ISSN (Print): 2788-8320 ISSN (Online): 2788-8339

JOURNAL OF SOCIAL RESEARCH DEVELOPMENT

www.jsrd.org.pk
editor@jsrd.org.pk

MULTITASKING BEHAVIOR IN THE WORKPLACE: A SYSTEMATIC REVIEW

Nadia Butt[1] & Nosheen Fatima Warraich[2]

[1]Ph.D. Scholar, Institute of Information Management, University of Punjab, Lahore, Pakistan
[2]Director, Institute of Information Management, University of the Punjab, Lahore, Pakistan

KEYWORDS

Multitasking Behavior; Work Performance; Human Multitasking; Workplace; Task Switching

ABSTRACT

The multitasking behavior is burgeoning in today's work environment which reflects capabilities of individual to manage multiple things simultaneously to attain the efficient work performance. Study examines effect of multitasking on human behavior in workplace and its impact upon work performance. A search strategy was formulated to conduct this literature review-based study, and different databases containing scholarly research material were explored to find related literature. Inclusion-exclusion criteria were defined & included studies fulfilled selection criteria. PRISMA-P (2015) guidelines were followed to complete study. After reviewing literature pertaining to subject, finding established the fact, internal and external interruption triggers the individuals' working behavior towards multitasking at the workplace. Multitask working behavior exerts an impact on overall work performance particularly, on work quality, productivity, and working memory. In this linking, no prior literature-based evidence is available in this domain in particular context. The scope of study is confined to published literature on human multitasking and human performance, literature on system multitasking and media multitasking is not included.

Corresponding Author Nadia Butt

Email: nadia.butt@riphah.edu.pk

DOI https://doi.org/10.53664/JSRD/03-02-2022-08-229-247

INTRODUCTION

Human multitasking, which originated in the computer sciences, is now more common as a result of technological advancements. It refers to carrying out two or more tasks at once, as well as completing the few or more tasks in sequence by switching between them within a set amount of time (Spink, Cole, & Waller, 2008). The ability of a computer to perform two distinct computing or processing tasks at once was the original meaning of the term multitasking. Computer systems contain several processing cores and can handle several

tasks at once. According to Kirschner and Bruyckere (2017), the term "multitasking" refers to individual capability to work on two/more information-processing tasks simultaneously or concurrently. As a result, the person is capable of performing multiple tasks that each require cognition, such as checking email or chatting online while at a meeting or working with a group. The underlying need for multitasking at job is that the person must manage numerous subtasks simultaneously for a limited period of time. This is another explanation for the phenomenon of the multitasking. Digital screens have taken over lifestyles and our industries are fast becoming automated that ultimately leading to multitasking a necessity in many workplaces.

As we find ourselves in age that is characterized by innovation and an information-driven economy where multitasking may affect work performance in either negative or positive stances. It could lead to resource conflicts in the information processing process or boost work productivity. Multitasking is area of interest in different disciplines, computer science, management, psychology, education, and information sciences. Still performing multiple activities at once is commonly thought of as multitasking, a review of relevant literature by Pashler (1994) revealed that human capacity to do basic cognitive operations concurrently is severely constrained. Kirschner and Bruyckere (2017), human brain has a single core and the cognitive system (brain functioning) of human beings allows them to switch between different tasks or perform activities in sequence rather than complete them at once. The two key criteria emphasized by Fich, 2011; Adler and Mavlanova (2011) in linking to the amount of time spent multitasking are task independence and performance unanimity, the standard of concurrency states that numerous tasks occur with time-based overlap over a specified time period, in contrast to the standard of independence, which means that tasks are self-contained.

Furthermore, it is believed that information / official tasks can be managed in one of three ways: sequentially, where one work begins as another finishes; parallels, where many tasks are carried out at once; interleaved, where one activity is put on hold to focus on another, then brought back (Bluedorn et al., 1992). Positive sensations related to the current activity caused people to decide to undertake numerous tasks at once when the assignment was too simple for their skills level. Salvucci and Taatgen (2011) broaden this discussion by suggesting that multitasking activities would be defined along a continuum, based on how long one activity is completed before being switched to another, spanning from thr seconds to hours. Multitasking is preferred by those with the higher polychromic tendencies, while single-tasking is preferred by those with the lower polychromic tendencies (König & Waller, 2010; Lascau et al., 2019). People who are monochronous focus their attention on primary task and perform better. People who describe themselves as polychronic express a desire to do several activities at once and believe that this is the best course of action (Conte & Jacobs, 2003).

The literature focuses on various forms of multitasking at work, like electronic multitasking, which involves using multiple electronic devices at once; multi-communicating, which focuses on multiple interactions with others; and information multitasking, which involves seeking and searching for the information on multiple information tasks. The simultaneous usage of the numerous digital media streams is known as media multitasking. People's simultaneous searches for various topics in the information sector also demonstrate th multitasking behavior (Spink, Cole, & Waller, 2008). As a trait of multitasking behavior time sharing and time switching between various tasks are demonstrated (Wickens, 1991). When resources begin to become overloaded, a healthy adaptive multitasking information habit may involve alternating between time sharing and time swapping. When resources begin to become overloaded, thus, a healthy adaptive multitasking information habit may involve alternating amid time sharing and time swapping (Waller, 1997). People occasionally become involved in multitasking in order to complete activities within the allotted amount of the time.

According to an individual's multitasking skills, time pressure in this state either positively or negatively influences work performance. People who have a polychromic temperament assume that executing two or more things at once will help them use their time more efficiently. The underlying need for multitasking at the job is that the person must manage numerous subtasks simultaneously for a limited period of time. This is another explanation for the phenomenon of multitasking. Human multitasking behavior has a relationship with Polychronic (preference for multitasking) and monochromic (preference for the single task) nature. Multitasking is preferred by those with the higher polychromic tendencies, while single-tasking is preferred by those with lower polychromic tendencies. Human behaviors are influenced in different manners, categories on the basis of the existing literature are: Negative effects include; distraction, depression, and working memory into positive effects include; variability, excitement, efficiency, and time-saving. Work performance affects in terms of individuals' working output (quality and productivity). Hence, current study has determined the factors of multitasking behavior and the effect of multitasking activities on work performance.

Problem Statement

Human Multitasking is establishing a new array of working behavior in workplace. Effects of multitasking activities on the human behavior and performance are debatable. Delbridge (2001), examined that individual disparities in how well people multitask. Some people are more adept at handling them than others. It was determined, sometimes people are able to engage in more than one task concurrently but next time, it would not practicable. In essence, it depends upon what we are doing, how much focus is required, and how much thinking is put into it. In crux, it depends on what we are doing, how focused, and how much thought is required. Multitasking activities influenced individual and organizational productivity. There is a debate about the pros and cons of the multitasking behavior in the

working environment, literature review provides evidence of both increases and decreases in efficiency and work performance. There is a dearth of literature regarding the impact of multitasking on the social, personal, and professional lives of employees. Multitasking has established researchers' attention in various ways thus, systematic review is conducted to analyze human multitasking behavior at the workplace and its effect on working behavior and performance.

Objective & Research Questions

The key objective of study is to identify factors that lead to multitasking behavior at the workplace and effect of multitasking on human work performance. To achieve objective, following research questions were formed:

1. RQ1: How Does Multitasking Behavior Develop at The Workplace?
2. RQ2: How Does Multitasking Affect Human Work Behavior and Performance?

LITERATURE REVIEW

Multitasking is important human ability to perform personal and professional tasks while ability is vital factor in behavior. Generally, people are inclined to perform some degree of multitasking in their official tasks and it has been observed that computer users, mainly information seekers, tend to switch tasks every few minutes. Multitasking behavior at the workplace has gained scholars' attention that explaining challenges related to multitasking and claiming that the innovation allows synchronized commitment to work and individual undertakings on large number of computerized gadgets (Petrova, 2019). Due to demands of modern work, it is common for people to start or continue tasks while others are still in progress or waiting to be finished. This behavior, known as multitasking behavior is coping mechanism for multitasking demands that are one of biggest stressors in contemporary settings (Zimber & Rigotti, 2015). Multitasking behavior is interrupting one activity in favor of another, breaking the fluency of task performance rather than completing one task at a time (Baethge & Rigotti, 2013). The ability to complete each job independently and the timing of their execution are the defining criteria of multitasking behavior (BenbunanFich, Adler & Mavlanova, 2011).

Two techniques that are common multitasking behaviors can be notable (Adler & Fich, 2012). A parallel technique involves performing concurrent activities simultaneously with greatest possible temporal overlap. Task is interrupted and left unfinished while attention is diverted to another work in interleaved technique (Adler & Fich, 2013; Zimber & Rigotti, 2015). The frequency of attentional shifts can be represented as a continuum, and both tactics entail shifting of attention. A parallel strategy requires switching between jobs very quickly (every second), whereas interleaved method entails shifts at a considerably slower rate (Adler & Fich, 2012). As result, both multitasking behaviors involve switching between activities, which means one task that is ongoing is stopped to make room for the another

(Adler & Fich, 2013; Brixey, 2007). The studies revealed that monochromic and polychromic abilities tailor up individual behavior to complete their tasks. Insight, memory, judgment, attention skills, and cognitive style were evaluated for these skills. Thus, monochronic and polychronic people perform and approach some activities and practices in quite diverse ways (Goonetilleke & Luximon, 2009).

The factors and predictors of individual's personal and professional multitasking behaviors have been discussed in the literature. Organizational management's goal is to get a lot of work done for not a lot of the money. One way to achieve this is by having an employee complete more work in a given period of time; in other words, by multitasking to improve work performance. In same way, libraries and information centers are working intending to resolve maximum information queries at minimum cost and time. Work pressure directly influenced the multitasking behavior of professionals/employees. Consequently, the work environment would be a critical factor that affects the multitasking behavior of individuals either in information context or other working spheres/situations. There are few empirical investigations of the interactions between dual-task performance and task switching, two research areas of multitasking that have been growing rather separately in the literature. The dual-task and task-switching performance are very likely two separate aspects of the multitasking ability, supporting the multifaceted nature of multitasking ability proposed by our previous study.

A small correlation was found between the dual-task cost and switching cost, and there was no gender difference associated with either multitasking cost (Lui & Wong, 2020). Therefore, to provide a more complete picture, these many characteristics of multitasking ability should be covered in any study assessing multitasking ability or comparing group differences in multitasking ability. The individual's capacity to adjust to the rising demands of multitasking and managing two jobs at once is another area of concern. This behavior, known as multitasking behavior is a coping mechanism for the multitasking demands that are one of the biggest stressors in contemporary settings. Due to the demands of modern work, it is common for people to start or continue tasks while others are still in progress or waiting to be finished. If multitasking is to be implemented in the workplace as a means of improving work performance, then it must be evaluated and its strengths and weaknesses identified, training the professionals to handle multiple tasks at a time with the different dimensions to incorporate multitasking in workplace in diverse contexts (König, Oberacher, & Kleinmann, 2010).

RESEARCH METHODOLOGY

The keywords' searching strategy was used to extract relevant studies from the published literature (peer-reviewed quantitative, qualitative and mixed methods) till the January 2020. For compressive search results, the set of keywords were developed as; multitasking, work performance, workload, organizational behavior, working memory and multiple tasks were

used for searching. Databases were searched: Science Direct, Emerald, Springer Link, Taylor & Francis, and Wiley online. Google Scholar was searched to get maximum publications for each construct, we used keywords multiple tasks, work multitasking, work performance and task switching and multitasking behavior to ensure the extensive coverage of studies. Since, each database uses its own indexing words, distinct proximity hands were applied. Subsequent Boolean search operation was carried out: Multitasking and work performance, Multitasking and factors, human behavior and multitasking, task switching/multiple tasks or multitasking activities.

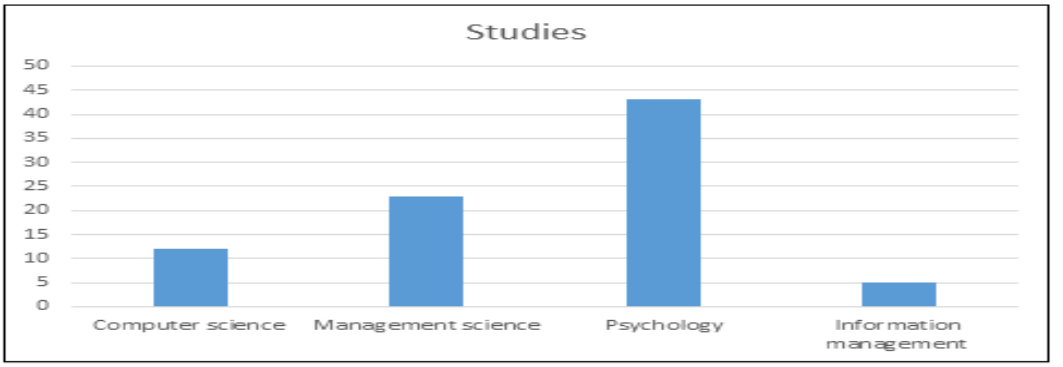
Inclusion Criteria

Studies were included in this review if they (a) investigated the multitasking behavior and performance at workplace (b) highlighted the positive, and negative effects of multitasking activities(c)examined effect of multitasking activities on work quality and productivity(d) examine working memory and workload (e) English language conceptual, reviewed and research-based studies were included in the selection sphere. Dissertations, book chapters, and Journal articles were counted in. The search strategy was not restricted to the year of publication.

Search Results

Our search resulted in 6,260 publications through Emerald, Springer, Science Direct, Wiley online, and Taylor & Francis databases. After removing duplicates, screened the abstracts of the remaining 156 publications where the inclusion criteria were met. After looking at the abstract, it was either obvious that these articles fit inclusion requirements, or it was needed to scan complete text to check that they did. This procedure resulted in selection of 22 relevant articles that fulfilled inclusion criteria: 9 studies on multitasking performance at workplace, 5 studies on individuals' work balance life, 5 studies on working memory two studies on task processing time.

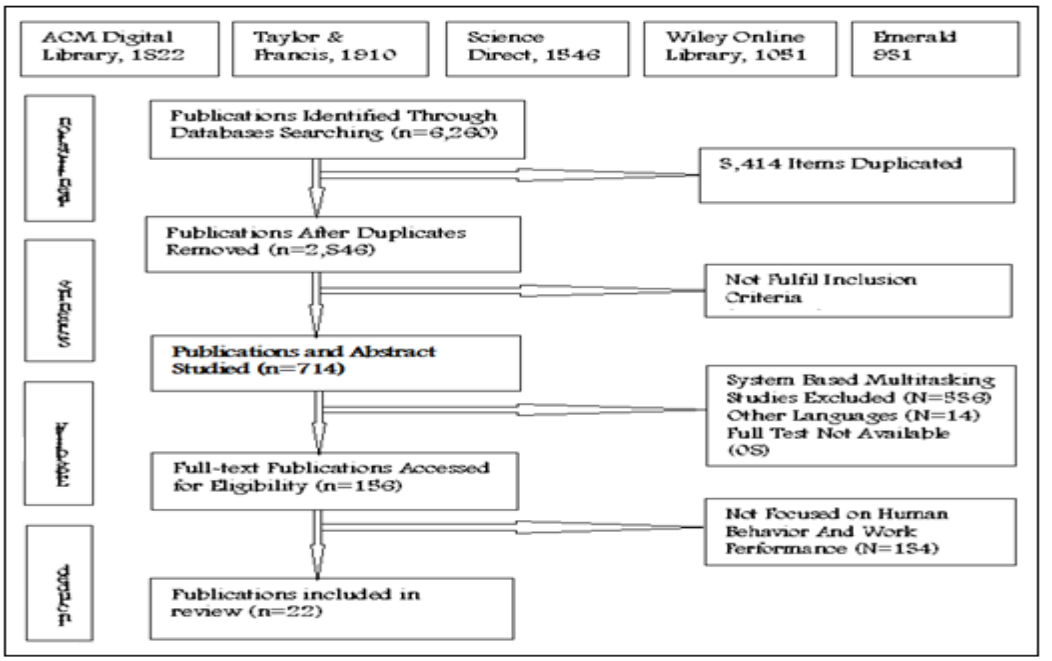
Figure 1 Discipline-wise Frequency of Publication



Inclusion and exclusion criteria for research, like title, abstract, full text, are clearly outlined in this figure. For last stage of inclusion, study topics, abstracts, and goals were examined.

For purposes of review, publication year, authors, methodology, sample and conclusions of chosen studies were evaluated.

Figure 2 PRISMA Flowchart



Synthesis Analysis

Elements are chosen according to research questions, the effect of multitasking on human work behavior and work performance, discipline of study, research purpose, methodology, and outcomes of studies.

Table 1 Key Studies and Findings

Author /year	Objectives	Method	Key findings
Wang, Fang and Guo (2020)	Create a mental model for evaluating the workload of multitasking to develop customized assistive technologies and enhance multitasking performance.	Experimental study	The TPN model can determine ideal MW or reaction time, which aids in development of emergency system responses and explains different tasks elements
Peifer and Zip (2019)	Inquire about stress management and work performance in relation to multitasking activities.	Experimental Multilevel analysis	Performance-damaging indirect effects of multitasking behavior through flow. Multitasking has a significant impact on performance.
Vregelaar (2019)	Factors of internet multitasking has worst	Semi-structured	In a cognitive context, seven reasons for multitasking on the

	impacts when done in cognitive setting. Additionally, research is done on how to control online multitasking in this particular situation.	interviews	internet were identified: information seeking, habit, reachability, curiosity, and worry about missing anything significant.
Conte et al., (2019)	Preference for multitasking activities and the relationship between job satisfaction, work engagement and polychronicity where polychronicity is a moderating variable.	Online survey by using Amazon Mechanical Turk service	Findings has proved polychronicity is a moderating variable People with lower levels of polychronicity saw a significant drop in their level of work engagement, instead people with higher levels of polychronicity maintained their level of work
Lakshmi Goel & Oliver Schnusenberg (2019)	Multitasking learning activities with polychromic nature and information technology innovativeness were investigated	Online Survey	Multitasking promotes learning by improving cognitive skills. Professionals who likely to opt for multitasking are prefer to opt for new techs as well.
Gartrell (2019)	to ascertain the general population impact of multitasking on personal performance and pinpoint differentiating elements	Meta-analysis	Meta-analysis resulted in overall population effect size of Cohen's d = -0.624, a substantive negative effect. Some distinguishable factors were found to be influential. Task complexity had a very large negative effect (Cohen's d = -3.633) and media multitasking orientation had a substantive negative effect (Cohen's d = -0.449).
Szumowska et al., (2018)	Look at the relationship between the desire and practice of multitasking and the need for closure (NFC).	Series of three studies Quantitative and experimental	Study1. NFC and multitasking preferences are negatively correlated. Thus, the preference for multitasking decreases as NFC increases. Study2. NFC and media multitasking behavior as determined by MMI had a negative correlation (r=0.25, p .001). Study3. The findings revealed a statistically significant negative connection (r=0.30, p=. 028; r=0.33, p=.013) between NFC and the number of task transitions.
Mochi, F., & Madjar, N. (2018).	Impact of multitasking on customer satisfaction and analyze how multitasking affects problem solving and response times.	Conceptual study	Organizations could improve employee performance, prevent cognitive fixation, and encourage the renewal of ideas and problem-solving skills by allowing interruption-free work time or facilitating interruption anticipation.

Kirchberg (2015).	The day-level outcomes of multitasking behavior, multitasking opportunities, interruptions, and unscheduled work are affective well-being with self-rated performance.	Diary study observation	The ability to multitask changes during the day conditional to interruptions, and unforeseen responsibilities. More multitasking during the work day is linked to lower self-rated performance and lower cognitive levels at the end of the day.
Mattarelli, & Incerti (2015).	This study looks at how people's views and perceptions of an organization affect their multitasking behaviors in workplace.	A mixed method study	All Multitasking Behaviors have a positive and significant effect on organizational polychronicity. The number of tasks is specifically positively and significantly influenced by organizational polychronicity.
Adlere (2015)	This study investigated how reminders from organizations influence work performance with multiple tasks. Does it improve work performance or hinder work quality?	laboratory experiment	Findings revealed that reminders influenced female work performance, additionally, reminders were ineffective for men and may even have the opposite impact by making them switch tasks more frequently and possibly lowering performance.
Russ and Crews (2014)	Tentatively explores correlations exist between multitasking, personality types, and organizational results.	Survey	Multitasking behavior is reported at workplaces but employees had different opinions about advantages and disadvantages Companies are not providing training for multitasking activities with few exceptions
Peterson, Joshua (2014)	multitasking-designed job systems	survey	Institutes utilize a multitasking skillset as a generic "cure-all" remedy to the high cost of staffing. Job and workplace designs have been modified to ensure that more tasks can be accomplished in the most expedited manners. With adequate training and development of multitasking skillset, a generalist workforce can be just as effective as a specialist workforce.
Kc, D. S. (2013).	The study aimed to assess the effect of multitasking on overall work performance	Quantitative in a clinical context	Multitasking initially helps to complete tasks in less time. Lower levels of multitasking resulted in better care quality; larger levels of multitasking result in compromising quality
Sanderson et al., (2013)	This study looked at how multitasking effect	Questionnaire Survey	For individuals with higher polychronicity have a positive

	individuals' polychronic nature and work performance with official projects		relationship between multitasking and work performance. The ability to multitask did not indicate appreciable performance differences for workers with poor polychronicity.
Cameron, A. F., & Webster, J. (2013).	This study explores multicommunication at workplace	Survey methodology to test the hypotheses	Multicommunicating has arisen as a result of today's environment of virtual work supported by multiple technologies
Buser and Peter (2012)	Effects of multitasking on performance when individual has a choice to perform multiple tasks or multitask under externally imposed schedule.	Survey and lab study	Individuals who worked sequentially perform well than those who are forced to work at once Setting up the work activities into the schedule enhances the work productivity
Otto et al. (2012)	Multitasking and its impact on the workplace	qualitative and quantitative	Multitasking skills decline with age. Multitasking in the workplace reduces productivity. Time management for official activities is beneficial as compared to multitasking.
Adler & Fich, (2012)	Determine the performance effects of different multitasking patterns by constructing a theoretical model.	Controlled experiment	An inverted-U pattern for performance efficiency (productivity) and a decreasing line for performance effectiveness (accuracy).
Crews, D., & Russ, M. (2012).	Impact of multitasking on productivity, error rate, critical thinking skills, and concentration. Multitasking typologies were explored, including task switching, dual tasking, and continuous partial attention.	Survey	Research advocates that multitasking has a negative impact on productivity, error rate, critical thinking skills, and concentration. Multitasking influenced individual behavior with regard to stress, work-life balance, and can have social repercussions.
Farnham, M. and Hutchinson, E. (2011)	Examines how high-performance work strategies affect various outcomes for businesses and employees. However, little research has been done on the effect of broad task design on product quality or financial success.	Survey	We find that multiskilling has a statistically significant positive relationship with financial performance in financial performance models when we treat it as exogenously determined; however, when we treat multiskilling as endogenously chosen, the statistically significant positive relationship nearly triples in size.
Colom et al., (2010).	Examine the relationship between intelligence, WMC, and multitasking.	Quantitative	There is an association between multitasking and Intelligence Findings indicated a relationship

Ettinger and Cohen (2019)	Analyze the gender differences in adolescent multitasking patterns, prevalence, types, and combinations	Mixed qualitative and quantitative	between multitasking and WMC WMC predicts multitasking Observed multitasking patterns showed back-and-forth searching among multiple tasks while individuals prefer to multitask in study time to explore more resources or sometimes distract from other parallel activities.

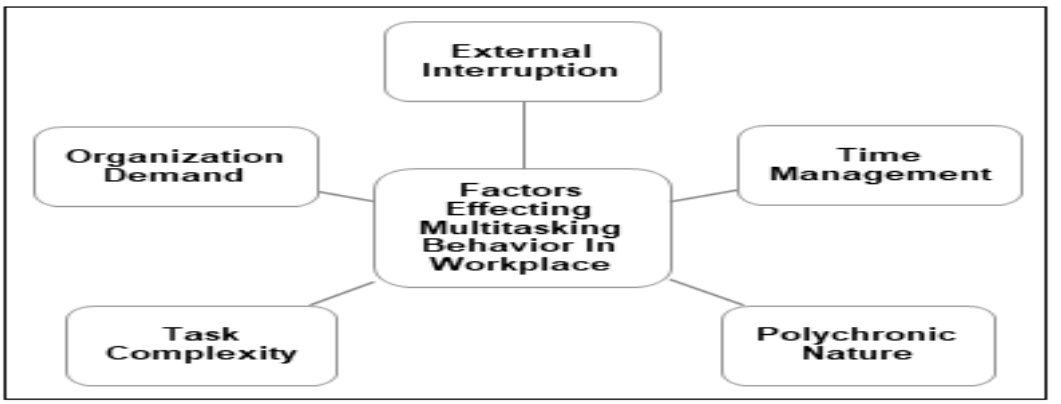
DISCUSSION

Multitasking activities are being practiced in the workplace and literature highlighted the effects of multitasking upon the human working behavior and work performance. Individual differences like attentional control, handling time pressure, abilities to take a task load, and cognitive abilities cause variation in human work behavior and performance in situations where multiple tasks are being carried out.

Factors Develop Multitasking Behavior in Workplace

It wasn't long before the information technology age's rapid economic expansion made multitasking important employment skill. Concurrent work systems, much larger category, depict multitasking. It is generally acknowledged that multitasking refers to the capacity to complete several things at once, however, multitasking entails necessary break of one task in order to accomplish different work on a dispersed task.

Figure 3 Factors Affecting Multitasking Behavior



Task complexity may predict multitasking behavior. When an individual has multiple tasks in the same time frame then external and internal interruptions trigger to multitasking or task switching (Gonzalez, 2004; Mark & Gonzalez, 2005). As the complexity of tasks grows, people strive to multitask which sometimes causes technological stress. External pauses refer to environmental cues like task deadlines, organization demand. Internal interruption refers to individual decisions made because of individual mental processes or choices to

pause a recent task to check other one. Adler and Fich (2013) the decision to pause, move, or switch when there are no external interruptions. They focused on internally-motivated interruptions, often known self-interruptions. This behavior is general as Salvucci, Taatgen, and Borst (2009) gave one reason for multitasking is self-interruptions where people choose to take a short break from one task or abandon it altogether to focus on another. Jobs are getting complicated as businesses change, and employees now have more obligations at work than ever before. To compete and complete the official tasks people are involved in multitasking.

Additionally, it is distinguished by time management, the employment of many skill sets, and a focus on constantly adjusting deadlines. People who have several tasks to complete in the short period of time may multitask in the intention of getting more done in less time (Britton & Tesser, 1991). Therefore, there should be a positive correlation between greater multitasking and higher workload. In their 2002 study, Hudson, examined the multitasking habits of managers in several firms. He came to the conclusion that managers deliberately multitask in order to get an advantage over their rivals. Working Memory Capacity (WMC) is predictor of multitasking behavior and Intelligence too has association with multitasking behavior explained through a SEM analysis that was performed by Colom, Molina, Shih and Santacreu (2010). Other similar studies reported the same results that multitasking is predicted by both WMC and IQ, however WMC was a greater predictor than intelligence (Bühner et al., 2006). Research findings of Bühner et al. (2006) by assessing several working memory components, researchers were able to gain clearer understanding of necessary skills for multitasking and the significance of working behavior in term of human memory for multitasking.

Using storage in relation to processing, coordinating and supervising tasks. Working memory, followed by reasoning and attention, was most accurate predictor of multitasking ability when predicting level of multitasking behavior, efficient measures and errors committed through multitasking, working memory gears confirmed differential validity: In processing context, multitasking error was primarily predicted by storage, while multitasking hustle was mainly projected by coordination (Ben & Sheffer, 2001). Thus, high working memory capacity could become a cause or choice to opt for multitasking at the workplace. Results of similar studies demonstrated that complex core work requires more time to complete and diverse subtask types demand different amounts of time. Performance on major tasks, workload, and the time it takes to resume after an interruption are all negatively impacted by mental weariness (Chen et al., 2022). Findings are explained by fact that difficult activities require higher abilities to perform multiple tasks and detrimental impact of exhaustion on working memory capacity.

Polychronicity, an individual ability to multitask that involves preference for multitasking, is a prime cause that develops multitasking behavior in general or at the working place (Hall,

1959). People who choose to finish one tasks before starting on to the next are identified as monochronic, whereas those who choose to work on the multiple activities at once are identified as polychromic (Bluedorn et al., 1999). Research shows that polychronicity is a causative factor of the multitasking behavior that exert impact upon working behavior and performance (Grawitch & Barber, 2013). In their desire to finish as many chores as they can, polychronics can lose sense of time. Thus, timeliness ideals and a focus on deadlines and timetables have a negative link with polychronicity and it causes task-related rush but not overall hurry, according to Ishizaka et al. (2001). As result, whereas polychronic people may frequently speed through several official tasks in workplace, they would not certainly feel stressed on daily basis by complex tasks. Moreover, group of hotel employees showed that those with higher polychronic nature had higher task efficiency and work productivity (Conte, 2019; Jang, 2012).

Effects of Multitasking on Work Performance

Multitasking may improve people's effectiveness in virtual meetings, University of North Texas' Department of Anthropology conducted the case study to examine the behavior of EDS (Electronic Data Systems) personnel in both in-person and online meetings. Magnus et al. (2014) clarified that people with strong levels of openness, vigor and independence have driven and perspective required to handle multiple tasks at once. People who place a high importance on structure and meticulousness may likely find multitasking difficult in their careers. One specific instance would be stress multitasking causes to professionals who must do multiple duties. If professionals got exceptionally high levels of work stress and misrepresent tasks then there would be a significant decrease in work performance. Taken together, for the employees to profit from incubation benefits in a multitask setting, they need both appropriate incentives and self-awareness regarding proper changeover time (Orun & Akbulut, 2019). In this connection, another issue is how well-equipped the professionals are to handle the growing demands of the multitasking and handlings two tasks at once.

If multitasking is to be used in the workplace as method of enhancing work performance, it must be investigated, its advantages and disadvantages must be determined, as well as professionals must be trained to manage several activities at once with diverse dimensions (König, Oberacher, & Kleinmann, 2010). According to research on multitasking, the impact of interruptions and multitasking may depend on the person's polychronicity, receptivity to new experiences, stress tolerance, and working memory capacity (Morgan et al., 2013). Multitasking has been labeled as a severe danger to work efficiency by psychologists. If a person cannot realize several tasks at once, multitasking will distract them and reduce their productivity. "Professional advisors who got the distraction through E-mail and telephonic conversations experience the loss in memory more as compared to a loss in IQ of smokers, published in 2005 by the Institute of Psychiatry at University of London." According to an

assessment of relevant literature, multitasking has been demonstrated to both improve and impair work performance.

Adler (2011) created a theoretical framework that calculates an inverted-U link between multitasking behavior and work performance and they tested it in the lab conditions using specially constructed software. Experiment was carried out with 205 participants assigned randomly to measure the multitasking and non-multitasking settings. The findings showed that multitasking and performance are related depending on statistic. When productivity is used to assess performance, there is an inverted-U curve between different multitasking levels, with medium multitasking performing much better than both extremely high and zero level low multitasking. However, if outcomes accuracy is used to gauge performance, the relationship is a downward-sloping line, and increasing multitasking causes a sizable loss in accuracy. In this connection, prevailing research on the multitasking appears that multitasking has significant cost because it rises human error and decreases efficiency. Theoretically, the researchers believe that people can only accomplish multiple activities at once when they are automated and individuals' preference toward multitasking (Amez et al., 2021).

Therefore, workers and professionals should be aware of effects of multitasking on their own performance and consider returning to the strictly sequential approach rather than increasing their multitasking levels to point where all efficiency, quality, and productivity gains are lost and performance suffers. Adler and Fich (2011) concluded that some of the multitasking actually improves the efficiency and work quality, multitasking has negative effects when a person engaged excessively. The findings of Rubinstein, Meyer, and Evans' (2001), investigation support past studies that found working with single task is more efficient than multitasking. Delays and distractions in the task completion are resultants of multitasking. Delbringe (2001) observed that focused on single job or objective results in fewer mistakes and takes less time than trying to concentrate on several tasks and goals. Boser and Peter (2012), multitasking reduces performance when compared to sequential execution; thus, study's results show that work schedules are crucial for efficient working and better quality.

Peifer and Gina (2019) extended multitasking phenomenon in two ways: first, they looked at the relationship between multitasking behavior and flow. Second, they examined the relationship between multitasking behavior and performance and found that it also has a significant effect. The results showed that this behavior is negatively associated to flow and that this lowered flow has negative indirect influence on performance. A research study (Sanderson et. al., 2013) investigated how inclination for multitasking, or polychronicity, affected the link between multitasking aptitude and performance. For people with upper grade of polychronicity, association between multitasking abilities and total performance was stronger. Ability to multitask did not translate into appreciable performance differences

for personnel with poor polychronicity. Employees who can multitask and prefer to do so will do their jobs at their best overall. In this connection, for employees who work in one mode, there is little correlation between multitasking skills and total job performance. In this regard, the authors investigated how doctors multitask in a hectic hospital emergency room (ED).

Another study (KC, & DS, 2014) looked at how multitasking affected workers' overall job quality, efficiency and performance by measuring processing time, efficiency and work output. Specifically, physician multitasking had a U-shaped response to the overall time needed to discharge a certain number of the patients. In other words, multitasking initially speeds up process of completing tasks, but only for a limited period of time. Multitasking at higher levels degrades performance quality even if it is associated with higher levels of care quality at the lower levels. The multitasking or task switching divide attention and this distraction has significant effect on overall prospective memory and performance squalor (Benjamin et al., 2000; Sanjram, 2013). These results are consistent with Delbridge (2001) research on attention switching and the effect of interruptions on information processing. Distractions can impair task performance, and this fact alone makes multitasking a crucial issue because of possible effects on knowledge learning and retention. Relationship amid multitasking and working memory discussed in studies and reported a negative influence of multitasking over holding of information within a short span of time (Clapp & Gazzakey, 2011; Colom et al., 2010).

Benjamin et al. (2000) pointed out that doing two or more things at the same time creates a disturbance in mental encoding processes. Further demonstrated that significantly poor memory is caused by fragmented attention at time of encoding. The quantity and quality of information that is permanently retained in memory might be affected by errors in the encoding process. The workload is an indicator of multitasking activities as extremely high or no workload will lower performance and it varies among individuals. Hickey and Collins (2017); Ruscio et al. (2018) said that better multitasking performance could be achieved by cultivating the automated systems in the replacement of manual systems or by adopting advance technology tools. Wang, Fang and Guo (2020) introduced a performance, based Timed Petri Nets (TPN) model to evaluate workload when opt multitasking. TPN model was tested through a combination of experiments consisted of three tasks performed with thirty-six participants. A task characteristic called task complexity (TC) has an impact on how well people multitask. Task interaction involving humans that depends on experience, knowledge, and demands is called task complexity (Liu & Li, 2012). The individuals are comfortable with the task complexity when they have practice and prior knowledge about assigned projects/tasks.

CONCLUSION

Addressing the topic of multitasking behavior and its impact upon working behavior and performance is important as its right way affects the workplace. The studies indicated that

multitasking is challenging, some people are better at switching amid tasks than others. The research findings established the fact a low-level (occasional) multitasking is in the beginning useful, but that unnecessary multitasking is negative to work efficiency. In some studies, multitasking was found to lower output, while in others, it was found to boost efficiency and increase work quantity. It depends on individuals' multitasking abilities and organizational/work demands. Different factors; time pressure, working memory, and prior experience have impact on individuals' work performance in a multitasking environment. Employees who can effectively manage the variety of tasks are more productive and less stressed. In some disciplines, ability to multitask was considered a positive attribute. More recently, there are negative vibes linked with multitasking behaviors. Organizations may deal adverse effects of multitasking in workplace. Employee interruptions can be reduced by advising them to log out of company email accounts and ignore calls while working on more crucial tasks.

Employees can manage workload prioritization and anxiety reduction by focusing on one task at a time while removing unneeded distractions. The employee can manage phone mail, text messages, and emails by checking them periodically during the day if he is not expecting an urgent communication. In addition, avoid continuously adding unimportant tasks that could distract from actual tasks. According to Christina Wasson, "multitasking can improve productivity for both the individual and the organization when properly managed, but it has minimal effect on virtual group meetings" (Wasson, 2004, p. 56). The negative effect is more reported when individuals are involved in intellectual works but multitasking has a positive influence and required is in admin management and fieldwork. There are two types of the multitasking parallel and sequential. Example of the parallel multitasking is like driving or listening, taking notes and listening to instructions, watching TV, and using a mobile phone. An example of the sequential multitasking is switching from one search tab to second and leaving incomplete first search back and the forth searching among different tabs.

Scientist and cognitive experts say that the human brain is less capable of working parallel but more capable of quick task switching. Another aspect is that individuals who have an inclination towards multitasking they switch their efforts from one task to another, they are concerned to get satisfactory results for all tasks instead of getting excellence in one. This individual preference "jack of all trades and master of none" allows people to handle the multiple goals adequately. Different factors; time pressure, working memory, and prior experience have impact on individuals' work performance in a multitasking environment. It depends on the individuals' multitasking abilities and organizational/work demands. It is a debate among researchers that multitasking is detrimental to performance and should be avoided, in high-pressure working environments where multitasking may be unavoidable, a paradigm shift is required to enhance the multitasking skill sets by providing multiple resources and technologies with professional development training. Psychologists suggest

that before making multitasking at the workplace, institutions must consider potential costs that may arise.

REFERENCES

Adler, R. F., & Benbunan-Fich, R. (2012). Juggling on a high wire: Multitasking effects on performance. *International Journal of Human-Computer Studies*, 70(2), 156-168.

Adler, R. F., & Fich, R. (2013). Self-interruptions in discretionary multitasking. *Computers in Human Behavior*, 29(4), 1441-1449.

Amez, S., Baert, S., Heydencamp, E., & Wuyts, J. (2021). Does Multitasking Affect Students' Academic Performance? Evidence from a Longitudinal Study. *International Journal of Hospitality Management*, 31(2), 588-595.

Baethge, A., & Rigotti, T. (2013). Interruptions to workflow: Their relationship with irritation, satisfaction with performance, and the mediating roles of time pressure and mental demands. *Work & Stress*, 27(1), 43-63.

Ben, G., & Sheffer, L. (2001). The relationship between the ability to divide attention and standard measures of general cognitive abilities. *Intelligence*, 29(4), 293-306.

Bühner, M., König, C. J., Pick, M., & Krumm, S. (2006). Working memory dimensions as differential predictors of speed & error aspect of multitasking performance. *Human Performance*, 19(3), 253-275.

Bluedorn, C., Kalliath, J., Strube, J., & Martin, D. (1999). Polychronicity and the Inventory of Polychronic Values (IPV): Development of an instrument to measure a fundamental dimension of organizational culture. *Journal of managerial psychology*. 24(8), 1149-1167.

Brixey, J. J., Robinson, D. J., Johnson, C. W., Johnson, T. R., Turley, J. P., & Zhang, J. (2007). A concept analysis of phenomenon interruption. *Advances in Nursing Science*, 30(1), E26-E42.

Chen, Y., Fang, W., Guo, B., & Bao, H. (2022). The moderation effects of task attributes and mental fatigue on post-interruption task performance in a concurrent multitasking environment. *Applied Ergonomics*, 102, 103764.

Crews, D., & Russ, M. (2012). The Impact of Multitasking on Human and Organizational Efficiency. *Leadership & Organizational Management Journal*, 2012(3).

Conte, J., Aasen, B., Jacobson, C., Loughlin, C., & Toroslu, L. (2019). Investigating relations in polychronicity, work-family conflict, job satisfaction & work engagement". *Journal of Managerial Psychology*, 34 (7), 459-473.

Colom, R., Martínez-Molina, A., Shih, P. C., & Santacreu, J. (2010). Intelligence, working memory, and multitasking performance. *Intelligence*, 38(6), 543-551.

Darmoul, S., Ahmad, A., Ghaleb, M., & Alkahtani, M. (2015). Interruption management in human multitasking environments. *IFAC-PapersOnLine*, 48(3), 1179-1185.

Farnham, M., & Hutchinson, E. (2011). The effect of multiskilling on labor productivity, product quality, and financial performance. In Advances in the Economic Analysis of

Participatory and Labor-Managed Firms. *Emerald Group Publishing Limited. Bingley*, pp. 35-62.

Grawitch, M. J., & Barber, L. K. (2013). In search of the relationship between polychronicity and multitasking performance: The importance of trait self-control. *Journal of Individual Differences*, 34(4), 222.

Goonetilleke, R. S., & Luximon, Y. (2010). The relationship between monochronicity, polychronicity and individual characteristics. *Behaviour & Information Technology*, 29(2), 187-198.

Hambrick, D. Z., Oswald, F. L., Darowski, E. S., Rench, T. A., & Brou, R. (2010). Predictors of multitasking performance in the synthetic work paradigm. *The Applied cognitive psychology*, 24(8), 1149-1167.

Hickey, A.R., Collins, M.D., 2017. Disinhibition and train driver performance. Saf. Sci. 95, 104–115. Hall, T., & Hall, T. (1959). The silent language (948). Anchor books.

Ishizaka, K., Marshall, S. P., & Conte, J. M. (2001). Individual differences in attentional strategies in multitasking situations. *Human Performance*, 14(4), 339-358.

Jang, J., & George, R. T. (2012). Understanding the influence of polychronicity on job satisfaction & turnover intention: Study of non-supervisory hotel employees. *International Journal of Hospitality Management*, 31(2), 588-595.

Kc, D. S. (2013). Does multitasking improve performance? Evidence from the emergency department. *Manufacturing & Service Operations Management*, 16(2), 168-183.

König, C. J., Oberacher, L., & Kleinmann, M. (2010). Personal and situational determinants of multitasking at work. *Journal of Personnel Psychology*. 24(8), 1149-1167.

Kirchberg, D. M., Roe, R. A., & Van Eerde, W. (2015). Polychronicity and multitasking: a diary study at work. *Human Performance*, 28(2), 112-136

Lui, K. F., & Wong, A. C. N. (2012). Does media multitasking always hurt? A positive correlation between multitasking and multisensory integration. *Psychonomic bulletin & review*, 19(4), 647-653.

Liu, P., & Li, Z. (2012). Task complexity: Eeview & conceptualization framework. *International Journal of Industrial Ergonomics*, 42(6), 553-568.

Mochi, F., & Madjar, N. (2018). Interruptions and Multitasking: Advantages and Disadvantages for Creativity at Work. *In Individual Creativity in the Workplace* (pp. 103-127). Academic Press.

Mattarelli, E., Bertolotti, F., & Incerti, V. (2015). The interplay between organizational polychronicity, multitasking behaviors and organizational identification: A mixed-methods study in knowledge intensive organizations. *International Journal of Human-Computer Studies*, 79, 6-19.

Otto, S. C., Wahl, K. R., Lefort, C., & Frei, W. H. (2012). Exploring the impact of multitasking in the workplace. *Journal of Business Studies Quarterly*, 3(4), 154

Petrova, Y., Brumby, D. P., & Cox, A. L. (2019). Future challenges in design for multitasking at work.

Peifer, C., & Zipp, G. (2019). All at once? The effects of multitasking behavior on flow and subjective performance. *The European Journal of the Work and Organizational Psychology*, 28(5), 682-690.

Paulo B. Goes, Noyan Ilk, Mingfeng Lin, J. Leon Zhao (2018) When More Is Less: Field Evidence on Unintended Consequences of Multitasking. *Management Science*, 64(7):3033-3054.

Pauline Dewan (2014) Can I Have Your Attention? Implications of Research on Distractions and Multitasking for Reference Librarians, *Reference Librarian*, 55:2, 95117, Peterson, Joshua, Job Designs: Multitasking in the Workplace (February 15, 2014).

Russ, M., & Crews, E. (2014). Survey of multitasking behaviors in organization. *International Journal of Human Resource Studies*, 4(1), 137

Ruscio, D., Caruso, G., Mussone, L., & Bordegoni, M. (2018). Eco-driving for the first time: Implications of advanced assisting technologies in supporting pro-environmental changes. *International Journal of Industrial Ergonomics*, 64, 134-142.

Stephens, K. K., & Davis, J. (2009). The social influences on electronic multitasking in organizational meetings. *Management Communication Quarterly*, 23(1), 63-83.

Sayer, L. (2007), "Gender Differences in the Relationship between Long Employee Hours and Multitasking", Rubin, B. (Ed.) Workplace Temporalities (Research in the Sociology of Work, 17), *Emerald Group Publishing Limited, Bingley*, pp. 403-435.

Szumowska, E., Boruc, A., & Kossowska, M. (2018). How many things do you (like to) do at once? The relationship between need for closure and multitasking preference and behavior. *Personality and Individual Differences*, 134, 222-231.

Sanderson, R., Lee, V., Viswesvaran, C., Gutierrez, S., & Kantrowitz, T. (2013). Multitasking: Do preference and ability interact to predict performance at the work? *Journal of occupational and organizational psychology*, 86(4), 556-563.

Sanjram, P. K. (2013, September). Attention and human errors in multitask performance. In Proceedings of the 11th Asia Pacific Conference on Computer Human Interaction (pp. 156-159).

Vregelaar, R. M. (2019). Internet Multitasking in the Workplace: Motives and Coping Strategies (Master's thesis, University of Twente).

Wang, P., Fang, W., & Guo, B. (2020). A measure of mental workload during multitasking: Using performance-based Timed Petri Nets. *International Journal of Industrial Ergonomics*, 75, 102877.

Zimber, A., & Rigotti, T. (2015). Multitasking: Komplexe Anforderungen im Arbeitsalltag verstehen, bewerten und bewältigen (1). Hogrefe Verlag GmbH & Company KG.