

Article

The Effects of Open Space on Reducing Workplace Stress: Case Study of Business Park in the Post-Socialist Urban Setting

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Abstract: Working people spend around 54% of their waking hours at a workplace, according to recent statistics. Work-related stress is unavoidable, and it can damage the health of employees and affect business performance. In this paper, we argue that open space inside the workplace environment can have a positive influence on reducing overall stress levels in all the categories of users. To our knowledge, there is a significant lack of research considering specific business districts and the gated complexes called business parks, especially in post-socialist Eastern European cities, where there they are still a novelty. Empirical research in this study is on the single case study of Business Park “Airport city” in Belgrade, Serbia. Its main focus is on the survey conducted with 235 participants based on a questionnaire, which examines the relation between workplace stress and workplace environments. The findings from the questionnaire show that the frequency, duration, and activity of open space usage influence the stress levels of employees in this specific workplace, while it is not visible relating to their age and gender. Additionally, final implications suggest that improved open space, such as well-expected greenery, but also the urban design non-associative to workspace and the socialization and exercise amenities customized for frequent and short work breaks, can facilitate the overall well-being of employees. They are innovative elements in relatively underdeveloped research on stress measures with open space usage characteristics in the specific (gated) workplace setting.

Keywords: health and well-being; stress level; workplace stress; workplace environment; business park; open space; urban design



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1. Introduction

An evolutionary paradigm of health comprehension, promoted by the World Health Organization (WHO), is much more than the simple absence of a disease or trauma, as it was previously considered [1]. This transformation shift in a form of a “mantra” with repeating the phrase “psychological and mental well-being” has (re)introduced terms and phenomena such as prevention, public health, natural environment, and ecological sustainability as an integral part of healthcare. The “mind, body and soul” approach has emerged as an outcome, or even a necessity due to a modern, hectic, and stress-full lifestyle, characteristic of dense and urban areas, where stress represents one of the four major health risks [2–6]. Although countless studies are referring to the importance of stress levels (SL) from the aspect of human well-being in scientific research, this topic is often related to issues regarding healthcare or housing, while there is considerably less research regarding the SL in different workplace environments (WPE), especially those in developing countries. The European Agency for Safety and Health at Work suggests that workplace stress (WS) represents one of the most significant health threats in the modern era and that almost one in four workers are affected by it. Studies claim how this type of stress, often called occupational stress, can have a significant effect on workers’ physiological and mental health and well-being as well as on business [7,8]. Although it was once regarded as a

problem exclusive to developed countries, increased workplace stress levels (WSL) now represent a major concern for the other countries as well [9]. The SL is strongly influenced by the environment. There is a large number of recent studies with evidence suggesting how open space characteristics (In this research, the term open space applies on outdoor places in urban fabric which visually and functionally looks like ordinary public space, such as town squares and parks. However, this kind of place is privately owned, and it is not open and accessible to all users thereof. In the other side, the term is not similar to an *open plan* concept, which is related to the interior design of buildings), both built and natural, can have a beneficial effect on reducing the SL and improving health outcomes [10–15].

In this research, we focus on the relation between the stress level of employees and the specific workplace settings such as gated business parks in post-socialist countries in Eastern Europe. Although there is a growing body of research that connects the importance of the WPE, particularly open space areas with natural scenery on workplace attitude and the overall SL [16], we identified a research gap in the domain of WS in relation to the specific workplace environment, i.e., ‘modern’ gated business districts and business parks. This type of urban development is becoming extremely globalised [17]. Conversely, open space inside a business district has only recently been starting to be considered as an added value not only by users, but also by developers and investors. Therefore, this paper represents the innovative study of the SL and well-being experience linked with open public spaces in WPE.

In the Eastern European post-socialist countries, such as Serbia, these globalization-driven business districts represent relatively new concepts in the domain of WPE and they have never been a major subject of scientific research. This research was conducted during the summers of 2019 and 2020, and the study polygon was “Airport City” Business Park (Modern business parks are a form of gated districts with office space and parking lots. For the purpose of this research, it is important to underline that the employees of the companies based in gated units such as a business park are more attached to the internal open space due to this characteristic) in Belgrade, Serbia. This complex, built in the late 2000s by “AFI” Israeli company, was promoted as a “City within a City”, i.e., as the first modern business park in Belgrade and Serbia with all modern amenities for business people and creative class. Many similar office complexes were built in Belgrade last years, but “Airport City” is still one of the largest ones in the terms of used space, with a decent share of open public spaces within it. The overall majority of the companies based in “Airport City” is fully integrated into global market, including even some ‘big players’. In line with their global perspectives, these companies and firms also promote their employee opportunities and working conditions according to international norms and standards. Hence, the undertaken research is in line with the general scientific intentions to properly understand the significance of the topic of well-being and stress levels in WPE.

In this particular research, two main research questions were: (1) How can WPE influence the SL of the employees in specific gated workplace complexes located in post-socialist countries? (2) Can we influence the SL by transforming this specific workplace environment and which spatial elements of open space inside the workplace environment could have a positive impact on SL? This two-step approach is applied in the conducted survey, developed through a two-part questionnaire. Part A is based on measuring the stress levels of employees via the Perceived Stress Scale and Part B examines the usage and spatial characteristics of open space inside the business park. Before presenting this survey-based research with the questionnaire, a theoretical framework is given to underline the significance of stress and stress-related issues on health in general, then to determine the relations between stress and workplace and the effects of open green space on the stress relief, health and well-being. Similarly, the overall spatial context of the research is presented in a multi-level manner, from the post-socialist transformation of business activities to local elements, the development of new business districts in Belgrade. Then, the obtained results from the survey are processed and combined using complex statistical tools such as the SPSS platform, with correlation and crosstabulation. In final section, they

are crossed with the aforementioned theoretical and spatial fundamentals to form the final conclusions as to how space–functional and physical–can facilitate the overall well-being of employees. This is the ultimate contribution of the research to international knowledge in this relatively new topic.

2. Literature Review

2.1. Workplace Stress and Health Outcomes

Is stress real or perceived? What causes stress? How is stress related to health and well-being? A variety of studies have been conducted regarding the phenomenon of stress. In the modern age of hectic lifestyles in urban areas, more and more people are affected by stress-related health issues. The SL is closely related to different types of illness and overall well-being. Stress represents a real threat. It can produce high levels of adrenaline and cortisol, which influence our circadian rhythm and affects both physical and mental human health [2,18,19].

Secondly, stress is about perception. Whether there is an actual or fictional cause for stress, the way humans perceive stress is directly reflected in our SL. Significant field research considers stress as the process by which environmental events initiate a series of cognitive and physiological reactions [5,10,20–24]. The environmental events that trigger these processes are commonly referred to as stressors, while the individual responses are generally called strains [25]. Ganster and Rosen also define stress in relation to the environment [24]. They emphasize the role of physical space on the SL and explain how our response to stress is shaped by environmental burdens, pressures, and challenges [24,26,27].

For a majority of people, the workplace is where they spend approximately eight hours per day. Therefore, one of the most common stress types is WS and it is often connected to a range of different health issues. According to many research surveys, the majority of employees distinguish their job activities as challenging, compelling, and very stressful [28]. The WPS is a pattern of responses that arises when employees are presented with work-related issues that do not match their knowledge, skills, or abilities. In these situations, workers can have different reactions: (1) physiological responses; (2) emotional responses; (3) cognitive responses, and (4) behavioral responses. When these reactions are repeated, they may progress into severe health outcomes [9,16,29]. This finally affects business efficiency and performance [28]. According to the WHO, the WPS can influence our mental and emotional state in a form of depression, anxiety, and irritability, which can lead to trouble sleeping, attention and concentration problems, and ultimately poor job performance [9,28]. Already, the authors from the late 20th century correlated the WPS with job satisfaction [2,4,7], but the recent studies underpin a concrete distinction between these two subjects, suggesting there is a range of reasons that can influence the WPS [24,27]. These reasons can be roughly divided into direct and indirect ones. Indirectly, personal issues such as personality, values, goals, age, gender, level of education, and family situation influence the overall WPS. On the other hand, the WHO identified direct causes that can generate WPS, and divided them into several categories, such as job demands and working conditions, participation and control, interpersonal relationships, career development, and job security, working hours, role in the company and overall income [9]. However, in this particular research, we focus on the impact that WPE can have on the SL of the employees. As Lottrup, Grahn, and Stigsdotter [30] underline, the effect of the workplace outdoor environment for employees' SL has mainly been ignored, even though the relationship between outdoor environments (open space) and human stress is supported by a vast body of empirical evidence. They additionally suggest that workplace greenery and access to open space and green environment can have a beneficial effect on the WPS and attitude, especially amongst female workers. Despite these possible benefits, studies show that the vast majority of employees do not use open space during working hours, due to lack of time or lack of habit [12,19].

In this paper, we are going to analyze the correlation between perceived WPS and WPE, particularly the usage of open space during working hours.

2.2. The Effect of Open Space on Stress, Health, and Well-Being in the Workplace Environment

As previously mentioned, many authors stress that the environment can have a significant role in producing or reducing the overall SL [31–33]. Environmental psychology implies that man strives for natural open spaces in relation to the urban environment [5,34]. Kaplan and Kaplan were among the first ones to point out the psychological perspective of experiencing space, i.e., environments. Psycho-evolutionary theory, as well as the above-mentioned concepts, is based on the assumption that man has an inherited or innate ability to understand, strive and respond positively to elements of nature [35–38]. The therapeutic benefits and significance of nature and a green environment for man are also evidenced by the modern Theory of Biophilia, whose hypothesis was set by Edward Wilson [39]. Ulrich concludes that even the view of natural landscapes in which greenery predominates has a restorative and stress-reducing effect. The author bases these claims on Darwin's theory of evolution, according to which human beings have a physiological and psychological connection to natural conditions [37]. A large number of authors have singled out the natural characteristics of open green space that directly affect the health and well-being of users: landscape and greenery (vegetation), sunlight, fresh air, vistas, colors, smells, and sounds from nature [40–43]. The above-mentioned characteristics of open spaces can have positive effects on psychological changes in the body, i.e., exposure to natural conditions strengthens the immune system and reduces the risk of chronic non-communicable diseases, cardiovascular diseases, diabetes, malignant diseases, etc. [44–56]. A special focus is placed on the research that indicates the positive effects of open spaces features on mental health. Studies suggest they can have a positive effect on cognitive functions, brain fatigue, and attention restoration, stimulate nervous system regeneration and serotonin and dopamine secretion, thus reducing the risk of mental illness, psychosis, depression, and anxiety [42,54,57–60].

Apart from natural features, the characteristics of open space that can have a positive impact on humans are built elements and overall urban design, which further affect the means of use, i.e., activities that will take place in open space [61–63]. These built characteristics may include aesthetics of buildings/built architecture; urban furniture and pavement; landscaping, etc. Urban design can be considered as a 'tool' for exploring the natural potential and designing the experience of space as well as the behavior of users [42,64–74]. Considering open space inside the WPE, the influence of urban design and built characteristics can be described from formal and functional aspects. The aesthetics and architecture of built structures, as well as urban design characteristics (landscaping, gardens, flowers, fountains, or public art), can appeal to the visual satisfaction of users. Additionally, urban design elements such as urban furniture, pavement, and urban furniture in the open space, can promote and support different activities such as socialization, communication, relaxation, or recreation [11,35,42,75]. All of these activities support physical and mental health and help reduce the overall SL [15,76–78].

Based on all aforementioned sources, stress at the workplace can seriously damage human health and affect their well-being. The WPS is real and it affects the majority of employees. In contrast, the WPE plays a crucial role in elevating and reducing the SL of employees, and open space can help reduce work-related SL. This conclusion clearly highlights the importance of the proposed topic.

3. Materials and Methods

The methodology used in this paper was divided into qualitative and quantitative methods, thus combining theoretical and empirical research. The methodological process was divided into two main phases: (1) theoretical and (2) empirical research. Theoretical research is based on the extensive literature review regarding the topics of health and well-being, stress, WPS, WPE.

Empirical research is developed as a single case study. Such a methodological approach conditions a specific research structure to be properly conducted. First, a selected case should be thoroughly studied [79,80]. This prerequisite, thitherto, compels a solid

theoretical background for the setting of the tools used for the further case study examination [81,82]. In this paper, the aforementioned theoretical approach in the previous section is the backbone of the theory. Finally, the single case study usually seeks a well-explained context [80], which is shaped as a separate section in this research, regarding spatial characteristic observation, before presenting the results of the survey analysis of the case study.

The selected case study is “Airport City” in Belgrade, Serbia. It is promoted as the first modern business park in the form of a multifunctional workplace complex in post-socialist Belgrade, fully equipped with up-to-date technologies and integrated systems. Additionally, it was the first bigger gated business park in the Serbian capital, even branded as an ‘urban microcosm’ [17]. Therefore, “Airport City” can be considered as an outlier/atypical case study due to its novelty in the wider context of Belgrade and Serbia. Such outlier case studies can give more qualitative data than typical ones due to their ‘accident-related’ nature [83,84]. The convenience of outlier case studies to extract qualitative information is utilized in this research by opting for a survey with a questionnaire to examine personal experience regarding the SL in open public space in “Airport City” (AC) Business Park (Figure 1). The empirical segment regarding the single case study was done in accordance with the concept of Evidence-based design (EBD). The main methodology is based on user perception, with a survey that was conducted amongst 235 employees of AC (The sample is preliminarily selected to target more than 10% of the total number of employees, which is not publicly available data, but unofficial calculations with “ordinary” employees indicate approximately 2000 employees. In addition, the survey was conducted with respondents during their regular entrance to or exit from the business park, to not omit the contingent of employees who do not use the open space of the park for their work break at all.). The methods of self-report and quantifiable measures were applied, using a two-part questionnaire. This questionnaire was developed with pre-coded questions, with multiple-choice options. It was divided into two parts. First Part (A) was established in order to determine the levels of workplace stress (WSL) using the Perceived stress scale (PSS) and the second part (B) is related to the workplace environment, in particular open space usage and spatial characteristics.



Figure 1. “Airport City” Business Park in Belgrade, Serbia: (a) general view on the business park; (b) the main plaza—a key public space within the park; (c) greenery and gardens within the business park; (d) greenery and urban furniture within the business park (Author: J. Marić, 2020).

Part A: According to recent studies there are several techniques for measuring the WSL, such as self-reports, behavioral measures, and medical-biological measures [21,25,85]. In this particular research, we opted for obtaining self-reports of the stress-related experience using PSS. The PSS is a widely used psychological instrument for measuring the perception of stress, often used within behavioral medicine research, with questions that are easy to comprehend and are not related to a specific group of stressors and strains, or a specific category of users [16,25]. The scale consists of 10 questions where the respondents

were asked about their subjective feelings in the period of one month. Participants were asked to answer with numbers from 0 to 4 (0 = Never 1 = Almost Never 2 = Sometimes 3 = Fairly Often 4 = Very Often). PSS scores are obtained by reversing responses (e.g., 0 = 4, 1 = 3, 2 = 2, 3 = 1 and 4 = 0) to the four positively stated items (items 4, 5, 7, and 8) and then summing across all scale items. A short 4-item scale can be made from questions 2, 4, 5, and 10 of the overall PSS. Individual scores on the PSS can range from 0 to 40 with higher scores indicating higher perceived stress. Scores ranging from 0–13 are considered low stress (LS). Scores ranging from 14–26 are considered moderate stress (MS). Scores ranging from 27–40 are considered high perceived stress (HS).

Part B of the questionnaire is related to the WPE, exclusively to open space inside a these environment. These spaces represent all of the physically open areas inside of the complex, as well as the view of the greenery and landscape from inside of the built structures and unregulated green areas outside of the district borders. In the questionnaire, this part consists of 3 questions regarding open space usage: frequency, duration, and activity of usage and 1 question about open space spatial characteristics. Respondents were offered a set of responses for each category.

The main goal of the questionnaire data processing was to combine the results of part A and part B in order to closely examine the relationship between overall WSL and open space usage and characteristics in a specific WPE. This is done using complex statistical analysis. In this survey, we used SPSS Frequencies, One-way ANOVA, and T-tests to analyze the obtained data. The data has been statistically processed using the statistical software SPSS (IBM SPSS Statistics 20). The significance level of 0.05 was used. In addition, the statistical significance of survey results was analyzed using methods of Correlation and Crosstabulation.

The undertaken research also has two noticeable limitations. First, it is conducted during summertime, which is more appropriate to the research of outdoor activities. The second limitation is that prospective respondents could freely choose to omit the survey. Although the dominant majority accepted to take part in it, some people did not.

In the next sections, the results of the survey are presented. Firstly, “Airport city” is described regarding the context and spatial characteristics of this business park. Afterwards, the survey results relating to WSL and open space usage are in focus.

4. Context: “Airport City” Business Park within Post-Socialist Belgrade

After a rise in developed countries in the USA and Western Europe, business districts and parks have been emerging in developing areas of Eastern Europe in the last few decades. This is the case with Belgrade, Serbia. The specificity of the selected “Airport City” in Belgrade is that it is a gated business park at a relatively remote position in the urban structure of Belgrade. Interestingly, the phenomenon of gated compounds is rather new for post-socialist Serbia, where even gated (residential) communities are still rare [86]. Furthermore, comparing such projects with the other ‘hot’ topics of post-socialist urban development, such as housing (re)development or central business districts, business parks are still rarely explored in scientific circles [87]. However, they are becoming the common spatial outcome of the strong influence of the still-developing global market and capitalism. The development of peripheral business and mixed-use projects have even caused the decentralization of many post-socialist capitals, which have transformed into bi- or polycentric cities with new centers at the urban periphery [88,89]. Hence, the ‘gated’ character and peripheral location of “Airport City” in the urban structure in Belgrade are also important for the overall understanding of the main topic of the overall comfort in open public space, knowing that they are novel albeit global elements to be examined beside the focal analysis and presented as a research contribution at both national and regional levels.

4.1. Workplace Transformation in Post-Socialist Belgrade

The Republic of Serbia has been in a state of post-socialist transition since the dissolution of socialist Yugoslavia in the early 1990s [90], including certain regional and local peculiarities [91]. Expectedly, the transition process has been the most visible in the Serbian capital, Belgrade [90]. The city has faced all notable characteristics of post-socialist economic transformation, driven by radical shift from an industrial to a service-based urban economy. This industrial character of many socialist cities has become a huge challenge during the post-socialist period, which brought a new order in urban development, marked by globalization, commercialization, spatial polarization and fragmentation, decentralization, and suburbanization [92].

It is commonly thought that post-socialist cities were the last ones that were connected to the global economy [93]. In the case of Belgrade, this issue has been even more problematic due to the so-called “blocked transformation” during the Yugoslavian crisis in the 1990s [94,95]. Thus, global capital and investors entered Serbia in the 2000s. The selected “Airport City” Project was among the pioneering projects. The first investor in the “Airport City” Project was “AFI” Israeli company, which was also common during this decade; Israeli investors were among the first ones in emerging, underdeveloped, and therefore risky markets in post-socialist Europe [96]. The other capitals across post-socialist Europe have also passed through this process, but earlier than in the case of Belgrade. Its first phase was the economic redevelopment of old city cores through the overall commercialization and consumerism, while in the second phase the commercialization-linked development was more attached to the urban periphery, in the form of new big-format projects [97,98]. Belgrade has followed this model, but less controlled spatial development has caused different local patterns. For example, an important trend in the urban development of post-socialist major cities was the relocation of retail and business activities from the inner city to suburbia, prompting their economic and spatial decentralization [99,100]. In Belgrade, this process was disturbed, because vast illegally built peripheral areas were unattractive for such expensive projects. Thus, the most attractive locations were those where illegal development was less present, in the western part of the city [101]. This unusual spatial polarization of Belgrade was best visible in the recent dichotomy between the old city core (“Old Belgrade”) and New Belgrade. New Belgrade is the most centrally located part of the Belgrade Urban Area mentioned as a new pole of the city decentralization, still with a lot of unbuilt and underused brownfield land [102]. During socialism, this part of the city had not been planned for business and retail. New Belgrade was colloquially known as “Belgrade dormitory”, because it was developed into the largest residential area in the socialist Yugoslavia, with several government complexes and industrial enclaves [103].

Nevertheless, since the start of the post-socialist transition in the early 1990s, this part of the city has been both physically and functionally transformed into a key ground for global business and trade in Serbia [102,104]. This spatial transformation further influenced the blossom of upscale residential and leisure projects and facilities [105]. Many of the new business and retail projects positioned in New Belgrade are developed without proper contextualization; they are more independent physical structures than a real part of the inherited urban tissue of New Belgrade [106]. Thus, they significantly contribute to the overall fragmentation of urban space. Moreover, some of them are built as gated projects, mainly within residential condominiums, enabling further urban segregation [86,107]. In that way, “Airport City” Business Park is unique in the city fabric (Figure 2) and therefore requires a better explanation of this project.

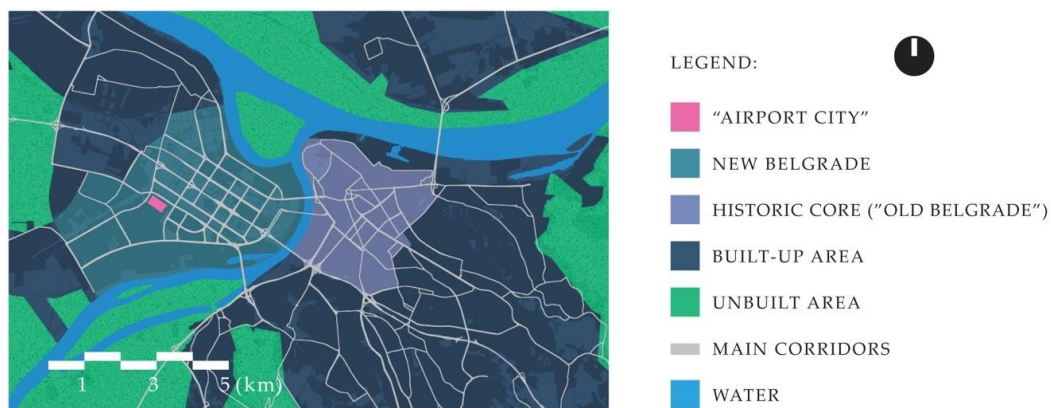


Figure 2. Position of “Airport City” Business Park in Belgrade, Serbia (Author: V. Parežanin, 2020).

4.2. Profile of “Airport City” Business Park

MAIN INFORMATION:

- Official name: AIRPORT CITY (Serb. *ERPORT SITI*)
- Development: 2003-
- Location: New Belgrade, 6 km west of Belgrade historic core (Figure 2)
- Land use: Non-residential mixed-use (Figure 3)
- Project surface: 10.5 hectares (unofficial, from available geodata)
- Targeted built area: 186,000–200,000 m² (official data from news)
- Current built area: 110,000 m² (unofficial, calculation based on available geodata)
- Open space share: 86% or 9 ha (calculation of available geodata). Just 15% of the entire park space is designed as an open space for the socialization of employees (Figure 1), while the rest is parking and currently unbuilt land, left for the future development.

HISTORY: The Project of “Airport City” Business Park in New Belgrade was started in 2003 by “AFI” Israeli Investment Company. Since then, the same company has invested in several other projects across Belgrade, but this initial investment is still the biggest one by size and value in their Belgrade portfolio [108].

The Business Park bears its name by its location—it was built on the site of the first interwar (from 1928) international airport of Belgrade, known as “Dojno Polje”. This airport was heavily damaged by Germans at the end of World War II, so it was relocated to the present-day location in 1962 [109]. Only one airport hangar is preserved (Figure 3b). It was protected as a national cultural heritage in 2013 [110]. After the reactivation of this site, four first buildings were completed in 2006. After this, the whole complex was sold to “CEE” Company [108], which runs it today. This company has also worked on the enlargement of the business park, adding six new 6-to-10-story buildings, while an additional one is in construction in 2020 (Figure 3b). The development of the business park has become a ‘magnet’ for new development in its surroundings, such as the “West 65” gated residential condominium [111].

The main plaza is the focal, centrally located open space of the complex (Figure 3). This is a longitudinal, 500-m long and 20-m wide pedestrian zone with SE-NW orientation, divided into five segments by one symbolic ‘monument’ (old plane) and three fountains. The middle line of this zone is pedestrian only and is covered by the combination of concrete elements and cobblestones thereof (Figures 1 and 3). Two sidelines are next to the buildings and with cultivated greenery, which consists of deciduous trees and flower gardens. The outside parts of cafés and restaurants and urban furniture occupies space between these gardens. Several cafés, restaurants, small shops, bank outposts, and ATMs are located on the ground floor of the buildings; in that sense, this plaza resembles the main street of a traditional town. Due to the orientation of the plaza, its southern side is in the shadow of nearby buildings, while its northern side is more exposed to the sun in

summer; thus, all café gardens along this side are with parasols and sunshades. All open spaces are equipped with high-quality furnishings that are well maintained. They differ in design, urban furniture, and pavement.



Figure 3. “Airport City” Business Park, state for 2020: (above) the complex and vicinity; (below) the internal organization and axonometric plan of the business park (Author: V. Parežanin, 2020).

5. Questionnaire Results

The results of the first part of the questionnaire (Part A) represent a sample characteristic/demographic characteristic and the overall WSL of all participants. Considering the registered demographic characteristics, the sample that we used in this survey consists of 43.4% male and 56.6% female respondents, with the most participants in the age group between 18 and 25 years (31.6%). A more elaborate demographic structure of the sample is presented in Table 1. As for the SL categories (low, medium, and high) most of the participants fall into a medium workplace stress-level (MWSL) (53.2%). Table 1 also shows

that female respondents reported significantly higher WSL than male respondents ($t(206.3) = -2.717, p = 0.008, p < 0.010$) and that the mean (average) age increases with higher level of the WSL ($F = 2.867, p < 0.050$). We can see that 48% of male participants experience low workplace stress-level (LS), while 73% of female respondents reported (MS) and high workplace stress-level (HS).

Table 1. Relationships between the respondent's workplace stress-levels (WSL) and gender, and age. SPSS T-test (gender) and One-way ANOVA (age).

		WSL Low	WSL Medium	WSL High	Numbers of Observations and Significance (Brackets)
Gender	Male	48.0%	42.2%	9.8%	N = 102
	Female	27.1%	61.7%	11.3%	N = 133
	All	36.2%	53.2%	10.6%	N = 235 ($p < 0.010$)
Age	Age (Mean/Average)	2.20	2.62	3.36	N = 235 ($p = 0.016$)

Table 2. Representation of open space usage dimensions in percentages (SPSS Frequencies) in the sample used in this survey—frequency, duration, activity, and spatial characteristics.

		% of Total	Numbers of Observations (N) and Significance (p)	Effect Size
Frequency	Rarely	19.1%	N = 235 $p < 0.0001$	$\eta p^2 = 0.110$
	Sometimes	36.2%		
	Often	24.3%		
	Always	20.4%		
Duration	<10 min	22.9%	N = 235 $p < 0.0001$	$\eta p^2 = 0.112$
	15–30 min	44.1%		
	30–60 min	23.3%		
	>60 min	9.7%		
Activity	watching	17.4%	N = 235 $p < 0.0001$	$\eta p^2 = 0.134$
	relaxing	33.2%		
	eating	31.1%		
	speaking	12.8%		
	recreation	5.5%		
Spatial characteristics	natural	68.4%	N = 233 $p < 0.01$	$r^2 = 0.032$
	built	31.6%		

Table 3. Representation of open space dimension in percentages—spatial characteristics.

Spatial Characteristics N–Natural and B–Built Characteristics	Total
Natural landscape, greenery, and vegetation (N)	31.3%
Sunlight and fresh air (N)	19.7%
Vistas, colors, and sounds (N)	17.2%
Aesthetics and architecture of buildings and restaurants (B)	6.9%
Urban furniture and pavement (B)	7.3%
The urban design of gardens, fountains, and sculptures (B)	17.6%

The results of the second part (part B) of the questionnaire are related to the WPE—open space inside “Airport city” Business Park. When we are examining how participants are using open space, in Table 2 we can see that most of them are using it sometimes, or a couple of times per month (36.2%), and for 15 to 30 min (44.1%). They are using open space mostly engaged in activities like sitting and relaxing (33.2%) and eating, drinking, and smoking (31.1%). Regarding spatial characteristics with the most calming effects on

respondents, natural ones stand out significantly from built ones in this survey with 68.4% in comparison to 31.6%. More specifically, natural landscape, greenery, and vegetation have the most calming effect with 31.2% in contrast with 6.8% for the aesthetics and architecture of buildings and restaurants (Table 3).

By combining the results of both parts (A + B) through correlation and crosstabulation, we analyzed the relation between open space dimensions and their effect on the WSL. The One-way ANOVA analysis showed the significant effects of all four open space usage dimensions on the WSL where activity has the strongest influence ($\eta^2 = 0.134$, $F = 11.812$, $p < 0.0001$), followed by duration ($\eta^2 = 0.112$, $F = 10.510$, $p < 0.0001$). In Tables 4–7, a more detailed structure of these findings is presented. These trends are visible for male and female participants, examined separately, but the effects are less statistically significant. Participants that chose natural spatial characteristics for its calming effects reported significantly lower WSL ($t(231) = -2.627$, $p = 0.009$, $p < 0.01$) in comparison with participants that chose built spatial characteristics (Table 7). In Table 7, we can see that respondents with low WSL mostly chose natural landscape, greenery, and vegetation for their calming effects on them (39.3%), while the participants who reported a high level of workplace stress-level prevalently chose an urban design of gardens, fountains, and sculptures (28.0%).

Table 4. Representation of respondents' WSL within open space dimension–frequency, and total percentages of different frequency groups in the sample, analyzed by SPSS Crosstabulations. SPSS One-way ANOVA analysis was used for analyzing WSL relationships with frequency.

Frequency	WSL Low	WSL Medium	WSL High	Total
Rarely, a couple of times per year	22.2%	55.6%	22.2%	19.1%
Sometimes, a couple of times per month	21.2%	68.2%	10.6%	36.2%
Often, a couple of times per week	52.6%	42.1%	5.3%	24.3%
Always, almost every day	56.2%	37.5%	6.2%	20.4%

Table 5. Representation of respondents' WSL within open space dimension–duration, and total percentages of different duration groups in the sample, analyzed by SPSS Crosstabulations. SPSS One-way ANOVA analysis was used for analyzing WSL relationships with duration.

Duration	WSL Low	WSL Medium	WSL High	Total
Up to 10 min	17.0%	66.0%	17.0%	22.6%
From 15 to 30 min	30.8%	55.8%	13.5%	44.3%
From 30 min to one hour	52.7%	45.5%	1.8%	23.4%
More than one hour	65.2%	30.4%	4.3%	9.8%

In this chapter, we have presented integrated results of the research, with the focus on the survey results regarding participant responses on a predefined questionnaire regarding their perceived SL and usage of open space in WPE.

Table 6. Representation of respondents' WSL within open space dimension–activity, and total percentages of different activities in the sample, analyzed by SPSS Crosstabulations. SPSS One-way ANOVA analysis was used for analyzing WSL relationships with activity.

Activity	WSL Low	WSL Medium	WSL High	Total
Watching from window or terrace	39.0%	46.3%	14.6%	17.4%
Sitting and relaxing	21.8%	65.4%	12.8%	33.2%
Eating, drinking, smoking	27.4%	61.6%	11.0%	31.1%
Speaking with friends	83.3%	13.3%	3.3%	12.8%
Engaging in physical activity/recreation	53.8%	46.2%	0.0%	5.5%

Table 7. Representation of respondents' WSL within open space dimension–spatial characteristics, and total percentages of different spatial characteristics in the sample, analyzed by SPSS Crosstabulations, we used SPSS T-test.

Spatial Characteristics Natural (N) and Built (B) Characteristics	WSL Low	WSL Medium	WSL High	Total
Natural landscape, greenery, and vegetation (N)	45.2%	50.7%	4.1%	31.3%
Sunlight and fresh air (N)	34.8%	60.9%	4.3%	19.7%
Vistas, colors, and sounds (N)	30.0%	60.0%	10.0%	17.2%
Aesthetics and architecture of buildings and restaurants (B)	25.0%	37.5%	37.5%	6.9%
Urban furniture, banks, and pavement (B)	41.2%	41.2%	17.6%	7.3%
The urban design of gardens, fountains and sculptures (B)	29.3%	53.7%	17.1%	17.6%

6. Discussion and Conclusions

The main findings from the previously elaborated survey-based analysis of the WSL and the related impact of the WPE in the case of in the case of specific workplace setting "Airport City" Business Park in Belgrade, Serbia, can be scrutinized into several implication bullets:

1. Female employees are more prone to higher WSL, as well as older employees. Nevertheless, gender and age do not play a significant role when related data are compared with the concrete preferences related to WPE issues, while the previous research showed gender significance in the assessment of the WSL [30].
2. On the other hand, considering this observed specific WPE environment, the results show that the usage and spatial characteristics of open space could have a noticeably more significant contribution on the SL of employees. Almost the half of the respondents use open public space quite regularly, albeit usually in short intervals. As was expected, with the increase in the frequency and interval of outdoor stay, the WSL decreases gradually. This relation indirectly implies that the respondents who cannot afford more free time during the workday due to, inter alia, stricter control at the workplace are under higher WSL. Considering existing research, there is a significant gap in examining the relationships between open space usage and WSL.
3. The respondents mainly use open space in the business park for relaxation in general, as watching can be counted as a kind of relaxation, too. However, the results show that this rather passive type of staying outdoor indicates their high WSL. Conversely, the respondents with lower WSL are able to be more active in the same situations, regardless of the activity type, whether they are mental or physical ones (socialization or exercise). It can be interpreted oppositely, too; the employees who tend to be more engaged in socialization or exercise have a lower WSL, which means that they can be more productive considering international sources. Socialization (speaking with friends) is especially important in the case of business parks as gated estates because this reveals that many of these 'speaking situations' are actually with the other colleagues who are friends at the same time.
4. Questionnaire results considering the effects of spatial characteristics of open space inside WPE indicate that employees prefer natural over built characteristics. Natural spatial characteristics in the open space are far more important for its calming effects than built ones, which is well-stressed in general literature [4–6,8,10–13,15,16,23,30,33,34,39,41,53]. Considering WPE there is far less research on this topic, but all the existing research supports these assumptions [4,7,9,12,13,18,23,25,30], as well as the results of this research, regarding the specific WPE. This is particularly true for greenery, which is expected by these sources, too. On the other side, there are built characteristics. Urban design and landscaping of open space are more prominent than the aesthetics and architecture of buildings, which is the least valued. Indirectly, this can point out that any impression or association of their workplace–building of their workplace or indoor space, even as an indoor restaurant–is generally less attractive

and arouse more negative emotions. Interestingly, this has not been sufficiently observed internationally.

To conclude, the enlisted implications underline that by the transformation of workplace environment we can influence the stress level of employees. Furthermore, they imply in which directions open space within the workplace environment can be improved to support the overall well-being of employees and decrease their work stress level.

- Physically, this is a space with a lot of greenery and the design that should not look like their workspace—an outdoor space with relaxing-looking furniture (benches) and without the visual connotation to their workplace (no view of corporative buildings).
- Functionally, this space should answer both the limitations of a relatively short time to stay outdoor and the advantages of socializing and exercise. Hence, recommendable facilities in and around open space are those for fast-track recreation (outdoor gym, for instance) and the cafés and restaurants prepared for fast service (but not suggesting fast food).

In the end, these conclusions can be a starting point for future research at the same time. It is obvious that the research of work stress level and the related impact of WPE are relatively rare and seek more such investigations in different workplaces. The prospective research can start with the directions to overcome the limitations of the undertaken survey. First, the research should be repeated during wintertime, during days with constant bad weather; both situations are relevant for many regions worldwide. Similarly, the research of the same format can be carried during summer days with extreme temperatures, to address the issue of climate crisis. Second, the other methods, especially based on quantitative techniques, could be implemented to check the results and findings obtained by this research. Third, all these research proposals can be adjusted regionally, for post-socialist Eastern Europe, where new peripheral headquarters, such as business parks, are still a novelty and thus possibilities to plan their proper development are bigger. Some long-term research can be more proactive, to intervene in open space and then examine the impact of this intervention; for instance, to arrange an outdoor gym and then to measure the effects regarding employees in nearby companies and businesses. Finally, more comprehensive research can be undertaken at upper spatial levels, such as bigger headquarters or even entire cities.

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