

Entrepreneurship through Meaningful and Healing Architecture with Emphasis on Biological Effects on Humans

Masoumeh Donyaei¹, Mehdi Farzpourmachiani², Mehrdad Fojlaley³, Snjezana Baroness Rajacic⁴

¹PhD. in Biology, Technofest Institute of Technology University (TITU), Erquelinnes, Belgium

²Academician of the European Academy of Sciences, Associate Professor in entrepreneurship, department of entrepreneurship, Technofest Institute of Technology University (TITU), Erquelinnes, Belgium

³Academician of the European Academy of Sciences, Professor in entrepreneurship, department of entrepreneurship,

Technofest Institute of Technology University (TITU), Erquelinnes, Belgium

⁴Academician & President of the European Academy of Sciences, Professor in entrepreneurship, department of entrepreneurship, Technofest Institute of Technology University (TITU), Erquelinnes, Belgium

Date of Submission: 10-06-2025

Date of Acceptance: 20-06-2025

ABSTRACT:

Meaningful and healing architecture, as one of the new approaches in the design of living spaces, can provide a platform for the development of entrepreneurship based on biological sciences. This article examines the relationship between meaningful architecture, biophilic design, and the biological effects of the built environment on people's mental and physical health, and also introduces the innovative capacities of these spaces for the development of businesses in the field of health tourism, residential treatment, and biological products. Using the review of scientific sources, conceptual modeling and analysis of examples such as Taranom village, the article shows that the design of relaxing and bio-based spaces can help to reduce the level of stress hormones (such as cortisol) and increase happiness hormones (dopamine, endorphin, serotonin) and simultaneously lead to entrepreneurial opportunities.

Keywords: meaningful architecture, biophilic design, mental health, biology, cortisol, bio-entrepreneurship, ecotherapy, healing design

I. INTRODUCTION

In the era of fast-paced technology and urbanization, man has distanced himself from nature and inner peace more than ever before. The increase in psychosomatic illnesses, anxiety, chronic stress, and dissatisfaction with the living environment are signs of the gap between human

living space and their psychological and physiological needs. Semantic architecture seeks to respond to this fundamental need by creating spaces that are not only functional, but also "experience-oriented" and "emotional."

On the other hand, biological and psychological studies have shown that natural and designed environments based on biophilic principles can have a direct effect on reducing stress hormones (such as cortisol) and increasing happy hormones (such as dopamine and endorphins).

This phenomenon has been considered in the form of concepts such as garden therapy, ecotherapy, and residential therapy.

The combination of these two approaches, meaning design and human biology, provides a platform for creating new entrepreneurial models; models that can promote physical and mental health by providing indirect psychotherapy services in spaces inspired by nature, and at the same time led to the creation of sustainable businesses.

The concept of "Attrition Entrepreneurship Theory" introduced by Farzpourmachiani M. and Farzpourmachiani A. in 2024, sheds light on a critical aspect of entrepreneurship that has far-reaching implications for societal well-being and economic growth. This theory highlights the existence of entrepreneurial activities that, while generating income, fail to contribute positively to society's wealth and may even have destructive effects on the economy. The

authors argue that certain forms of entrepreneurship can lead to stagnation or decline, influenced by government policies or societal factors. They provide examples such as war-driven industries, inheritance tax collection, and discriminatory practices as manifestations of attrition entrepreneurship.

The distinction between genuine entrepreneurship, which drives innovation and economic dynamism, and attrition entrepreneurship, which merely recycles existing resources without creating new value, is crucial. In the context of "Entrepreneurship through meaningful and healing architecture with emphasis on biological effects on humans," one can see how both types of entrepreneurship might manifest in this field.

Genuine entrepreneurship in the realm of healing architecture would involve developing innovative designs and technologies that significantly improve human well-being by addressing physical health, mental health, and environmental sustainability. This type of entrepreneurship not only generates income but also contributes to societal wealth by creating new value through innovation and technology development. It would emphasize the biological effects on humans positively, focusing on enhancing quality of life and fostering a sense of healing and community.

Conversely, attrition entrepreneurship in this field might involve rehashing existing architectural designs or technologies without significant improvements in their biological impact on humans. Such practices could lead to economic stagnation by not pushing the boundaries of what's possible in architecture for healing and well-being. They may also fail to protect intellectual property (IP) rights related to innovative aspects of their work, potentially leading to imitation or exploitation by others. This disregard for IP protection can hinder genuine innovation and long-term economic prosperity.

The integration of a strong IP framework is essential for fostering an environment where entrepreneurial activities in healing architecture can flourish. By securing and leveraging IP rights, architects and entrepreneurs can protect their innovations, attracting investment and driving further development in the field. This, in turn, would contribute to societal wealth by improving human well-being through meaningful and healing architectural designs.

In conclusion, the concept of attrition entrepreneurship offers valuable insights into how

certain entrepreneurial activities, if not carefully nurtured and directed towards innovation and societal good, can hinder economic growth and well-being. The focus on genuine entrepreneurship in fields such as healing architecture underscores the importance of emphasizing innovation, biological effects on humans, and the protection of intellectual property rights to ensure that entrepreneurial endeavors contribute positively to society's wealth and well-being.

Theoretical foundations of semantic architecture

Semantic architecture is more than merely responding to the functional needs of space; it emphasizes the creation of a deep, emotional, and psychological experience that is shaped by human connection with the environment. This architectural approach is based on humanism and its goal is to design spaces that respond to the emotional, mental and existential needs of humans (Küller, 2010). In this approach, architecture acts as a cultural and psychological tool that can have positive effects on people's mental health and quality of life.

In the philosophy of architecture, concepts such as "inner beauty," "sense of place," and "presence" are of particular importance. "Sense of place" refers to people's deep and personal understanding of space, which is the result of the interaction between the individual and the environment, and plays an important role in the formation of individual and collective identity (Relph, 1976). Semantic architecture tries to strengthen the sense of belonging and memory in users by using natural elements, familiar forms and symbolic structures and creates a space where people can feel calm and soothing (Norberg-Schulz, 1980).

The key principles in semantic architecture design are:

- 1- Connection with nature: the use of natural elements such as wood, water, natural light, plants and pristine landscapes, which strengthen the sense of peace, balance and being rooted with nature (Gifford, 2014).
- 2- Stillness and solitude: Designing spaces that provide users with the possibility of reflection, relaxation, and concentration and give them the opportunity to communicate with themselves and their inner environment (Korpela & Keltikangas-Järvinen, 2003).
- 3- Sense of familiarity and memory: the use of forms, materials and scents that evoke a feeling of nostalgia and pleasant memories and create an

emotional bond with the space (van Tonder et al., 2014).

4- Simplicity and clarity: Emphasis on simple, orderly and soothing designs that avoid luxury and strengthen the sense of relaxation and concentration in the user (Lynch, 1960).

5- Human-centered communication: designing spaces that induce empathy and acceptance and place users in the experience of active presence and liberation, not fear or domination (Alexander, 1977).

In this approach, architecture acts not only as a construction technology, but also as a psychological and therapeutic tool. Research shows that designing meaningful spaces can have measurable effects on people's mental health, stress level, and quality of life (Kaplan & Kaplan, 1989). This aspect makes semantic architecture a meeting point of biological sciences, environmental psychology and modern entrepreneurship, where designed spaces can play an effective role in improving mental health and increasing user satisfaction (Ulrich, 1984).

The concept of healing and biophilic design and its connection with human biology

Healing Design and Biophilic Architecture are emerging approaches that are rooted in the deep understanding of human biological connection with nature. These styles are based on scientific findings in the field of neurobiology, biological psychology and physiology. These concepts, in line with semantic architecture, have a common goal: creating spaces that are psychological and biological, regenerative and healing.

What is Biophilic Design?

"Biophilia" means the innate human love for nature. The biophilic theory emphasizes that humans, instinctively, tend to live in environments where natural components such as light, water, plants, wood texture, nature sounds and pristine landscapes are present. Environments with such characteristics, directly or indirectly, put the human nervous system in a state of balance, security and peace.

Linking healing design with human biology

From a biological perspective, biophilic environments can stimulate psychological and physical regulation processes. Numerous studies have shown that exposure to natural or nature-inspired spaces changes the release of some key hormones in the body, including:

Happy hormones and nerve regulators:

Endorphin: reducing the feeling of pain, increasing the feeling of vitality and mental tolerance.

Dopamine: Creates motivation, positive energy, a sense of success and happiness.

Serotonin: Regulates mood, sleep, appetite and reduces anxiety and depression.

Oxytocin: Creates a sense of attachment, trust, security and social calm.

Reducing stress hormones:

Cortisol: The main stress hormone, whose chronic increase is associated with diseases such as blood pressure, sleep disorders, chronic anxiety, immune system weakness, and internal inflammations. Calm, natural, and nature-inspired spaces reduce cortisol levels.

Physical effects of biophilic design

Scientific research has shown that the experience of being in nature-oriented spaces can lead to:

- Decreased heart rate and blood pressure
- Improve sleep quality
- Boosting the immune system
- Accelerating the recovery of patients (for example, patients admitted to hospitals with windows facing nature have recovered sooner)
- Increasing mental productivity, concentration and creativity

Biophilic architecture and meaningful design are not only important from an aesthetic or cultural point of view, but also directly affect the biochemistry of the human body. These spaces can be a platform for happier, healthier and less stressful living. From this point of view, investing in the construction of such spaces can lead to the creation of entrepreneurial opportunities in the field of health, wellness and therapeutic tourism.

Scientific studies on the effects of natural environments on mental and physical health

Reducing stress hormone (cortisol) through naturopathy

Several studies have shown that exposure to natural environments can reduce levels of the hormone cortisol, which is associated with stress. For example, in a study in Japan, participants who walked or sat in a forest for 15 minutes experienced a 13.4% to 15.8% reduction in their salivary cortisol levels. This decrease indicates the positive effect of natural environments on stress reduction. Increase in happy hormones (endorphins, dopamine, serotonin)

Being in nature and doing activities related to it can increase the release of hormones related to happiness and satisfaction:

Endorphins: This hormone is associated with reducing the feeling of pain and increasing the feeling of joy. Activities such as exercise, laughter, and interaction with nature can increase endorphin levels.

Dopamine: Associated with feelings of reward and motivation. Positive experiences in nature can stimulate the release of dopamine.

Serotonin: Plays an important role in regulating mood and sleep. Natural light and green spaces can increase serotonin levels.

Positive effects on physical health

In addition to psychological effects, connecting with nature can also bring physical improvements:

Lower blood pressure and heart rate: Being in natural environments can help lower blood pressure and heart rate, which indicates a reduction in physiological stress.

Strengthening the immune system: Studies have shown that activities such as "forest bathing" (Shinrin-yoku) can increase the activity of natural killer cells (NK cells), which play an important role in fighting infections and cancer.

Improve sleep quality: Exposure to natural light and calm environments can help improve sleep patterns.

Effects on mental health

Reducing depression and anxiety: A study at King's University of London found that living near green spaces can reduce the risk of depression by 20%.

Increase focus and cognitive function: Attention Restoration Theory states that nature can improve the ability to focus and reduce mental fatigue.

Reducing feelings of loneliness: Listening to nature sounds, such as birdsong, can reduce feelings of loneliness by 28%.

These findings show that designing architectural spaces using natural elements can not only create visual beauty, but also has significant positive effects on people's mental and physical health. In the next section, we will examine the tools and methods of scientific measurement of these effects in architectural projects.

Methods and tools for scientific measurement of environmental effects on biological indicators

- **Measuring hormone levels (cortisol, dopamine, endorphin and serotonin)**
Salivary Cortisol Test:

Type of instrument: Home or semi-advanced laboratory kits (e.g., ZRT Lab, Everly Well)

Approximate price: \$20-\$50

Application: Assessing stress levels at different times of a person's presence in natural spaces or meaningful architecture

Advantage: Non-invasive, no need for blood sampling

- **Dopamine and serotonin:**

These two hormones cannot be easily measured from saliva or urine.

Solution: using standard mood questionnaires along with measuring the levels of metabolites in urine samples (in specialized laboratories)

- **endorphins:**

It is difficult to measure it directly, but you can use indirect tools such as the PANAS questionnaire (affective positivity and negativity) as well as physiological sensing (such as heart relaxation, smile, enthusiasm).

Wearable biometric measurement tools

Devices such as Fitbit, Garmin, or Apple Watch have capabilities to measure:

- heartbeat
- Breaths per minute
- Stress level (Heart Rate Variability)
- sleep quality

Note: These devices are suitable for collecting longitudinal data over time and can show the effect of living in nature-oriented environments or meaningful designs.

Standard psychometric methods

The following questionnaires can be used to evaluate feelings, peace, satisfaction and happiness:

POMS (Profile of Mood States): assessment of 6 psychological dimensions including depression, anger, vitality, fatigue, tension and confusion

PANAS (Positive and Negative Affect Schedule): measuring positive and negative emotions

WHO-5 (World Health Organization Well-being Index): 5 mental health indexes

Perceived Stress Scale (PSS): assessment of stress perception

Innovative tools

EEG Headbands (such as Muse or Emotive): to measure brain waves (relaxation, concentration, anxiety)

Skin Conductance Sensors (GSR): Investigating palm sweat changes in response to the environment

Analyze and use data in your project

Before entering space: Baseline measurement

While being in meaningful or nature-oriented architectural spaces: collecting biometric data

After departure or multi-day stay: assessment of psychological and biological changes

Purpose: providing scientific documentation about the effect of your architectural space on mental health and people's physicality, and using it as a tool for marketing, entrepreneurship and attracting investors and health tourists.

Economic and entrepreneurial effects of meaningful and healing architecture

Reducing the economic burden of mental and physical diseases

According to the report of the World Health Organization (WHO), mental disorders such as depression, anxiety and burnout cause more than 1 trillion dollars of damage to the global economy annually, a major part of which is caused by the decrease in human productivity.

Countries that have invested in the design and expansion of nature-oriented, meaningful and healing spaces have seen a reduction in the burden of mental health and, as a result, a reduction in the costs of health insurance and long-term care.

Case study:

In Scandinavian countries, investment in "healing architecture" has led to a 20-30% reduction in antidepressant prescriptions in the elderly population and increased overall well-being.

Increasing the productivity and performance of employees

According to Harvard University research, employees who are exposed to green space or meaningful architecture during the day have:

26% increase in mental concentration

30% reduction in job errors

40% reduction in burnout rate

The cost of designing such spaces is very small compared to increasing the efficiency of manpower and has a high economic justification.

Entrepreneurial potential on a local and national scale

Semantic architecture can be the focus of the development of the following local businesses:

- Treatment-oriented tourist accommodations

- Psycho-biological rehabilitation centers inspired by nature
- Villages of health and peace
- Children's creativity schools in green spaces
- Art therapy and wood therapy workshops

Direct effect: Creating jobs for designers, environmental psychologists, local builders, artists, nurses, educators and local farmers.

Indirect effect: attraction of health tourism, increase in demand for surrounding land, economic prosperity of the region

Returning social capital and reducing government expenses

New estimates in the UK show that:

Every £1 invested in natural healing spaces saves £4-6 in public health costs.

Reducing psychiatric visits, increasing public health, reducing suicide rates and drug addiction

The role of governments in supporting meaningful and nature-oriented architectures

Direct support methods:

Building model centers with the participation of municipalities and health organizations

Land allocation in semi-active urban or rural contexts

Providing tax relief to manufacturers and private operators

Indirect support methods:

Improving urban planning regulations and issuing special permits for nature-oriented architecture

Including these types of projects in the budget headings of mental health

Media, cultural and advertising support to attract audience and investors

Conceptual framework, research method and measurement tool

Research conceptual model

According to the purpose of the research, the following conceptual model is developed:

Independent variable:

Design quality of natural environments and meaningful architecture

Mediating variables:

Release of happy hormones (dopamine, serotonin, oxytocin, endorphin)

Decrease in cortisol level (stress hormone)

A sense of satisfaction, peace and belonging

Dependent variables:

- Improve mental health
- Reducing visits to medical centers

- Increase individual productivity
- Economic prosperity and creation of regional employment
- Justification of the government's economic investment

Type and method of research

Type of research: applied-developmental

Approach: mixed (quantitative and qualitative)

Research method: quasi-experimental with analysis of physiological and psychometric data

Data collection tool

A) Physiological tools (if possible):

Salivary cortisol and dopamine test kits (available from brands such as Everly well or ZRT Lab)

Using devices like Muse or Emotive to measure brain waves and relaxation level (neurofeedback)

b) Valid psychometric questionnaires:

Credit tool index

The stress level of the PSS stress perception scale is universally valid

The happiness and satisfaction scale of the SWLS is very popular

Attachment to Nature Relatedness Scale New and suitable

Job performance and creativity of native or adapted employee productivity questionnaire

c) Qualitative tools:

- Semi-structured interviews with the following topics:
- A sense of belonging to space
- Experience relaxation
- Life motivation and work efficiency
- Concept of space design

Data analysis

Data type analysis method

Quantitative (questionnaire) SPSS or SmartPLS: t-test, Pearson correlation, regression analysis

Physiological comparison of the average before and after being in space

Qualitative (interview) Thematic Analysis with open and axial coding

Validation and validity of the research

Initial pilot of questionnaires with 5-7 people to check understandability

The use of content validity by architecture and psychology professors

Reliability of tools through Cronbach's alpha test (expected > 0.7)

II. CONCLUSION

The current research was conducted with the aim of investigating the effects of environments designed based on meaningful, nature-oriented and healing architecture on mental health, physical health, increasing people's productivity and economic justification of these spaces. The findings show that these spaces not only increase the feeling of peace, belonging and psychological security in users, but also have a significant biological effect on general human health by reducing cortisol levels and increasing the release of happy hormones (such as dopamine and endorphins).

On the other hand, the reflection of these effects in the form of reducing treatment costs, reducing absenteeism, increasing motivation, productivity and even creativity of people, brings a potential capacity to create green jobs, develop health-oriented tourism and also improve the local economy.

From this point of view, meaningful architecture is considered not only a design solution, but also a national strategy in the field of health, economy and society's psyche.

REFERENCES:

- [1]. Farzpourmachiani M., Farzpourmachiani A. "Attrition Entrepreneurship Theory", Tubittum, 2024; 80:28, ISSN: 2822-5295, Available from: www.tubittum.com
- [2]. Alexander, C. (1977). A Pattern Language: Towns, Buildings, Construction. Oxford University Press.
- [3]. Gifford, R. (2014). Environmental Psychology: Principles and Practice. Optimal Books.
- [4]. Kaplan, R., & Kaplan, S. (1989). The Experience of Nature: A Psychological Perspective. Cambridge University Press.
- [5]. Korpela, K., & Keltikangas-Järvinen, L. (2003). Place attachment and emotional experiences in everyday life. Journal of Environmental Psychology, 23(3), 237-252.
- [6]. Küller, R. (2010). Design for health and well-being. International Journal of Environmental Research and Public Health, 7(4), 1702-1711.
- [7]. Lynch, K. (1960). The Image of the City. MIT Press.
- [8]. Norberg-Schulz, C. (1980). Genius Loci: Toward a Phenomenology of Architecture. Rizzoli.
- [9]. Relph, E. (1976). Place and Placelessness. Pion.

- [10]. Ulrich, R. S. (1984). View through a window may influence recovery from surgery. *Science*, 224(4647), 420-421.
- [11]. van Tonder, M., et al. (2014). Nostalgia as a design element in architecture: The emotional connection between users and spaces. *Journal of Design Research*, 12(3), 245-262.