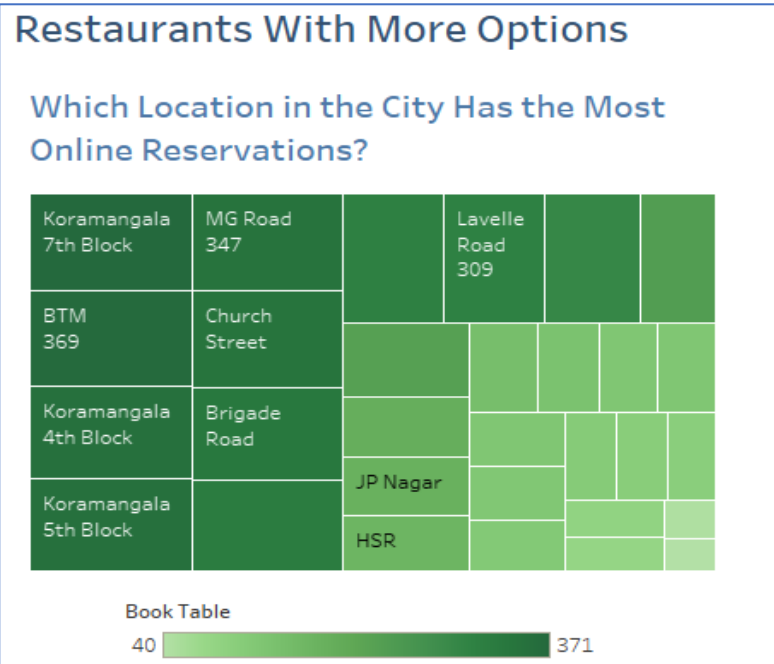

Figure 16 Online ordering, in green, shows that Lavelle is 10th in the most online reservations.

Market Saturation: Restaurants in Bengaluru, India

Online Reservations – The book_table or Online Reservations data was also turned into binary values for data visualizations. On the left in Figure 18, you can see that only 26% of the restaurants reported have online reservations. Customers were reluctant to eat in a public establishment during the pandemic as they were afraid their wait staff, customers or the cleanliness of the restaurant would cause them to get sick. Looking at Figure 17, we can see that only 5 cities reported having online reservations of 30% or higher. More importantly, the 5 cities of Basavanagudi, Bannerghatta Road, Kammanahalli, Benashankari, and New BEL Road have this as an almost forgotten amenity and should seriously look at changing this attribute.
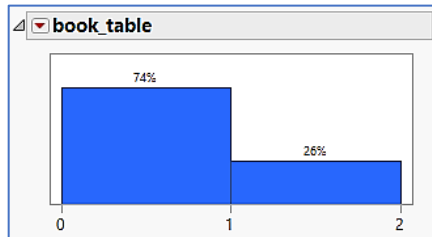

Figure 17 Online ordering where "no" = 0-1 and "yes" = 1-2

listed_in(city)		N	Mean	% of Total
BTM	book_table	1439	0.26	5.99%
Koramangala 7th Block	book_table	1391	0.27	6.03%
Koramangala 4th Block	book_table	1359	0.26	5.77%
Koramangala 5th Block	book_table	1324	0.27	5.75%
Koramangala 6th Block	book_table	1265	0.25	5.23%
Jayanagar	book_table	1090	0.23	4.00%
Indiranagar	book_table	1025	0.30	5.05%
MG Road	book_table	1017	0.34	5.64%
Church Street	book_table	983	0.35	5.60%
Brigade Road	book_table	970	0.34	5.43%
Lavelle Road	book_table	898	0.34	5.02%
Residency Road	book_table	846	0.35	4.76%
JP Nagar	book_table	829	0.21	2.86%
Old Airport Road	book_table	760	0.29	3.62%
HSR	book_table	750	0.22	2.70%
Whitefield	book_table	635	0.29	2.99%
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Brookefield	book_table	600	0.20	1.98%
Bannerghatta Road	book_table	550	0.19	1.69%
Frazer Town	book_table	546	0.22	1.95%
Kammanahalli	book_table	534	0.19	1.64%
Kalyan Nagar	book_table	521	0.21	1.79%
Bellandur	book_table	508	0.26	2.16%
Sarjapur Road	book_table	508	0.24	2.00%
Malleshwaram	book_table	498	0.25	2.00%
Rajajinagar	book_table	378	0.23	1.43%
Banashankari	book_table	373	0.11	0.65%
Electronic City	book_table	326	0.25	1.32%
New BEL Road	book_table	284	0.16	0.75%
All	book_table	23435	0.26	100.00%

Figure 18 Reservations where the larger the mean, the more reservations are used by city.

When looking at the other options that have been seen as attractive toward potential customers, Online Reservations, or the ability to Book a Table in Advance is stronger in the City Locations that simply have more restaurants, such as in BTM or the Koramangala blocks. As shown below in Figure 19, Lavelle

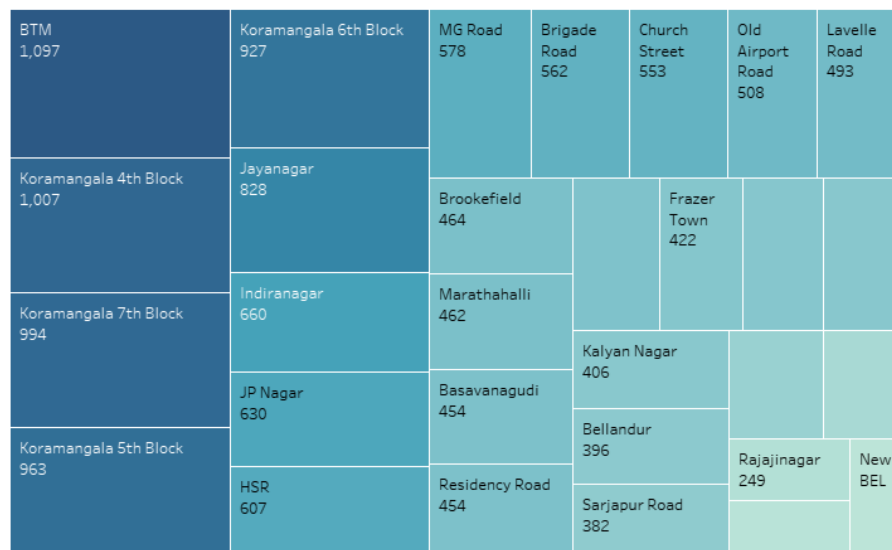## Which Location in the City Has the Most Online Ordering?

Figure 19 Online Ordering where the larger the number, the darker the color.

Road (493) again outnumbers Residency Road (454) in Online Ordering but they both fall lower in the ranks amongst the 30 City Locations. With only 34%-35% of the restaurants within these two locations reporting that that utilize online ordering, this is shown as a definite weakness in increasing the customer base after the COVID-19 pandemic.