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Task-Switching Taxes in Open-Plan Offices: Minimum Uninterrupted Focus Blocks for Error Reduction

Beenish Chohan
Islamia University Bahawalpur, Punjab, Pakistan
beenish_chohan123@gmail.com

Sabir Riaz
Islamia University Bahawalpur, Punjab, Pakistan
riazsabirkhan@gmail.com

Abstract
This paper analyses the consequences of green-hushing, the underreporting of ESG practices, in marked public stock market indices such as the FTSE 100, the S&P 500 and the DAX 30 which has a wide mix of industries in technology, finance, healthcare, and consumer goods among others. The literature employs archival, such as ESG scores that are provided by MSCI ESG and Sustainalytics and financial performance that are provided by Bloomberg and Reuters, which covers 500 companies between 2015 and 2023. Green-hushing has been operationalized as a binary factor in such a way that firms ranked in the lower half of their industry on ESG disclosure scores are considered to have been green-hushing. The dependent variable is stock returns calculated as annualized change in price adjusted by dividends and some of the control variables used include firm size, profitability, market-to-book ratio, and industry fixed effects. Measuring the causal impact of green-hushing on the stock returns, the Difference-in-Differences (DiD) design isolates the effect of green-hushing with the consideration of time-invariant characteristics and time-varying parameters considered. The robustness checks, which are alternative estimators, placebo tests, and bootstrapping, are applied to determine the results. It is an ethical study since it considers publicly available information and confidentiality. The paper seeks to give an insight regarding how green-hushing affects stock performance and efficiency in reporting ESG, which is of great value to investors and those making decisions on behalf of companies.

Keywords: *Green-Hushing, ESG Disclosures, Stock Returns, Stock Returns, Corporate Sustainability, Investor Behavior, Corporate Valuation, and Financial Performance*.

Introduction

One of the attributes of the modern workplace design is the use of open-plan office concept that is aimed at encouraging collaboration and communication. The design of these spaces aims at ensuring that the employees interact with each other easily, encourage team work and eventually improve overall productivity through eliminating the traditional office barriers. Nevertheless, as good as open-plan Office may be, it has been represented to have also led to some of the challenges especially in terms of focus and productivity. Among the most important problems that will appear on the scales of such work environments is the fact that such an environment is characterized by high frequency of task-switching which employees might repeatedly face mainly due to the interference by colleagues, meetings, or even the noise.

According to the current research, such environments lead to the higher rate of task-switching, which may severely interfere with the thinking process of an individual. Task-switching is moving the attention between tasks and this continual process is known to have a cognitive load. Cognitive load involves the amount of effort needed to use information and carry out tasks which to some extent may disrupt the cognitive system as a result of frequent switching between tasks hence not allowing people to focus due to complicated tasks. Consequently, task switching may cause an increase in error rates, a decrease in the rate of task completion, and decreased productivity as a whole (Becker et al., 2021). It becomes especially serious in the case of high-stakes or error-sensitive settings like a healthcare or a financial sector when significant consequences of even minor errors can occur.

Furthermore, research has always revealed that open-plan offices increase the amount of interruptions. One study by Zhao and Kim (2020) found that 15 percent of the respondents who did go to work at open-plan offices had their chances of switching tasks and experiencing interruption increase compared to employees who worked in traditional office environments. The employees in these environments easily lose this concentration since distractions are relentless. On the one hand, the open-plan office design is aimed at promoting interaction, but, on the other hand, it introduces the environment that does not support working with extended concentration among employees whose activities require thinking. This can be corroborated by the findings of Johnson and Smith (2019), who emphasized that employees at an open office environment bear a greater extent of task-switching, which has been attributed to elevated mental exhaustion and poor job contentment.

Even though an increasing number of studies have been used to determine the effects of task-switching in open offices, there is still a high lack in the literature of the necessary length of uninterrupted work time that should be applied to reduce these ill implications and attain better business performance. There are relatively few empirical studies on the amount of time employees require in order to compensate the cognitive costs of task-switching and there are fewer still that deal with the issue of independent worker time and error levels directly. This literature gap is interesting considering the fact that organizations are still investing in open-plan office designs usually without addressing the cognitive effects that such offices would entail on the performance of the employees.

Recent research presents research projects like that of Becker et al. (2021), Zhao and Kim (2020), and Johnson and Smith (2019), has pointed to the necessity of the structured setting, which diminishes the cognitive burden-related to the perceived task-switching. Such works show that minimizing distractions and giving employees focused time frames with no distractions can vastly improve the performance of the mind and lower the rates of errors. As an example, Becker et al. (2021) discovered that workers who had an opportunity to work under distracting conditions at least 90 minutes showed a significant decrease in the number of errors that frequently interrupted participants. This is consistent with the thinking of cognitive load, in which it is believed that lessening the amount of cognitive hardship by cutting back on interruptions can result in expanded accomplishment of errands (Sweller, 2011).

The purpose of the present research is to examine the influence of task-switching in assignment of managing an open- plan office on the performance of employees and the rate of errors committed. In particular, it will examine how the potential adverse outcomes of task switching

can be reduced via uninterrupted focus blocks or time intervals devoid of interruptions. The paper proposes a valuable contribution to the investigation of the relationship between the task switching, focus periods, and the error rates to come up with an insightful idea of how to set up the environment best suited to perform more efficiently.

Having determined the topic and the research question, it is possible to propose the following hypothesis:

H1: As task-switching rises, there will be an increase in error rates in an open-plan office.
H2: A 90 minutes minimum block of continuous working time decreases mistakes in tasks to a minimum.

Results of this study will be valuable to the current debate of whether office plans have been effective or not and will have practical implications to organizations that want to get the best office design that fits into some organizational improvement of employees. It is hoped that the findings will support the evidence-based advice on how to cope with cognitive load in open-plan offices, and even how to address the workspace and work schedule policies.

There is much literature on the phenomenon of task-switching in the world of cognitive psychology, as research has shown that, most likely, the phenomenon is prevalent in the contemporary workplace. Task-switching is defined as a change of focus to various tasks and has to be done often due to environmental distractions like interruption, notifications, or shift in work priorities. There has been an increasing evidence and studies that have been pointing out the cognitive costs attached to task-switching frequently, showing that it undermines performance in terms of cognition and raises the rates of error at an individual job execution. Jett and George (2003) also studied the effects of interruptions that occur frequently on cognition especially when they happen in an open office space. They would even confirm that such surroundings would encourage one to switch tasks by just making the interruptions a lot more frequently and consequently, employees in a task-switching environment feel overloaded with cognition and there would be slower mental processing and the chances of making an error additionally would rise too.

Studies have demonstrated that task-switching hampers the capacity of people to focus and in a setting where heavy or challenging tasks are done this becomes a very big issue. At open-plan offices where people around get to meet and interact, can be distracted by other employees as a result of instances in the office; employees tend to shift between activities that as well contribute towards impairment of the efficiency of the employees. Practically, the works of Mark, Gudith, and Klocke (2008) found out that workers of open-office environments dedicated much of their working hours to address interruption and task switching. Such repeated switching creates even more cognitive overload and reduces overall productivity of work. A cognitive burden is introduced in the environment by frequently switching tasks and as such, this cognitive burden can impair task performance resulting in lower productivity and increased errors on the job.

Task-switching involves mental processes whose cognitive rules can be formulated by the theory of Cognitive Load (Sweller, 2011). Cognitive load theory Four aspects of human brain and learning According to Sweller, human brain has a limited capacity to handle information. When people have to carry out one information stream after another stream or may have to shift

between various tasks very often, this ability is overloaded which makes its work less efficient. Cognitive load is the mental effort involved in processing information when executing any given task and can be divided into three categories namely intrinsic load, extraneous load and germane load. Intrinsic is the intrinsic load or feature of a task and is extraneous load which is the cognitive load imposed on the environment, like interruptions. However, the amount of mental effort to learn it or solve it problem is called Germane load. High task switching rate ups extraneous cognitive load by having workers constantly need to shift their focus consideration and cognitive abilities to adapt to the new job or input. Such constant shift of mental resources will impair the process of handling and finishing tasks effectively thus resulting in higher rates of errors and reduced performance (Sweller, 2011).

In an open office, cognitive demands posed by switching tasks may be high, and the employees are likely to have competing claims on their attention. When one has difficulties in concentrating on one task so much occurs at a time because of the interruptions that come, a problem of cognitive overloads arises. In other words, if an employee is interrupted during the process of preparing a complicated analysis or writing a report, then the brain needs to make some adjustments to receive an input of the new job, and this is rather large cognitive load. This slows down the amount of cognitive resources one can use to perform the main task thus rendering the individual prone to make more mistakes and errors. In addition, when interruptions are longer, the cognitive load will be even higher, and that is why the employees will have more complicated task in terms of getting focused on the initial task once they move back to the previous one.

Literature Review

Another perspective through which one could learn the role of the workspace design on the tasks and mental activity is Behavioral Operations Theory (Kauffman, 2020). This theory proposes that the physical and organizational set up of a working place may either enhance or interfere with the capability of the workforce to concentrate, analyze information and carry out work. The building and design of offices, such as the sheer layout, the noise degree, and the provision of privacy are highly influential in the way people execute cognitive intensive activities. Specifically, the open-plan offices are characterized with more interactions and diversions occurring by design and can interfere with the thinking and performance of the tasks at hand. According to Kauffman (2020), the open-plan office setting, which is characterized by great emphasis on togetherness and the need to be open, frequently comes at the cost of personal attention and concentration. Employees who constantly have their cognition eroded by distractions and interruption end up becoming thinly spread and their performance will start to show poor quality.

To the Behavioral Operations Theory, this equilibrium between collective and concentration can be determined by how the office environment is designed. Although open-plan offices promote communication and collaboration among office workers, they may establish a setting where the workers get side-tracked and become unable to focus on a single and specific task that needs attentional consistency and psychological involvement. According to the theory, the organization can make it their consideration to consider installing facility within the workspace in a way that the employees can have time to pursue personal concentration including installing special areas of quiet time or adjustable working hours. Organizations can also control cognitive overloading to enhance task performance by offering employees time to devote most of their mind towards accomplishing tasks without any interference. Kauffman points out that companies have to

balance between collaborative environment and the one that would also encourage individuals to be able to concentrate and focus.

The hypotheses used in this study are based on the relationship between task-switching, cognitive load and office design as a theoretical outlook of the relationship. Based on the cognitive load theory and behavioral operations theory we are suggesting that task-switching results in a greater level of error production in the open-plan office, and that, the reduction of errors in the task-switching environment could be significantly reduced by allocating work time where there is no interruption. The following hypotheses are going to be our hypotheses:

H1: Open-plan office arrangements would increase the task-switching and cause an increase in the rate of errors. This hypothesis conforms to the cognitive load theory that puts across the idea that switching of tasks frequently results in raised extraneous cognitive loads and worsen the performance of the tasks.

H2: A 90 minutes block of continuous work time is adequate in minimizing errors chances on a task. The logic behind this hypothesis is that decreased cognitive load that will be achieved through providing uninterrupted blocks of concentration will increase cognitive performance and decrease the number of errors.

The theoretical framework that has been developed in this paper highlights the relevance of the physical environment and task-switching regarding the development of cognition performance. The integration of cognitive load theory and the theory of behavioral operations attempts to analyze the way in which office layout affects the accomplishment of the task or in other words the study will give insight into the impacts of office design on task performance in an open plan setting. The results of this paper have the potential to be applied to organizational practices, especially with respect to the crafting of office environments and the use of work schedules to minimize cognitive load and enhance performance of the employees.

Cognition cost in switching tasks in the open-plan offices comes under complete explanation with the theories of cognitive load and behavioral operations. The study contained in the research will advance our knowledge on the influence of such costs on the tasks performance with the aim to offer evidence-based practices that design the work environment in the most beneficial way to increase focus, productivity, and reduction of errors.

Methodology

This study addresses task switching and interruption with the open-plan office setting to explore its effect on the cognitive load and performance on the task. This study aimed to examine the impact of regular multitasking and task switching in dynamic work cultures on cognitive performance which was conducted in two different working environments; a technology based start up company and a financial consultancy firm. The research adheres to a mixed-methods research guide through which employee surveys (qualitative) and the successful performance of cognitive tasks (quantitative) are implemented. In the surveys, the respondents self-reported on the incidence and the type of interruptions, cognitive load perception and the effects of these factors to task performance. The performance in cognitive tasks was measured in two conditions including interruption-free time and high-interruption time. Tasks were the problem-solving task,

the memory test and the creative thinking one, the performance in solving them was measured by the error rates, reaction time and the work quality.

The sample consisted of 150 workers in the departments (tech, finance, creative) and stratified to neutralize the industry-specific requirements of the tasks. The GPower software was used and the results indicated that the sample was large enough to reveal significant performance differences. Task-switching frequency was established through administration of Likert-scale questions in the survey and error rates were calculated based on the performance during both conditions. Task performance testing and the two surveys were also used to assess constant focus period. An excellent consistency in the instrument was indicated by the reliability test (Cronbach alpha = 0.85 task-switching frequency and 0.89 task-switching error rates).

A two-factor repeated measures ANOVA analysis was applied as the means of contrasting the error rates in the interruption-free and interruption-heavy conditions. In a manner that was specific to an industry, Post-hoc Tukey Honest Significant Difference (HSD) tests were carried out to analyse task-switching effects. Bot the IRB and a written consent were obtained, and I guaranteed their anonymity of the participants and their willful involvement in the process of study.

Results

The study outcomes provide an understanding of the correlation that exists between task-switching, cognitive load and performance within the open plan office systems. The results of the study give credence to the hypotheses that switching tasks can raise error rates and that there is an improvement in lowered reminder rates when people have an interrupted time of focus.

Scot-situation-change-of-trajectory | 3.12 | 1.07

The descriptive statistics of the key variables that were being measured during the study can be found in the following table: task-switching frequency and error rates under interruption-heavy and interruption-free conditions:

Error Rate(int) - % | 9.55 | 2.08 non -interrupted Error Rate(non -interrupted) 6.73 1.65
Interaction plots Plots of post-Hoc

The Task-Switching Frequency represented an average of 3.12 points (that is a 5-point scale), judging that participants were likely to be involved in task-switching during the workday. The Standard Deviation of 1.07 portrays moderate variation in the frequency of delaying in changing the task and some having greater frequency than others.

The Error Rate (interrupted) -mean was 9.55 errors with increased standard deviation of 2.08 and this depicted an enormous influence on occurrence of errors by frequent task-switching. On the other hand, Error Rate (uninterrupted) had mean score of 6.73 and standard deviation of 1.65, which is dramatically lower in case with uninterrupted employees were given a chance to concentrate. The contrast between the interrupted and the uninterrupted error rate is an indication that the immediate impact of the cognitive load of task-switching is directly proportional to the performance.

Hypothesis Tests

Regression analysis was used to check the hypotheses and both of the hypotheses are supported: The error rates escalate in the case of task switching. Estimation of this hypothesis gave a value of 0.26 as regression coefficient (beta) and p- value less than 0.01 representing a positive correlation with statistical significance between the task-switching and error rates. This observation is similar to what the previous studies have come up with regarding the cognitive load theory (Sweller, 2011) that explains that working on multiple tasks often leads to raised rates of errors due to the rise of cognitive load. Employees that engaged in context switching more often showed more error rates, which leads to the supposition that task switching on a regular basis with multiple interruptions worsens the accuracy of tasks and task productivity.

H 2: 90 minutes of sustained attention contributes towards getting rid of errors to a large extent. The value of the regression coefficient (2) that this hypothesis answers is -0.31, with the value of the significance (p) less than 0.05, indicating that the relationship between uninterrupted focus time and the error rates is negative and significant. This finding concurs with the presence of cognitive load theory that also points out that less cognitive hassles (i.e. less task-switching) equal higher amount of mental resources that people dedicate to a specific task and therefore can boost performance and carry out less errors (Sweller, 2011).

Discussion

The current research will build on the available literature on cognitive load and task switching in professional organizations by investigating the correlation that exists between the offices in an open setting, cognitive load, and their respective task performance. The results are consistent with the Sweller cognitive load theory (2011) which holds that task switching and interruption causes extraneous cognitive load to the task process performance. Particularly, the paper proves that the high rates of switching tasks are directly related to the rate of making errors, which confirms the belief that the human brain cannot be able to manage numerous duties at the same time due to its limited capacity.

The research also falls within the Behavioral Operations Theory (Kauffman, 2020) according to which the organizational structure and physical workspace have a role to play in the outcome of the task at hand. The findings point out that even though open-plan offices are developed to encourage teamwork, they might inadvertently lead to mental overload due to the facilitation of time-shifted tasks and distractions. Organizations can counter the adverse nature of such settings by availing guided times of focused attention.

Some of the implications of these findings are as follows:

1. Redesigning Office Layouts: To help employers, organizations ought to redraft open-plan office facilities to grant employees areas or time spent where they can work without any interruption. This may include forming quiet places or flexibility in the schedules to allow more time of concentration.

2. Scheduled Crisp Periods: The managers can come up with policies that enable employees to get scheduled quiet periods where the employees are supposed to restrict interruptions and focus on some complex tasks. This mechanism is proved to elevate the productivity and decrease error rates.

3. Cognitive Load Awareness: The part that cognitive load plays in the increased switching between tasks is essential to know in organizations where there is an attempt to enhance the performance of the employees. Cognitive overload and increase in the number of errors in performing a task can also be addressed by training programs aimed at teaching employees the significance of focus and ways of controlling distractions, which can result in fewer mistakes in a task.

Though this research is important, there is a number of boundary conditions that need to be kept in mind. The effects of task-switching can first be different according to the task that people are doing and how it is complex. As an example, creative tasks can be more vulnerable to those adverse consequences of disruptions than routine tasks, because creative tasks engage the mind at a greater level. Such variations in the tasks could be investigated further in future research. Also, the impact of technology in reducing task-switching may be another area that future research may be carried out on. Digital seems to be able to assist in terms of minimizing the negative consequences of open-plan offices; noise-canceling software, task management apps, or time-tracking tools that minimize distractions are additional clues about how technology can assist with the management of cognitive load and task-switching.

To sum up, the given research emphasizes the cognitive consequences of task-switching in open-plan office environments and the significance of focus time to facilitate the enhancement of task performance and low error rates. Office redesign enabling deep work can help eliminate the cognitive overload that organizations experience, which will lead to a more productive and efficient working environment.

Conclusion

The current research is eye-opening in terms of the controversial complex between switching tasks, cognitive stress, and performance in an open office environment. Results in the study support the position that switching tasks in an office that has open-plan offices are highly detrimental to the cognitive load and error rates. These findings are in line with an already established theory of cognitive load (Sweller, 2011) which postulates that the limited processing capacities in the brain are overworked by the continuous task-switching causing poor performance in the tasks. In particular, the study establishes that providing employees with at least 1.5 uninterrupted work hours is highly effective in alleviating the adverse effects of task-switching on the performance because it enables them to minimize errors and increase efficiency in performing tasks.

A deliberate block of uninterrupted attention during the day is something that organizations considering making their employees more productive and take the mental burden of interruptions away should incorporate in their day plans. The results will appeal to instituting quiet hours, assigned concentration zones, or loose working schedules to give workers time to do intense, concentrate work. Such habits would help the employees to be more focused, to have less cognitive stress and enhance the overall output of work. These changes further correspond to the suggestions made by Jett and George (2003) whose incidental study quoted that interruption minimization may help peoples work to be more productive and enhance their well-being related to work.

Besides imparting valuable information on workplace design, this study can also serve as actionable implications of the study towards both managers and organizations in the need to redesign their office environments and substantially enhance thinking ability. The future research could also further investigate the effect of task-switching on different kinds of task and also the effectiveness of technology to limit interruptions. As an example, the possibilities of digital devices in assisting employees to cope with switching tasks as well as to stay focused must be tapped to find out how these technological instruments could assist in cognitive work performance in open-concept office settings.

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