

# An Analytical Study of Start-Up Trends: An Indian Perspective

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## Abstract

With the growing consumer market, India is one of the most favorable places to open a start-up. Various factors that influence the start-ups' success, change over time. Their effects have to be analyzed properly in order to sustain this ever-evolving fast-changing world of trends. In this paper, we aim to study the most common patterns of funding in Indian start-ups industry and to analyze the current status of these start-ups. Means of interactive graphs have been employed to get an insight of the analysis done on the data set. Various start-ups have been categorized broadly into 8 industry verticals, then the graphs have been presented to show the number of start-ups opened in this category and also about how many of them were unsuccessful or being closed. This paper presents the analysis report to get an insight into present trends of investments in various industries and the success rate of start-ups opened in those industries.

**Keywords:** Start-ups, Funding, Industry Verticals, Trend Analysis, Preprocessing

## Introduction

Start-ups have been the flavour of the season over the last few years for the Indian markets. Start-ups are set to play a big role in the growth of the economy as it boost the huge number of employment subject. Ministry of Commerce and Industry released a notification to define the word

start-ups. According to News, L., & News, B. (2019), We can identify an entity as a start-up that is incorporated or registered in India. Furthermore, entity will be considered a start-up up to a period of seven years from the date of incorporation or registration, for biotechnology firms this period is 10 years provided it has an annual turnover not exceeding Rs 25 crore in any preceding financial year, and If it works towards innovation, development or improvement of products or processes or services, or if it's a scalable business model with a high potential of employment generation or wealth creation."

Time changes very fast and with this time changes the ever-evolving trends, there are many factors that determine whether a particular start-up will thrive or not. These factors, which influence the success of start-ups, are the geographical or climatic conditions of a particular region, people's demand and interest in that area, and many more. India is a plethora of colorful and different cultures distributed over a large area broadly into 29 states of the Republic of India. India is a developing country and besides this, it is the fastest growing economy in the world, according to a report by CII Blog, (2018). Indian start-ups raised \$3.5 billion in funding in the first half of 2015, and the number of active investors in India increased from 220 in 2014 to 490 in 2015 as mentioned by Sinu, M. (2017), and the same trend continues for the following years. Indian start-ups contribute a significant amount of share in the Indian economy. Through this paper, we have tried to present the analysis and study of various start-ups' trends in different cities as well as in different industry

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verticals. The purpose of presentation and visualization is achieved through the means of pie charts and bar graphs.

From the past few years, start-ups are contributing actively towards the GDP of Indian economy and the government of India has taken various initiatives to support these budding start-ups and to encourage the young entrepreneurs to take up these initiatives. Now before investing in any start-up, there might be various questions that can come in the mind of the investors as which is the most profitable industry to invest, or regarding the future success of the investment. Keeping all these things in mind, we have tried to accomplish an analytical study of start-up trends with respect to an Indian perspective.

Rest of the paper is as follows: Section 2 gives an insight of the work done in related fields mainly on start-up trends, Section 3 is a brief about the problem statement and motivation after which Section 4 is dedicated for the dataset and pre-processing. Section 5 gives an insight of the experimentations performed with the data, Section 6 is all about interpretation and analysis of the results and Section 7 provides a brief about the future scope.

## Related Work

The already existing work related to the start-up analysis includes the study on the contribution of start-ups in the economic development of India, in which the authors have tried to elucidate upon the successful start-ups in India and the government initiatives supporting the growth of start-ups and how these start-ups lead to a steady growth of Indian economy, this paper reveals that with over \$5 billion worth of investment India paved its paths to the third position in the world ranking in terms of start-ups, active investors have grown from 220 in 2014 to 490 in 2015 as mentioned by Sinu, M. (2017). Sara and Peter, (1998), have analyzed the gender biases over funding for start-ups, in which preferences of the investors towards male or female-owned start-ups is compared and scrutinized on the basis of a survey conducted on the 600(300 owned by men and 300 owned by women) start-ups. The results show quantifiable gender differences in certain areas of business financing, although intra-sectorial similarities demonstrate that gender is only one of a number of variables that affect the financing process. Feldman,

(2013) conducted a study on the topic of patent demands against venture-backed start-ups. In which he presents the details of responses of more than 200 venture capitalists and their portfolio companies. Mattayev, (2017) presented in his thesis the risk management strategy formation for an ICT start-up entering the Russian market. In this thesis various economic, political, social, technological and legal aspects and risks have been studied then the detailed SWOT analysis is presented in this thesis. Hussien, (2017) presented a multiple case study on employee engagement and retention at start-up companies. Where the data is collected from 11 start-up founders in total, which consisted of 9 from Finland, 1 from Germany and 1 from the USA, where the employees of these 11 companies are interviewed and then the detailed comparison of the companies is presented in this paper. Feldman, (2014) showcased the view from the venture capital community for patent demands and start-up companies. A bibliographical study and survey on valuation methodologies for business start-ups is another article presented in the field of start-ups. The article presents important contribution to the promotion and maintenance of start-ups' projects from the market point of view, many of which are in the early stage of deployment, since it will serve as a source of consultation for such category of company that needs to identify the better options in the process of valuation for start-ups and companies as support for the economic and financial viability study of projects in the early stage, supporting the professional segments of Administration, Finance and Engineering Production, not limited only to those, de Oliveira, F. B., & Zotes, L. P. (2018). A very unique kind of study in its own way is presented by Barkema, et al, (1998), in which they have examined about whether firms expand internationally through start-ups or acquisition. The results of this article show that foreign start-ups rather than acquisitions are the ultimate result of multinational diversity. Adding on, the influence of cognitive factors on start-up behaviors and success at venture creation was carried out. A claim has been made here that measuring of attributions before the potential entrepreneurs had started their businesses; one can make a stronger assertion for a casual relationship between initial attributions and each individual's subsequent success or failure in business start-ups by Gatewood et. al, (1995). Brush, (1992) presented a study comparing the past trends, new perspectives and future directions regarding

the role of women in entrepreneurship and business world was presented in this paper, the author had tried to review the empirical research studies on women business owners and their ventures and has classified the studies in the framework.

## Problem Statement and Motivation

With the advancement in technology and opportunities, the Indian start-ups are growing at a faster pace like never before. Opening a start-up depends on many factors, proper analysis of the effects of these factors before channelizing funding to open a start-up is very much necessary and required. These factors include the availability of electricity as it is the backbone of start-ups and industries mainly the software industry. Road links, train links or air links which comes under the ease of accessibility of resources in a particular area being also a key role for the investments in various fields. This was the main motivation behind choosing this topic for analysis. By the means of analytical study, we which to achieve the answers to below-given questions:

- Which industry is favoured by investors for funding in India?
- How many funds do start-ups generally get in India?
- Which city in India is generally favoured for start-ups?
- What is the current status of start-ups in different industry verticals?

## Data Set and Pre-Processing

We have used the standardized data set on funding on Indian start-ups from Kaggle.com. (2017) which was shared by track.in. This dataset has funding information on the Indian start-ups from January 2015 to August 2017. It includes columns with the date funded, the city the start-ups are based out of, the names of the funders, and the amount invested (in USD), types of funding. Appropriate information was searched and the data set is extended to include start-ups till March 2018. Total entries in the data set are 2518, for the purpose of the proper analytical study a new attribute was added to the present status of start-ups in the Market. This attribute can take one value out of “Active”, “Closed” or “Acquired”.

- Active means the start-up is still active and working.
- Closed means the start-up has been shut down.
- Acquired means the start-up has been acquired by some other firm.

Also the field industry vertical has some hundreds of different categories, we have clubbed those categories and divided the start-ups in the list in broad 8 categories, which are Food and Beverages, Marketplace, Healthcare, Education, Technology, Payment, Media, Social Network. These industry verticals are explained below-

- Food and Beverages – This industry vertical consists of start-ups that were being opened in the field related to food and beverages like the online food ordering platforms, food, and beverages delivery start-ups, creative cooking start-ups, themed restaurants, etc.
- Marketplace- In this field, we have categorized the start-ups which were related to the online e-commerce, banking, and financing start-ups and the start-ups which directly deals with the consumers or logistics.
- Healthcare- This category includes the start-ups related to fitness and healthcare like online pharmacies, medicine home delivery, online doctor consultation, fitness brands, fitness and health supplements, etc.
- Education- In this field, we have added the start-ups related to the education sector like the platforms for online textbook solutions, platforms that provide educational tutorials and guidance, start-ups of education and career guidance, etc.
- Technology- Start-ups related to technology like the new devices or instruments, etc. are clubbed into this category.
- Payment- The craze of online and cashless payments has provided a platform for the development of these start-ups, which includes e-wallets, online payment platforms, etc.
- Media- This field includes the start-ups and ventures opened in the field of media like news and broadcasting, etc.
- Social Networks- This includes the platforms which help people to connect with each other to exchange messages or other types of information.

Missing entries were dealt with filling the missing entries in the amount field by taking the average of the cumulative total funding.

### Experimentation

- For data pre-processing, all the cells with missing values were either filled with a correct value or were removed where information was not available.
- A new column, Status, was added which gave information about the current status of start-ups.
- Data in “Industry Vertical” was classified into different categories which helped in analysing the field which is favoured most by the investors.
- All the calculations are done using Python , Python.org, (n.d.) on “Jupyter Notebook.”, Jupyter.org, (n.d.)
- The pre-processed and cleaned data was uploaded on Jupyter Notebook and then library files were imported from pandas Pandas.pydata.org, (n.d.) and seaborn Seaborn.pydata.org, (n.d.) (For analysing and plotting purpose.)
- The number of start-ups which commenced and thrived with investment in a given period was calculated city-wise as shown in Fig. 1.

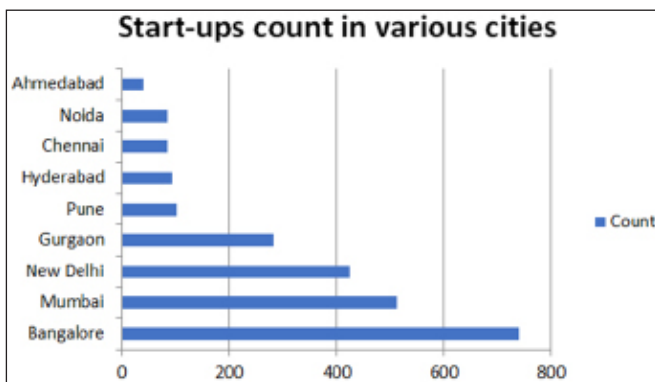


Fig 1: Start-Ups Count in Various Cities

- Fig. 2, shows the percentage share of cities in total Indian start-ups, after which total and average investment generated by start-ups in every city was calculated and presented in Fig. 3 and the pie chart is given in Fig. 4, which is based on the percentage share of total investment.

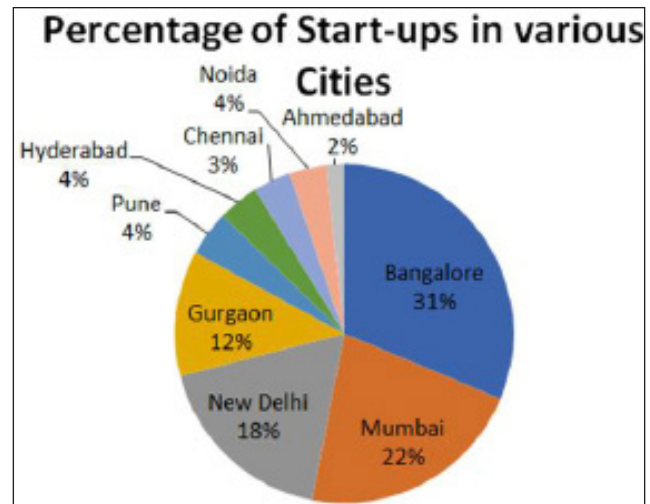


Fig. 2: Percentage Shares of Cities in the Total Count of Start-ups

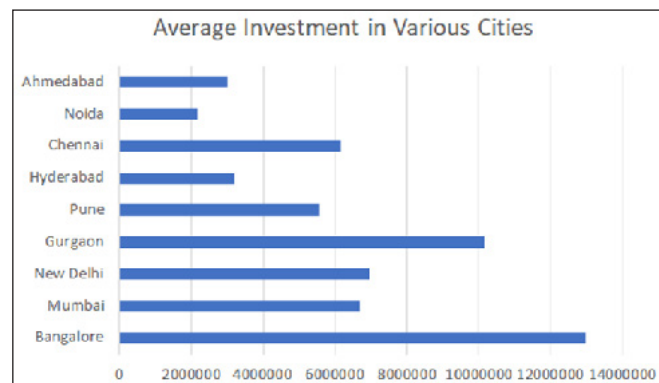


Fig. 3: Average Investments in Various Cities

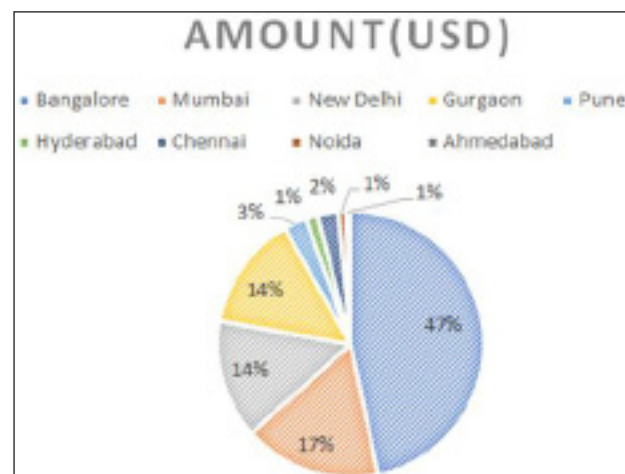


Fig. 4: Percentage Shares of the Various Cities in the Total Investments (USD)

8. Then the number of start-ups opening in each industry field was calculated and plotted on a bar

graph shown in Fig. 6 and the percentage share is shown in the pie chart of Fig. 5.

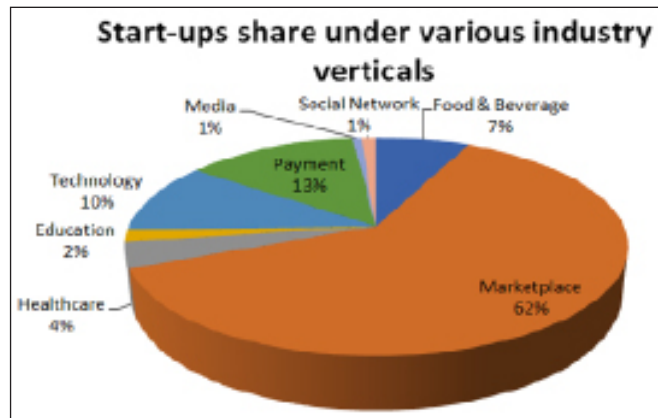


Fig. 5: Start-Ups Share under Different Industry Verticals

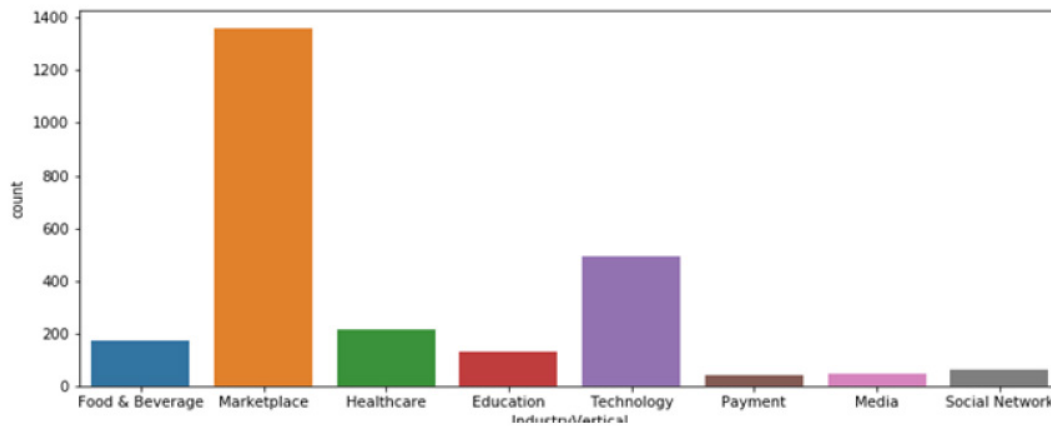


Fig.6: Numbers of Start-Ups in Various Industry Verticals

- Status of start-ups for every field is calculated and shown using graphs shown in Fig. 7 to Fig. 10.

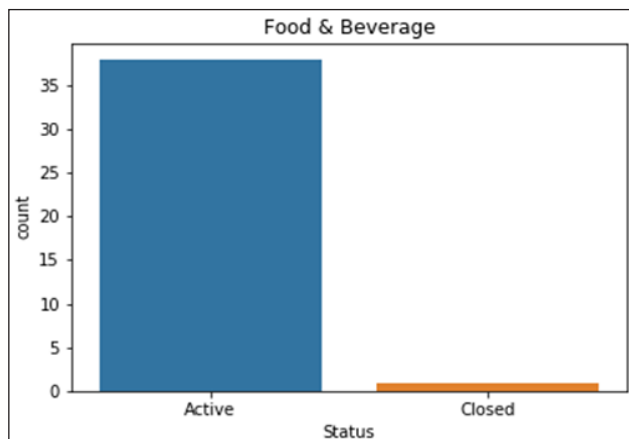


Fig. 7: Status of Start-Ups in Food and Beverages Industry

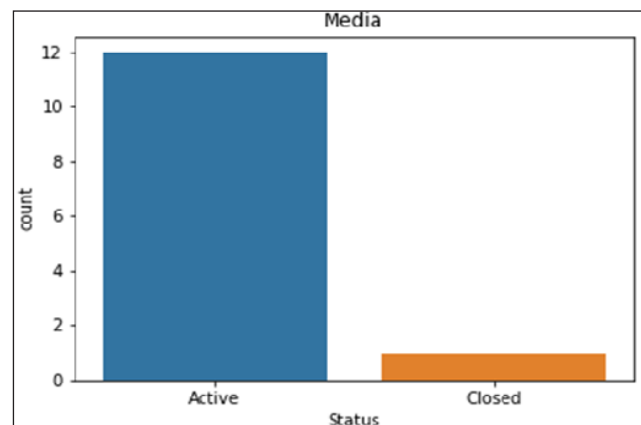
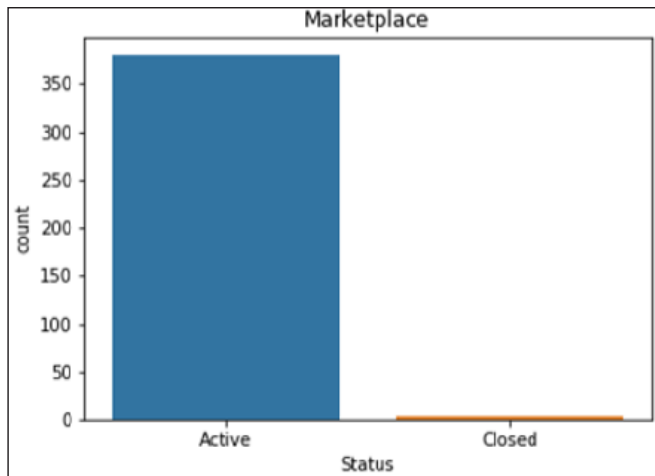
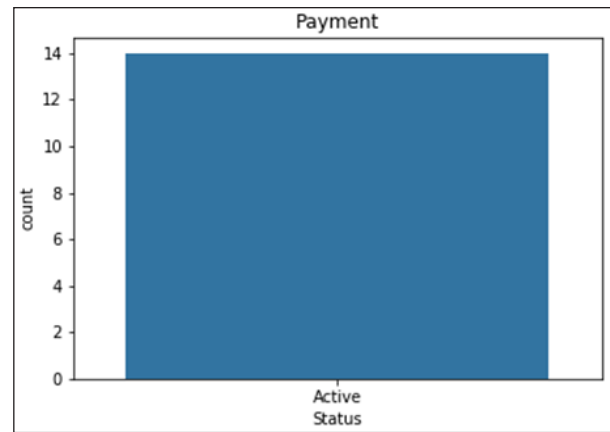


Fig. 8: Status of Start-Ups in Media

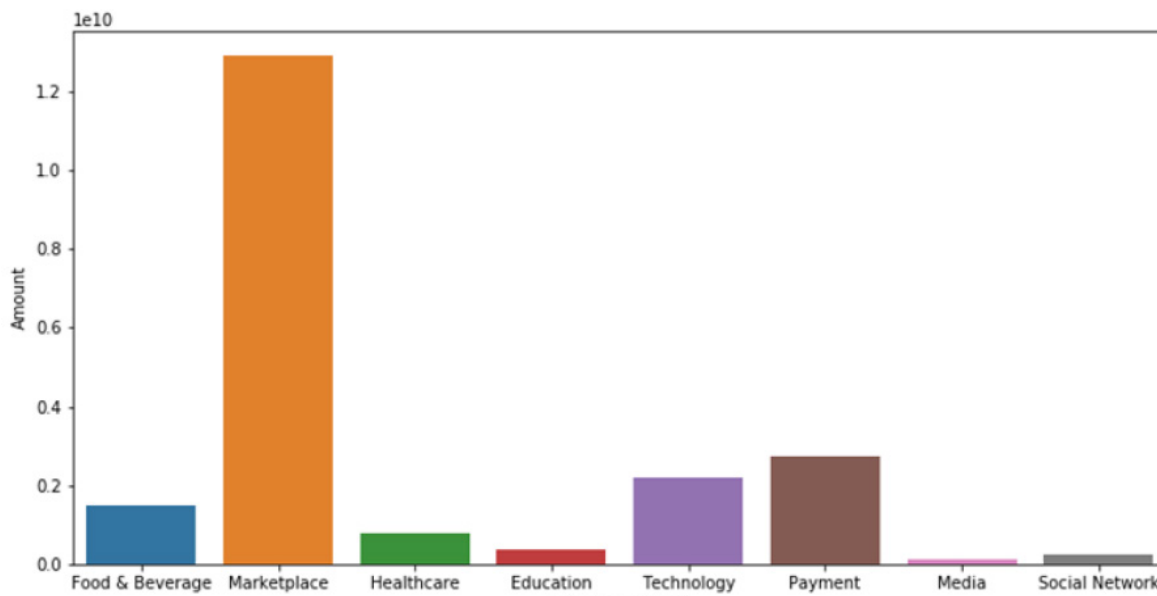


**Fig. 9: Status of Start-Ups in Marketplace**



**Fig. 10: Status of Start-Ups in Payment**

- Lastly, Total investment in each field was calculated and plotted on a bar graph and shown in Fig. 11.



**Fig. 11: Total Investments in Each Field**

## Analysis and Interpretation

- Fig. 1, shows a city-wide record of start-ups. In our analysis, Bangalore was the most preferred city for opening start-ups. Of the total 2478 start-ups that commenced, 739 opted to start in the city of Bangalore.
- For every 100 start-ups that open in a given period, 31% of companies preferred Bangalore as the hub for their operations. Followed by Mumbai, which is preferred by 22% of companies. New Delhi was

third with 18% likeability. These statistics are shown in Fig. 2.

- Next, we calculated the funding distribution over 9 cities with the maximum number of start-ups. Again, Bangalore topped with total funding of 9,58,76,58,957 dollars of investment in a given period.
- Average funds received by the cities were also calculated by dividing the total funding of a city by the number of start-ups it has. The result of this analysis is shown in Fig. 3, where we can see Bangalore

again remained at the top followed by Gurgaon and New Delhi respectively.

- Industries were divided into various categories and analysis was done on the basis of the number of start-ups that started and the total investment received by that field. Fig. 5, shows the number of start-ups in each field. Marketplace, which included E-Commerce, Logistics, Finance, Renting/Hiring, and services were the most preferred choice as more than 1300 start-ups were opened in this category. Payment and Technology stood at 2<sup>nd</sup> with 13% and 3<sup>rd</sup> with 10% respectively.
- Fig. 7 to Fig. 10 shows the current status of the start-ups in each field. Media witnessed the worst performance in terms of average closed start-ups which included a number of start-ups that closed divided by the total number of start-ups in that industry. Fig. 7 is for the status of start-ups in the food and beverage industry which shows that a total of 38 start-ups are still active and only 1 has closed. Fig. 8 shows that 12 start-ups are active and 1 has closed in the media. Fig. 9 shows 378 start-ups are active and 14 start-ups have been closed in the marketplace. All 14 start-ups in the payment field are active as shown in the Fig. 10.

## Conclusion and Future Scope

Since starting and maintaining a company depends on a plethora of factors, both internal and external, one cannot perfectly predict the future of a particular start-up and its long-term sustainability. We analysed the data and tried to present the current trends with respect to the funds gained in a particular city location, and Industry vertical. We find that Bangalore was the top choice of companies for their headquarters, and Marketplace, which includes the commercial exchange of goods and services, was the most preferred Industry for start-ups in India. There is a lot of future scope for the existing work, for example, different regression techniques can be applied to predict the expected status of start-up after some time or to predict the most favourable city for establishing the start-ups based upon given values for the attributes. The results presented in this paper can also be used for deciding future investments in different industries and in different cities of India.

## Availability of Data and Materials

The dataset generated and analyzed during the current study is available on Kaggle <https://www.kaggle.com/gsdeepakkumar/startup-funding/data>.

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Not Applicable.

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