

Prioritizing Financial Crises Due to COVID-19: An Economic Safety and Sustainability Approach in India

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ABSTRACT

In order to reduce the community-transmission of the novel coronavirus, precautionary measures require major attention. Reducing coronavirus transmission in the Indian population has included utilization of protective masks, which ranked in the first level, followed by hand hygiene, self-observations, respiratory manners, social distancing, and environmental cleanliness and ventilation, respectively. But the Indian Government has taken a good initiative by ordering a lockdown to provide safety to its population and sustainability to the environment or nature. People in some sectors are doing work from home to still the rate of transmission, but the financial transactions also stop. In some sectors (product/service), it is also not possible to work from home, and in India, the infrastructure or facilities or science is not that developed. Hence, the Indian economy is suffering. In this paper, an effort is taken to find the financial crises in India due to Pandemic COVID-19 and prioritize it by Topsis method.

KEYWORDS

COVID-19, Financial Crises, Grey-TOPSIS, India, Indian Economy, Safety

1. INTRODUCTION

COVID-19 or Corona Virus is a idiosyncratic case of virus in India. Even though India has faced some Epidemic previously but first time is challenged with an Pandemic. Indian Economy being an mixed economy has half of India's worker involved in agriculture, the other one third worker's employed by the service industry, which contributes two third of India's output. Indian's follow the concept of circular flow of income and expenditure. It has two basic flows, the real flow and the money flow. In case of circular flow, if two sectors are considered (i.e, house hold/ domestic sector and the firming sector) due to Covid-19 all financial institutions and business sectors has been shut down and no service of the workers is required .As there is no production of goods or and no services provided, small business firms and household sector not able to provide remuneration to their employees.

DOI: 10.4018/IJSDA.20210101.oa1

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If factor payment not done then the standard of living of household sector decreases. So they are unable to pay the firms in form of consumption expenditure. Considering market equilibrium, in this scenario, due to panic of corona virus and shutdowns, people are tempted to buy more goods, accessories, and groceries, etc. So some shops raise the values of goods to gain profit. People having no choice are forced to buy it with high cost and price as the production sector is closed down the supply is declined. In this case the demand is much more than the supply. So the firms do not enter into any competition to sell their products. So price of goods raised automatically. In short Indian economy will fall backward economically 20 years according to experts.

In India very few people are involved in economic activity as per paying capacity but many people are unable to afford and purchase their required goods and services. As many people stop buying certain goods business organisations stop supply of those goods. This leads to a collapse in stable national income of India. As transportation and other service sectors clamped down farmers are unable to buy and sell their goods, this leads to wastage of efforts and goods and imbalance in economy. As intermediate goods from primary sector is unavailable the secondary sector also retires.

The lockdowns and shutdowns have direct effect on tertiary, quinary and quaternary sectors.

Large population- As India is a country with huge population the need of every section of people in the society is not fulfilled. This has increased significantly during the present situation of covid as the product and service delivery partially paused, leading to disturbance in the circular flow of income.

Unemployment increased rapidly due to shutdown of different sectors of economy and Slow down in procurement of national wealth.

2. LITERATURE REVIEW

One of the pandemic also termed as “swine flu/ Spanish flu” was initially reported in Mexico on 26th April 2009, after the last reported flu pandemic on July 1968. As on 15th June 2009 and within lesser than 50 days, it was reported of affecting over 76 countries with 35,928 cases and 163 deaths. Chawla et al. (2009) have described the mitigation approaches for combating flu pandemic at local, state as well as national levels. Bats are natural-reservoirs of a number of novel as well as highly pathogenic viruses like corona-viruses. Li et al. (2016) have considered a total of 183 and 236 hospitalized children with acute encephalitis-like syndrome and respiratory tract infections in order to explore the cytokine expression profiles in them. Anti-CoV IgM antibodies were detected in 22 out of 183 i.e. 12.02% and 26 out of 236 i.e. 11.02% patients, respectively. Further, the “Cytokine analysis” revealed of significantly higher level of serum granulocyte-colony stimulating-factor (G-CSF) in both CoV-CNS as well as CoV-respiratory tract infections in comparison to healthy controls. Wacharapluesadee et al. (2018) have revealed that corona-virus related infections and shedding was found in more juvenile as compared to adult bats. Park et al. (2018) have discussed about the transmissibility as well as severity of “Middle-East Respiratory-Syndrome (MERS)” infection and it was reported of having differences by outbreak-regions & characteristics of patients. The first identification of a typical pneumonia through SARS-CoV was made in November 2002 in Guangdong (China), and the infection was exposed quickly to Beijing, Hong-Kong, Canada, Singapore, and Vietnam in March 2003 as a highly infectious disease with respiratory-droplets as major transmission routes (Hui and Zumla, 2019). The “coronavirus envelope (E) protein” is a small, integral-membrane protein associated with several virus-life-cycle aspects such as assemblage, budding, envelope-formations, and pathogenesis (Schoeman and Fielding, 2019). Hierlihy et al. (2019) have reported from their analysis that the mitigation measures for the mosquito-borne virus such as Chikungunya have been placed into six categories like insecticide uses, behavioural protective-measures, public-education, blood and blood products’ control, biological vector-control, and quarantine of infected persons, respectively. Salamatbakhsh et al. (2019) have assessed the worldwide burdens of premature-mortality owing to “Middle East

Respiratory Syndrome (MERS)” by utilizing publicly available data from the “WHO-website” of the reported 1789 MERS patients between 23rd September 2012 and 17th May 2019 in Saudi-Arabia. There has been the reporting of mild-illness with fever symptoms with COVID-19 in the majority of cases and the most commonly reported symptoms being cough. In case of the aged peoples or those with co-morbid conditions, a severe & fatal outcome tends to occur (Sun et al., 2020; WHO, 2020a). The neurological signs found with some COVID-19 patients include headaches, nausea & vomiting. The invasions in the central nervous-system have been reported of partially responsible for the COVID-19 patients with acute respiratory failures (Li et al., 2020). The present treatment methodology of COVID-19 cases mainly focuses on early recognitions, isolations, suitable control measures for infections and supportive-care provisions (WHO, 2020b). A number of clinical-trials are undertaken for evaluating the therapeutic agents for the suspected or confirmed SARS-CoV-2 infections, even though there are no specific antiviral treatments (Harrison, 2020). In spite of intense research efforts the appearance of new diseases are still a source of substantial uncertainty. Recently a severe respiratory disease was reported in Wuhan (China), and at least 1,975 cases have been reported as of 25 January 2020, since the hospitalization of first patient on 12th December 2019. It has been suggested by the epidemiological investigations about the association of the outbreak with a sea-food market in Wuhan. Wu et al. (2020) have considered a single worker at the market of Wuhan, who was admitted to the central hospital on 26th December 2019 with a severe respiratory syndrome. The patient was reported to be affected of coronavirus that was most closely related to a group of “Severe Acute Respiratory Syndrome (SARS)” like coronaviruses i.e. “genus Betacoronavirus, subgenus Sarbecovirus” which had been previously found in bats in China. Zhou et al. (2020) have suggested of powerful network-based methodologies for rapid identification of potential drugs for 2019-nCoV/SARS-CoV-2. The direct transmission of 2019-nCoV from person-to-person includes contact transmission, sneezes, coughs, and droplet inhalations. This can also be transmitted through the saliva and oral routes. Peng et al. (2020) have considered the dental professionals and recommend control measures for the infection during dental-practices in order to block the transmission routes from person-to person in dental-clinics and hospitals. In a short span, a global consciousness has been captured by a novel coronavirus affecting significantly the human’s day-to-day life and has emerged as a public-health emergency (Gudi and Tiwari, 2020). With the aim of minimising the transmission of COVID-19 viruses, the ophthalmologists should closely work with local infection-control teams for the implementation of infection control-measures suitable for respective clinical-settings (Lai et al., 2020). The species SARS-like corona viruses are responsible for COVID-19 and SARS-CoV-2, and it is found to be slightly larger than influenza, SARS and MERS viruses at 125 nm (Fisher and Heymann, 2020). Chen et al. (2020) have tried to develop a mathematical model to calculate the coronavirus transmissibility by developing a “Bats-Hosts-Reservoir-People” transmission network-model and then simplified the model as “Reservoir-People (RP)” transmission network-model. It was found of a higher transmissibility of SARS-CoV-2 as compares to the MERS in the “Middle-East countries”, but lower than MERS in the “Republic of Korea”. de Souza et al. (2020) have developed a slide microscope-kit in order to provide an innovative-approach to virology-teaching that explores giant virus-particles along some aspects of animal virus-interaction with cell-lines. Further, the kit that was developed has been used in practical-virology classes for the “Biological Sciences” course at UFMG (Brazil).

Moreover, a number of multi-criteria decision making (MCDM) methods have been employed in diverse significant areas. Some of the MCDM methods include “preference-ranking organization-method for enrichment-evaluations (PROMETHEE)”, “analytic hierarchy process (AHP)”, “data envelopment analysis (DEA)”, “decision-making trial and evaluation laboratory (DEMATEL)”, “technique for order of preference by similarity to ideal solution (TOPSIS)”, etc. (Chaharsooghi & Ashrafi, 2014; Wu, 2007). The judgments by decision-makers are often un-certain and remain

un-defined with certainty. Thus it becomes very complicated to make the decision-making process. Many researchers have recently integrated different methodologies for solving vague problems in non-deterministic social, environmental and economical areas (Kuo et al., 2008; Li et al., 2007; Zhang et al., 2005). The Grey theory has been reported to be superior in un-certain information situations and is used in order to study human judgments with un-certainties and ambiguities (Li et al., 2007). The extension of TOPSIS was investigated for a group-decision environment in the tea industry and a grey based TOPSIS method was developed in a study (Shih et al., 2007). In order to select the best supplier in MCDM, an integrated model of grey theory and TOPSIS has been proposed (Jadidi et al., 2008). Mishra et al. (2013) have suggested a MCDM method based on grey theory and fuzzy-TOPSIS to select the suitable flexible-system in implementing mass customization-strategies. Fuzzy AHP and TOPSIS were applied for evaluating the performances as well as ranking the bank's branches (Aliakbarzadeh and Tabriz, 2014). In a study fuzzy-TOPSIS was proposed to improve the supply-chain management process of the food-industries (Roghianian et al., 2014). Nyaoga et al. (2016) have used "Grey-TOPSIS" approach in order to measure and rank the value-chain performances of the tea processing firms. Srivastawa et al. (2017) have considered ten Gear materials to evaluate their performance based on four selective criteria by the use of "Grey-TOPSIS" method and then validated the result by "Grey-Complex proportional assessment (COPRAS-G)" method. Chen (2019) has explained the problems of the existing coordinated-TOPSIS and has proposed a novel coordinated-TOPSIS in view of the co-efficient of variation in order to avoid the limitations in the existing coordinated-TOPSIS. The primary aim of this study was to prioritize the preventive measures against COVID-19 viruses' infectious diseases under "Grey-TOPSIS" multi-criteria environment.

3. RESEARCH METHODOLOGY

In this study, a total of 51 financial individuals/specialists, academicians were considered to collect their knowledge as well as awareness about the recent epidemic corona virus and its effect in India. The participants were chosen randomly between the age group of 25 to 60 years from the state of Odisha in India. Further, on the basis of the opinions of five numbers of financial experts in India, a questionnaire is designed with 14 important variables for financial crises due to Pandemic Covid 19 in Likert scale(1,2,3,4,5 i.e. totally agree, agree, no opinion, disagree totally disagree) respectively .Then factor analysis is conducted by minitab 17 to find most important factors then Topsis method is implemented to prioritize the variables.

4. RESULT AND DISCUSSION

After consulting with financial experts and academicians and literature review, the below points are playing main roll for Financial crises in India due to Pandemic Covid-19, shown in the Appendix:

1. High prices of basic needs of living and Less involvement of people in economic activities;
2. Fall in share market/bear effect in business activities;
3. High raise in price in medical services and equipment;
4. Salary crises and unemployment;
5. Increase in subsidies;
6. More investment in research and medical sector;
7. All production except essential commodities luxurious goods producing company are closing down;
8. Tourism and NPAs, religious tourism/pilgrimage is short on money;
9. Other sectors dominated by extreme focus on medical sector;
10. Globalization trade drastically reduced or halted;
11. Transactions paused;

12. Activities with economic transaction shutdown;
13. Drop in the collection of taxes and increasing expenditure (social welfare);
14. Huge subsidy so deficit in budget.

Then factor Analysis by minitab 17 is conducted to find most important factors for financial crises and among 14 items 10 items are selected having Cronbach's alpha more than 0.5 (acceptable) range under two constructs Direct factors and Indirect factors as per Table 1.

Table 1. Factor analysis

	Item	Factor 1	Factor 2	Cronbach's Alpha
Direct Factors	1. High prices of basic needs of living and less involvement of people in economic activities	0.976		0.865
	2. Fall in share market/bear effect in business activities.	0.853		0.988
	4. High raise in price in medical services and equipment	0.921		0.823
	5. Salary crises and unemployment	0.934		0.786
	12. Globalization trade drastically reduced or halted	0.901		0.865
	13. Transactions paused.	0.832		0.854
Indirect Factors	7. More investment in research and medical sector		0.764	0.758
	9. Tourism and NPAs, Religious tourism is short on money.		0.855	0.788
	15. Drop in the collection of taxes and increasing expenditure (social welfare).		0.813	0.864
	16. Huge subsidy so deficit in budget.		0.787	0.687

Sectors affected due to Pandemic can be categorised below:

- **Very severely affected:** Manufacturing sector, automobile sector;
- **Severely affected:** Transportation sector, small scale business sectors, textile, hotels;
- **Affected sector:** Banking, financial sector, etc., educational sector, entertainment industry;
- **Less affected:** Essential service sector (i.e., health sector, tele sector, utility sector [gas, electric, water]);
- **Very less affected sector:** Pharmaceutical, medical sector;
- **Not affected sector:** Agricultural sector, internet services.

These sectors are taken as alternatives and for establishing a choice matrix for the ranking, the structure of the matrix are often expressed as in Table 2 the chosen criteria were the 10 items found after factor analysis result.

Table 3 shows selecting alternatives.

The normalized decision matrix (Table 5) was obtained based on the decision matrix (of Table 4).

Table 5 shows calculating the normalized decision matrix.

The weighted normalized decision matrix was calculated (Table 6) by multiplying the normalized decision matrix by its associated weights which was followed by the calculation the PIS and NIS (Table 7).

Table 2. Different criteria weights

Criteria	Items	Weight
1. High prices of basic needs of living and less involvement of people in economic activities	B ₁	0.77
2. Fall in share market/bear effect in business activities.	B ₂	0.83
4. High raise in price in medical services and equipment	B ₃	0.95
5. Salary crises and unemployment	B ₄	0.62
12. Globalization trade drastically reduced or halted	B ₅	0.78
13. Transactions paused.	B ₆	0.80
7. More investment in research and medical sector	B ₇	0.47
9. Tourism and NPAs, religious tourism is short on money.	B ₈	0.64
15. Drop in the collection of taxes and increasing expenditure (social welfare).	B ₉	0.78
16. Huge subsidy so deficit in budget.	B ₁₀	0.64

Table 3. Selecting alternatives

Code	Criterion
A ₁	Very severely affected
A ₂	Severely affected
A ₃	Affected sector
A ₄	Less affected
A ₅	Very less affected
A ₆	Not affected sector

Table 4. Calculating the decision matrix

	B ₁	B ₂	B ₃	B ₄	B ₅	B ₆	B ₇	B ₈	B ₉	B ₁₀
A ₁	5	2	2	5	2	4	2	1	1	5
A ₂	4	1	2	4	4	1	3	4	2	1
A ₃	1	4	1	5	3	3	5	2	5	5
A ₄	4	5	5	2	1	2	4	1	5	2
A ₅	4	2	1	1	5	4	6	5	4	1
A ₆	4	1	1	4	4	5	2	4	4	5

Then, the separation measures were calculated by using the m-dimensional Euclidean distance. The separation measure D_i^+ and D_i^- of each alternative or barriers from the PIS and PIN was as given in Table 8.

The relative closeness to the idea solution were calculated and ranking of the alternatives in descending order was done as in Table 9.

Table 5. Calculating the normalized decision matrix

	A1	A2	A3	A4	A5	A6
B ₁	0.227273	0.181818	0.045455	0.181818	0.181818	0.181818
B ₂	0.133333	0.066667	0.266667	0.333333	0.133333	0.066667
B ₃	0.166667	0.166667	0.166667	0.416667	0.083333	0.083333
B ₄	0.238095	0.190476	0.238095	0.095238	0.047619	0.190476
B ₅	0.105263	0.210526	0.157895	0.052632	0.263158	0.210526
B ₆	0.210526	0.052632	0.157895	0.105263	0.210526	0.263158
B ₇	0.090909	0.136364	0.227273	0.181818	0.272727	0.090909
B ₈	0.058824	0.235294	0.117647	0.058824	0.294118	0.235294
B ₉	0.047619	0.095238	0.238095	0.238095	0.190476	0.190476
B ₁₀	0.263158	0.052632	0.263158	0.105263	0.052632	0.263158

Table 6. The weighted normalized values

	A1	A2	A3	A4	A5	A6
B ₁	0.022727	0.036364	0.004546	0.054545	0.036364	0.054545
B ₂	0.013333	0.013333	0.026667	0.1	0.026667	0.02
B ₃	0.016667	0.033333	0.016667	0.125	0.016667	0.025
B ₄	0.02381	0.038095	0.02381	0.028571	0.009524	0.057143
B ₅	0.010526	0.042105	0.01579	0.01579	0.052632	0.063158
B ₆	0.021053	0.010526	0.01579	0.031579	0.042105	0.078947
B ₇	0.009091	0.027273	0.022727	0.054545	0.054545	0.027273
B ₈	0.005882	0.047059	0.011765	0.017647	0.058824	0.070588
B ₉	0.004762	0.019048	0.02381	0.071429	0.038095	0.057143
B ₁₀	0.026316	0.010526	0.026316	0.031579	0.010526	0.078947

Table 7. Determining the PIS and NIS

	A1	A2	A3	A4	A5	A6
A ⁺	0.026316	0.047059	0.026667	0.071429	0.058824	0.078947
A ⁻	0.004762	0.10526	0.00454	0.01579	0.009524	0.02

Table 8. Calculating separation measure D_i^+ and D_i^-

	B ₁	B ₂	B ₃	B ₄	B ₅	B ₆	B ₇	B ₈	B ₉	B ₁₀
D_i^+	0.523682	0.109242	0.075909	0.12829	0.109242	0.109242	0.113788	0.097477	0.094956	0.125032
D_i^-	-0.04921	-0.04012	-0.07345	-0.02107	-0.04012	-0.13485	-0.03557	-0.05188	-0.0544	-0.02433

Table 9. Separation measures and the relative closeness coefficient

Barriers	Closeness Coefficient	Normalized	Ranking
B ₁	-0.10372	0.003472	8
B ₂	-0.58042	0.019432	5
B ₃	-29.8699	0.999999	1
B ₄	-0.19651	0.006579	7
B ₅	-0.58042	0.019432	4
B ₆	5.265933	-0.1763	10
B ₇	-0.45475	0.015225	6
B ₈	-1.13779	0.038092	3
B ₉	-1.34136	0.044907	2
B ₁₀	-0.2416	0.008089	9

From the ranking, it was observed that the significant causes of financial crises obtained were high raise in price in medical services and equipment, drop in the collection of taxes and increasing expenditure (social welfare), tourism and NPAs (religious tourism is short on money), globalization trade drastically reduced or halted, fall in share market/bear effect in business activities, more investment in research and medical sector, salary crises and unemployment, etc.

5. CONCLUSION

This study aims to promote to find the most important points for financial crises due to COVID-19. It becomes most important to have public-health interventions during an emergency-situation, especially when behavioral change is most required for effective-responses. It is an essential component in the successful implementation of any precautionary measures by providing more clear as well as consistent information about “COVID-19” for the betterment of public-health. Moreover, with proper conveyance of the public-health measures and recommendations for minimizing the transmission of viruses, reduction in the burden on health-care systems, and effectiveness of transmission prevention should be incorporated into the public-health improvement strategies. It is also very important to safe our country from Economical crises as the coronavirus is spreading at a very dangerous speed throughout the world, thus it is the essential responsibility of every service-providers, policy-makers, and decision-maker to act proactively to prepare a suitable framework for any such emergency-situation to overcome financial crises by taking care of most important points which are prioritized. The outcome of this study will help the individuals, community-group, service-providers, policymakers, and decision-maker in establishing adequate safety measures in order to fight against this killer-virus so as to ensure a sustainable good public-health in India.

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APPENDIX

Table 10. Questionnaire

	1	2	3	4	5
1. High prices of basic needs of living and Less involvement of people in economic activities 2. Fall in share market/bear effect in business activities. 3. High raise in price in medical services and equipment 4. Salary crises and unemployment. 5. Increase in subsidies. 6. More investment in research and medical sector. 7. All production except essential commodities luxurious goods producing company are closing down. 8. Tourism and NPAs Religious Tourism/pilgrimage is short on money. 9. Other sectors dominated by extreme focus on medical sector. 10. Globalization trade drastically reduced or halted 11. Transactions paused. 12. Activities with economic transaction shutdown. 13. Drop in the collection of taxes and increasing expenditure (social welfare). 14. Huge subsidy so deficit in budget.					

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