

Architectural Thesis Beyond Standards Makes a Mission of Solving Sustainability Challenges Possible

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Abstract

The study elucidates the concept of sustainability as an intellectual method, based on laws of human nature, for managing creative anthropogenic impacts. This technique is exemplified through anthropological, architectural, and doctoral dissertation strategies, thereby demonstrating that it is characterized by a universal model for achieving standard, innovative, and unprecedented goals. This study employs a multidisciplinary approach, encompassing an investigation of scientific literature, regulations, traditional Lithuanian architecture, relevant case studies, and the author's works. Solutions beyond standards, emphasizing individual mission-oriented approaches to tackle the latest sustainability challenges, are identified. This study provides a framework for composing a humanitarian thesis dedicated to inventing a tool for creating and evaluating artistic solutions of sustainable architecture. The foundational structure is suitable for application elsewhere in both scientific and practical discourses.

Introduction

The sustainability issues are universal, despite the controversy surrounding the attitudes and tools that correspond with them. To illustrate this tendency, the terms 'limited' and 'limitless' appear at opposite ends of a spectrum. The term 'limited' is associated with concepts such as standards or traditions, whereas 'limitless' is linked to ideas like positivity theory, which has been extensively researched by Rosemary Napper [1]. The study reveals that each position represents a distinct degree of sustainability rather than a singular methodology. *The Report on Progress Towards the Sustainable Development Goals: Towards a Rescue Plan for People and Planet*, published by the United Nations in May 2023, is the latest manifesto to highlight the urgent need for collective action on a global scale. It emphasizes that the current generation has a unique opportunity to be the first and last to save the planet and, therefore, must act now and in unprecedented ways [2]. The notion of an unprecedented solution aligns with the term 'invention', as defined by the World Intellectual Property

Organization (WIPO), 'a new way of doing something, or offers a new technical solution to a problem.' Such solutions are beyond standards and, therefore, approvable through the patent process, as announced on the WIPO official website. New-way solutions satisfy the fundamental requirements for original contribution to knowledge set forth in the doctoral dissertation. However, the quality of the work can vary considerably, falling anywhere on a spectrum between diversity and innovation [3]. In general, the element of novelty represents a pivotal criterion inherent to the extant regulatory framework governing doctoral studies. To illustrate, *the Statute of Science Doctoral Studies*, approved by the Minister of Education, Science and Sport of the Lithuanian Republic in 2020, stipulates the requisite contributions to novelty within the context of the presented ideas, processes, research issues, and so forth [4]. The document is devoid of any definition of what characteristics may be considered 'novel.' Consequently, it is unclear whether the work in question may be legally held liable for its resemblance to said characteristics. The intricate and interdependent nature of the diverse forms of

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capital implicated in sustainable development necessitates the attainment of objective clarity, particularly concerning large-scale, long-term solutions such as those on the built environment. Furthermore, the article highlights an effective solution that is contingent upon the alignment of theoretical and practical approaches. This provides a rationale for the quality of research with respect to its novelty characteristics, particularly concerning the principles of developing science-based innovations that can be transformed into entrepreneurial practice, such as in the form of start-ups.

The field of invention offers a novel avenue for exploring the potential applications of fundamental laws. In general terms, it can be defined as 'innovation'. *The Cambridge Dictionary* (CD) [5] defines innovation as 'a new idea or method, or the use of new ideas and methods. In the context of the article, the focus is on the analysis of innovation possibilities. Nevertheless, the term 'innovation' is subsequently defined as a change in technological performance, which is likely to be recombined, improved, or adapted to a specific context while continuing to build upon already developed solutions. The term 'revolutionary', by the CD, is defined as 'something that has never been made before, or the process of creating something that has never been made before'. This describes a change in the perception of phenomena, which consequently results in a change in technical performance. More accurately, it creates unprecedented ways of performance, which can be defined as 'invention'.

Unprecedented is (not) scientific. The term 'unprecedented' as used by the CD is defined as 'never having happened or existed in the past'. The term 'scientific,' as defined by the CD, is 'relating to science, or using the organized methods of science'. The juxtaposition of meanings – new and in existing scope – demonstrates the diverse nature of characteristics, which have been widely analyzed by such authors as the philosopher and social theorist Jürgen Habermas. These characteristics have been uncovered to be, in fact, logical (anthropological) in nature [6]. In light of these considerations, the author of the publication proposes that individual solutions be regarded as inextricably linked to scientific inquiry. This implies that they constitute a logical avenue of approach, as defined by the Latin verb 'ducere,' meaning 'careful and using the system of methods' [7]. Furthermore, the recurrent deployment of unprecedented solutions by fundamental tenets of sustainability can be viewed as a process of new norm formation, thereby aligning them with the domain of scientific investigation.

This work establishes a framework for organizing the invention through an architectural thesis, originally entitled *Possibilities in Artistic Solutions of Sustainable Architecture in Lithuania*, which is developed by the author of this publication. It is postulated that the result is per the universal laws of anthropogenic creativity. The methods of

induction and deduction are employed to examine existing applications of sustainable development principles and to propose novel paradigms for their implementation. The evolution of the built environment through the lens of anthropology is considered a source of knowledge that forms the fundamental understanding of the sustainable development methodology appearing in levels (logic for the sequence of procedures). The aforementioned creativity framework is presented in the initial section of the article, with scientific literature serving as the primary data source. The analysis includes a variety of case studies from both national and international contexts, as well as examples of inventive creativity management scenarios employed by the author of the article. The second part of the study puts forth the proposition of integrating the sustainable development framework into the context of innovations derived from successfully defended doctoral dissertations in the fields of technology and humanitarianism. Subsequently, the core principles are employed in the formulation of an invention on the creation and evaluation of artistic solutions of sustainable architecture. The framework's characteristic of hierarchical levels makes it compatible with algorithmic technology, which may be considered integral to digital and even cyber technologies such as artificial intelligence. The scheme of the concept of sustainable development and explanation of its basic principles, universal for theory and practice, finalizes the study.

I. Concept of Sustainability: Architecture Development and Theoretical Framework

The concept of sustainability is universally defined as the interaction of environmental, social, and individual laws, or alternatively, as the interrelationship between physical and mental aspects. It is an exclusively human strategy for achieving goals. From an anthropological perspective, physical human needs, such as survival, are fundamental in determining the choice of creative decisions, such as building construction and materials. This is also characteristic of the architectural traditions of Lithuania. To illustrate, prior to the Mesolithic era, temporary camps established by tribes provided opportunities for the pursuit and hunting of food sources. It was only during the Bronze Age that the sophisticated capabilities of farming, which enabled the construction of stationary buildings both above and below ground, emerged. The establishment of stable settlements provided an environment conducive to the advancement of mental capabilities, including the development of arts and crafts. Furthermore, in this context, human curiosity led to an examination and resolution of transformative issues as well as a transcendental perception of the universe. To illustrate, burial traditions and buildings, for example, burial mounds of unique aesthetical appearances (stone arrangement),

emerged [8]. It is interesting to note that even in primitive cultures such an invention, which is an alternative to *Stonehenge*, physically embodies fundamental knowledge on the space observation technique [9]. In conclusion, sustainable development represents a logical progression of stages for achieving a range of diverse human creative goals. Each stage involves a universal set of capital.

David Bergman asserts that sustainable architectural development levels range from survival to thriving [10], aligning with the hierarchical model of human needs as postulated by American psychologist Abraham Harold Maslow [11]. Robert Dilts, an expert in human neurolinguistics, derived the concept into a form of a hierarchy of logical levels specifically derived from the human body-mind interrelationship [12]. The combination of these sustainability models with anthropological findings by Jürgen Habermas [6] irrefutably demonstrates the direct correlation between human development and human-made development. This means that the creator and the creature are inextricably linked. The doctoral student and the scientific dissertation both indicate capabilities/capacities that range from formation to reformation and are universally applicable, whether in technological or humanitarian cases. Fig. 1 presents the model of the researcher-and-research in line with the hierarchical sequence and terminology of R. Dilts.

The rationale behind a scientific, research-based approach to development is illustrated through an examination of the contemporary funeral solution in the context of Lithuania, which was defended as the Master's degree final research project of the author of the article [13]. It was declared that in accordance with the principles of physical law, the life-cycle of human beings is parallel to the characteristics of an eco-cycle, including the manner in which they operate. As a result, a universal pattern emerges. At the end of the life cycle, the corpse or cremated remains of the deceased are interred in a private or collective grave. These are social laws that regulate the processing of human remains. There are several standard alternatives for disposition, including burial underground, in a memorial, and other forms that combine elements of both. In this context, reformulating (innovating) operational principles involves combining existing techniques and/or making consensuses

to suit the specific requirements of the researched contexts. For instance, burial underground in a memorial may be the optimal solution. The contemporary sustainability issues of pollution and urbanization demand unprecedented solutions. In the United States, the method of preparing a body for disposal by freeze-drying was invented. The man behind this invention was schoolteacher Philip Backman. He patented the invention in 1978. Backman's method still needed improvement. The Promession® (a freeze-drying technique for reducing the body to particles specifically by means of gentle vibration), invented by Susanne Wiigh-Mäsak, is the individualized and aesthetical solution to the processing of human remains. It was patented in 1999. It is already legal in Sweden, the United Kingdom, and South Korea and is compatible with standard burial forms. Dalia Augustinaitė proposed that corpses that are processed in this way are mixed with cement dust, thus creating concrete cubes that would form a Promession® pathway memorial [14]. The practice of burial in cement or other liquid and solid substances represents a novel alternative to traditional practices such as burial in gravel or, in certain cultures, in water. This approach is unprecedented and reformulates the conventional understanding of burial. Its compatibility with and respect for physical and mental norms, as well as its alignment with higher intelligence doctrines such as ethics and theology, elevate it to a fully-fledged sustainability level, making it a mission-oriented solution.

An inventive or, as J. Habermas named it, a critical mindset is aligned with the legitimations of democratic order, which is of particular importance to bring into the context of postwar Europe [15]. An analysis of such cultures, for instance, Lithuanian, is of the utmost importance in order to ascertain the possibilities for identity preservation and restoration. Nevertheless, the creation of long-lasting authenticity necessitates a reflexive approach to defining characteristics, whereby the roots are not preserved in a static state but rather undergo a process of transformation. To facilitate scientific research, it is essential to establish a foundation of theoretical and practical knowledge that can be used to identify patterns and principles that can then be applied to facilitate transformation in new ways. Reformations result in the destruction of existing structures, whether partial, in form, or complete, in purpose. To

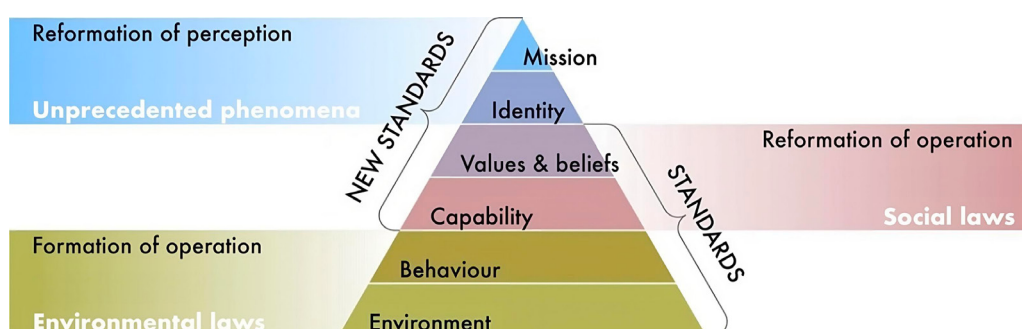


Fig. 1. The hierarchy of logical levels by R. Dilts in alignment with capabilities of sustainable research-and-researcher (developed by the author).

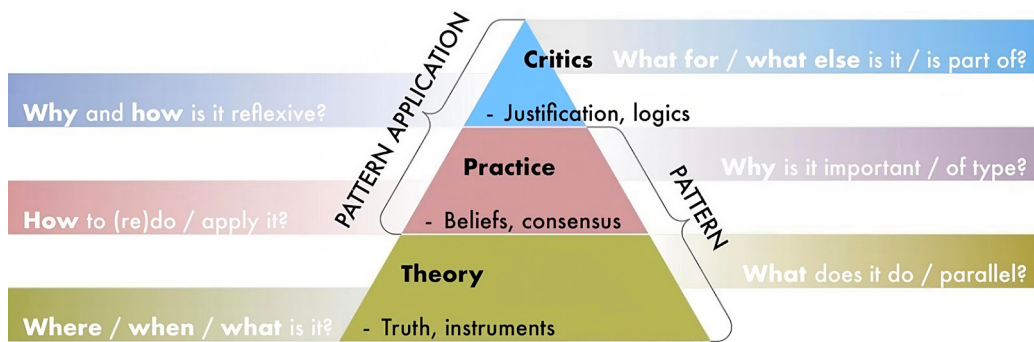


Fig. 2. The hierarchy of knowledge domains by J. Habermas in alignment with decision-making tool (developed by the author).

exemplify a radical transformation from an anthropogenic perspective, the fundamental principles of constructing burial mounds represent the very first prototype of a fortress [8]. The construction of *Stonehenge* in England (3000–2000 BC) preceded the building of burial mounds (2000–1000 BC) in the Eastern European region. Consequently, it can be inferred that cultures such as the Lithuanian only adopted this solution into their local context, thereby reflecting the goals of their predecessors. Figure 2 illustrates a decision-making tool that employs J. Habermas' terminology at the theoretical, practical, and critical [16] levels of sustainable development, thereby demonstrating the transformational characteristics inherent to such a process. The level of practice is where new and old strategies of development converge. It is also the point at which a decision is made as to whether the solution should proceed in a standard or beyond a standard manner (see the next chapter for further details). In general, if universal and intellectual frameworks are misaligned, such as in the case of disorder between environmental and certain human needs, an essential shift must be made instead of adjustment. Every level of sustainable development is equally meaningful and should continue as long as it aligns qualitatively with the basics – the laws of nature.

II. Structure of Doctoral Thesis: Case Study and Development

The preceding chapter's insights have led to the formulation of a hypothesis that doctoral theses, as

human-made strategies, exhibit characteristics associated with sustainable development. By applying this logic, it is possible to achieve specific category goals by dividing the structure of a sustainable thesis into discrete levels. The analysis is based on three case studies. *The Assessment of Building Energy Functionality in the Integrated Building Design* by Vilūnė Lapinskienė represents a doctoral thesis in the field of technological sciences (Case A). *The Interaction of Artistic Forms and Reinforced Concrete Technologies in Lithuanian Architecture* by Aušra Černiauskienė represents a case within the field of the humanities (Case B). This publication presents the author's ongoing doctoral thesis research, originally entitled *Possibilities in Artistic Solutions of Sustainable Architecture in Lithuania*, which represents a case within the field of humanities (Case C). The structure and motives of the two-level innovation strategy are currently being investigated, with Cases A and B having been defended and serving as a reference point for Case C.

Case A

V. Lapinskienė states that her Doctoral Thesis aims 'to develop a concept building design technology and a series of procedures, in which the methods and tools applied enable a more efficient design of a building concept that is compatible with the user's initial requirements and the capabilities of the design team' [17]. The author examines methodologies inherent to the field of technology, with a particular focus on engineering sciences, and considers the potential for integrating these methodologies in the specific field of civil engineering. The first chapter of the Thesis

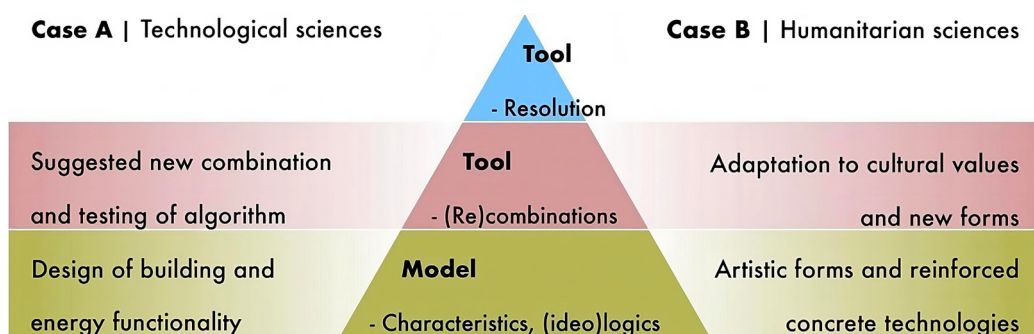


Fig. 3. The comparison of innovative cases of doctoral theses of diverse science fields in alignment with the constitution of sustainable development (developed by the author).

presents a theoretical analysis of building design and its energy functionality characteristics and methods. Based on the findings, the second chapter of the Thesis synthesizes standard algorithms, including additive parameters, into a new technology for assessing interrelationship. The third chapter concludes with the testing and calibration of the formulated methodology. The proposed solution is innovation, achieved through the adjustment of existing (standard) alternatives of a similar nature (technological). As illustrated in Figure 3, the research encompasses two of the three stages of sustainable development, ultimately leading to the creation of a (re)combined tool.

Case B

As stated by A. Černauskienė, her Doctoral Thesis aims 'to determine the origins and expressions of the interaction and to determine its specific features and potential cultural value in Lithuanian architecture with the help of a two-level theoretical model' [18]. The study adheres to established standards of architectural research methodology. The first chapter presents a theoretical formulation of the concept of interaction between artistic forms and reinforced concrete technologies, as well as the theoretical assumptions underlying the interpretation of these interactions. Summarizing the findings, a two-level model is thus formulated, delineating the contextual characteristics and expression of interaction. The second chapter examines the adaptation of the model to new forms of interaction in contemporary architecture in Lithuania. The third chapter is devoted to an analysis of the cultural value-based characteristics of the interaction in local and analogous cultural contexts. The new knowledge is utilized for the formulation of methodological guidelines for interaction, which can be applied in the context of Lithuania. The solution is innovative. In Figure 3, the right side of the scheme demonstrates that the study has reached the sustainable development level of (re)combination of standard tools. Therefore, although the derivative is new in the research area in Lithuania, it is a replication of the precedents.

Blueprint in Cases A and B

The two theses, despite differing in their particulars, are organized according to inductive and deductive principles in order to elucidate the attributes and modes of organization of the phenomena under investigation. In Case A, the standard parameters of structures of a similar nature (standard and sub-standard in a specific field) are merged, and a new composite is tested in standard scenarios. In contrast, Case B employs an inverse methodology to that of Case A. It begins by generalizing the standard properties of the technique and then proceeds to examine it in both standard and analogous contexts. In both cases, there is a

general tendency for precedents to be calibrated for use in specific contexts or, conversely, for specific contexts to be brought into a unified solution under universal characteristics. This tendency is applicable when specific type criteria are employed alone or in conjunction with diverse type criteria of a similar nature (typical and sub-typical techniques). The first chapter is dedicated to the creation of a universal model. The second chapter explores the potential applications of this model in practice, whether through original or derived approaches. The third chapter presents an experimental investigation of the model using alternative samples. This publication does not undertake a comprehensive investigation into whether the quality of theoretical frameworks aligns with practice patterns in any of these cases. It respects the decision of the responsible authors to continue in their existing, albeit innovative, mode.

Settings of Case C

The initial intention of D. Augustinaitė was to adhere to the established standards of scientific research methodology, thereby resulting in a refined version of existing solutions to the researched issue. The initial aim was to investigate the phenomenon of sustainable architecture and establish guidelines for advancing higher-quality sustainable architectural solutions in Lithuania. In order to respond to the task, it is necessary to consider the characteristics of sustainability, architecture, and their interaction, as well as the methods of qualitative development and assessment of the phenomenon. The findings revealed a discrepancy between the standard practices of phenomenon quality management strategies and three universal laws. Firstly, it was found that methodologies do not necessarily involve both environmental (technical) and social (values) criteria, which are necessary for the characteristics of both architecture and sustainability. Secondly, the level of quality is directly correlated with the quantity of parameters involved, with the highest possible score representing the lowest level of sustainability requirements (point zero). Moreover, the precise number and type of parameters are not predetermined, allowing for subjectivity in determining which factors are the most significant. Thirdly, the classification of phenomena in levels is conducted in a linear (one-dimensional) manner, lacks cohesion with transformation over stages (two-dimensional or circular techniques), and merely reflects relevant time and space context (third-dimension techniques). It can be reasonably deduced that any novel combination of parameters derived from existing tools is an ineffective means of resolving the task. To illustrate, the optimal scenario would be the creation of a comprehensive manual contributing to good practice but not creating quality sustainability or quality architecture or both in quality interaction, even

if the higher goals are considered. In metaphorical terms, this can be seen as an ‘architectural’ rediscovery of Homo sapiens, resulting in the accidental rather than strategic achievement of a variety of tasks within the sustainability discourse.

Solution of Case C

The author has developed a comprehensive understanding of the commonalities between anthropogenic ‘things’ and humans. This provides clear insights into the possibilities of (re)organizing both structures [19]. This has led to an exploration of social science methodology, particularly in relation to the interaction between physical and mental characteristics. As a result, the repetitive framework, which is intrinsic to alternative fields such as anthropology, economics, education, political science, psychology, and sustainable development, emerged. In order to apply it to the humanitarian sciences, the matter must undergo a process of transmutation (invention) to make possible its integration into technological solutions that mimic nature and correspond to the uncovered social means. To achieve a solution to the task under consideration, methodologies originating in the humanitarian, technological, and social sciences contribute to the process in equal measure. The initial chapter of the Thesis is a study of the characteristics of sustainable architecture and the principal operational models associated with it. A theoretical three-dimensional framework (*technique 7R*) is constructed [20]. The second chapter investigates contemporary practical strategies, such as regulations, documents, initiatives, sustainable building assessment systems, competitions, guidelines, and the possibilities for managing the phenomenon in question. A practical framework is derived by aligning the in-use practical criteria (co-criteria) with the criteria of the algorithm of *technique 7R*. As a result, the aforementioned invention introduces additional *R* (for defining resources in *technique 8R*), regarded as the primary criterion for the management of artistic solutions of sustainable architecture. In other words, the second chapter examines the compatibility of specific parametric procedures (options) with a particular sequence of core procedures

(framework). To illustrate, similarly, applications are tested on complex digital technology. The third chapter introduces a specific sustainable architecture development-evaluation system that responds to the interaction of theoretical and practical frameworks. The methodology is subjected to experimental testing and calibration in the context of a case study in sustainable architecture. To illustrate, the co-criteria for water resource management, which were explored under three levels (the original study divides the scale into six minor steps), revealed the following: at the basic level, for example, the building is situated on the bank of the river for access to water; at the middle level, the water collector is reinterpreted in the context of a traditional solution for a house, such as in *the House in the Countryside* (completed in 2007) in Arta, Spain, by Juan Herreros Arquitectos; at the ultimate level, the solution reflects transmission approach, such as making in *the Garden of the Fine Arts* (completed in 1993) in Kyoto, Japan, by Tadao Ando. The very first prototype of the methodology, which employs co-criteria for clay material, was introduced at the 3rd International Civil Engineering and Architecture Conference (CEAC 2023) in Kyoto, Japan. This prototype was subsequently presented in the event’s lecture proceedings. Figure 4 depicts the structural components of D. Augustinaité’s Doctoral Thesis, which are consistent with the hierarchical model of sustainable development goals. Figure 5 in duplication illustrates the fully-fledged algorithm’s development steps in the structural design diagram [21]. The diagram is presented in a reversed order of visualization in comparison to the original approach to the basic design concept by J. Harvey Evans. To elaborate, the spiral loops for the development of the solution originate with the general idea, which is situated at the edge of the circle and subsequently investigated (researched and tested) in depth (repetitively and with revisions) towards the centre (the final solution). In the case of D. Augustinaité’s concept, the central point (Level I) is a highly specific pre-existing solution that has been tested for its adaptability to other realities (contexts). This is done with the intention of pertaining to diverse, parallel scientific and practical discourses. Consequently, at Level II, the co-criteria have been investigated with a view to identifying solutions pertaining to matter and energy.

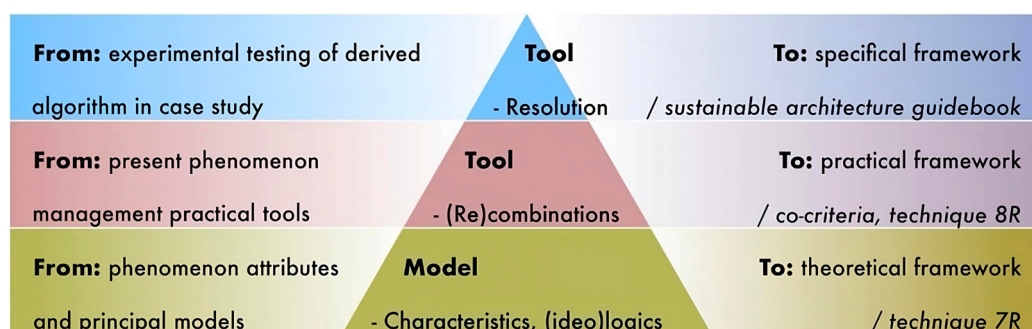


Fig. 4. Case C – structural research components in alignment with sustainable development goals (developed by the author).

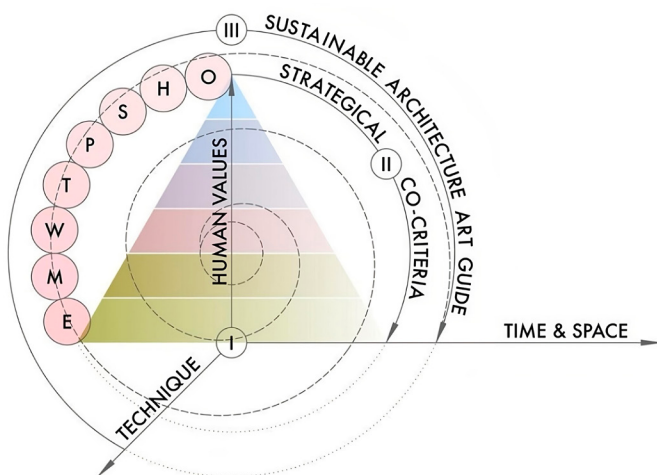


Fig. 5. Structural design diagram of sustainable architecture algorithm (developed by the author).

In a scheme, they are defined as including a specific focus on E for energy, M for materials, W for water management, T for transport and pedestrians, P for pollution and waste, S for site and ecology, H for health and wellbeing, and O for other criteria in practical strategies. In conclusion, the final solution, Level III (*sustainable architecture art guide*), represents the initial concrete solution among numerous potential avenues for the central concept's utilization. Consequently, the solution of the invention can be considered the prototype for subsequent iterations, embodying the fundamental principles that underpin the development of alternative solutions. In other words, the invention represents an inverse methodology (compared with the basic design concepts) for the generation of solutions, namely the introduction of hitherto unutilized universal principles.

The Concept of Sustainable Doctoral Thesis

Rules of thumb in decision-making for two-levelled innovations (standard and inventive) development in the doctoral thesis (see Fig. 6):

- Both levels of innovative cases employ inductive and deductive research methods, which may include

the analysis of abductive meanings and specific methodologies.

- Both levels of innovative cases are investigated in theoretical and practical frameworks.
- The alignment of universal and applied frameworks in typical (and sub-typical) settings is investigated. This composite is an artefact of natural properties, but similar additives may be involved. In the presence of misalignment, the framework must be searched for principles that can be transformed into other (non-typical) materiality (contexts), i.e., brought from the other fields of sciences and practices.
- Interdisciplinarity is the key to innovative solutions. The ability to manipulate methodologies and contexts with similar characteristics results in the development of standard innovations. The conversion of *Stonehenge* to a burial mound is a case in point. The transformation of methodologies into a distinctive embodiment represents the mission (the ultimate level of creativity) capabilities and, subsequently, the generation of inventive solutions. The conversion of a burial mound to a fortress is an illustrative example of this process.
- (Re)composition of patterns adds new choices in the quantity of existing qualities (competitive).
- Resolution of patterns creates unprecedented quality (noncompetitive), the most effective choice.
- Standard/innovative problem research is a stepping stone to knowledge with the potential to develop inventions in future work experiences. Inventive research demonstrates a full-fledged developer's awareness to respect and qualitatively respond to all needs (environmental, social, and individual) originating in the concept's core principles.
- The innovation aims to bring a universal pattern into a very specific, however similar to the former, context.
- The invention reveals a very specific context pattern with universal applicability in new, exclusive fields which are unfamiliar in nature to the former.

Considering the scheme depicted in Figure 6, it is imperative to consider the hierarchical logic of the developments' structure. Universal (fundamental) patterns are defined as non-considerable choices (mandatory) for the development of knowledge (research) as they form

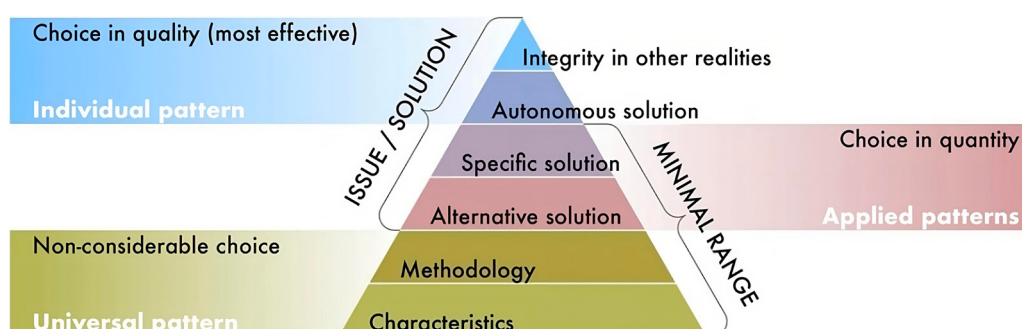


Fig. 6. Sustainable doctoral thesis concept (developed by the author).

a basic understanding of performance (methodology) characteristics of the phenomenon. To develop new solutions, applied patterns investigate social approaches where universal patterns are already used (a set of very specific and alternative choices for solutions). Both universal and applied levels are necessary to be explored (minimum range) in order to create innovation, which is the improvement of the quality of solutions. If the question at hand has no existing solution in already applied patterns, or the applied patterns cause disorder in the fundamental discourses (below levels), the individual (unprecedented) patterns must be employed. This is the most effective anthropogenic solution for answering qualitative environmental, social, and individual (autonomous) needs synergy. Achieving the full spectrum of sustainable development levels creates a precedent solution that is integral in other realities (other discourses of science and practice).

Conclusions

Solving the challenges of sustainability, from the hunt for the dear to the reformulation of perception on the possibilities of sustainable architecture, are equally important goals of humanity. Moreover, the higher tasks are impossible to achieve if the basics are incomplete. Such a law is important both in everyday life and in the development of a doctoral thesis – overleaping the stages would result in a lack of resources to come to qualitative and even the most effective decisions. Interaction of all levels is the ultimate goal, yet any novel solution is treated as responsible if it results in a positive impact on the quality of development. The need for unprecedented solutions arises from the necessity to address higher human needs. These needs may be driven by a desire for progress in line with evolutionary principles, such as the advancement of civilization, or by a recognition of the need for radical change in response to revolutionary principles, such as the mission to solve contemporary sustainability challenges. Modern sustainable education practices are inherently characterized by the integration of innovative principles within the curriculum [22]. The methodology of unprecedented solutions (inventions) must also be included because the study shows that refinement of existing solutions (innovations) does not necessarily have a positive impact on sustainable development. The development of artistic solutions of sustainable architecture management strategy serves to exemplify the crucial steps and objectives that are required for the invention of a new concept. It illuminates the necessity for enhanced capabilities to perceive interdisciplinarity as not only the convergence of similar discourses but also, more importantly, the integration of disparate ones. The sustainable doctoral thesis concept, formulated by the

author of the publication, serves as a guide to achieving both innovative and inventive solutions, which are explained as distinct levels of sustainable development.

The author of the article presents a comprehensive investigation of the principles of sustainability derived from a variety of scientific and practical disciplines. The majority of D. Augustinaitė's experience and knowledge is acquired from the field of innovative architecture. Nevertheless, interdisciplinary competencies provide a foundation for investing her mental and physical capital in the education and practice of architecture, with the objective of achieving inventive and entrepreneurial outcomes. Such capabilities are instrumental in the creation and supervision of sustainable development initiatives across various sectors, including education, business, and governmental regulatory practices.

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Associate Professor Dr Indrė Gražulevičiūtė-Vilenišké of the Kaunas University of Technology exemplified the characteristics of a sustainable development observer, advisor, and motivator throughout the study process. This led to the conclusion that, even if the creator of sustainable development possesses all the necessary capabilities, the environment, especially one that is positively supportive, is a mandatory element for the achievement of success.

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