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## **ERGONOMIC ASPECTS OF MODERN WORKSPACE DESIGN: COWORKING CENTRES**

*This article examines and analyses the design of modern workspace (on the example of coworking centre) through the prism of ergonomics. The aim of the work is to identify peculiarities of ergonomics in the context of modern workspace design, and to analyse the main approaches to the usage of ergonomic knowledge in the process of designing coworking centres interiors.*

*The ergonomic approach essence to the elaboration of the working space design has been clarified, as well as the tasks have been outlined. The solution of the last ones can contribute to the creation of a maximally safe space with the atmosphere that can allow to contribute the increasing work efficiency. In the process of workspace designing, the ergonomic factor should be taken into account in order to ensure the best fit between employees and their work. Usually, it consists of three interrelated aspects. It has been proved that the ergonomic aspects of the modern workspace design involve the project elaboration of all coworking centre areas, the selection of furniture and various equipment, taking into account both psychological and physiological characteristics of a modern person. Colour is one of the main factors in the development of coworking centres lighting concept. It is important to decide on the general colour solution of separate zones, since light is a harmonious addition to the definite interior. The choice of a zone in a warm colour scheme involves the usage of warm and soft lighting. On the other hand, shades of blue are most appropriate in a cool interior. In the process of projecting a coworking centre environment, designers have to consider not only the layout and the choice of furniture at all stages, but also take into account more complex aspects of well-being, such as pleasure and social connections.*

*It has been established that while design alone cannot solve all the issues related to the workspace well-being, still, it can provide a proper enabling environment with its active promoting the leading work practices implementation, labour processes improvement, innovation and creativity introduction, as well as the level of stress reduction.*

**Key words:** ergonomics, ergonomic design, coworking centre, furniture, workspace.

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## ЕРГОНОМІЧНІ АСПЕКТИ ДИЗАЙНУ СУЧАСНОГО РОБОЧОГО ПРОСТОРУ: КОВОРКІНГ-ЦЕНТРИ

*У статті розглянуто та проаналізовано дизайн сучасного робочого простору (на прикладі коворкінг-центру) крізь призму ергономіки. Мета роботи полягає у виявленні особливостей ергономіки в контексті дизайну сучасного робочого простору та аналізу основних підходів до використання ергономічних знань у процесі проєктування інтер'єрів коворкінг-центрів.*

*Уточнено сутність ергономічного підходу до розробки дизайну робочого простору та окреслено завдання, вирішення яких послуговує створенню максимально безпечною простору з атмосферою, що сприяє підвищенню працездатності. Ергономічний фактор необхідно враховувати у процесі проєктування дизайну робочого простору, щоб забезпечити найкращу відповідність між працівниками та їхньою працею. Він зазвичай складається з трьох взаємопов'язаних аспектів. Доведено, що ергономічні аспекти дизайну сучасного робочого простору передбачають розробку проєкту всіх зон коворкінг-центру, вибору меблів та різноманітного обладнання з урахуванням і психологічних, і фізіологічних особливостей сучасної людини. Колір є одним із головних чинників у розробці концепції освітлення коворкінг-центрів. Важливо визначитися із загальним кольорним рішенням окремих зон, оскільки світло є гармонійним доповненням інтер'єру. Вибір зони у теплій кольоровій гамі передбачає використання теплого м'якого освітлення, натомість у прохолодному інтер'єрі найбільш доречними є відтінки синього кольору. У процесі проєктування середовища коворкінг-центру дизайнери повинні враховувати не лише планування та вибір меблів на всіх етапах, але й брати до уваги і складніші аспекти благополуччя, такі як задоволення та соціальні зв'язки.*

*Констатовано, що незважаючи на те, що дизайн не може самостійно розв'язати всі питання, пов'язані з добробутом робочого простору, він все ж може забезпечити сприятливе середовище, яке активно сприяє впровадженню провідних методів роботи, покращенню робочих процесів, введенню інновацій та креативності, а також зниженню рівня стресу.*

**Ключові слова:** ергономіка, ергономічний дизайн, коворкінг-центр, меблі, робочий простір.

**Formulation of the problem.** Ergonomics is directly related to the design of modern workspace, one of the main goals of which is the formation of harmonious subject environment that meets human necessities.

In connection with the growing need to design the most comfortable atmosphere at the workplace, the research of the features of workspaces design and planning, in particular, coworking centres, as one of the most popular at the current stage, and taking into account innovative tendencies in ergonomics,

the basis of which form the latest foreign scientists' studies, is being updated.

**Research analysis.** In blighty and foreign scientific dimension, various aspects of ergonomics in design have been studied by: V. Holoborodko "Ergonomics for designers" (2012), V. Svirko, A. Rubtsov and O. Chemakina "Design-ergonomic factors of creating visual information systems" (2018), H. Raikovska "Design and ergonomics in the professional training of specialists in the field of industrial engineering" (2018), O. Safronova, M. Strilchuk, R. Ahliullin and

K. Donets “Peculiarities of the formation of modern information agencies interior design” (2017) et al.

At the same time, despite the steady scientific interest of blighty scholars in the given problem issue, the question of the influence of ergonomic aspects on the formation of modern workspace design remains insufficiently highlighted. As an exception, we can mention the scientific publications of Yu. Radchenko and O. Shmeliova “Peculiarities of formation of coworking centres interior design on the basis of higher educational establishments” (2018), K. Prykhodko “Creative environment in the context of coworking centre design” (2021).

**The aim of the article** is to reveal peculiarities of ergonomics in the context of modern workspace design and to characterise the main approaches to the use of ergonomic knowledge in the process of designing coworking centres interiors.

**Main material presentation.** The dynamic development of information and communication technologies has changed the way of life and social behaviour of modern people, as well as caused an everyday experience rethinking, including the one at the workplace. Globalisation, technological progress, and demographic changes are megatrends that have ultimately changed the work nature, the number and quality of available jobs, and ways of doing work (e.g., remote work). Digital nomadism, which promotes work mobility and flexibility, fully meets the requirements of modern society, and stimulates the emergence of new workspace types, one of the popular forms of which is a coworking centre (Kojo, Nenonen, 2014) – workspace that satisfies the new model of work with more flexible schemes in order to increase the professional level, work capacity and support the necessary balance between family and work.

Currently, the workplace is far from the traditional office conception, but the necessity in physical workplaces still exists, still, in more flexible, universal and mobile forms. Workplaces of the first decades of the 21st cent. are more adaptable to technological innovations, new equipment and tools that affect work schedules. Therefore, as an example, at the modern stage the number of necessary items on the desktop is reduced to a laptop and a mobile phone, which, providing access to Internet, eliminate the need to have traditional items of the late 20th cent., such as books, telephones, fax machines, magazines, calendars, calculators, globes and other stuff at hand. According to the researchers, the evolution of labour objects reflects the image of social life, in other words, “a set of objects expresses the technological development of a human group, the ecological conditions which are supported by it, and the system

of social relations which are used in practice by it” (Daciano da Costa, 1998: 13). Despite the fact that the availability of digital equipment allows the office to be located anywhere (home, cafe, library, etc.), the greatest demand is for workspaces that stimulate network interaction as well as joint work.

Coworking spaces are places for working together and common sharing that represent new ways of working, creating definitely flexible environment and physical conditions that attract more and more professionals to work in them (Giddens, 2001: 52). They are a variety of modern workspace that creates conditions for project work, spontaneous collaboration and/or mobile work, innovation and creativity.

One of the important functions of the coworking centre is the ergonomic function.

Ergonomics is a science of finding the ideal fit between a person and the work one performs. Regarding technologies, ergonomics involves the elaboration of products and devices in accordance with the user’s demands, the specifics of the working environment, and some definite peculiarities of working tasks, with the aim of creating an extremely safe space with an atmosphere that promotes productivity.

The ergonomic factor that must be considered in the process of projecting a workspace design in order to ensure the best fit between workers and their labour usually consists of three interrelated aspects:

- work: the ergonomics of this aspect involves the elaboration, taking into account both physical and mental limitations, as well as the strength positions of a person who will perform this kind of work (specifics, workload, equipment arrangement (size, shape, use expediency for solving the set tasks, etc.), working environment (temperature, air humidity, lighting, noise, vibration, etc.), availability and specificity of information usage);

- personality: an ergonomic approach to each employee means designing places and equipment for work that will contribute to the best use of human abilities, while protecting a person’s health, creating safe working conditions and increasing work capacity (physical characteristics (body size and shape), fitness, strength and posture, hearing, vision and tactile sensations, skills and competence, knowledge and experience, personality and one’s attitude, training);

- organisation: organisation evaluating from the perspective of ergonomics and human factors means studying how business-level considerations influence human behaviour and actions (organisational culture, management, leadership, teamwork, work mode, communication, resources).

Researchers claim that interior quality, materials and scale are felt and measured by eyes, ear, nose, skin,

tongue, skeleton and muscles (Pallasmaa, 1996: 41). The sound depends on materials and forms, as well as on the variety of possibilities of their combinations, which create a various atmosphere. The way a space and environment are experienced depends on particular material resource, as their effects on texture, light reflection and sound propagation are crucial. New materials, which are light, with specific ergonomic and acoustic properties, certain forms are currently the basis of design.

According to the researchers, the design of coworking centre environment should be considered as “a complex design of space and interior that surrounds the users of this workspace, and is designed to fulfill an aesthetic, ergonomic and stylistic function – to meet the needs of people in beauty, comfortable conditions for high-quality professional activities and individual needs” (Prykhodko, 2021: 56).

In each coworking centre, the following main groups of rooms or zones can be distinguished:

- the lobby area, which consists of a reception desk and a waiting area;
- an open working area, also known as “open space” (the coworking centre visitors can rent a workplace at tables or counters placed next to each other);
- a zone of private offices or an office area (usually, it is represented by a small office designed for one employee);
- a zone of work rooms (mainly a room for work of a small team);
- negotiation area (rooms for negotiations and conference rooms);
- lounge area;
- recreation area.

Basic ergonomic rules used in the design of coworking centres should be highlighted. They are typical for all zones:

- in the planning process, it is important to take into account the rules of ergonomics of the space, so that the zones are convenient to use, visitors cannot be injured due to poorly placed furniture, do not disturb each other due to too small sofas in the rest area, lobby or lounge area, etc.;
- it is important to calculate the dimensions of the room – as a rule, three zones are created in small coworking centers: an open zone (in which the work area and the lobby are combined), a zone of private offices (rooms of different sizes are used both for individual work and for team work or holding meetings) and a recreation area (usually it includes a kitchen and a lounge area). In large premises of co-working centers, the zoning of the recreation area into the kitchen, lounge areas, cafes, bars,

recreation rooms, game rooms, sports rooms, etc. is characteristic. The creation of several zones in one room gives the visitors of the co-working center as many opportunities for communication as possible;

- in the process of designing co-working centres, it is important to clearly separate one functional area from another with the help of various sliding doors, partitions, curtains, racks, bar stands, as well as other equipment and partitioning structures; one of the separation options is a multi-level floor or ceiling, which visually divide these zones;

- the lounge and the rest areas should be located in the least lit place of coworking centres in order to create an atmosphere that promotes maximum relaxation; traditional for these zones is the presence of comfortable furniture – sofas, armchairs and coffee tables; floor lamps and sconces are usually used for lighting;

- when choosing coworking centre furniture, it is necessary to take into account the anthropometric data of a person. E.g., according to ergonomic studies, for an average man, the space on the sofa should be at least 710 mm, and for a woman – at least 660 mm, additionally, the height and inclination of the back should be such that the hip and the shin of a sitting person can form an angle close to a straight one, and the feet can rest completely on the floor;

- the placement of furniture in the coworking centre is carried out so that it does not interfere with free movements both in the middle of a certain zone and also between them;

- all gadgets, equipment, and other items necessary for professional activity and recreation should be within the worker’s sight.

Light plays an important role in creating an ergonomically favorable working space in coworking centres. Artificial lighting in the premises of the coworking centre is recommended to be of a few types: bright, muted and diffused. Chandeliers on the ceiling contribute to the creation of a solemn festive atmosphere and scatter light as much as possible. A bright overhead light can be replaced by tall lamps on racks (appropriate in coworking spaces designed in high-tech style). A source of muffled light can be several dozen ceiling spotlights, which should be placed not only on the ceiling, but on the walls as well. Diffused light is extremely appropriate in recreation rooms. It does not suppress vision and promotes quick adaptation for further work.

Before elaborating the lighting concept of coworking centres, it is important to decide on the question of general colour scheme of certain zones, since light is a harmonious addition to the interior, like a solution of the zone in a warm colour scheme

involves the usage of warm soft lighting, and, on the other hand, in a cool interior, shades of blue are the most appropriate.

In large open lounge areas, in which large-sized furniture is used, it is necessary to set power lighting devices, including big floor lamps and sconces. Particularly, in order to emphasise the floor (pattern of parquet, laminate or carpet), it is recommended to choose floor lamps and lampshades which direct light downwards.

The ergonomic function is related to comfort, and is directly connected with meeting the needs of visitors to coworking centres visitors. The flexibility associated with the furniture form is necessary for the dynamics of the community, such as cooperation, communication, creativity, which require great versatility of space.

Flexibility and modular components make coworking centres spaces more cost-effective by allowing the space to be quickly changed for a variety of activities and just the usage that visitors may need. Considerable attention is paid to the parameter of ergonomic function/comfort, that are ergonomics and comfort of work chairs.

The design of furniture for a coworking centre has to meet new requirements of modern lifestyle – lightness, which was usually associated with elegance, aesthetic perception, and now represents the implementation of miniature, universal and portable objects that provide flexibility and mobility, additionally, simplify the performance of everyday tasks.

The main parameters of furniture design for coworking centres are these ones: ergonomics/comfort; materials/environmentalism and flexibility/form. The balance between all of them is necessary for creating relationships between various moments of work (cooperation, learning, communication, etc.). The design of furniture for coworking centres should facilitate human adaptation to new conditions, social distancing and hygiene, which has become especially relevant in the context of pandemic, while preserving the concept of cooperation and socialisation that is fundamental to coworking spaces. Designers have the opportunity to create and develop furniture according to the following requirements:

- made of materials that are easy to wash, and at the same time are resistant to detergents and disinfectants;
- the furniture should ensure the opportunity of maintaining a safe distance between the working area

and other ones (in particular, be equipped with acrylic screens and partitions).

According to the researchers' opinions, taking into account that the future of the workspace will be focused on the idea of teamwork, society incorporation and encouraging collaboration, the solution could become flexible and modular furniture system that allows to create a variety of configurations easily and quickly, that meet a set of goals on workplace without changing the space individuality (Cruz, 2021: 336).

The creation of favorable climate in coworking centres spaces, which has a positive effect on the human body, contributes to the improvement of health and maintenance of well-being, is carried out due to "climate control". Thanks to innovative technologies, the operator only needs to set the necessary parameters of temperature, air humidity, oxygen concentration in the air. So, the system will turn on and adjust the equipment necessary for each function – from window opening drives, ozonation, humidification and filtration systems to air conditioning, electric or water heating, underfloor heating, etc.

Analysing such an element of ergonomics as the acoustics of the coworking centres space, we note that usually in all common areas, except for those directly intended for holding seminars, open lectures, meetings, negotiations, etc., silence and mutual respect reign.

**Conclusions.** Ergonomic aspects of modern workspace design involve the project elaboration of all coworking centre areas, the selection of furniture and various equipment, taking into account both psychological and physiological characteristics of a modern person. Such an approach contributes to the creation of optimal conditions for increasing work efficiency and generating new creative ideas. Since the concept of coworking supports the idea of cooperation and sharing, the space should evoke the feeling of comfort, associated with a working environment that promotes creativity and professional activity.

In the process of designing the coworking centre environment, designers have to consider not only planning and furniture selection at all stages, but take into account more complex aspects of well-being, such as pleasure and social connection.

While design is not able to solve all well-being issues on its own, it still can create an enabling environment that actively promotes best work practices, improves work processes, innovation and creativity, particularly, reduced stress.

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