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FEATURES OF DESIGNING A MODERN OFFICE SPACE, ITS EQUIPMENT AND FURNITURE

The aim of the study is to identify the main factors, modern approaches and methods of creating a comfortable office space based on the analysis of modern domestic and foreign experience in designing this type of premises.

Methodology. Critical analysis of scientific sources on the research topic, normative and reference literature, comparative analysis of advanced domestic and foreign experience in office interior design, and a synthesis of the research results have been used in the study.

Results. Historical aspects of the development of offices and modern trends in the interior design of this type of premises are considered. The main factors of creating a comfortable office space are identified: design in accordance with modern ergonomic requirements; implementation of aesthetic principles of interior design, effective functional and planning organisation. The ergonomic criteria for workplace organisation are presented, and the main aspects of office ergonomics are highlighted. Based on the analysis of modern design experience, approaches and techniques of artistic and aesthetic, functional and planning solutions for office spaces are identified. In particular, rational planning that combines common communication spaces with individual workstations, artistic and aesthetic solutions with balanced colour palette and accents, optimal lighting and modern ergonomic equipment are becoming integral components of an effective modern office space.

The scientific novelty lies in determining the main factors in creating a comfortable office space based on the analysis of modern interior design practice for this type of premises, identifying current trends, approaches and techniques for creating the office interior, which is a further contribution to the development of research on office environment design.

The practical significance of the results obtained lies in the possibility of their application by designers and employers when designing office interiors.

Keywords: interior design, office space, comfortable environment, ergonomics, artistic and aesthetic solution, functional and planning structure.

Introduction. Today's dynamic world requires companies to quickly adapt to new conditions and challenges. The COVID-19 pandemic, the development of technology, and the change in the work paradigm have led to the need for a substantial review of the organization of office spaces. Historically, the office environment has reflected the cultural and technological advances of its era, evolving in response to external stimuli. Today, we are faced with the challenge of creating a space that would not only meet modern technical requirements, but would also be optimized in terms of ergonomics, psychological comfort, and communication efficiency.

The relevance of the problem of designing modern office spaces lies in the fact that they

become a mirror of corporate culture, reflecting the company's values and approaches to the well-being of its employees. A scientific study of this problem can provide practical material for designers and employers who seek to provide optimal working conditions that will contribute to the growth of productivity, preservation of the health of personnel, and improvement of corporate culture.

Analysis of previous studies. Theoretical provisions regarding the goals, objectives and requirements of ergonomics and engineering psychology have become the subject of research by domestic scientists in the field of architecture and design: S. Apostoliuk, A. Apostoliuk, P. Bekhta, V. Brusentsov, O. Brusentsov, I. Buhaichenko and I. Kyseliov [10], O. Gervas

[12], V. Holoborodko [14], V. Danylenko [15], I. Lynnyk [20], M. Potapenko [24], S. Serdiuk [25], Yu. Trofimov [26] and others. The principles and approaches to workplace optimization and safety were the focus of such scientists as V. Arbakitov and I. Tkachenko [8], T. Bulgakova and I. Sova [11], N. Savina [9], S. Shklyar [27] and others, who considered the factors of regulation and safety, as well as comfort and functionality of workplaces of office workers, principles of flexible design that allow for easy reconfiguration of office space depending on the needs of the team. For example, V. Arbakitov and I. Tkachenko examined in detail the ergonomic aspects of the human body position during work, paying attention to the criteria for determining the optimal working posture and methods of preventing fatigue in people. S. Shklyar described two main types of office: open space and cubicle, and also considered in detail the ergonomic requirements for the organization of the workplace in the office premises. The impact of design and ergonomics on the emotional state and productivity of workers has been studied and highlighted by modern Ukrainian researchers: O. Burov, A. Honcharov, S. Dudka [17], V. Koveziuk, M. Kuprienko [9], O. Polyakova, T. Bulgakova and D. Kosenko [23] and others, who emphasized the exceptional importance of colour solutions, lighting and materials in modern office design and their impact on the psychophysical state of employees. V. Koverziuk emphasizes the aesthetic aspects of interior design, in particular visual design. S. Dudka considers design as an aesthetic phenomenon of creating an ergonomic object environment, defines the features of ergodesign to achieve the compositional aesthetic integrity of objects and space.

Despite a significant number of studies in the field of interior design of administrative premises, offices in particular, the constant development of design in this area, the emergence of new requirements and challenges require clarification of the features of the

formation of a comfortable and efficient office at the current stage.

Objectives. To analyse the modern domestic and foreign experience of designing office premises; determine the main factors of the formation of a comfortable office space, modern approaches and methods of artistic and aesthetic, functional and planning solutions for office interiors.

Research results. The evolution of office spaces is inextricably linked to the development of society, economy, technology and culture. After all, the office has always reflected the structure of social relations, the level of development of production, communications, and art of a certain era. Office spaces have always been a mirror of socio-economic relations, the level of technological development and cultural features of a particular era.

For example, the first offices of Ancient Rome reflected the management system of the Roman Empire in the form of *Officiums* – small rooms in central squares where state clerks, tax collectors, and archivists worked. The layout and arrangement of these premises corresponded to the administrative needs of the empire [3].

The scriptoriums of the Middle Ages, located at monasteries, were associated with the dominance of the church in cultural life. These were large halls with lecterns and shelves for storing manuscripts. Books were copied and decorated here, which was the main occupation of the monks [4].

The emergence of large office buildings in the 18th century is associated with the development of bureaucracy and paperwork in public administration. Long rows of desks reflected the need to process paper documents. Active use of typewriters and paper has become part of office culture [1].

The concept of the streamlined office-factory, which became widespread in the 19th century, is directly related to the industrial revolution and the rise of industrial production. The office was organized according to the principle of a conveyor belt, with a clear regulation of the labour process, which reflected

the factory system. On the one hand, R. Propst's "Action Office" system in the 1960s was a revolutionary step as it brought flexible modular partitions to quickly change the office layout. It corresponded to the desire to democratize and humanize the office environment [2].

However, the economic crisis of the 1970s forced companies to cut costs, which led to the regression – the proliferation of monotonous cubic offices without taking into account human needs. It was a step back from the progressive ideas of the 1960s. On the other hand, the spread of open offices in the 20th century became possible due to the change in social relations – the transition to a post-industrial society, democratization and the perception of employees as individuals. The open space symbolized the departure from rigid hierarchy and authoritarian control [2]. Only since the 2000s, with the development of technology, it became possible to return to the concept of a humanistic, ergonomic office with an emphasis on employee comfort.

Thus, the evolution of office spaces proceeded in a wave-like manner – periods of innovation were replaced by simplification under the pressure of economic realities, but the general vector is towards the humanization of the environment.

Historical experience shows that the office has always evolved in accordance with the cultural and technological achievements of the era. At each historical stage, office design absorbed the essential features of the era – from the technological development to values and social relations. This provides a basis for understanding the principles of designing modern office spaces taking into account the latest possibilities.

Modern trends in office design continue to move towards creating the most comfortable and functional workspaces. Today's office premises must meet the requirements of not only functionality, but also comfort and aesthetic appeal. After all, the office is a place where people spend a significant part of their time, so the productivity and overall well-being of

employees largely depend on how ergonomic and comfortable it is.

With globalisation and the rapid development of technology, the concept of the office as a conventional working space is expanding. Today, the office is becoming a place where the emphasis is shifting from mere efficiency to comfort, collaboration and corporate culture. All this, in turn, has an impact on the productivity of employees [18; 21].

Ergonomics plays an extremely important role in ensuring the physical comfort of the employee. Height-adjustable desks, ergonomic chairs and proper lighting create a healthy working environment and reduce the risk of health problems. At the same time, natural light is considered the best for office space, and artificial light should complement it, ensuring there is now glare on screens and creating a comfortable atmosphere [22, p. 12]. It is equally important to take into account the composition and temperature of the air and the noise level in the room. Modern technologies, such as advanced ventilation systems and acoustic solutions, help to create an optimal climate and reduce noise levels, which are important for the comfort and productivity of employees in large open spaces.

Based on the research of American scientists conducted at a number of US enterprises, it was found that a properly organized (from the point of view of ergonomics) workplace of an employee in the office increases their productivity during the entire working day by an average of 15–25% (Tab. 1) [27, p. 49].

The design and arrangement of the workplace must ensure the optimal working posture of the employee, which takes into account and does not interfere with the natural physiological processes of the body and provides the best opportunity to perform the work for which it is intended. In today's world, a significant part of the work is done in a sitting position. Prolonged sedentary work is harmful to a person in the general sense: they hunch or lean forward, and the spine is deformed, injuring the

discs; a person raises their shoulders and bends their arms, keeping them in tension – and naturally, they start to hurt. Research has

determined what wrong posture leads to (Tab. 2) [27, p. 50].

Table 1

Ergonomic criteria for organizing an employee's workplace

№	Name	Description
1	Physical difficulty of the work	Taking into account the comfort and physical load required of the employee.
2	Dimensions of the work area	Taking into account the spatial parameters of the work area and the employee's need for movement during the performance of tasks.
3	Technological characteristics	Features and technical aspects of the work process affecting the location and organization of the workplace.
4	Static loads	Loads on the employee arising from long-term staying in one position.
5	Time spent	The time the employee spends at the workplace.
6	Location of control facilities	Optimal location of control facilities within the motor space depending on the frequency and accuracy of actions, as well as in the range of the motor field.
7	Overview of sources of visual information	Ensuring the absence of obstacles for the observation of visual sources of information.
8	Change of posture during work	The possibility of changing the employee's position during the working day to reduce physical strain.
9	Access to places of adjustment and repair	Providing free access to areas where maintenance, adjustment or repair of equipment takes place.
10	Placement of main and auxiliary equipment	Organization of the workspace in such a way that the main and auxiliary equipment are optimally located for the convenience and efficiency of work performance.

Table 2

Consequences of incorrect posture

№	Consequence	Description
1	Impaired respiratory function	The volume of the lungs decreases, less oxygen and blood reach the tissues and brain.
2	Digestive disorders	The work of the intestines is disturbed, the digestive system does not function properly.
3	Premature aging of tissues and curvature of the spine	Body tissues age prematurely; the spine loses its resistance to deforming influences, its curvature develops.
4	Chronic muscle tension	Muscles are in a state of chronic tension; pain occurs in the back and muscles, and headaches appear.
5	Increased fatigue	Systematic overstrain of muscles causes increased fatigue.
6	Decreased cognitive ability and concentration	Liveliness of thinking, working capacity and speed of reaction decrease, drowsiness and poor concentration appear.

There are several key aspects to consider when organizing a seated workplace. Firstly, the height and size of the workspace should be adapted to ensure that it can be adjusted to suit the individual needs of the employee. Secondly, it is important to consider the characteristics of the support surface, including its height and type

(whether flat, saddle or inclined). Finally, it is essential to ensure that there is adequate space for the employee's feet to rest comfortably. The relative location and layout of the workplaces should ensure safe access to the workplace and the possibility of quick evacuation in case of danger.

Thus, the main aspects of office ergonomics are as follows:

- space planning: space standards, isolation of workplaces, possibility of cooperation and communication, variability of equipment, multifunctionality or narrow specialization of the premises, alternate, collective, individual use taking into account not only general trends, but also specific functions, for example, bank, campaign management, law firm, etc.

- ergonomic equipment design: placement of the worker taking into account work movements and movements according to the functional process; table height adjustment, the possibility of changing the position during work, partitions with hinged elements and equipment (between tables and zones), stationary and mobile furniture elements, placement of ergonomic elements (keyboard, monitor), ergonomic chair;

- microclimate: temperature, air humidity, its composition; the possibility of controlling the composition of the air with the addition of disinfectant elements, which became especially relevant during the COVID-19 pandemic;

- optimal lighting and colour scheme: lighting design and selection of colours that do not create additional glare and do not overload the employee's vision in the work area;

- psychological aspects: overall satisfaction with working conditions, the possibility of active participation in the layout and "customization" of the workplace, the psychological climate of the team, etc.;

- social and psychological factors acquired in the course of the campaign development: social partnership of all team members, concern for optimizing the social and psychological climate, optimal working conditions with a seat near the window, an individual "cell", comfortable furniture with adjustment and filling of the workplace, the opportunity to relax, take a break, have proper nutrition, communication with other team members, creating an atmosphere of pride for the company, etc.

Aesthetics also plays an important role in psycho-emotional comfort and stimulation of creativity. An interior that is pleasing to the eye, bright colours or, on the contrary, calm neutral tones can create an atmosphere that will encourage productive work.

The aesthetic design of the workplace is a key element in creating a favourable environment for employees. According to the results of the research by L.R. Hnatiuk and Y.I. Polishchuk, 69.81% of respondents preferred warm light colours, 15.09% chose cold light ones, and minority groups chose warm dark ones (5.66%), achromatic (7.55%) and cold dark colours (1.89%). These data confirm that soft and light shades are the most desirable for an ergonomic office interior, reflecting the needs of the employee's nervous system. Research also shows that 64.15% of respondents feel that the interior affects their mood, 30.19% feel this influence weakly, and 5.66% do not feel it at all [13, p. 65].

The role of decorative elements cannot be overlooked as they help employees feel at home, promote relaxation, and help reduce stress. The atmosphere of the room and attention to detail significantly affect the mood of the team. For example, integrating artistic elements and visually appealing details into the design demonstrates respect for employee preferences. This helps to increase motivation because people see their working conditions improve as they progress in their careers. Representing the philosophy and culture of the brand through the interior helps the team feel united, inspires them to have new achievements and be proud of their organization [19].

In addition, an original and striking design can be not only a company's business card, but also a marketing tool that tells a much deeper story about the company than ordinary promotional material. At the same time, the choice of expressive furniture materials, the quality of lighting, simplicity and cleanliness of the design without unnecessary things also play an important role in maintaining the company's aesthetics.

An example of this approach is the Ukrainian studio Yakusha Design, which not only creates unique architectural and design projects but also receives international recognition, as was the case with their My Universe project (Fig. 1). This project combined a design studio, a furniture showroom, and a lecture hall, highlighting the brand's deep connection to culture and heritage. This is a vivid example of how design can tell the story of a company and become its true identity [16].

Therefore, the aesthetics of the workspace not only reinforces the corporate culture, but also has a direct impact on the employee productivity, motivation and satisfaction.

Designing a comfortable office space for work which combines the principles of ergonomics and aesthetics begins with choosing the type of office layout. As is known, offices have several types of planning solutions: cubicle office space, open space, group office and combi-office. The cubicle office has shortcomings in the organization of teamwork and space efficiency, while the open space and group office have disadvantages in the organization of individual work and ensuring sound insulation. It is the last type of layout – the combi-office – that combines the advantages and allows avoiding the disadvantages of the previous types.

For example, in the building complex of "Scandinavian Airlines" (Stockholm, Sweden) (Fig. 2) [6; 7], built on the shore of an artificial lake, around a large central space (a street with pockets) communal spaces of the second rank are formed (cafes, shops, a swimming pool, a fitness centre, which are used by both 1.5 thousand employees and everyone else who wishes), as well as local "communal" zones of the actual office part. Such a zone for 30–40 people includes a sector for negotiations and informal communication, a centre for office equipment and telecommunications equipment, a kitchen and dining room.

The main functional modules are personal cabins with an area of approximately 12 m² – are grouped around "communal areas".

Partitions and cabinet doors leading to these areas are made of glass, which eliminates the effect of physical isolation and ensures that the space of compact cabinets "flows" into more spacious volumes. Therefore, every employee can feel good psychophysically.

Furniture and equipment, cabinet details are designed in the local national style, although in general, the international style dominates. Furniture made of wood is "rough", functional, with simple forms, creating a business atmosphere. At the same time, each employee can complement the interior of the office to their taste with decorative and artistic products, peasant and household items, and personal items.

Communal areas for informal communication between employees and visitors are located on open terraces overlooking the lake; furniture contributes to rest with the wicker supplemented with plants and decorative elements.

All this together provides an optimal psychological climate in the team and contributes to the psychophysiological comfort of each employee.

The Citizen Office (Vitra Campus, Weil am Rhein, Germany) of the Vitra company is another vivid example of the concept of combining group and individual work in the office, implementing the principles of ergonomics and aesthetics, and creating an environment that maximizes productive work. In 2000, a revolutionary office concept was introduced at the Vitra campus: the network office. Vitra replaced individual offices in the Action Office style with a collaborative environment that reflected the company's innovative spirit. In 2006, the network office was transformed into the Net 'n' Nest Office to reflect the realisation that an office should offer both privacy and collaboration. In 2010 and 2018, further changes were made to create the Citizen Office, in which an "office forum" for direct interaction and communication is surrounded by traditional workstations. The office is viewed as a living environment with a

complex infrastructure, i.e., like a city. The forum is the central square, and the surrounding

workstations are the individual neighbourhoods of this city.



a

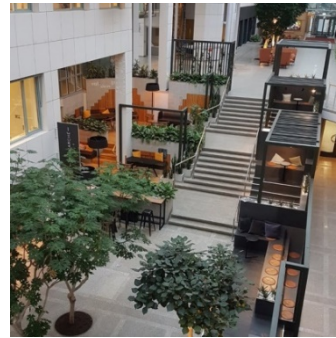


b

Fig. 1. The My Universe project for the Yakusha Design studio is located near Palats Ukraina metro station, *a* – studio reception; *b* – office premises



a



b

Fig 2. "Scandinavian Airlines" building complex (Stockholm, Sweden): *a* – general view of the building; *b* – "communal" areas of the office



Fig 3. Citizen Office (Vitra Campus, Weil am Rhein, Germany). Zones for teamwork



a



b



c

Fig 4. Citizen Office (Vitra Campus, Weil am Rhein, Germany): *a* – places for meetings or work of two or three people; *b* – workplaces; *c* – zones for individual work

The effective functional and planning organisation of the space allowed combining comfortable areas for teamwork and communication of large groups of employees, cosy corners and places for meetings or work of two or three people, as well as isolated areas for individual work that requires concentration and inadmissibility of distraction (Fig. 3–4) [5].

In terms of artistic and aesthetic solutions, the office is dominated by simple, regular geometric shapes of furniture and equipment that do not overload or tire the visual perception of employees. The expressiveness is based on the use of colour accents against the background of neutral light interior colour. All this, together with the harmonious proportions of objects and space, creates a unique comfortable environment where it is pleasant to be and work.

Integrating nature through biophilic design, which includes the use of plants and natural materials, not only improves air quality but also makes the office more aesthetically pleasing. Modern office spaces also need to be adaptable to the rapidly changing needs of the team. Therefore, adaptability in design, which includes mobile furniture on wheels, modular solutions and adjustable partitions, is becoming a key element in ensuring a comfortable and efficient workspace.

Thus, designing in accordance with modern ergonomic requirements using aesthetic principles and effective functional and planning organisation are prerequisites for creating a comfortable office that promotes productivity and employee satisfaction.

Conclusions. The paper examines the historical aspects of the development of offices and modern trends in the interior design of this type of premises. The main factors of creating a comfortable office space are identified: design in accordance with modern ergonomics requirements; implementation of aesthetic principles of interior design, effective functional and planning organization. Analysis of the domestic and foreign experience of office interior design showed that taking into account

the mentioned factors transforms the office from a simple place to perform tasks into an environment that stimulates creativity, promotes communication and preserves the health of employees. Modern office design is a harmonious combination of rational zoning, expressive aesthetic solutions, use of the latest technologies and creation of a healthy environment.

Comfort of the office space shaped by several key factors, starting with the organization of the workplace. Correct placement of furniture and equipment creates optimal conditions for using space. In addition, lighting plays an important role by providing sufficient natural and artificial light to improve comfort and efficiency. Controlling noise and creating a quiet working environment is another factor that affects office comfort. In particular, acoustic solutions help in providing a favourable working environment. The choice of colour palette is important for maintaining productivity and comfort, while integration of different colours can have a positive effect on the emotional state of employees. Zoning of space, which involves dividing it into functional areas, helps to support various types of activities. This is important for organizing effective work in the office.

Modern approaches to artistic and aesthetic design include minimalism, use of minimal decor, and biophilic design, which is based on the use of natural elements to improve the mental well-being of employees. Technological design, which involves the integration of modern technologies and innovations, helps to create a modern and functional work environment.

Functional and planning solutions include open space for collaborative work, flex spaces for adaptive zones and multimedia zones for presentations and meetings. Ergonomics also plays a key role, ensuring the use of furniture and equipment that supports the health and comfort of workers. The result is an office space that not only improves comfort, but also serves as a key factor in increasing productivity and job satisfaction of each employee.

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ОСОБЛИВОСТІ ДИЗАЙН-ПРОЄКТУВАННЯ СУЧАСНОГО ОФІСНОГО ПРОСТОРУ, ЙОГО ОБЛАДНАННЯ ТА МЕБЛІВ

Мета: визначити основні чинники, сучасні підходи та прийоми формування комфортного офісного простору на основі аналізу сучасного вітчизняного та закордонного досвіду проектування даного типу приміщень.

Методологія. В роботі використано критичний аналіз наукових джерел за темою дослідження, нормативної та довідкової літератури, порівняльний аналіз передового вітчизняного та зарубіжного досвіду дизайну інтер'єру офісів, синтез результатів дослідження.

Результати. Розглянуто історичні аспекти розвитку офісів та сучасні тенденції в дизайні інтер'єру даного типу приміщень. Визначено основні чинники створення комфортного офісного простору: проектування у відповідності до сучасних вимог ергономіки; втілення естетичних принципів формування інтер'єру, ефективна функціонально-планувальна організація. Наведено ергономічні критерії для організації робочого місця, виділено основні аспекти ергономічності офісу. На основі аналізу сучасного досвіду проектування виявлені сучасні підходи та прийоми художньо-естетичних та функціонально-планувальних рішень офісних просторів. Зокрема, раціональне планування, що поєднує загальні комунікативні простори з окремими робочими станціями, художньо-естетичні рішення з виваженим обранням колірної палітри і акцентів, оптимальне освітлення та сучасне ергономічне обладнання стають невіддільними компонентами ефективного сучасного офісного простору.

Наукова новизна полягає у визначенні основних чинників створення комфортного офісного простору на основі аналізу сучасної проєктної практики інтер'єру даного типу приміщень, виявленні сучасних тенденцій, підходів та прийомів формування інтер'єру офісу, що є подальшим вкладом у розвиток досліджень з дизайну офісного середовища.

Практичне значення одержаних результатів полягає у можливості їх застосування дизайнерами та роботодавцями при проектуванні інтер'єру та меблів для офісів.

Ключові слова: дизайн інтер'єру, офісний простір, комфортне середовище, ергономіка, художньо-естетичне рішення, функціонально-планувальна структура.

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