

HARMONY IN INDOOR/OUTDOOR CONTEXT OF ARCHITECTURE

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Abstract

Intensity of indoor/outdoor dialogue in the context of architectural history has rapidly evolved due to technological progress while the quality of environment expressed as harmony has proved to be of coincidental character. Reality reveals a pressing need to restore integrity, wholeness and harmony of environment, at the same time searching for a balance in the dialogue between interior and exterior space and a way to harmony in this complicated system. By analysing previous successful and unsuccessful examples in the architecture of publicly most sensitive objects in the re-established Latvia, one obtained a pyramid of subordinated guidelines to be used in architectural theory and practice in support of creating a harmonious architectural environment. The subject is of current importance not only among experts but in all levels of society: we all are users of this environment. In order to create a harmonious high-quality environment in the future, at first, one has to invest substantial resources in all levels of education; it will become a reflection of inner conflicts of a new concept of space, continue historical process of architectural development and introduce diverse approaches to harmonise indoor/outdoor space in a scientifically grounded way.

Key words: indoor/outdoor harmony, indoors/outdoors, interior/exterior space, architecture, glass panels, glass systems.

Introduction

The modern tendency to merge indoor and outdoor space shows a pressing need to restore integrity, wholeness and harmony of environment. Up to now it has been a spontaneous coincidental process, and a need has arisen for a scientifically grounded mechanism to regulate it, along with artistic tasks in planning harmonious spatial structures. Development of new well-grounded principles for a harmonious linking of indoor and outdoor space, taking into account recent trends in this area, has become a central task and an issue for research (Большакова, 2013). 'High-standard living environment in attractive surroundings is one of the main conditions for city development and labour force attraction. Municipalities want to offer attractive residential territories thus securing their main municipal budget resource, i.e. income tax (Treija, 2006)'. Tourism, with its commercial infrastructure and profit coming from high environmental quality, is an important factor.

A harmonious environment consists of interaction between harmony and disharmony (Гликин, 1979); its wide spectre encompasses parallels of material and spiritual aspects (Jencs, 2003, 2010, 2013). The issues addressed by the present study comprise a limitless amount of subjective and objective factors. Previous level of study on architectural conditions, criteria and aspects of indoor/outdoor harmony does not provide sufficient knowledge of the subject; this problem has previously not been a primary focus. Communication of building architecture, interiors and landscape architecture, as a harmony of indoor/outdoor dialogue, has been studied in a fragmentary way, and the studies lack a unifying core in the meaning and scope of real situation in life and architecture where intensive

application of glass systems may be observed. The model unifying the form and function in architectural systems created by J. Briņķis and O. Buka (Briņķis and Buka, 2006) today could be supplemented by another essential element, i.e. interior space, or indoors. Theoretical basis of certain aspects in environmental design consists of an extremely long array of studies such as:

- Systems of universal proportions – inspiration of natural harmony in bionics and possibilities it offers for creating harmonious spaces (Kimberly, 2001; Kundziņš, 2008; Neufert, 1970; Гликин, 1979);
- Application of colour harmony and principles in environmental design (Godjevac, 2010; Kundziņš, 2008);
- Harmony in synthesis of architecture and art (Alle, 2013; Spārītis, 2013; Strautmanis, 1982; Гликин, 1979; Швидковский, 1984);
- Harmony in space (Neufert, 1970; Strautmanis, 1977);
- Techniques of harmony in architecture (Jencs, 2003, 2010, 2013; Neuferts, 1970; Zigmunde, 2010a; Гликин, 1979);
- Aspects of harmony in urban landscape (Briņķis and Buka, 2006; Briņķis, 2007; Briņķis and Buka, 2008; Īle, 2010; Ziemeļniece, 2012; Zigmunde, 2010b; Гликин, 1979).

Indoor/outdoor harmony and its future development possibilities anticipate an analysis of endless matrixes made of multiple components to obtain results with maximum precision, taking into account the factor of infinity and specifics of outdoors, nowadays accumulated by indoors - both spaces freely interflowing into each other. In order to adjust the key of harmony to indoor/outdoor dialogue in a possibly

best way – which is the main objective of the present study – the following tasks were put forward:

1. Research of how the dialogue of spiritual and material indoor/outdoor dialogue has evolved in architectural history; chronological summary of main facts with conclusions in regard to present situation and global trends;
2. Summary of conclusions in regard to indoor/outdoor harmony obtained after inspection of objects in nature;
3. Development of conclusions on conditions of indoor/outdoor harmony and its development possibilities.

In order to carry out a full-fledged study one must analyse both objective (material and spiritual) and subjective (emotional and psychological) factors opening way to an endless diversity of opinions from experts and users. A justified question arises: is it possible at all to do such work, taking into account multifariousness, inconstancy and instability against time spans as well as dynamic importance of public space (Geldofs, 2009)? In order to fulfill this task, more realistic limits in time and space have been set, i.e. the last 25 years in the territory of present-day Latvia. From 2013 to 2014 the most sensitive environmental objects and functionally different object groups in the territory of Latvia were publicly inspected and results published in reviewed scientific publications (Balode and Grietēna, 2014; Grietēna, 2013; Grietēna, 2014a; Grietēna, 2014b). After summarising conclusions from theoretical and empirical research, the aim of the study was to come as close as possible to the conditions of harmonious indoors/outdoors serving as a basis for take-off in developing scientifically grounded methods for the advancement of indoor/outdoor harmony in the future.

Materials and Methods

The heavenly dimension of art is embodied in material expressions, especially architecture. One might say that architecture lies between heavens and the earth. Therefore, in order to create a unified typology of architecture, interior and landscape, one must consider links comprising the system in two main directions: historical stages of spiritual experience in architecture and three basic levels of the process: thinking in shape-building terms – ideal level of composition; shape-building in mind; and design stages where an idea evolves into a project (Бласов, 2015). In the present study, theoretical and empirical methods were applied employing the comparative-theoretical method as a main one in described stage. The latter methods expressed itself as informative and archive-making, analysing the evolution of material and spiritual indoor/outdoor dialogue in world's architectural history (task 1). In previous stages of the

study, the results of which comprise the basis of the present study, theoretical and empirical methods were applied: photoanalysis, inspection of objects in nature in various seasons and various times of the day, and sociological surveys. Material chosen for the study was 15 publicly sensitive buildings and 3 of their groups built in the territory of Latvia from 1991 to 2014; one analysed the dialogue of building design, landscape and interiors (composition, coloristic, proportions – massiveness, level of filigree, glass panel areas, level of emotionality), harmony in mutual interaction of architecture and interiors (task 2).

Application of comparative method in summarising information for the study:

1. Principles of glass system application in architecture:

- Composition of glass panel areas in space and their proportion – massiveness in relation to parts without glass;
- Compositional application of colours and chiaroscuro under insolation impact;
- Research of visual accents created by chiaroscuro play;
- Assessment of semantic correspondence of indoors/outdoors and level of emotionality according to functional programme of respective space.

2. Summary of studies on the impact of mutual compositional build of indoors/outdoors:

- Architectural shape-building, glass systems and landscape around objects as the main criteria in the search for harmony between indoors and outdoors, compliance with a supreme spiritual task following the function of spaces.
- Assessment of indoor/outdoor harmony – summary of opinions by experts and other respondents on correspondence of indoor/outdoor dialogue to the supreme task of an object under consideration.

In analytical generalisation stage, with the help of inductive cognition method, the priority factors for an assessment of visual aesthetic quality of indoors/outdoors were determined by inspecting architectural objects in Latvia and trying to come closer to the general principles of defining the main criteria for the present study on indoor/outdoor harmony (task 3).

Results and Discussion

Evolution of indoor/outdoor dialogue in architectural history

At the start of humanity, seclusion of indoor space, independently of its form, was a characteristic basic feature of homes embodying the initial task of living space or area – to protect and guarantee continuation of human race. Accentuation tended to proceed from outdoor space to indoor area. Sunlight coming from

outdoors threw light into the dark caves. Entrance into homes or place of junction with outdoors, was masked due to safety reasons. During human evolution, house building expanded, yet seclusion was still important although homes became externally more visible. Living houses in Pompeii is a typical example of a secluded living area where living space was separated from outdoors and linked to it by passages leading from vestibule to an exit shaft (Джуха, 2000).

Architecture of Byzantium and European renaissance (castles and dwelling houses) was characterised by a centralised structure. The principle of moving from outdoors to indoors remained but was already expressed in accentuation of entrances, continuity of borders and development towards the centre. An outstanding example of a centralised structure from late renaissance period is Villa Rotonda built by the architect Palladio (1508-1580); classicism ideals in an ideal architecture embodied by the villa interacted with a contrasting adjacent landscape. A perfect architecture in natural surroundings underlined architectural performance in contrast to a seemingly arbitrary landscape and became an example of an ideal architecture in the particular period (Вавилина, 2000).

Baroque introduced new thinking: indoors (divisions of interior space) started reacting to outdoors. Relation of interior and exterior space obtained plastic expressions. Nevertheless, indoor/outdoor dialogue retained continuity of material borders and isolatedness up to 20th century.

Up to the end of the 18th century metal was used in building for producing small decorative elements (bars, dividing elements, fastening details like nails and ties). After inventing coke-melting oven in England metal's quality improved; it became cheaper and opened new possibilities for its use in building. At the same time, glass production technologies were improved and glass and its products became cheaper as well. Englishman J.Paxton made the famous Crystal Palace in London's Hyde Park and deeply moved the world of architects. Already in the second half of the 19th century glass and metal constructions, and glass cupolas as roofs had become very common, especially in England, and became an integral part of Victorian era. 19th century architects and designers tried to use the new opportunities to the maximum: compression members (supports, columns, arches) were made of cast iron, i.e. ferrous alloys and widely employed. Comparing to metal which contained very little carbon, cast iron is more durable in compressive stress. On the other hand, metal works better in cases of tensile and flexural stress thus making a good material for beams and ties. However, the new combination of metal and glass revealed serious drawbacks: metal's high thermal conductivity cooled interior space in

winter while in summer it got overheated due to the transparency of glass. The only method to tackle the problem was airing of rooms. It was the time when the first railway station pergolas built in glass and metal appeared winning people's hearts and minds. As a result, such pergolas were built in vast amounts. Exhibition and market pavilions built in glass and metal and easy to mount and demount turned out to be excellent companions of the general trend. This era is well characterised by the controversial Eiffel Tower in Paris built in honour of Exposition Universelle of 1889. It was the time when one of the first suspended facades was made for a German shoe factory designed by W.Gropius. Suspended glass façade panels considered as an early prototype of modern façade panels started a new trend called constructivism. In America Mies van der Rohe led the work of finding new ways for applying glass for administrative needs in skyscraper construction. The optimal skyscraper construction system intended to have carcass structure where, instead of bearing walls, one inserted compression columns supported by a reinforced concrete core penetrating the whole building's height. Bearing brick walls in buildings of such construction lost sense. The spirit of the age found a necessity to rehabilitate itself in the nature, and modern achievements offered an excellent opportunity to satisfy this need. Nature, due to glass panels in walls, became a part of interior, i.e. outdoors entered indoors. This concept was most skilfully embodied in the artwork of L.Mies van der Rohe and F.L.Wright (Новиков, 2000).

20th century brought radical change and new accents in indoor/outdoor communication: a new era in environment design started linking indoors and outdoors into a single whole. According to the opinion of architectural historian Z.Gideon, the essence of the 20th century architecture was rooted in its multifacetedness and endless diversity of inner interrelationships. A new interior design age started, led by the main principle – from indoors to outdoors. Centralised plans in buildings were replaced by open ones. Architectural objects and their interiors gradually turned from frozen organisms closed to outdoors into open, pulsating and kinetic objects related to outdoors. An example of a radical change of the mentioned approach is the creative work of the American architect F.L.Wright. He accentuated and secured an irrefutable link between indoors and outdoors materialising it in his architecture which was free from choking and oppressive boxes and, through its glass panels, widely linked to picturesque natural landscapes. Interior plans of buildings, too, obtained freedom and were pulsating into each other as live organisms. Common interior space divided by zoning (i.e. lightweight interior design forms) contained organs necessary for a live organism, with different

functions subordinated to a single whole. At first Wright broke walls with the help of corner windows, and light from outdoors streamed into indoor spaces where it had never fallen before.

Fireplace, bed and table in room centre, instead of former stationary division walls, organised interior space with their function. Indoors were transparent and linked to outdoors; divisions were employed to the minimum. Creative work of the time by the famous Le Corbusier, too, was characteristic with two accents: structural modifications of interior space striving to reach spatial unity and integrity, and merging of indoors with outdoors. Confirmation of a free room plan came with the architecture of Mies van der Rohe, however, the universal suburban glass living house, i.e. aquarium in the USA already seemed exaggerated and unfit for comfortable living.

Creative work by the Brazilian architect O.Niemeyer, too, is characterised by the replacement of interior division walls with lightweight panels thus merging borders of interior decoration. Idea of maximum openness did not bring the expected results but exposed a number of issues related to it. As a result, architecture, after having run another circle of evolution in the spiral of dialectics, started returning to proven classic values such as fundamental walls and divisions enclosing confined rooms (Курбатов, 2000). At the end of the 20th century one came to a conclusion that in order to create high-standard environment one cannot be led by a principle of moving from indoors towards outdoors only; one should also be guided by the reverse link - from outdoors to indoors. This verity became widely visible in private housing architecture of the 20th century's end. In parallel to indoor/outdoor communication thoroughly shaken in the world's stormy architectural tendencies a serene life has been led by the pragmatic countryside building crafts which have been successfully combining human interior needs with outdoors at all times (Кузнецова, 2000). It is proved, e.g. by traditional Japanese living house architecture which, in case of need, is a shelter from natural elements and, due to its lightweight and mobile divisions can be quickly transformed both from inside and outside thus joining indoors and outdoors. In most cases there are two stationary walls, the rest of them are convertible and made of wood, glass or paper. Garden at a Japanese house is designed as its continuation and after sliding the division, interior space physically and spiritually joins with exterior one (Лунц, 2000).

Another turn of centuries is over, and due to architectural heritage of the last 40 years there has been a new start of a new situation characterised not by graduate change of styles in a logical sequence, not with one particular trend like it was in former historical periods of architecture, but a previously unseen stylistic diversity. Styles are developing in parallel to each

other, having mutual impact on each other, fighting, being interpreted and improving. Spatial volumes of architecture develop in geometrical progression always creating new fantastic form mutations, especially underlining multifarious applications of glass systems thanks to new technologies and scientific discoveries in bionics (life+technology). The notion of borders in architecture has transformed and obtained new dimensions – like a new organism it plastically pulsates from outdoors into indoors and the other way round, depending on objective and subjective factors (Лихачева, 2000). Minimalism under the guidance of T.Ando brought the idea of restoring links between artificially and naturally created environment: exterior abstraction, interior representability, clarity, purity, laconism, asceticism, and transparency of concept. Hi-tech, on its part, with its industrial technological focus lays claim to Guinness records in architecture – glass panels in the area of several thousand square metres, fastened in openwork metal structures in all dimensions in a shape-building diversity on a previously unseen scale. One of examples of the creative work by architect Henry Foster, airport terminal in Hong Kong, brilliantly and graphically characterises the new possibilities. Innovation, utopianism, biotechnological modelling, dynamism, transformability and dematerialised walls of warm air separating indoors from outdoors – this is the contribution of this style in the architecture of indoor/outdoor dialogue.

While the world trends develop by leaps, national building craft exists in Japan, China, Bali islands, Maldives, Russia, Latvia and many other parts of the world and with good reason; taking into account climatic specifics of every region it provides for a harmonious environment having been developed and accepted by society in long term in hundreds and thousands of years.

Summary of conclusions on indoor/outdoor harmony in objects inspected in nature

Results obtained in researching education institution architecture confirmed a previous hypothesis that the development of indoor/outdoor harmony in the context of 20th-21st century technologies creates a new architectural scenery. Latvian architecture presents excellent examples of an environment serving for the needs of unprotected members of society such as children, e.g. linking of nature and interior space in recreational areas such as in the new extension of Jelgava Secondary School No. 4 designed by architect A.Ziemeļniece with façade made of glass panels and curved towards outdoors thus integrating nature into interior space in an intensive and propitious way. In the new Latvian Academy of Arts' extension designed by A.Sīlis (SZK&Partners),

an obvious contrast to the historic volume, the linkage with outdoors, or the sky, through proportions of glass areas in windows in relation to parts with no glass, has obtained a value of a finished, framed artwork. A widely popular and favourite technique is an entrance motif designed in voluminous glass panels: it emotionally softens borders, creates gradualness and overcomes interspatial borders. This principle has materialised in many new education institutions, e.g. International School in Piņķi designed by architect D.Zalāne (Grietēna, 2013) as well as in architecture of many shopping and sports centres and administrative buildings. Also, in healthcare institutions the linking of nature and specially designed rehabilitation gardens with interiors has become a key to indoor/outdoor harmony accepted on international level; this niche holds an important potential for development in Latvia (Balode, 2014).

A successful example of a harmonious linking of indoors and outdoors for rehabilitation needs is Brukna Manor complex which, after the 21st century transformation of buildings and landscape, has regained its original aesthetic and architectural quality, and harmoniously states its identity through spiritual dimensions, mental feelings and attitudes. Brukna Manor complex is a harmonious environment for a rehabilitation centre combining values of both material and spiritual harmony. Brukna Manor house, in spite of the changed function, has been renovated according to the values of classicism and may be considered a standard of harmony. Building's new interiors form a unique synthesis of antique heritage and modern art. Environment there exists in a state of continuous transformation like a live organism and is created for living, not for the strict needs of museum. Manor's classic building and interiors are finely supplemented by a garden designed in style of Italian renaissance; buildings of the 21st century render it stylistically diverse. However, the core of the complex, i.e. manor house, interiors and garden, has a strong uniting factor, i.e. central symmetry axes of material and spiritual character that helped preserve harmony in spite of challenges that were posed by functional transformation. The spiritual vertical symmetry axis is expressed through a human one: since the very start of Brukna Manor restoration all works were successfully conducted by dean A.Mediņš. The vertical, as a central symmetry axis for spiritual dimension, is an irreplaceable frame of reference in creating a harmonious environment (Balode and Grietēna, 2014).

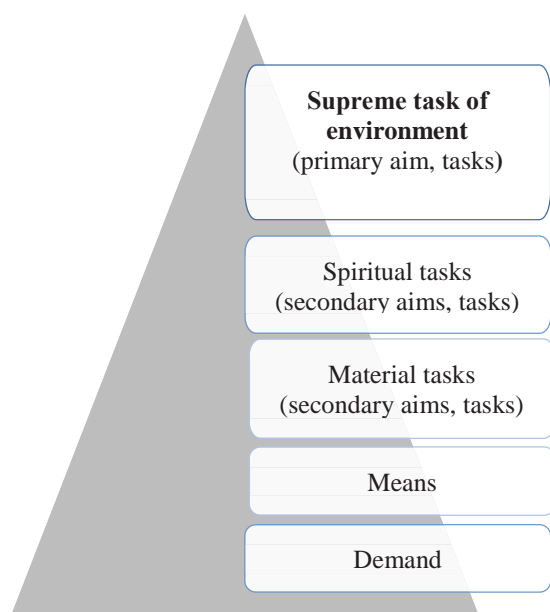
Most recent heritage of sacral architecture in Latvia is widely represented in the form of new modern Catholic churches where in a harmonious indoor/outdoor dialogue the main importance should be attached to integration of the idea of transcendence.

Compositional application of colours and chiaroscuro under the impact of insolation as well as visual accents created by chiaroscuro play have to underline altarpiece in a space by establishing necessary balance and arranging priorities in the right order. Aesthetic harmony or a picturesque landscape perceived through a glass panel only has a subordinate meaning. For example, in Holy Trinity Roman Catholic Church in Rīga designed by architect U.Šēnbergs, light falls in through asymmetric windows arranged high in walls and accentuated altarpiece which not only organises space opening the view to the sky, but also, in balanced portions, opens interior sacral space for communication with urban outdoors. There are a lot of examples of harmonious indoor/outdoor communication in Catholic church architecture of Latvia: Dobeles Roman Catholic Holy Trinity Church, architects J.Kukša and I.Kārklīņš; Saldus Roman Catholic Church, architect A.Andersons; St.Dominique Roman Catholic Church in Liepāja old town and others. Māra Church in Liepāja, architect A.Skujiņa, and St.Meinard's Church and catholic parish centre in Liepāja, architects A.Hupfauf (Germany) (central raised volume) and AKA bureau with A.Kokins, A.Kokina (radial enclosing external part), with their ideological contribution to harmonious indoor/outdoor communication, hold a potential for technical improvements in the future. Analysing a number of sacral buildings within the present study, it was concluded that for maximum result a synthesis of approaches should be employed; a wrong application of light in organising space in sacral buildings sooner or later leads to additional measures and material expenses. Therefore advanced knowledge in creating indoor/outdoor harmony would not only raise the quality of architectural environment, but also help in reaching a higher level of environment design in a more economic and purposeful way (Grietēna, 2014b).

The new building of Latvian National Library (LNB) designed by architect G.Birkerts can be considered as a bright and refined sample of indoor/outdoor harmony in architecture, a successful result of interdisciplinary cooperation of environment makers. The building presents an encounter of noble aims defined twenty five years and respective results of the present day; they have stood the test of time and must be recognised as timeless. Conclusions reached in previous studies on priorities regarding interspatial harmony in other functionally different objects are supported by studies of indoor/outdoor harmony in relation to the new LNB building. In order to come possibly closer to indoor/outdoor harmony in environmental design, upon starting design development for a building one needs long-term thinking and definition of a primary aim, in other words, a supreme task followed by tasks for reaching

it, with subordinated secondary aims and tasks derived from available means and demand. Subordination has the deciding role in reaching harmony (Grietēna, 2014a).

Indoor/outdoor harmony and possibilities for its development today



Source: Graph created by the author (2015).

Figure 1. Subordination of indoor/outdoor aspects as the main condition for creating a harmonious environment.

Summarising conclusions on environmental harmony in functionally different objects and their groups in all successful examples one may notice the same principle: the decisive role of value subordination in reaching harmony in environment design (Figure 1), balance between the spiritual and the material, very much like what is necessary between sciences and humanities. Architecture is a unique area integrating both of these values in itself in balanced amounts. Due to the novelty of the issue, society, people working in public administration and more than often experts as well lack advanced knowledge on conditions of indoor/outdoor harmony and do not pay sufficient attention to it. In order to ensure a harmonious high-quality environment in the future, one must first invest substantial resources in all levels of education; it will become a reflection of inner conflicts of a new space concept, continue historic process of architectural development and introduce diverse approaches to harmonise indoors/outdoors in a scientifically grounded way. With time, a general level of education in this socially sensitive aspect and issues increasing, we may hope for a

development of complex practical solutions based in legislation.

Conclusions

Intensity of indoor/outdoor dialogue in the context of architectural history has been rapidly evolving since the 19th century due to technological achievements reaching culmination in the 20th century in living houses with as much glass systems as possible serving as a breaking point of the ruling trend. Since then intensity of the dialogue has diminished, however its trend remains high, looking for balance of a dialogue of interior and exterior space and a way to harmony in this complicated system.

After inspection of education institutions a conclusion was drawn that a close relation of nature and interior space in recreational areas is one of the keys to indoor/outdoor harmony. This communication justifies itself even more in healthcare institutions that have an access to rehabilitation gardens. In a sacral space direct communication with outdoors disturbs its function, therefore in objects like that promotion of indoor/outdoor harmony should be made by indirect, reflected light or a direct communication with the sky. Besides, it is crucially important to organise the light taking into account indoor subordination, i.e. accentuating altars. Library spaces require a solution in-between education and sacral buildings – an indoor presence of nature and urban space has to be tempered. Outstanding results may be achieved by combining light shafts, tunnels, skylights, and reflected lights with traditional windows in facades if the latter are subordinated to the previous in terms of light intensity.

In the summary of conclusions several directions of indoor/outdoor harmony development in modern Latvia appear, both open and closed to communication; however, the leading trend still is towards overtness. By analysing previous successful and unsuccessful examples in the architecture of publicly most sensitive objects of the re-established Latvia, one obtained a pyramid of subordinated guidelines to be employed as a support system for introducing harmonious architectural environments. The subject is of current importance not only in circles of experts but in all levels of society: we all are users of this environment. In order to create a harmonious high-quality environment in the future, at first, one has to invest substantial resources in education; it will become a reflection of inner conflicts of the new space concept, continue historic process of architectural development and introduce diverse approaches to harmonise indoors/outdoors. Due to the novelty of this problem, society, people working in public administration and more than often experts as well lack advanced knowledge on the conditions of indoor/outdoor harmony and do not pay sufficient attention to the issue. With time,

common awareness in this area will increasing, we may hope for a development of complex practical solutions for this publicly sensitive issue based in most recent scientific strategy grounded in research and materialised in a harmonious environment.

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