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Research on Survey for Finding Effects of Covid-19 Pandemic on Construction Industry

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Abstract: ***This research paper is mainly carrying purpose of finding the effects of Covid-19 pandemic on construction industry. This is achieved through a methodology which involved online questionnaire survey based on the quantitative assessment of the impacts as well as review of the professionals who are the respondents. The respondents are directly related to construction activities and also possess good credibility for their work and academic qualification. The survey has been designed and hosted via google forms and shared with respondents mentioned earlier. The survey is designed so as the researcher gets insights related to even minute problems which were faced by the professionals during the hard times of pandemic. Survey is also taking care of gathering information related to probable losses caused to the respondents by asking an open-ended question related to work. Further the gathered data has been explained theoretically as well as represented visually by bar graphs and pie charts etc. From obtained results, a badly affected conditions pf construction industry come in light. Majority of respondents were forced to fully or partially stop their projects. Other issues which are highlighted by more than one third of the respondents are, higher operating cost at site, decreased demand of construction during Covid-19, supply chain provider's problem, black marketing. Actual number of affected professionals is a dark side in such difficult time.***

Keywords*: Professionals, business, experience, data, questionnaire survey, black marketing, construction industry.*

I. INTRODUCTION

The Covid-19 pandemic has made outreaching effects on almost all the parts of our life, be it employment, businesses, infrastructure, IT services, tourism etc. Even after a year and half since first case of covid-19 detected in India, it has become a continued challenge for everyone. Although government and private sector working hand in hand, tackling a pressure on healthcare system become a difficult job. With the starting of the Covid-19 pandemic, a message across the India has been clear that all people should stay at home. Indeed, this has seemed a greater dilemma to the construction sector since a majority of the people cannot work from home. However, it shows that majority of the workers in this industry will not get paid if they do not come up for work and henceforth will lose their jobs.

The construction activity in the India has rapidly declined since the nation-wide lockdown in March 2020 whereby thousands of builders' work has been halted in addition to job cuts due to coronavirus hitting the economy [2]. The lockdown due to Covid-19 resulted in various infrastructure project sites started at closure as it is mainly due to an effect on the labour movement and also due to supply chain disruptions that contracted further as more states enforced COVID-19 lockdown. The construction industry offers employment to 35 million people in India [5].

To conduct the assessment of effects of Covid-19 on construction industry, a survey is carried out by a me which included a brief information related to respondent's qualification, work experience and pointers related to their general information of work during a start and peak of pandemic. All the data is collected and compiled according to three parts- Respondent's 1. Professional data, 2. Post unlock.

The survey respondents are fresher civil engineering graduates who started working or interning at local construction firms, some are post graduates and experienced engineers, some are architects. Ranging from different work experiences of respondents who participated in survey, it is particularly designed to provide precise information about problems occurred due to lockdown restrictions, shutting of manufacturing plants. The study starts with a literature review followed by a collection of primary data through a questionnaire survey, distributed to the construction and built assets professionals [1].

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II. OBJECTIVE

The aim of the research is to determine the effects of the pandemic on construction industry in the India, therefore, the research will utilize the following research tools to determine the impact of financial crisis to the construction industry and find out practices that have been adopted by contractors in response to the challenges presented by the global financial crisis.

1) Explanatory study of published resources from eminent sources.
2) Online questionnaire survey through google form.

III. LITERATURE REVIEW

A. *Status of Construction Industry in India*

Construction activity is expected to expand on an average by 7.1% per year.

1) The Indian real estate sector will be expected to reach a market size of Rs. 12.6 Lakh Crores by end of 2020.
2) The Construction industry is expected to record a CAGR of 15.7% to reach about Rs. 51.6 Lakh Crores by 2022 [4].

Over the next 24moths (8 quarters), the report's analysts are expecting that growth across residential, industrial and institutional sectors in India to stay impacted due to the economic turmoil caused by the COVID-19 outbreak. Although the near-term challenges, medium to long term scenario remains well positive. Over the near future, investment in the construction industry will be mainly influenced by government spending in the infrastructure sector [4].

B. *The impact of Covid-19 on construction industry*

The total lockdown caused by COVID-19 has badly curtailed economic activities. The construction industry was no exception that have been severely affected by the COVID-19 pandemic and there is no data exclusively reported as the first quarter of FY2020 focusing on the impact of the pandemic on the construction industry hence this study is aimed to discover the effects of Covid-19 on it [2].

1) Disruption of supply chain of building materials
2) Losses in construction-
3) Shortage of labors
4) Financial problem
5) Contractual implication issue
6) Material cost and availability
7) Unemployment
8) Issues in real estate, infrastructure

IV. METHODOLOGY

A. *Introduction to Research Methodology*

This research aims to find the negative effects of the COVID-19 pandemic in the construction industry. This was achieved with the explanatory study review of limited literature; as this pandemic is recent phenomena and has lesser information available and an extensive study of research published in eminent sources and also with the collection of primary data from construction professionals in Architecture, Civil Engineering, Contractors. [1]

B. *Questionnaire Survey*

The questionnaire contains both close-ended and open-ended questions with multiple-choice options. The survey questionnaire is designed and created online, hosted in google drive and shared in a google form. Link to the google form is shared to professional directly through contacts numbers, messengers and professional platforms such as LinkedIn and construction professionals' forums, also directly by emails. A total of 31 responses were received. The survey questionnaire was structured under the following subheadings: general information of survey respondents, variables to assess the effect of pandemic on construction industry, revival of construction sector post Covid-19 and reviews from the respondents [1].

However, this research paper is focussed on general information of survey respondents, variables to assess the effect of pandemic on construction industry, these two aspects only.

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V. DATA ANALYSIS, RESULTS AND DISCUSSION

A. Data Analysis

The data gathered from the survey is from respondents across Maharashtra and other states in India, analysed using descriptive statistics. Table 1 represents the general information of survey respondents. Table 2 represents variables to assess the effect of pandemic on construction industry. Both the sections of the online questionnaire survey are presented in visuals as well as explanatory part for better understanding.

The total number of respondents in this survey are 31. The participants different level of education, work experience and job positions. The data and information are collected in regards to the effects of pandemics on construction industry in the India using closed-ended questions. The responses were measured using a multiple-choice question.

This part comprised data analysis based on the questionnaire collected from the field research the topic under investigation. To be able to analyse the findings collected from the field, I utilized tables, descriptive statistics as well as charts to display the data. The analysis was conducted according to the structure of the questionnaire, hence it involved three parts for the questionnaire as mentioned in methodology.

The first is general information of survey respondents;

Table 1: General information of survey respondents.

Questions	Description	Number	Percentage (%)
Respondents Academic Qualification	• Diploma • Graduate • Masters • PhD	1 19 11 0	3.2 61.3 35.5 -
Respondents' Profession	• Civil Engineer • Architect • Project Manager • Contractor	25 2 1 3	80.6 6.5 3.2 9.7
Years of Experience	• 0-3 years • 3-5 years • 5-10 years • More than 10 years	20 4 4 3	64.5 12.9 12.9 9.7

The sampling of the professionals participated in the survey are related directly to construction sector with having their own firm or working in some infrastructure companies.

1) Majority of them are graduates in civil engineering i.e., 61.3% of total 31 respondents, others with Master's degree comprises of 35.5% of total and Diploma holders are 3.2% of 31 respondents.
2) Profession wise survey included about 80.6% are the civil engineers, 6.5% are the architects, 3.2% are the project managers and 9.7% are the contractors out of total 31 respondents.
3) Respondent's years of experience also noted as follows; having 0-3 years of experience comprised of 64.5%, 3-5 years of experience are 12.9%, 5-10 years of experience are also 12.9% whereas more than 10 years of experience are 9.7% of total 31 respondents.

The second part of the survey contains the variables linked to assess the effects of pandemic on construction industry, it is shown in following table;

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Table 2: Variables to assess the effect of pandemic on construction industry

Questions	Option/ description	Frequency	Percentage
How has covid-19 affected your business?	*9)* Decreased up to 20% *10)* Decreased by 50%. *11)* Decreased by more than 50%. *12)* It hasn't affected turnover	7 10 10 4	22.6 32.3 32.3 12.9
Have you had to stop your operations at any point during the pandemic?	*13)* Yes- I previously stopped operations but started again. *14)* Yes- I stopped operations and still not able to restart it. *15)* No- I haven't had to stop operations.	20 5 6	64.5 16.1 19.4
Have any of your projects been cancelled or postponed because of covid 19?	*16)* Yes *17)* No	27 4	87.1 12.9
Has your business been able to get the material, goods or services it needed to continue operations during the pandemic?	*18)* Yes *19)* Not always *20)* No	1 29 1	3.2 93.5 3.2
Has your business been affected by any of following factors during pandemic?	*21)* Travel/transport restrictions *22)* Increased operating cost *23)* Decreased demand *24)* All of the above	13 9 5 19	41.9 29 16.1 61.3
How did you manage your workforce in the lockdown?	*25)* Helped them reaching their home *26)* Paid wages *27)* It was not manageable that time	2 16 13	6.5 51.6 41.9
Did you observe any black market in building materials?	*28)* Yes *29)* No *30)* Can't say	17 2 12	54.8 6.5 38.7

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B. Discussion

The second part of the survey has helped me providing the statistics related to impact pandemic caused on the construction.

1) Businesses which are decreased by Covid-19 by 50% and >50% are 32.3% & 32.3%respectively, some which decreased by 20% are 22.6%. Also, about 64.5% of the respondents had to stop their operation during the lockdown.

2) About 87.15% of the respondents had to stop or postpone their construction during peak of covid-19. Out of the 31 respondents only 3.2% were able to get regular material, goods and services even during the pandemic. 93.5% registered their response as NOT ALWAYS, while 3.2% couldn't arrange to do so.

3) Transport restriction, increased operating cost and decreased demand had affected about 41.9%, 29%, 16.1% of respondents respectively.

4) The respondents managed their workforce during pandemic by; 6.5% helped them reaching their home, 51.6% paid wages to workforce, while 41.9% said it was not manageable at that time.

5) About black marketing during the lockdown in pandemic, 54.8% of respondents said they observed the black marketing in building materials, 6.55% said NO, whereas 38.7% registered as CAN'T SAY.

The questionnaire survey generated results from the respondents in the form of Averages, Percentage, Cumulative factors and Frequency, but due to limited number of respondents, only frequency and percentage data is used to represent in pie charts and bar graphs. It makes the understanding of the data more convenient for the readers.

C. Results

It was clearly evident from the project status that over 90% of respondents stated that their projects were affected during this Pandemic. About 87% of participants indicated that their projects were partially stopped due to the COVID-19, similar number of the participants out of total further experienced full stoppage due to stringent restriction due to lockdown and guidelines related to construction.

1) Graphical visuals of general information of survey respondents

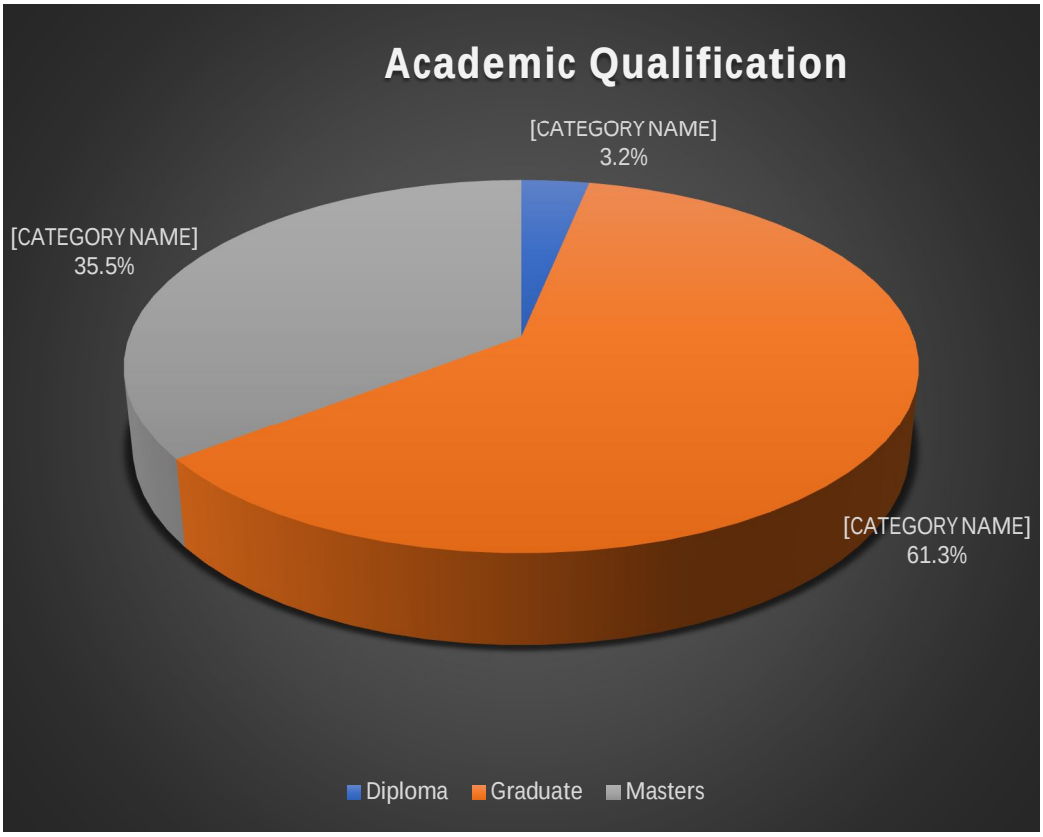


Fig.1 Academic qualification details

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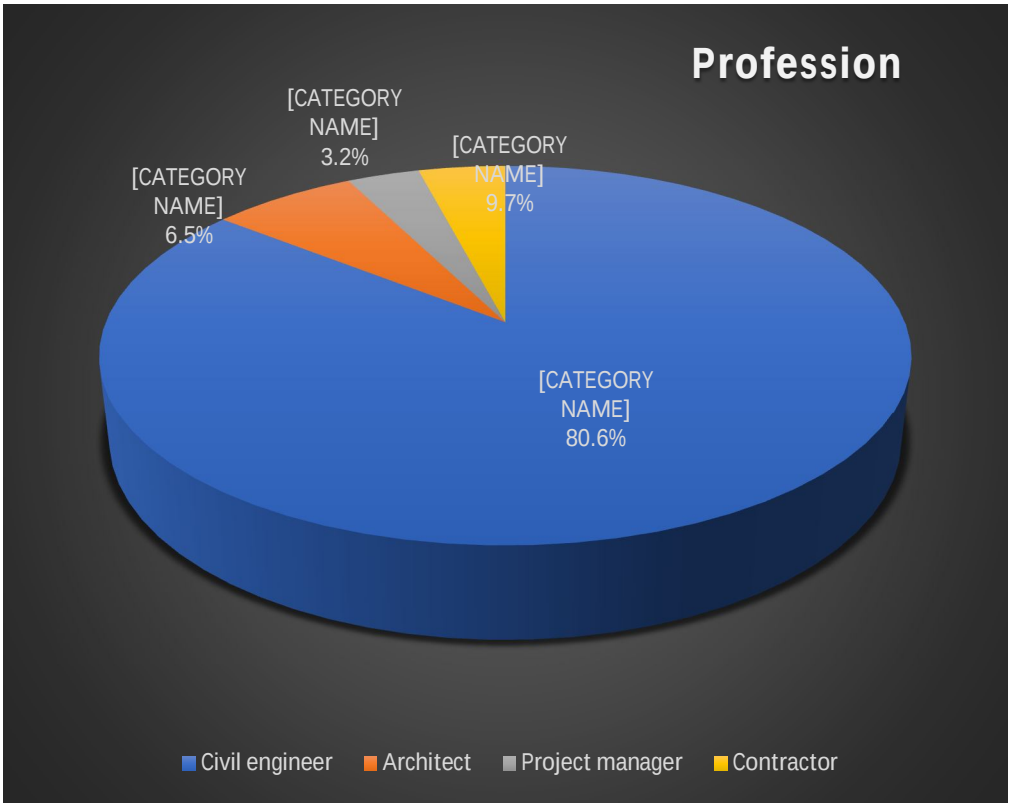


Fig.2 Profession detail

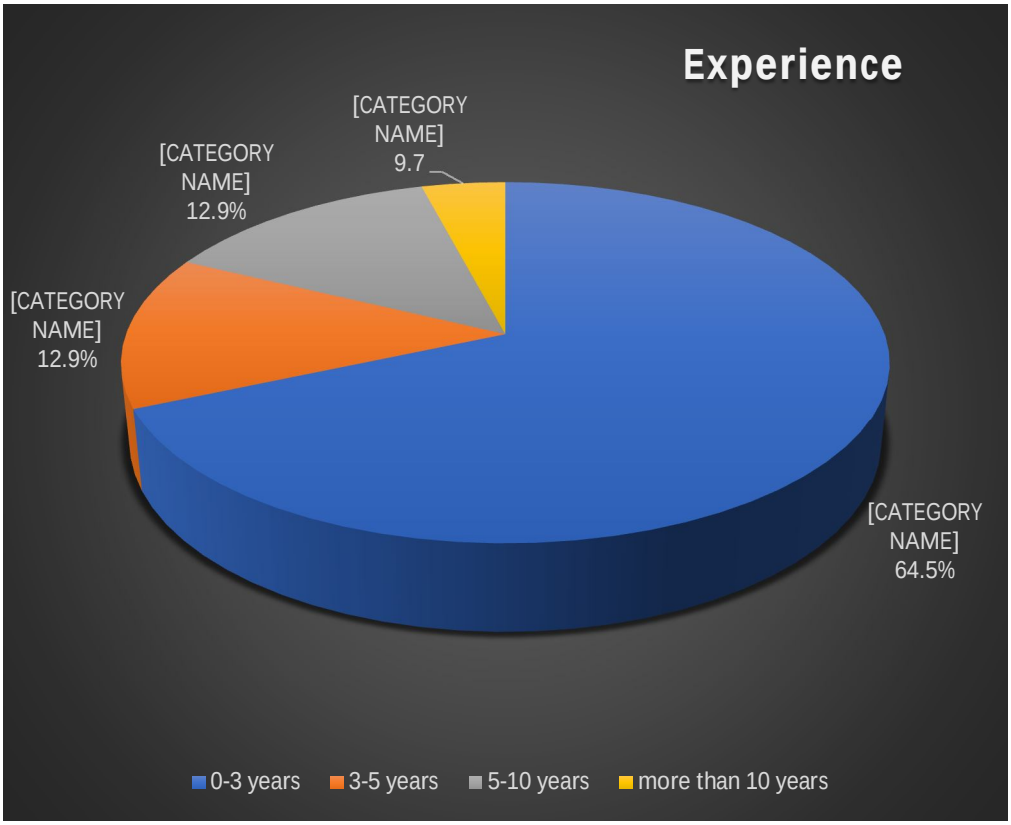


Fig.3 Experience in years details

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2) Graphical Visuals Of Variables To Assess The Effect Of Pandemic On Construction Industry

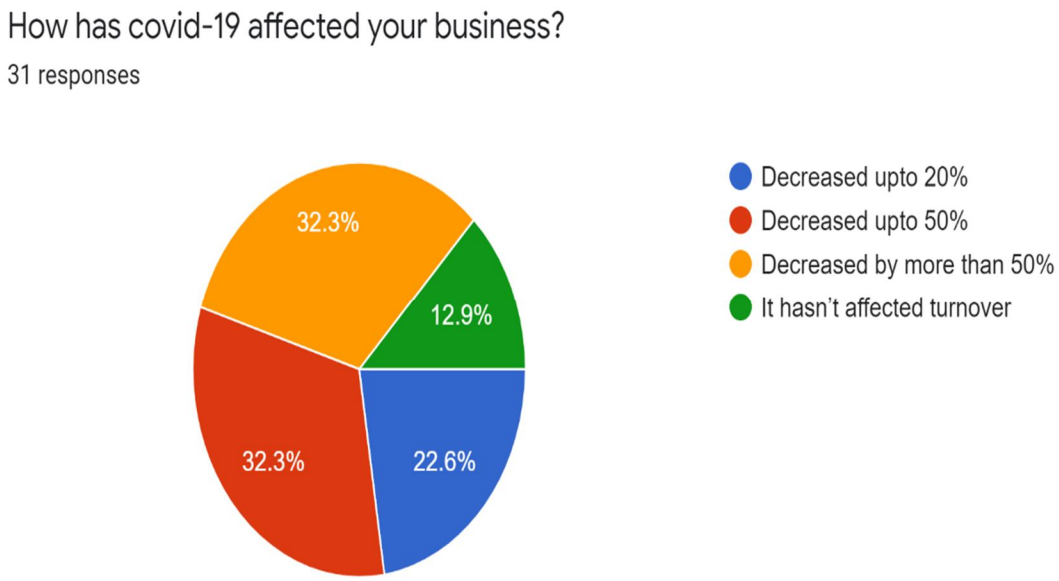


Fig. 4 Effect on business

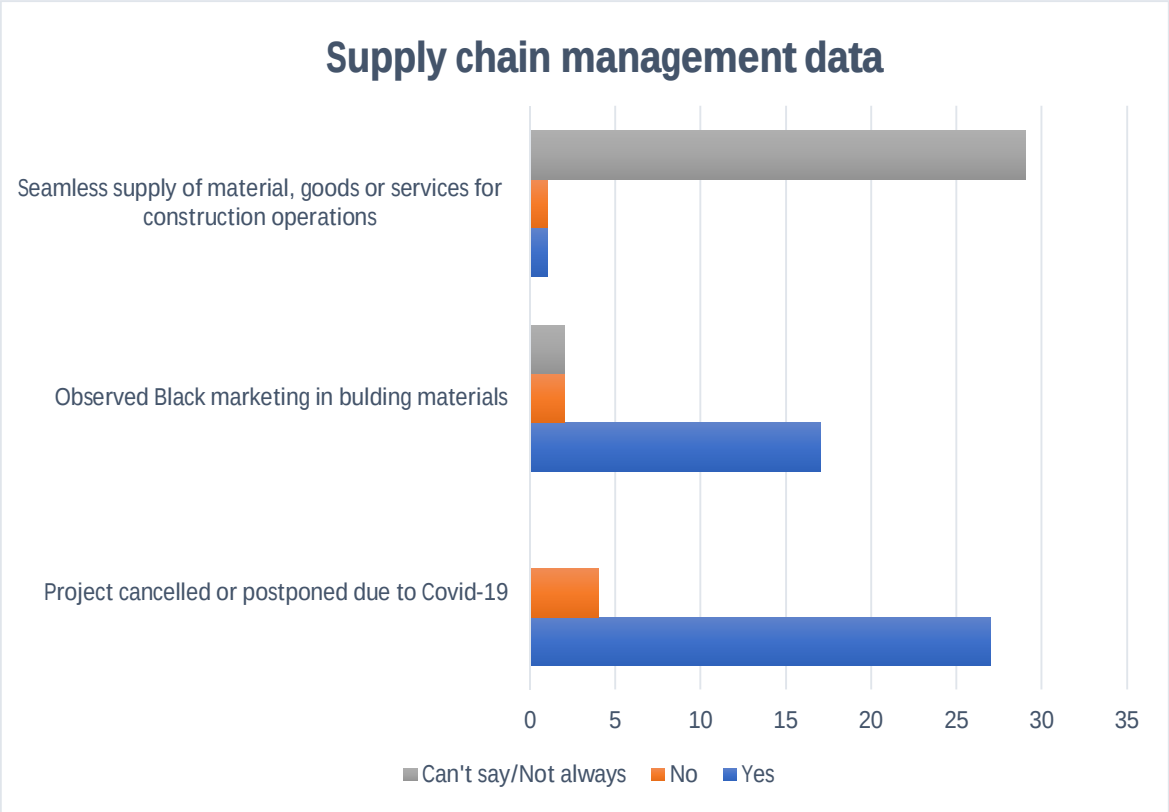


Fig.5 Supply chain management detail

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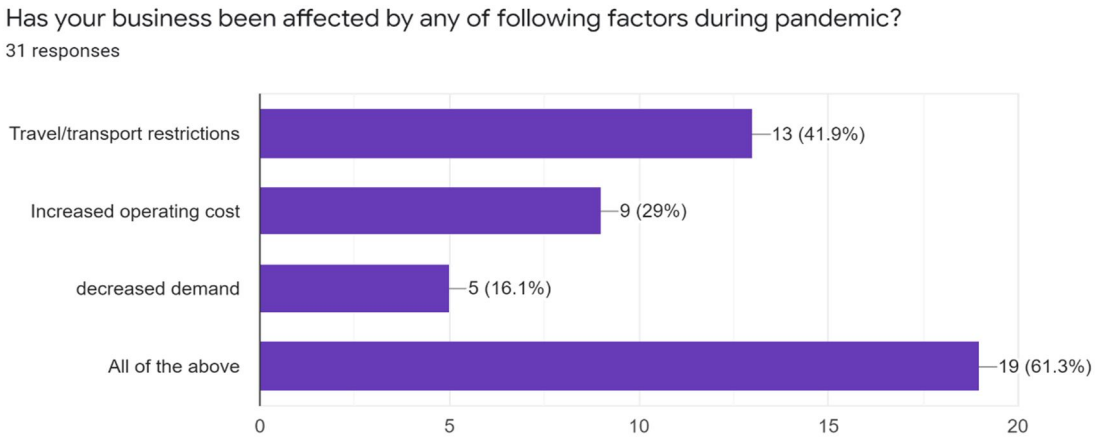


Fig.6 Factors affected business negatively

VI. CONCLUSION

The research paper gathers and compiles the collected data and statistics from the conducted questionnaire survey using literature review and data analysis. The work exactly identifies the experiences of the professional respondents in construction industry as it relates to Covid-19, those included are Civil engineers, Architects, Project managers and Contractors. Aim of the paper is achieved through statistics collected in the form of Averages, Percentage, Cumulative factors and Frequency, collectively called as quantitative methodology and to assess impact of Covid-19 on construction industry.

Results are focussing upon difficult facts for the professionals both working individually and in the bigger construction firms, that despite possessing enough capital, the system couldn't support the line of operations during the lockdown or the peak of Covid-19 in 2020-21, for e.g., black marketing, difficulties in regular procurement of goods and services, transport restriction etc. All of the mentioned factors cost dearly to whole of the construction and allied industries across India. However, this research paper primarily concerns about the impact within a country but it is not hidden fact that all over the world this chain of disruption and economic loss is also huge, this fact has been made clear by some of the respondents in the survey who are working in the larger construction firms which has multinational presence. Overall inference is more than 95% of the construction projects got delayed, postponed, even cancelled. About the professionals more than 80% of them faced severe capital crunch, some of them were even exhausted their savings. The findings and experiences are in the initial phase of lockdown in FY 2020-21 and also during the peak of covid-19 in India i.e., 3rd quarter of FY 2020-21.

VII. ACKNOWLEDGEMENT

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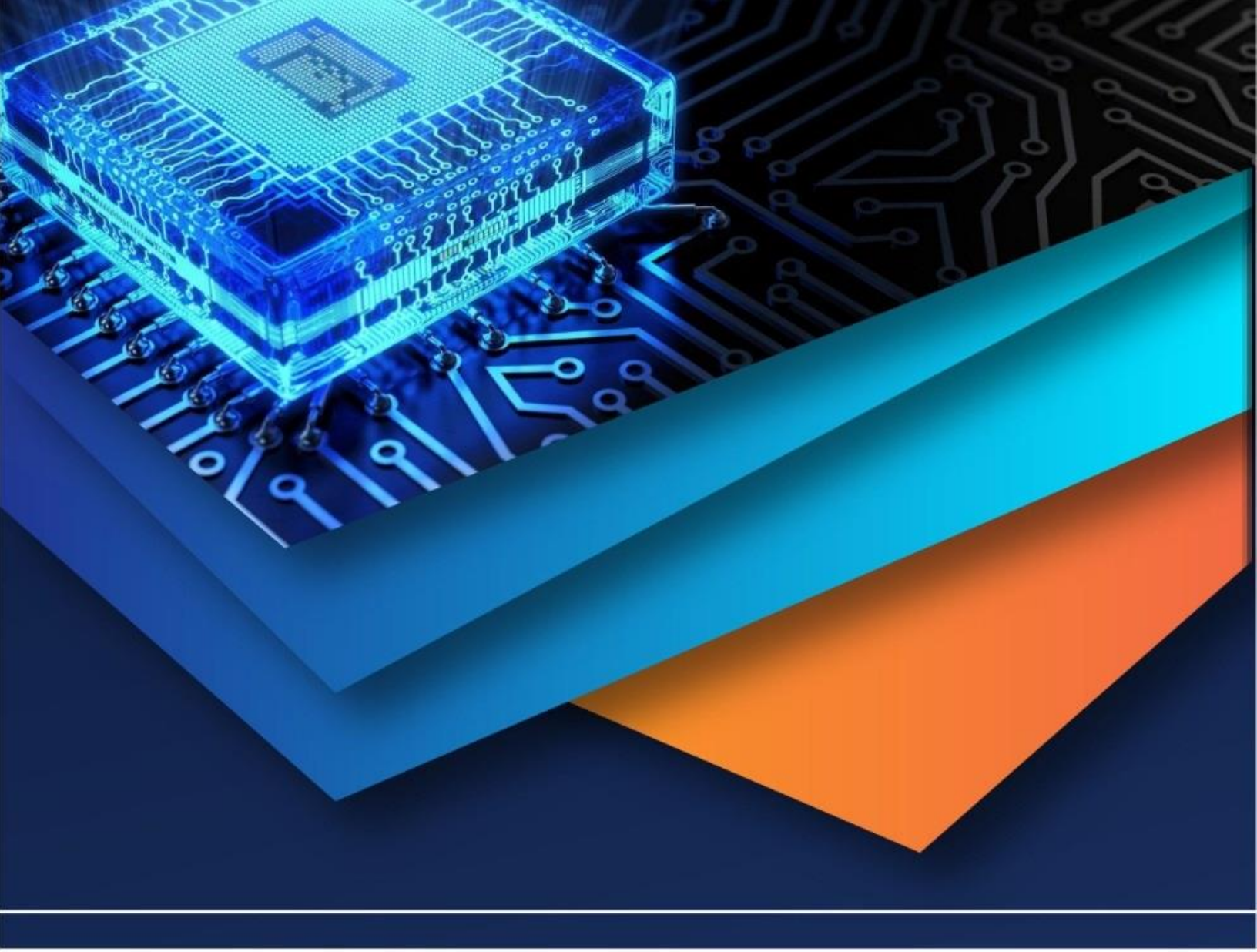
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