Exploratory Study of Production and Managerial Causes of Industrial Sickness of Paper Mills

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Abstract

The sickness in industrial organizations is contributed by numerous internal and external causes. The existing literature identifies that these causes are connected with production, finance, marketing, managerial and other external force. The current study is an effort to identify production and managerial causes of the sickness of the paper mill of Indian State of Assam. A field study through a questionnaire method was conducted among three hundred one sampled respondents. The seven points Likert scale uses to rate the level of agreeability on production and managerial causes of sickness. The collected primary data has been analysed and processed using a principal component analysis with exploratory factors. The factor analysis retains two-factor components of production causes and three-factor components of managerial causes comprises of four and one items and three items in each factor component respectively with the highest factor loadings, eigen value and communalities accordingly. The production factors are Factor 1: Inadequate Production Means and Input and Factor 2: Poor Productivity. Whereas managerial factors are found as Factor 1: Inefficient Management, Factor 2: Ineffective Compensation and Motivation Plan and Factor 3: Indifferent Government Approach. The 67.90% and 72.195% of cumulative variance in production and managerial causes are explained by Inefficient Management, Ineffective Compensation and Motivation Plan and Indifferent Government Approach.

Keywords: Industrial Sickness, Production, Managerial, Causes, Exploratory Factor Analysis

Introduction

Sickness occurs throughout the life cycle of an industrial organization for a variety of causes. The issue of sickness in industries and commercial units is currently widespread in India as a result of its alarmingly increasing frequency. Those who believe in the effective and efficient use of resources must give it immediate attention. The incidence of sickness in the industrial sectors has followed rapid industrial growth. There are so many instances of industrial sickness in both public and private sector businesses. In a bustling industrial setting,

established business units that were prosperous, tranquil, and productive become ill and cease operations as other, more productive units come along to take their place. In India, the prevalence of industrial sickness has increased over the past. Other significant sectors including engineering, chemicals, rubber, cement, electrical, and paper have also been impacted. These include some of the historic industries like cotton textiles, jute, and sugar. Massive public and government funds are being held back in failing industries. Numerous employees and workers have lost their jobs. In this respect, the current study is being undertaken to identify the managerial and production factors that led to industrial sickness in the paper mills of the Indian state of Assam.

Review of Literature

According to Narayana (1994), the four main causes of sickness in companies are mismanagement, governmental policies, labour issues, and time and expense overruns.

Kachhwah (2014) distinguishes between internal and external causes of industrial sickness that impacted India's small-scale industry.

Singh (2011) classified the sources of sickness as internal and external, which are connected to personnel, marketing, finance, and production. In addition, inefficient corporate planning and control, reluctance to change, state in senior management, and a lack of management are some of the key causes of poor corporate management.

According to Bhushan, Chandra et al. (2012), the main reasons of sickness in the Indian state of Tripura's micro- and small-business sectors are fund misappropriation, debt issue, a lack of operating capital, weak market demand, problems with management, and out-of-date technology.

Gupta (1988) recognized five basic patterns of industrial sickness, including: a) Operating, which results from managerial inability to carry out ongoing operations effectively or from managerial corruption; b) Strategic, which results from a lack of adaptability to long-term changes in the environment; c) Staying-power Deficiency, which is caused by a flawed financial structure; d) Still-Born, which is a project that was initially misconceived; and e) Catastrophic

Anubhai (1988) described four characteristics of sickness, namely, that it is neither temporary nor isolated, that it primarily affects the organized sector, that composite mills within the organized sector are more affected, and that it is more pervasive in older textile hubs like Ahmedabad and Bombay. The issues facing the composite industry in the older textile hubs are structural, geographical, and environmental. Another reality is that the management of textile mills suffered from outdated ideas about the market, technology, products, and raw resources.

Rao and Rao (2012) recognized that management inefficiency is the primary cause of industrial sickness.

According to research by Khandwalla (1988) involving thirty-six rehabilitation officers who worked closely with sick units and confirms improper management is the main contributor of corporate sickness.

According to Chakraborty (2016), there are several factors that contribute to industrial sickness, including poor management, inexperienced labour, inadequate promotional efforts, routine material theft, and inefficient use of financial resources.

Hoque (2007) cites management, financial, technological, and environmental factors as the root causes of industrial sickness.

Mehta and Harode (1999) investigated how the closure of industrial facilities in developing economies may have major implications since their infusible resources and comparatively few substitute employment prospects cannot effortlessly absorb the resulting loss of jobs, production, and money. In addition, it has been determined that the current institutional and legal framework to address the issue of industrial sickness is insufficient, particularly in preserving the rights of the workers. The Gujarat textile crisis highlights the flaws of the current framework.

Because these lose their "mother units," Roy and Basu (2015) noted that industrial sickness in big scale units has a substantial effect on micro and small-scale enterprises. The study shows that production and labour are factors in large units' issues. Each unit experiences regular labour unrest, which slows down output. Small and micro scale units are struggling with a lack of order on the one hand and a shortage of competent labour on the other.

In their 2016 study, Sunita and Navulla examine the negative effects of industrial sickness, including its effects on banks and financial institutions, the waste of limited resources, effects on employment, investors, and business owners, as well as the loss of tax revenue for the government and its negative effects on related units.

D. Navulla According to et al. (2016), the Fertilizer Corporation of India (FCIL) developed health problems as a result of poor management decisions, ineffective human resource management, outdated technology, power issues, irregularities in the supply of raw materials, and bad government regulations.

According to Goyal et al. (2012), the study highlights internal causes include a lack of competent labour, high manufacturing costs, a lack of innovative product development, old technology, and management malpractice. On the other hand, the failure of human resource management, the location of the wrong plant, the availability of funding, the management of marketing, the economic state of the nation, and government policy regarding the disinvestment of non-profit making units are the external causes of industrial sickness. Though various studies have been completed on different industries and enterprises. But there is very limited study is found in the paper industry especially the causes of sickness. So, this is an effort to study the production and managerial causes of the sickness in paper mills of the Indian state, Assam.

Database and Methodology

The study was exploratory in nature andconstruct on primary material gathered from the sample respondents of two defunct Nagaon and Cachar paper mills in the Indian state of Assam.The field survey method was adopted to get the desired data from the sampled respondents and first-hand experience of the problem. A questionnaire was prepared considering production and managerial causes relevant to the study. The questionnaire consists of nine items and seventeen items on production and managerial causes respectively. The questionnaire's items were appended from the inputs obtained from existing literature studies and pilot survey done in the mills.

The response of the target respondents was measured through seven-points Strongly disagree to Strongly agree on a Likert scale. The aim of the Likert scale was to measure the level of agreement and disagreement of respondents on different items of the questionnaire. The following is the Likert scale used in the questionnaire. The seven points Likert Scale for measurement of response are 1 - Strongly Disagree, 2 - Disagree, 3 - Somewhat Disagree, 4 - Neutral 5 - Somewhat Agree, 6 – Agree and 7 - Strongly Agree.

The decision regarding the use of a seven-point Likert scale is derived from the assumption of reliability, validity and judgmental ability. Preston and Colman (2000) suggested that the scale with more response types up to about seven provides Significantly greater validity, discriminating power, and reliability. The longer response scales help respondents to express their opinions satisfactorily. The seven-point scales give a better subjective assessment of the effectiveness of the questionnaire item than the five-point scales (Finstad, 2010). Another study completed by Taherdoost, H. (2019) on Likert scale and comparing the different length of rating scales suggests that the use of seven-point scales is more suitable.

A sample of 302 was determined through Yamane (1967) formula for defining sample size for a finite population. The desired information was collected from three hundred two sample respondents through a simple random sampling technique.

The percentage is used for the analysis of demographic information. The multivariate statistical technique, factor analysis is used to explore a small set of variables out of large numbers of variables. In the current study, exploratory factor analysis was used to analyse and describe the primary data that had been gathered. Kaiser-Meyer-Olkin (KMO) measure of sample adequacy and Bartlett test of sphericity have been used to assess the suitability of respondent data for factor analysis prior to factor extraction. Factor extraction uses principal component analysis with varimax rotation. The software SPSS version 20 was employed to process the primary data. Table and Figure have been used to present the processed data. The final factor solution is shown in the scree plot and path diagram.

Result and Discussion

The Exploratory Factor Analysis (EFA) has been performed to obtain the result from the primary data collected through a questionnaire from the sampled respondents' of paper mills.

Exploratory Factor Analysis Pertaining to Production Causes

Bartlett's Test of Sphericity and the Kaiser-Meyer-Olkin Test have been applied to measure the sample adequacy and the strength of the relationship among variables before going to further analysis. In the study KMO value is .746 which is sufficiently good as per the rule of thumb. The Bartlett test is also found significant i.e., p=.000<.05 at a 5% significance level (Table-1). Then, the principal component analysis with varimax rotation is performed over nine items of production causes.

Table-1: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.746
Bartlett's Test of Sphericity	Approx. Chi-Square	324.443
	df	10
	Sig.	.000

Source: Authors

In the process, the first-factor analysis detects low anti-image correlation value of .345 in item 9 but the criteria are more than .6. Therefore, in the next factor analysis, the ninth item is excluded from further analysis. Again, in the next analysis, item 1 is excluded due to less communalities of .442 but the criteria are to retain more than .5. Similarly, the items 8 and item 6 are omitted from further analysis due to low communalities and factor loading points.

Table-2: Result of principal component analysis of Production causes

Items	Factor 1	Factor 2	Communalities
PC 3. Shortage of raw material due to non-availability at the source	.854		.730
PC 2. Old and obsolete plant &machinery due to lack of timely renovation	.782		.618
PC 5. Inadequate availability of coal as an energy source	.730		.544
PC 4. Problem in procurement of production input due to poor connectivity	.704		.537
PC 7. Low-capacity utilisation of plant		.982	.966
Eigen Value	2.371	1.024	
Percentage of variance	47.416	20.483	
Cumulative percentage of variance	47.416	67.900	

Source: Authors

Factor 1: Inadequate Production Means and Input

Table-2 shows the final rotated competent matrix of items related to production causes. The two extracted factors with eigen value more than 1 or more is considered for analysis. Factor 1 is comprised of PC3 -shortage of raw material due to non-availability at source, PC2 -old and obsolete plant &machinery due to lack of timely renovation, PC5 - inadequate availability of coal as an energy source, and PC4 - problem in procurement of production input due to poor connectivity with the factor loading of .854, .782, .730 and .704 respectively. The Factor 1 has been labelled as "Inadequate Production Means and Input". The factor loading explained that these four items are highly correlated with Factor 1 termed as "Inadequate Production

Means and Input". Factor 1 has eigen value of 2.371 and contributes 47.416 % of variance which means that the 47.416% of production causes is described by "Inadequate Production Means and Input".

Factor 2: Poor Productivity

Then again, Factor 2 is consisted of item PC 7- low-capacity utilisation of plant with a factor loading of .982 and eigen value of 1.024 and labelled as "Poor Productivity". This item is highly correlated with Factor 2. This factor explains 20.48% of variations and along with Factor 1 explains up to 67.90 % of the cumulative variance (Table-2). Finally, it can be concluded that 67.90 % of the variance in production causes is stated by "Inadequate Production Means and Input" and "Poor Productivity". The Scree plot (Figure-1) presents the factors component of production causes and their eigen value. The Path Diagram (Figure-2) shows the factor-wise grouping of the Items related to production causes.

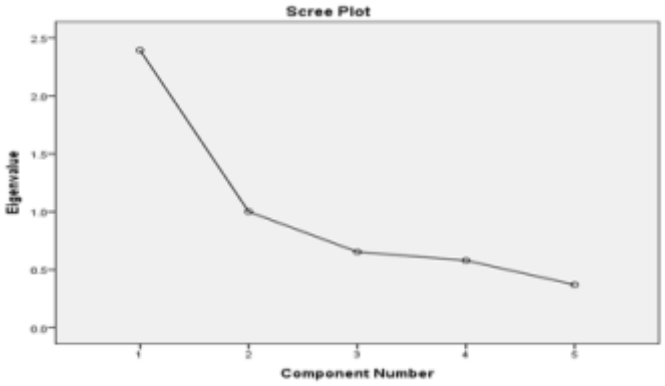

Figure-1: Scree Plot

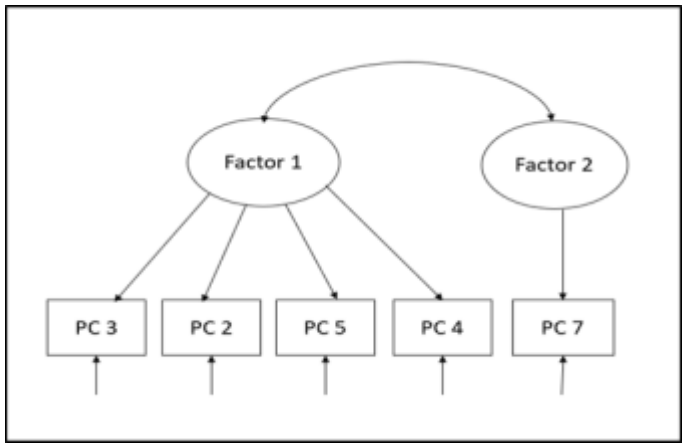

Figure-2: Path Diagram

Exploratory Factor Analysis Pertaining to Managerial Causes

The Kaiser-Meyer-Olkin test and Bartlett's Test of Sphericity have been performed before proceeding to further analysis. The purpose is to check the sample adequacy and the power of relationship among the variables of managerial causes. The adequate value of KMO i.e., .802 is displayed for factor analysis. The significant value of p=.000 <.05 at a 5% level of significance is found in the Bartlett test (Table-3). On seventeen numbers of items of managerial causes, the varimax rotation in the principal component analysis is applied to extract significant factor solutions.

Table-3: Result of KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.802
Bartlett's Test of Sphericity	Approx. Chi-Square	1039.293
	df	36
	Sig.	.000

Source: Authors

The EFA is performed pertaining to managerial causes with seventeen Items. In the first-factor analysis, Item 5, Item 6, Item 8, and Item 11 show low anti image correlation which is below .6. Therefore, these four items are excluded in the next factor analysis. The EFA with the rest 13 Items are performed and identified that another four Items i.e., Item 4, Item 7, Item 9 and Item 10 are required to exclude from the further factor analysis due to a communality value less than .5. The final factor solution is obtained through processing of nine items (Table-4).

Table-4: Result of Principal Component Analysis of Managerial Causes

Items	Factor 1	Factor 2	Factor 3	Communalities
MGC 13. Lower level of managerial efficiency	.893			.817
MGC 12. Lack of proper resource utilisation	.827			.754
MGC 14. Deteriorated management and employee relation	.785			.717
MGC 2. Irregularity in wages and salary payment of worker and employee		.860		.742
MGC 1. Lack of motivation among employee		.858		.771
MGC 3. Lack of proper grievance handling mechanism		.853		.744
MGC 17. Effect of indifferent policy approach towards public sector enterprises			.891	.795
MGC 15. Lack of policy maker interest to revive the paper mills			.706	.651
MGC 16. No revival package declared for revival of the mills			.580	.507
Eigen Value	2.422	2.275	1.801	
Percentage of variance	26.909	25.273	20.012	
Cumulative percentage of variance	26.909	52.183	72.195	

Source: Authors

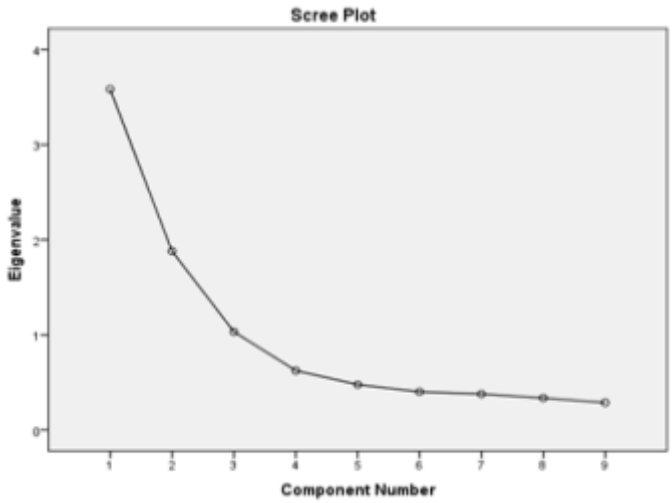

Figure-3: Scree Plot

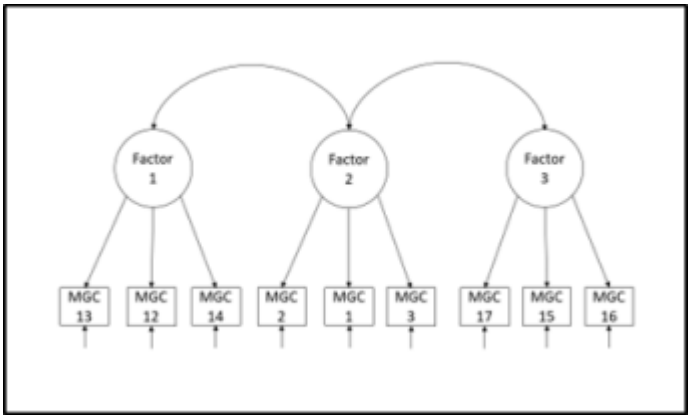

Figure-4: Path Diagram

Table-4 shows the final rotated component matrix of items of managerial causes with eigen value 1 or more, and the three principal component factor is extracted.

Factor 1:Inefficient Management

Factor 1 consists of three items which are MGC 13.Lower level of managerial efficiency, MGC 12. Lack of proper resource utilisation and MGC 14. Deteriorated management and employee relations with a factor loading of .893, .827 and .785 respectively. Factor 1 is labelled as "Inefficient Management". These three items' factor loading explained are high correlation with Factor 1. Factor 1 has eigen value of 2.422 and reveals a 26.909 % of variance. 26.909% of managerial causes are well-defined by Inefficient Management (Table 4).

Factor 2: Ineffective Compensation and Motivation Plan

Similarly, the items MGC 2. Irregularity in wages and salary payment of workers and employees, MGC 1. Lack of motivation among employees and MGC 3. Lack of proper grievance handling mechanism forms Factor 2. The factor loading of these three items are .860, .858 and .853. These three items are highly correlated with Factor 2 which is labelled as an "Ineffective Compensation and Motivation Plan". Factor 2 has eigen value of 2.275 and along with Factor 1, it explains up to 25.273% of the variance of managerial causes(Table 4).

Factor 3: Indifferent Government Approach

Factor 3 is comprised of MGC 17.Effect of indifferent policy approach towards public sector enterprises, MGC 15.Lack of policy maker interest to revive the paper mills, and MGC 16. No revival package declares for the revival of the mills with a factor loading of .891, .706 and .580.Factor 3 is named as "Indifferent Government Approach". These three items are highly and moderately correlated with Factor 3. The eigen value is more than 1 i.e., 1.801. Factor 3 i.e., Indifferent Government Approach along with Factor 1 i.e., Inefficient Management and Factor 2 i.e., Ineffective Compensation and Motivation Plan explains up to 21.012% of the variance of managerial causes. On the basis of analysis, it can be concluded that 72.195% of the variance in managerial causes is explained by Inefficient Management, Ineffective Compensation and Motivation Plan and Indifferent Government Approach (Table 4).

The Scree plot (Figure 3) indicates the factors component of managerial causes and their respective eigen value. The Path Diagram (Figure 4) shows the factor-wise grouping of the Items related to managerial causes.

Conclusion and Implication

The result of the study indicates that the causes of the sickness of paper mills are multiple pertaining to production and management in the paper mills of Assam.The shortage of raw material due to non-availability at source, old and obsolete plants and machineries due to lack of timely renovation, inadequate availability of coal as an energy source, problem in procurement of production input due to poor connectivity and low-capacity utilisation of plant with a factor loading of .854, .782, .730, .704 and .982 respectively has explained 67.90% cumulative variations of the two extracted principal component production factors Factor 1: Inadequate Production Means and Input and Factor 2: Poor Productivity. While, Lower level of managerial efficiency, lack of proper resource utilisation and deteriorated management and employee relation with a factor loading of .893, .827 and .785 respectivelyhasstated72.195% cumulative variations of resulted in three principal managerial factors Factor 1: Inefficient Management, Factor 2: Ineffective Compensation and Motivation Plan and Factor 3: Indifferent Government Approach.

The study found that the inadequate production means and input and poor productivity are the contributing production causes and the inefficient management, ineffective compensation and motivation plan and indifferent government approach are the significant managerial causes of the sickness of paper mills in Assam. These production and managerial causes can be timely addressed by the management to revive the mills.

The improvement measures are the time-bound steps for the revival of the mills. Since there is a large implication of paper mills in the area in terms of employment, resource availability and use, and concerned allied enterprises. The management should carry out a timely appraisal of the sickness or underperformance causes for better productivity of the mills. The management should also ensure the proper supply of production means and inputs for the smooth functioning of the production process. Furthermore, the mills may adopt a turnaround strategy for efficient management of resources.

References

- Anubhai, Prafulla (1988): Sickness in Indian Textile Industry: Causes and Remedies *Economic and Political Weekly*, Vol. 23, No. 48, pp. M147-M157
- Backhaus, K., Erichson, B., Plinke, W., & Weiber, R. (2006). Multivariate analysis: anapplication oriented introduction. *Springer Verlag, Berlin,11*(1), 543–601.
- Bartlett, M. S. (1950). Tests of significance in factor analysis. *British journal of psychology*.
- Chakraborty, Monalisha (2016). "Industrial Sickness in Dum Dum: a Case Study of Jessop and Company" *International Journal of Social Science and Humanities Research*, Vol. 4, Issue 1, pp. 673-682.
- Comrey, A. L., & Lee, H. B. (2013). *A first course in factor analysis*. Psychology press.
- Eaton, P., Frank, B., Johnson, K., & Willoughby, S. (2019). Comparing exploratory factor models of the Brief Electricity and Magnetism Assessment and the Conceptual Survey of Electricity and Magnetism. *Physical Review Physics Education Research*, *15*(2), 020133.

- Everitt, B. S. (1975). Multivariate analysis: The need for data, and other problems. *The British Journal of Psychiatry*, *126*(3), 237-240.
- Finstad, K. (2010). Response interpolation and scale sensitivity: Evidence against 5-point scales. *Journal of usability studies*, *5*(3), 104-110.
- Goyal, K.A., Gupta, Nitin, and Gupta, Neeta (2012) "An Overview of Sickness in Micro, Small & Medium Enterprises in India", *Pacific Business Review International*, Volume 5 Issue 5, pp. 29-35.
- Gupta, L. C. (1988). Controlling Corporate Sickness, Oxford University Press, Bombay
- Hair, J. F., Anderson, R. E., Tatham, R. L., & William, C. (1995). Black: Multivariate data analysis with readings. 4. *Auflage, Englewood Cliffs*.
- Hogarty, K. Y., Hines, C. V., Kromrey, J. D., Ferron, J. M., & Mumford, K. R. (2005). The quality of factor solutions in exploratory factor analysis: The influence of sample size, communality, and overdetermination. *Educational and psychological measurement*, *65*(2), 202-226.
- Hoque, A.K.M Solayman, Biswas, S.K. (2007): "Problems of Sick Industries - Bangladesh Perspective", Proceedings of the International Conference on Mechanical Engineering 2007 (ICME2007) 29- 31 December 2007, Dhaka, Bangladesh
- Jolliffe, I. T. (1990). Principal component analysis: a beginner's guide—I. Introduction and application. *Weather*, *45*(10), 375-382.
- Kachhwah, Amol O (2014). "Sickness in Small Scale Industries", *Global Journal of Multidisciplinary Studies,* Volume 3, Issue 5, ISSN 2348-0459.
- Kaiser, H. F. (1970). A second-generation little jiffy. Psychometrika. 35 (4), 401-415
- Kaiser, H. F. (1974). An index of factorial simplicity. *Psychometrika*, *39*(1), 31–36. https://doi.org/10.1007/BF022915753 (Part II), 77-85
- Kaiser, H. F., & Rice, J. (1974). Little jiffy, mark IV. *Educational and psychological measurement*, *34*(1), 111-117.
- Mehta, S. S. and Harode, Dinesh (1999). Industrial Sickness and Workers: Case of Gujarat Textile Industry. *Economic and Political Weekly,* Vol. 33, No. 52 (Dec. 26, 1998 - Jan. 1, 1999), pp. L71-L84
- Narayana, M.S. (1994). Industrial Sickness (1994): Review of BIFR's Role, *Economic and Political Weekly*, Vol. 29, No. 7, pp. 362-376
- Navulla, D., Guniganti, S., & Boda, J. R. (2016). The Analysis of Industrial Sickness with Reference to the FCIL. *Journal of Finance and Banking Review*, *1*(1), 32-39.
- Pett, M. A., Lackey, N. R., & Sullivan, J. J. (2003). *Making sense of factor analysis: The use of factor analysis for instrument development in health care research*. sage.
- Preston, C. C., & Colman, A. M. (2000). Optimal number of response categories in rating scales: reliability, validity, discriminating power, and respondent preferences. *Acta psychologica*, *104*(1), 1-15.
- Ratner, B. (2009). The correlation coefficient: Its values range between 1/1, or do they. *Journal of Targeting, Measurement and Analysis for Marketing*, *17*(2), 139–142. https://doi.org/10.1057/JT.2009.5/TABLES/2
- Roy, Sumana and Basu, Ranjan (2015). Industrial sickness and its impact on the economy: A case study of Haora district, West Bengal, *Economic Affairs*, 60(1); 57-62
- Singh, N (2011). Industrial Sickness: Causes & Remedies. *Annals of Management Research*, Volume 1, Number 2, pp. 14-29
- Stevens, J. P. (2012). *Applied multivariate statistics for the social sciences*. Routledge.
- Tabachnick, B. G., Fidell, L. S., & Ullman, J. B. (2007). *Using multivariate statistics* (Vol. 5, pp. 481-498). Boston, MA: pearson.
- Taherdoost, H. (2019). What is the best response scale for survey and questionnaire design; review of different lengths of rating scale/attitude scale/Likert scale. *Hamed Taherdoost*, 1-10.