

BIOPHILIC ARCHITECTURE FOR A HEALTHY AND PRODUCTIVE
WORKPLACE IN THE TROPICS

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Specially dedicated to my beloved family and friends.

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ABSTRACT

Biophilia, defined as the inborn pull of humans to nature, is an idea which has already been acknowledged by scientists and designers for the past several decades and subconsciously for thousands of years by humanity itself. In the workplace however, nature inclusive design has always been deemed a luxury for bosses' intent on creating the ideal employee workplace, or those who desire to show off their inclinations towards environmental responsibility. In the real world, biophilia can in fact improve work production and financial costing through the improvement of the community's well-being. By inserting elements of our natural environment into the built environment, it is not just a luxury, but rather, a comprehensive asset in production and well-being, as proven by neurological and physiological research. In the research case studies presented, samples of minor investments concerning little to no up-front costs, for example, presenting staff access to plants, views towards the outdoors, natural daylighting and other biophilic design outlines. Based on these case studies, backed by scientific evidence, it is proven that the financial feasibility for the implementation of biophilic design in larger scale projects, be it in hospital settings where the healing processes in patients are accelerated, increased productivity in offices, improved test results in academic institutions, or increased sales in retail outlets, the research carried out proves the practicability for integrating biophilic design into out working and living spaces and in fact it is able to improve workplace wellness and productivity of the office users significantly.

ABSTRAK

Biophillic, tarikan semula jadi manusia kepada alam semula jadi, adalah konsep yang telah ditakrifkan oleh saintis dan arkitek selama beberapa dekad yang lepas dan telah diamalkan selama beribu-ribu tahun oleh manusia. Bagaimanapun di tempat kerja, reka bentuk yang menggunakan elemen alam semula jadi sentiasa dianggap sebagai tidak sesuai dan tidak praktikal. Padahal, biophillic sebenarnya boleh meningkatkan tahap produktiviti pekerja dan meningkatkan kesejahteraan pekerja dan masyarakat. Dengan melibatkan unsur-unsur alam semula jadi ke dalam alam bina dan struktur bangunan, elemen-elemen semula jadi ini bukan suatu kemewahan, tetapi sebaliknya, biophilia adalah aset yang komprehensif dan boleh meningkatkan pengeluaran dan kesejahteraan pekerja, seperti yang dibuktikan oleh penyelidikan saraf dan fisiologi. Dalam kajian kes penyelidikan yang dibentangkan, pekerja yang mempunyai akses ke elemen-elemen semulajadi seperti tumbuh-tumbuhan, pemandangan ke arah luar bangunan dan reka bentuk biophilia lain yang menyumbang kepada kesejahteraan manusia adalah lebih produktif. Berdasarkan kajian kes yang disokong oleh bukti saintifik, produktiviti dan kesejahteraan adalah lebih ketara bagi pelaksanaan reka bentuk biophilic dalam projek-projek berskala lebih besar, sama ada dalam persekitaran hospital di mana proses penyembuhan pesakit boleh dipercepatkan, peningkatan produktiviti di pejabat, keputusan dalam institusi akademik, atau peningkatan jualan di keda-kedai, penyelidikan yang dijalankan membuktikan bahawa dengan mengintegrasikan reka bentuk biophilic ke dalam reka bentuk bangunan mampu meningkatkan kesihatan di tempat kerja dan produktiviti pengguna pejabat dengan ketara.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Looking at the trends of urbanization and current demographic change of today's society, a lot of people are staying and working at cities and it is essential to design building that help to mitigate sick building syndrome and lessen the overall impact for the built environment. As there are more and more green consciousness among the public, therefore understanding on how to implement biophilic feature in office workspace is important to help create a healthy and productive workplace. It is vital to understand the psychology of the users at the office building. This understanding gives valuable insight on the best approaches to indoor and terrace landscaping, in order to achieve a balanced workplace through vegetation. It is important to understand the psychology, wants and needs of the individual. It is also important to understand the role vegetation and architectural planning can have on the social interaction in the workplace, promotes a sense of community and also sets a healthy ambience while improving the indoor environmental quality (IEQ). Of course this would naturally permeate through the entire office building. According to research, buildings which factor vegetation into their design improve employee productivity and create a balanced and healthy working environment. Based on research conducted, wellbeing of the workers will increase by as much as 15 percent with a clear connection with nature both internally or on external environment regardless of the company culture or values. These days, more and more people work long hours indoors, exposed to chemicals substance that are harmful from building

materials, endure poor interior air quality and are stressed out with no avenues to release the tension. Current trends in green architecture focus on day lighting, thermal comfort, sustainable building materials and the integration of natural environments which can potentially alleviate these effects.

1.2 Problem Statement

Many Asian cities are developing rapidly, and maximising land and return of investment is every clients concern. Thus space optimization, creating a healthy work environment while maintaining productivity is of the utmost importance. The current approach to high-rise office buildings creates an atmosphere that is not conducive for working. People are less productive, stressed out, can easily catch viruses or other health related illnesses. Poorly planned high-rise buildings often suffer from Sick Building Syndrome (SBS). Land use plays an important role in the vitality of an area, as well as that of a building. It is essential to introduce mix-use program within the building to create different activities which run throughout different times of the day. This creates a vibrant atmosphere and promotes social interaction.

The current building does not provide a strong axis and has no public vistas, which is a gap that should be improved upon. The indoor environment is sealed and does not provide breakout/green spaces or spaces for social interaction. Through implementing biophilic features in the office building, it will help to significantly improve the health, productivity to the company structure while lessen the overall environmental impact on the natural and built environment. Health is an important aspect in achieving sustainability, which makes green buildings a secure and comfortable place to stay, interact and work. The study looks into understanding the principles and application of biophilic design in high-rise buildings, in order to achieve a balanced, stress free workplace.

1.3 Research Aim and Objectives

The main research aim is to gather, analyse and implement information on the existence of both the nature in the workplace and the criteria and purposes of implementing biophilic design features within the current urban office setting in order to design a healthy and productive working environment. The research will revolve around the implementation of suitable design approach in order to promote productivity and enhance workplace wellness to be incorporated in the current Design Thesis project. Basically, there are 4 main objectives that will be outlined and achieved:

- i) To investigate the characteristics and specific nature of biophilic design
- ii) To examine the means of manifestation of biophilic features concepts in ecological design with the use of selected case studies
- iii) To examine the means of experiential contact between human and biophilic features in an office environment with the use of selected case studies.

1.4 Research Questions

Based on the literature review research and studies, the research questions generated and produced are :-

- i) How biophilic design features can further improve, enhance and create a sustainable, productive, low stress working environment?
- ii) How integrated open spaces with direct and indirect visual connection can help to enable public and office users to interact?
- iii) How experiential contact between human and biophilic features in an office environment can help to improve workplace wellness and productivity of office users?

1.5 Significance of Studies

The significance of studies for this research is to identify direct and indirect approach underline under the design of biophilic features to promote workplace wellness and enhance the working environment to create a positive ambience. This chapter will outline the understanding for research paradigm in order to generate research objective for further research purposes. Research methodology is done in a systematic manner to get the final outcome underlined under the research aim and objectives. The research studies will be useful for students and academic instructor adopting the same strategies in enhancing their workplace wellness. Furthermore, this research can be used as a guidelines to evaluate the performance of office users in certain working environment and used to their advantage.

Besides that, this study will serve as reference for future implementation on designing an ideal workplace for corporate companies. The vital research objective in this studies is getting to understand and simplify the patterns of biophilic design and deriving the architectural design approach based on the research. The main design hypothesis for biophilic design is simple and the implementation of how it can be placed in our built environment to improve the health significantly. Most of the time, biophilic design is regarded as a luxury by the employers and corporate companies without considering it as the best alternative to boost the productivity of the workers in the working environment. In fact, studies show that implementation of biophilic design features can have significant impact on the productivity and help to reduce the overall impact of the building as well.

Based on Terrapin Bright Green released journal paper with the titled ‘The Economics of Biophilia’, it stressed on the idea of creating direct and indirect access to nature will help to generate a healthy returns for the tenure and longevity of the building itself. Whereas there is a study conducted to showcase the productivity level done by Heschong-Mahone group, strategic placements of greeneries, direct access to views of greeneries and large windows reduce the stress level and promote the productivity of the workers significantly.

1.6 Research Scope

The scope of studies for this research will focus on the wellbeing and psychological benefits with the implementation of biophilic design features for the current office high rise building. The study will focus on the implementation of open plan working environment, use of natural daylighting and ventilation, lush green landscape, refuge and prospect elements, recycled building materials which are all categorised under the biophilic design features. The method for data recording would be identified as qualitative research method and case studies analysis would be adopted as my primary data source. The results of the finding through the research significantly shows that by implementing biophilic design features, it will help to generate and boost positive effect on productivity, alleviate stress level, enhance wellbeing of the workers, cultivate collaborative working culture and enhance working satisfaction level with the final outcome of a healthy and productive workplace.

1.7 Flow of Research Methodology

The flow of the research methodology adopted in this research can be synthesised on the diagram shown below. The study starts with the identification of research framework on how biophilic design features can help to enhance the overall wellness in socio environmental aspect. It is aimed to contribute towards a healthy and positive working environment for the workers. Next, issues is further derive with objective outlined to achieve the research aim previously outlined. It extended from the issues and objectives to an wide scope of literature review on the biophilic design and how it can help to generate suitable architecture approach for office setting. The author will further underline and study on three selected case studies to come out with a set of design principles and design approach for biophilic design. The research will end with the identification of suitable architectural design strategies that can be implemented on high rise office tower.

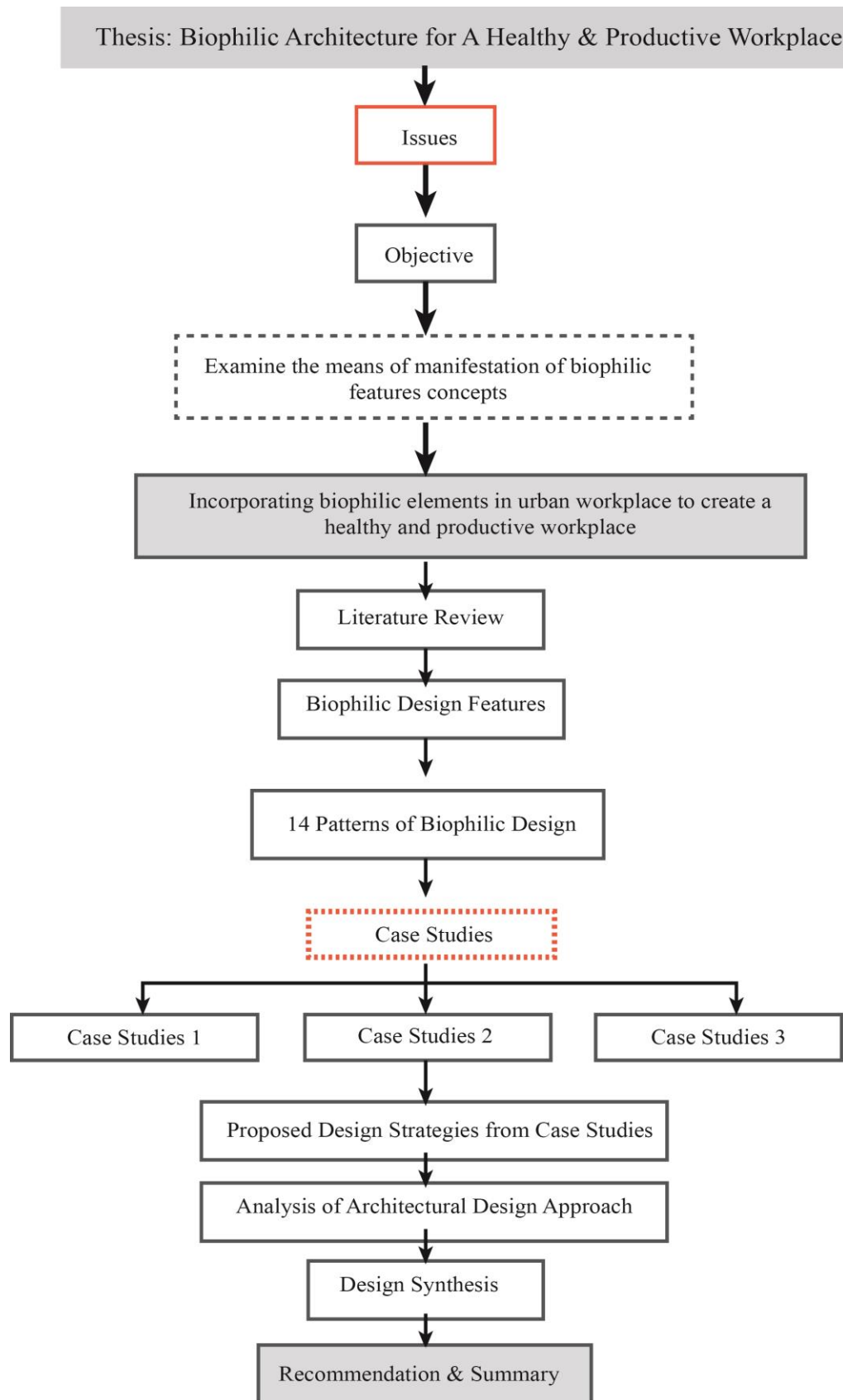


Figure 1.1 The Flow of Research Methodology

1.6 Expected Findings

At the end of the research, the author will outline the design strategies and spaces required based on biophilic design features with certain formulated design criteria that can be implemented on current design thesis project. Based on the conducted research studies, it is shown that biophilic design features can contribute to further enhance the productivity and improve the overall workplace wellness in high rise office typology. According to sources of reading and research study, it can be summarised that with the higher implementation of biophilic design features, the overall productivity and wellness will be increased significantly.

The research also revolved around vertical green elements where it is able to enhance the working environment with direct and indirect visual connectivity to the exterior thus contributing to the overall workplace wellness of the office building. Potential design strategies will be underlined by the author in creating and designing office environment that can help to mitigate sick building syndrome in urban context high rise office. According to this study, all the theory, design approach and principles derives can be further applied in author's design thesis project.

1.7 Structure of Dissertation

There are five main chapters in this structure of dissertation. Chapter 1 focuses on the overview study which includes the background of the study, research aim and objectives, research questions, research methodology selected to derive the research objective and final expected findings.

Chapter 2 is a compilation of selected studies and research done by other researchers on biophilic design features. Generally, it is a study on the background of biophilic design to gain the basic understanding on the subject matters. The theory of biophilia, the history development of biophilic design features, definition of biophilic

design and the elements will be underlined in this chapter. In addition, research will be carried out on experience and attributes and specifically focusing on the vertical green elements and its application in today's built environment. Last but not least, the study will include the overall workplace wellness in relation to biophilic design and application of biophilic design.

Chapter 3 outlined the research methodology adopted in order to get the final outcome of the studies. The main research framework would base on three case studies which have the implementation of biophilic design pattern outlined in the literature review. In addition, this chapter outlines the research paradigm, research procedure and outline of overall research framework.

Chapter 4 will be the collection of findings according to the collected data outlined in the previous chapter. The data is collected in various sources and will be analysed in this chapter. The final analysis of this chapter will be utilized to generate suitable design approach to achieve the research objectives mentioned earlier.

Finally, Chapter 5 will provide a summary of research objectives, study and research and the significant of the study. In addition, this chapter will discuss on the objectives and limitations of the study and list the recommendations for potential further study related to biophilic design features.

1.8 Summary

All the research is an extension from previous related researchers with compilation of added information. It highlights on the issue of workplace wellness in high rise office building and how biophilic design strategies can help to enhance the productivity and wellness specifically. The concern and limitation for the author is not governed by definition of biophilic design but how it can help to improve the

overall wellbeing and productivity of the workers. The architectural design approach would contribute to help remedy the lack of green and integrated public space related to biophilic design features in high rise office building typology.

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APPENDIX A

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