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Commute Factors Analysis: A Scare of Employeesin Indian Suburban railway

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Abstract

This research paper is an inquiry of hurdles that commuters of Indian railways face every day, and attempts to diagnose the relationships between the employee commute and its impact on employee wellbeing. This article also aims to create awareness about the problems of commute and its insight solution for the commuting experience of employees. Either pleasant or not; consequences of the commuting is discussed with a focus on employee satisfaction and withdrawal behavior. Now a days whole Indian railway sector of transport is reporting structural changes to create an atmospheric up gradation and modernization to conventional transport mode. The data collected through a sample survey of 540 regular movers through Indian railway commuters employed in a number of organizations in NCR Region, gone through the train-Dart experienced which is responsible for creating highest levels of a negative outcome on reaching their workplace. So this research attempts to discuss crowding factors affecting commuters well-being and to envisage its operations for regular employees who commute for their job purposes through (IR) Indian railway.

Key Word: - Employee Wellbeing , Withdrawal Behavior, Train-Dart Experience, Conventional Transport

I. Overview

In modern-day societies, commuting to work is a significant aspect of daily life. In India, the country's notable financially viable development has considerably increased the share of the suburban population, while raising the importance of public transport. This has added to put an enormous lumber for urban commuters, not only in a megacity like Mumbai but also in lots of other cities. Commuting also described in view of "a plague that affects modern man" (koslowsky, et al., 1995). Despite the size of this problem, however, very few research attention has been paid to analyze the effects of commuting on commuter well-being (Roberts et al., 2011). A sample survey conducted by Eurostat in 2001, concluded and suggested that commuting cause stress results as substantial disturbances to productivity, creativity, and competitiveness of an employee.

Although contextual studies have a high range of long commute impact on well-being, mostly negative. Rather, a type of equilibrium should emerge. Commuting has different unpredictable results on an employee who commute daily for their job purposes. We can easily understand the relationship between personal life and work life consequences. The type of commute and commuting experience may have an important impact on; commuters lifestyle, not just in the form of expression but also at the cost of overall well being who we are, not just in expressions of physical health, but with regards to our overall well-being and behavior (Santhosh, 2015). Early research on commuting stress by Raymond Novaco and others shows how perceptions of commuting impedance (both distance and time of the trip, as well as other aspects) increase commuting stress. Passenger crowding is a major concern not only for those using rail transport but also for those who manage rail systems worldwide (Cox, Houdmont, & Griffiths, 2006). There is also evidence of disruptive and aggressive behavior (Loo & Kennelly, 1979; Hutt & Vaizey, 1966) and impaired task performance (Baum & Paulus, 1987). Some researchers have also argued that the effects of crowding stress can persist long after the exposure to crowding has ended (Bell et al., 2001; Sundstrom, 1978; Stokols, 1976). From a few of the available empirical studies, the spillover effects of crowding are found to be associated with a variety of adverse outcomes, including social withdrawal, less altruistic behavior, reduced levels of interaction, lower frustration, and emotional disorders (Bell et al., 2001; Baum & Paulus, 1987). In this review, Evans and Cohen (2004) report that crowding may cut subsequent coping efforts in such a way that it can exacerbate the impact of high temperature on negative effect and can heighten the effects of daily hassles on psychological health and physiological stress. In summary, the significant effects of crowding as environmental stressors that can trigger a variety of outcomes have been reasonably established in the literature.

II. Research Framework

Data Collection

A standard Scale is adopted and distributed to 700 participants at different railway stations who use MST for daily commute through railway services in the Delhi - NCR area. Out of these 540 valid questionnaires were returned, the middling age of the participants was 28 years and they were predominately male. It was recognized that a predominantly young, educated population working in a new service industry in Delhi-NCR Region. Participants were asked to identify their most frequent mode of transport, route when commuting to work, along with the time taken (in minutes) and distance (in kilometers) of an average commute. The coefficient alpha for this measure in the study was 0.84.

Analysis of the Study

The collected data were analyzed using SPSS. The variables like working conditions, monetary benefits, safety and security, the timing of work, relationship with colleagues and union, grievance handling and working environment entered the regression model as independent variables and stress entered the model as a dependent variable. The questions asked in the questionnaire spread into following three segments as under-

Psychosocial aspect of Crowding-

Pjt6A, Pjt6B, Pjt6C, Pjt6D

Ambient Environment- Pjt7A, Pjt7B, Pjt7C, Pjt7D

Passenger Density aspect- Pjt8A, Pjt8B, Pjt8C, Pjt8D

Factor Analysis (FA): -

FA is used to determine the significant factors affecting the employee well-being majorly as the overcrowd commute factor. The KMO and Bartlett's test is a measure of sampling adequacy. Here the KMO value is (0.921) which is greater than 0.5R (Table-1) acceptable. KMO in the statistics can help in predicting when data are likely to appear factor well, based on correlation and partial correlation. KMO is used in respect of each individual variable and with the sum i.e, the overall statistic of KMO. KMO have variance from 0 to 1.0 and KMO overall should result in 0.60 or higher to go forward in factor analysis. In case it does not reduce the indicator variables in connection with lowest values of individual KMO statistic, so long the KMO rises overall above 0.60 (few research scholar are lenient in accepting it with 0.50 cut-off). For computing KMO overall, the numerator, except .0 self-correlations of variables with themselves, it should be the sum of squared correlations of each variables in respect to the analysis (denominator would be same sum and plus sum of squared partial correlations of each variable i.e, with each variable j, so that other analysis are under control. Closure to 1 shows that patterns of correlations is relatively compact and hence analysis should yield to very distinct and reliable factors. Though Kaiser (1974) has remarked favorably towards accepting values bigger than 0.5 as for barely acceptable (as values lower than this, suggest for either collecting more data or give a rethought over which variables to be included). Further, it is to be understood that between 0.5 and 0.7 values it should be considered as mediocre, between 0.7 and 0.8 are good, between 0.8 and 0.9 are great and values above 0.9 are superb (Hutcheson & Sofroniou, 1999)

In statistics, Bartlett test relating to sphericity is used to find the presence of correlations between the variables. This process supports in statistical probability pointing that at least some of variable is having substantial correlations amount in the matrix. This test can often be used prior to PCA or factor analysis, tests so as to learn whether data arrives from multivariate normal distribution is having zero covariances.

The Bartlett's Test of Sphericity is applied to test

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.921
Bartlett's Test of Sphericity	Approx. Chi-Square	4012.444
	Df	66
	Sig.	.000

Table-1

Communality refers to common variance proportionately available in the variable. The communalities towards the *i*th variable is to be computed by taking sum of squared loadings over the variable as shown here below

$$\widehat{h}_i = \sum_{j-1}^{m} \widehat{l}_{ij}^{2}.$$

Communality means a squared variance-accounted-for statistic revealing as to what extent variance within the measured variables are reproduced through the latent factors under the model. Contrary to this as to how much conceptually the variance are measured/observed. Variable

the null Hypothesis that the variable is interrelated in the population. Here the significance value is less than 0.05, thus both the results are appropriate for factor analysis.

having no specific variance or otherwise random variance also, will produce a communality of 1; however a variable which does not share its variance over any other variable will have a communality of 0. In factor analysis, interest in finding common underlying dimensions within the data and primary interest only in the common variance. Therefore, while running a factor analysis it is understood fundamentally that how much of the variance present in our data common variance is. This gives a logical halt: for doing factor analysis, we need to understand the proportion of common variance available in data, yet the only option to measure the extent of the common variance is by doing a factor analysis. Immediately after underlying factors are extracting, the new communalities need to be calculated so as to represent multiple correlation between the variable and with the factors extracted. Hence, the communality can be called for measuring of the proportion of variance expressed by extracted factors.

Here, Communalities analysis by using the principal extraction method shown in the table-2 reveal that most of the extracted factors of items are above 0.5 (Except 0.247) and acceptable for the further analysis.

Communalities

	Initial	Extraction
"how disorderd is the train that you are on today"	1.000	.707
"how chaotic is the train that you are on today"	1.000	.733
"how disturbing is the train that you are on today"	1.000	.692
"how cluttered is the train that you are on today"	1.000	.705
how you feel squashed inside the train that you commute on today	1.000	.743
how you feel uncomfortable inside the train that you commute on today	1.000	.553
how you feel hindered inside the train that you commute on today	1.000	.247
how you feel stressfull inside the train that you commute on today	1.000	.594
the physical environment is hot inside the train that you commute on today	1.000	.655
the physical environment is stuffy inside the train that you commute on today	1.000	.785
the physical environment is smelly inside the train that you commute on today	1.000	.716
the physical environment is noisy inside the train that you commute on today	1.000	.623

Extraction Method: Principal Component Analysis.

Table-2

Total Variance Explained (Table-3) using principle component analysis depicts that two following factors explained 64.60% of the Variance. These two factors have Eigen values more than 1 which is acceptable in the case of extraction of variables. This application *make linear transformations very easy to understand*. The Eigen value on given factors can measure variance for total variables that is accounted for in respect of that factor. Eigen values ration is ratio of explanatory importance for the factors relating to variables. In case a factor shows low Eigen value, then it is to be presumed that it is supporting with the contribution with explanation of variances in that variables and then it need to be treated as redundant in respect of more important factors.

Total Variance Explained

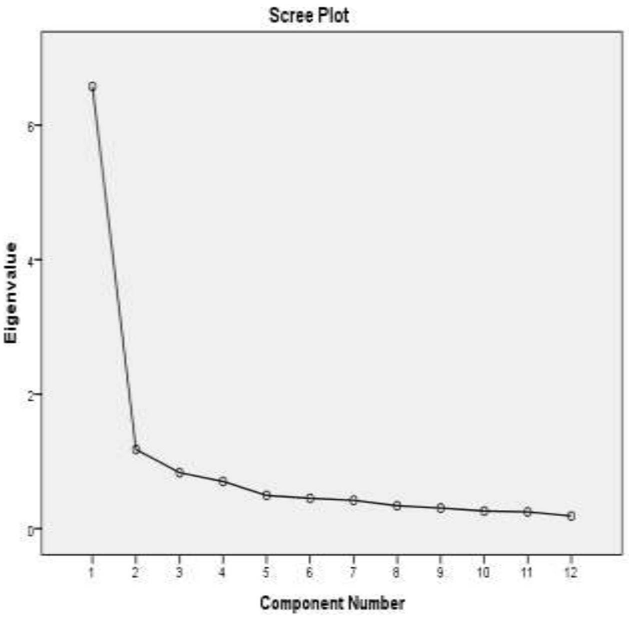
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.575	54.789	54.789	6.575	54.789	54.789	3.918	32.648	32.648
2	1.178	9.813	64.603	1.178	9.813	64.603	3.835	31.954	64.603
3	.833	6.938	71.541						
4	.702	5.849	77.390						
5	.494	4.113	81.503						
6	.451	3.755	85.259						
7	.421	3.509	88.768						
8	.341	2.840	91.607						
9	.307	2.555	94.162						
10	.263	2.189	96.351						
11	.249	2.077	98.428						
12	.189	1.572	100.000						

Extraction Method: Principal Component Analysis.

Table-3

Graph-1

This analysis can best fit the factors over a scatter diagram of responses the way that factors express the variance which is attached to the responses to each other statement.



This methods supports in getting factors in such a manner that whatever the variance related to each statement under the study are fully explained by Screeplot (Graph-1) shows the graph represent factor spread, the two factors contributing to 64.60% variance has Eigen Value more than 1.

Conclusion

The present study promotes understanding of commute and the factors that induce commute effect on employees who commute at regular basis through Indian sub-urban railway. It has been found that different psychological and environmental factors are responsible for creating the level of stress among commuters. It indicates that stress is influenced by public commute and the condition of the train. This may be true because of overcrowding during peak hours and also the attitude of commuters for public transport. The commute pressure on the employees makes them feel insecure. So this study has serious implications for both the organization and the employees.

Limitations and Directions for Future Research

This study was conducted only in Delhi-NCR Region of Indian suburban railway. It is imperative that the sample size may be increased from a heterogeneous group of commute employees in different route across the study area. Hence, a complex model consisting of antecedents and outcome variables may be developed and tested. Structural equation modeling may be used to establish the multiplicity of relationships as this would account for measurement and structural errors. Demographic details were not included in this study. Future study may include these variables and the influence of such variables along with the stressors may be captured. Finally, no distinction was made between conductors and drivers and therefore the stressor – stress relationship may be studied for conductors and drivers separately.

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