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INFRASTRUCTURAL SERVICES AND SOCIAL SECURITY BENEFITS PLAY CATALYTIC ROLE FOR GIG WORKERS OF FOOD AND BEVERAGE INDUSTRY IN MUMBAI METROPOLITAN REGION

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Abstract:

Gig work is increasing across all industries and sectors all over world after pandemic. In Mumbai, the gig workers of food and beverage industry are more as compared to other municipal corporations in Mumbai Metropolitan Region. The Ambarnath municipal council has more gig workers as compared to Matheran Municipal Council. Rural parts of Vasai have less gig workers but Ambarnath and Kalyan rural has more gig workers. Employment generated by the wholesale and retail trade, restaurant and hotel were more during 1990 's in Mumbai city. But currently, this industry is growing very slow in terms of employment as compared to other industries and employment. The ordinary least square regression shows that gig workers of food and beverage industry are positively correlated to all municipal corporations in Mumbai Metropolitan Region but negatively correlated to Thane and Panvel rural area. Sewage and water supply is positively co-related to gig workers in Vasai Virar municipal corporation. Most of units in food and beverage unis are small and do not provide employment throughout year. The social security is not provided to most of the gig workers. Hygiene, regular pay scales, normal work hours, training is not provided to gig workers. Central and State government must draft rules and regulation for this sector with strict guidelines. It will improve the current economic status of gig workers and work environment in this industry.

Keywords: Industry, Social Security, Income, Gender Discrimination

JEL: J01, J31, J41 J46

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INTRODUCTION

The COVID-19 pandemic intensified economic reliance on gig workers that perform essential tasks such as health care, personal transport, food and package delivery, and ad-hoc tasking services within the developed and developing world. As a result, workers who provide such services are no longer perceived as low-skilled labourers but as essential workers who fulfil a crucial role in society (Friedland J, Balkin DB, 2023). The same gig economy platform in multiple areas to conduct research for investigating more regional and cultural differences. The post-pandemic context could also bring some new changes to the gig economy as a socio-technical system, so there might be unique issues after Covid-19 pandemic that are noticeable, considering how remote work becomes a routine in many workplaces (Dedema, M., & Rosenbaum, H. 2024). Similarly, after pandemic, unemployment worsened, these gig platforms also emerged as key sources of paid work for gig workers, with some platforms promising an unusual degree of health and financial support for their gig workforce (Anwar et.al 2022). Therefore, over the period time, the Gig Economy has grown in popularity (Behl, A. et.al 2022). Many industries and sectors accepting gig work to improve workers performance and efficiency.

Gig platforms will continue to thrive and serve as the technical resource power grids for the global stage in the future. Based on current trends, the country will be at the forefront of technology,

labour, and skills. The gig economy has been growing and is predicted to outperform pre-pandemic forecasts due to the expected flood of gig workers switching from full-time jobs (Ramakritinan Swathi Lakshmi and Thiruchelvi Arunachalam, 2022). But there are many economists who have criticised the gig work of different sectors. The gig work has many disadvantages, as much of the work in gig economy is not regulated by the state. Therefore, the Government of India has proposed new framework in June 2022 to recognize the services and jobs of gig economy also under the ambit of organized sector and engaged in the process of providing standards with respect to the wages and working conditions. But still the jobs of gig economy are that it obstructs the vertical growth of designation of employees and also stops him or her from acquiring the new skills. The gig economic conditions do not function in controlled environment which makes the operations of entities more vulnerable (N. Suresh 2022). In the literature, different issues are highlighted of gig workers by researchers all different sectors in different countries.

Mumbai is financial capital of India. It provides large scale employment opportunities continuously to different types of work. Therefore, many people continuously migrating in region and working in different sectors. The food and beverage sector are not exception to this phenomenon. During 1990's, number of hotels and restaurants were established in city. Many large- and small-scale industries provided jobs on shift basis. Therefore, food and beverage sector grown very significantly. Many migrants started working as helpers, cook, waiters, food delivery person etc. Few migrants started their own small hotels and restaurants in suburbs. Due to transport availability, space, demand for services, the hotel and restaurant business spread into suburbs of Mumbai. Due to rising per capita income, flexible work hours, changing food habits of organised sector, the demand for fresh, packed food increased in Mumbai and suburbs. Women work participation also contributed positively to the growth of this sector. Few women workers are contributing directly or indirectly in this sector. The chain of food supply grown in Thane, Dombivli, Kayan, Navi Mumbai, Vasai Virar, Mira Bhayander and Panvel with increase in population. Due to quick transportation and other infrastructure in region, unlimited labour is available to this sector in Mumbai Metropolitan region. Therefore, number of hotels and beverages found in different parts of region. Educated and high-income class often go along with family for dinner, engagement parties, get togethers, office meetings, conferences, birthday parties, Christmas parties etc. They book number of hotel rooms and demand number of services occasionally. They also order food from nearest restaurants at different events and parties. Working women also orders food for family due to their office assignments and online meetings. But rural parts of Panvel and Thane is not found the same trends for this industry. There is negative demand for this industry. Due to lower income, distance of travel, rigid culture for food could be the reasons of lower demand for different services from these workers. The culture of ordering food from hotels and restaurants or going out with family and friends is popular in urban areas.

Food and beverage service is the commercial aspect of the food industry, in which individuals are provided with meals at a place of business in exchange for money or some other form of payment. This can be either casual dining or fine dining establishments. Work in this industry can range from packaging to preparing, transporting, and serving food or beverages. After covid -2019, such services became very popular among common people in cities. Food and Beverage Services can be broadly defined as the process of preparing, presenting, and serving of food and beverages to the customers. The industry grown significantly in the region but the workers working in this sector such as managers, cook, waiters, food carriers are not benefited much. The gig economy model has its own perks and disadvantages. Gig workers in the food and beverage service sector are informal employees, lacking job security, stability and social security benefits that traditional employment provides. On the other hand, gig workers are their own bosses, who relish the freedom and flexibility that comes with it, particularly if they are well paid, receive good treatment by the employers and consider their gig as a supplementary source of income rather than their primary financial security,

thus maintaining a work-life balance. Although having a gig workforce can prove to be beneficial to the hospitality industry, it can also be problematic hiring pre-qualified and experienced staff at a low pay scale, thereby leaving the sector short-staffed or over-staffed very quickly. There are number of units are not registered with Municipal Corporations. Most of the workers are appointed on contract basis. Units are located at corner without adequate space and safety. Workers do not receive social security benefits. They do not get appointment letter with full pay along with causal, sick leaves with standard working hours with good working environment. Women labours are denied the maternity leave and equal pay rights and work adjustment. In many incidents, they are removed from work without notice and compensation. Dealing with work timing and shifts is one of the major challenges of working in the hotel industry. This is especially noteworthy because the majority of people go out to enjoy themselves during holidays and festivals. Those are the busiest times for hospitality service professionals, and they will be unable to take any time off or vacation at that time. As expectations on the home front are disregarded, this obviously causes a component of life stability and family struggle (Ramakr itinan Swathi Lakshmi and Thiruchelvi Arunachalam, 2022). Worker's working in Food and Beverage industry has very long waiting hours in region. Food preparation, delivery of order, number of natural factors, customer specific problems, delay in orders are common things. It effects on their duty hours and work performance. They always struggle with technical and physical delivery of food. Through technology things are easy but ground realities are different. Customers often give orders through app, chat, phone etc. But servicing such food on time is a responsibility of workers within area. If orders are given late or it is delayed, the delivery boys must listen to customers. Number of vehicles are used to deliver the food. If vehicle accident, signal cutting, police case, damage to vehicle and person are not consider by company. During rainy seasons, it is hard work to deliver food on time. City has full traffic issue on different roads. Most of the time, workers need to wait longer hours for customers. Few labours are hard working. It cannot be measured in terms of money only. Few labours have physical and professional abilities that is also different issue.

The women workers are not provided the maternity, sick leave, and compensatory leave. They either work before marriage or after complete fertility. They work in environment which is seasonal, less flexible and less payment. The formal sector does not provide credit facilities to contract labour of this sector. Therefore, such workers often found in slums with inadequate infrastructure facilities. The state government do not have draft of guidelines for gig workers of food and beverage industry. There is need of immediate draft document for minimum payment, standard work hours, maternity leave, causal and medical leaves, and provident fund. The hotel and beverage sector units ignored demand of the workers of this sector. Major objective this study is to find the number of gig workers in the metropolitan region as per age group in different councils and corporation. Every municipal corporation and council, the number of gig workers are different, and they are based on number of units. The density of population is different in different corporation and council in region. The infrastructure services are also affecting on gig workers of food and beverage industry. Water supply and sanitation play the significant role in as far as gig workers of region is concerned. Without such facilities, they cannot perform their activities effectively. Second last objective of the study is to find the relationship of the infrastructure services and gig work force in region. Lastly to find the rules and regulation of state government with this sector which protects the economic interest of workers of this sector.

1. RESEARCH METHODOLOGY

1.1 DATA

We have collected population data from Census 1971, 1981, 1991, 2001 and 2011. MMRDA plans are providing detail of urbanisation, water supply, solid waste, land use pattern in MMRDA region.

Times of India provides recent infrastructure developments in MMRDA region. The current affairs are also available about the changing workforce pattern and industrial investment in Mumbai Metropolitan Region. We have also referred Maharashtra Times, Business line, Business standard to understand the change in contracts of workers in sectors, industries and labour demand and supply in region. We have also referred the Environment status report of various years of different municipal corporations to understand the change the various environmental issues faced by the region. We have analysed data in SPSS and R software. The results are presented in terms of corporations and councils of region. The density of population and CAGR is calculated for various years.

1.2 METHODOLOGY

We have developed the economic model to understand and examine the workers in the food and beverage industry in Mumbai Metropolitan Region.

$$\sum_{i=1}^n P_{MMR} = \sum_{i=t}^n M_s - \sum_{i=t}^n (MTR) \quad (1)$$

Population of MMRDA in current period is calculated as population of Maharashtra minus population of districts excluding Thane, Mumbai and Mumbai suburbs and Raigad. The boundaries of MMRDA are decided by state government.

$$\sum_{i=t}^n P_{MMR} = f(Mcor, Mcol, Ur, Ub) \quad (2)$$

Population of MMRDA consists of Municipal corporations, councils, urban and rural villages.

$$\sum_{i=t}^n GW_{MMR} = \frac{(P_{MMR} * Q)}{100} \quad (3)$$

Gig workers in MMRDA is a ratio of population of gig workers divided by total population in MMRDA at time t. Where Q is a ratio of gig workers in MMR.

$$\sum_{i=t}^n GW_{MMR} = A(FT, TT, TF) \quad (4)$$

Gig workers in Mumbai Metropolitan Region are divided into different age groups. They are fifteen to twenty-five, Twenty-five to Thirty-five and Thirty-five to fifty-nine.

$$\sum_{t=1}^n Pd_{MMR} = \sum_{t=1}^n (P/A) \quad (5)$$

Population density in MMRDA at time t is population divided by area. The area is measured as square kilometres. Water Supply at time t to population of MMRDA is measures as follows.

$$\sum_{t=1}^n PCWs = (P, I, O, Et, Ot) * Sn \quad (6)$$

Water supply per capita is calculated as population, number of industries, Public and private offices, educational institutions, and others multiplied as standard norm for population. The standard norm Liters Per Capital per Day (LPCD) is 135 litres.

$$\sum_{t=1}^n WS = \sum_{t=1}^n (P, I, O, Et, Ot) / Sn \quad (7)$$

Sewage generated in MMRDA at time t is related to per capita sewage generated by population, industries, Public and private offices, educational institutions. It is multiplied by the standard norm. The standard norm is decided as 0.80 per cent per day. The solid waste generated by every unit is estimated as follows.

$$\sum_{i=1}^n SW = ((P, I, O, Ed, M) / Sn) \quad (8)$$

Solid waste generated by every unit is categorised as population, industries, offices, educational institutions, markets etc.

2. ABOUT GIG ECONOMY AND WORKERS

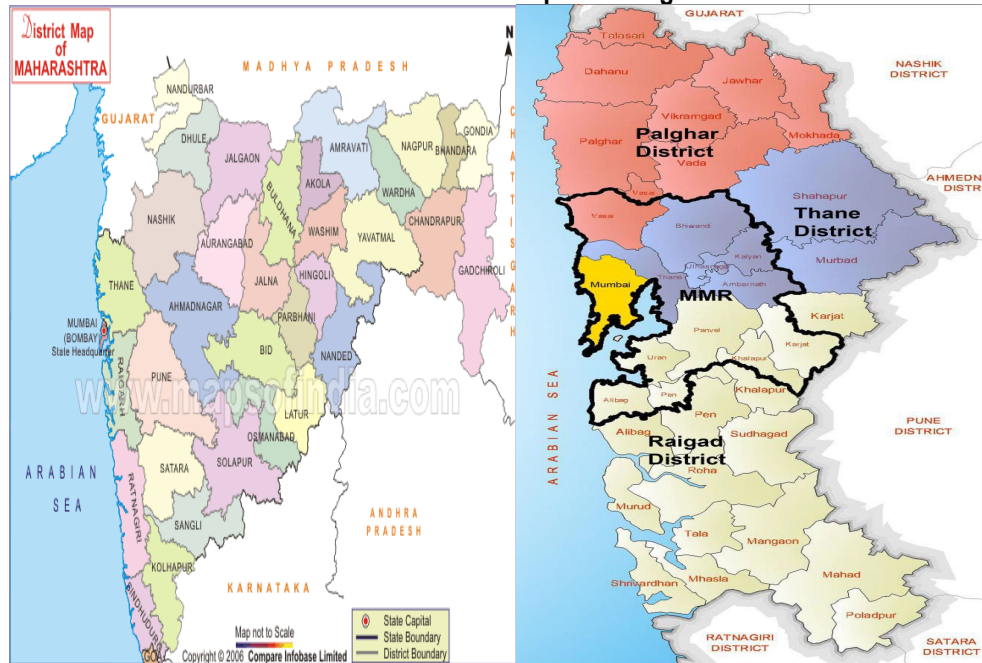
The term gig economy, gig work and gig workers used alternatively by different labour related studies. Gig economy refers to, “is an economy that offers a work platform to all the workers which is flexible, choice based, independent and involves exchanging of labour and resources through Physical and digital platform that facilitates effective gaining opportunities” (Saraswathi C.2023). Alternatively, the term gig refers to those people or the workforce who meet their end needs by employing or working themselves for a specified period (Sardana S. et.al 2022). Few economists have defined the Gig workers based on their nature of work, technology use and economic benefits received at work. Advances in online technology have fuelled the rise of the “gig economy”—a free market system in which mobile apps or websites connect consumers with individual workers providing services. Gigs are denoted by short-term, one-off employment contracts mediated by online platforms which include online food delivery (Jia S.S. et.al 2022). Few researchers focused on nature of work and payment whereas few researchers have focused on rules and regulation, technology, and compensation etc.

According to Niti Aayog report (2022, p.3) “The gig workers are generally engaged in income-earning activities outside of a traditional employer-employee relationship, as well as in the informal sector”. The objective of this paper is to study the actual number of gig workers in region and the availability of infrastructural facilities available to them. Technology plays significant role for work efficiency of gig work force in any economy. The problem is that gig work does not come with pensions, sick pay, holiday entitlement and parental leave (Banwari, V. 2018). Most of the gig workers face various challenges. Well-being is the experience of health, happiness, and prosperity. It also includes the physical, psychological, and subjective well-being of the people involved in the gig economy (Pillai S.V. Drishya Dev 2022). The kind of work, skills, technology, contracts and government rules and regulation could be an acute problem in this sector.

3. ABOUT MUMBAI METROPOLITAN REGION

Mumbai Metropolitan Region is highly urbanised and developed region of India. The Mumbai Metropolitan Region is spread over 6328 sq.km. It consists of 9 Municipal Corporations. Due to high density of population, they are spread in nearby areas. They are Greater Mumbai Municipal Corporation (MCGM), Thane Municipal Corporation (TMC), Kalyan Dombivli Municipal Corporation (KDMC), Navi Mumbai Municipal Corporation (NMMC), Ulhasnagar Municipal Corporation (UMC), Bhiwandi Nizampur Municipal Corporation (BNMC), Vasai Virar Municipal Corporation (VVMC) Mira-Bhaandar Municipal Corporation (MBMC) and Panvel Municipal Corporation (PMC). All the corporations have their public transport system, and they are well connected with each other. The region has also 9 Municipal Councils namely Ambernath, Kulgaon Badlapur, Mathran, Karjat, Khopoli, Pen, Uran, Alibag and Palghar. Population of council is low and infrastructure facilities are less developed. There are more than 1000 urban habitats and rural villages in Thane, Raigad and Palghar district which are the part of Metropolitan Region. Most of the workers of food and beverage live in one corporation and work in another corporation. Local trains and buses connect all the corporations and councils in region.

MAP 1: Mumbai Metropolitan Region



3.1 GIG WORKERS IN HOTEL AND BEVERAGE INDUSTRY IN MUMBAI METROPOLITAN REGION

Urbanisation is growing fast in Mumbai Metropolitan Region. Construction, manufacturing, banking and insurance and other services sector growth is higher. The demand for hotel and beverage industry is growing fast. The markets concentrating predominantly in and around large cities, gig platforms across the globe seem to depend as much on the cheap labour of migrants and minorities as on investment capital and permissive governments. (Van D.N. and Vijay D., 2021). We have estimated the gig workers from population of Mumbai Metropolitan Region (MMR). It is presented in the following table.

Table 1. Gig workers in hotel and beverage industry in MMRDA (2024)

No			Gig workers		Gig workers	Sub
A	Municipal Corporation		Numbers	Sub-total (numbers)	Percent	Percent
1		Greater Mumbai	608679		49.59	
2		Thane	121036		9.86	
3		Ulhasnager	25577		2.08	
4		Kalyan Dombivali	68571		5.59	
5		Mira Bhayander	55293		4.51	
6		Bhiwandi Nizampur	39840		3.25	
7		Navi Mumbai	79756		6.50	
8		Vasai Virar	88995		7.25	
B	Municipal Councils			1087841	0.00	88.63
1		Ambernath	14840		1.21	
2		Kulgaon Badlapur	12756		1.04	
C	Thane district council			27595	0.00	2.25
1		Alibag	1043		0.09	
2		Karjt	1635		0.13	

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No			Gig workers		Gig workers	Sub
3		Khopoli	4076		0.33	
4		Matheran	160		0.01	
5		Panvel	13007		1.06	
6		Pen	2230		0.18	
7		Uran	1856		0.15	
D	Raigad district councils			24007	0.00	1.96
1		Thane	-531		-0.04	
2		Ambernath	8266		0.67	
3		Vasai	5251		0.43	
4		Kalyan	21431		1.75	
5		Bhiwandi	15879		1.29	
E	Total Thane District rural			50296	0.00	4.10
1		Alibag	5632		0.46	
2		Karjat	5229		0.43	
3		Khalapur	2931		0.24	
4		Panvel	14724		1.20	
5		Pen	4038		0.33	
6		Uran	5062		0.41	
F	Raigad Total rural			37617	0.00	3.06
		Total MMR	1227262	1227356	99.99	100

Source: Estimated from MMRDA Census data of 2011

We have estimated that the gig workers in Mumbai city. It is estimated that 608679 (49.59 per cent) gig workers could be from food and beverage industry. They could be managers, waiters, cook, food carriers, helpers etc. In Thane city, the gig workers are estimated as 121036 (9.86 per cent). In Ulhasnagar, the gig workers are estimated in current year as 25577 (2.08 per cent). In Kalyan Dombivli Municipal Corporation (KDMC), the estimated gig workers are 68571 (5.99 per cent). In Mira Bhayander, the gig workers could be 55293 (4.51 per cent). In Bhiwandi -Nizampur Municipal Corporation, the estimated gig workers are 39840 (3.25 per cent). In Navi Mumbai city, the gig workers could be 79756 (6.50 per cent). The number of workers based on density of population and people working in that industry. In Vasai Virar Municipal Corporation (VVMC), the gig workers could be 88995(7.25 per cent) in 2024. Every municipal corporation, the proportion of gig workers is different. Municipal Corporations of Metropolitan Region has highest numbers of gig workers 1087841(88.63 per cent) in 2024. In Ambernath Municipal Council, the gig workers could be 14840 (1.21 per cent). In Kugaon-Badlapur, the gig workers could be 12756 (1.04 per cent). It is less number because population of council is less. In Thane district, only 27595 (2.25 per cent) gig workers found. In Ragad district only 24007 (1.96 per cent) workers found from gig category in current period. The Thane district's rural area, 50296 (4.10 per cent) labour could be Gig workers in 2024. In Raigad district, the rural part could be 37617 (3.06 per cent) gig workers in current period i.e. 2024. We estimated that the Gig workers in food and beverage could be 1227262 in current period, and they are spread in different corporations and councils in region.

Table 2. Age wise gig workers in Mumbai Metropolitan Region (Numbers) (2024)

No	Municipal corporation/Council	Age category	18-23	24-38	39-43	44-51	52<	Total
A	Municipal Corporation							
1		Greater Mumbai	97389	389555	60868	48694	12174	608679

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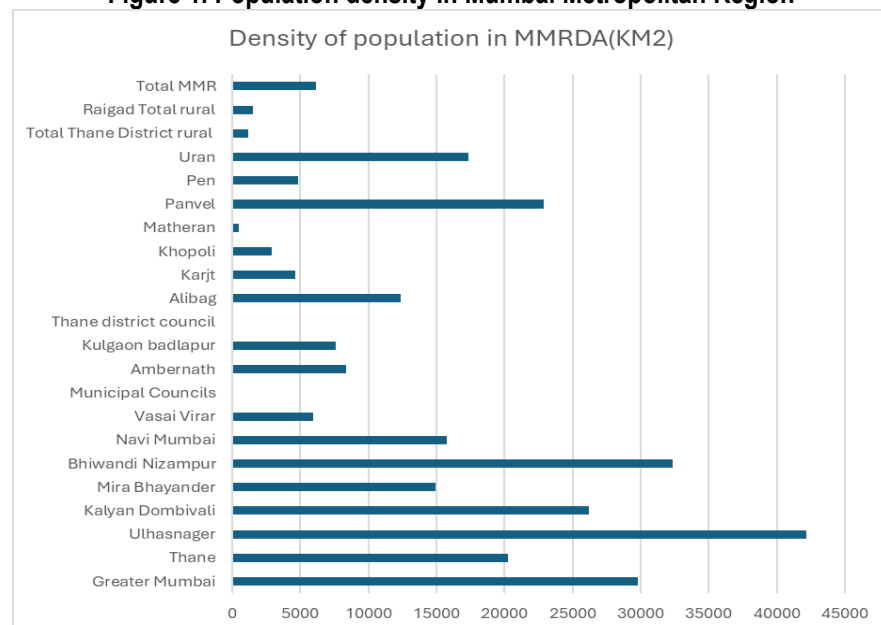
No	Municipal corporation/Council	Age category	18-23	24-38	39-43	44-51	52<	Total
2		Thane	19366	77463	12104	9683	2421	121036
3		Ulhasnager	4092	16369	2558	2046	512	25577
4		Kalyan Dombivali	10971	43885	6857	5486	1371	68571
5		Mira Bhayander	8847	35388	5529	4423	1106	55293
6		Bhiwandi Nizampur	6374	25498	3984	3187	797	39840
7		Navi Mumbai	12761	51044	7976	6380	1595	79756
8		Vasai Virar	14239	56957	8900	7120	1780	88995
B	Municipal Councils			0	0	0	0	0
1		Ambernath	2374	9498	1484	1187	297	14840
2		Kulgaon Badlapur	2041	8164	1276	1020	255	12756
C	Thane district council		0	0	0	0	0	0
1		Alibag	167	668	104	83	21	1043
2		Karjt	262	1046	164	131	33	1635
3		Khopoli	652	2609	408	326	82	4076
4		Matheran	26	102	16	13	3	160
5		Panvel	2081	8324	1301	1041	260	13007
6		Pen	357	1427	223	178	45	2230
7		Uran	297	1188	186	148	37	1856
D	Raigad district councils		0	0	0	0	0	0
1		Thane	-85	-340	-53	-42	-11	-531
2		Ambernath	1323	5290	827	661	165	8266
3		Vasai	840	3361	525	420	105	5251
4		Kalyan	3429	13716	2143	1714	429	21431
5		Bhiwandi	2541	10163	1588	1270	318	15879
E	Total Thane District rural		0	0	0	0	0	0
1		Alibag	901	3604	563	451	113	5632
2		Karjat	837	3347	523	418	105	5229
3		Khalapur	469	1876	293	234	59	2931
4		Panvel	2356	9423	1472	1178	294	14724
5		Pen	646	2584	404	323	81	4038
6		Uran	810	3240	506	405	101	5062
F	Raigad Total rural		0	0	0	0	0	0
		Total MMR	196362	785448	122726	98181	24545	1227262

Source: Estimated from MMR Census data 2011

We have divided the gig workers in different age groups. The 24-38 age group could have 389555 gig workers in Mumbai city in 2024. The 52-age group could have 12174 gig workers in Mumbai city. Such workers have less skills as compared to young workers of gig industry. Thane city could have 19366 gig workers in 18-23 age group. The 24-38 age group, Thane city could have 77463 workers. Thane urban has very high density of population. The 44-51 age group, Thane city could have 9683 gig workers. Old people are reluctant to join food and beverage industry. They have less skills as compared to young p workers. Ulhasnagar city could have 16369 gig workers in the 24-38 age group. At the same time, the Kalyan Dombivli Municipal Corporation could have 43885 gig workers in 24-38 age group in 2024. In 39-43 age groups, the 6857 gig workers are calculated. The Mira

Bhayander Municipal Corporation could have 35388 gig workers in 24-38 age group in current period. In Bhiwandi-Nizampur Municipal Corporation, the 24-38 age group could have 25498 gig workers. The Navi Mumbai Municipal Corporation could have 51044 gig workers in 24-38 age group. In 39-43 age groups, the Navi Mumbai Municipal Corporation could have 7976 workers. The Vasai Virar Municipal Corporation, the gig workers could be 56957 gig workers. In Ambernath Municipal Council, the 9498 workers could be Gig workers, but they would be in 24-38 age group. It is economically most active group with maximum aspirations for different posts. At the same time, the Kulgaon Badlapur Municipal Council could have 8164 gig workers in 24-38 age group in 2024. In Alibag, the 668 gig workers are calculated in 24-38 age group in current year. Panvel could have 8324 gig workers in 24-38 age group. It is most economically active group. Many young people find job in hotel and beverage industry at this age. In Pen, 1427 gig workers would be in 24-38 age group. In Uran, 1188 gig workers could be in 24-38 age group. In Bhiwandi rural, the gig workers could be 10163 in 24-38 age group. But Kalyan would have 13716 gig workers in the rural area. In 2024, Vasai rural could have 3361 gig workers in 24-38 workers. Alibag could have 3604 gig workers in food and beverage industry but of 24-38 age group in 2024. It means, the workers of maximum municipal council are higher in 24-38 age group. The Karjat rural could have 3347 gig workers in 24-38 age group. Khalapur could have 1876 gig workers in 24-38 age group. Everywhere in region, the 24-38 age group is very active as hotel and beverage industry is concerned. The Panvel rural could have 9423 gig workers in 24-38 age group. We can find that 785448 gig workers could be in 24-38 age group in current period. The 196362 gig workers in MMRDA could be in 18-23 group. In 39-43 age group, the gig workers could be 98181. The 52 above age group gig workers in MMRDA could be 24545 in current period. The COVID-19 pandemic has only increased visibility of the inequalities in this market. The pressure is put on workers with lack of regulated working times, the impossibility of negotiating wages, and the non-existent support from platforms for insurance and better working conditions. This visibility translates into greater concern for customers and workers. On the one hand, customers are more aware of the 'essential' nature of platform workers. On the other hand, workers have also become more aware of the problems with their labour conditions (Arriagada A. et.al 2023). But the scope to improvement of labour condition in region is limited because population is continuously increasing. The density of population is increasing fast in some parts of suburbs.

Figure 1. Population density in Mumbai Metropolitan Region



Source: Estimated from census 2011 data

From the above figure, we can observe that the Ulhasnagar has more than 40000 sq.km density of population. Many households stay in one apartment without proper structure and hygienic environment. The Bhiwandi Nizampur Municipal Corporation could have 32000 sq.km density of population. The Greater Mumbai could have density of 30000 sq.km. Mumbai and Thane have high daily migration. People from urban and rural area migrate to city. People from Panvel, Kalyan, Ambernath come for work daily in Mumbai city and travel back to home till night. There is no survey which shows that the migrant workers daily come in city or shift in another city or Municipal Corporation. They live and use municipal corporations' infrastructure services in one corporation and work in another municipal corporation. Municipal Councils such as Matheran, Khopoli, Karjat have very low population density. They are far places from Mumbai city. Maximum population want to work in Mumbai and Thane city. Therefore, migration is very high in such municipal corporations. Panvel and Uran municipal councils, the population is increasing very fast. Therefore, density of population is also increasing in recent years. The gig workers are staying in one suburb and working at other suburbs. Few gig workers move all over the region continuously based on nature of work orders.

Table 3. Employment structure of Greater Mumbai

NIC division	Description	1980		1990		Increments (Percent)	Growth (Percent)
			Percent		Percent		
0	Agriculture, Hunting Forestry and Fishing	23089	1.05	10491	0.43	-5.26	54.56
1	Mining and Quarrying	920	0.004	348	0.01	-0.25	-62.17
2 and 3	Manufacturing and repairs including household industries	791060	35.97	690621	28.47	-44.35	-12.7
4	Electricity, Gas, and water	14388	0.65	10997	0.45	-1.5	-23.57
5	Construction	14028	0.64	20082	0.83	2.67	43.16
6	Wholesale and retail trade and restaurant and hotels	545591	24.81	705127	29.07	70.44	29.24
7	Transport storage and communication	209883	9.54	131472	5.42	-34.62	-37.36
8	Finance insurance, Real estate, and business services	138849	6.31	248541	10.25	48.43	79
9	Community social and personnel services'	303557	13.8	578945	23.87	121.58	90.72
10	Not elsewhere classified	157996	7.18	29257	1.21	-56.84	-81.48
	Total	2199361	100	2425881	100	100	10.3

Source: Economic Census 1980, 1990

As far as employment is concerned then in 1980's, the manufacturing and repairs including household industries provided 791060 (35.97 per cent) persons. Maximum employment is available from this sector only. Wholesale and trade, restaurant and hotels provided employment to 545591 (24.8 percent) persons. The community, social and personnel services provided 303557 (13.8 percent) person employment. In 1990's the wholesale and trade, restaurant and hotels provided employment to 705127 (29.07 percent) persons. It is highest as compared to other sectors in region. It is followed by manufacturing and repair including household industries (28.47 percent). The community social and personnel services provided 578945 (23.87 percent) employment in 1990. As far as growth of employment from 1980 to 1990 in employment is concerned then community, social and personnel services have highest growth from 1980 to 1990. Mining and quarrying have (-62.17

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percent) decline in employment from 1980 to 1990 in Mumbai. We can see the employment pattern in region has drastically changed over the period of time. There are number of causes for change in employment pattern in region.

Table 4. The Office oriented sectors in region

NIC Division	Major group Description	Year		Year		Increments	Growth
		1980	Percent	1990	Percent		
73	Transport services: packaging, car-fling, travel agencies	6811	1.93	22921	3.65	5.83	236.53
80 and 81	Banking and allied activities, provident and insurance	86009	24.4	116393	18.51	10.99	35.33
82 to 85 and 89	Business, professional, legal services, operating of lotteries, renting, leasing and auctioneering services	52790	14.98	132148	21.02	24.72	150.33
90	public administration and defence services	116523	33.06	232501	36.97	41.97	99.53
92	Education, scientific and research services	58267	16.53	75709	12.04	6.31	29.93
94	Welfare, Business, professional and labour organisations	16521	4.69	26473	4.21	3.6	60.24
95	Recreational and cultural services	15148	4.3	21853	3.48	2.43	44.26
98	International and extra territorial bodies	400	0.11	818	0.13	0.15	104.5
	Total	352469	100	628816		100	78.4
Percent Total		16.03		25.92	100		

Source: Economic Census 1980, 1990

As far as office-oriented employment of various industries is concerned then in 1980's, the public administration and defence services had 116523 (33.06 per cent) persons. The banking and allied activities, provident and insurance have provided 86009 (24.4 percent) employment to persons. As far as 1990's is concerned then public administration and defence services (39.97 per cent) were still leading in 1990's to provide employment in city. The business, professional, legal services, operating of lotteries, renting, leasing and auctioning services had provided 13214 (21.02 percent) persons. As far as increment was concerned then public administration and defence industries, it was 41.97 per cent. But the increment in international and extra territorial bodies are concerned then it is only 0.15 per cent. In Mumbai city, the growth of business, professional, legal services, operating of lotteries, renting, leasing and auctioning services was 150 percent from 1980 to 1990. The growth of transport services, packaging, car fling, travel agencies were 236.53 percent. It was highest as far as all other sectors of Mumbai city. We found change in employment by different sectors in region over the period.

Table 5. The growth of major Industries in Mumbai Metropolitan Region

No	Industry group	NIC Div	1998	2005	CAGR (%)
1	Textile	17	15012	24527	7.26
2	Fabricated metal products except, machinery and equipment	28	17359	17600	0.2
3	Chemicals and chemical products	24	2642	3160	2.59
4	Furniture and related n e c	36	12601	27321	11.69

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No	Industry group	NIC Div	1998	2005	CAGR (%)
5	Waning apparels, dressing, and dyeing for fur	18	6100	45108	33.09
6	Food products and beverages	15	13746	16472	2.62
7	Rubber and plastic products	25	5240	5938	1.8
8	Other transport equipment	35	3377	540	-23.04
9	Publishing printing and reproduction of recorded media	22	5376	6575	2.92
10	Machinery and equipment.	29	2686	3158	2.34
11	Other non-metallic mineral product	26	2533	3463	4.57
12	Electric machinery and apparatus	31	904	2214	13.65
13	Dressing of leather, manufacturing of luggage, handbags, and footwear	19	2891	7736	15.1
14	Basic metals	27	188	4377	56.78
15	All other groups		8188	10047	2.97
	Total		90655	178236	8.79

Source: Economic Census 1998, 2005

As per the economic survey of 1998 and 2005, it shows different picture. The basic metal industries have grown from 8188 units from 1998 to 10047 in 2005. The CAGR of basic metals is observed as 56.78 per cent. There was huge demand for basic metal industries during 1998 period in region. The waning apparels, dressing and dyeing for fur grown from 6100 to 45108 units. It has grown with CAGR 33.09 percent from 1998 to 2005. The growth of fabricated metal products except, machinery and equipment industry were lowest (0.2 per cent) from 1998 to 2005.

Table 6. The status of industries in Mumbai Metropolitan Region

No	Name of Industry	CAGR (2012 to 2024)
1	Textile	2.98
2	Fabricated metal products except, machinery and equip	0.17
3	Chemicals and chemical products	1.65
4	Furniture and related n e c	3.57
5	Waning apparels, dressing and dyeing for fur	4.44
6	Food products and beverages	1.66
7	Fibber and plastic products	1.27
8	Other transport equipment	-2.19
9	Publishing printing and reproduction of recorded media	1.79
10	Machinery and equipment.	1.54
11	Other non-metallic mineral product	2.36
12	Electric machinery and apparatus n e c.	3.75
13	Dressing of leather, manufacturing of luggage, handbags, and footwear	3.85
14	Basic metals	4.61
15	All other groups	1.81
	Total	3.40

Source: Calculated from MMRDA data

We have calculated the growth of major industries in MMRDA from 2012 to 2024. We found that basic metals industries have grown with 4.61 percent. It is followed by waning apparels, dressing, and dyeing for fur as 4.44 per cent. The electric machinery and apparatus had 3.75 per cent growth

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from 2012 to 2024. The negative growth (-2.19 percent) found for other transport equipment's from 2012 to 2024. The food products and beverage industries had 1.66 per cent growth from 2012 to 2024. In MMRDA, for all industries the 3.40 per cent growth was found during 2012 to 2024 period. We can conclude that the food and beverage industry has grown over the period of time in region.

4. INFRASTRUCTURE FACILITIES IN METROPOLITAN REGION

Infrastructure facilities in play catalyst role for employment. All types of workers benefit from basic infrastructure facilities. Water supply on continuous basis play very important role and it promote regular employment and work efficiency. The solid waste and wastewater treatment provides the clean environment and hygiene in city. Gig workers do not get the basic social securities at workplace. Therefore, such infrastructure facilities play significant role in promoting employment.

Table 7. Water supply in Mumbai Metropolitan Region (MLD)

Sr.No.	M. Corp/ Council/ SPAs/ Rural	Exist. Domestic Water Supply	Domestic Demand*	Domestic Water supply Shortfall	Industrial Demand	Comm- ercial Demand	Gross Water Demand	Gross Water Availability	Gross Water Deficit
1	2	3	4	5	6	7= 2% (6+4)	8 = 4+6+7	9=3+6	10= 8-9
1	Greater Mumbai	3,276.0	4,324.58	1,049.00	352.00	93.50	4,770.11	3,628.00	1,142.11
	Zone 1	3,276.0	4,324.58	1,049.00	352.00	93.50	4,770.11	3,628.00	1,142.11
2	Vasai-Virar City	131.50	330.79	199.00		6.60	337.41	131.50	205.91
3	Mira- Bhayander	136.00	216.54	81.00	50.00	5.30	271.88	186.00	85.88
4	VVSNA	3.28	17.59	14.00		0.40	17.94	3.28	14.65
5	Vasai	1.00	2.50	2.00		0.10	2.55	1.00	1.55
	Zone 2	271.78	567.42	296.00	50.00	12.40	629.78	321.78	307.99
6	Thane	492.00	434.78	-57.00	7.00	8.80	450.62	499.00	-48.38
7	Kalyan- Dombivli	268.50	280.56	12.00	20.00	6.00	306.57	288.50	18.07
8	Bhiwandi- Nizampur	115.00	164.65	50.00		3.30	167.94	115.00	52.94
9	Ulhasnagar	165.00	111.33	-54.00		2.20	113.56	165.00	-51.44
10	Ambernath	59.00	62.44	3.00	50.00	2.20	114.69	109.00	5.69
11	Kulgaon Badlpur	37.00	47.16	10.00		0.90	48.10	37.00	11.10
12	Kalyan Villages	12.53	31.33	19.00		0.60	31.96	12.53	19.43
13	BSNA	11.24	28.09	17.00		0.60	28.65	11.24	17.42
14	AKBSNA	5.05	12.62	8.00		0.30	12.88	5.05	7.83
15	Ambernath	1.97	4.94	3.00		0.10	5.03	1.97	3.06
16	Kalyan	1.96	4.90	3.00	2.20	0.10	7.24	4.16	3.08
17	Bhiwandi	7.81	19.52	12.00		0.40	19.91	7.81	12.10
	Zone 3	1,177.06	1,202.32	26.00	79.20	25.50	1,307.15	1,256.26	50.90
18	Navi Mumbai	420.00	296.04	-124.00	47.00	6.90	349.90	467.00	117.10
19	Panvel	29.50	48.20	19.00	44.00	1.80	94.05	73.50	20.55
20	Uran	3.50	7.50	4.00		0.10	7.65	3.50	4.15
21	Navi Mumbai New Town	190.00	122.09	-68.00		2.40	124.53	190.00	65.47
22	Uran Rural	0.03	0.06	-		0.00	0.07	0.03	0.04

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Sr.No.	M. Corp/ Council/ SPAs/ Rural	Exist. Domestic Water Supply	Domestic Demand*	Domestic Water supply Shortfall	Industrial Demand	Comm- ercial Demand	Gross Water Demand	Gross Water Availability	Gross Water Deficit
	Zone 4	643.03	473.89	-169.00	91.00	11.20	576.20	734.03	157.83
23	Khopoli	6.20	15.98	10.00		0.30	16.30	6.20	10.10
24	Karjat	11.02	6.85	-4.00		0.10	6.99	11.02	4.03
25	Matheran	1.40	0.70	-1.00		-	0.71	1.40	0.69
26	Karjat	4.74	11.84	7.00		0.24	12.08	4.74	7.34
27	Khalapur	0.16	0.39	-		0.01	0.40	0.16	0.24
	Zone 5	23.52	35.76	12.00	-	0.65	36.48	23.52	12.96
28	NAINA	14.85	37.14	22.00		0.70	37.88	14.85	23.02
29	Khopota	2.31	5.77	3.00		0.10	5.88	2.31	3.57
30	Panvel ⁽¹⁾	0.01	0.02	-		-	0.02	0.01	0.01
	Zone 6	17.17	42.93	25.00	-	0.80	43.78	17.17	26.60
31	Pen 1	7.39	9.00	2.00		0.20	9.18	7.39	1.79
32	Pen 2	0.09	0.22	-		0.00	0.22	0.09	0.14
	Zone 7	7.48	9.22	2.00	-	0.20	9.40	7.48	1.93
33	Alibag 1	5.50	4.73	-1.00		0.10	4.82	5.50	0.68
34	Alibag 2	5.68	14.20	9.00	53.00	1.34	68.54	58.68	9.86
	Zone 8	11.18	18.93	8.00	53.00	1.44	73.36	64.18	9.18
	Total	5,427.22	6,675.05	1,249.00	625.20	145.69	7,446.26	6,052.42	1,551.67

Source: MMRDA reports g 2021

Greater Mumbai has total demand of water is 4770 MLD but actual supply is 3628 MLD. The deficit is found as 1142 MLD. In Vasai Virar municipal corporation, the demand of drinking water is 337.41 MLD but the supply is only 131mld. Therefore, deficit is found as 205.91 MLD. The Mira Bhayander municipal corporation has water demand as 271 MLD but corporation gets only 186 MLD water daily. It has deficit of 85.88 MLD. The Thane municipal corporation has 450.62 MLD of water demand, it gets 499 MLD water. It has surplus water supply in region. Kalyan Dombivli Municipal Corporation has 306 MLD water demand but it gets only 288.50 MLD water supply. Bhiwandi Nizampur municipality has 167 MLD water demand but gets only 115 MLD water supply. It has 52.94 MLD water supply. Ulhasnagar Municipal Corporation has 113 MLD water demand. It receives 165 MLD water supply. This corporation receives 51.44 MLD more water supply than it required. The density of population is also higher in this corporation. Still water supply is surplus. The Panvel Municipal Corporation has total demand of water as 94 MLD but it receives only 73.50 MLD water. The deficit is observed as 20.55 MLD. Khopoli municipal council has 16.30 MLD water demand but it gets only 6.20 MLD water supply from different sources. The deficit is observed as 10.10 MLD. Total demand in Mumbai metropolitan demand for drinking water is 7446.26 MLD. But the water supply is only 6052.42 MLD. The deficit in drinking water is observed as 1551.67 MLD in 2016. Water deficit in corporation means women are struggling to get minimum water to family. They can't participate in job market and income for family. The corporation and councils are expected to provide regular, clean drinking water. At the same time, the sewage waster must be processed in region. Clean environment also plays significant role for health of people.

Table 8. Solid waste generation in MMRDA (Ton)

Municipal Corporations/ Councils	SW Generated (Tonnes/day)	Location	Total Area/ Capacity	Area Available for future use (Ha)	Status
MCGM	7465.20	Kanjur marg	141 Ha	70.00	Operational
		Deonar MSW		1.4	Operational
		Mulund	25 Ha		Operational

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Municipal Corporations/ Councils	SW Generated (Tonnes/day)	Location	Total Area/ Capacity	Area Available for future use (Ha)	Status
NMMC	672.60	TTC area, Turbhe	26.32 Ha	6.58	Operational
TMC	1104.60	Khardi	4.04 Ha		Exhausted
		Mumbra	15 Ha	7.00	Operational
		Kalwa	15TPD		Operational
BNMC	177.50	Chavindra	2.S Ha		Operational
		Dapoda	26 Ha		Proposed
KDMC	748.20	Aadhar-wadi	30 Ha		Operational
		Umbade	19 Ha		Proposed
UMC	126.50	Maharal	4Ha		Operational
		Kambe	18 Ha		Proposed
		Shantinagar			Closed
MBMC	202.25	Pali, Uttan	31 Ha	19.00	Operational
		Saiwan			Proposed
WCMC	733.20	Gokhivare	19.33 Ha	10.54	Operational
Councils					
AMC	53.13	Chikhholi	13.58 Ha	Proposed	
		Moriwali		Operational	
KBMC	36.54	Valavali	6.56 Ha	Operational	
Matheran	0.84	S.No.102,S-2/3	1 TPD	Operational	
Uran	6.30	Bori Pakhadi	1 Ha	Operational	
Alibag	4.41	Badane	1 Ha	Operational	
Panvel	48.60	Karanjade, Chal	14 Ha	7.00 Operational	
Khopoli	14.91	Mil	3.25 Ha	Operational	
Pen	7.77	Ambeghar		Operational	
Karjat	6.09	Dahiwale, Karjat		Operational	

Source: MMRDA report 2021

Above table shows that MCGM have 7465 tons of daily solid waste. Kanjurmarg, Deonar and Mulund have dumping grounds of Mumbai city. Daily solid waste is transported at landfill sites by trucks. The NMMC has daily collection of 672.60 tonnes of solid waste. It is transported to TTC and Turbhe dumping ground and it is 26.32 hector. Navi Mumbai Municipal Corporation has given priority for clean environment and hygiene. TMC collects 1104.60Tones of solid waste and it is transported to Kharadi, Mumbra and Kalwa. The Bhiwandi Nizampur Municipal Corporation collect 177.50 tonnes of solid waste and transport to Vhavindra and Dapoda dumping ground. Kalyan Dombivali Municipal Corporation collects 748.20 tonnes of solid waste. It transfers the solid waste to Aharwadi and Umbade. UMC collects 126.50 tonnes of solid waste. MBMC have 733.20 tonnes of solid waste and transported to Uttan and Saiwan dumping grounds. Evey Municipal Corporation has different issues related to collection and transport of solid waste. Ambernath Municipal council has 53.13 tonnes of solid waste. It is transported to Chikhholi but it is proposed landfill. In Uran city, 6.30 tonnes of solid wate calculated. It is transported to Bori Pakhadi. Alibag city has 4.41 tonnes of solid waste. Panvel city has 48.60 tonnes of solid waste which is transported to Karanjade. It is expected that each municipal corporation and council will collect the solid waste and keep the area clean and disease free. It may improve economic productivity of the people.

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Table 9. Sewage collection and treatment in MMRDA (MLD)

Sl. N	Unit	Existing Water Supply (MLD)	Existing Sewage Generated	Amount of Sewage Collected & Treated (MLD)	Present Installed Capacity of STPs (MLD)	Present Gap (MLD)
A	Municipal Corporations					
1	Greater Mumbai	3,276	2620.8	1700	2826	1202.4
2	Thane	492	393.6	120	252	273.6
3	Kalyan-Dombivali	268.5	214.8	80	80	134.8
4	Vasai - Virar City (VVSNA)	134.78	107.824	0	0	107.824
5	Navi Mumbai	420	336	242	385	94
6	Mira-Bhayander	136	108.8	11	11	97.8
7	Bhiwandi-Nizampur	115	92	17	17	75
8	Ulhasnagar	165	132	28	28	104
	Sub-Total (A)	5,007	4006	2198	3599	1808
9	Ambernath	59	47.2	28	28	19.2
10	Kulgaon-Badlapur	37	29.6	0		29.6
11	Panvel	29.5	23.6	0	0	23.6
12	Khopoli	6.2	4.96	0		4.96
13	Pen	7.39	5.912	0		5.912
14	Uran	3.5	2.8	0		2.8
15	Karjat	11.02	8.816	0		8.816
16	Alibag	5.5	4.4	0		4.4
17	Matheran	1.4	1.12	0		1.12
	Sub-Total (B)	160.51	128.408	28	28	100.408
18	Navi Mumbai New Town+ NAINA	204.85	163.88	49	125	114.88
19	Khopta	2.31	1.85	0		1.848
20	Kalyan 27 Villages	12.53	10.02	0		10.02-4
21	BSNA	11.24	8.99	0		8.992
22	AKBSNA	5.05	4.04	0		4.04
	Sub-Total (C)	235.98	188.784	49	125	139.784
	Urban MMR (A+B+C)	5,404	4,323	2,275	3,752	2,294
	Census Towns & Rural MMR					
	Thane District	12.734	10.19	0		10.1872
	Raigad District	10.67	8.54	0		8.536
	Total Census Town & Rural MMR	23.404	18.7232	0	0	18.7232
	Total (MMR)	5,427	4,342	2,275.00	3,752.00	2,067

Source: MMRDA report 2021

In Mumbai city, 2620.8 MLD sewage is generated daily but only 1700 MLD is collected and treated. The gap is 1202.4 MLD which is flowing to rivers and Arabian Sea. It pollutes the environment and effect on peoples' health. Thane municipal corporation has 393.6 MLD sewage but only 120 MLD is collected and treated. Total 273.6 MLD is left out in Sea. Kalyan Dombivli Municipal Corporation could have 214.8 MLD sewage. But city has only 80 MLD sewage treatment capacity. Other sewage is flowing to Ulhas River. In Navi Mumbai Municipal Corporation, the sewage generated is 336 MLD in which 242mld sewage is collected and treated. The gap is found as 94 MLD. In Ulhasnagar city, the sewage generated is 132 MLD but only 26 MLD is treated. The gap is observed as 75 MLD. In the urban area of MMR, 4342 MLD sewage is generated but only 2275 MLD is collected and treated

the gap is almost 2062 MLD. Total MMR is concerned then sewage generated is 4342 MLD but the collected and treated sewage is only 2275 MLD. The gap in sewage treatment is 2067 MLD. It is flowing with number of rivers and Arabian sea. It pollutes the environment in Mumbai Metropolitan Region.

5. ECONOMETRIC ANALYSIS

We have used ordinary least square regression to find the correlation between dependent and independent variables. The nature of the dependent variable is the number of gig workers in MMRDA. An independent variable consists of the number of workers in different municipal councils and corporations, rural and urban area, water supply, solid waste, and sewage in each municipal corporation. We have used the ordinary least square method (Greene, W.2003) to find the correlation between the number of gig workers in region with infrastructural facilities. The econometric model is explained as follows.

$$Y_i = \alpha + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \dots + \epsilon \tag{9}$$

Where,

Y_i = Dependent variable as number of gig workers in MMRDA

x_1 to x_3 are independent variables such as gig workers in each municipal corporation, councils, rural and urban area as well as water supply, sewage, and solid waste in each area. The results are presented in the following table.

Table 10. Regression result for gig workers in region

Municipal Corporations and councils	Co-efficient (Standard Error)	T test
Mumbai	0.73 *(0.00)	48.26
Thane	0.362*(0.00)	100.10
KDMC	1.10*(0.00)	57.33
Bhiwandi	0.81*(0.00)	52.56
All Municipal corporations	1.27*(0.00)	267.27
Ambarnath	0.54*(0.00)	32.07
Khopoli	0.57*(0.00)	6.46
Raigad	0.37*(67.12)	67.12
Thane	-0.25*(0.00)	-25.33
Ambarnath	0.35*(0.00)	36.35
Vasai	0.58*(0.00)	7.23
Kalyan	0.31*(0.00)	79.17
Bhiwandi	0.66*(0.00)	23.30
Total Thane district Rural	0.39*(0.00)	100.64
Karjat	0.67*(0.00)	5.13
Panvel	0.46*(0.00)	31.48
Pen Raigad Rural	0.96*(0.12)	2425.24
Uran	0.60*(0.00)	7.56
Panvel Rural/Raigad	-0.017**(0.017)	-3.26
Sewage in Vasai Virar	0.13**(0.13)	3.95
Water supply in Vasai Virar	0.15*(58.34)	4.99
Constant	-12591.011(1881.34)	-66.93
R=0.70	Adjusted R=66	R2=0.65
Std error of the estimate	105.94	F =1888040.979

Above table shows that gig workers are positively correlated to Mumbai, Thane, KDMC, Bhiwandi municipal corporation. Such municipal corporations have more labours working in food and beverage industry. The Municipal Corporations have high density of population. Public and private

transport facilities exist for all people. The Ambernath, Khopoli Municipal Councils have high proportions of gig workers. Thane Rural has negative growth of gig workers in MMRDA. Thane rural has very low density of population. Due to low density, profits to hotel and beverage units are very low. They cannot appoint more staff against the loss of units. But Vasai, Kalyan, Bhiwandi rural has positive correlation with total gig workers over the period. Panvel rural had negative correlation of gig workers of food and beverage industry. Panvel rural is not connected well by transport facilities. It is underdeveloped area of Mumbai Metropolitan Region. Sewage and water supply issues are positively co-related with gig workers in Vasai and Virar Municipal Corporation. Sewage processing is not done completely in Vasai Virar Municipal Corporation. Overall cleanliness is very poor in this corporation. People do not prefer to go to hotels or order food from hotels and restaurants. The water shortage is also observed in this corporation. Overall hotel and beverage industry is not flourished in this corporation over the period due to water and sewage related issue.

6. POLICY IMPLICATION AND CONCLUSION

Gig economy is continuously increasing with increase in economic growth of any country. Much of the gig economy boomed during the COVID-19 pandemic, where it came in handy for delivery of food, essentials, and transportation services, which was hugely affected during the pandemic (Sugumaran T. and Abirami Viswanathan 2023). The gig economy is gaining momentum in different industries including construction, manufacturing, retail, food, and beverage amongst others. But now, it is marked that the gig workers have long work hours and an unstable income. This has led to a situation where gig workers are increasingly demanding labour rights. Gig work has been qualitatively explored, highlighting the elements of control exercised by the platform companies. However, there is a dearth of quantitative assessment of the economic sustainability of gig work (Sinha D. and Pandit D. 2023). This study focuses on the challenges of gig workforce working in the food and beverage industry in Mumbai Metropolitan Region. This study found that Mumbai city has a greater number of gig workers of food and beverage sector. It is compared with all other Municipal Corporations of Mumbai Metropolitan Region. The number of restaurants and beverage units are also more in city. The density of the population is also more. Mumbai is a financial capital of country and provides good employment opportunities into different sectors. Food and beverage are industry, and it provides benefit to other industries. Therefore, this industry has backward and forward linkages with other industries. Such an important industries grown very fast after 1990's. But after globalisation, this industry has not maintained its growth in terms of employment and working standards. Overall environment is not flexible for the growth of this industry. Some rules and regulations lapses were found in a changing business environment. Firstly, all units of food and beverage must be registered units with corporation and state government. There must be uniform code of conduct to each worker and organisation. Government must fix the minimum work hours, salary, maternity leave, flexibility, minimum wages. Every unit must follow the standard work practices at workplace in this industry. Therefore, in the long run, in addition to giving more autonomy to gig workers by flexibly designing the workflow and optimizing the technical elements of the platform. The platform enterprises should focus on how to alleviate the dual physical and psychological pressure that gig workers are subjected to because of the algorithmic control of online labour platforms. Furthermore, platform enterprises should encourage a people-oriented corporate culture and aim to achieve a win-win situation about the occupational health of employees and the enterprises' corporate interests by adopting a perspective that considers employees' physical and mental health (Lang, J.J. et.al 2023). All workers must have adequate casual and sick leaves with over times rules. Provident fund must be provided to all contract labours. The fundamental solution to improve work and the quality of life perceived by gig workers is to improve the working environment and economic conditions. With the growing use of the platform in the labour market in the New Normal era, the protection of the rights of workers will emerge as an issue, due to the lack

of boundaries in work, such as the lack of clear division between work and rest, and special employment status (Kim Y.G. et.al 2023). Every unit must provide proper electricity at work, water supply, ventilation, standard cooking methods and service methods. Many old women leave this industry due to rigid work hours and night duties. The female workers must be provided adequate job training including standard cooking and service methods. The technological infrastructure plays a major beneficial part in the gig economy. Beyond the physical setup, it's important to check for social factors that affect people's access to and utilization of technological infrastructure (Tripathi M.A and Tripathi R. 2020). The focus must be on digital platform for food delivery segment or apply to other segments of the platform economy. The dynamics are there in the divisions among groups of workers, contributing to the discussion and understanding that gig workers are a heterogenous group, with a diverse set of interests, such as their attachment to the job (Pedro Mendonça, Nadia K. Kougiannou Ian Clark 2023). Therefore, social security benefit policies required for gig workers and units providing gig work. All the above polices will certainly help to grow the units as well as improve the standard of units. It will also help to retain work force of this sector. Regular work force is strength of any business unit rather than liability.

AUTHORS CONTRIBUTIONS

The author/authors listed have made a substantial, direct, and intellectual contribution to the work, and approved it for publication.

CONFLICT OF INTEREST STATEMENT

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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