

Multitasking in Knowledge Intensive Business Services

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Abstract

The objectives of this study were two-fold. First, to analyze multitasking activities in Knowledge Intensive Business Services (KIBS) and the employees' perception of multitasking effects on individual and organizational performance. Second, to explore associations between the perception of multitasking and individual Time Management Orientation (TMO). The research study employed an online survey methodology. The questionnaire contained 56 questions organised in four groups. Methods of relationship analysis and regression analysis were applied to get answers to the research questions. The study indicated that the employees of surveyed KIBS were strongly engaged in multitasking activities in their workplaces. The informants estimated that on average they worked on nine different tasks per day. Additionally, their working days were filled with interruptions, caused either by external factors or self-interruptions. The majority of respondents also admitted that the ability to multitask was considered their job requirement, thus supporting the findings of other studies that KIBS do prefer multitasking employees. The effects of multitasking on individual and organizational performance were perceived ambiguously by the respondents. Meanwhile, the majority of respondents (above 70%), regardless of the level of polychronicity, admitted that they were able to make good decisions and concentrate better when they worked on one task at a time. The data analysis confirmed the findings reported earlier that individuals with more polychronic TMO did perceive multitasking as having more positive than negative effects both at the individual and organisational levels. Human multitasking has been widely researched in such fields as medicine, command and control, aviation, information technologies, but there is little detailed empirical evidence on multitasking in KIBS such as management consulting, research and development, architecture, engineering services, design, and advertising. Our research provides a fresh view on the human aspects of KIBS companies which can be of help in addressing the related managerial issues. The setting of the optimal number of tasks, task allocation considering employees' individual differences, designing of workflows require further research as this may give the KIBS company managers guidelines and tools for organizing productive multitasking towards enhanced work efficiency and effectiveness and employees' well-being.

Keywords:

Multi-tasking;
Time Management Orientation;
Productivity;
Task Switching;
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1- Introduction

Nowadays, people multitask at work, in their cars, on the street, and while being at home. Multitasking is omnipresent in many work domains such as command and control, information and knowledge work, aviation, medicine, and others. Kalisch, et al. (2010) performed an observational study on nursing activities at two hospitals and found that nurses spent 34% of their time multitasking. Additionally, they were interrupted every six minutes [1]. Gonzalez and Mark (2004) revealed that modern office workers switch between tasks on average every three minutes, thus spending 28% of a day on interruptions [2]. A survey conducted by an IT-market research firm claims that multitasking is costing the US economy as much as \$650 billion a year in lost productivity [3].

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Meanwhile, Knowledge-Intensive Business Services (KIBS) is one of the sectors showing a strong preference for teams comprised of hyper-functional, multitasking individuals [4]. The daily tasks of knowledge workers are information rich and they routinely multitask between very different kinds of work behavior, from more solitary critical thinking to highly communicative collaboration with others [5]. The study of research and development (R&D) service companies in the UK revealed that multitasking was common. “*Employees work on new project proposals, feasibility studies and development projects in parallel, while also providing specialist inputs to other teams*” [6].

Even though human multitasking has reached new heights these days, its effects on individual and organizational performance are still not clear. There is little detailed empirical evidence on multitasking and research findings are controversial. Most of the scientific studies are motivated by the potentially negative effects of multitasking, and there is indeed a strong evidence base demonstrating negative outcomes of multitasking such as cognitive overload, higher error rates, psychological distress and burnout. In the organizational context, multitasking is said to have the negative impact on productivity due to interruptions, and the time required to regain focus. At the same time, much less research has focused on the positive side of multitasking. For example, Kraushaar and Novak (2010) define multitasking productive [7], assuming that, if practiced and properly managed, multitasking can enhance the work efficiency and effectiveness. According to Kapadia and Melwani (2020), multitasking increases creativity through activation and cognitive flexibility acting in tandem [8]. Zellmer-Bruhn (2003) study revealed that multitasking in the team level spurred knowledge transfer effort and the acquisition of new routines [9]. Lazear and Gibbs (2014) claim that multitasking is beneficial in cases where the worker possesses skills which can be used to complete a number of related or interrelated tasks, to facilitate on-the-job training and to reduce transaction costs [10].

Considering the KIBS specifics, we may assume that such a type of enterprises would give a stronger preference to individuals who are able to do multiple activities concurrently and have a taste for multitasking. Several studies have confirmed that polychrons perceive multitasking behavior as efficient and motivating and prefer to engage themselves in multiple tasks at the same time [11]. Whether we value multitasking or not, there is no question that it is becoming an increasingly desirable skill in our society, and one that requires additional understanding.

The purpose of this research was to answer two questions:

1. *Do KIBS employees perceive multitasking as having more negative than positive effects at the level of an individual and an organization?*
2. *Does the individual time management orientation influence the perception of the positive and negative effects of multitasking?*

The study adds to the body of knowledge about the human aspects of KIBS companies and provides a start-up point to further researches on organizing productive multitasking towards enhanced work efficiency and effectiveness and employees’ well-being in KIBS.

2- Theoretical Background

2-1- The Term “Human Multitasking” and its Development

For decades business managers have valued efficiency. In his seminal work *Wealth of Nations* (1776), Adam Smith argued that the main cause of prosperity was increasing the division of labor. Smith gave the famous example of a pin factory asserting that breaking down the pins production process into narrow tasks and giving workers specialized jobs would result in an enormous increase in productivity [10]. The concept of specialized workplaces was widely used in the 20th century. Taylorism advocated a mechanistic approach to workers and that the only valued contribution was workers’ time and energy, not their knowledge or creativity. While Taylor’s Scientific management theory proved successful in industrialized companies, it has not performed well in modern companies.

Nowadays the rapid technological development is decreasing the demand for routine tasks, increasing the demand for creativity and innovation and altering the way how the work is done in organizations [12]. Multitasking is the movement away from specialization and one consequence of the reorganization of work as a result of the introduction of the “Toyota Way”, a set of principles and behaviour that underly the Toyota Motor Corporation’s managerial approach and production system. The reorganization implies delegation, teamwork, job rotation and multitasking [13].

Terminologies that are currently used to describe the multitasking phenomenon vary from field to field, with cognitive psychology, anthropology, computer science, information science, and media studies espousing labels that range from “multitasking” to “dual-tasking”, “task-switching”, or “polychronicity” [14].

The term “multitasking” originated in the computer engineering industry in the middle of 1960s to refer to the ability of a microprocessor to process several tasks simultaneously. Since then, the term has been applied to study human behaviour. As part of this study, the authors analysed 17 definitions of the term “multitasking” and revealed that they could be clustered along two main dimensions. First, most of the definitions reviewed (Table 1) define

multitasking in relation to *task concurrency*. That implies the human behaviour of doing more than one task in parallel. Second, multitasking is defined in the context of *task interconnectedness*. In this case, an individual is said to be multitasking if he or she is switching between multiple tasks which might or might not be mutually related.

Table 1. Definitions of the term “multitasking” based on literature review.

Sources	Multitasking definition	Dimension	
		Task concurrency	Task inter-connectedness
Bongers et al. (2015) [15]	An individual need to concurrently attend to more than one task	x	
Fischer and Hommel (2012) [16]	Performing two tasks concurrently	x	
Franssila et al. (2016) [17]	When an individual is handling more than one task at the same time	x	
Matton et al. (2016) [18]	Management of concurrent sub-tasks	x	
Walter et al. (2017) [19]	Continuing the primary task while also attending to the secondary task	x	x
Kenyon and Lyons (2007) [20]	The simultaneous conduct of two or more activities during a given time period	x	
Korabik et al. (2016) [21]	The behaviour of doing more than one thing simultaneously	x	
Konig et al. (2005) [22]	The ability to accomplish multiple task goals in the same general time period by engaging in frequent switches between individual tasks	x	x
Judd (2013) [23]	Switching to and from at least one task, within a series of tasks, on more than one occasion	x	x
Morgan et al. (2013) [24]	Performing two or more tasks at once. It also refers to switching from one task to another after short spans of a few seconds, i.e., time sharing	x	
Aral et al. (2012) [3]	The act of taking on multiple simultaneous projects in parallel; the act of taking on multiple dissimilar tasks simultaneously	x	x
Bellandi et al. (2017) [1]	The simultaneous performance of one or more tasks related to one or more activities	x	x
Paul et al. (2015) [5]	The switching of two or more tasks related to the same goal or different goals	x	x
Barron and Rose (2017) [25]	(a) Requiring performance of multiple distinct tasks (i.e., tasks requiring different equipment, processes, and demands and/or tasks that are associated with different outcomes), (b) Requiring a conscious shift in attention from one task to another (such that simultaneous tasks that can be readily automated, such as driving while listening to the radio, may not meet this more stringent definition of multitasking), and (c) Requiring shifts in attention that occur over a relatively short time span	x	x
Adler and Benbunan-Fich (2012) [26]	When a user shifts attention to perform several independent but concurrent computer-based tasks	x	x
Benbunan-Fich (2012) [27]	When an individual performs more than one unrelated activity at the same time	x	
Goonetilleke et al. (2010) [28]	To accomplish many goals within a certain period of time by switching between individual tasks		x

The definitions consider the task interconnectedness through the prism of:

- *Task priorities*, for example, “continuing *the primary task* while also attending to the *secondary task*” [19];
- *Task similarity*, varying from similar to dissimilar tasks [3];
- *Task hierarchy*, for example, the relation of the task to one or several activities [1], and
- *Goal relationship*, e.g. tasks related to the same or different goal [5].

Many of the definitions of multitasking combine both the task concurrency and task interconnectedness. For example, König et al. (2005) define multitasking as “*the ability to accomplish multiple task goals in the same general time period by engaging in frequent switches between individual tasks*” [22]. It is worth highlighting that the authors define multitasking as the “ability”, which according to the Oxford Dictionary, means something that can be trained and developed.

Only one of the reviewed definitions has used the term “project” instead of the term “task” defining multitasking as “the act of taking on multiple simultaneous projects in parallel” [3]. It is known that in the project management field, the term “project” is defined as a temporary endeavor consisting of activities and tasks to be undertaken to create a unique product, service or result. It is also known that nowadays with the continuous development of technology and flexible changes in the organization, employees of many companies and industries work on multiple projects at the same time [30]. In addition, they handle not only various types of projects at the same time but also normal operations. So, the definition of Sinan, et al. calls for a look at the multitasking phenomenon in a much broader context, for example, concurrent management of a set of projects, programs or project portfolios, not only at the level of individual

tasks. For the purpose of this study, the multitasking definition of König, Bühner, & Mürling (2005) is used.

2-2-Types of Human Multitasking

Wickens et al. (2015) divide human multitasking in two different modes – *concurrent multitasking* and *sequential multitasking* [31]. The concurrent multitasking implies that two tasks are carried out at the same time (e.g. driving and talking) and the attention is divided by sharing limited, multiple resources of the brain. The sequential task performance means that an individual must choose to do one task or the other because concurrent task performance is impossible because of overload [32]. According to Li, et al. (2011), concurrent multitasking is more suitable for tasks using different sensory modalities or body parts than those using the same sensory modalities [11].

A similar classification has been proposed by Salvucci et al. (2009) in the frame of the domain-free Unified Theory of Multitasking. In their opinion, at one extreme of the multitasking continuum, there are tasks that involve frequent switching and can be characterized as *concurrent multitasking*. At the other extreme, there are tasks involving longer spans between switches (measured in minutes or even hours) and can be characterized as *sequential multitasking*. The office-worker domain represents an example of sequential multitasking: the worker might focus on writing a paper for several minutes to hours before switching to another task, perhaps later resuming the original interrupted task [33].

Korabik, et al. (2017) differentiate between *natural multitasking* like talking while eating or driving while listening to the radio and *time-driven multitasking* which is prompted by time pressure [21]. Kraushaar and Novak (2010) have researched the phenomena of multitasking in the context of learning. They define multitasking as either *productive* or *distractive*. The first one involves multiple acts while studying (e.g. listening, watching, formulating, taking notes). The second one includes activities that are unnecessary for learning and deplete the limited cognitive resources [34]. According to Gonzalez and Mark (2004), only half of the task switches of the modern office workers are caused by external interruptions such as the phone ringing or an e-mail arriving, the other half represent self-initiated switches including making a phone call or leaving the desk [35]. This raises the question of how much of the office worker time is voluntarily spent on distractive activities, thus affecting the overall work productivity.

Adler and Benbunan-Fich (2012) refer to the three task management strategies based on the amount of task overlap, namely, *sequential*, *parallel* and *interleaved* [26]. The first two strategies are like those proposed by Salvucci et al. (2009). The interleaved strategy means that a task underway is voluntarily or involuntarily suspended to allocate attention to another task [26]. This research focuses on sequential multitasking as defined by Salvucci et al. (2009) [33].

2-3-Multitasking Effects on Individuals and Organizations

Despite the fact that human multitasking has reached new heights these days, its effects on individual and organizational performance are still not clear [26] and research findings are disputable. Some claim that multitasking increases productivity by enabling workers to smooth stop-start work requirements, realize complementarities across tasks and incorporate relevant information from one task into decision making on other tasks. Others claim that multitasking creates confusion, distraction and cognitive switching costs that reduce workers' ability to complete tasks [3]. One is clear, most of the studies are motivated by the potentially negative effects of multitasking.

Based on the literature review, the authors have identified a number of positive and negative effects of multitasking on the individual and the organization (see Table 2). The list has been used as a base to develop a part of questions for the online survey.

Cognitive overload, also called information load, is the most often cited negative effect of multitasking behavior [17, 24], resulting both in cognitive costs and emotional costs. Switching from one task to another requires people make changes to physical and mental states, and operations required to make these changes take time and resources [36]. Increasing load produces a rise in arousal to mobilize cognitive resources. Under minimal amounts of arousal, people lack the motivation to stay focused on the task at hand and their performance is likely to suffer. At the other extreme, under high levels of arousal, humans might be unable to cope with the demands of the situation and their performance decreases. Wiener et al. (1984) labelled these extremes as under-load and overload. Performance is said to be the best when people are in a relaxed-alert state [26].

Cognitive costs of multitasking involve reduced reaction times and task completion rates [3], higher error rates [18] and even tragic consequences such as aviation catastrophes, patient death, car accidents [36]. In his book "Brain rules: 12 Principles for Surviving and Thriving at Work, Home and School", a developmental molecular biologist Medina (2008) is writing that "...a person who is interrupted takes 50 per cent longer to accomplish a task and makes up to 50 per cent more errors" [29].

Table 2. Positive and negative effects of multitasking.

Multitasking effect	On individual		On organization		Sources
	+	-	+	-	
Cognitive overload		x			[17, 24]
Reduced reaction times and task completion rates		x			[3, 29]
Higher error rates		x		x	[24, 28, 29, 37]
Longer task completion time				x	[37]
Anxiety, frustration and confusion		x			[24]
Psychological distress, reduced well-being and burnout		x			[13, 30, 37]
Increased intrinsic motivation	x				[10]
Increased project output			x		[3]
Timely information transfer and advice provision			x		[19]
Improved knowledge transfer effort and the acquisition of new routines			x		[3, 9, 10]
Lower transaction costs			x		[10]
Diminishing marginal returns				x	[3]

Multitasking is also associated with a range of negative emotional costs such as anxiety, frustration, confusion [24], psychological distress and decreased well-being [20] and burnout [13].

Due to switching costs, overload and congestions, multitasking is also said to be detrimental to work productivity. Sinan et al. (2012) analyzed empirical evidence on multitasking, email networks and output for employees at a midsize executive recruiting firm and uncovered two key findings [3]. First, more multitasking is increasing project output, but diminishing marginal returns. “*At low levels of multitasking, taking on more work enables workers to complete more work per unit time. However, multitasking also increases the time it takes to complete each project on average, creating diminishing returns*” [3] Second, multitasking performance improves with access to heterogeneous knowledge. The researchers found out that recruiters with network contacts who had heterogeneous knowledge were less productive on average, but more productive when juggling diverse multitasking portfolios. Zellmer-Bruhn (2003) study revealed that multitasking in the team level spurred knowledge transfer effort and the acquisition of new routines [9].

By analyzing various multitasking effects, one can conclude that most likely there are optimal levels of multitasking both at the level of an individual as well as in different working environments, but more research and experiments are needed.

2-4- Role of Time Management Orientation in Multitasking

An individual’s multitasking ability is related to different individual characteristics in the scientific literature, the *time management orientation* (TMO) being one of the most often cited traits. TMO also labelled as Time Management Preference, time use orientation, time use strategy, and preferred pattern of time utilisation is an individual difference variable that pertains to one’s preference about the utilisation of time [21].

According to TMO, some people are inclined to do one thing at a time (i.e., monochrons), whereas others can attend to multiple activities concurrently (i.e. polychrons). Monochronic individuals view multitasking as fragmented, confusing, stressful and lacking focus, eventually leading to a reduction in work satisfaction [11]. Conversely, polychronic individuals prefer to work on multiple activities over the same time, they treat interpersonal relations as important as the work to be performed, can handle interruptions and perceive polychronic behaviour as efficient and motivating. Polychronicity has been found to be negatively related to preferences for following schedules and deadlines, at the same time, it is positively correlated with creativity. It is important to add that polychronic individuals do not necessarily work faster than monochronic ones. Polychronicity, as a personal trait, determines how time is allocated to multiple tasks rather than how quickly those tasks are done [11].

Considering the KIBS specifics, we may assume that such a type of enterprises would give a stronger preference to polychronic individuals than monochrons as their employees.

3- Methods and Procedure

The current research study employed an online survey methodology. An invitation to participate in the survey was sent out to 200 employees of different knowledge-intensive business services (KIBS) via the authors' e-mail and social networks accounts providing candidates for participation with a hyperlinked address to the questionnaire website. The survey was anonymous, reinforcing confidentiality. It was accessible at any convenient time. 132 valid questionnaires were received.

The questionnaire contained 56 questions organised in four groups. The first group of questions collected general information on the survey participants' gender, level of education, age, marital status, size of the company, industry and occupation, current position and job situation, time worked with the organisation, number of average hours worked per day and days spent on a sick leave and catching up on work on working days and at the weekends.

The second group of questions focused on the types of multitasking activities the survey participants were engaged in their workplaces. The informants were asked to assess the average number of different tasks performed per day, the number of tasks effectively done at the same time, the average time spent on a work task uninterrupted, the manner and frequency on the use of technologies (computer, mobile, e-mail, instant messaging, social networks) at the workplace.

The third group of questions identified informants' perception about the positive and negative effects of multitasking both at the level of an individual and the organisation. These questions were developed using the list of multitasking effects identified in the literature review. Nine statements were related to the multitasking effects on the individual level, 5 statements were formulated in connection to the multitasking effects on the organisation's performance (see Figures 2 and 3). Each statement was scored on a 5-point Likert scale and had to be assessed with 5=strongly agree and 1=strongly disagree. During the data analysis, the assessment scale for the statements characterising the negative effects of multitasking was reversed with 5=strongly disagree and 1=strongly agree. Both measures of the effects of multitasking – at the level of an individual and an organisation – demonstrated good reliability. The Cronbach's alpha was 0.83 and 0.82, respectively.

The fourth section of the survey assessed the individual time management orientation. It consisted of twelve statements scored on a 5-point Likert scale with 5 standing for strongly agree and 1 for strongly disagree. The statements were derived from three instruments used to measure polychronicity – the Inventory of Polychronicity Values (Bluedorn, Kalliath, Strube, Martin, 1999), the Modified Polychronic Attitude Index (Kaufman-Scarborough, Lindquist, 1999) and the Multitasking Preference Inventory (Poposki and Oswald, 2010). When performing the data analysis, the assessments of statements related to monochronicity were recoded with 1=strongly agree and 5=strongly disagree. The measure of the individual time management orientation demonstrated good reliability (Cronbach's alpha = 0.79).

To answer the first research question, One-Sample Chi-Square test was performed. To test whether the informants more agreed or disagreed with the statements on multitasking effects, data were transformed into dichotomies – “strongly disagree or disagree” and “strongly agree or agree”. To answer the second research question, the simple linear regression analysis was conducted. The data were analysed using the *IBM SPSS Statistics 23* software. A detailed flowchart of research methodology is depicted in figure 1.

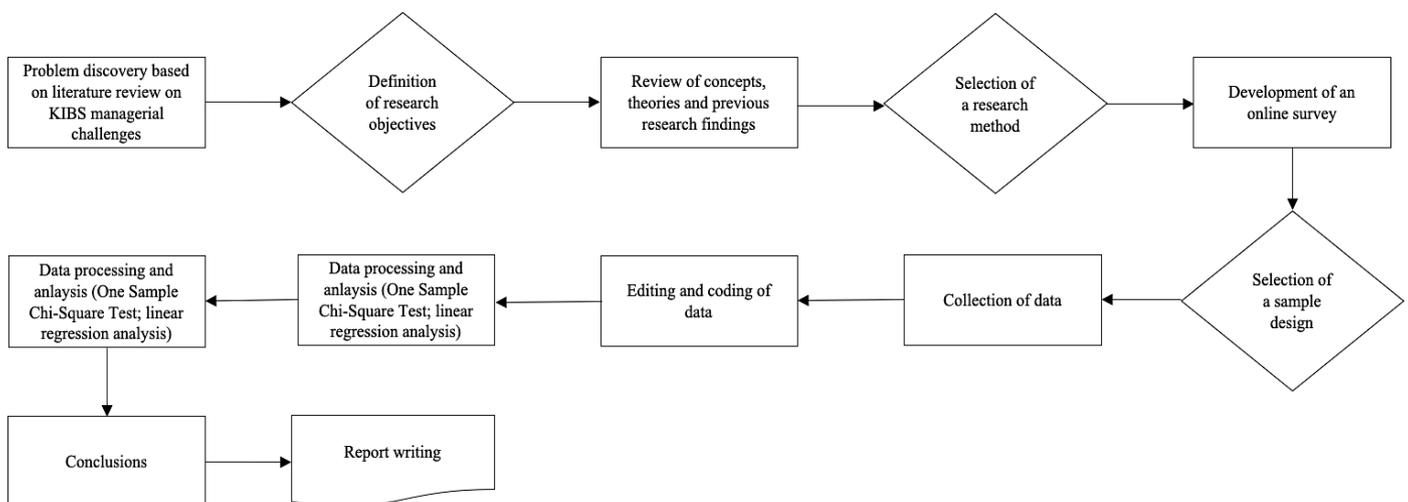


Figure 1. Flowchart of the research methodology.

4- Results and Discussion

4-1- Participants

There is 132 people participated in the survey ($N=132$), 88 (66.7%) were women and 44 (33.3%) were men in the age range from 19 to 65 or older. 102 (77.3%) of them ranged in age from 25 – 44. 72 (54.5%) were married and 40 (30.3%) were single, the rest being divorced or in another status. 106 (80.3%) had the university level education (undergraduate degree, Master's degree or doctorate). 110 (84.0%) were employed full-time. Participants were almost equally divided between managerial and non-managerial positions (46.2% and 53.8%, respectively). 68.9% of the informants worked in small and medium-sized enterprises.

4-2- Multi-tasking Behaviour

74 (56%) informants indicated that the ability to multitask was considered a job requirement. The participants estimated that on average they worked on nine different tasks per day ($M=9.03$, $SD=8.211$). In addition to that, their workdays were filled with interruptions. 68 informants (51.5%) estimated that they spent on average of 15 minutes on a work task or activity uninterrupted. 82 (79%) informants admitted that they were able to work on a single task before switching to another task on average 10 – 20 minutes only. One of the explanations for such a voluntary “check-out” might be related to the way human attention works. Several studies have confirmed that in a typical lecture or a presentation, people may keep their attention for about 10 minutes before it starts declining. What happens at the 10-minute mark is still unclear [29].

One of the drivers of multitasking behaviour and contributor to fragmented attention is the use of technology. The absolute majority of the respondents indicated that they used a mobile phone ($n=104$, 79%), a computer ($n=127$, 96%), an e-mail ($n=123$, 93%), instant messaging such as Skype, messenger, WhatsApp ($n=97$, 73.5%) and social networks, e.g. Facebook, Linked-in ($n=67$, 51%) at the workplace every day. When asked to assess their e-mail usage routine, 37 (28%) informants admitted that they typically read or responded to work e-mail immediately; 68 (51.5%) did that when they were not in meetings or otherwise occupied.

4-3- Positive and Negative Effects of Multitasking

The frequency analysis (Figures 2 and 3) of the data concerning the positive and negative effects of multitasking both at the level of an individual and an organization revealed that 16% to 38 % of the survey participants held the neutral opinion. The rest of the answers were rather evenly divided between agreement and disagreement.

As for perception of the effects of multitasking at the level of an individual, the statements “I am able to concentrate better when I work on one task at a time” and “I am able to make good decisions when I work on one task at a time” were the only ones which generated agreement of the absolute majority of informants – 99 (75%) and 93 (70%), respectively. These answers complement the answers to the question “How many tasks can you effectively do at the same time?”. The respondents estimated that on average they could effectively do 2.48 tasks at the same time ($M=2$, $SD=1.214$).

The results of One-Sample Chi-Square test specified that there were no equal probabilities of occurrence of the negative and positive categories in three statements out of nine: “I am able to concentrate better when I work on one task at a time”, “I am able to make good decisions when I work on one task at a time”, “I make more mistakes when I work on more than one task at the same time”. Respondents were much more likely to agree with these statements than to disagree. Concerning the other six statements, respondents did not explicitly agree or disagree. Overall, the distribution of informants' responses to nine statements suggests that the multitasking effect is perceived ambiguously at the individual level.

The homogeneity of perception of the effects of multitasking at the individual level was observed in different subgroups of respondents. The results of nonparametric tests (Kruskal-Wallis test, Mann-Whitney test) showed that there were no significant differences in composite scores between the subgroups with respect to age range, gender, education, marital status, employment status, job position and size of organisation. There was no significant relationship between the composite score and the tenure with current employer as well. However, a weak negative correlation between the composite score and the average work hours per day was detected (Spearman's rank correlation coefficient $r_s=-0.206$, $p<0.05$). It means that the longer hours the employee works, the more negative she/he is about multitasking and its effects on individual performance and well-being.

Concerning perception of the effects of multitasking at the level of an organisation, One-Sample Chi-Square test revealed that there were equal probabilities of occurrence of the negative and positive categories in all five statements. This means that the multitasking effect is perceived ambiguously at the organizational level.

Similar to the results of the perception of effects of multitasking at the individual level, at the organisational level the homogeneity was observed in different subgroups of respondents with respect to age range, education, marital

status, employment status, job position and size of organisation. An exception is gender subgroups. Mann-Whitney test showed males see more positive effects of multitasking on the organization than females. There were no significant relationships between analysed composite score and such variables as respondent’s tenure with current employer and the average work hours per day.

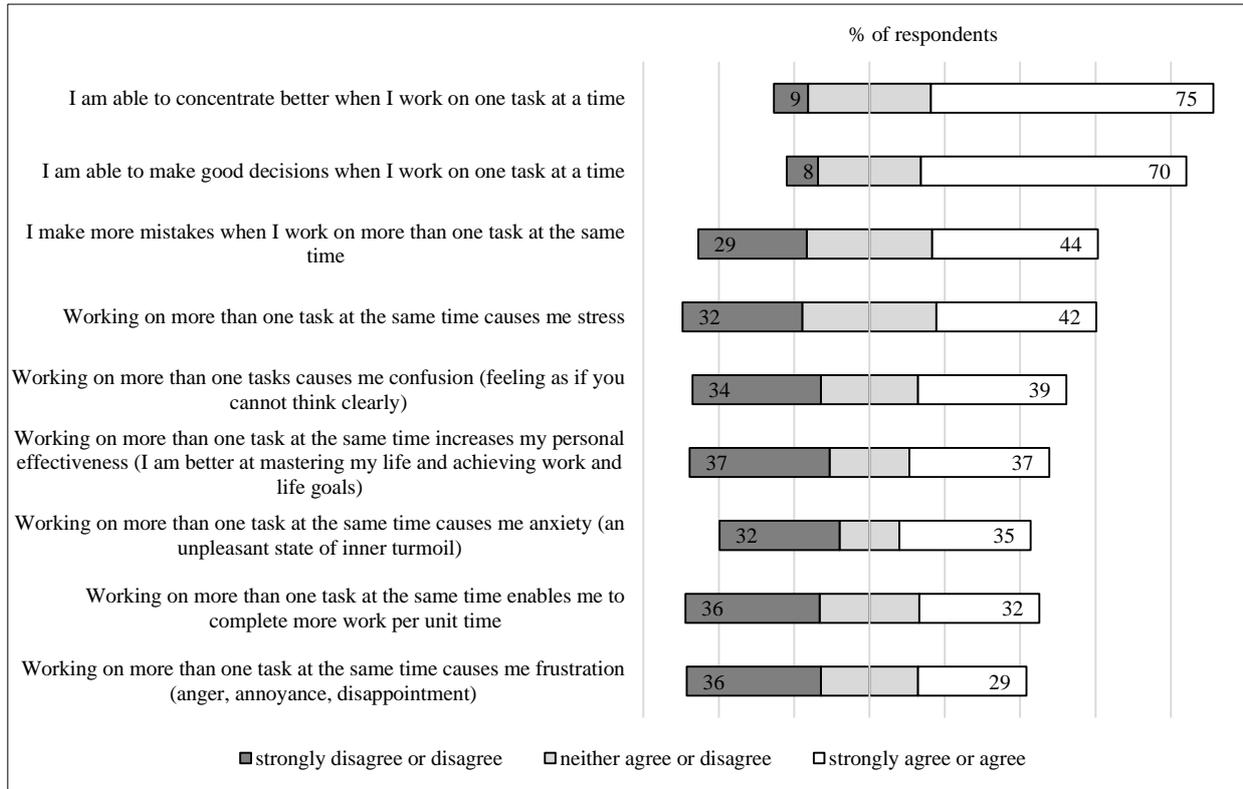


Figure 2. Perception of the positive and negative effects of multitasking at the level of an individual.

4-4- Multitasking and Individual Time Management Orientation

22 respondents (17%) have a score of 2.5 or lower on the individual time management orientation scale, which points to monochronism. Conversely, 37 respondents (28%) have a score of 3.5 or higher on the same scale indicating polychronism. The remaining 73 informants (55%) assessed themselves as standing in the middle of the monochronic – polychronic continuum.

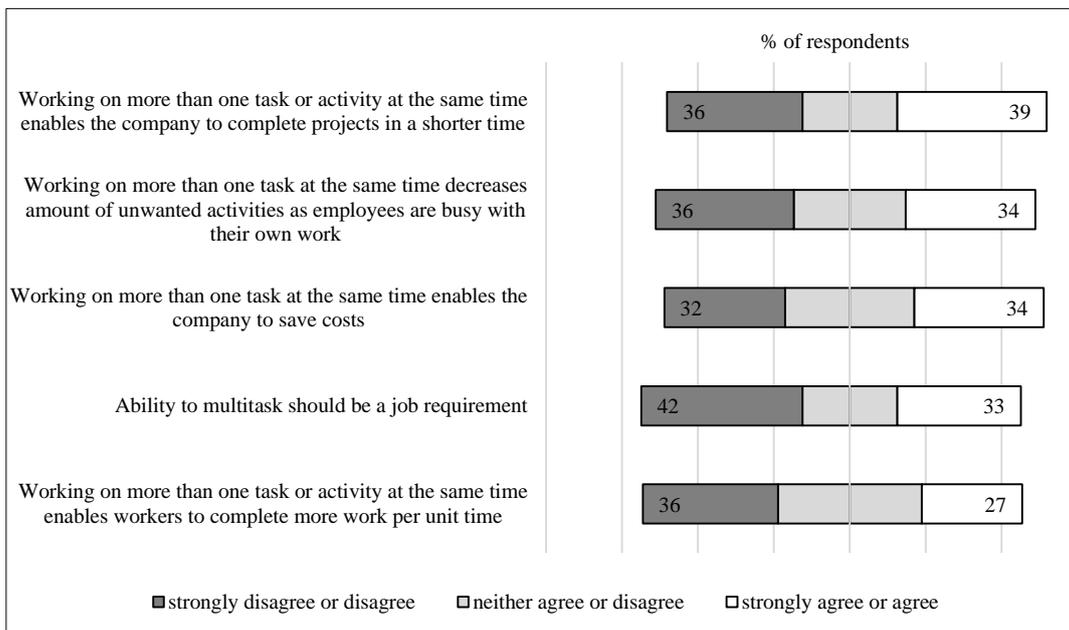


Figure 3. Perception of the positive and negative effects of multitasking at the level of a company.

A linear relationship is observed between the individual time management orientation (polychronicity) and effects of multitasking at the level of an individual and an organization (Figure 4).

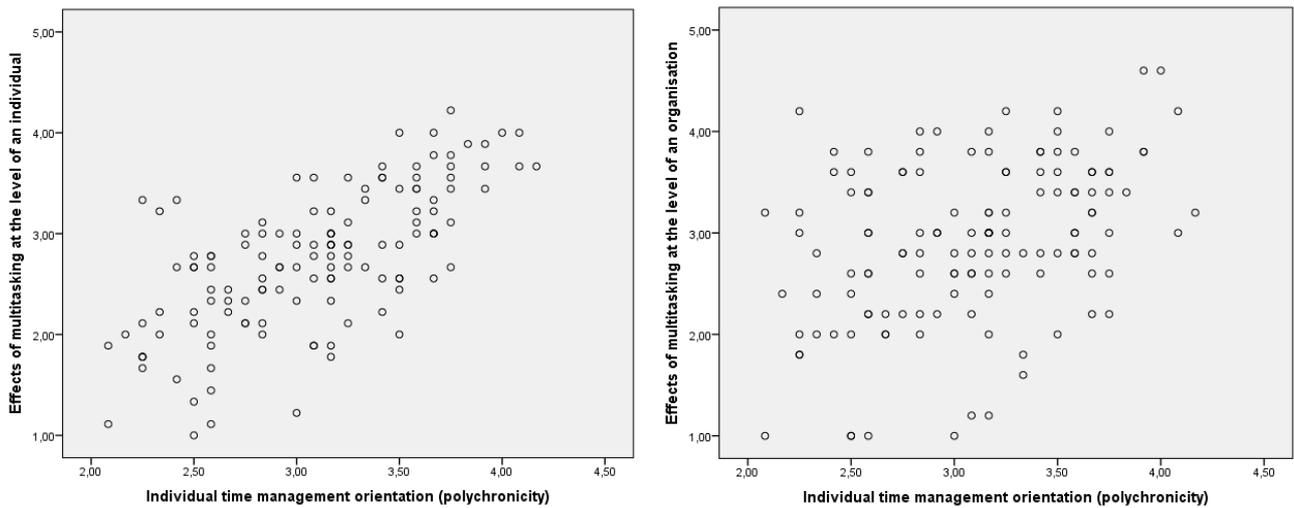


Figure 4. Relationship between TMO (polychronicity) and perception of multitasking effects.

The Spearman's rank correlation coefficients (Table 3) indicated that the higher the polychronicity level, the stronger the individual's preference for multitasking behaviour ($r_s=0.679$, $p<0.01$). The correlation analysis showed that individuals with polychronic time management orientation less likely agreed with the view that multitasking was stressful ($r_s=0.456$, $p<0.01$), causing frustration ($r_s=0.548$, $p<0.01$) and anxiety ($r_s=0.532$, $p<0.01$). They also disagreed more that they made more mistakes when multitasking ($r_s=0.471$, $p<0.01$). The more polychronic an individual was, the more likely he or she agreed that multitasking enabled completing more work per unit time ($r_s=0.458$, $p<0.01$). The results of regression analysis confirm the suspected relationship. The estimated regression model is perception of the multitasking effects on the individual level = $0.891 \times$ Individual time management orientation with an adjusted R Square of 96.8%.

Finally, there appeared to be a weak but statistically significant correlation between individual TMO and the perception of the multitasking effects on the organizational level ($r_s=0.371$, $p<0.01$). The correlation analysis revealed that individuals with higher polychronicity more likely agreed that working on more than one task or activity at the same time enabled workers to complete more work per unit time ($r_s=0.348$, $p<0.01$) and the ability to multitask should be a job requirement ($r_s=0.329$, $p<0.01$). The results of the regression analysis also confirmed the suspected relationship. The estimated regression model is Perception of the multitasking effects on the organisational level = $0.937 \times$ Individual time management orientation with an adjusted R Square of 93.9%.

In general, data analysis revealed that correlation coefficients and results of regression analysis were higher when assessing the multitasking effects on individual rather than organisational performance.

Table 3. Spearman's rank correlation coefficients.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
1	Tenure with current employer																		
2	Average work hours per day	0,061																	
3	Working on more than one task at the same time increases my personal effectiveness (I am better at mastering my life and achieving work and life goals)	-0,141	-0,135																
4	Working on more than one tasks causes me confusion (feeling as if you cannot think clearly)	-0,037	-0,162	0.483**															
5	I am able to concentrate better when I work on one task at a time	-0,041	-0,147	0.381**	0.261**														
6	I am able to make good decisions when I work on one task at a time	0,043	-0,154	0.232**	0.329**	0.544**													
7	Working on more than one task at the same time causes me stress	0,054	-0,096	0.305**	0.478**	0.336**	0.215*												
8	Working on more than one task at the same time causes me frustration (anger, annoyance, disappointment)	0,039	-0,118	0.472**	0.566**	0.308**	0.227**	0.630**											
9	Working on more than one task at the same time causes me anxiety (an unpleasant state of inner turmoil)	0,128	-0,124	0.495**	0.700**	0.277**	0.280**	0.578**	0.738**										
10	I make more mistakes when I work on more than one task at the same time	0,008	-0.229**	0.409**	0.650**	0.405**	0.376**	0.444**	0.504**	0.555**									
11	Working on more than one task at the same time enables me to complete more work per unit time	-0,145	-0,135	0.591**	0.341**	0.250**	0.221*	0,155	0.480**	0.380**	0.309**								
12	Effects of multitasking at the level of an individual	-0,005	-0.206*	0.696**	0.769**	0.587**	0.509**	0.666**	0.802**	0.804**	0.730**	0.585**							
13	Working on more than one task or activity at the same time enables workers to complete more work per unit time	-0,179	-0,129	0.575**	0.274**	0.212*	0.204*	0.178*	0.380**	0.302**	0.252**	0.557**	0.455**						
14	Working on more than one task or activity at the same time enables the company to complete projects in a shorter time	-0,198	-0,146	0.474**	0.320**	0,140	0,140	0,078	0.266**	0.179*	0.279**	0.439**	0.352**	0.511**					
15	Working on more than one task at the same time enables the company to save costs	-0,114	0,032	0.387**	0.257**	0,122	0,121	0,055	0,131	0,146	0.244**	0.352**	0.283**	0.454**	0.612**				

16	Working on more than one task at the same time decreases amount of unwanted activities as employees are busy with their own work	-0,077	-0,065	0.453**	0.258**	0.211*	0.227**	0,124	0.216*	0.244**	0.259**	0.302**	0.345**	0.461**	0.457**	0.437**			
17	Ability to multitask should be a job requirement	0,019	0,008	0.368**	0.248**	0.269**	0.299**	0,078	0.198*	0.188*	0.300**	0.248**	0.328**	0.369**	0.391**	0.508**	0.382**		
18	Effects of multitasking at the level of an organisation	-0,132	-0,089	0.569**	0.330**	0.223*	0.227**	0,097	0.299**	0.245**	0.333**	0.465**	0.430**	0.709**	0.775**	0.773**	0.728**	0.724**	
19	Individual time management orientation (polychronicity)	-0,092	-0,103	0.536**	0.526**	0.350**	0.368**	0.456**	0.548**	0.532**	0.471**	0.458**	0.679**	0.348**	0.288**	0.221*	0.238**	0.329**	0.371**

* – correlation is significant at the 0.05 level (2-tailed)

** – correlation is significant at the 0.01 level (2-tailed)

4-5- Discussion

The study indicated that the employees of surveyed KIBS were strongly engaged in multitasking activities in their workplaces. The informants estimated that on average they worked on nine different tasks per day. Additionally, their working days were filled with interruptions, caused either by external factors or self-interruptions. The majority of respondents also admitted that the ability to multitask was considered their job requirement, thus supporting the findings of other studies [5, 6] that KIBS do prefer multitasking employees.

Strong engagement of the surveyed KIBS employees in multitasking activities is not surprising per se considering the fact that the majority of them (68.9%) works in small and medium-sized enterprises. Already in the Wealth of Nations, Adam Smith wrote that the degree of specialization is limited by the extent of the market. It means that smaller firms are more likely to use multitasking in job design and emphasize multiskilling, the ability to perform a number of tasks, in their employees more than do larger firms [11].

Although the data analysis of this survey proved that multitasking was a highly demanded ability in KIBS, the surveyed participants were not united in their opinion whether it actually should be a job requirement and whether multitasking had more positive or negative effects on the individual and organisational performance. While approximately one third of the respondents agreed that multitasking caused frustration, stress, anxiety, higher error rates and decreased personal effectiveness, one third thought the opposite. The same tendency was observed in the assessments of multitasking effects on the organisational performance. Around one third of informants agreed that multitasking decreased the number of unwanted activities as employees were busy with their own work, helped the company to save costs, complete more work per unit and complete projects in shorter time, one third held the opposite opinion. 25% to 44% of the survey participants held the neutral opinion in all these questions. At the same time, the majority of respondents (above 70%), regardless of the level of polychronicity, admitted that they were able to make good decisions and concentrate better when they worked on one task at a time. Moreover, they estimated that on average they could effectively do 2.48 tasks at the same time. This raises the question on why do people have so mixed perceptions about multitasking while they hold a rather clear view about the personal capacity to multitask?

According to Lam, Allen and Green (2010), the choice of the middle alternative in the Likert scale can be related to the fact that respondents lack information or an opinion about the attitudinal object, have feelings of ambivalence or low intensity toward the object, less consideration and interest, or uncertainty about the strength of an attitude [38]. We explain these contradictory perceptions with the publicly dominant opinion that multitasking is a way to keep pace with the new speed in the modern business environment and multitaskers are regarded to be more efficient and high-performing employees. At the same time, there is a growing body of research and knowledge that multitasking impairs our work, and employees who are multitasking intensively have personally experienced that working on many tasks at the same time wears us out both mentally and physically. The latter was also confirmed by our study as the surveyed employees who worked longer hours, felt more negative about multitasking and its effects on individual performance and well-being.

In 2018, an international group of researchers carried out a survey on stress at work collecting 856 responses from employees of four different countries (Ireland, Latvia, Germany and Spain). The research was conducted in the frame of Erasmus+ project IMPRESS (Improving management competences on Excellence based Stress avoidance and working towards Sustainable organisational development in Europe; Ref.no. 588315-EPP-1-2017-1-ES-EPPKA2-KA). The highest stress ratings across all countries were observed in the dimension “task” with multitasking and frequent interruptions being rated as the main stressors. Meanwhile, in 2017, Accenture, a global professional services company, published a research report “New Skills Now: Inclusion in Digital Economy” concluding that the demand for the ability to multitask has tripled since 2010, and will remain critical in the future labour market [39]. The World Economic Forum forecasts that cognitive flexibility, an ability closely related to multitasking, will become one of the top 10 skills workers will need by 2020 [40]. These trends mean the organisations’ leaders have to look for new strategies and ways to set up working environments that make productive performance possible without compromising the well-being of their employees. The study of IMPRESS project revealed that stress at work could be reduced if an employee knew how to get the job done and how his or her work fitted into the overall aim of the organisation, possessed resources and control needed to perform the task and there were effective processes and workflows in the organisation.

The data analysis confirmed the findings reported earlier that individuals with more polychronic time management orientation did perceive multitasking as having more positive than negative effects both at the individual and organisational levels. At the same time, the data should be interpreted carefully in the context of multitasking performance prediction as this study did not measure polychronicity and the actual ability to multitask or productivity. In fact, the definition of multitasking ability itself calls for revision. Medina (2008) stresses that the human brain, when it comes to the ability to pay attention, cannot multitask as it naturally focuses on concepts sequentially, one at a time. Every time you switch from one task to another, the executive system of the human brain follows four consecutive steps: 1) shift alert, 2) rule activation for task #1, 3) disengagement, 4) rule activation for task # 2. That is the reason why interruptions require more time to accomplish a task and lead to more errors. “People who appear to be good at multitasking actually have good working memories, capable of paying attention to several inputs *one at a time*” [29]. In other words, such people are more capable of task switching rather than multitasking. In this context, the authors are planning further research on the similarities and differences of human abilities like task switching, multitasking and cognitive flexibility.

5- Conclusion

Although research continues to prove that multitasking and interruptions are the main stressors at workplaces, the ability to multitask is becoming more and more demanded and regarded as one of the key skills to succeed in the future labour market. Summarising the findings of the IMPRESS project, this survey and future forecasts, we can conclude that managing interruptions, setting of the optimal number of tasks and designing of workflows require further exploration as this may give the company managers guidelines and tools for organising productive multitasking towards enhanced work efficiency and effectiveness and employees’ well-being.

Several limitations should be acknowledged in the interpretation of our results. The first limitation stems from the choice of the research method. To obtain a more comprehensive understanding of the multitasking phenomena in KIBS, the quantitative survey should be combined with qualitative research methods such as interviews, observations, analysis of time-recordings. The second limitation is related to the choice and the size of the research sample. For the generalization of research results, the size of the sample shall be increased in a number and the selection of respondents shall be extended beyond the author’s professional and social networks.

6- Conflict of Interest

The author declares that there is no conflict of interests regarding the publication of this manuscript. In addition, the ethical issues, including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, and redundancies have been completely observed by the authors.

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