IMPORTANCE OF BIOPHILIC ATTRIBUTES IN EUROPEAN COWORKING SPACES

Irina Mohora

PhD, "Politehnica" University, Faculty of Architecture and Urbanism,Timisoara, ROMANIA,
irina.mohora@student.upt.ro
*Corresponding Author

Abstract

Contemporary coworking spaces are intended to form communities, offering shared territories to their users. Functionality and comfort prevail, representing a framework for productivity, creativity and the construction of professional networks. Wellbeing has become a stringent necessity in the office, rather than a form of luxury as it was perceived throughout history. Furthermore, it implies the fulfilment of a series of physical, functional and psychological criteria. Biophilic attributes have been recently related to workplace comfort, but studies have not yet specifically analyzed occupants` perception of space in their presence. As a result, the purpose of this paper is to identify whether European coworkers acknowledge the need for biophilic attributes in their workspace or whether they identify biophilia as a positive trait when it is included in the interior ambient.

Existing reports evaluate the present-day development of coworking spaces from multiple perspectives, but do not take in account clients` reactions towards spatial comfort relative to the presence or absence of natural features. Consequently, the research was based on the analysis of users` freely expressed reviews on the platform coworker.com, in regard to the quality of European coworking spaces. The selected biophilic criteria focus on a holistic sensory experience, implying all five levels of spatial experimentation and their direct or indirect effect on occupant wellbeing and productivity.

The research highlights a clear tendency of southern countries to openness towards exterior spaces, as they benefit from the outdoors for a longer period throughout the year. In contrast, one of the initial presumptions, Nordic countries would have been prone to include natural elements inside, but this is not a common practice as the results have shown. Although the main hypothesis of the research was that biophilic elements would be noticed and evaluated as positive in both exterior and interior spaces, only few situations tend to get this reaction when the quantity and quality of biophilic attributes is satisfactory enough and have a substantial impact on the user.

Although this analysis was conducted to determine feedback towards biophilic elements inside and outside coworking spaces, one cannot oversee the most important feature of such a workspace: the sense of community, as a social attractor and main determinant of modern collaboration. Therefore, the social aspect should be supported by all administrative and spatial characteristics: architecture, design and the links with natural features.

The practical implications of the paper target investors, managers and designers alike, who would be able to implement better coworking solutions and concentrate the budget on the spatial and functional characteristics that potentiate the workspace. This type of analysis is often overlooked in the decisional process, as it is a post-occupancy feedback method, but an inverted study can serve to organically identify important opinions for future updates, redesigns or relocations. In contrast to a survey or report based on specifically targeted questions, reviews give more freedom of expression, offering unexpected points of view that would otherwise be neglected.

The results raise two new possible hypotheses: the presence of biophilic aspects blends in the general ambience, becoming an integral part of the space and is no longer perceived as a special feature. On the contrary, when these vital traits (natural light, proper ventilation and temperature, window views) are missing, one experiences immediate negative reactions regarding comfort or functionality.

Keywords: Coworking, workplace design, biophilic attributes, nature connectedness, comfort, reviews, clients, community

1   INTRODUCTION

Modern man spends an important period of his lifetime inside, notably, at home and in the workplace. Even though architecture discussions often revolve around the omnipresent subject of residence, one must not overlook the significance of this second "home" that is certainly growing in importance, with more psychological and functional implications than ever before.

The transformation of work is nowadays reflected in new ways of collaboration, interaction, hierarchy and productivity. Previously, the simple action of "going to work" meant crossing a certain distance to a place where instruments were used collectively to perform specifically monotonous tasks, whereas today, there is a tendency of perceiving the workplace as an instrument per se, where human interaction is sustained by spatial layout, furnishing and overall interior space quality. Asides from classical office work, relatively new types of activities as freelancing and entrepreneurship, have risen the independence and mobility of the once called "white collars". What setting could fulfil the needs of such flexible activities? Firstly, the answer was home offices, then, as client meetings were involved, came the cafes, libraries and other informal meeting places and finally, the coworking emerged.

Being confronted with high mobility rates, receiving both local and international users, the interior design of coworking spaces is a constant challenge for investors, managers and architects alike. The general concept, functionality, comfort and layout, must assure an optimized dose of flexibility to host a wide range of activities, while remaining coherent and attractive to new clients. According to the platform deskmag.com, worldwide coworking networks are facing a constant growth and diversification (DeskMag, 2018) and the most stringent management challenges are attracting new members, market price and competition (DeskMag, 2018, p. 32).

Comfort, as defined by (Vischer, 2008), implies three degrees of complexity, starting with physical comfort, related to the physical environment (light, ventilation, humidity, air quality), functional comfort, defined by spatial potential of supporting activities and psychological comfort, related to personal wellbeing, sense of territory and human interconnectedness. While the physical and functional comfort are an absolute necessity in any workplace, psychological comfort deeply relies on personal preferences and might be of utmost importance on the coworking real estate market, marking the subjective differences between competitors. Indoor and outdoor natural elements are being integrated in office environments in order to confront the acute estrangement of urban areas from nature. Seen mostly as a temporary and costly tendency, investors often avoid directing funds towards greenery and outdoor leisure that do not bring immediate added value to office climates. But, based on user comfort and wellbeing, nature too shall become a norm for future projects and building refurbishments.

Pursuing this idea, the study aims to identify the major deficiencies between actual interior design and users` spatial perception, mainly considering the developing trend of biophilic design and human-nature connection. Consequently, the research brings forward and tries to define a fundamental human need, nature-connectedness, reflected in a highly dynamic environment.

1.1 Coworking Spaces: Evolution and Challenges

 "The freedom and independence of working for myself along with the structure and community of working with others." This is how Bradley Neuberg defines the coworking concept for the first time in 2005 (Haworth, 2010; BCNewt, 2015). From only three available coworking places in 2005, to 18900 locations worldwide in 2018, the fast pace of collaborative workstyle development demonstrates an ascending need for this type of service. (DeskMag, 2018). The actual motor of such a radical change is the Digital Era that has allowed an unprecedented mobility. Man is not necessarily physically present or connected to his workplace, but is

strongly connected to virtual, professional and social networks.

Raising from necessity to lifestyle, the gradual but speedy evolution of coworking followed the quick raise of technology and the work model transformation that evolved from physical work, to knowledge and digital work. These transitions have been immediately reflected in the office space. Consequently, there are several terms to describe work outside the classical office that tend to be synonymous to coworking: home office, remote work, telework, collaborative work, nomadism, etc. The concepts are implemented by agencies in the field of tertiary design through contemporary design patterns: Activity Based Work, Nomadism, Flex-office, Mixed space, Virtual Office.

From an ecological point of view, coworking is a sustainable way of space usage and recycling: the common employment of goods like furniture, printers, shared spaces, office supplies; the occupation potential is higher than a classical rental office due to a more flexible renting capacity and schedule. Generally, locations are central or at least well positioned relative to transportation cores, while bigger conurbations contain several coworking spots that are spread around the city, so people can choose the closest one, which reduces commute time, costs and pollution drastically for both tenants and their clients.

1.2 The Origins of Coworking

Several historical landmarks have led to the creation of the coworking concept. On the one hand, housewives` need to work from home decades ago (Saval, 2014, chap. 7), on the other hand, the financial crisis of the 90s` (Saval, 2014, chap. 7)that reduced the recently established corporate personnel who were obliged to seek work opportunities elsewhere, by creating various small businesses as entrepreneurs or freelancers.

The very first independent workplaces were people's homes for paperwork or coffee shops and other unconventional spots for meetings, unadapted locations to bureaucratic activities from spatial and functional points of view. According to a Deskmag report (Foerstsch, 2017), 45% of tenants have worked from home (teleworking) before choosing a coworking space. After several unsuccessful attempts, teleworking turned out as an inconvenient long-term solution, due to isolation from community, social and professional groups, (Saval, 2014, chap. 8; Nick Wakeman, 2017) despite the above stated ecological advantages.

Coworking spaces aim to fill the gaps between office work and home office, while allowing the needed flexibility and providing some common spaces and facilities. Typical coworking clients are freelancers and entrepreneurs, but there is a growing number of small companies and even corporations (DeskMag, 2018, p. 29) who reach out for an alternative workspace, in exchange for a regular rental, thus taking advantage of better common facilities, interaction with professionals from various fields of interest and taking part in events, all at advantageous costs.

2 WORKPLACE WELLBEING

2.1 Comfort in the Workplace

2.1.1 Comfort Typologies

Transitioning from production to digitalization, together with the augmented interest in knowledge work and creative thinking, the workforce requirements are becoming broader and more complex. Being provided that the first offices were rarely adequately equipped with minimal furnishing, supplies, little to no natural light, weak ventilation and restrictive functionality to undertake the necessary routine activities, nowadays, being given that automation solves most usual tasks, the human creative capacity becomes a unique instrument. Hence, productivity turns into an abstract concept, activated by individual and collective creativity, interdisciplinary collaboration and free management of time. In order to respond to these demands, the workspace extends beyond the physical limits, organically adapting to occupants` ideas, being designed to offer a wide range of collaborative spatial solutions.

Nevertheless, the essential conditions for functionality and habitability are basic physical comfort rules, regarding indoor space quality but also the intrinsic human-nature connection (Wilson, 1984): natural light, air quality, acoustics, materials, scents, nature connectedness. Physical comfort is necessary but insufficient for the proper functioning of the modern office. The other two conditions are the functional and psychological aspects transposed into spatial organization, furnishing, circulation optimization and aspects of territoriality and social relations.

The bottom line of a good office fit-out resides in the improvement of life quality, considering the three comfort patterns, firstly from the occupants` point of view and then from the economical and productivity

growth point of view. Considering that coworking users are mostly freelancers, the two stated targets often overlap. Consequently, it is believed that the three comfort types (Figure 1a) make the quintessence of a good workplace. Environmental psychology often refers to the importance of human-nature relatedness regarding comfort in the workspace (Figure 1b), in order to fight some of the well-known built environment issues: stress, nature alienation, illnesses caused by poor indoor climates.
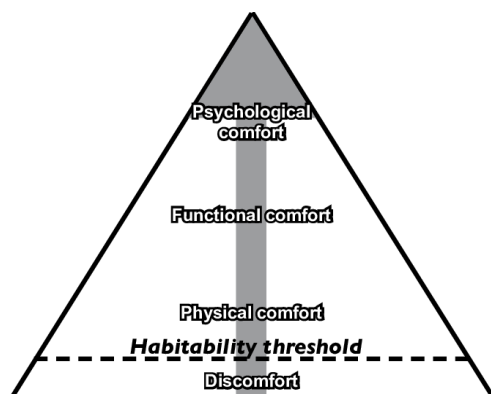

Fig. 1 a)The pyramid of comfort (Vischer, 2008)   b)Biophilic coworking: Second Home, Lisbon, Portugal

2.1.2   Interior Quality Standards

Recent studies have argued that sustainability not only resides in green systems and high-tech equipment for energy reduction, but also on the quality of indoor air, overall space standards and occupant wellbeing. Consequently, the already existing certifications such as LEED or BREEAM have added these as new criteria for the final evaluation, while new certifications are specifically targeted towards indoor quality such as WELL Building standard or HQE in France. Although less quantifiable than energetic performance and with less immediate results, the presence of nature in proximity of stressful human activities is shown to have great potential in cognitive, creative stimulation and stress reduction (Kaplan, 1995). Nature-building connectedness targets psychological comfort and human wellbeing and is becoming a requirement in both new buildings and refurbishments.

2.2 Workplace Comfort

2.2.1   Restoration And Nature Links In The Workplace

Restorative environments (Kaplan, 1995) firstly aim to reduce the adverse effects of anthropogenic interventions, development on natural systems and human health and secondly promote more positive contact between people and nature in the built environment. In 1991, the scientist and architect Dr. Roger S. Ulrich demonstrates (Ulrich *et al.*, 1991) that exposure to natural elements aids in psychological and physiological recovery, better than prolonged exposure to any type of built environment. Considering that most people spend a great part of their time indoors, lack of nature connectedness is being resent in illnesses causing high stress levels, mental health and respiratory problems, all defined as "The Sick Building Syndrome".

According to the « Attention Restoration Theory » elaborated by Stephen Kaplan (Kaplan, 1995), diverse vegetation and natural views have a major contribution on wellbeing and health in general. In like manner, the American ecologist and researcher Stephen R. Kellert states in his work "Building for life" that there are multiple possible relations between the built environment, nature and man, so a certain balance can be created with proper design methods based on Kellert`s main Biophilic attributes: *nature in space, natural analogues, nature of space* (Stephen R. Kellert, 2005, chap. 2; Green, 2016)*.*

These Biophilic principles target a complex experimentation of the surroundings, by implementing green systems and architectural elements in the built ensemble, leading towards harmonious correlations between human activities and nature. Biophilic interior designs were firstly appreciated in healthcare, where the beneficial effects were visible in quicker healing and less medication of patients directly related to natural landscape window views (Ulrich *et al.*, 1991). Noticing all the health-related problems of employees, the nature-relatedness strategy had to be incorporated in office buildings enforcing a different approach on architecture and interior space.

2.2.2 *Sensorial Perception And Attention In Work Environments*

Visual perception is intensely studied relatively to architecture and design, but the work environment implies a wide range of sensorial experiences that influence the human-space relation and concentration capacity. Attention is also closely related to productivity, as excessive environmental stimulation leads to diverted attention, lowering productivity.

Urban settings and the digital world abound of stimulus that engage active attention (tasks, activities) and involuntary attention (sound, light) (Williams, 2017, p. 42) in a beneficial manner, inducing frequent short interval reactions, that become extremely demanding for mental health. Voluntary or directed attention is limited and requires restoration, thus, variations with disconnection and engagement of involuntary attention are mandatory. Nature sends less stimulus, with a lower range of demanding tasks in comparison to the office (emails, phone calls, calendar alerts, meetings). Hence, nature urges people to reach for profound ideas and creativity, generating a state of calm and inner peacefulness. In a world where urban bustle is inherent, one must learn how to develop resiliency and the means that lead to that state of mind. The present research leans considerably on both directed and involuntary attention to identify perception patterns of biophilic elements in coworking spaces. It is assumed that some elements will be perceived through directed attention and reflected in users' reviews, while other elements will tend to blend in the general ambient, being mostly perceived indirectly and probably will not be clearly spelled out.

Human brains have the capacity to filter (screen) information received from the environment, limiting the stimulus that affects the body, as a result, what people see and hear is also limited. The brain is a filter that helps prioritize information and tasks, allowing a maximum engagement of four simultaneous actions (Williams, 2017, chap. 4). Considering this filtration ability, it is interesting to observe what exactly are the foremost environmental stimulus that engage or attract attention of coworking users. According to Deskmag`s Global Coworking Report, noise and lack of space are the only spatial and comfort issues stated in the first ten problematic criteria (DeskMag, 2018, p. 32) of coworking offices. Noise mostly affects concentration, while lack of space might have severe sensorial and functional implications, both leading to decrease in productivity if perpetuated on a longer timeframe.

3 HYPOTHESIS

There is an emerging tendency in corporate interior design to insert vegetation near work desks, in office proximity or common spaces. Firstly, one must wonder whether this, as any other design style, will end by fading away in time or whether closeness to nature is a stringent necessity in the work environment. Theoretically, sustainability is not an evanescent tendency, as contemporary environmental issues are not temporary either; but the challenge is to identify whether coworking occupants are conscious this nature connection necessity.

According to several statistical reports (Foerstsch, 2017) the most important traits when choosing a coworking space from users` point of view are: a social atmosphere (59%), interaction with other members (56%) and a strong community (55%). They are followed by the proximity to the members' homes (51%), good value for money, good transport links (each 41%) as well as a basic office infrastructure (38%).

This research intents to complement these statements and asks important questions regarding a more profound view on occupant comfort and wellbeing, related to the biophilic aspects of the workspace that will be further discussed in the following sections.

4 METHODOLOGY

Unlike a classical targeted survey this research was based on the comparison and analysis of freely expressed reviews of coworking users around Europe. These are not specialist reviews, but sheer opinions that highlight what drew people`s attention on positive or negative ways.

Using the public database on the platform *www.coworker.com* (Coworker.com, 2018), over 1500 reviews have been classified and analyzed, respectively a maximum of 70 reviews (or less when unavailable) for each European country. Both positive and negative opinions have been taken into consideration, quantified as "+1" for positive or "-1" for negative, each time a certain aspect was clearly stated. Firstly, the reviews were classified by region (Western, Eastern, Central, Northern) and country. This allowed rapid observations concerning local habits or preferences. Secondly, a set of criteria had to be established in order to obtain clear results. As the character of the study was mostly organic, the classification was developed accordingly, following mostly expressed opinions, but keeping in mind the main aim of the study, that of identifying biophilic traits and the influence on productivity.

As a synthesis of the theoretical part described in the previous section, the biophilic criteria selection was based on Stephen Kellert`s findings regarding the insertion of natural attributes in interior design. Thus, the emphasis of complex sensorial experiences was pursued, correlated with the effects over the psychological state and productivity. Following the three main levels of building-nature connectedness, *nature in the space, nature analogues and nature of the space* (Stephen R. Kellert, 2005; Green, 2016), the foremost important criteria selection of this research was formulated, *Biophilic criteria*: visual connection with nature (window views), connection with natural systems (outdoor greenery), Non rhythmic sensory stimuli (indoor greenery), Nature of space (interior design), comfortable working environment, Dynamic and diffuse light (natural light). The following categories are meant to support and complement arguments and conclusions drawn from this first one. These are: *Spatial criteria: Prospect and refuge (*private booths, meeting rooms), Biomorphic forms and patterns (building character), location; *Social criteria*: good management, pleasant coworkers, community oriented, networking opportunities; *Facilities*: internet connection, price, food and beverages, complimentary amenities.

5 RESULTS AND DISCUSSIONS

5.1 How Are Biophilic Elements Perceived In Coworking Spaces?

Considering the environmental screening capacity, it is expected that surrounding information will be hierarchically structured and processed, so different coworking places shall promote site-related traits with various intensity, scales that will have a different impact on each occupant.

Regarding the "Nature in space" biophilic principle, visual connection with nature and natural systems are to be considered in the shape of urban parks and squares, alignment trees or dispersed vegetation and in the best cases, complex natural landscapes. Most coworking spaces are centrally situated but closeness to greenery depends on the regional character. Office position is usually positively evaluated, including accessibility, proximity to complementary functions and greenery as well, so the presence of vegetation is seldom perceived as an asset per se. Places characterized by strong spatial features (a special courtyard, seaside location, mountain side) tend to impress the viewer in this regard, while the community aspect falls in second place when the coworking space is reviewed. Coworking spaces near important natural landscapes such as seaside (Croatia, Greece, Portugal) or mountains (Serbia) attract users especially through these features and a corresponding interior design. In opposition, leaner types of workspaces (Nieuwenhuis *et al.*, 2014) are remarked by their potential to enhance social activities and networking.

The "Nature analogues" principle involves abstract interpretations of nature in the built environment, through biomimicry and might be reflected in actual shapes, connections or functional systems of space. Architectural character and connection to heritage are important assets of any office location, influencing the interior design concept, spatial organization and local atmosphere through either obvious or subtle stylistically details. Considering the Classical architectural orders, the 1900s styles of Art Nouveau and Art Deco, historical patterns draw inspiration from natural models, bringing an intrinsic visual comfort to any space, unusual for new or modernist constructions. Unconsciously, people are attracted to these specific details that inspire prestige and aesthetical comfort on the other hand.

Material connection with nature is yet another way of transposing nature in design, through both tactile and visual experiences of surface. Being also an integral part of the general concept, this aspect is seldom realized or expressed in the analyzed situations, as it integrates in the overall visual environment.
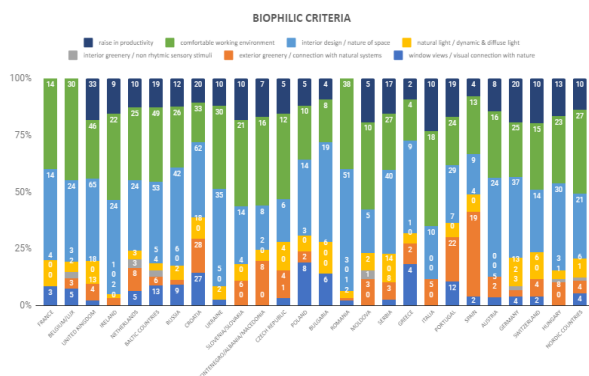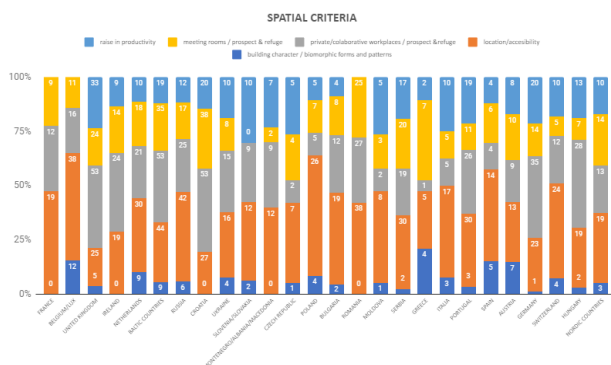

Fig. 2 Biophilic criteria analysis

Fig. 3 Spatial criteria analysis

"Nature of space" is mostly reflected in the Prospect and refuge biophilic attribute, a common aspect of contemporary office design, implying that throughout his development, man needs safe, isolated spots also allowing optimal views on the surrounding activity. Reflected in the workplace, this involves creating both individual, quiet areas and common rooms with optimally oriented sights towards wider spaces. A proper balance between individual and collaborative activities is more important than the actual surface; as a result, several situations have shown that restraint spaces with well-balanced organization are more appreciated than large surfaces of monotonous office configuration.

5.2 How Is The Absence Of Biophilic Attributes Understood Related To Comfort And Functionality?

Coworking is a growing trend among freelancers and companies alike and it is a viable alternative for home offices with all the advantages. Lack of professional entourage, typical household distractions and important financial investments in technical equipment when working at home, are strong arguments to embrace the transition to a coworking community. The professional atmosphere is also an advantage in client meetings. As a result, most reviews target these aspects, as they have chosen and appreciated the concerned spaces for the offered common amenities, good management, a strong community feeling and networking opportunities. There rarely are reviews that do not state these features.

Space is often widely defined as "comfortable" when basic requirements as natural lightning, acoustics, ambient diversity and layout flexibility are met. Spatial layout is not seen as a positive trait when its functionality is favorable, however, few situations highlight dissatisfaction mainly concerning acoustics, lack of surface or insufficient individual/focused or group workspace choices (Figure 4). Most positive opinions arise from spaces that offer multiple options regarding theme, atmosphere, collaboration, quietness and isolation levels. Space layout, general atmosphere and physical comfort aspects are meant to facilitate workflow and collaborative activities; most negative reviews are related to one or more physical or spatial traits that impede working conditions, like noise, improper common facilities or bad furniture (Figure 4).
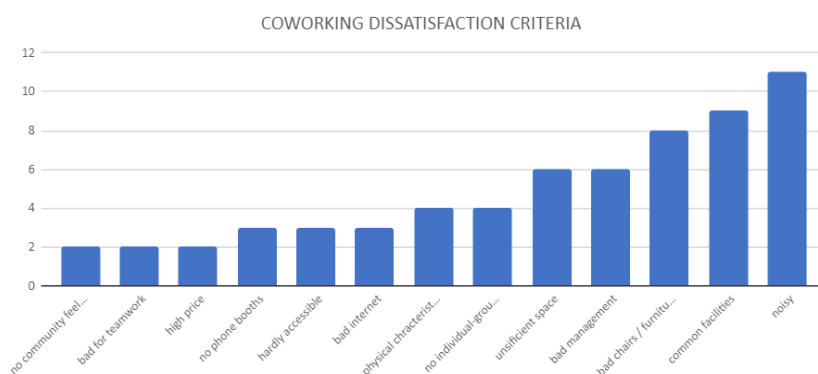
Fig. 4 Coworking dissatisfaction criteria

Being given the main subject of the paper, we notice that green features are not often among the most wanted characteristics of a functional space, unlike natural lightning, temperature and ventilation that were encountered repeatedly. Consequently, lack of greenery in office proximity is whether not felt and is not expressed accordingly, or it is present and passes unnoticed. In the second case one may assume that the quality and quantity of the vegetated material is insufficient to have enough impact on the viewer.

5.3 What Are The Regional Habits Regarding Office Greenery Preferences?

Interior greenery was especially pursued as a biophilic feature throughout this study. Unfortunately, very few reactions were found, although several locations did include green walls, potted plants or outdoor views. Nevertheless, one of the initial presumptions was partially confirmed, as all positive reactions towards interior greenery come from cold climate countries (Belgium, The Netherlands, The Baltic Countries, Moldavia, Germany and The Nordic Countries). Consequently, comparing to a total lack of indoor greenery reactions from the warm climate countries, we can confirm a tendency of Nordic countries towards bringing nature inside, as access to outdoor greenery is limited.

Regardless of geographical location, several common traits emerge when analyzing users` preferences, referring to basic needs that support the actual work and collaboration process. Internet connection, quality

food and beverages are amid the most sought-after facilities and are found in most reviews (Figure 5). The nature of modern collaborative work demands high speed connectivity, while the need for quality meals and coffee are to be taken into consideration not only from a basic point of view but also as an alibi for networking, discussion and collaboration.

From the psychological comfort perspective, the importance of interhuman relations (Figure 6) is to be highlighted, coagulated by the general culture and concept of the place. A unique coworking is seen as attractive through the ideas that are promoted within (recycling, training events and meetings, networking evenings, etc), the potential to create a sense of community (Lyndon, Gretchen and Peter, 2017), foster professional liaisons and finally enhance individual and group productivity.
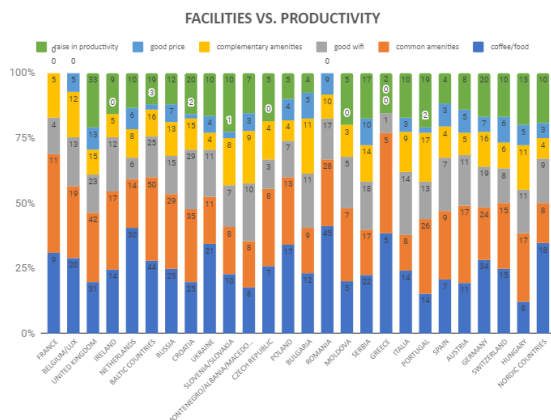

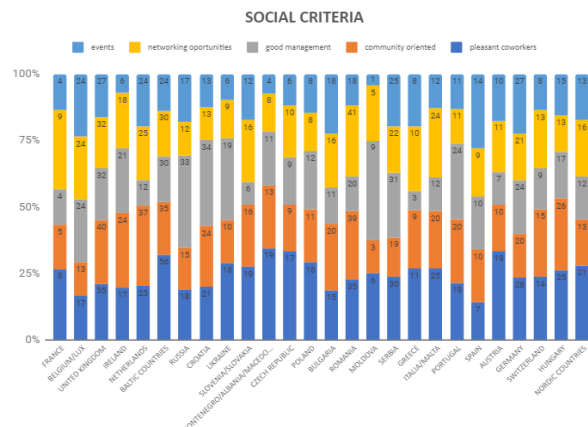Fig. 5 Facilities and productivity analysis

Fig. 6 Social criteria analysis

6   CONCLUSION

As a general conclusion after the analysis of the three main categories of criteria, it is obvious that location is of great importance, implying several aspects: accessibility, position within the built fabric, proximity to complementary facilities and access to outdoor greenery. While the first three criteria are of utmost significance in the decisional process of coworking place selection, greenery does not stand out as a factor per se. Natural landscapes are considered when choosing a workplace if they offer a complex set of leisure or sports opportunities nearby (ski resort, beach, playground, riverside). Hence, landscape views and visual connections to other green systems are not seen as essential in the workplace, although several research sources argue for the beneficial character.

Albeit an ascending design trend and lifestyle revolving around sustainability and greenery, indoor greenery is found among the least important comfort traits of coworking spaces, in opposition to outdoor greenery and leisure areas that were highly appreciated when correlated to office activities and events. Natural landscapes were noticed as well when they took part in the location character: mountain resort, seaside or river side, view over a park.

A developing confirmation of one hypothesis is that of colder climate countries, northern or central-European, which tend to include more greenery inside than southern countries with warmer climates. The difference resides clearly in the accessibility level of the outdoor space, more restrictive for colder climates.

Comfort is an often-expressed statement regarding the overall condition of the workplace, referring to physical, functional and psychological contentment. Comfort is indeed partially a subjective preference, but physical and functional comfort tend to include many similarities from one individual to another and as stated above, the psychological aspects, mainly the social component, are of great importance in coworking spaces.

6.1 General Recommendations

There are several directions that could be taken into consideration by coworking space investors and designers regarding green space. Firstly, location-wise, one should aim for a place in walking distance from accessible greenery: park, river banks, lake, seaside, mountainside, that also allows people to engage in sports or leisure activities. Secondly, when the context does not permit outdoor greenery nearby, interior courtyards, patios and terraces used for both mental restoration and occasional work, can become as

valuable as natural landscapes, when properly designed and purposed. In the third place, if neither of the above can be fulfilled, interior design must integrate valuable green features inside, targeting a complete sensorial experience.

6.2 Limitations and Further Study

A future study might aim towards comparing several coworking spaces with green features in detail, considering the initial investment versus user's actual opinions concerning the space. This would serve both investors to better direct their finances and designers as well to accentuate those desired features.

The study can be expanded to a worldwide scale, respectively narrowed down to each country independently or further to urban level. This would allow to generate a wide, regional and local trend concerning the preferences over greenery on coworking spaces. Subjectivity is among the limitations of the method, as spatial and greenery perception might be also influenced by personal preference and thus end up being overlooked in reviews, although the green system is present.

6.3 Acknowledgements

REFERENCE LIST

BCNewt (2015) *Bradley Neuberg Interview on the creation of the coworking concept*. Available at: https://www.bcnewt.com/en/blog/2015/02/17/bradley-neuberg-creador-concepto-coworking/.

Coworker.com (2018) *Coworker, work outside the box*. Available at: https://www.coworker.com/reviews.

DeskMag (2018) *Ultimate Coworking Space Data. selected visuals taken from the 2018 Global Coworking Survey*.

Foerstsch, C. (2017) *The Members: How, When & Why Do They Work in Coworking Spaces?* Available at: http://www.deskmag.com/en/coworking-space-members-how-when-why-are-people-working-in-coworking-spaces-statistics-market-report.

Green, T. B. (2016) *The economics of Biophilia: Why designing with nature in mind makes financial sense*, *Journal of the Philosophy of Sport*. doi: 10.1080/00948705.2016.1199281.

Haworth (2010) 'Harnessing the Potential of Coworking', (1), pp. 1–7. doi: 10.1097/PRS.0b013e3181c2bb9d.

Kaplan, S. (1995) 'The Restorative Benefits of Nature', *Journal of environmental psychology*, pp. 169–182.

Lyndon, E. G., Gretchen, M. S. and Peter, A. B. (2017) 'Co-constructing a Sense of Community at Work: The Emergence of Community in Coworking Spaces', *Organization Studies*, 38(6), pp. 821–842. doi: 10.1177/0170840616685354.

Nick Wakeman (2017) *Once a telework pioneer, IBM pulls employees back to the office*, *Washington Technology*. Available at: https://washingtontechnology.com/blogs/editors-notebook/2017/03/ibm-telework-change.aspx.

Nieuwenhuis, M., Knight, C., Postmes, T. and Haslam, S. A. (2014) 'The relative benefits of green versus lean office space: three field experiments.', *Journal of experimental psychology. Applied*, 20(3), pp. 199–214. doi: 10.1037/xap0000024.

Saval, N. (2014) *Cubed: A Secret History of the Workplace*. Available at: https://www.amazon.com/Cubed-History-Workplace-Nikil-Saval/dp/0385536577.

Stephen R. Kellert (2005) *Building for life - designing and understanding the human nature connection*. Island Press; 2 edition.

Ulrich, R. S., Simonst, R. F., Lositot, B. D., Fioritot, E., Milest, M. A. and Zelsont, M. (1991) 'Stress Recovery

During Exposure To Natural and Urban Environments 1', *Journal of Environmental Psychology*, 11, pp. 201–230. Available at: http://ac.els-cdn.com/S0272494405801847/1-s2.0-S0272494405801847-main.pdf?_tid=5b3fd6c6-3734-11e7-94b2-00000aab0f26&acdnat=1494608546_ac2e3b3fff9febb768d491f62610cb4a.

Vischer, J. C. (2008) 'Towards an Environmental Psychology of Workspace: How People are Affected by Environments for Work', *Architectural Science Review*, 51(2), pp. 97–108. doi: 10.3763/asre.2008.5114.

Williams, F. (2017) *The Nature Fix*. W. W. Norton & Company.

Wilson, E. O. (1984) *Biophilia*. Harvard University Press. Available at: http://www.hup.harvard.edu/catalog.php?isbn=9780674074422&content=reviews (Accessed: 7 June 2017).