Research Article

Upshot of a New Normal Facet: A Systematic Review and Meta-Analysis of Telecommuting on Commuting Stress

Kavya. R

Research Scholar - Department of Business and Management - CHRIST (Deemed to be University)
Kavya.r@res.christuniversity.in

Dr. Raghavendra A N

Associate Professor - Department of Business and Management - CHRIST (Deemed to be University)
Raghavendra.an@res.christuniversity.in

Abstract

Telecommuting is becoming a more prevalent way of working, and it has captivated the curiosity of researchers and academics alike. A bright spotlight was hurled on telecommuting practice during the 1970s, and the term telecommuting was coined by 'Jack M Nilles.' Telecommuting is beneficial for both management and employees in cost savings, work-life balance, flexibility, autonomy. This study aims to answer two questions related to telecommuting – 1) What are the consequences of Commuting stress on employees and management? 2) What effect does telecommuting have on commuting stress? The authors provide answers to these issues based on a systematic review and meta-analysis of 64 research conducted in a natural context with 3,16,044 participants. PRISMA was used as a preferred method for systematic reviews and meta-analysis. Two essential items were established using the PICO extended version since our expected result was a psychological one. This article covers three different aspects: Telecommuting, Commuting Stress & Traffic Congestion. From the empirical study's findings, it was found that Telecommuting has a positive effect/impact on commuting stress. It also has a detrimental effect by increasing commuting by 14% in terms of personal household traveling. Many studies have stated that Telecommuting can drastically impact the reduction of traffic congestion in a positive way. Consequently, planners and policymakers should consider telecommuting's counteracting effect while predicting the stress reduction effect in daily commute and determining the level of telecommuting required.

Key Words: *Telecommuting, Commuting stress, Traffic Congestion, PRISMA, PICO,*

Introduction

A successful business relies on two essential aspects in today's competitive world, i.e., Customer Satisfaction and Employee satisfaction. Employees are viewed as valuable assets to the company, and they play a critical part in its growth and development. Content and motivated employee will have a higher probability of contributing more to booming business growth. An employee working in a traditional workspace has to devote his/her time to daily commute irrespective of transportation he uses. The daily commute in the traffic-congested cities is even a hard-hitting part for employees. According

to the recent report on Global traffic congestion, four cities in India stands at the top, and these cities are Mumbai, Bengaluru, Delhi, and Pune (Dipak K Dash, 2021). The daily commute is hardship in Traffic Congested Cities like Miami, London, Cali, Brasilia, Toronto, where the average time for daily commuting goes up to 82 minutes (Julia Watts, 2019). Major cities in India experience traffic jam from early morning and goes on till midnight. Spending more time on a daily commute can lead to severe issues in mind, health, and social relationships (Schaefer, 2005). This study aims to find out more about the multi-disciplinary works of literature that report the effect of Telecommuting on the Commuting stress of employees. Telecommuting refers to the alternative work arrangement a privilege to work from home provided by the companies to its employees (Mokhtarian, 1991).

Telecommuting is a term coined by Jack M Nilles in 1979. It refers to the alternate work arrangement given to the employees in the company. Employees can work outside office premises (home, coffee shops, or any other venues) in telecommuting. Telecommuting is also called Teleworking and Remote working. Tele means distance. A person who is into distance working is considered to be a Teleworker. The person who monitors and supports tele managers. Telematics is used to organize office work efficiently. Telematics refers to the setup of IT and system connections from office space to telecommuter's system. Telecommuting frequency is increasing in drastic mode. Earlier it was allowed due to various reasons like employee sickness, maternity.

Furthermore, now telecommuting has become part of every company's policy. It has its pros and cons. Most of the studies found that telecommuting is benefiting companies and employees in various aspects. However, Telecommuting is accepted by companies/Institutions during the crisis like Novel Corona Virus. All the companies have adopted the policy of letting employees work from home. Educational institutions have adopted telecommuting by training their faculties in teaching the students online through various platforms like Google meet, WebEx, and many other platforms. Now, Telecommuting is a new normal in India (Text, 2018).

In some telecommuting frameworks, employees can better balance their personal and professional lives, and employees have a higher level of job satisfaction and improvement in job performance, upright in work engagement. Trends in telecommuting state that employees' isolation can be solved during telecommuting by letting employees have a healthy relationship with the manager and their peers through various technology tools like Zoom, Google meet, and other applications used for communication. Nowadays, telecommuting is restricted to the IT industry and the education industry as well. Tele managers play a significant role in training and supervising telecommuters. Indeed, better collaboration and communication were the foremost reasons giant companies like American Express, IBM, Flipkart, Accenture, Apple, and many more gave positive starting for telecommuting program. Teleworking is accepted and followed by all the companies during the pandemic of Covid-19. After analysing various situations and business activities, some companies like TCS and Google have decided to continue telecommuting even after lifting the lockdown.

Before, the employee was given the option of working from home only when the employee could not visit the office for various reasons (employee falling sick, personal reasons, onsite options, or other specific reasons). Nowadays, telecommuting has become increasingly common in many organizations, and it has become an integral part of human resource management policy.

Traffic congestion is a massive issue in all the cities that creates commuting health issues. Employees residing in metropolitan cities face a massive issue in traffic congestion. It takes an average of 2 – 4 hours to commute to the office. Telecommuting can also act as a substitution for commuting issues. Telecommuting was used as a tool for reducing congestion and the clean air act in the United States.

For instance, Bangalore is considered the highest traffic congestion city globally, and most of the traffic congestion places are found to be the place where IT industries are situated. This problem can also be solved by allowing employees to work remotely for few days a week. It will assist in reducing traffic congestion and greenhouse gas emissions. This study aims to understand the effect of telecommuting on commuting stress considering the situation of the Covid-19 Pandemic, where the majority of the organizations have given the privilege to work from home considering the health and wellbeing of their employees.

This study unfolds as follows, begins with an introduction to telecommuting and different types, we next discuss commuting issues and traffic congestion, after providing this backdrop, we review the findings from literature works concerning telecommuting implications on commuting stress, followed by conclusion and recommendation for future research and practice. The quality of evidence in research focused on and analysing Telecommuting, and its impact on commute stress among workers was examined using the PRISMA guidelines.

Methodology

Meta-Analysis methods were used for this research study. PRISMA was used as a preferred method for systematic reviews and meta-analysis. Two essential reason items were established using PICO extended version as our target outcome was more of a phycological factor. The main research questions were (1). Are employees facing Commuting stress? (2). Does Telecommuting act as a substitution for reducing commuting stress and traffic congestion?

The following electronic research databases were used for literature search, EBSCO, Google Scholar, Science Direct, ProQuest. Articles published before January 1st, 2021 was considered for this research.
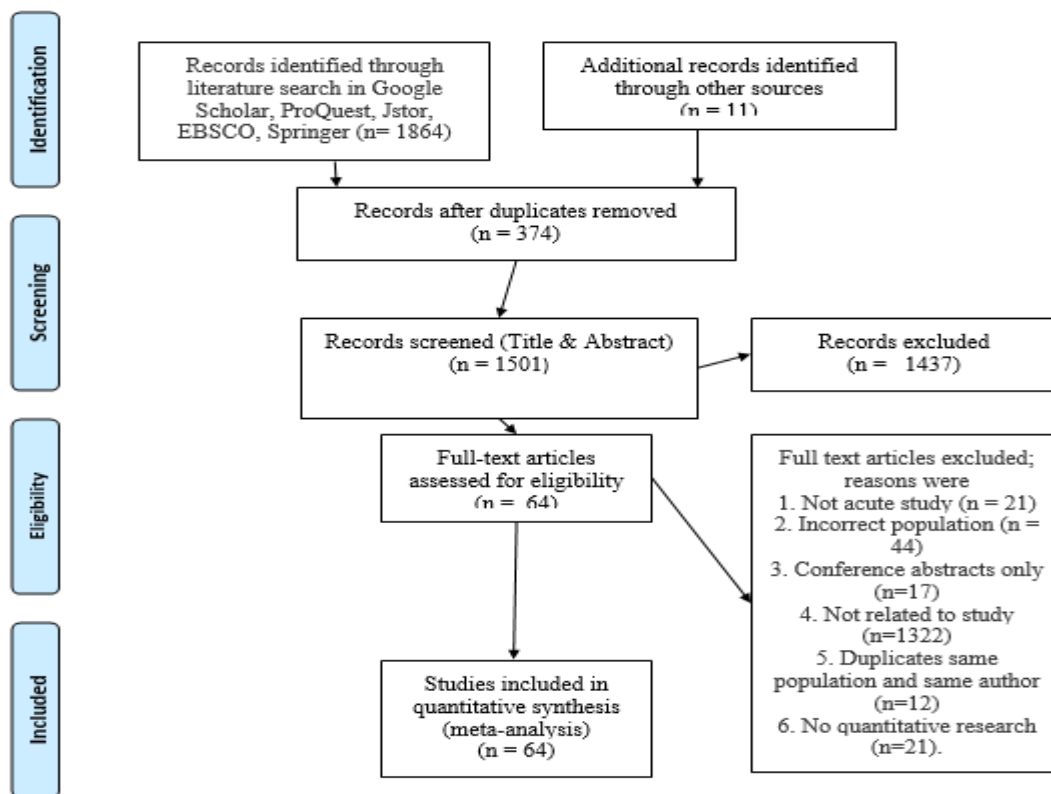

Fig 1: PRISMA statement flowchart for Meta-Analysis and Systematic Reviews of the study.

Fig 1 shows an overview of literature search criteria and inclusion and exclusion criteria. One thousand eight hundred sixty-four articles were retrieved with search items "Telecommuting"? "Home-based Telecommuting"? "Work from Home"? After removing duplicates found in research databases, 1501 articles were screened based on title and abstracts. Full-text articles have been screened and excluded due to Duplicate population and study topic, incorrect population, an unrelated study. After these exclusion criteria, the final studies included for the meta-analysis study were 64. These 64 studies were included based on PICO (Population, Intervention, Comparator, and Outcomes) extended version. This meta-analysis study summarizes all the available and related empirical results for the respective relationship between telecommuting and commuting stress.

This study also includes published and unpublished works from other sources to eliminate the problem of publication bias.

Research Questions	What is the impact of Telecommuting on Commuting Stress? Does Telecommuting acts a substitution for reducing the commuting stress and traffic congestion?	
	Inclusion Criteria	Exclusion Criteria
Population	Employees in a Company (i.e., who commutes to office daily)	Non-workers and workers who will not commute daily to office
Intervention	Telecommuting / Work from Home	Work Stations near House/any other flexible work practices
Comparator	Any Comparator	
Outcomes	Phycological Outcomes (Stress)	Other Outcomes (Health issues etc..,)
Study Design	Empirical/ quantitative /Qualitative Studies	Reviews, Discussion articles, applications and models
Others	Published and Unpublished articles in English, published before January 1st 2021	

Fig 2: PICO Extended version for this review

Inclusion criteria for articles to be analysed further by using PICO extended version were (1). Being published in peer review journals written in the English language (2). Reporting an empirical /Quantitative/Qualitative Study. (3). Including the studies related to Telecommuting/Commuting Stress/Phycological and health factors. Furthermore, the exclusion criteria were (1)—population of non-workers, non-telecommuters. (2). Review articles, models, and Applications.

Summary of Empirical Studies

This study is a systematic review to assess the Commuting stress of workers and inform about Telecommuting's substitution effect that can help many firms to address their employees' bad mental health throughout the world. Everyday Commuting to and from work is a Hussle job for many employees, especially those residing in traffic-congested cities. The daily commute in traffic-congested, highly populated metropolitan cities is said to be terrifying for people. It affects commuter's health and also generates pollution in the environment. Because of the global market scale and economy, cities are becoming engines of growth all across the developing globe (Sridhar, 2019). In India, cities like

Bengaluru, Mumbai, Pune, Chennai, Hyderabad, and Delhi are primarily known for IT Hub and Traffic Congestion. However, people who commute daily for their work are considerably more.

Human resource management is about hiring, training, appraising, retaining, and compensating the organization's employees. It is a vital and ongoing process in every company. The hard-hitting task is to manage people(employees) in the organization without their cooperation and coordination. Their involvement and engagement in the job are essential for the smooth running of the business. As stated by the organization's policy, the employees were bound to the company's restricted workplace and timings. However, in recent times, some companies have a unique program called "telecommuting" for their employees. Tele managers are the people who manage, supervise, and monitor the performance the efficiency of telecommuters. Tele commuters are the employees who work outside the office area. There are certain practices involved in the telecommuting program. There are several reasons for following telecommuting program; they are as follows, Technological advancement (laptops, network connections, cell phones have made a way of communication easier), Travelling (increase rate of traffic will consume more time while traveling to workspace), work-life balance (employee can manage his/her work-life balance in telecommuting). This study aims to understand telecommuting's substitution for commuting issues and the effect of telecommuting on traffic congestion and commuting stress.

As India is also a highly populated country, A survey of 470 individuals reported that the average time-traveling one way is 60 minutes (7% of their day) (ET Bureau, 2019; Sridhar, 2019). Spending more time in the daily commute to the office creates various physical and mental issues. These issues can lead to poor employee performance, lower job satisfaction, and lower morale (TOI, 2019). It also causes workplace aggression in expressing hostility and obstructionism because of traffic difficulties (TOI, 2019). A study from Robert Half shows that 50% of employees find that daily commute is stressful, and 45% of them expressed that their commute is too long. The average time of daily commute one way is 50 mins (HR Daily Advisor Content Team, 2019). Commuters in India face extreme difficulty reaching their destination both day and night (Chakraborty et al., 2018). It is well known that Commuting exacts considerable stress on the human mind and body and family relationships. Commuting stress can arise due to various reasons. Typically, according to these investigators (Koslowsky, 1997) a commuter confronted with any one of a wide range of stimuli associated with the trip between home and work (e.g., traffic congestion. noise. crowding. traffic signals) can be expected to respond with increased anxiety, lower productivity, greater absenteeism, and even a greater likelihood for specific physical ailments and diseases (Raymond W. Novaco, 1990) Day in and day out, all of the worries add up, each additional minute of travel is associated with an increase in health concerns (Schaefer, 2005). Previous research has intended on the mutual thing of objective and subjective stressors of the commute that shell out to an individual's commuting stress. Objective stressors that have constituted to predict commuting stress include time spent commuting (Gottholmseder et al., 2009; Kluger, 1998; Morrow, 2010; Novaco et al., 1990; Rasmussen et al., 2000; Vance, 2006), traffic congestion, and distance of the commute (Kluger, 1998).

Commuting issues impact not only the employee but also the employer as a whole. In a recent study, commuting stress impacts hiring success and retention (Dr.John Sullivan, 2015). It also leads to increased absenteeism, frequent tardiness, higher turnover rates, lower employee engagement (Dr.John Sullivan, 2015). In the Survey of 185 respondents, they were facing irritability and low emotional stability (Wiese, Bettina S & Stertz, 2020). In the recent Survey, 74 commuter hotspots in 16 different countries with a population size of 3,00,000 and more, the average time spent commuting to the office are 80 mins one way (Julia Watts, 2019). Based on a sample of 336 participants, it was found that

Burnout and intention to leave were both tied to commuting stress. (Amponsah-tawiah et al., 2016). Also, in a survey of 6856 respondents, it was stated that commuting and job stress are considerably decreased for telecommuters compared to that of traditional employees who are into 9-5 system jobs.

To summarize, according to the observations from the survey data used in this study, telecommuting is connected with both high wages and subjective well-being, signifying that it is a desirable working style, at least from the standpoint of workers. In this sense, growing the availability of telecommuting is one of the excellent labour-management practices for improving workers' welfare (Masayuki, 2018). Telecommuting benefits employees in the center around in reduction of commuting stress (Hill et al., 1998; Kurland & Egan, 1999; Mokhtarian, 1991).

The study conducted by 7500 + commuters found that employees find it challenging to commute daily to work due to traffic congestion and spending most of the time traveling from and working. The average time spent by employees in daily commute is more than 200 hours in a year. In the same study, it was suggested that employees and organizations adopt work from home/Telecommuting to reduce the stress of daily commuting (Ariella Kristal & Whillans, 2019). Some studies like (Chapter & Jiang, 2008; Kim, 2017; Zhu, 2013) pays explicit attention to understanding the impact, effect, and relationship between telecommuting and commuting aspects. From these studies, people prefer telecommuting as they dislike long commutes and avoid getting stuck in a traffic jam. The aspect of environmental issues related to commuting, fewer person-hours, is lost due to traffic jams. Traffic jams will be minimized during rush hours, so there will be fewer greenhouse gas emissions (GHGE) on our congested roads (Onchoke & Akash, 2012). Telecommuting is often stated as a potential strategy to reduce several emerging social-economic problems, including transport congestion, environmental pollution, and production costs (The Vu & Vandebona, 2007).There are some potential impacts of telecommuting on the daily commuting aspect. Some of the positive impacts are (1). Reduced commuting trips (2). Reduced travel distance (3). Peak hour traffic spread (4). Reduced vehicle ownership. (5). Reduced traffic accidents (6). Improved air quality (7). They have reduced transport incidents. Likewise, there are some negative impacts of telecommuting on the daily commute (1). Increased business-related trips. (2). Increase in their household member trips (3). More personal travels. (4). Urban sprawl is encouraged (The Vu & Vandebona, 2007). Commuting daily from and to the office is also related to urban development. For instance, in a survey of 215 responses, it was found that Telecommuting and ITS (Intelligent Transportation System) measures are highly significant factors in the residential location choice decision. Therefore, these measures are likely to induce the urban land development pattern (Tayyaran et al., 2010). Another group of studies used diverse approaches to analyse participants' trip diary data from telecommuting pilot projects and concluded that telecommuting has an additional travel reduction effect. (Pendyala et al., 1991) assessed pre-and post-telecommuter and non-telecommuter groups using a two-group design, and (Mokhtarian & Meenakshisundaram, 2002) By categorizing telecommuters into current and previous telecommuters, a three-group project was done (Nilles, 1998) A one-time survey was used to compare telecommuter and non-telecommuter families (Hopkinson, 2002) and (Glogger et al., 2008) without a control group, using a pre-and post-test design (Hamer et al., 1991), Five surveys were done with 3-month intervals using the same design (Graaff et al., 2004) applied two-way fixed effects modelling with two waves of the time-use survey.

The following are some of the accords that resulted from the diversity of methodologies. First, they discovered that telecommuting could partially replace non-commute business travel for telecommuters (NWT)(Graaff et al., 2004; Hopkinson, 2002) and nonwork travel (NWT) (Glogger et al., 2008; Graaff

et al., 2004; Hamer et al., 1991; Mokhtarian & Meenakshisundaram, 2002) Second, they revealed that telecommuting lowers non-telecommuting household members (Glogger et al., 2008; Hamer et al., 1991; Nilles, 1998; Pendyala et al., 1991) Third, (Pendyala et al., 1991) These travel-reduction effects, it is asserted, are equally relevant on regular commute days. Empirical studies have supported the view that there are traffic benefits associated with telecommuting. Analysing trip records obtained from 219 respondents, of which 73 are telecommuters, (Pendyala et al., 1991) concluded that telecommuting is a viable trip reduction measure because it leads to a substantial reduction in trip generation, VMT, peak-period trips, automobile use, and freeway travel on telecommuting days, and it does not increase nonwork trips. As the number of studies stated that telecommuting could be substituting work travel and decreasing commuting stress, some studies found that telecommuting personal travel trips have increased 16% compared to daily work commutes. For example, (Balepur et al., 1998) observed that telecommuters made more trips returning home, eating a meal, shopping, and social/recreational trips on telecommuting days. (Zhu, 2013) Also, telecommuters had longer daily shopping trips, family/personal business trips, and social/recreational trips than non-telecommuters.

The complementary effect of Telecommuting is highlighted in many research studies. The novelty of this study is examining whether Telecommuting is considered to be a substitution/strategy for reducing commuting stress. To further examine the effects of commuting stress on employees and employers living in metropolitan cities facing the highest traffic congestion. This paper aims to provide previous empirical shreds of evidence to study the possible impact of telecommuting on commuting stress. In the study, it was found that from 2001 to 2009, there was a significant impact of telecommuting on daily work commutes and work satisfaction of employees (Zhu, 2018). In a semi-random representative sample of 215 employees, it was observed that commuting stress in the employees would directly affect the turnover intention by reducing the life satisfaction of employees in the organizations (Demiral, 2018). In the (Piskurich, 1996) Study, telecommuting can positively impact energy conservation, less time in traveling, and stress reduction spent commuting. According to studies, the critical problem faced by commuting stress is that commuting stress can also lead to workplace aggression. The commuter's stress might be because of traffic congestion, long commute, and workplace environment. The survey from 116 respondents commuting daily to office space in traffic-congested cities observed that spill over from the traffic environment to the workplace environment is possible. In the same study, other sources of daily hassles, any unresolved issues in the traffic environment (including anger-provoking events) may have continued to influence and intensify subsequent workplace reactions to potential stressors, even though their immediate (or "state") effects may have become indistinguishable in conscious awareness. Commuting stress also arises because of commuting time, commuting distance, and traffic congestion. Commuting stress is seen more in the employees residing in traffic-congested cities like Bengaluru, Mumbai, Chennai, and Delhi. According to data from a city transport survey conducted in Bengaluru from 2001 to 2018, the average one-way commute time to work is 42.45 minutes, covering 10.84 kilometres, and average spending of Rs.2,589 per month on commuting to work (Sridhar, 2019). Commuting experiences can have an impact on subsequent work and family life, influencing individuals' task performance, aggressive behaviours, work-family conflict, and negative mood (Evans & Wener, 2006; Hennessy, 2008; Kluger, 1998; Schaeffer et al., 1988).

Commuting also has consequences for employers, organizations, and the state. While most urban traffic congestion is caused by commuting to and from work instead of ''joy riding''; the location of houses and jobs at remote distances entail high transportation costs, expensive infrastructures, and environmental concerns due to high energy use (Emre & Elci, 2015). A recent study from Road wage survey in the United States report that 48 % of working adults reported their job dissatisfaction as an

impact of commuting, 32% took commuting into consideration when deciding their current job, 27% of the respondents stated that they could perform their duties from home and 15% of the respondents reported they would change their jobs for a shorter commute. In a comparative study between commuters and non-commuters, only about 28% of the commuters were satisfied with their jobs when the telecommuting option was given. A study conducted in 2012 of 394 samples found that most teleworkers had correctly anticipated some positive outcomes such as having more time for themselves and family, reducing commuting stress, and having more flexibility (Maruyama & Tietze, 2012). Due to the advent of covid-19, a health crisis worldwide, all the organizations forced and made work from home/Telecommuting mandatory. The scenario made all employees work from home, and the daily commute to the office was avoided. Few studies during this scenario stated that employees are facing less commuting stress and health issues and satisfied with working from home (Brunilda Nazario, 2020; Indian Labour Organization, 2020). As employees have faced much stress due to commuting, the recent cross-sectional study survey conducted during 2020 states that Remote workers appreciated mainly saved travel time to go to work (Moretti et al., 2020).

Discussion and Conclusion

The study aimed to understand and review the works of literature on Telecommuting and commute Stress. This article helps in extending the knowledge of the impact of Telecommuting on Commuting Stress. From a researcher's viewpoint, the research on telecommuting is only beginning to scratch the surface. To better understand all of the nuances of this phenomenon, there is a need to understand organizational, managerial, and worker perception. This study's main findings are summarized as follows: First, Commuting Stress causes various Physical, Mental, and behavioural problems in commuters who spend more time commuting. Second, Individuals have s strong feeling of avoiding a long commute. Third, Telecommuting is a perk given to its employees by organizations to have flexibility in a job.

Fourth, there is a significant and robust impact of telecommuting on commuting Stress. Fifth, Telecommuting has a positive impact on reducing the commuting stress in employees. Sixth, it can also negatively impact employee's performance and productivity by increasing other personal household commuting (travel, shopping). Otherwise, the majority of the empirical studies stated that Telecommuting impacts commuting Stress positively by reducing it. Seventh, Telecommuting also reduces traffic congestion and leads to saving the environment from traffic pollution. These findings suggest that shortening commuting time plays a vital role in improving worker's work-life balance and well-being. The limitation of Telecommuting is that the adoption of telecommuting programs might be significant given that the current labour market is characterized by a reduction in the employee's commitment to specific organizations. According to the empirical evidence, there are some hidden costs associated with commuting Stress for both employers and employees.Meanwhile, Telecommuting cannot be the substitution for specific job duties where employee physical presence is necessary. Telecommuting can be considered a substitution partially/entirely in daily travel or the daily commute to work. Telecommuting is intrinsically linked to information technologies companies have to facilitate requirements necessary for 24/7 communication between clients, co-workers, and supervisors. Telecommuting can potentially increase the work tasks into home time by saving the commute time and eliminating the commute stress. Likewise, it may be effective in relieving traffic congestion and the concentration of air pollution. This systematic analysis can accumulate knowledge related to telecommuting and commuting Stress and test the causal relationship between the variables.

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