

ENRICHING CO-WORKING SPACES WITH BIOPHILIC DESIGN: ITS IMPACT IN ENHANCING USER PREFERENCE

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ABSTRACT

Humans have an innate love of nature. As a result of rapid advances and technological developments, our relationship with nature is growing increasingly distant. Due to urbanization, people have lost touch with nature and have restricted access to greenery and open spaces. Modern lifestyles do influence the occupants to work longer periods in order to deal with enormous workloads and achieve deadlines. A majority of the co-working occupants are stressed, dealing with challenging emotions that lead to an unhealthy lifestyle. Studies indicate that if natural elements are used in a built work environment, it enhances well-being of people by helping them reconnect with the natural elements such as water, ventilation, colours, scents, natural lighting, a practise known as 'biophilic design'. Modern co-working spaces are designed to foster community by providing users with shared spaces. Effectiveness and comfort of the occupants' reign supremacy, serving as a foundation for productivity, collaboration, creativity and the development of professional networks. The findings demonstrated that current biophilic design patterns greatly improve coworkers' emotional well-being and may be utilised as a design guideline. Furthermore, this study looked into different ways of applying biophilic design patterns, which might impact the quality of biophilic encounters and thus increasing user Occupancy Rate. The study's practical implications are aimed at investors, managers, and designers, who will be able to implement better co-working solutions and focus their budgets on biophilic elements, spatial designs and functional qualities which enrich and enhance the user preference at co-working spaces.

KEYWORDS: Co-Working, Biophilic Attributes, User Occupancy, Nature Connectedness,.

Introduction

"Look deep into nature, and then you will understand everything better".

- Albert Einstein

Exposure to nature today has never been more crucial than ever. We're spending more time indoors and away from nature than ever before, thanks to longer work hours and longer commutes. This means we're missing out on the vital psychological and physiological advantages provided by trees, fresh air and waterbodies. But it's not all doom and gloom, due to a "Biophilia", which is changing the way we think about and interact with our surroundings (Zack Sterkenberg, 2017)¹.

Numerous studies reveal that humans prefer the natural environment to the built world, therefore biophilic design allows humans to collaborate with nature without jeopardising our advanced way of life. The need for beneficial contact with nature continues to be critical to people's health and fitness, but its satisfactory occurrence in today's-built environment has become highly challenging. The result has been an increasing disconnect between people and nature in the built environment reflected in inadequate contact with natural light, ventilation, materials, vegetation, views, natural shapes and forms and in general beneficial contact with the natural world.

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¹ Zack Sterkenberg. (2017, October). Retrieved from google: <https://www.ambius.com/blog/why-biophilia-matters/>

Biophilic design is a design approach that attempts to reconnect the indoor and outdoor worlds through the use of natural materials and ventilation, water features, colours, scents, natural lighting, outdoor views and sound. The objective of biophilic design is to address the deficiencies of contemporary architecture, design and landscape practice by developing a new framework for a satisfying experience of nature in the built environment. (Dalal Nasser Alaqueel, 2019)¹ Biophilic design is a method of creating workspaces that are sensitive of their users' health, mental and physical well-being. When used appropriately, biophilic designs provide a range of therapeutic, emotional, and behavioural advantages. (S. Kellert & Calabrese, 2015)² Human Space Report (Cooper)³ states feeling good usually translates to being able to do more. There is clear evidence directly correlating biophilia with the productivity of a workspace, in addition to the multitude of studies that demonstrates the relationship between well-being and productivity. In a European study, Cardiff University⁴ researchers observed strong associations between nature and greater productivity.

This study is driven by a belief that a well-designed human-nature connection should play an important role in improving residents' health and well-being by raising their environmental awareness and nature connect (CHEN, 2017)⁵ which will help the users to derive the benefits of nature but will also enhance their creative potential.

Browning, et.al (2014)⁶ in their paper presented a framework for biophilic design that is reflective of the nature-health relationships most important in the built environment – those that are known to enhance our lives through a connection with nature. Furthermore, the study explores the patterns in a general sense in order to address universal concerns of human health and well-being. (e.g., stress, visual acuity, hormone balance, creativity) within the built environment which in a specific way can be applied to co-working spaces which includes occupants from diverse professions and join due to the preferred attributes that co-working space provides them which enhances occupants creative potential and incorporating biophilic design can only bring them a step closer as to how nature can make the occupants feel better, puts the people using space in better state of mind thereby enabling the people to connect better with the space, sharing ideas, knowledge, resources and skills.

Thus, further study is required to determine the use of biophilic design patterns in a proper and effective way in built environment so as to create better biophilic experience. In addition, the biophilic design patterns can be used as a guideline to design commercial adaptive reuse spaces, increase occupants' performance and company socio-economics in the future (Lerner, A., & Stopka, M. (2016)⁷

This paper examines whether the usage of natural elements influences the creative potential of the users of co-working space and if it benefits users physically, emotionally and whether biophilic designing influences the occupancy rates with a strong indication that the rise in engagement with biophilic design components in co-working spaces will provide useful data to designers, individuals, co-working spaces, corporates to make their environments healthier for the occupants.

Review of Literature

Lerner, A., & Stopka, M⁸ described that the biophilic design patterns impact the quality of biophilic experiences. Those who experienced them achieved higher productivity from changes in the ventilation standards, others emphasized the importance on their well-being. **Tonia Gray and Carol Birrell⁹**, the research shows that incorporating components of biophilic design has a substantial influence on increasing productivity, reducing stress, improving well-being, promoting a collaborative work

¹ Alaqueel, D. (2019). Biophilic Design Contributions to Health and Wellness in Co-working Settings

² Kellert, S., & Calabrese, E. (2015). The practice of biophilic design. *London: Terrapin Bright LLC.*

³ Cooper, P. S. (n.d.). Design in the workplace – the Biophilia imperative. Retrieved from plus.nl/resources/article files/Human-Spaces-report-web-res-3.pdf.pdf

⁴ Nieuwenhuis, M., Knight, C., Postmes, T., & Haslam, S. A. (2014). The relative benefits of green versus Lean office space: Three field experiments. *Journal of Experimental Psychology: Applied*, 20(3), 199.

⁵ The Impact of Biophilic Design on Health and Wellbeing of Residents Through Raising Environmental Awareness and Nature Connectedness. The University of Georgia, ATHENS, GEORGIA. Retrieved from https://getd.libs.uga.edu/pdfs/chen_yingting_201708_mla.pdf

⁶ Browning, W.D., Ryan, C.O., Clancy, J.O. (2014). 14 Patterns of Biophilic Design. New York: Terrapin Bright Green llc.

⁷ Lerner, A., & Stopka, M. (2016). The Financial Benefits of Biophilic Design in the Workplace: A Review and Summary of Current Research. MIST Environment.

⁸ Lerner, A., & Stopka, M. (2016). The Financial Benefits of Biophilic Design in the Workplace: A Review and Summary of Current Research. MIST Environment

⁹ Gray, T., & Birrell, C. (2014). Are biophilic-designed site office buildings linked to health benefits and high performing occupants? *International journal of environmental research and public health*, 11(12), 12204-12222.

environment, all of which contribute to a high-performance workspace. The study reveals that biophilic offices are high-performance workplaces. **Abby Lerner and Mike Stopka**¹ studies the financial benefits of biophilic design in the workplace and their study shows that human body demonstrates a positive response to the biophilic element and how natural day light helps to balance the daily cycle of hormonal activity. The result shows office employees with nature and green view performed better as compared to office without any biophilic elements. **Van de Koevering, J.G.C**² The results of the study reveals that the order of importance of preferred characteristics of co-working space are accessibility, location, layout of space, diversity of tenant, facilities and services, community and sustainability and office décor where the most important motivation to work in co-working space. **Paul Downton, David Jones, et.als.**,³ reviews the application of biophilic design in Australia, including the scope of design, health literature, the '14 Patterns of Biophilic Design' and performative measures, brings forward a new Biophilic Design Pattern. Their study summarises that biophilic design is a rapidly evolving discipline and is set to become a vital part of making the kind of modern, liveable Eco city. The larger strategy is that biophilic design, using the **Browning et al.**⁴ 14 Patterns of Biophilic Design, with an additional 15th Pattern, offers a pragmatic applied performative criteria upon which place-making and built environment projects can be measured in creating healthy places (**Downton et al.**)⁵ for humans and living systems alike. **Ayuso Sanchez et.als.**⁶ In their article focussed on the development of a tool to measure improvement in productivity their study evaluated and measured the combination of greenery and daylight into a biophilic design and the results highlighted an improvement in well-being, performance, creativity and health.

Benefits of Biophilic Design in Offices & Co-working Spaces⁷ this article focusses on how start-ups and innovative co-working spaces are redefining how a workplace should look like. The case on Amazon 'spheres' boasts of vegetated surface, a 'recharge space' aims to connect employees and visitors with nature in an urban setting. The article results showed that offices environments which had incorporated natural elements showed 15% higher level of wellbeing and ensured higher levels of employee creativity and motivation. **Determan, J., Akers, et.als., (2019)**⁸ Their study focussed on designing a physical learning environment with biophilic design and to see whether it helps to reduce student stress and improve learning outcomes in a middle school Math class at a public charter school in West Baltimore. The study presents data collected from a biophilic classroom and a control classroom, where the physical design of each space varies wherein, one is a traditional classroom and the other biophilic classroom. The finding reveals that the biophilic classroom helped to reduce students' stress levels, learning outcomes were 3 times more in Biophilic enabled classrooms. **Dalal Nasser Alaqueel**⁹ analyses the common pattern of biophilic design in workplace setting. The result of study emphasizes on providing clear view from workspace as it maintains the connection with natural system which enhances the positive health responses. The study recommends co-working space to increase the visual connection with nature to enhanced workspace, increase thermal and airflow variability pattern, which provides visual comfort, enhances mood and provided comfort to the users of co-working space. **Qinghua Lei, C. Y**¹⁰ in their study highlight that dose of greenery at workplaces impacted health and productivity performance. Their study observed that productivity improved in all places wherein greenery was placed. The research outputs provide important measurement datasets for quantitative biophilic design research, but also for important understandings to support biophilic design practice since green coverage ratio is one of the most important design parameters.

¹ Lerner, A., & Stopka, M. (2016). The Financial Benefits of Biophilic Design in the Workplace.

² Van de Koevering, J. (2017). The preferred characteristics of co-working spaces (Doctoral dissertation, Master's Thesis. 2017. Eindhoven University of Technology, Netherlands. 25 November).

³ Paul Downton, David Jones, Josh Zeunert, and Phillip Roös, (2017), "Biophilic Design Applications: Putting Theory and Patterns into Built Environment Practice," in The International Conference on Design and Technology, KEG, pages 59–65. DOI 10.18502/keg.v2i2.596

⁴ W.D. Browning, C.O. Ryan, and J.O. Clancy, 14 Patterns of Biophilic Design, Terrapin Bright Green, LLC, New York, (2014).

⁵ P. Downton, D.S. Jones, and J. Zeunert, Creating Healthy Places, Melbourne Metro, Docklands, Melbourne, (2016).

⁶ Ayuso Sanchez, Julia; Ikaga, Toshiharu; Vega Sanchez, Sergio (2018). Quantitative improvement in workplace performance through biophilic design: A pilot experiment case study. *Energy and Buildings*, 177(), 316–328.

⁷ Mohora, I. (2019). Importance of Biophilic Attributes in European Coworking Spaces. *Proceedings of INTCESS*, 979-988.

⁸ Determan, J., Akers, M. A., Albright, T., Browning, B., Martin-Dunlop, C., Archibald, P., & Caruolo, V. (2019). The impact of biophilic learning spaces on student success. Retrieved from <https://cgdarch.com/wp-content/uploads/2019/12/The-Impact-of-Biophilic-Learning-Spaces-on-Student-Success.pdf>

⁹ Alaqueel, D. (2019). Biophilic Design Contributions to Health and Wellness in Co-working Settings.

¹⁰ Qinghua Lei, C. Y. (2021). A quantitative study for indoor workplace biophilic design to improve health and productivity performance. *Journal of Cleaner Production*, 324. doi:<https://doi.org/10.1016/j.jclepro.2021.129168>

Objectives

- To investigate the benefits of incorporating biophilic design in Co-working Spaces.
- To analyse the creative potential of occupants at Co-working Spaces which have incorporated biophilic design.
- To evaluate the occupancy rates of Co-working spaces designed with biophilic architecture/elements.

Statement of the Problem

In today's businesses scenario, there is increasing demand for co-working spaces in every country globally which helps to maintain the work-life balance and there is also increase in the demand of biophilic elements such as greenery, water, colour, light etc., in co-working space due to the increasing awareness of health and wellbeing of the individuals. Further, work settings have an impact on our creativity, productivity and overall well-being. This study focuses on the importance of implementing biophilic design in co-working spaces in order to enhance user preference for such spaces.

The main aim of the study is to understand the attributes of biophilic design in co-working spaces, users' response to the benefits of biophilic elements, to analyse creative potential of the users of such spaces, to evaluate the user preference for and higher occupancy rates in co-working spaces which incorporate biophilic designs.

Research Methodology

• Data Source

The required primary and secondary data for the present study was explored through interviews and questionnaire from respondent users of co-working spaces and also from published reports, journals and surveys.

• Sample Unit and Size

Sample respondents' population comprised of professionals, consultants, real estate agents, freelancers, start-ups and employees from different organizations in two co-working spaces. A total of hundred and seven (107) respondents are considered to gather the data. The study uses random sampling technique to administer the questionnaire.

Hypotheses

H₁: There is statistically significant difference in the perception of the benefits of adopting biophilic design in co-working space as per qualification of the users.

H₂: There is a significant difference in creative potential of users of co-working space which have adapted biophilic design with regard to professional title.

H₃: There is an impact of the biophilic design on the occupancy rate of co-working space.

Limitations of the Study

The study covers only aspects viz., biophilic elements, benefits of natural elements and creative potential of users provided with respect to understanding its impact on occupancy rates further the study is restricted to respondents of two co-working spaces only.

Analysis and Results

Descriptive research is used for the study. Since the co-workers are available at different times according to their work schedule and convenience and considering the difficult times prevailing, the sample size is restricted to 135 respondents who are working in two co-working spaces. Results were analysed and tested with the help of Frequency Analysis, Levene's Test for Homogeneity Variance, ANOVA, Regression Estimation and Tukey's HSD (Honestly Significant Difference) Test. Finally, there were 18 partial responses and 10 unanswered responses which were excluded and 107 completed responses were considered for analysis (Response rate of 79%).

H₁: There is statistically significant difference in the perception of the benefits of adopting biophilic design in co-working space as per qualification of the users.

The hypothesis is analysed and tested with the help of Tests of Homogeneity of Variances and ANOVA.

Table 1: Tests of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
Benefit_mean	Based on Mean	1.673	3	103	.177
	Based on Median	2.424	3	103	.070
	Based on Median and with adjusted df	2.424	3	101.428	.070
	Based on trimmed mean	1.911	3	103	.132
(Primary Source)					

Table 1 (a): ANOVA

Benefit_mean					
	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	.356	3	.119	.364	.779
Within Groups	33.604	103	.326		
Total	33.960	106			
(Primary Source)					

It can be inferred from Table 1 that: the significance value of Levene statistic¹ based on a comparison of medians is .070. Since, it is not a significant result, it means requirement of homogeneity of variance has been met, and the ANOVA test can be considered. Furthermore, it is inferred from Table 1 (a), that Sig P value from the table = 0.779 that is Significance P value is more than 0.05 alpha levels, hence H1 is rejected and Null hypothesis H0 is accepted. i.e., there is no significant difference in the perception on the benefits of adopting biophilic design in co-working space with regard to education variable of respondents. Factually, not all end-users have the same motivations for choosing a co-working space. Spinuzzi² found that co-workers seek many other benefits from using a co-working space related to interaction, feedback, trust, learning, partnerships, encouragement and referrals and to conclude, in this study users with different qualifications have the same perception on the benefit of having biophilic designed co-working space.

H₂: There is significant difference in creative potential of users of co-working space which have adapted to biophilic design with regard to professional title of the users.

The hypothesis is analysed and tested with the help of Tests of Homogeneity of Variances and ANOVA.

Table 2: Tests of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
Creative_Potential_ User_Mean	Based on Mean	1.562	11	95	.123
	Based on Median	1.004	11	95	.449
	Based on Median and with adjusted df	1.004	11	74.106	.451
	Based on trimmed mean	1.450	11	95	.164
(Primary Source)					

Table 2 (a): ANOVA

Benefit_mean					
	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	8.093	11	.736	2.788	.003
Within Groups	25.070	95	.264		
Total	33.163	106			
(Primary Source)					

It can be inferred from Table 2 that: the significance value of Levene statistic based on a comparison of medians is .449. Since, it is not a significant result it means the requirement of homogeneity of variance has been met, and the ANOVA test can be considered to be robust. Further

¹ Nordstokke, David & Zumbo, Bruno & Cairns, S.L. & Saklofske, Don. (2011). The operating characteristics of the nonparametric Levene test for equal variances with assessment and evaluation data. *Practical Assessment, Research & Evaluation*. 16. 1-8.

² Spinuzzi, Clay. (2012). Working Alone Together Co-working as Emergent Collaborative Activity. *Journal of Business and Technical Communication*. 26. 399-441. 10.1177/1050651912444070.

Table2 (a) offers ample statistical evidence to infer that occupants with varied professional titles have difference in creative potential, as the levels of significance in the ANOVA table is less than the threshold limit of 0.05. Hence, this hypothesis is validated empirically. With this result there is ample empirical evidence to reject H0 at 5% level of significance and accept H1, signifying there is statistically significant difference among the occupants bearing different professional titles in the co-working spaces. The method used for Multiple comparison (post hoc) is Turkey HSD ¹ of the users with varied professional titles to know which of the various pair of means the difference is significant and post hoc Tukey HSD test determined mean difference between the management (lower, middle, upper level) and the student users that reaches significance. It can be inferred that the management level users have found to have more creative potential than the other group.

H₃: There is impact of biophilic design on the occupancy rate of co-working space.

The hypothesis is analysed and tested with the help ANOVA and Regression estimation.

Table 3: ANOVA^a

	Model	Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	8.499	1	8.499	30.374	.000 ^b
	Residual	29.379	105	.280		
	Total	37.878	106			
a. Dependent Variable: Occupancyratemean						
b. Predictors: (Constant), Naturalelementmean						
(Primary Source)						

Table 3(a): Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.474 ^a	.224	.217	.52896
a. Predictors: (Constant), Natural_element_mean				
(Primary Source)				

Table 3 (b):Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.605	.295		8.830	.000
	Natural_element_mean	.384	.070	.474	5.511	.000
a. Dependent Variable: Occupancy_rate_mean						
(Primary Source)						

It can be inferred from the Table -3 that Sig P = 0.000, that is Significance P value is less than 0.05, hence alternative hypothesis is accepted, signifying there is an impact of Biophilic design on occupancy rate. Results from Table 3 (a), depicts the strength of the relationship between model and dependent variable (Occupancy rate) explained by independent variable (Natural element) to an extent of R Square .224, i.e., a 22.4% variation within the data and since the significance P value is less than 0.05, the model fits the data well indicating strength of the model in terms of the occupancy rate and natural element. Further, it is inferred from the Table 3 (b) using $Y = a + bX$ Where, $a = 2.605$ $Y =$ occupancy rate and $X =$ natural element $= 2.605 + .384 * \text{Natural element}$, there by showing the regression slope of occupancy rate is valid at .384 which indicates that as the value of X variable (Natural element) increases by 1, the value of Y Variable (Occupancy rate) increases by 0.384.

Conclusion

This study investigated whether enriching co-working spaces have an impact on user preference in terms of the benefits derived as a result of incorporating biophilic elements. Literature (Cooper, C., & Browning, B. 2015)² shows that there is increasing evidence that biophilic design has a positive influence, ranging from reducing stress and anxiety to enhancing the quality and availability of respite from work and improving levels of self-reported well-being.

¹ Schlattmann, Peter; Dirnagl, Ulrich (2010). Statistics in experimental cerebrovascular research: comparison of more than two groups with a continuous outcome variable. , 30(9), 1558–1563. doi:10.1038/jcbfm.2010.95

² Cooper, C., & Browning, B. (2015). Human spaces: The global impact of biophilic design in the workplace. Interface inc.

The findings are in line with this, the study demonstrated that irrespective of the user's qualification levels or designation they agree that biophilic design patterns and combinations promote a better environment for them to be healthier, happier and helps increase focus and concentration (Ong, M. H. J., & Bahauddin, A. 2018).¹

The study highlights that the creative potential of users in a biophilic design enabled co-working space and those who enter the space feeling happy are more likely to be more creative (Cooper, C., & Browning, B. 2015)².

The outcome of this study strongly states that there is an interrelationship between biophilic environment and co-workers (Orel, M. and Bennis, W.M. 2021)³, and as a result, co-working spaces must pay stronger attention while designing interiors with room for nature which has significant effect on enhanced collaboration, including across layout, improved morale, and mitigation against stress. (Gray, T., & Birrell, C. 2014)⁴ and that co-working environment in fact has direct and an indirect potential to foster creativity (Stumpf, C. 2013)⁵ and co-working spaces vary in terms of their creative potential, with varying effects on individuals who work in them. The co-working space, which is said to have a high creative potential, has a minimalist design with bright colours and natural elements and individuals who work in a bright and open environment with green plants may promote high levels of enthusiasm and creativity (Suharjanto, et al. (2020)⁶

The study also emphasis on the impact of biophilic design on the occupancy rate of co-working space. The use of live plants and foliage also has a positive impact on users and so does illumination and spaciousness. Topgül, S. (2019)⁷ People are experiencing pandemic fatigue, anxiety and stress issues, which are affecting their health, personal and professional relationships, thus many users are opting for co-working spaces that include air, greenery, and natural light but at the same, attracting new members has been and remains the number one challenge for operators (Deskmag 2018)⁸. There is no dispute that that biophilic design has an impact on co-workers' health and wellness and many reports indicate an increase in the occupancy rates of these spaces. Times of India report (2021, August)⁹ reveals a surge in occupancy rates back to 70%-90% and the report also appreciates top co-working spaces like Wework, Workafella, Awfis Space Solutions, The Hive - Flexible workspaces for not only their unique spatial designing but also for their incorporation of natural elements. The findings of the study confirm that there is strong evidence of interrelationship between occupancy rate and biophilic elements in co-working spaces.

Research Implications, Limitations and Scope for Further Research

The study's implications are aimed at investors, architects, designers, corporates and builders to create better co-working solutions and focus their budgets on biophilic elements, spatial designs and functional qualities which enrich and enhance the user preference at co-working spaces.

Though an increase in the creative potential was observed among the co-workers in the management level, subjectivity is one of the study's limitations, because perceptions of biophilic elements and spatial design are influenced by users' personal preferences and may be ignored. Further the data for the study was collected from only two co-working spaces, resulting in a lack of generalisation.

We do not overlook the observations regarding a requirement in -detail aesthetic designing, biomorphic design of different co-working spaces which could be a unique feature of the co-working spaces which could perhaps enhance the creative potential and drive the occupancy rates of the space.

¹ Ong, M. H. J., & Bahauddin, A. (2018). Biophilic design in heritage indoor workplace in George Town, Penang, Malaysia/ Josephine Ong Ming Hui and Azizi Bahauddin.

² Cooper, C., & Browning, B. (2015). Human spaces: The global impact of biophilic design in the workplace. Interface inc.

³ Orel, M., & Bennis, W. M. (2021). Classifying changes. A taxonomy of contemporary coworking spaces. Journal of Corporate Real Estate.

⁴ Gray, T., & Birrell, C. (2014). Are biophilic-designed site office buildings linked to health benefits and high performing occupants? International journal of environmental research and public health, 11(12), 12204-12222.

⁵ Stumpf, C. (2013). Creativity and space: the power of Ba in coworking spaces (Doctoral dissertation, Zeppelin Universität)

⁶ Suharjanto, G & Taufik, C & Mariana, Yosica & Suryawinata, Bonny. (2020). The implementation of biophilic design in co-working space design as a concept of healthy sustainable architecture. IOP Conference Series: Earth and Environmental Science. 426. 012090. 10.1088/1755-1315/426/1/012090.

⁷ Topgül, S. (2019). The Impact of Biophilic Designs on Worker Efficiency. Sosyal Ara tırmalar ve Davranı Bilimleri, 5(9), 11-26.

⁸ Deskmag. 2018. "Coworking forecast." <https://www.dropbox.com/s/rjbmdo4wp4aeccx/2018%20Complete%20Coworking%20Forecast.pdf?dl=0>

⁹ (2021, August). Retrieved from <https://timesofindia.indiatimes.com/business/india-business/occupancy-rate-at-co-working-spaces-back-to-70-90/articleshow/85439135.cms>

Future research can validate these in the Indian context. A future study might evaluate many co-working spaces with biophilic elements in detail, taking into account the initial outlay vs users' opinions about the co-working-space. This would benefit investors in better directing their funds and space designers in emphasising those desired biophilic features preferred by users. Our findings on implementing biophilic elements in enhancing user preference needs validation through further enquiry. Future study should consider a wide range of co-working locations with varying levels of biophilic design elements. Future research should examine a wide array of co-working spaces that differ with regards to levels of the biophilic design elements.

There is also a pressing need for examining diverse users' attitude, motivation, unique characteristics and benefits provided by co-working spaces towards their preference in choosing them.

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