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Dergi, senede iki defa Eylül ve Mart aylarında, e-dergi olarak yayınlanmaktadır. Derginin yazım dili Türkçe veya İngilizce'dir. Türkçe makalelerde İngilizce özet, İngilizce makalelerde Türkçe özet bulunmalıdır. Dergiye yazı teslimi çalışmanın daha önce yayımlanmadığı anlamına gelmektedir**.**

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Makale ile birlikte, etik olmayan durumlar ve intihal tespiti amacıyla Turnitin veya iThenticate raporu da gönderilmelidir. Benzerlik oranının toplamda %20'yi geçmemesi gerekmektedir.

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Gönderilen yazılarda kaynakça gösteriminde uluslararası geçerliliği olan "APA 6.0 Yazım Kuralları ve Kaynak Gösterim Biçimi" kullanılacaktır.

Kitap Referansları

Abisel, N. (2006). *Sessiz Sinema*. Ankara: Deki.

Abisel, N., Arslan, U.T., Behçetoğulları, P., Karadoğan, A., Öztürk, S.R. & Ulusay, N. (2005). *Çok Tuhaf Çok Tanıdık*. İstanbul: Metis.

Özbek, M. (Ed.) (2005). *Kamusal Alan*. İstanbul: Hil.

Kejanlıoğlu, B. (2005). Medya Çalışmalarında Kamusal Alan Kavramı. Meral Özbek (Ed.), *Kamusal Alan* içinde (s. 689-713). İstanbul: Hil.

Makale Referansları

Barr, S., & Gilg, A. W. (2006). Sustainable lifestyles: Framing environmental action in and around the home. *Geoforum*, 37 (6), 906–920

Song, Y., & Knaap, G. J. (2003). New urbanism and housing values: A disaggregate assessment. *Journal of Urban Economics*, 54, 218–238.

Yazar(lar)ın Sorumluluğu

Dergide yayınlanan görüşler yazarlara aittir. Yazarlar basılmış halde olan makalelerinde bulunan bilgilerin tüm sorumluluğunu üstlenirler. Dergi bu makalelerin sorumluluğunu üstlenmez.

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Dergide basılmış bir makalenin tamamı veya bir kısmı başka bir dergide basılamaz veya konferans vb. herhangi bir etkinikte kullanılamaz.

NOTES FOR AUTHORS

About Journal

NEU Journal of Faculty of Architecture (NEU-JFA) is an international, refereed, semi-annual, scientific publication released by Near East University (NEU). Faculty of Architecture is the hosting institution of the journal. The journal publishes original scientific articles in the context of architecture, interior architecture, urban planning and design, landscape planning and design, as well as history, sociology, art history, ecology, geography, archeology and semiotics for the analysis of the concept of city.

NEU Journal of Architecture Faculty is published as online, twice a year in September and March. The language of the journal is both Turkish and English. English abstracts in Turkish articles and Turkish abstracts in English articles should be additionally written. Submission to the journal means that the study has not been published before.

Preparation of Manuscript

Manuscripts should be prepared according to the manuscript formatting requirements. Therefore, the study that will be submitted to the journal should firstly be arranged according to the article template.

- The length of the manuscript should be up to 8000 words including title, abstract, keywords and references and should not exceed 20 pages in total. After the title not exceeding 15 words, the names of the author (s) and the institutions they are attached should be written. Then, 300 words abstract and 3-5 key words should be written. After the abstract, the main text with introduction, literature review, methodology and conclusion should be written respectively. Finally, the references should be added. Articles should be written with APA 6.0 Style writing rules.

- The text should be written as 12-point, Times New Roman and single spaced. The article title must be 14-point, bold, Times New Roman. The main headings in the article are written in 12-point, bold and Times New Roman. Subtitles are written in 12-point and italic. Headings and subheadings are numbered. The paper layout is A4 with a space of 2,5cm at the top, bottom, left and right.

Originality and plagiarism

A similarity report accompanied by a Turnitin or iThenticate program for unethical cases and plagiarism should also be submitted with the manuscript. The similarity rate must be below 20% in total.

Figures, illustrations, tables and photos

All tables, figures and graphics should be sent both in the same text file and separately. All charts, graphs and diagrams in the text should be called figures and consecutive numbers should be given. Each figure and table should be given a number with Arabic numerals. The figure titles should be written before the figure and the table titles should be written after the table and all figures and tables must be cited in the text.

Visual materials such as pictures, photographs, plans, maps, drawings, graphics should be submitted as separate files as ‘tiff’ or ‘jpeg’. The horizontal edge of the pictures should be at

least 10 cm and their resolution should be at least ‘300 dpi’, in other words the short side should be at least 1200 pixel.

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Firstly, the compliance of the manuscript with the formating requirements will be checked. Manuscripts which do not obey the formatting requirements of the journal, are not sent to the referee; it is sent back for the necessary corrections. Finally, after the review process, a positive or negative desicion is given for publication.

References

APA 6.0 Style rules must be used for formatting, references and citations.

Book

Abisel, N. (2006). *Sessiz Sinema*. Ankara: Deki.

Abisel, N., Arslan, U.T., Behçetoğulları, P., Karadoğan, A., Öztürk, S.R. & Ulusay, N. (2005). *Çok Tuhaf Çok Tanıdık*. İstanbul: Metis.

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Any part of an article published in the journal cannot be printed in another journal conference or event.

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EDİTÖRDEN

Yakın Doğu Üniversitesi Mimarlık Fakültesi dergisinin üçüncü sayısında, sizlere tekrar merhaba demekten çok mutluyuz.

Yaşamda ve eğitim hayatında tüm değişen dönüşen şeylere rağmen değişmeyen değerlerin takipçisi olarak devam etmeye kararlıyız. Gerçi dergi yaşantımızda da değişiklikler oldu, ilk sayıda elimize aldığımız basılı sayılar devam eden süreçte, bu sayı dahil olmak üzere, sadece digital olarak yayınlanacak.

Bu sayıyla beraber, başta Editör Yardımcısı Doç. Dr. Buket Asilsoy'a, derginin kurumsal kimliği konusundaki katkıları için Hüseyin Aşkaroğlu'na, web tasarımı konusundaki katkıları için Orhan Özkılıç'a, bu üçüncü sayımızda yoğun programları içinde özenli değerlendirmeleriyle makalelerin ve derginin bilimsel niteliğinin yükselmesine katkıda bulunan Devrim Yücel Besim'e, Hakan Sağlam'a, Özge Ö. Fuller'e, Çiğdem Çağnan'a, Nilüfer Kart Aktaş'a, Müge Rıza'ya ve bu sayıya makaleleri ile katkıda bulunan yazarlar, Hoda-Esmaeilian Toussia, Mustafa A. Gaber-Can Kara, Evans Kimani Njunge-Buket Asilsoy, Zeynep Onur-Ejeng Ukabi-Evans Kimani- Ugwulebo John ve Zeynel Çağlar Ayanoğlu-Havva Arslangazi Uzunahmet'e çok teşekkür ederim.

Ayrıca derginin bu sayısında Üniversitemiz Fen Bilimleri Enstitütüsünde yüksek lisans ve doktora çalımalarını sürdüren öğrencilerimizin makaleleri ağırlıkta. Bu derginin onların akademik yaşamlarına aracılık ediyor olması büyük mutluluk.

Keyifli okumalar dilerim…

Saygılarımla,

Prof. Dr. A. Zeynep Onur

FROM THE EDITOR

We are very happy to say hello to you again in the third issue of Near East University Faculty of Architecture magazine.

Despite all the changing and transforming things in life and education, we are determined to continue as a follower of unchanging values. Such that there have been changes in our journal life, after the printed version that we received in the first issue, the journal will only be published digitally in the ongoing process including the current one.

With this issue, I would like to thank to Assoc. Prof. Dr. Buket Asilsoy as Assistant Editor, to Hüseyin Aşkaroğlu for his contributions to the journal's corporate identity and to Orhan Özkılıç for his contributions to web design. In addition I appreciate the efforts of Devrim Yücel Besim, Hakan Sağlam, Özge Ö. Fuller, Çiğdem Çağnan, Nilüfer Kart Aktaş and Müge Rıza who contributed to the raising of the scientific quality of the journal and articles with the careful review evaluations in this third issue. I also would like to thank to the authors who contributed to this issue with their articles, Hoda-Esmaeilian Toussia, Mustafa A. Gaber-Can Kara, Evans Kimani Njunge-Buket Asilsoy, Zeynep Onur-Ejeng Ukabi-Evans Kimani- Ugwulebo John and Zeynel Çağlar Ayanoğlu-Havva Arslangazi Uzunahmet.

In this issue of the journal, the articles of our students who are continuing their master's and doctoral studies at the Graduate School of Applied Sciences are predominant. It is a great pleasure that this journal mediates their academic life.

Yours truly,

Prof. Dr. A. Zeynep Onur

The Application of Evolutionary, Generative, and Hybrid Approaches in Architecture Design Optimization

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Abstract
Since the emergence and application of evolutionary optimization approaches in architecture in the early twentieth century, a wide range of studies have attempted to integrate evolutionary strategies with the design process. The extensiveness and dispersion of research in this field and the growing application of the generative evolutionary techniques in solving design problems necessitate analytical classification of pertinent literature review. Based on the descriptive-analytical review of the literature on generative evolutionary strategies in architecture, this paper proposes a research model for an integrated generative design framework to enhance the future application of this approach in the conceptual design stage. Therefore, first, selected 140 journal articles, with key-word exploration method, between 2014 and 2020 is analyzed to categorize the applied techniques, identify the gap, and address the issue of selecting the appropriate evolutionary approach in the early stage of design. Literature analysis is classified into seven topics, each demonstrating shortcomings of related studies in four categories of form finding, Spatial Programming, Performance-based optimization, and Multi-objective optimization. The research results indicate a growing interest in applying hybrid methods, multi-objective optimization problems, the need for an integrative generative evolutionary framework in the early design phase, and a conceptual design tool with Co-simulation possibility.

Keywords: evolutionary optimization algorithm, multi-objective optimization, generative design, hybrid methods

Mimari Tasarım Optimizasyonunda Evrimsel, Üretken Ve Hibrit Yaklaşımların Uygulanması

Özet
Yirminci yüzyılın başlarında mimaride evrimsel optimizasyon yaklaşımlarının ortaya çıkması ve uygulanmasından bu yana, geniş bir çalışma yelpazesi, evrimsel stratejileri tasarım süreciyle bütünleştirmeye çalışmıştır. Bu alandaki araştırmanın yaygınlığı ve dağılımı ve tasarım sorunlarının çözümünde üretici evrimsel tekniklerin artan uygulaması, ilgili literatür taramasının analitik sınıflandırmasını gerektirmektedir. Mimaride üretken evrim stratejileri ile ilgili literatürün tanımlayıcı-analitik incelemesine dayalı olarak, bu makale kavramsal tasarım aşamasında bu yaklaşımın gelecekteki uygulamasını geliştirmek bağlamında entegre bir üretken tasarım çerçevesi oluşturmak için bir araştırma modeli önermektedir. Bu nedenle, öncelikle 2014 ve 2020 yılları arasında ve anahtar kelime aracılığıyla seçilen 140 makale, uygulanan teknikleri kategorize etmek, boşlukları belirlemek ve tasarımın erken aşamasında uygun evrimsel yaklaşımın seçilmesi konusunu ele almak için analiz edilmiştir. Literatür analizi, her biri dört kategoride, Mekansal Programlama, Performansa dayalı optimizasyon ve Çok amaçlı optimizasyonda form bulma ilgili çalışmaların eksikliklerini gösteren yedi konuya ayrılmıştır. Araştırma sonuçları, hibrit yöntemlerin, çok amaçlı optimizasyon problemlerinin uygulanmasına olan ilginin arttığını ve erken tasarım aşamasında bütünleştirici bir üretken evrimsel çerçeveye ve eş zamanlı simülasyon olasılığına sahip kavramsal bir tasarım aracına duyulan ihtiyacı göstermektedir.

Anahtar Kelimeler: evrimsel optimizasyon algoritması, çok amaçlı optimizasyon, üretken tasarım, hibrit yöntemler

INTRODUCTION

Design process encompasses iterative activities of data collection, problem definition and exploration, ideation and evaluation. Due to extensive, complex, and seemingly contradictory involved design aspects, a shift towards generative and evolutionary design in the field of architecture has occurred which replicates natural evolution process in the virtual spaces of the computer (Frazer J. H., 2002). This biology-driven approach has provided designers with a diversified search space and design options as well as obtaining specific goals (HM., 2006).

Since 1970, with the growing application of evolutionary techniques in form finding and solving multi-objective optimization problems in architecture, extensive studies have been conducted in response to proposing a comprehensive generative evolutionary framework in the early design phase. The broad range of research can be exemplified in studies related to form finding (Ceccato, 1999), (Kicinger, 2005), (Janssen, 2005), engineering research field (Rosenman, 1999), (J., 1995), (Poon J., 1996), evolutionary algorithm development (Gong, 2008), (Mühlenbein, 1993), design notion (HM., 2006), (Gu, 2006), multi-objective optimization (Lee L. H., 2008), (Limbourg, 2008), and hybrid systems (Nariman-Zadeh, 2005), (Park, 2007). Aiming to identify a comprehensive generative evolutionary approach, this paper applies a descriptive literature review to select, analyse, and categorize the related literature among journal articles from 2014 to 2020. The first section of the paper defines research area to help clarify potential keyword exploration. The second part examines the selected articles based on four design objectives of "form finding", "performance-based optimization", "Spatial Programming", and "multi-objective problems". This classification facilitates the literature analysis process and demonstrates the number of studies with only one specific goal as opposed to adopting a multi-objective outlook in the early design stage. Also, the efficacy of various applied evolutionary techniques in different articles can be compared more precisely when they share a common objective.

RESEARCH METHODOLOGY

In this article a descriptive literature review was adopted to identify interpretable patterns and gaps in academic published journals, using qualitative descriptive statistics with info graphic representations. This method includes seven different stages as is illustrated in Figure 1. The first step, initialization, uses library research to identify and define related keywords. The second step is to search designated academic database, naming Scopus, Science Direct, and Google Scholar for review journal articles, with preferably high citation, between 2014 and 2020, English language, and based on keywords "evolutionary", "generative", "multi-objective", "optimization", "conceptual", "design" with excluding "urban" and "town", as urban design is not in the scope of this research. The third step involves sorting and organizing data based on publication year, citation, relevance to design and architecture field, and the use of case study. Among 250 journal articles extracted from the second step research, 100 relevant articles were selected in the fourth step. Also, to extend the search space the keywords "Shape Grammar", "form finding", and "Spatial Programming" were added to the step 2 keywords one by one, and step 2, 3, and 4 were repeated to obtain the pertinent data. In the fifth step, the studies were classified based on the main objective of the research containing, "form finding", "performance-based optimization", "Spatial Programming", and "multi-objective problems" for better evaluation of techniques and tools. Each of the documents was analysed based on the applied technique, algorithm, and generalization process in the sixth step. Finally, based on the achieved analysis conclusion, a research model for applying the integrative generative evolutionary framework was proposed.

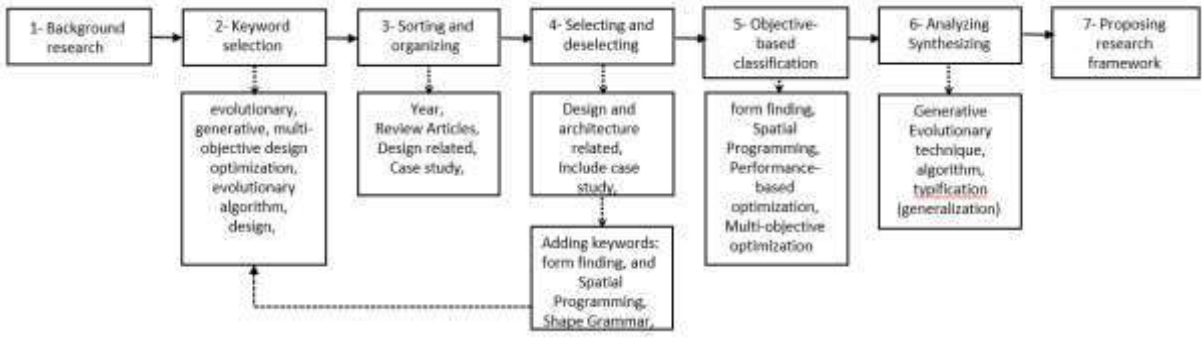

Figure 1: Seven-step research structure. Source: Author

BACKGROUND RESEARCH

Evolutionary Computation (EC) and Evolutionary Design

Design is "*a dynamic process of adaptation and transformation of the knowledge of prior experiences in order to accommodate them to the contingencies of the present* (Oxman, 1990)". In essence, the design process is a recursive procedure, attempting to reconcile complex, contradictory involved elements which can consequently be defined as a continuous problem definition process. To address and support this level of complexity, Evolutionary Computation has been applied and examined by many scholars)Sims, 1994(, (Frazer J. , 1995), (Bentley, 1999). According to Bentley (p., 1999), Evolutionary Computation and Evolutionary Design are rooted in Computer Science and Evolutionary Biology. This field has emerged as an extensive approach by scholars such as Holland (Holland, 1975), Rechenberg (Rechenberg, 1978), and Fogel (Fogel, 1963) to integrate Evolutionary Biology and Computer Science (p., 1999). Evolutionary Computation (EC) is based on the evolutionary biology, mimicking the natural evolution of real life. Explaining briefly, natural evolutionary process can be defined as a series of activities, including selection, crossover, and mutation, that lead to the spread of inherited traits, increasing the probability of survival and reproduction of an individual in a population over successive generations. The fitness of these individuals depends on the environment and their potentials in achieving their goals (Eiben, 2015). Evolutionary Computation, inspired involves Evolutionary Algorithm (EA), Evolutionary Strategy (ES), Genetic Algorithm (GA), and Genetic programming (GP), which all mimic the natural evolution, albeit with some differences in the mechanisms of mutation and crossover (Chan K.H., 2002). Table 1 depicts some of the evolutionary algorithm definitions and history.

Table 1: Evolutionary algorithm types, definition, and history

EVOLUTIONARY ALGORITHM	GENERAL DEFINITION	ORIGIN
GENETIC ALGORITHM (GA)	*Genetic Algorithm is a family of computational models based on principles of evolution and natural selection. These algorithms convert the problem in a specific domain into a model by using a chromosome-like data structure and evolve the chromosomes using selection, recombination, and mutation operators* (Li, 2004)	Holland, 1962, in Ann Arbor, USA
GENETIC PROGRAMMING (GP)	*The automated process of improving system behaviour for solving non-linear problems using evolutionary algorithms* (Wang, 2016).	Fogel, 1962, in USA

EVOLUTIONARY STRATEGIES (ES)	*A set of rules for the automatic design and analysis of consecutive experiments with stepwise variable adjustments driving a suitably flexible object/system. Like with all classical methods, the performance of the evolution strategies largely depends on the adjustment of the internal parameters, prominently the mutation strength(s*) (Beyer, 2002)	Rechenberg, 1965, in Germany
DIFFERENTIAL EVOLUTION (DE)	*Differential Evolution (DE) is a parallel direct search method which utilizes NP D-dimensional parameter vectors (Storn, 1997). The population-based intelligent optimization algorithm is for solving continuous and discrete problems. The evolution process in this algorithm is based on gradual and continuous improvement in the candidate response and according to the principles of all evolutionary algorithms, it needs a fitness function* (Ho-Huu, 2016).	Storn and Price 1997,

John Frazer (1995) was among the first scholars to use evolutionary methods in design, especially in architecture and structural design, and to study the generative aspect of evolutionary algorithms (Frazer J. , 1995). Also, Karl Sims)Sims, 1994(reviewed early experiments of applying GA in graphic and virtual creature design. Various studies and projects have been carried out in relation to form finding for architectural and structural design with evolutionary processes (Kicinger, 2005), (Janssen, 2005). While this innovative approach can be applied for generating, evaluating, and exploring design problems' solutions, most of current related studies concentrate on one of these aspects, and mainly on the performance-based optimization process at the detailed design stage. Optimization is an important, decisive activity in design. Designers will be able to produce better solutions when they can save time and money with optimization methods. *Optimization is the process of adjusting the inputs to or characteristics of a device, mathematical process, or experiment to find the minimum or maximum output or result* (Haupt, 2004). Generative and evolutionary methods have proven to be strong synergists for design exploration, and design optimization has been proposed as a method to assist the exploration process. Rarely is optimization intended to achieve an optimal solution, instead providing designers with insight into the solution space (Stouffs, 2015). Involving elements in this process contain: 1) Objective function (differs in various fields, naming Model Economic, Profit Function, Cost Function, Index performance and so on), 2) Constraint (defining system behaviour with functions and variables), 3) Decision Variables (which in optimization we seek to determine their values to achieve the optimal function), and 4) The type of variables that include Mixed Integer Programming. Optimization problems can be divided into 1- single-objective optimization problems and 2- multi-objective optimization problems based on the number of objective functions. In single-objective optimization problems, the goal of solving the problem is to improve a single objective function whose minimum or maximum value fully reflects the quality of the response obtained. But in some cases, especially in design problems, it is not possible to score a hypothetical answer to an optimization problem based solely on one goal. In this type of problem, we have to define several objective functions and optimize the value of all of them at the same time. Multi-objective optimization is one of the most active and widely used research fields among optimization topics. In architectural problems two types of issues can be mentioned, one is the existence of several conflicting goals, and the other is a very complex and extensive search space. Therefore, many studies have attempted to apply Multi-objective Optimization techniques to assess and obtain optimal solutions.

Generative Design System

Generative design can be defined as the process in which multiple potential solutions are identified by algorithms. Generative architecture is defined more generally by the use of a

generative system, such as a set of language rules, a computer program, a set of geometric transformations, a diagram, or other procedural innovations in the design process by which the final design is produced. The generating system has different degrees of automation from fully automated process to step by step user-controlled process. This process includes designing the algorithm (rules), setting the initial shapes and parameters, advancing the adaptation process, and finally selecting the best option. The maturity of generative systems in architecture occurred after the development of architecturally-based software in the mid-twentieth century. One of the first systems written in architecture based on shape grammar (shape rules) was to generate Villa Paladin. Stiny and Mitchell (Stiny, 1978) created parametric shape grammar which not only generated Villa Paladin ground plans, but it also created novel ground plans coherent to their initial pattern. Their first attempt was to redesign parts of Palladio's architectural rules in a modern way and generate a form (Stiny, 1978). Table 2 defines some of common generative systems.

Table 2: Common generative design systems

GENERATIVE METHOD	GENERAL DEFINITION	ORIGIN
SHAPE GRAMMAR	George Stiny defines a shape grammar as 'a set of transformation rules applied recursively to an initial form, generating new forms' (Strobbe, 2015)	Stiny & Gips, 1972
CELLULAR AUTOMATA	Cellular automata (CA) are discrete models of space and time and typically involve interactions of cells across homogeneous lattice grids. Cells can take on a given finite number of cell states, which can change according to simple rules each cell executes in relation to its cell neighborhood (Herr, 2016)	John von Neumann, 1950s
LINDENMAYER SYSTEMS	L-System is an algorithmic digital generator which is based on the parallel rewriting system, a type of formal grammar, that can potentially produce natural fractals. Developed by a Hungarian biologist Aristid Lindenmayer in 1968, L-systems can reproduce the dynamic of plant growth, offering architects to apply this system of form generation in architectural designs (Rian, 2014).	Aristid Lindenmayer, 1968

Hybrid Systems

The approaches proposed so far, in the early stages of design, concentrate more on general optimization, thus, using innovative and meta-heuristic algorithm to replicate the simulation model, which often results in local optimum. In an effort to improve the efficiency of evolutionary methods to solve optimization problems, researchers have used a combined method. The hybridization process is done in the following ways:

1) Using an algorithm to create a population and then applying another method to improve the created population. 2- Using multiple parameters in an evolutionary method, and 3- Using local exploration to improve the solutions obtained from multi-objective optimization evolutionary methods (Thangaraj, 2011).

One of the most widely used hybrid methods is the simultaneous application of several similar algorithms with different parameters which can affect the algorithm behaviour. Rodriguez et al. (Rodriguez, 2012) identified 312 ISI journal articles related to the hybridization of evolutionary algorithms and Simulated Annealing algorithm, which in comparison to 123 articles used

evolutionary algorithms and other metaheuristic ones, demonstrates the applicability of this system.

ANALYZING LITERATURE REVIEW

In this paper, 140 reviewed journal articles were selected based on their relevance to design and architecture and the implementation of the applied system with case studies. To create a more coherent comparison between articles in terms of methodology, four objectives of "form finding", "Spatial Programming", "performance-based optimization", and "multi-objective problems" has been considered. A selection of widely used systems has been classified under these four categories which is as follows:

Form Finding and Simulation

Evolutionary modelling is a type of generative design process inspired by biological evolution to generate design solutions. A key factor in this strategy is how genes are used to provide design solutions. In literature review analysis areas of Parametric Modelling, agent-based systems (geometry optimization, and topology finding), shape grammar, graph grammar, and cellular automata were identified.

1- Parametric Modelling: The main feature of Parametric Modelling (PA) is the possibility of re-building and modification based on varied parameters. The implementation of this process in design computer programming such as Grasshopper and Dynamo is approximately similar. Parametric modelling was first invented by Rhino, a computer-aided design software developed by Robert McNeel and Associates. The key advantage of parametric modelling is, when setting up a 3D geometric model, the shape of model geometry can be changed as soon as the parameters such as the dimensions or curvatures are modified; therefore there is no need to redraw the model whenever it needs a change (Feng Fu, 2018). Parametric design allows designers to focus on formative and generative design using 'advanced parametric applications viz., Grasshopper, CATIA, and Generative Components through scripting (Williams, 2014).

2- Agent-based systems: Agent Based Modelling and Simulation (ABMS) refers to a category of computational models invoking the dynamic actions, reactions and intercommunication protocols among the agents in a shared environment, in order to evaluate their design and performance and derive insights on their emerging behaviour and properties (Abar, 2017). When optimizing geometric patterns with evolutionary algorithms such as GA, rather simplified variables are used, since complex shapes create multiple parameters, effecting the process of finding the optimal solution. Agent-based systems can address this issue by allowing the morphing of geometry with a few agent points (Yi Y. K., 2015).

3- Shape Grammar: Knight and Stiny (Knight, 2015), extend the application of Shape Grammar in both design process and Making. "Making is Doing and Sensing with Stuff to make Things". They modify algebras for the materials (basic elements) of shapes to define algebras for the materials of objects, or things. Figure 2 illustrates the knotting grammar inspired from *khipu* , the knotted strings made by the Incas as a physical recordkeeping and communication language. And the repetition rule model based on this idea. "*The idea is to capture the salient properties of stuff and things in actual making, so that manipulating stuff and things can be described as computation*".

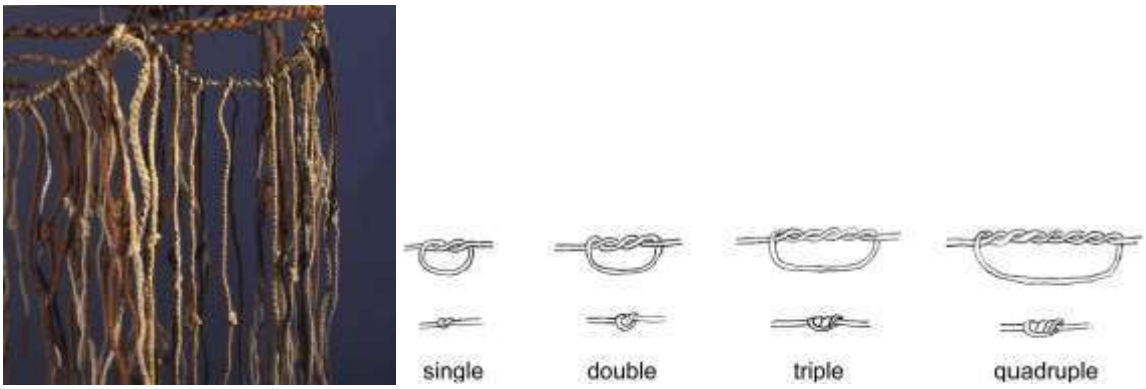

Figure 2: Khipu, and Single and multiple overhand knots model, Source (Knight, 2015)

4- Graph Grammar: Lee et. Al (Lee J. H., 2017), apply A graph grammar consists of links and nodes that are used to analyse the structural and functional relations required for generating designs. Based on authors' opinion, the two best-known approaches to computational analysis in architecture are concerned with the 'syntax' of space and the 'grammar' of form. The combined process relies on three connected processes as can be seen in Table 3.

Table 3: Node, link and shape, three process of Graph Grammar, Source (Lee J. H., 2017)

	Node	Link	Shape
Theory	Space Syntax	Space Syntax, Shape Grammar	Shape Grammar
Configuration	Functional space (vocabulary)	Functional relationship (grammar)	Formal properties (sentence/structure)
Example			

In the mentioned article, authors applied Graph Grammar to Wright's architecture, and analysed nineteen Prairie houses, typical of the Wright's work. Also, they used massing grammar to illustrate the overall form of the design. Figure 3 depicts four generation of Prairie house after the final configuration.

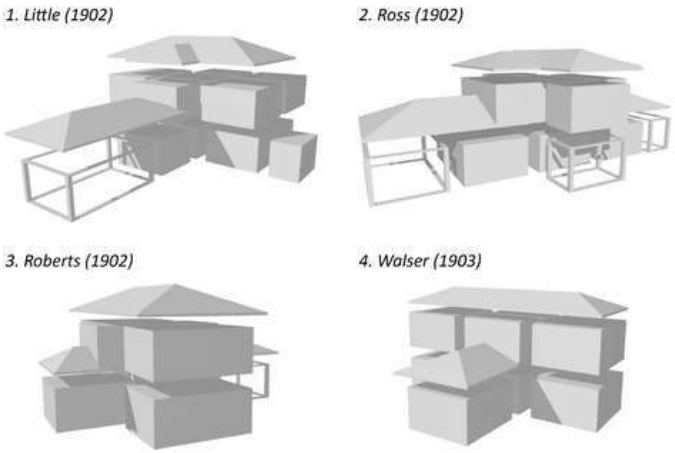

Figure 3: Massing of four Prairie houses, Source (Lee J. H., 2017)

5- Cellular Automata: this approach has been applied in generating high density residential buildings by SalmanKhalili Araghi and Rudi Stouffs (Araghi, 2015). The major characteristic of a CA generative system is to produce a vast number of solutions and generate complex

morphologies by applying simple rules to cope with the majority of constraints. In this paper, CA is applied to address three element of density, accessibility and natural light in the architectural context. According to authors, "*the majority of CA applications in architecture perform conceptual form generation, allowing designers to explore a variety of results from which they can select potential solutions*". Also, cellular automata and shape grammars have the potential to be employed in a complementary way in the early stage of the self-generating design process (Speller, 2007). Araghi and Stouffs, implemented their system in three-dimensional modelling software Rhinoceros®, and programmed the CA rules in RhinoScript. Figure 4 illustrates three generated residential blocks, addressing density, accessibility and natural light.

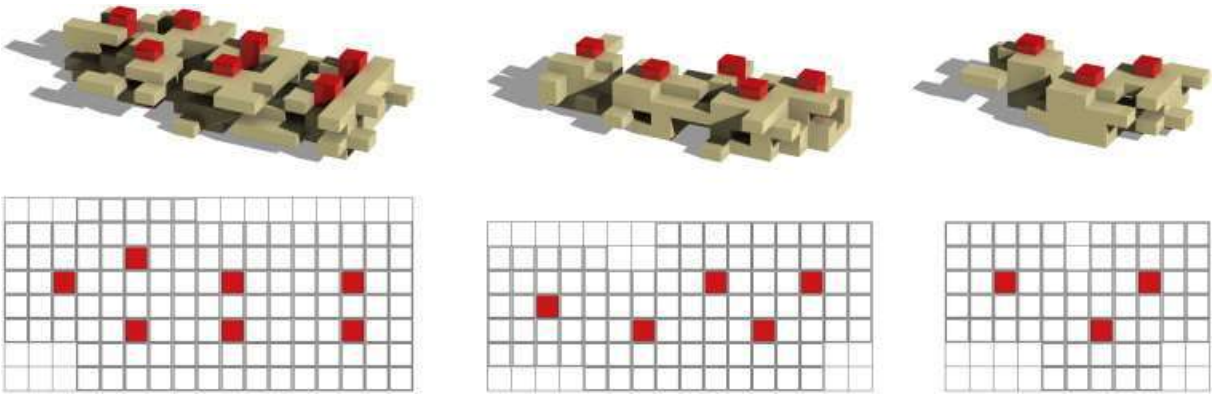

Figure 4: Three samples of generated blocks and their footprints. Source (Araghi, 2015)

Layout Generation

The problem of spatial configuration is concerned with finding suitable locations for a set of interrelated objects that meet design requirements and maximize design quality according to design preferences (Chatzikonstantinou, 2014). Spatial programming (SP) is a research field in which the process of arranging spatial elements and issues such as distance, proximity, or other functions are important. According to Gero (Gero, 1997), an SP problem is NP-complete[1] and presents all the difficulties associated with this class of problems, thus could be solved efficiently by a non-deterministic algorithm. The use of evolutionary algorithms in space planning problems has been explored since the early 90´s. Based on Calixto and Celani research (Calixto, 2015), the evolutionary methods of genetic algorithm, genetic programing, evolutionary strategies, interactive evolutionary algorithm and parallel genetic algorithm have been applied to generate plans or evaluate it, and has been combined with other methods such as shape grammar, graph theory, and adjacency matrix.

Layout design optimization can be classified into topological and geometric constraint based on constraint type. Topological constraints are defined as a hierarchical relationship of spatial elements such as proximity, non-proximity, and proximity between spaces. Geometric constraints are defined by plane, length, width, or spatial direction. Guo and Lee (Guo, 2016) applied multi-agent topology finding system and an evolutionary optimization process to address the issue of spatial layout modelling and the multi-floor topology. The Multi-agent system represent rooms as points without having volumes and shapes. Therefore, to optimize the generated model, this paper used a grid system for the conversion. Figure 5 illustrates the proposed process by the authors.

[1] A problem is called NP (nondeterministic polynomial) if its solution can be guessed and verified in polynomial time; nondeterministic means that no particular rule is followed to make the guess.

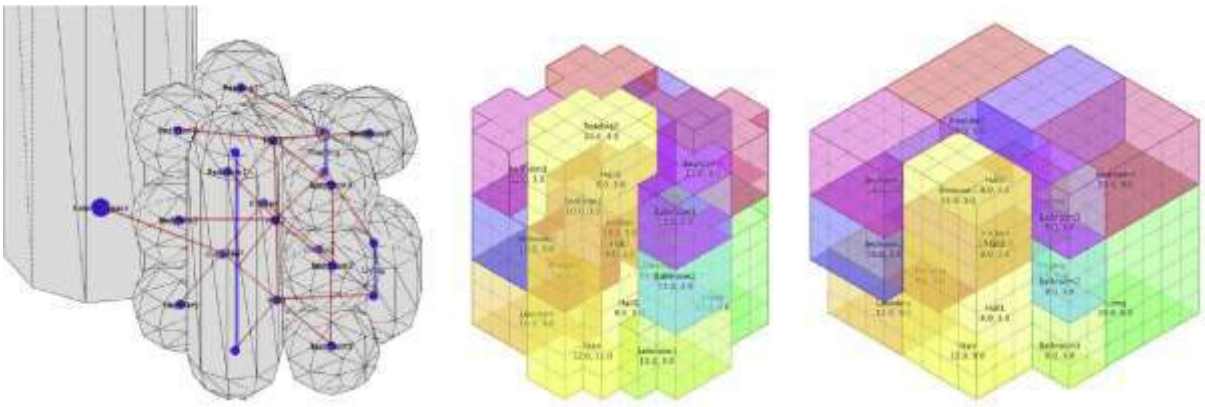

Figure 5: Left: generated multi-agent layout. Middle: converted grid system. Right: optimized grid system, source (Guo, 2016)

One of the important issues that should be considered in the application of evolutionary methods is the proper use of related tools such as programming languages or related software and plugins. Reinhard Koenig (Koenig, 2015), developed open source library for computational planning synthesis, called CPlan which enables optimization of synthesized spatial configuration. The aim of the library is to provide an easy to use programming framework for people with basic programming knowledge. This open source has basic geometry objects with a computational geometry library as well as a geometry viewer with corresponding mouse interaction. Different sections of this source are: 1- geometry library, viewer and mouse interaction, 2- computational analysis, graph measure to calculate centrality measures for street networks, Isovists field calculations, view field properties, visual centralities, and solar analysis, 3- generative methods, 4- synthesis methods, and 5- Visualization. Figure 6 depicts Cplan software prototype.

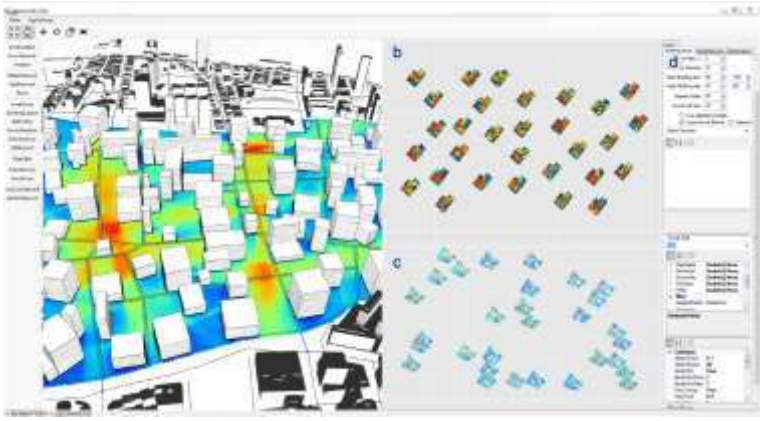

Figure 6: Software prototype showing the main areas of the synthesis systems user interface, source (Koenig, 2015)

Performance-based optimization

The significant growth in applying optimization methods to improve building performance has provided a wide range of research studies, the development of evolutionary approaches, and appropriate tools in this field. "Performance-driven architectural design" emphasizes on integrated and comprehensive optimization of various quantifiable performances of buildings. This approach takes a holistic view towards ecological and environmental performances of

buildings while ensuring that the functions and aesthetics of the design are not overlooked (Xing Shi, 2013). However, most studies have concentrated on the performance aspect or techniques of computational optimization. According to Huang et al. (M.F. Huang, 2015) Performance-based design optimization (PBDO) is the combination of state-of-the-art performance-based engineering and a computational design optimization technique into an automated and synthesized design platform that aims to minimize the structural or life-cycle cost for buildings subject to natural hazards such as severe earthquakes and extreme windstorms. Searching PBDO in literature review, most studies have applied this approach to optimize life cycle cost, structural efficiency, and material cost, published in the field of engineering. In architecture domain, Shi and Yang (Xing Shi, 2013) emphasize on developing an effective technique to conduct performance-driven design and optimization from the perspective of architects. Conventionally, performance-driven optimization processes, regarding energy or structural efficiency, is implemented after the conceptual design phase by design programming tools' experts, despite numerous unified tools for simultaneous designing and BPS implementation. Architects and designers still prefer design tools such as ArchiCad, Sketchup, Revit, Rhino, and Maya, as they support the concept of a sketch and the freedoms associated with design tools (Negendahl, 2015). To integrate architects' preferences in Performance-driven architectural design, Shi and Yang selected Rhinoceros and Grasshopper (graphical algorithm editor) as a suitable platform for architects and established three performance simulation programs, namely Ecotect, Radiance, and EnergyPlus, in Rhino. Simulation results can be automatically fed back to the modelling program to guide the design optimization controlled by certain algorithms. Thus, the key to the workflow is a data exchange and communication system to control the entire design and analysis process.

Due to the significant importance of sustainability issues, designing nearly zero-energy or energy efficient buildings with Building Performance Simulations (BPSs) approaches has gained considerable attention. Table 4 classifies some of the selected articles related to performance-based optimization based on their methods, tools, and conclusion.

Table 4: Summary of selected articles regarding performance-driven optimization

REFERENCE	APPROACH	METHOD	CONCLUSION
(MIN-YUAN CHENG, 2014)	Application of evolutionary algorithm (EMARS), and artificial intelligence (AI) model, to efficiently predict the for assessing buildings energy performance	Examine the EMARS on 12 building forms simulated in Ecotect simulation software, evaluating relative compactness, surface area, wall area, roof area, overall height, building orientation, glazing area, and glazing distribution.	Surface and roof area are the most important impactful factors in heating load (HL). Cooling load (CL) in controlled by 6 out of 7 factors. CL and HL have a weak correlation with the compactness factor.
(NEGENDAHL, 2015)	building performance simulations (BPSs) in the early design stage	The assessment of user integration, and model integration (concerning computational automation processes)	integrated dynamic models may combine a design tool, a visual programming language and a BPS to provide better support for the designer during the early stages of design
(MOHAMED HAMDY, 2016)	Comparison of seven commonly-used multi-objective evolutionary optimization algorithms in solving the design	Comparison of (pNSGA-II), (MOPSO), (PR_GA), (ENSES), (evMOGA), (spMODE-II), (MODA), for a case study house in Helsinki,	provide an overall view of the performance and behaviour of these algorithms based on which researchers can make a choice for their specific

	problem of a nearly zero energy building (nZEB)	Finland using a complex energy model.	problem. tests were performed on one selected building energy model. The effect of building models on the test results has not been evaluated.
(MOHAMMAD SAFFARI, 2017)	a simulation-based optimization methodology	coupling EnergyPlus and GenOpt with an innovative enthalpy-temperature (h-T) function to define the optimum PCM peak melting temperature to enhance the cooling, heating, and the annual total heating and cooling energy performance of a residential building in various climate conditions based on Köppen-Geiger classification.	choosing the phase change materials (PCM) melting temperature in different climate conditions is a key factor to improve the energy performance in buildings.
(PATRICK SHIEL, 2018)	identify the groups of influential parameters within a design stage building energy performance simulation (BEPS) model and determine quantitatively, how influential these groups might be on the predicted energy usage	real world BEPS models developed for real world buildings. Use of Revit BIM and modification of data based on laser scan of the actual building. Derive output from Sketchup and OpenStudio in the EnergyPlus IDF format.	how a modeller has interpreted various aspects of a building's design has been acknowledged in the Literature affects model accuracy.
(WORTMANN, 2019)	architectural design optimization (ADO), considering objectives of structure, building energy, and daylight	Comparison of meta-heuristic, direct search, and model-based methods. Use of Opossum as the first established model-based optimization tool.	for practical, simulation-based, and time-intensive ADO problems with modest evaluation budgets—a global model-based method such as RBFOpt is the most likely to yield the best results.
(ABHISHEK SANJAY JAIN, 2020)	Evaluates sustainability options simulated and analysed together including Phase change materials (PCM), green roof and a cool roof. Use of GA for optimization. Parametric analysis.	Central Library of IIT Delhi is modelled for simulation using DesignBuilder, then energy efficiency analysed in EnergyPlus. Optimization with genetic algorithm.	The energy performance of an existing infrastructure may be highly improved by optimization of its inherent design parameters.

Multi-objective design Problems

Architectural design is a multifaceted process encompassing multiple and complex qualitative (intangible) and quantitative (tangible) aspects, resulting antagonistic parameters and various constraints. Generative Evolutionary Design approaches can facilitate the process of achieving optimal solutions by exploring a range of desirable alternatives and effectively computing time-consuming tasks. This approach and the related design programming tools have been

successfully applied in recent studies. However, there is still extensive criticism over design automation systems due to inconsistencies of fully-automated evaluation process. To address these challenges, different approaches have been proposed, including the use of "Hybrid evolutionary algorithms" and "Interactive-generative design systems", with the key aim of allowing the designer to consider tangible and intangible aspects in one environment in the early design stage. In other words, an integrative generative evolutionary framework to generate design alternatives, evaluate their desirability, and perform optimization (to either obtain the optimum solution or gain insight into solution space) which architects can implement without the help of computer programmers, can answer the contemporary design processes. Two recent research studies in performance-based conceptual building designs with different approaches, one with the application of fully-automated design process, through co-simulation, and the other one with adopting interactive optimization technique, is presented.

1- Yi (Yi H. , 2020) mentions the pivotal role of incorporating computerized performance simulation into the design process in bridging the gap between design and engineering. In this paper, Co-simulation approach as a holistic view via the modular composition of different simulators or the hybridization of algorithms is described. Also, it proposes a computational framework that can visualize and evaluate space occupancy, energy use, and generative envelope design given a space outline. Visual programming language (VPL) of Grasshopper (GH) for Rhino is used for full integration and automation of the design process. Also, for optimization criteria built-in GH components and Phyton (IronPython) scripts was applied. The co-simulation, the Building Controls Virtual Test Bed, Energy Plus, and Radiance were interfaced in Rhino, and the agent-based model (ABM) approach and Gaussian process (GP) were applied to represent random human behaviour. Figure 7 illustrates the Scheme of Agent-Based Model-based PBD automation process.

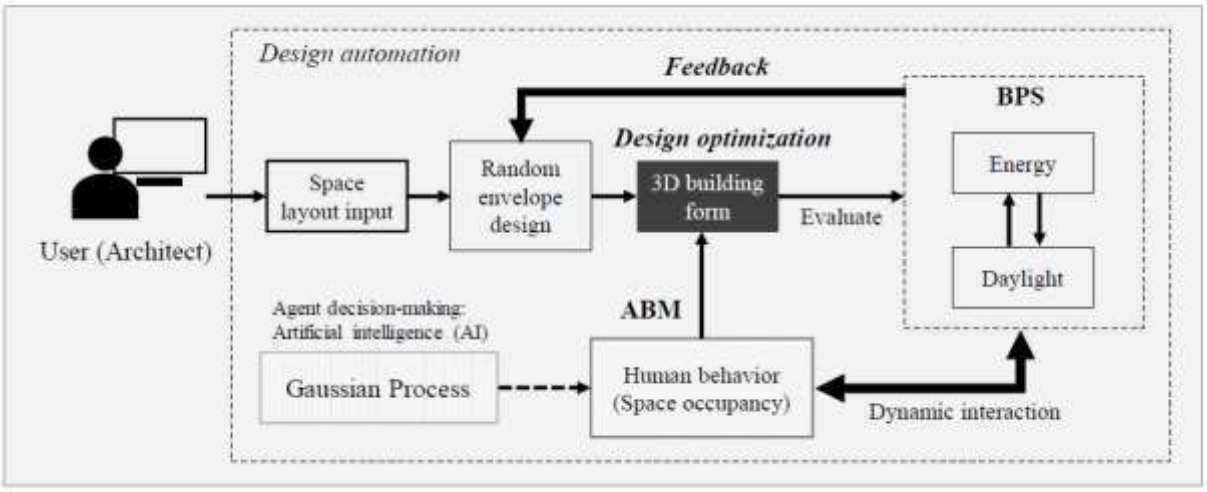

Figure 7: Scheme of ABM-based PBD automation process, source: (Yi H. , 2020)

2- Nathan and Brown (Nathan C. Brown, 2020) mention the necessity of conducting more research in analyzing the effect of interactive optimization techniques on design process. To analyse the feedback, this study engages 34 experts in various design fields to generate a roof structure for an athletic centre which has been searched among the restored parametric models. The design objectives include minimizing energy use intensity, total energy, total structural weight, and total structural weight per area. The results of their survey in four different environments, free, feedback, interactive optimization, and automated optimization, demonstrates that while designers found the interactive approach more effective, due to the lack of adequate knowledge, they had many difficulties applying the method. Also, the available estimated performance data would lead to more efficient solutions. Figure 8 illustrates the

classification of four different analysed settings based on their potentials in a range from producing more performance-based solutions to allowing more diversity and creativity.

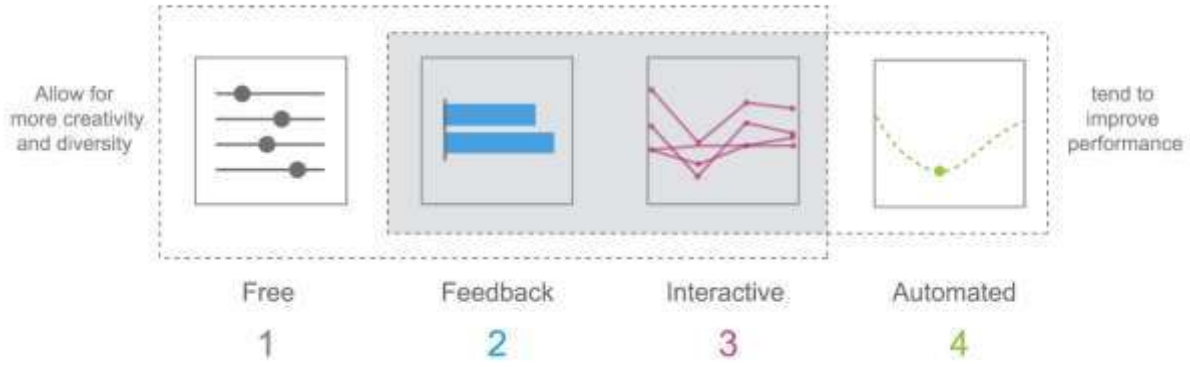

Figure 8: results of the study analyzing the effect of interactive optimization process based on designers' feedback. Source (Nathan C. Brown, 2020)

DISCUSSION and CONCLUSION

The analysis of 140 studied journal articles in four categories of form finding, Spatial Programming, Performance-based optimization, Multi-objective optimization can be classified in the following topics:

1- Applicability of meta-heuristic evolutionary algorithms in the conceptual phase in terms of performance, creativity, and diversity. There is a plethora of studies applying various algorithms, such as various types of GA (VEGA, MOGA, and so on), simulated annealing, particle swarm optimization, and so on, in design problems. However, most studies in this category lack a holistic outlook towards involved various design problems, examining the evolutionary algorithm mainly in performance-based optimization processes with few variables. There is a diverging viewpoint regarding the efficacy of GA in solving multi-objective design problems.

2- Analyzing creativity and diversity in generating design solutions based on precedent alternatives. Although many studies have applied generative approaches such as Shape grammar, Cellular automata, and Genetic Algorithm to produce design solutions coherent to a designated style, the degree of creativity and diversity in the generated solutions has less been analysed. In the selected studies used agent-based model approach, a consensus exists over its effectiveness to handle multi-objective design problems. However, the number of research in this topic is less than other evolutionary approaches.

3- Shape Optimization: topology and shape optimization are mainly studied in performance-based optimization with emphasize on iso-geometric, aerodynamic, structural and energy efficient shape optimization with rather simplified geometric relations. Fewer studies in the field of architecture address the qualitative properties of optimal topologies.

4- Conceptual design tools with Co-simulation possibility. Although conceptual design tools have been used extensively during the past twenty years, user-friendly interfaces that can offer flexible solutions for grouped design problems and enables simultaneous evaluation processes are still in their early development phase.

5- Multi-objective interactive approaches in the conceptual design phase: Interactive Generative Evolutionary systems that support designers in the early design phase has received little consideration in the literature review.

6- Integrative framework in a parametric design program: the need for programming/ scripting Performance criteria, environmental constraints, and design criteria in a visualized parametric design simulation framework is apparent.

7- Hybridization: the need to study effective methods of hybridization through combing evolutionary algorithms or various evolutionary approaches. Each of these methods should be compared in terms of outcome quality, performance, creativity, and diversity.

In this research, a descriptive-analytical approach was applied to assess literature review in generative, evolutionary, and hybrid approaches in the field of architecture. A seven-step model was proposed to thoroughly select related literature, analyse them, and classify the results based on the evaluation. The assessment demonstrates a growing interest in Hybrid approaches through the last six years from 2014 to 2020. However, most of these studies aim performance-based optimization with less or no regard to creativity criteria in design. The highest numbers of studies in form finding area applied shape grammar as an analytical generative method. Also, during the studied period, the number of studies that combine shape grammar with other evolutionary algorithms has increased, which shows the growing attention towards integrative comprehensive systems. Figure 9 depicts the comparison between 2014 and 2015 articles in terms of the applied methods. The highest number of studies were related to Hybrid systems and genetic algorithm.

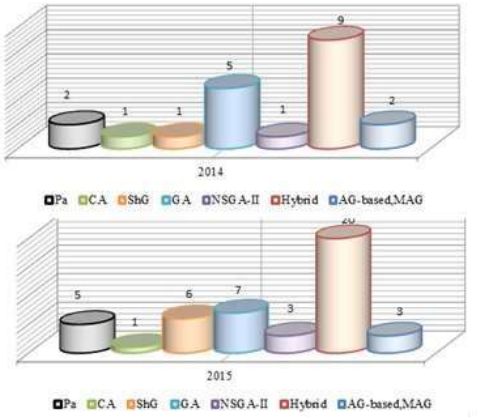

Figure 9: comparison of articles in 2014 and 2015 in terms of applied technique

Figure 10 shows the number articles based on the applied technique through the studied period of time.

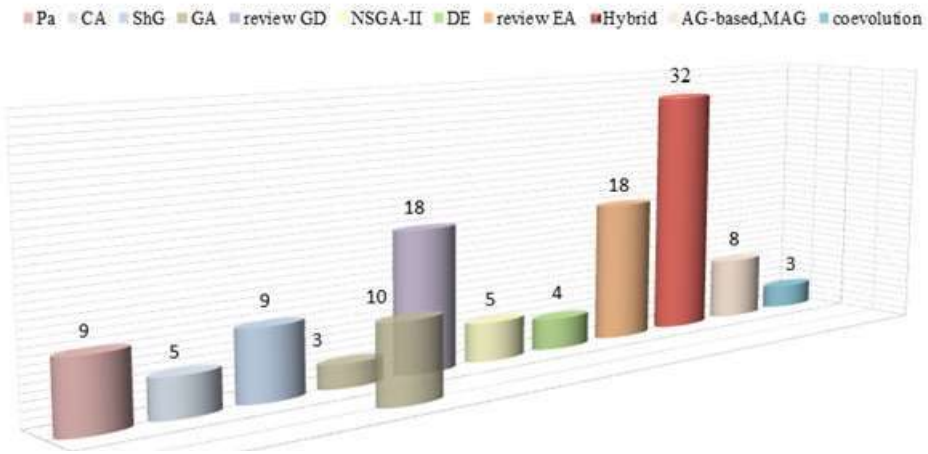

Figure 10: applied techniques in the selected literature review between 2014 and 2020.

Based on the results of analytic literature review, a research model is proposed (Figure 11) that provides a foundation for future studies in this area. Prior knowledge in design process, and various evolutionary applied approaches, as well as comprehensive definition of design objectives, problems, and constraints is necessary for achieving diverse, creative solutions.

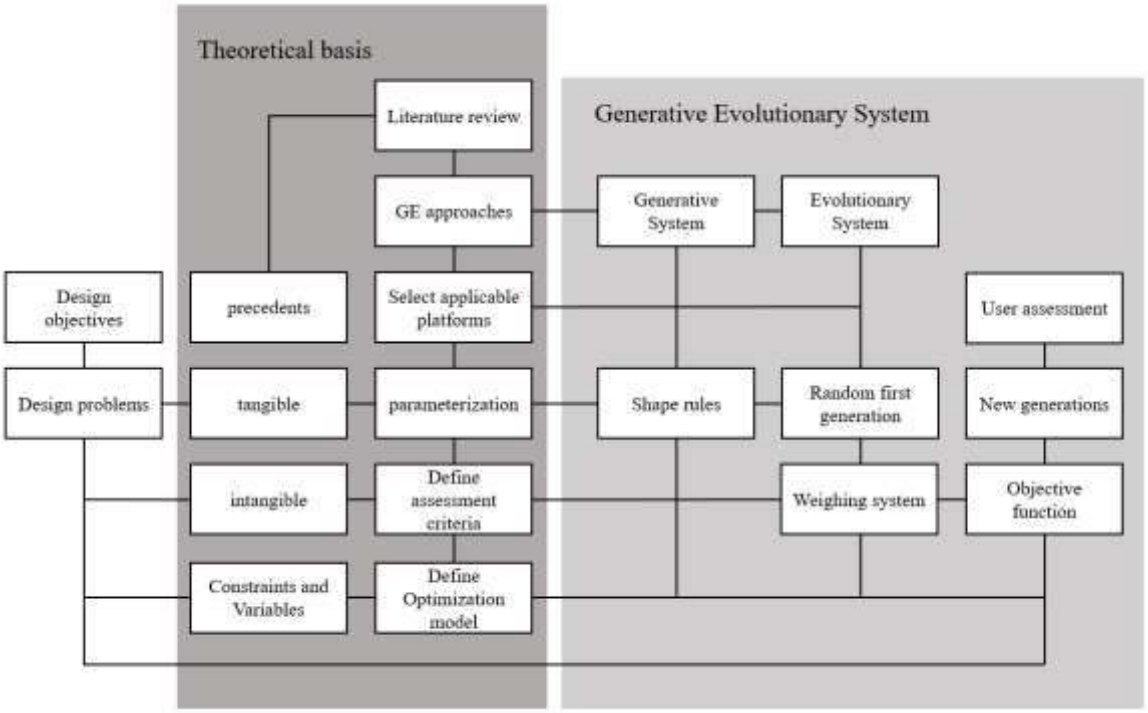

Figure 11: Study model for an integrative Generative evolutionary system

REFERENCES

Abar, S. T. (2017). Agent Based Modelling and Simulation tools: A review of the state-of-art software. *Computer Science Review, 24*, 13-33. doi:https://doi.org/10.1016/j.cosrev.2017.03.001

Abhishek Sanjay Jain, P. S. (2020). Thermal energy performance of an academic building with sustainable probing and optimization with evolutionary algorithm,. *Thermal Science and Engineering Progress, 17*. doi:https://doi.org/10.1016/j.tsep.2019.100374

Araghi, S. K. (2015). Exploring cellular automata for high density residential building form generation. *Automation in Construction, 49*, 152-162. doi:https://doi.org/10.1016/j.autcon.2014.10.007

Bentley, P. (1999). Aspects of evolutionary design by computers. In Advances in Soft Computing (pp. 99-118). Springer, London.

Beyer, H. G. (2002). Evolution strategies–A comprehensive introduction. *Natural computing, 1 (1)*, 3-52. doi:https://doi.org/10.1023/A:1015059928466

Calixto, V. &. (2015). literature review for space planning optimization using an evolutionary algorithm approach: 1992-2014. *SIGRADI 2015 [Proceedings of the 19th Conference of the Iberoamerican Society of Digital Graphics*, (pp. 662-671). Florianópolis, SC, Brasil.

Ceccato, C. (1999). The architect as toolmaker: computer-based generative design tools and methods. *CAADRIA '99* (pp. 295-304). Shanghai (China): Proceedings of The Fourth Conference on Computer Aided Architectural Design Research in Asia / ISBN 7-5439-1233-3].

Chan, K.H., F. J. (2002). An Evolutionary Framework for Enhancing Design. In G. J.S., *Artificial Intelligence in Design* (pp. 383-403). Dordrecht: Springer. doi:https://doi.org/10.1007/978-94-017-0795-4_19

Chatzikonstantinou, I. (2014). A 3-dimensional architectural layout generation procedure for optimization applications: DC-RVD. *Thompson, Emine Mine (Ed.), Fusion - Proceedings of the 32nd eCAADe Conference* (pp. 287-296). Newcastle upon Tyne, England, UK: olume 1, Department of Architecture and Built Environment, Faculty of Engineering and Environment.

Eiben, A. E. (2015). *Introduction to evolutionary computing* (2nd edition ed.). Berlin, Heidelberg: springer. doi:https://doi.org/10.1007/978-3-662-44874-8

Feng Fu. (2018). *Design and Analysis of Tall and Complex Structures.* Butterworth-Heinemann. doi:https://doi.org/10.1016/B978-0-08-101018-1.00006-X

Fogel, L. J. (1963). *Biotechnology: Concepts and Applications*. Englewood Cliffs: NJ: Prentice Hall.

Frazer, J. (1995). *An Evolutionary Architecture.* Architectural Association publications, Themes VII.

Frazer, J. H. (2002). Generative and evolutionary techniques for building envelope design. *In Soddu, C (Ed.) Generative Art 2002* (pp. 3.1-3.16). Italy, Milan: 5th International Conference GA2002. Generative Design Lab.

Gero, J. K. (1997). Learning and re-using information in space layout planning problems using genetic engineering. *Artificial Intelligence in Engineering, 11*(3), 329-334. doi:https://doi.org/10.1016/S0954-1810(96)00051-9

Gong, W. C. (2008). Enhancing the performance of differential evolution using orthogonal design method. *Applied Mathematics and Computation 206(1)*, 56-69. doi:https://doi.org/10.1016/j.amc.2008.08.053

Gu, Z. T. (2006). Capturing aesthetic intention during interactive evolution. *Computer-Aided Design, 38(3),*, 224-237. doi:https://doi.org/10.1016/j.cad.2005.10.008

Guo, Z. (2016). Evolutionary approach for spatial architecture layout design enhanced by anagent-based Topolgy finding systems. *Frontiers of Architectural Research, 6*(1), 53-62. doi:http://dx.doi.org/10.1016/j.foar.2016.11.003

Haupt, R. L. (2004). *Practical genetic algorithms.* Hoboken, New Jersey: John Wiley & Sons, Inc., .

Herr, C. M. (2016). Cellular automata in architectural design: From generic systems to specific design tools. *Automation in Construction, 72*, 39-45. doi:https://doi.org/10.1016/j.autcon.2016.07.005

HM., C. (2006). Generative Design in an Evolutionary Procedure. In T. H. Van Leeuwen J.P., *Innovations in Design & Decision Support Systems in Architecture and Urban Planning* (pp. 419-431). Dordrecht: Springer. doi:https://doi.org/10.1007/978-1-4020-5060-2_27

Ho-Huu, V. N.-T.-D.-T. (2016). An adaptive elitist differential evolution for optimization of truss structures with discrete design variables. *Computers & Structures, 165*, 59-75. doi:https://doi.org/10.1016/j.compstruc.2015.11.014

Holland, J. H. (1975). *Adaptation in Natural and Artificial Systems.* Ann Arbor: The University of Michigan Press. Retrieved from Google Scholar

J., G. (1995). Interactve Evolutionary Algorithms in Design. *Artificial Neural Nets and Genetic Algorithms*, 227-230. doi:https://doi.org/10.1007/978-3-7091-7535-4_60

Janssen, P. F. (2005). Generative evolutionary design: A framework for generating and evolving three-dimensional building models. *Innovation in Architecture, Engineering and Construction,, 1*, 35-44.

Kicinger, R. a. (2005). Parameterized versus Generative Representations in Structural Design: An Empirical Comparison. *Proceedings of the 7th Annual Conference on Genetic and Evolutionary Computation* (pp. 2007–2014). New York, NY, USA: Association for Computing Machinery. doi:https://doi.org/10.1145/1068009.1068344

Knight, T. &. (2015). Making grammars: from computing with shapes to computing with things. *Design Studies, 41*, 8-28. doi:https://doi.org/10.1016/j.destud.2015.08.006

Koenig, R. (2015). CPlan: An Open Source Library for Computational Analysis and Synthesis: An Open Source Library for Computational Analysis and Synthesis. *In eCAADe 2015-real time-extending the reach of computation: proceedings of the 33rd International Conference on Education and Research in Computer Aided Architectural Design in Europe. 1*, pp. 245-250. Vienna, Austria: eCAADe. doi:https://doi.org/10.3929/ethz-a-010522005

Lee, J. H. (2017). A Combined Plan Graph and Massing Grammar Approach to Frank Lloyd Wright's Prairie Architecture. *Nexus network journal, 19(2)*, 279-299. doi:https://doi.org/10.1007/s00004-017-0333-0

Lee, L. H. (2008). Multi-objective simulation-based evolutionary algorithm for an aircraft spare parts allocation problem. *European Journal of Operational Research189(2),*, 476-491. doi:https://doi.org/10.1016/j.ejor.2007.05.036

Li, W. (2004). Using genetic algorithm for network intrusion detection. *Proceedings of the United States department of energy cyber security group, 1,*, 1-8.

Limbourg, P. &. (2008). Multi-objective optimization of generalized reliability design problems using feature models—A concept for early design stages. *Reliability Engineering & System Safety, 93(6)*, 815-828. doi:https://doi.org/10.1016/j.ress.2007.03.032

M.F. Huang, Q. L. (2015). Performance-based design optimization of tall concrete framed structures subject to wind excitations. *Journal of Wind Engineering and Industrial Aerodynamics, 139*, 70-81. doi:https://doi.org/10.1016/j.jweia.2015.01.005

Min-Yuan Cheng, M.-T. C. (2014). Accurately predicting building energy performance using evolutionary multivariate adaptive regression splines. *Applied Soft Computing*, 178-188. doi:https://doi.org/10.1016/j.asoc.2014.05.015

Mohamed Hamdy, A.-T. N. (2016). A performance comparison of multi-objective optimization algorithms for solving nearly-zero-energy-building design problems. *Energy and Buildings, 121*, 57-71. doi:https://doi.org/10.1016/j.enbuild.2016.03.035

Mohammad Saffari, A. d. (2017). Simulation-based optimization of PCM melting temperature to improve the energy performance in buildings,. *Applied Energy, 202*, 420-434. doi:https://doi.org/10.1016/j.apenergy.2017.05.107

Mühlenbein, H. &.-V. (1993). Predictive models for the breeder genetic algorithm i. continuous parameter optimization. *Evolutionary computation, 1(1)*, 25-49. doi:https://doi.org/10.1162/evco.1993.1.1.25

Nariman-Zadeh, N. A. (2005). Inverse modelling of multi-objective thermodynamically optimized turbojet engines using GMDH-type neural networks and evolutionary algorithms. *Engineering Optimization, 37(5),*, 437-462. doi:https://doi.org/10.1080/03052150500035591

Nathan C. Brown. (2020). Design performance and designer preference in an interactive, data-driven conceptual building design scenario,. *Design Studies, 68*, 1-33. doi:https://doi.org/10.1016/j.destud.2020.01.001

Negendahl, K. (2015). Building performance simulation in the early design stage: An introduction to integrated dynamic models. *Automation in Construction*, 39-53. doi:https://doi.org/10.1016/j.autcon.2015.03.002

Nguyen, A. T. (2014). A review on simulation-based optimization methods applied to building performance analysis. *Applied Energy, 113*, 1043-1058.

Oxman, R. (1990). Prior knowledge in design: a dynamic knowledge-based model of design and creativity. *Design Studies, 11*(1), 17-28. doi:https://doi.org/10.1016/0142-694X(90)90011-Z

Park, H. S. (2007). Evolutionary design of hybrid self-organizing fuzzy polynomial neural networks with the aid of information granulation. *Expert systems with Applications33(4),*, 830-846. doi:https://doi.org/10.1016/j.eswa.2006.07.006

Patrick Shiel, S. T. (2018). Parametric analysis of design stage building energy performance simulation models,. *Energy and Buildings, 172*, 78-93. doi:https://doi.org/10.1016/j.enbuild.2018.04.045

Poon J., M. M. (1996). Emergent Behaviour in Co-Evolutionary Design. In J. S. Sudweeks, *Artificial Intelligence in Design '96* (pp. 703-722). Dordrecht: Springer. doi:https://doi.org/10.1007/978-94-009-0279-4_37

Rechenberg, I. (1978). Evolutionsstrategien. In R. U. Schneider B., *Simulationsmethoden in der Medizin und Biologie. Medizinische Informatik und Statistik, vol 8* (pp. 83-114). Berlin, Heidelberg: Springer. doi:https://doi.org/10.1007/978-3-642-81283-5_8

Rian, I. M. (2014). Tree-inspired dendriforms and fractal-like branching structures in architecture: A brief historical overview. *Frontiers of Architectural Research, 3(3),* 298-323. doi:https://doi.org/10.1016/j.foar.2014.03.006

Rodriguez, F. J.-M. (2012). Hybrid metaheuristics based on evolutionary algorithms and simulated annealing: taxonomy, comparison, and synergy test. *EEE Transactions on Evolutionary Computation, 16(6), ,* 787-800.

Rosenman, M. A. (1999). Evolving designs by generating useful complex gene structures. In P. J. Bentley, *Evolutionary Design by Computers* (pp. 345-364). San Francisco, California : Morgan Kaufmann.

Sims, K. (1994). Evolving virtual creatures. *Proceedings of the 21st annual conference on Computer graphics and interactive techniques* (pp. 15-22). New York, NY, USA: Association for Computing Machinery. doi:https://doi.org/10.1145/192161.192167

Speller, T. H. (2007). Using shape grammar to derive cellular automata rule patterns. *COMPLEX SYSTEMS-CHAMPAIGN-, 17(1/2),* 79-102.

Stiny, G. &. (1978). The Palladian Grammar. *Environment and Planning B: Planning and Design, 5*(1), 5–18. doi:https://doi.org/10.1068/b050005

Storn, R. P. (1997). Differential Evolution – A Simple and Efficient Heuristic for global Optimization over Continuous Spaces. *Journal of Global Optimization 11,* 341–359. doi:https://doi.org/10.1023/A:1008202821328

Stouffs, R. &. (2015). Generative and evolutionary design exploration. *AI EDAM, 29(4),* 329-331. doi:doi:10.1017/S0890060415000360

Strobbe, T. P. (2015). Toward a visual approach in the exploration of shape grammars. *Artificial Intelligence for Engineering Design, Analysis and Manufacturing: AI EDAM, 29(4),* 503-521. doi:10.1017/S0890060415000475

Thangaraj, R. P. (2011). Particle swarm optimization: hybridization perspectives and experimental illustrations. *Applied Mathematics and Computation, 217(12),* 5208-5226. doi:https://doi.org/10.1016/j.amc.2010.12.053

Wang, L. L. (2016). Gas-liquid two-phase flow measurement using Coriolis flowmeters incorporating artificial neural network, support vector machine, and genetic programming algorithms. *IEEE Transactions on Instrumentation and Measurement, 66(5), ,* 852-868.

Williams, J. L. (2014). Parametric Design Strategies for the Generation of Creative Designs. *International Journal of Architectural Computing,* 263-282. doi:https://doi.org/10.1260/1478-0771.12.3.263

Wortmann, T. (2019). Genetic evolution vs. function approximation: Benchmarking algorithms for architectural design optimization. *ournal of Computational Design and Engineering, 6*(3), 414-428. doi:https://doi.org/10.1016/j.jcde.2018.09.001

Xing Shi, W. Y. (2013). Performance-driven architectural design and optimization technique from a perspective of architects,. *Automation in Construction, 32,* 125-135. doi:https://doi.org/10.1016/j.autcon.2013.01.015

Yi, H. (2020). Visualized Co-Simulation of Adaptive Human Behaviour and Dynamic Building Performance: An Agent-Based Model (ABM) and Artificial Intelligence (AI) Approach for Smart Architectural Design. *Sustainability, 12*(16). doi:https://doi.org/10.3390/su12166672

Yi, Y. K. (2015). Agent-based geometry optimization with Genetic Algorithm (GA) for tall apartment's solar right. *Solar Energy, 113*, 236-250. doi:https://doi.org/10.1016/j.solener.2014.11.007

Analyzing Urban Neighborhood Sustainability: Case of Göçmenköy, Nicosia

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Abstract

Due to the rapid urban growth and development in many cities nowadays, the aspects of sustainability show an extensive disruption and neglect to the city's identity which usually happens due to unplanned urbanization. Additionally, this wreaking havoc to the local's way of life and threatening the future of those areas, and their neighborhoods in many cities. Göçmenköy which is one of the oldest neighborhoods in North Cyprus, constructed back in 1963, in time of economic and social instability, that took a toll on the sustainability measures that should have been taken, yet managed to still be standing until today. Nowadays, due to the urbanization process of the city by the great influx of students and immigrants, the neighborhood saw a rapid increase in housing settlements, shops, and other services adjacent to road networks. This caused a drastic change in the lifestyle of the area and showed an intentional disregard for user needs in terms of spatial planning. Within this manner, this study aims at analyzing the effect of urbanization of the area in terms of sustainability, in micro and macro scale levels, for example: density and context, movement patterns, land use, climatic designs, and community issues in Göçmenköy. The methodology adopted Oktay's model (2001) that performs critical evaluation of the sustainability of the neighborhoods along with the help of Geographical Information system (GIS) and field surveying. The final evaluation was summed up into a table with three scales (good, fair, and poor) assessing sustainability levels of the neighborhood according to Oktay (2001) method. The results showed an overall good result in regard to land use planning and movement patterns owing to the presence of all needed services within a close proximity from any point inside the neighborhood and a good transportation network that goes across the neighborhood. Additionally, fair results regarding density and context and community issues due to the mixing of urban pattern employed and low affordable housing.

Keywords: Sustainability, neighborhood analysis, north Cyprus, GIS, social housing

Kentsel Komşuluk Sürdürülebilirliğinin Analizi: Göçmenköy Örneği, Lefkoşa

Özet

Günümüzde birçok şehirdeki hızlı kentsel büyüme ve gelişme nedeniyle, sürdürülebilirlik yönleri, genellikle plansız kentleşme nedeniyle meydana gelen şehrin kimliğinde büyük bir bozulma ve ihmal göstermektedir. Ek olarak, bu durum yerelin yaşam tarzına zarar vermekte ve bu bölgelerin ve birçok şehirdeki mahallelerinin geleceğini tehdit edebilmektedir. Kuzey Kıbrıs'ın en eski mahallelerinden biri olan Göçmenköy, 1963 yılında ekonomik ve sosyal istikrarsızlık döneminde inşa edilmiş, alınması gereken sürdürülebilirlik önlemlerine zarar vermiş olsa bile ancak bugüne kadar ayakta kalmayı başarmıştır. Günümüzde öğrenci ve göçmen akını temelli kentleşme süreci nedeniyle, ilgili bölgede mahalle konut yerleşimlerinde ve yol ağları boyunca dükkanlar ve diğer hizmetlerde hızlı bir artış görülmektedir. Bu durum, bölgenin yaşam tarzında köklü bir değişikliğe uğramasına neden olmuş ve mekansal planlama açısından kullanıcı ihtiyaçlarının kasıtlı olarak göz ardı edildiğini göstermiştir.Bu bağlamda, bu çalışma, bölgedeki kentleşmenin etkisini mikro ve makro ölçekte sürdürülebilirlik açısından analiz etmeyi amaçlamaktadır, örneğin Göçmenköy'deki yoğunluk, içerik, hareket modelleri, arazi kullanımı, iklimsel tasarımlar ve topluluk sorunları gibi konuları ele alarak komşuluk birimi bazında sürdürülebilirlik açısından incelemektedir.Metodolojide Oktay (2001) modeli benimsenmiştir ki bu model Coğrafi Bilgi sistemi (CBS) ve saha araştırması yardımıyla mahallelerin sürdürülebilirliğinin eleştirel değerlendirmesini yapmaktadır. Sonuç değerlendirme, Oktay (2001) yöntemine göre mahallenin sürdürülebilirlik düzeylerini değerlendiren üç ölçek (iyi, orta ve kötü) içeren bir tablo halinde özetlenmektedir.Sonuç bulgular mahalle içindeki herhangi bir noktaya yakın mesafede ihtiyaç duyulan tüm hizmetlerin varlığı ve mahalleden geçen iyi bir ulaşım ağı sayesinde arazi kullanım planlaması ve hareket modelleri açısından genel olarak iyi bir sonuç göstermiştir. Ayrıca, kullanılan kentsel özellikler ve düşük maliyetli konutların karışımı nedeniyle yoğunluk-içerik ve topluluk sorunları açısından orta düzeyde bir sonuç göstermiştir.

Anahtar Kelimeler: Sürdürülebilirlik, mahalle analizi, kuzey Kıbrıs, CBS, sosyal konut

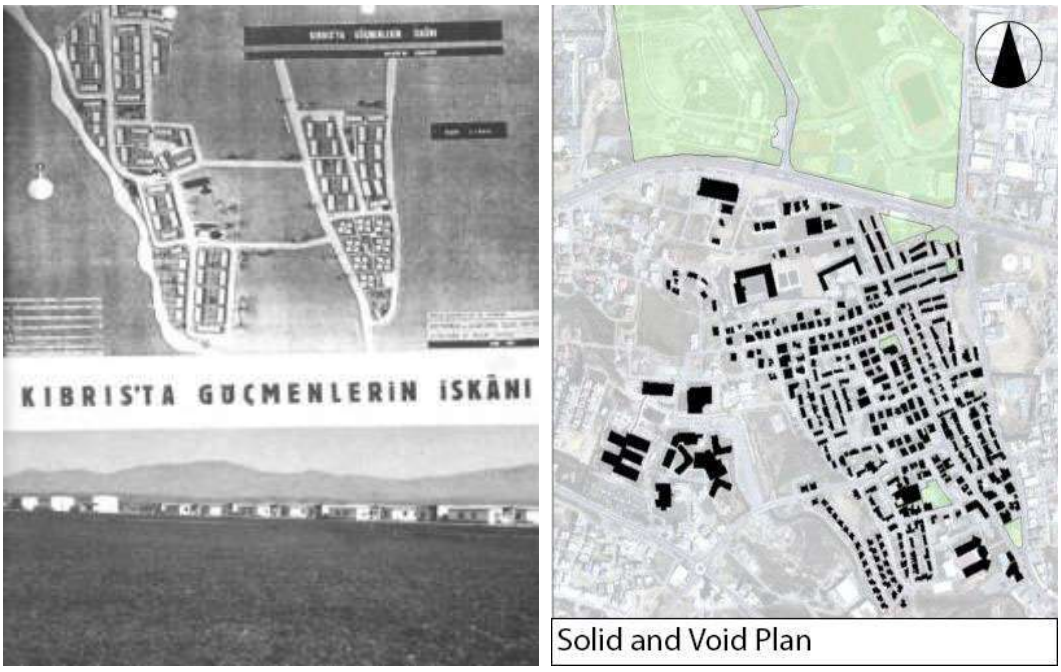
1. INTRODUCTION

During the past couple of years, a general term of sustainable development has emerged after the increase in rate of urbanization and population growth that highlighted the need of social, physical, and economic development for today's use and to be usable and long-lasting for the upcoming generations, underlining that this development is not an end goal, instead it is a vision for a better lifestyle (Newman & Kenworthy, 1999, p.5). The term sustainable development has been mentioned in different forms and definitions throughout the years, therefore in this context Neighborhood sustainability is the focus of this article, as they are vital elements in the development of a city (Dehghanmongabadi, et al., 2014). In order to obtain sustainable development in a Neighborhood, a good balance between social, economic, and environmental requirements must be integrated with the urban development measures (Blum and Grant, 2006; Al-Hagla, 2008).

There lie five main principles that would ensure a sustainable neighborhood as identified by the UN-Habitat; Firstly providing adequate space for streets and efficient street networks (I.e walkable, proper street hierarchy, adequate parking spaces), Secondly, High density (I.e efficiently accommodating more people, reducing the dependency of cars, enhancing social equity), Mixed Land-use (developing a range of activities and land uses in close proximity, to enhance the local economy and decrease care dependency), Social mix, (promoting social interaction, attract services to the neighborhood), and finally, limited land-use specialization (combining compatible land-uses in one neighborhood). Upon the implementation of these principles, a more sustainable version of a neighborhood will be established that will be more walkable, affordable, and will give a vibrant street life (Dehghanmongabadi, et al., 2014).

Rapid urban growth and expansion tend to cause changes in people's way of living by disturbing the existing urban form of the area. Old neighborhoods in old cities are one of the most prone locations to suffer the most; as the newer constructions in those areas cause changes in the cohesion of the place, mixed land-use ratio, percentage of greeneries, density, provision of parking spaces, and social equity resulting in a drastic change in the overall identity of the neighborhood.

In this study, the analysis of a neighborhood called Göçmenköy (The Immigrant’s Neighborhood) in Nicosia; the world’s last divided capital; is conducted. In 1966 the displaced Turkish Cypriots sought refuge from the southern parts due to inter-communal violence, therefore the government was faced with the task of accommodating them, as a start one of the important housing settlements created was in Hamitkoy and Ortakoy which became settlement and distribution centers for new urbanization of the area that was powered by the eagerness to house around 2103 families at the time, after that also came one of the newer housing district developments which were named as Göçmenköy and were aimed at rapid and quick housing for the displaced Turks. The aim of this paper is to compare the area’s urban form, and the changes that happened to it in terms of sustainability measures by breaking it down into six elements (density and context, movement patterns, land use, climatic design, land design, community concerns). The methodology used in this article adopted Okay’s model (2009) of qualitative assessment sustainability analysis supported by the use of GIS, along with literature review, observations, and field survey to help identify the main reasons of how the neighborhood took shape back in 1963 and evaluate the current level of sustainability and how it can be improved to create a more sustainable neighborhood.



(a) (b)

Figure 1: (a) Showing the Göçmenköy development plan that was going to be planned back in 1966 (Atun, 2006, from (Gürdallı and Koldaş, 2017), (b) shows the current plan of and pattern of Göçmenköy (2020).

2. STUDY AREA

Göçmenköy as a housing development area, started in the year 1966, back then the aim was to house few thousands and maintain the spatial needs of the people in terms of places for interactions, back yards, and some semi-open areas, as shown in Figure1 (Quiresh, 2004), It can be seen from the patterns created the accomplishments of such a task, but as the country settled and started to grow from within and started receiving more immigrants whether students or from Turkey, the area started growing and new settlements started to show in the area causing a rapid deformation and change in the character of the urban settlements of the area. Göçmenköy is surrounded by two neighborhoods, Ortakoy on the West and Taskinkoy to the East. The Neighborhood is seamlessly blending with them and both neighborhoods, share a bunch of services together like, schools, hospitals, and supermarkets which better reflects the sense of connection with the neighbors. The area is not created with the grid system unlike new developments like Köşklüçiftlik, instead, it was developed with a network structure that is mixed and is particularly considering that the tree types, organic, and grid pattern that facilitated high accessibility and permeability which better shows the integration with the surrounding context further improving the economic and social sustainability of the area (Zafersoy and Batirbaygil, 2004).

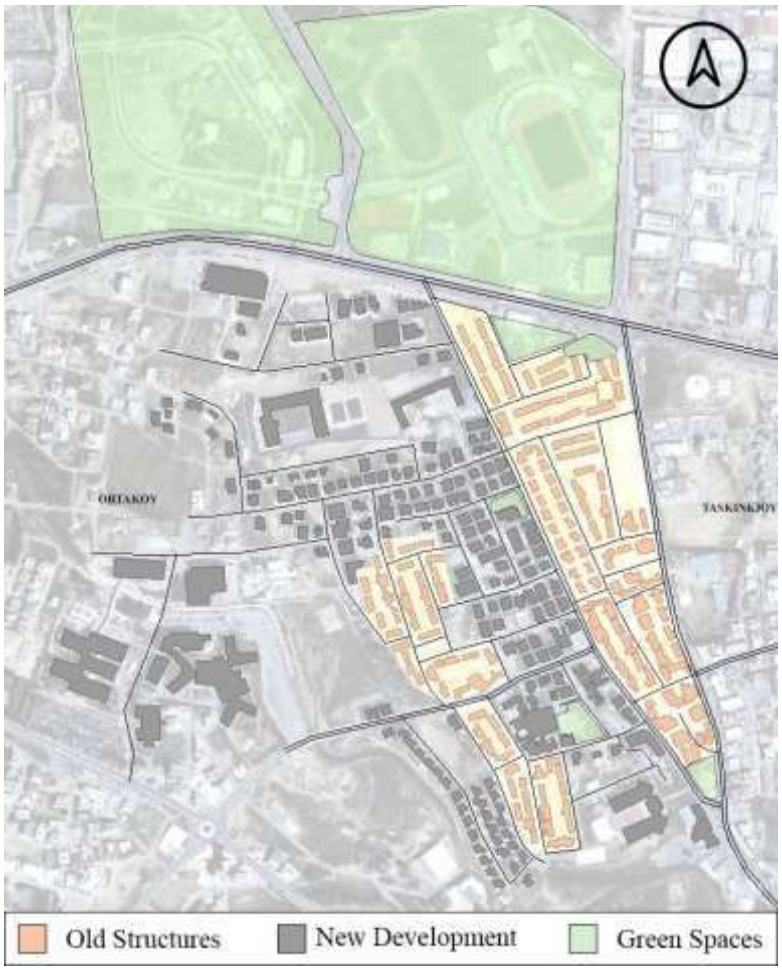


Figure 2: Shows the permeability and the integration of Göçmenköy with the surrounding neighborhoods, and how the old planning developments is still a great part of the current development.

One of the main goals back then was to create a sense of unity within the newly displaced residents and to create a sense of unity, so they can feel secure and at home, during the tough times they were going through (Atun, 2007)(Gürdallı & Umut Koldaş, 2017). Therefore, the urban was done with that element in mind, creating low-density housing areas, two-story houses that have front house terraces, and backyards that share a common green area which could be regarded as semi-private area, for the neighbors to meet and talk, more like the opposite approach from what is seen at Arabahmet when it comes to semi-private areas configuration. This further enhanced the sense of community in the area. Besides the fact that some old settlements were actually built by the residents themselves, which actually made them able to say that we built it by our own hands, as everyone played a role in the construction of their house, and they called them mujahideen as they had defense duties at night and worked in construction in the morning (Figure 3) (Quriesh, 2004), which at the end of the construction resulted in a really strong sense of community and safety that resulted in the name, "Göçmenköy" being given to the area.

As Quiresh (2004) stated that "Göçmenköy is the most perfect, and biggest implementation of immigrant settlement project", in another statement he said 'An exemplary village with shops, school and social facilities in the center' and was labeled the most modern during its time. The 1966 housing settlements were designed with modernist architecture principles in mind; they are naturally well lit, however Ozay (2004) pointed out some defects in the design, as it was

built on the most economical way possible following the minimal standards that would cost the lowest eventually lead to low comfort levels in the houses, even though they tried to balance that out with creating semi-open spaces like the terraces and garden were essential in terms of climatic and social qualities, Ozay (2004) also added that the orientation of the houses was lacking, as the houses were mostly orientated towards the sun which is not preferred as the living areas can't be used comfortably in areas oriented towards the western direction, especially during the summer heat. Moreover, the front terrace areas are covered by hard surfaces without any shading elements and vegetations that resulted in the absorption of large amount of heat in the summer. The presence of mature vegetation around the old settlements provides a proper shading for the near houses and makes up for the design flaws that were implemented creating a good and comfortable living areas (Figure 3 and 4).

Figure 3: Göçmenköy Immigrant Settlement Project, 1966-71 (photo taken from Atun, 2016) (Gürdallı and Koldaş, 2017)

Figure 4: Showing the monolithic view that is created in the neighborhood because of the new development (Ozay, 2005)

3. METHODOLOGY

The Methodology employed in this study is based on Oktay (2001) sustainability analysis for different neighborhoods that are located in Turkey and Northern Cyprus Cities. GIS (Geographic information system), which is a computer-based information system that is effective in planning, analyzing and decision making, etc. GIS is a good to be employed as it has a feature called map overlay that allows the user to perform spatial analysis of the desired area. Required information related to Oktay's (2001) approach for assessing the level of sustainability in urban neighborhoods can be easily present and analyze by using GIS. In order to assess sustainability aspects of the neighborhood, 6 major elements are used within this perspective. These are can be stated as movement patterns, land use, land design, climatic design, and community Issues. Related data are also presented in a measurement table based on the GIS information and observation remarks.

3.1 Movement Patterns

Due to the development of Rauf Denktaş Avenue as a main artery and a direct connector to the heart of the city center, the Göçmenköy area was divided into two sectors, The east and west zones. The Eastern zone is predominantly residential immigrant houses as shown in (Fig. 8), while the Western part has a mixed use functions and mostly contains newer 3 to 4 storey settlements made upon increasing need, Beside the fact that the area is pretty densely populated and that it connects main areas together in supporting of the fact that it is connected to the ring road that connects far neighborhoods together, like Gonyeli, Haspolat and most parts of Nicosia as it is regarded as a main network throught out Northern Nicosia (Zafersoy, 2014), in addition to that it is close to Near East University that resulted in the alteration of the demography of the area into being predominantly occupied by university students and old people who are to this very day still occupying most of the eastern immigrant settlements, therefore that placed pressure to include a main public transportation route for the area, covering the main streets shown in the (Fig. 7) below, which helped reduce the car dependency in the area and further enhancing the environmental sustainability of the area. The location of Göçmenköy area is a pretty good in terms of services and accessibility to services, for instance having a close proximity to Burhan Nalbantoğlu State Hospital, which has direct connection from the main street and another access from Göçmenköy secondary arteries, providing a quick access to the area in case needed, without the fuss of traffic jam and traffic lights. The area also houses 4 different schools that all of them are placed on the main route (Rauf Denktaş Avenue) which increase accessibility for those schools to include students from surrounding neighborhoods helping in bridging the two closest communities' distance wise and helps maintain the social sustainability element in the neighborhood.

Owing to the low car-dependency in the area due to sufficient public transportation options the car parking sufficiency is pretty good except on momentary stop areas on the main road that tends to cause some traffic congestion as it would be expected from a main service road, however yet as shown in (Table 1) the parking sufficiency is fair based on the ratio made by the GIS analysis, yet there exist allot of informal parking areas in the back street area as shown in the (Fig. 5).

Figure 5: Showing the informal parking lots created in empty lands

Moreover, the area is a pretty secure for walking as there is a good amount of traffic-calming measures (as shown in Table 1) in areas where speed might be employed by the drivers, not to mention the ones present on the main road, which eases the crossing for old people and children when crossing the streets (Fig 6).

Figure 6: Showing an example of the traffic calming measures employed to slow down traffic

Figure 7: Showing the Traffic Movability and Land uses analysis of the area (Map done by GIS)

According to the land use analysis, commercial uses, religious activities, offices, and some restaurants are located on the main road which splits the neighborhood. Due to the importance of this connection spine to the city center and to the main road on the north connecting to the university and to other further areas in the city, this changed the land use ratio into a linear form where commercial services are on the main road and the residential zones are at the back arteries, besides the traffic congestion that this change produces and the separation of the neighborhood into two, it still has its upsides, which is creating a self-sufficient area where all the needs are met in a close walking distance to all the services needed, further enhancing the walkability and reducing car-dependency and safety in the vicinity.

In terms of building characteristics, the area is generally divided into two types, the one to two storey high mass housing settlements created in the 1960s, and the newly developed 3 to 4 storey houses, the eastern side with the older settlements has lower density in terms of residents and the effect on the cityscape is quite minimal and harmonious, while on the other hand the 3 to 4 storey houses the density is higher and on the 3 dimensional aspect they created a

monotonous look that disrupted the sense of unity that the neighborhood had.

3.2 Climatic Design

The newer 3 to 4 story settlements that were created following universal template plans which didn't respond to the users' way of living or daily lifestyle and the monotonic use of reinforced concrete and plaster for the façade further separated and created a gap when it comes to the sense of place and community in the newly developed settlements (Quiresh, 2004). Moreover, the newer settlements also failed into achieving an efficient design from the point of climate aspects performing in a lower efficiency compared to the older settlements, for example, by the installation of large dimension windows and flat roofs, and wrong sun orientation and material selection that lowered the comfort levels in the building, besides the lack of semi-open spaces and greeneries in the buildings (Ozay, 2004).

Figure 8: Example of the old and New settlements (plans and orientations) (Ozay, 2005).

3.3 Land Design and the Community

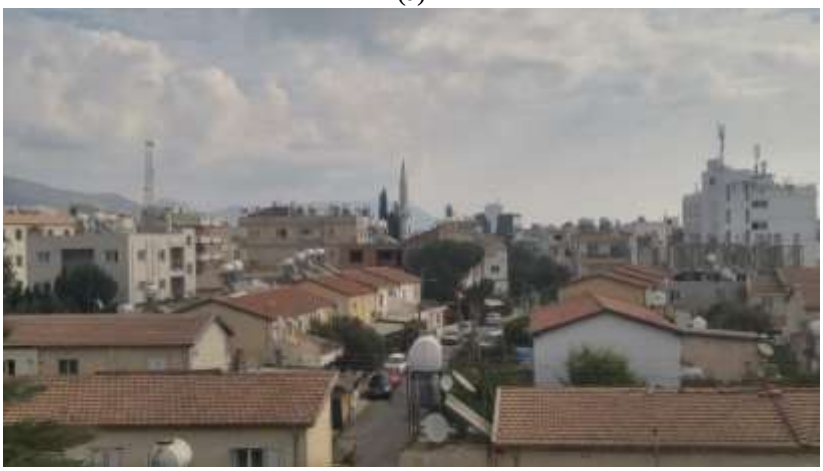
Even though the area doesn't have any natural green spaces in the close vicinity, the area still has a fair amount of greeneries and vegetation spread across the area, mostly surrounding the older settlements and providing shade for the pedestrians, and the residents making the walking in the area a pleasant activity as well as forming a barrier for the residents of the nearby houses from the streets and reduce the noise coming from them, the types of trees commonly found here are orange trees, lemon trees, palm trees, and cypress trees, which in turn plays a role in maintaining the environmental sustainability of the area (Fig. 9).

Figure 9: The trees that are aligned on the streets, some are edible in fact

When it comes to man-made open spaces for interaction, the area has around 4 of them spread around across the neighborhood, those neighborhood parks in the area that are shown in (Fig. 10) below follow the proper definition of a neighborhood park that offer a variety of recreational schemes even though they aren't very big, but they contain facilities such as a playground for the neighborhood kids, seating areas, open lawn and pathways that are sufficient to maintain social sustainability in the neighborhood. One of the parks are made in the surrounding area of (Nurettin Ersin Paşa Camii) the neighborhood mosque, and it is also another good place for people to meet besides the hosting of these gardens to religious events that happen weekly, monthly, or even yearly and further bridges the gap in tradition, culture and nationalities amongst the Göçmenköy residents and sometimes also referred to the building as a landmark as the mosque's minaret can be visible from certain places in the area (Fig. 11), Furthermore, the small park presents at the south intersection that links Göçmenköy and Taskinkoy together this park is currently used to celebrate the International Göçmenköy-Taşkınköy Festival of Culture and Arts, organized by GÖÇ-TAŞ, the Göçmenköy-Taşkınköy Culture Association. In the festival, folk dance groups from Turkey and Cyprus perform and local bands and singers have concerts. Moreover, there is another park in the close vicinity that houses a children playground elements and open bodyweight sports equipment for the people to use, and some hard surfaces, and soft surfaces to be used by the neighborhood residents and secluded and secure from the main traffic, also it provides an opportunity for the parents to monitor their children when they are in the field, However, as the results are shown in (Table 1) the play areas in the neighborhood is quite low that the children play in empty fields or on the sidewalk which would be a risk for them especially when in proximity to the street, Also there the presence of stepped seating areas that encourage the hosting of community events that also plays part in maintaining social sustainability in the neighborhood.

Figure 10: Neighborhood park maps in Göçmenköy. (1) Goc-Tas Park, (2) Göçmenköy children park, (4) Göçmenköy art park

(a)



(b)

Figure 11: (a) A view of Ernes pasha mosque's minaret which could be identified as a landmark. (b) view from a further point in the neighborhood showing the minaret. (photo by the authors).

On the northern side of the site, there lies one of the local parks in the city. Community parks are the kind of places that are located in an area that is very accessible for all the surrounding neighbors to come and to host all sort of events that require huge spaces, they are designed to engage the families, and visitors an entire day with multiple and diverse activities and amenities throughout. They usually have high-quality level parks and have a size of around 8 to 40 acres. In our case, her the Fuar community park is of an area of around 30 acres, however, the downside is that it doesn't have the sport fields required and that is because they are existing, but opposite to the park in the readily accessible Sports center in the district covering an area of around 40 acres containing all sort of sports fields (Football, foosball, tennis, swimming pool, indoor saloons, and a football stadium) that all host national scale events and has a team named after the place called "Göçmen", all these elements makes the neighborhood vibrant and lively, and help increase the sense of place.

(a)

(b)

Figure 12: (a) Fair Community Park, (b) Ataturk Sport Center

The area has been known to be very affordable as the houses over time grew with some defects especially the older ones as they were made with the most economical means and by following the minimum standards, so they appeal to people like the students as their stay is temporary, while the newer ones are more expensive but yet affordable compared to the services that it offers especially the advantage they have of being within close proximity to the university. The presence of those services and public spaces allow the people to meet, therefore, knowing one another from within the neighborhood, although as shown in (Table 1) the availability of semi-private areas is scarce and mostly limited to the older settlements, yet the enclosure that is created by the buildings, and the trees help maintain the sense of community, the neighbors know each other and the kids are playing around making the area lively, especially those living in the older houses on the east which creates a sense of safety for the pedestrians and a sense of active surveillance for the by-passers.

Table 1: Assessment result of Göçmenköy

CASE	Gocmenkoy Neighborhood	POOR	FAIR	GOOD
DENSITY & CONTEXT	RELATION WITH WIDER URBAN CONTEXT		•	
	ENTITY/COHESION			•
	GRAIN OF STREETS AND PUBLIC ROUTES		•	
	IDENTIY OF SETTLEMENT AND SENSE OF PLACE		•	
	QUALITY OF PUBLIC SPACE (DESIGN, SHAPE, SCALE)		•	
	THE SUCCESS OF PUBLIC REALM (USE OF STREETS, SQUARES ETC)		•	
	FOCAL POINTS AND PUBLIC BUILDINGS	•		
MOVEMENT PATTERNS	INTEGRATION WITH EXISTING TRANSPORTATION ROUTES		•	
	LOCATION OF PUBLIC TRANSPORTATION FACILITIES		•	
	INTEGRATION BETWEEN DIFFERENT MOVEMENT MODES (FOOT, CYCLE, CAR)		•	
	ACCESSIBILITY OF HEALTH SERVICES		•	
	ACCESSIBILITY OF FOOD SERVICES BY EASY MOVEMENT MODES			•
	CAR PARKING STANDARDS AND LOCATION OF CAR PARKING SPACES		•	
	CAR PARKING SUFFICIENCY		•	
	TRAFFIC CALMING MEASURES			•
	PEDESTRIAN SAFETY			•
	BIKE CYCYLING PATH	•		
	DISABLED ACCESS	•		
LAND USE	MIX USE FOR OWN CONVEINENCE (HOUSING/COMMERCIAL)			•
	MIX USE RATIO		•	
	DIVERSITY OF HOUSING UNITS			•
	PUBLIC-PRIVATE INTERFACE		•	
	SETTLEMENT DENSITY IN TWO-DIMENSION			•
	SETTLEMENT DENSITY IN THREE DIMENSION			•
CLIMATIC DESIGN	BUILDING ORIENTATION AND MASSING		•	
	EXPOSURE TO UNWANTED SUN		•	
	CROSS VENTILATION IN OUTDOOR SPACES		•	
	CROSS VENTILATION IN INDOOR UNITS		•	
LAND DESIGN	ACCESS TO NATURE	•		
	ACCESS TO EDIBLE LANDSCAPE		•	
	PROVISION AND USE OF COMMON OUTDOOR SPACE			•
	USE OF EXTERIOR SPACE		•	
	HIERARCHY OF OPEN SPACES	•		
	TREE PLANTING		•	
COMMUNITY ISSUES	GROUP IDENTITY AND SENSE OF BELONGINGNESS		•	
	PLAY AREAS		•	
	AVAILABILITY OF COMMUNITY FACILITIES		•	
	AVAILABILITY OF SEMI-PRIVATE SPACES FOR NEIGHBOURLY CONTACTS	•		
	AVAILABILITY OF SPORTS AND CHILDCARE FACILITIES		•	
	HOUSING AFFORDABILITY			•
	PERCEPTION OF SAFETY		•	
	SOCIAL NETWORK		•	

4. CONCLUSION

As shown based on the analysis the area started on an organized plan back in 1963, then after the rapid urbanization and rise of the settlements caused a rapid deformation and change in the character of the urban settlements, however, it's very well integrated with the neighboring areas. According to this neighborhood, the areas with 2 story created a better sense of unity than higher story and the main issue is the lack of areas like semi-private spaces, backyards, or even some shared green spaces in close proximity and this is the fault of the authorities for focusing on creating living spaces without considering meeting spaces. When it comes to accessibility the area is very accessible from all direction, which makes it a good link between different areas with each other, and because of this and the presence of 4 different schools, the authority was forced to provide necessary public transportation link on the main street in an effort to reduce the car dependency in the area.

The land use arrangement is pretty good following the linear arrangement created a strip full of commercial shops that supply all the needs for the residents in the area, without the headache of traffic congestion or noise pollution, Besides that climatically older buildings showed better concern with the climatic sustainable settlements, however it still didn't show the best climatic solution as it was built on economical budget for the immigrants for the absolute minimum requirements was the aim, when on the other hand nor did the new settlements was able to create a good solution for the climatic design problem that existed in the older settlements in fact it was worse with less concern to vegetation and sun orientation and shading, Across from the neighborhood lies two of the biggest public gathering spots, the club and the fairground, Other than that doesn't have a big enough neighborhood park to gather the neighborhoods together, the areas surrounding the older settlements has more vegetation than the newer settlements which make it more pleasing to live there. Finally, we would like to conclude that Göçmenköy area is a good neighborhood area with good affordable and variable houses, However, I think it could be better if a set of elements are employed, starting from the creation of semi-private areas, More climatically / environmental sustainable housing designs and orientation when it comes to newer developments, Moreover more measures should be taken for pedestrian safety to encourage walking, sometimes by means of adding trees for shades and protection and bicycle path instead of the main street which hurdles traffic at some points, and Finally a proper hierarchy of spaces is very much advised for a better provision of spaces.

REFERENCES

Abu-Orf, H. (2005). Collaborative planning in practice: The Nicosia master plan. Planning Practice & Research, 20(1), 41-58, DOI: 10.1080/02697450500261707.

Al-Hagla, K. (2008). Towards A Sustainable Neighborhood: The Role of Open Spaces. International Journal of Architectural Research, 2(2), Pp. 162-177

Blum, A. and Grant, M., (2006) Sustainable neighbourhoods: Assessment tools for renovation and development, Journal of International Research Publications, Present Online, Issue Ecology, Vol 1, p3552 ISBN/ISSN: 1311-8978.

Dehghanmongabadi, Abolfazl, Şebnem Önal Hoşkara, and Nina Shirkhanloo. Introduction to Achieve Sustainable Neighborhoods. International Journal of Arts and Commerce, 3, 2014, pp. 16-26

Gazioğlu, T. (1996). Social Housing Schemes in the TRNC. Northern Cyprus Monthly IV, 5. Erişim adresi: http://www.cypnet.co.uk/ncyprus/economy/econ10.htm.

Gürdallı, H., & Koldaş, U. (2017). Kıbrıs Cumhuriyeti'nden Kuzey Kıbrıs Türk Cumhuriyeti'nin İnşasına Giden Süreçte Lefkoşa'da Mekânın ve Mimarinin Siyasi Dönüşümü: 1963-1983. Journal of History Culture and Art Research, 6(4), 748-772. doi:http://dx.doi.org/10.7596/taksad.v6i4.1104.

Keser, U. (2006). Kıbrıs'ta Göç Hareketleri Ve 1974 Sonrasında Yaşananlar. Çağdaş Türk Tarihi Araştırmaları Dergisi, 12, 103–128.

Oktay, D., Kara, C. (2007), Neighborhood Sustainability: A comparative Analysis in the Northern and Southern Sectors of Nicosia, ESS 2007: International Conference on "Environment: Survival and Sustainability".

Oktay, D. (2001) Planning Housing Environments for Sustainability: Evaluations in Cypriot Settlements. İstanbul, 2001, Yapi Endustri Merkezi Yayınlari

Ozay, N. (2004), A Comparative study of Climatically responsive house design at various periods of Northern Cyprus architecture, Department of Architecture, EMU.

Quriesh, A. (2004), K.K.T.C.'DE TOPLU KONUT ÜRETİMİ ÜZERİNE ARAŞTIRMA, Fen ve Sosyal Bilimler Enstitüsü, Mimarlik.

Zafersoy, H., (2011), Sonrasi Lefkosa Konut Alanlarinin Gelismistir, YDÜ Fen Bilimleri Enstitüsü, Lefkosa.

Zafersoy, H., Batirbaygil, H. (2004), Urban Integrity: The City of Nicosia, Turkish Republic of Northern Cyprus, Megaron.

A Study about Public Participation in the Universal Design of Public Spaces

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Abstract
Through a partnership between civil society stakeholders and the various project design teams, issues related to the universal design of public spaces are better discussed for the community members who feel undermined by existing design schemes. Public spaces which are properly and adequately designed could contribute to ensuring equal opportunity for all groups of people in the community and help boost social mobility. Consequently, finding suggestions about the appropriate design of public spaces for all groups of people with the support of public engagement should be a basic prerequisite requirement for providing community facilities. Within this scope the analysis of a case study of High-Line Project in New York, USA, as a part of a regeneration project that has utilized the universal design well through the inclusion of the society is evaluated. In brief it can be suggested that universal design is an efficient tool for boosting social sustainability via creating urban environments for the usage of a wide range of all individuals as much as possible and public engagement must be a part of this design process.

Keywords: public spaces, universal design, public participation, case study

Özet
Kamusal alanların evrensel tasarımıyla ilgili konular, sivil toplum paydaşları ve çeşitli proje tasarım ekipleri arasındaki iş birliği aracılığıyla, mevcut tasarımlar tarafından ihmal edidiğini düşünen marjinal topluluk üyeleri için, son zamanlarda daha iyi tartışılır hale gelmiştir. Düzgün ve yeterli bir şekilde tasarlanmış kamusal alanlar, toplumdaki tüm insan grupları için eşit fırsat sağlanmasına katkıda bulunabilir ve sosyal hareketliliği artırmaya yardımcı olabilir. Sonuç olarak, halkın katılımının desteğiyle tüm insan grupları için uygun kamusal alan tasarımı hakkında çözümler bulmak, toplumsal fayda sağlamak için temel bir ön koşul olmalıdır. Bu kapsamda, evrensel tasarımı toplumun katılımıyla iyi çözümleyen bir yenilenme projesi kapsamında ABD, New York'ta High-Line Projesi'nin bir vaka çalışması olarak analizi değerlendirilmektedir. Bu çalışma sonucunda özetle evrensel tasarımın, mümkün olduğunca geniş bir yelpazedeki tüm bireylerin kullanımına yönelik kentsel ortamlar yaratarak sosyal sürdürülebilirliği artırmada etkili bir araç olduğu ve halk katılımının bu tasarım sürecinin bir parçası olması gerektiği söylenebilir.

Anahtar Kelimeler: kamusal alanlar, evrensel tasarım, halkın katılımı, vaka analizi

1. INTRODUCTION

Urban public spaces have a significant role in providing people living in the city a good quality of life. This is in line with the global goal of sustainable growth, which aims to achieve greater social equity. Actually, as it is known sustainable urbanism targets not only the social paradigms but also the environmental, cultural and economic dimensions. And it can be argued that public spaces have vital significant direct or indirect benefits for all four dimensions of the sustainability (Woolley, 2003).

In order not to be ignored or neglected, the urban community should be able to provide more resources to disadvantaged population groups. Properly and suitably constructed public spaces could contribute to ensuring equal opportunities for all classes of people in the society and help to improve social mobility. The correct and appropriate design should therefore be a basic requirement for the provision of community facilities (Davarinezhad and Rahnama, 2015). Physical barriers often restricts the use of the public space domain by individuals with disabilities, the elderly, persons with disabled children, pregnant women etc. (Yousefi and Fardi, 2016). Ease of access to public areas, such as pedestrian walkways, must be free from barriers that may prevent people needing special attention from taking urban street expeditions (Sisiopiku and Akin, 2003; Asadi-Shekari et al., 2012).

The design of public spaces appears to be an interactive and interpretive process, carried out in communities through complex and transformative discussions with a positive approach to interpersonal and intercultural agendas, focusing on the 'arenas of struggle' (Healey, 1993). Public space design should also take into account the general way of thinking of the masses and involve them in regular dialogs to help them communicate their thoughts more freely. Such that this can only be done in a culture of democracy. At the end of the day, the community is the main beneficiary and recipient of these completed projects and will therefore also be able to play a significant role in the construction process, because they clearly know what suits them best.

The idea is that the diverse framework of community-based organizations, including local citizens, interest groups and private and public organizations, is a key factor in the successful adoption of the Universal Design, which creates social creativity and equity. Barton et.al, (2003) argued that the greater the participation of the local community in the design and construction of residential projects and public spaces, the greater the possibility of creating a place of community importance. Due to their day-to-day interactions with these special groups, the public will play an important role in ensuring that their needs are better addressed.

By applying the universal design principles to urban public spaces, the disadvantaged members of society could make use of urban environments in a more qualified way and could receive support for their public life. Urban public spaces, as part of the urban environment, must meet the necessary and important needs of the disadvantaged. This study therefore firstly explores the concept of urban public spaces, secondly, universal design of public spaces and thirdly, public participation in the course of universal design of public spaces. After the literature review, High-Line Project in New York, USA as case study is evaluated. Finally the study is concluded based on the outcomes of the literature review and the case study analysis.

2. URBAN PUBLIC SPACES

Day by day the cities are becoming more important for the humanity as the urbanization continues to accelerate in today's modern era. Urban public spaces are a significant asset of the cities (Kart, 2005). In the meantime, their importance is highly recognized as the urban environments have mostly become intense concrete surfaces carrying serious environmental, social and cultural challenges.

According to many researchers, scholars and planners, there are different definitions of the concept of public space in the literature. It can be argued that there are two main types of this concept as urban open and urban green spaces. Urban open spaces are the remaining openings or empty spaces outside the buildings and transportation paths that are dominantly covered with hardscape material. These open spaces within an urban environment are mainly streets and squares. See Figure 1.

(a) An urban open space (b) An urban green space

Figure 1: Public spaces in Warsaw, Poland (author)

Urban green spaces are the remaining openings or empty spaces outside the buildings and transportation paths that are dominantly covered with greenery. These green spaces within an urban environment are all parks and greeneries starting from the building unit up to city level such as neighborhood parks, botanic parks etc. There are many remarkable benefits achieved from urban green spaces. They can deliver social services for quality of life and are considered as a key component for the concept of sustainability (Lee and Kim, 2015).

In general public space provides many social, environmental and aesthetic benefits to cities (Korkut et al., 2010). Creating a suitable environment for recreational needs, achieving positive psychological effects on residents, helping to tackle global warming and climate change are among these benefits.

There are disparate classifications of the concept of public space. They can be classified according to the usage type as public, semi-public, semi-private and private. In addition, they can be classified according to their level of function (Ceylan, 2007).

3. UNIVERSAL DESIGN OF PUBLIC SPACES

People's public life exists in a diverse collection of forms and functions in urban public spaces. Accordingly, such spaces must be able to accommodate a variety of habits, uses and activities, such as shopping, walking, talking, using facilities as everyday activities to entertain, relax or even spend time, as well as occasional celebrations and events (Jalaladdini and Oktay 2012). The urban community will be able to offer more opportunities for disadvantaged population groups to prevent marginalization and desolation. Public spaces are where people meet their friends on a regular basis and carry out their daily activities and therefore play a vital role in people's lives (Low, 2000; Mehta, 2013). Most of the previous research focused on public space accessibility for specific groups, such as women, the disadvantaged, particular ethnic groups, the disabled and the elderly (Mehta, 2013). This is because public spaces make a major contribution to the definition of people's quality of life. This relates to the social objective of sustainable development, which seeks to achieve greater social equality (Reiter and Herde, 2011).

Such that the poor quality of the roadways and potholes tends to build hurdles and make the poor feel unsafe on the streets. For instance the lack of audible alarms at street crossings also makes it unsafe for people with disabilities to cross public streets, especially those with hearing disabilities. Consequently, the ideas that the city must make the streets open, safe and convenient for the disadvantaged ensures that universal design concept is always relevant and convenient.

Universal design is the design of products and technologies that can be used by all people as widely as possible without the need for adaptation or advanced design (Eslami and Mahmoudi, 2016). Universal design is an approach that promotes the preservation of social sustainability factors that ensure equal distribution of resources and services within and between generations (i.e. intra-generational equity and intergenerational equity) as well as the allocation of rights to use environmental services within a given ecosystem (Rahim, 2012). See Figure 2.

(a) Outside Oslo central station that is designed according to the universal design principles (https://zeroproject.org/)

(b) Belediye Boulevard in Yenikent-Nicosia designed according to the universal design principles (author)

Figure 2: Samples of urban spaces designed according to the universal design principles

Universal design has proved to be a new source of inspiration for designers on their journeys to achieve designs that suit a wide range of users to the greatest extent possible. The definition of universal design is defined as the design of space and the equipment used for most people of any skill or age, in accordance with their space needs (Imrie & Hall, 2001; Segherlou & Farzin, 2014). In other words, the main goal of universal design is not to make people conform to space, but to make spaces suitable for people. The design principles for universal design were developed by a group of U.S. designers and design educators from five research organizations in 1997. These principles are as follows:

- Equitable Use
- Flexibility in Use
- Simple, Intuitive Use
- Perceptible Information
- Tolerance for Error
- Low Physical Effort
- Size and Space for Approach and Use

4. PUBLIC PARTICIPATION IN THE UNIVERSAL DESIGN OF PUBLIC SPACES

Public dialog offers an opportunity to dilute self-interest statements by adding theoretical elements to convince others of their relevance, or at least their credibility. Hypocritical as these statements may be, they may lead to compromises in the public interest or in the interests of other groups (Allmendinger, Tewdwr-Jones 2002). The use of a participatory approach allows for timely identification of principles, priorities and future disputes, and the participation of stakeholders and, as a result, planning activities. It can improve local people's conditions because businesses can bring wealth if they are set up with social and mutual values.

The designing of public spaces appears to be an engaging and interpretive process, conducted in communities through diverse and transformative conversations with a constructive approach to interpersonal and intercultural agendas, focusing on the 'arenas of struggle' (Healey, 1993). The planning of public spaces should also take into account the general way of thinking of the masses and engage them in constant dialogs to help them to express their thoughts more freely; this can only be seen in a culture of democracy. The community is ultimately the primary beneficiaries and users of these completed projects, and therefore, they should also be able to play an enormous role in the development process as they know specifically what suits them best.

The theory is that a key factor in the successful implementation of the universal design which generates social innovation and equity is the unique structure of community-based organizations, including local residents, interest groups, and private and public organizations. Barton et.al, (2003) argued that the greater the involvement of the local community is in the design and development of neighborhood developments and public spaces, the greater the likelihood of establishing a place of local significance. The public due to their day to day interaction with these special groups; they can play a huge role in ensuring that their needs are better achieved. Throughout the construction of spaces and public streets, the interests of marginalized groups in the community have usually been overlooked.

The combination of top-down policies that allow neighborhoods to self-organize their municipal resources and bottom-up community-led organizations are now showing fascinating results in terms adoption of the universal design concepts. The objective is so that the disadvantaged could make use of urban areas and urban environments similar to other members of society and could continue their public life without support. The final outcome of this process of engagement between national and local levels is the development of community-based enterprises that are able to preserve the social sustainability factors that ensure equal distribution of resources and services within and between generations (i.e. intra-generational equity and intergenerational equity) as well as the allocation of rights to use environmental services within a given ecosystem (Peredo and Chrisman, 2006).

5. CASE STUDY: THE HIGH LINE, SKY CITY PARK IN NEW YORK, USA

High Line Park is a 2.33 km elevated section of the disused Central New York Railroad. Inspired by the 4.8-kilometer Promenade plantée (tree-lined walkway), a similar successful project completed in Paris in 1993, the High Line was rebuilt and designed as a greenway landscape and a railway-to-trail park. See Figure 3, 4 and 5.

Figure 3: High-Line railroad in the 1980's (tr.pinterest.com)

Figure 4: The High-Line before restoration (thehighline.org)

Figure 5: The High Line Map Layout (washingtonpost.org)

A group of landowners lobbied for its demolition in the 1980s, after the railroad was out of service, while local residents and activists challenged the demolition efforts in court. In 1999, the residents of High Line founded an organization called "Friends of the High Line" to advocate for the preservation of the High Line and to reuse it as a public open space. The study found that the High Line project was financially beneficial and resulted in a fair competition for ideas on the design of the High Line. In 2006, CSX Transportation Corporation donated ownership of the High Line to the City, and after numerous public hearings, the best design, championed by the "Friends of the High Line" was chosen and designed to be the symbol of New York City. The design entailed of a universal design that had to incorporate all disadvantaged population groups.

The High Line, in its neighborhood, has become a signature element and a strong driver of investment in New York City. This is considered to have contributed significantly to the rejuvenation of the West Side of Manhattan. The City rezoned the area around the High Line in 2005 in order to stimulate growth while preserving the identity of the neighborhood. The park's mix of rezoning and growth helped create one of New York City's fastest growing and lively neighborhoods.

The design of the park is clearly symbolic and has inspired other cities to evaluate the ability to replicate it in their cities. The universal design of the site offers more opportunities for disadvantaged population groups to prevent marginalization and desolation. With the application of well laid wooden and concrete floors and inclined stretches in the amphitheaters and stairs so as to make the physically disabled feel represented and catered for they would be free to use the public space even when in wheelchairs and strollers. The application of Peel-Up benches design, which entails of benches that seem to rise up as a natural extension of the path itself. It enables children and even the physically disabled to easily sit down and get up from the benches without much restrictions. The Inclusion of the original rails in the design by lining it with loose gravel bonded with aggregate giving the landscape a more rough and rugged feel, but with a rather smooth and solid feel which is accessible for people with disabilities (Figure 6, 7, 8 and 9).

Figure 6: Well laid concrete floors enabling the physically handicapped to walk (thehighline.org)

Figure 7: Peel-up benches design enabling ease of use (thehighline.org)

Figure 8: Inclined stretches in the amphitheatre making it easily accessible for physically disabled persons (thehighline.org)

Figure 9: Original rails lined with loose stone gravel bonded with aggregate, smooth enough for the physically disabled to use (thehighline.org)

The High Line is important and meaningful as a politically, ecologically, culturally, socially and economically sustainable campaign. Politically, as evidence and as an example of the impact of civic participation, members of adjacent neighborhoods played a huge role to have it rescued. Ecologically, it is in the center of town, it boasts of a green roof of 6 acres. Historically, the conversion of an unused rail line into a modern public space as a building project was unheard of. Socially as a neighborhood and a world-class park where families, tourists and the community come together and economically as an entrepreneurial initiative that has demonstrated the potential of public spaces to raise revenue, attract businesses and improve local economic growth. See Figure 10.

Figure 10: Present day view of the highline (thehighline.org)

6. CONCLUSION

As the urbanization is increasing worldwide, more and more individuals have the requirement of accessing public spaces in the urban environments. Therefore, these spaces must be well organized and designed in order to be reached by all sorts of urban residents. Universal design is an emerging topic for the design of different scales of urban environments including both buildings and public spaces (Steinfeld & Maisel, 2012). This concept is a principle that brings equity and also seeks to ensure equal distribution of resources and services within and between generations and classes of people. In other words universal design is a tool to raise the impact and quality of the public spaces

In addition, public participation plays a huge role in the ensuring that the adoption of the universal design policies have been put in place. Such that the direct role the public play in finding different strategies that generally help elevate the lives of the disadvantaged and minority groups cannot be understated. With the example of the High-Line Project in New York, USA, the inclusion of the public through the "Friends of the High Line" organization who have played a huge role in championing of the regeneration of the old rail has been highly fulfilled. Hence it can be argued that the achievements of the universal design principles can be obtained to the greatest extent possible if the public participation is included to the process of design.

Due to the lack of appropriate frameworks for cooperation between project design teams and civil society stakeholders, significant human capital can be seen to be going to waste. It is therefore important to promote social sustainability rather than personal benefit and gain, in order to unlock these dormant resources and to stimulate the power of local communities. In brief, through such collaborations, vulnerable groups in society will also be better represented in the cities with effectively applied principles of universal design. Because, such examples of public participation is highly required around the world.

References

Allmendinger, P., & Tewdwr-Jones, M. (2002). The Communicative Turn in Urban Planning: Unravelling Paradigmatic, Imperialistic and Moralistic. *Space & Polity*, Vol. 6, No. 1: 5–24.

Asadi-Shekari, Z., Moeinaddini, M., & Zaly Shah, M. (2012). Disabled pedestrian level of service method for evaluating and promoting inclusive walking facilities on urban streets. *Journal of Transportation Engineering*, 139 (2), 181-192.

Barton, H., Grant, M. & Guise, R. (2003). *Shaping Neighborhoods: A Guide for Health, Sustainability and Vitality*. Oxford, UK: Taylor & Francis.

Ceylan, A., (2007). *Yaşam Kalitesinin Arttırılmasında Kentsel Yeşil Alanların Önemi ve Kentsel Dönüşüm ile İlişkilendirilmesi*. İstanbul Technical University, Institute of Applied Sciences, Unpublished MSc Thesis, İstanbul.

Davarinezhad, M., & Rahnama, M. (2015). The assessment of urban furniture for the disabled (Case study: Shiraz City and large park). *Journal of Civil Engineering and Urbanism*, 1, 16-21.

Eslami, L., & Mahmoudi, M. M. (2016). Universal Design and Social Sustainability in the City: The Case Study of Tehran Iran. Studies in health technology and informatics, 229, 263-273.

Healey, P. (1993). The communicative work of development plans. *Environment and Planning B*, 20: 83-104.

Imrie, R., & Hall, P. (2001). *Inclusive design: Designing and developing accessible environments*. Spon Press.

Jalaladdini, S., & Oktay, D. (2012). Urban public spaces and vitality: A socio-spatial analysis in the streets of Cypriot towns. *Procedia - Social and Behavioral Sciences*, 35, 664-67

Kart, N. (2005). Emirgan Parki'nda Kullanicilarin Memnuniyet Derecelerinin Değerlendirilmesi. İstanbul Üniversitesi Orman Fakültesi Dergisi, 55 (1), 185-208.

Korkut, A. B., Şişman, E. E., Özyavuz, M. (2010). *Peyzaj Mimarlığı*, Tekirdağ-Verda Yayıncılık, (ISBN: 978-605-88381-0-9).

Lee, Y. C., & Kim, K. H. (2015). Attitudes of citizens towards urban parks and green spaces for urban sustainability: The case of Gyeongsan City, Republic of Korea. *Sustainability*, 7 (7), 8240-8254.

Low, S. (2000). On the plaza: The politics of public space and culture. Austin: University of Texas Press.

Mehta, V. (2013). Evaluating public spaces. Journal of Urban design, 19(1), 53-88.

Peredo, A.M., & Chrisman, J.J. (2006). Toward a theory of community-based enterprise, Academy of Management Review, 31(2): 309–328. DOI: https://doi.org/10.5465/amr.2006.20208683.

Rahim, A. A. (2012). Universal Design in maintaining social sustainability.

Reiter, S., & Herde, A. D. (2011). Qualitative and quantitative criteria for comfortable urban public spaces. 2nd International Conference on Building Physics. Antwerp, Belgium.

Segherlou, E. N., & Farzin, A. A. (2014). Comparative study of urban public spaces based on the need of disabled with universal design approach (Case study: District 6 of Tehran Municipality).

Sisiopiku, V. P., & Akin, D. (2003). Pedestrian behaviors at and perceptions towards various pedestrian facilities: an examination based on observation and survey data. Transportation Research Part F: Traffic Psychology and Behaviour, 6(4), 249-274.

Steinfeld, E., & Maisel, J. (2012). *Universal design: Creating inclusive environments*. John Wiley & Sons.

Woolley, H. (2003). *Urban open spaces*. Taylor & Francis.

Yousefi, M., & Fardi, R. (2016). Physical responding of the urban public space to citizens' rights. Mediterranean Journal of Social Sciences, 7 (3), 167-172.

https://www.thehighline.org/. Accessed on August 2020.

https://www.washingtonpost.com/graphics/2018/lifestyle/travel/high-line/. Accessed on August 2020.

https://zeroproject.org/. Accessed on September 2020.

http://tr.pinterest.com. Accessed on September 2020.

Language of Tragedy in Architecture

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Abstract
The nightmares of war, disaster, terrorist attacks, and genocide, etcetera, are daily redefining people's environment at all scales. Its impacts create uncertainty in the coherence of the three pillars (physical, social, and economic) of sustainable development. The most vulnerable harm is on the intangible endowment of human memory. The big pertinence under contemplation remains: Should we forget about the incidence that causes us to suffer desolation, loss of interaction, habitation, energy, and lives? In response, architecture has shown media potentials of communicating societal functions/events, beautiful or ugly, with buildings as a 'code' within the context. The study intends to analyse museums' architecture of remembrance as a medium for communicating tragedy, whether or not the architects/design teams of such museums encapsulated horrific conditionality's in the architectural language to create an effect on the users. A critical review of three museums of remembrance Hiroshima Peace Memorial Museum, Japan; Apartheid Museum, South Africa; Yad Vashem (Holocaust History Museum, Israel) has been selected as three contexts Africa, Asia, and the Middle East.The study conceptualizes that the catalyst for horror is not selective but a global phenomenon with human existence. Furthermore, the configuration of museums of remembrance is a praxis house for human interaction void of race, class, and belief, which is opening up sustainable lines of dialogue for learning, reconciliation, and coexistence. Most importantly, architecture represents full lines in that social-cultural and community communication between people and their deplorable history. It has been observed that weirdly shaped structural elements, colour scheming, lighting and surface texture of the spaces, the size of openings, and hallways either widely spaced or narrowly spaced, the orientation of the museum in context, the combination of materials used, and the functional zoning and the spatial configuration of the museum are tools to convey a sense of tragedy in architecture.

Keywords: Architecture, tragedy, memorial museums, remembrance, tragedy in architecture

Özet
Savaş, felaket, terörist saldırılar, soykırım vb. kabuslar her ölçekte insanların çevresini yeniden tanımlamaktadır. Bu durumun etkileri, sürdürülebilir kalkınmanın üç ayağının (fiziksel, sosyal ve ekonomik) tutarlılığında belirsizlik yaratır. En yalın zarar, varlığı ölçülemeyen insan hafızasında yaşanmaktadır. Bu noktada geriye tefekkür içeren büyük bir kaygı kalır: Peki yalnızlaşma, kök salma engeli ile etkileşim, enerji ve yaşam kaybına neden olan vakayı unutmalı mıyız? Buna yanıt olarak, mimari, güzel veya çirkin, toplumsal işlevleri / olayları iletmenin medya potansiyellerini binaları bir 'kod' olarak kullanarak göstermiştir. Çalışma, bu tür müzelerin mimarları / tasarım ekiplerinin kullanıcılar üzerinde bir etki yaratmak için mimari dildeki korkutucu şartları özetleyip özetlemediğine bakılmaksızın, trajediyi iletmek için bir araç olarak anıt müzelerin hatırlama mimarisini analiz etmeyi amaçlıyor. Üç anma müzesinin eleştirel bir incelemesi olarak, Hiroşima Barış Anıtı Müzesi, Japonya; Apartheid Müzesi, Güney Afrika; Yad Vashem (Holokost Tarih Müzesi), İsrail, üç farklı çoğrafyada seçilmiştir. Çalışma, korku katalizörünün seçici değil, insan varoluşuyla birlikte küresel bir fenomen olduğunu kavramlaştırıyor. Dahası, anıt müzeleri, ırk, sınıf ve inançtan yoksun olarak, insan etkileşimi için bir uygulama yeridir ve öğrenme, uzlaşma ve bir arada yaşama için sürdürülebilir diyalog hatları açar. En önemlisi, mimari, insanlar ve onların acı barındıran tarihleri arasındaki sosyal-kültürel ve toplumsal iletişimindeki esas hatları temsil eder. Garip şekillendirilmiş yapı elemanlarının, mekanların renk şeması, aydınlatma ve yüzey dokusunun, açıklıkların ve koridorların geniş aralıklı veya dar aralıklı boyutlarının, müzenin bütün içerisindeki yönünün, kullanılan malzemelerin kombinasyonunun ve müzenin işlevsel bölgelendirme ve mekansal konfigürasyonunun, mimaride bir trajedi duygusu yaratmak için araç olarak kullanıdığı gözlemlenmiştir.

Anahtar Kelimeler: Mimarlık, trajedi, anıt müzeleri, anma, mimaride trajedi

INTRODUCTION

Tragedy is an event that causes great suffering, destruction, and distress, such as a serious accident, crime, or natural catastrophe (lexico.com). The waves of tragedy are boundless, different seasons, cultures, and contexts experience various forms of it from history to present

and the future yet uncertain. How the architecture of Museums of remembrance will communicate past tragedy is the challenge to be attempted to explore through a careful investigation of three Museums cases.

Architecture, as all mediums of art, conveys senses to the users by means of the language that has been created by means of space. There are tools as scale, material, construction, structure, the light used, context, colour etc… Architecture is not about computation or placement; it is about ingrained feelings (Kushner, 2015).

Spaces for collecting memories and has their own vocabulary. When the memory is about horror, crime, catastrophe, meaning related to tragedy, are there a common vocabulary to be specified for museums of tragedy?

Can architecture construct the reflective connect of people with their past tragedy through buildings? Traumatic events keep changing the social cultural and spatial layers of urban contexts. At present, the impacts of tragedy on societies seem to defy nation's interventions and leave us with unanswerable questions. The affective defects on people's memory can be constructed because people naturally do not want to lose both tangible and intangible aspects of their history. Over the years, architecture keeps evolving but the realism still remains that the object (building) have three folds' interaction with people: People that live in it, work in it and those who looks at it.

Memory is an intangible value which modern society tries to shun but remains an indelible aspect of human existence. Fundamentally, three primary arguments are presently trending about museums. That is:

- Critically, the shock of traumatic happenings, for real! We ponder its place in the human race?
- How architecture of museums will stage or communicate tragedy to audience as seen in Poetics how plays can showcase that.
- Even interestingly is the pragmatic paradigm shift witnessed with the language of museum architecture after a turn of 1900 in different contexts?

To create a sequential journey of the study, a prescription of the selected examples, Hiroshima Peace Memorial Museum, Japan; Apartheid Museum, South Africa; Yad Vashem (Holocaust History Museum), Israel has been analyzed.

Hiroshima Peace Memorial Museum, designed by Tange Associates Company with Kenzo Tange as Principal, opened in August 1955 to mark a ten year anniversary since the bombings. The team had been sent to explore the damages that resulted from the atomic bomb, which dropped on Hiroshima's city, Japan, on the morning of August 6, 1945. The designs were initially part of a competition in 1949, which Kenzo Tange's team won and were therefore commissioned to actualize the designs to its totality.

The Apartheid Museum of South Africa built 2001, designed by Mashabane Rose Associates through Public-Private Partnership funding by Solly and Abe Krok (businessmen) as a social commitment to gain government approval for other social infrastructural developments (Amusement Park/Science Center) within the re-claimed mining land site. Its located in the context of Witwatersrand Gauteng (place of gold in Sotho, now Lesotho) as an emblem of Johannesburg city in South Africa.

The Yad Vashem Museum built-in 1953, on the western slope of Mount Herzl, which is called the mount of remembrance. On a height of 804 meters (2,6380ft) it is located in western Jerusalem, within the context of the pastoral landscape. It is a tribute for preserving the memory of the dead that is the victims of the Holocaust—honouring the Jews who fought against the Nazi oppressors and the gentiles who selflessly helped the Jews in need. The story-line of the Old Museum designed by architect Munio Weinraub exhibits the historical development of

anti- Semitism and Nazism, now substituted by exhibits that focus on the personal stories of Jews killed in the Holocaust as completed on 2005 by Moshe Safdie.
The rationale for this research lies on analysing the reflective connect between architecture of museums of remembrance and tragedy with focus on how the language of architecture communicating horror to the public. The following questions are engaged to get the targeted objectives of the study:

1. How can we remember tragedy through museums of remembrance's architecture?
2. Are there any common architectural language used on the museums of remembrance for tragedy?

In order to satisfy the remarked primary functions, secondary functions are generated either explicitly or implicitly from the designer's end or at the audience's point. The relationship between people and buildings is a form of communication, and architecture is the medium for the interaction.
The next moved involves visiting the web pages of the designers and checking other architectural online discourse media platforms to settle issues related to discrepancies of data and obtain visual data. The analysis will capture the exterior of the buildings selected, their interiors and spatial configuration, the application of materials, and relation with the context to evaluate the architectural codes. The architect's motivation and statements about carrying out such works (commissions), we will also evaluate to locate their reference and philosophy.
The analysis exercise will adopt an open-minded general approach, both insider and outsider perspective since some of the language used on the buildings may carry technical codes.

LITERATURE REVIEW

Architecture and Tragedy in Museums

Architecture, in cognizance of tragedy, can build the people's reflective connection with their past tragedy through buildings. Tragedy, comes with diverse directions and points of view, but generally speaking Williams (1962) reveals as the shaping of events focused basically on pain of humans that entails a companionship of alienation or pleasure weather in the life of the observers or the participants. The maltreatment of races has a different trend in our society; the persecution of the Jewish race still calls for a remembrance of tragic events that have a place in engraving of world disasters. It sure gives a known icon that feeds both knowledge and position. Our phrase says more than we realize, and we perceive negative events more than we value to say (Tugend, 2012). This effects here that expression is never a timid and unbiased reflection, but a character wet through to implement. As so said, architecture is no exemption to this rule. Architecture speaks as of its means of knowing memorials. It speaks to its users, and the passing of such a message could lead to a feeling of safety, success, or fear, etcetera as affection. It was never an expedition of perfect spaces constructed to the gathering of people from one another.
The tragedy embedded into architecture, presents us with the museum outlets by which communities define their history. They offer a vision for the general monumentality of various histories, pinpointing them into outlets that serve diverse, widespread reasons (Amritha & Geijerstam, 2011). Today architecture possesses a form of allure to the diversity through the edifice of interest that would attract them. We understand architecture by configuration, layout, and even light as states, "elucidation like configuration themselves accomplish a cultural, factual govern role. We explain buildings in certain ways because by so doing, we can expatiate some knowledge upon different forms of the world which we live". The real reason for aim within a museum, designed within a site area, is not just the concept of the designer, but it's what is embedded and recreated with diverse people's experience (Davis & Bowring, 2011). Architecture does not only speak configuration; it speaks affections too. Arguably, It could

obey what critics posit, that the exercise of design understanding becomes more relevant than the configuration of spaces.

Museums designed for remembrance of tragedy do not only configure our history but how we address it for purposes and the tragedy itself, including differences in them, is also a capital into our future. In this context, architecture is the in-between of bringing imagination into reality to affect the community. However, such practice is a humbling process with diverse responsibilities: it demands the right people needed to bring such imaginations to life (Amrith et al., 2005). Museums serve both an independent form of the originator of the dialogue and as an organization that adopts the view of assertive recommence to organize its assemblage, retrospective, and investigations (Liefooghe, 2019).

We know that architecture possess "definition" to be more than just atypical structure or space. Architecture speaks to different users according to how such messages transmit to them. Moreover, such bring about different emotions of diverse kinds of perspective; thus, individual experience defines a space (Davis & Bowring, 2011b). We interpret tragedy built, otherwise for various reasons -to explicate in the current, as section of our world for the manifestation of many memories passed across. Tragedy as a function of past traumatic events could be a way of social remembrance, dark memories. For example, in order to address present needs, the German historians of genocide expatiated an upward movement of time (Fig.1,2,3), what society needs, brought about through creation, design of diverse museums.

Figure 1

Figure 2

Figure 3

Figure 1: Sachsenhausen concentration camp Orangeburg, Germany, 2007 (Davis & Bowring, 2011)
Figure 2: Tower of nations, Germany, 2007 (Davis & Bowring, 2011)
Figure 3: Memorial of murdered Jews Berlin, Germany (Davis & Bowring, 2011)

Analysis of Case Studies

This study has been analysed three examples of museums of a prescription of the selected examples, Hiroshima Peace Memorial Museum, Japan; Apartheid Museum, South Africa; Yad Vashem (Holocaust History Museum), Israel has been analysed. Sequel to these indicators, the analysis of the case studies begins with appreciation of the visual data which are arranged cordially. The primary qualities are identifying using two variables. The first variable is the four criteria mentioned in the methodology of the study: Architectural expression, interior and spatiality, materials application, architect's statements and relationship with the locational context.

(I) Hiroshima Peace Memorial Museum, Japan 1955

The architectural language of Hiroshima Peace Museum signified a smoky glazed pilotis bridge-like icon whose inspiration is traceable to modernism like in the works of Bauhaus School, Germany and Villa Savoye by Le Corbusier. Tange's idea for the Museum was that he wanted it to bring out remorse and a commitment to peace, symbolized by various structures like the Peace Arch and the Cenotaph Stone. The exhibits of the remains follow: a narrowly and dark lit entrance alleys, rough black-painted walls and a darkened hallway. The exhibits

ends and exits at a walkaway that is maximally illuminated representing the transference from dark, rags and ashes to a new life of peace. The primary information about the case is organized in (Table 1) and the visual materials are shown in (Figure 4, 5, ….16). While the analysis summarized in (Table 2).

Table 1: Hiroshima Peace Memorial Museum, Japan (Authors).

ARCHITECT	KENZO TANGE / TANGE ASSOCIATES
AIM	To commemorate the Nuclear Atomic Bomb that was dropped in the city of Hiroshima on the Morning of 6th August,1945.
LOCATION	Located between the intersection of the Honkawa and Motoyasu rivers, Motomachi District, Japan.
SPATIALITY	East wing and West wing.
STYLE	Modern
FUNDER	Japanese Government
BUILT YEAR	1955

All visual data shown below for Hiroshima Peace Memorial Museum are retrieved from the archives of (Hyunjung, 2012), other exceptions will be mentioned accordingly to avoid monotony.

Figure 4

Figure 5

Figure 4: Hirosima City before the Bombings
Figure 5: Hirosima City after the Bombings

Figure 6

Figure7

Figure 6: Location of Hirosima Peace Memorial Museum on google map
Figure 7: Site selected for Hiroshima Peace Memorial Museum

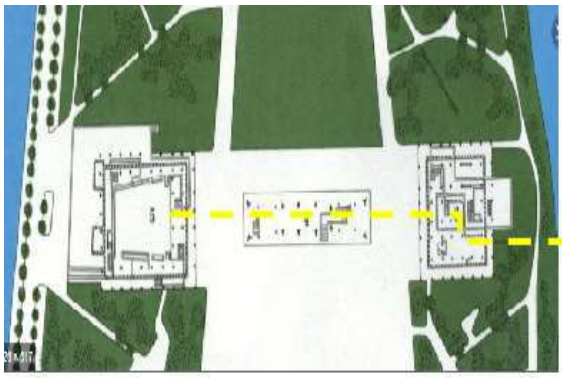

Figure 8

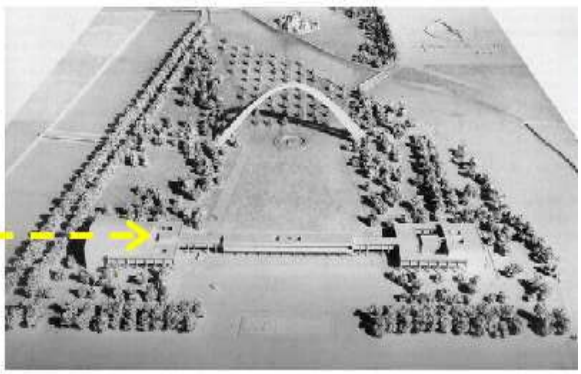

Figure 9

Figure 8: Floor Plan of Hirosima Peace Memorial Museum
Figure 9: Model of Hirosima Peace Memorial Museum

Figure 10

Figure 11

Figure 10: Main Facade of Hirosima Peace Memorial Museum
Figure11: Unpainted Rear View of Hirosima Peace Memorial Museum

Figure 12

Figure 13

Figure 12: Narrow and darkly lit entrance alleys
Figure13: Rough black-painted interior walls

Figure 14: Interiors showing remains left by the bombings (hpmmuseum.jp)

Figure 15

Figure 16

Figure 15: Interiors exhibits showing dark surfaces/dim lighting
Figure16: Interiors walkway to exit brighter and glittering

Table 2: Analysis of Hiroshima Peace Memorial Museum (Authors).

CRITERIA	ARCHITECTURAL EXPRESSION	INTERIOR AND SPATIALITY	MATERIALS APPLICATION	ARCHITECT'S STATEMENTS	RELATIONSHIP WITH CONTEXT
IDENTIFIED POINTS UNDER THE VARIABLES	● A modernist style which is against the Japanese traditional motifs that had been practiced all along. ● Inspired by the famous Architect Le-Corbusier, where it employed the use of pillars (pilotis) for support and also opted the use of flat roofs to bring out the shape of the structure. ● The unornamented, raw concrete structure of the Hiroshima project reflected the influence of "Brutalism" as a postwar style. ● The lighting at night resembles a fiery aspect. ● Lighting and exhibits to evoke a feel of atomic bombings.	● The interior comprises of two floors which are supported by the pillars driven to the ground and which act as foundations. ● The spatial configuration of the museum comprises of two wings, the east and west wings; which takes the visitors through a feel of being in the events as they occurred. ● Narrowly spaced and dimly lit hallways for the entrance. ● Rough black walls of the museum portray remorse and sadness ● Photographs and actual artifacts left after the bombing. ● Brighter wider hallways in the exits with floor-to-ceiling windows overlooking the Hiroshima Peace Memorial Park.	● The unornamented, raw concrete structure. ● Bricks from the actual bombing sites with charred effects joined with Roughly painted and textured walls to catch and invoke a feel of grief with the visitors. ● Natural plaster giving it a feel of an "honest" expression of materials. ● Well painted walls at the end to show hope and relief.	● Kenzo's design entailed of putting together several elements together to form a park by chance, the cigarette brand was called "Peace", hence the park was named the Peace Memorial Park.	● It is located between the intersection of the Honkawa and Motoyasu rivers, which are in Motomachi Districts. ● The location of the museum is at the exact point where the bomb was dropped, hence forms the core of remembrance to the public. ● The location of the museum is at the exact point where the bomb was dropped, hence forms the core of remembrance to the public.

The Hiroshima Museum analysis conducted in "Table 2" and "Figure 4-16" indicates a convey devastation to the visitors through dense materials, black surfaces, rough walls affected by the bombings, and low lit exhibition spaces. The target is to create a global symbolic peace city with inspiration the architect captured from a packet of a Cigarette pack, was conceptualized to realize the Peace Memorial Park. The museum constitutes the epicentre of the city of Hiroshima contextually continuous manner in-between two rivers, Honkawa and Motoyasu, to connect the Motomachi District. It is a brutal symbol of post-war architectural influences with south glazed facade cladded with dwarf concrete piers in a repetitive mode creating rhythm. The adoption of verticality and horizontality solidly represented. The building's totality and other structures in the park and the internal spaces holistically synchronized as part of the exhibits. Therefore, more dedication to integral parts help stage the uncertainty of atomic bombings and massive death than the monumentality of the building.

(II) Apartheid Museum, South Africa 2001

The architectural embodiment adopts an L-shaped strip 'documentary type' of exhibition (Soudien, 2008), housing 22 exhibition spaces progressively visualizing the three major historical phases of South Africans' social-spatial and socio-political struggle. The museum aimed to commemorate apartheid victims, heroes for freedom struggle, and host the first democratic elections. Its architectural language is a mythologize epistle and a confluence for the historical past burdened with heaviness, spatial/racial divide, and the new that is light, encompassing liberal society. The outlook is a breakaway from the strict norms for a museum, conversant to the reference context of Johannesburg but a secure contemporary international icon with inspirational tights with the Holocaust Memorial in Berlin. The conceptualization of the building as part of the exhibit's resources infuses emotional sensitivity on the users.

The museum uses encased visuals to restrict visitors' physical touch, which James (2010) thesis findings reputed that representation as symbolic with how segregated race were bar from accessing things even when it can be viewed.

A concise information about the Apartheid Museum is provided in (Table 3), while the supporting visual data are shown in (Figure17,18, …. 28) and (Table 4).

Table 3: Analysis of Hiroshima Peace Memorial Museum (Authors).

ARCHITECT	**MASHABANE ROSE ASSOCIATES (ARCHITECTS AND URBAN DESIGNERS)**
AIM	To commemorate the victims and heroes of apartheid (1948-1990), and exhibits the three stages of historic spatial and racial developments in South Africa.
LOCATION	Northern Park Way and Gold Reef Road, Johannesburg, South Africa.
SPATIALITY	East wing and West wing.Auditorium, Temporary Exhibit Space and Archive Facilities.
STYLE	Modern
FUNDER	Solly and Abe Krok (businessmen)
BUILT YEAR	2001

All visual data for the Apartheid Museum shown below are retrieved from the archives of (Mashabane Rose Associates, 2008), otherwise stated.

Figure 17 **Figure 18**

Figure 17 & Figure 18: Bird-view of Apartheid Museum in the context of Gold Reef, Johannesburg highlighted in yellow by authors (Retrieved from google.com/map)

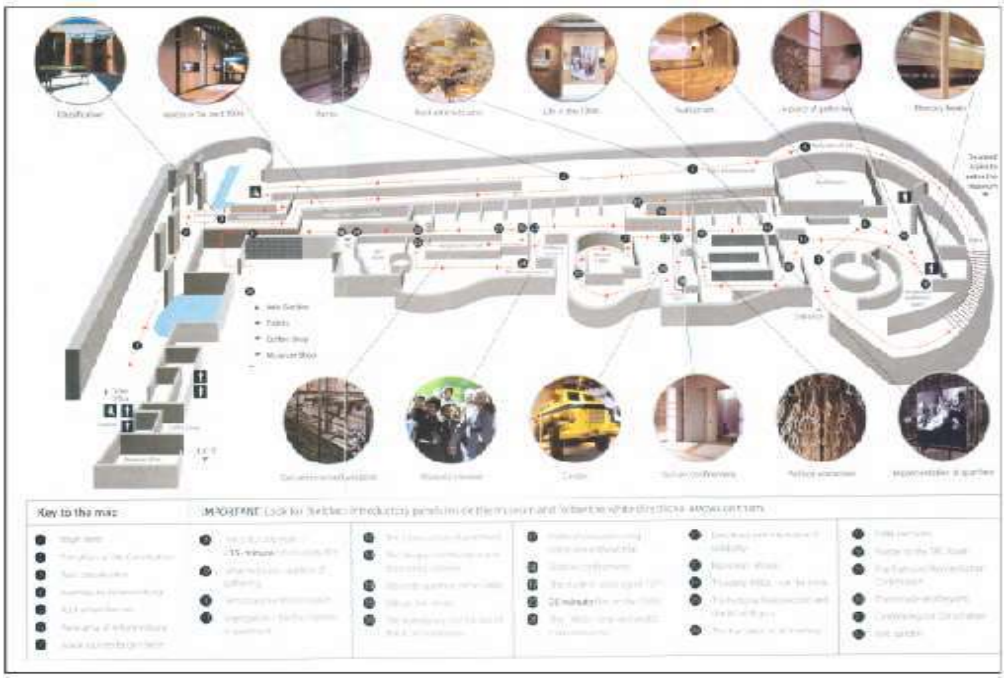

Figure 19: Visitors Brochure showing exhibits (Archives of Apartheid Museum, South Africa)

Figure 20 **Figure 21** **Figure 22**

Figure 20: Exterior start of orientation grassy ancient mining landscape
Figure 21: Exterior use of hard materials
Figure 22: Exterior end of orientation to disorientation

Figure 23 **Figure 24** **Figure 25**

Figure 23: Main Entrance to Apartheid Museum-Starting of disorientation movement (apartheidmuseum.org)
Figure 24: Guns Room
Figure 25: Nooses Room

Figure 26 **Figure 27** **Figure 28**

Figure 26: Convergence space-Starting of reorientation movement
Figure 27: Celebration of liberty-Democracy reorientation
Figure 28: Conjugal movement out of internal exhibits to auxiliary facilities

Table 4: Analysis of Apartheid Museum South Africa 2001 (authors)

CRITERIA	ARCHITECTURAL EXPRESSION	INTERIOR AND SPATIALITY	MATERIALS APPLICATION	ARCHITECT'S STATEMENTS	RELATIONSHIP WITH CONTEXT
IDENTIFIED POINTS UNDER THE VARIABLES	● The architectonic represents a weaponize symbol of a Pistol (gun) with a downward barrel or blocked nuzzle (breakaway from the common language of museums. ● Use of random ticketing labels (White, Non-white and Europeans) at Entrance Way correspond to inform divide on visitors. ● It is a modernist form that symbolize brutalism and desolation via social-spatial and racial segregation. ● It is inspirational like the Holocaust Memorial in Berlin. ● The created landscape berm is opaque from the street. ● Crossing paths and creamy out of exhibition to auxiliary spaces indicate lightness and togetherness.	● The building has been conceptualize as part of the building's exhibit as a restricted circuit journey through dark transition spaces. ● Use of narrow ramps to the roof top, circular staircase to museum's interior exhibition, and encased visuals to culminate the link from past - suffering - liberation. ● Solitary confinement chamber. ● Bullet-riddled Buffel armoured vehicle used to quell protests. ● Dark room with nooses hanging from the ceiling and gun room. ● Brighter wider hallway and gets lighter to the circular room and departure hall with big pit of rocks on one side of the circular room.	●The massive use of hard materials/dark colors (concrete, metal and rock cages) on all the external faces of the building bearing reference to the dry plateau landscape of South Africa. It is also repressing to define racial segregation. ● Natural plaster giving it a pale resemblance to the historic mining site and how certain 'people of color' did not matter.	● The design team director, Chis Kroese in an interview opined, quote "That kind of thing may have become a bit cliched, but I think it's very powerful" (Jones, 2017) .One possible interpretation of his statement is that, the museum is a commonplace in the context of South Africa but very powerful in the international modern architectural language. ● According to Mashabane Rose, the appearance is a representation of 'the local color and texture of the mine dumps and the iconic headgear structures' remains (Rose, 2008).	● The museum is symbolic to the historic meaning of the context of Witwatersrand Gold Rush. ● The seven pillars at the entrance courtyard representing the seven values of South Africa constitution, symbolizing a reference of the city of Johannesburg.

The analysis of the Apartheid Museum, South Africa, as shown in "Table 4" and "Figure17-28" shows that the architectural language express and communicate tragedy to the users. The dominance of the selection and application to evoke experiential conditions intensely play on the use of hard materials, dark surfaces and colours/rough textures, dimming light sensors, and compact transitional pedestrian movements to convey the message of tragedy. The exhibits started with a connection to the locational context to the historic mining landscape and pale plateau grassland of Witwatersrand Gauteng. Leading to the open entrance courtyard displaying the symbolic representation of South African constitutional values with the seven columns mounted, this flow we referred to as orientation stage of the experience. The shocking entrance gates categorize ushers in the next stage of experience, the disorientation stage with a stringent characterization that configured apartheid-mindedness. The third stage evolves into the lighter and freer specification, introducing democracy and the new South Africa, calling this the reorientation stage.

(III) Yad Vashem (Holocaust History Museum), Israel 2005

The Yad Vashem Museum is structured under the motto: "Remembering the past. Shaping the future". The new Holocaust History Museum shaped like a triangular concrete prism that cuts through the landscape, massive and more technologically advanced museum. The New will replace the Old funded by the Zionist community. The visitors follow a present route that takes them through underground galleries that branch off from the main hall. The museum emits a feeling of emotions of dark memories to the users. To fulfil the stated goal, the exhibits include visuals materials and text. The mode of remembrance presented indicates a literal experiential effect on the visitors using the exhibits but the architectural embodiment is rather liberating and point users to the city of Jerusalem as the eternal ultimate place. Dominance is shown on the network of skylit galleries illuminated from both sides of the prism to create the ancient Mevoah – Succah (temporary huts used for Jewish Festival of Sukkot). The summary of the preliminary information is represented on (Table 5) and the visuals are shown in (Figure 29,30 ….35), and the analysis is organized in (Table 6).

Table 5: Yad Vashem (Holocaust History Museum), Israel (Authors)

ARCHITECT	**MOSHE SAFDIE ARCHITECTS**
AIM	To honor the victims of holocaust and serve as international center of Holocaust research and remembrance.
LOCATION	Situated on a hillside overlooking Jerusalem's Ein Kerem Valley.
SPATIALITY	The Holocaust History Museum includes a new reception building (Mevoah), a Hall of Names, a synagogue, galleries for Holocaust art, an exhibitions pavilion, and a learning and visual center.
STYLE	Modern
FUNDER	The Holocaust Martyrs' and Heroes' Remembrance Authority.
BUILT YEAR	2005

Figure 29 **Figure 30**

Figure 29: Yad Vashem Museum Center on Google Map
Figure 30: Bird view of Yad Vashem Museum Center

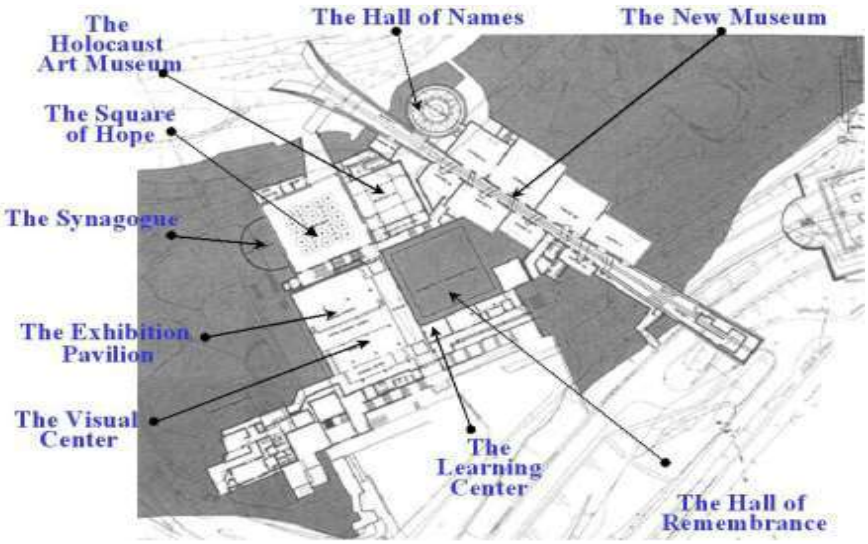

Figure 31: Spatial Layout of Yad Vashem Museum Center

Figure 32 **Figure 33**

Figure 32: Exteriors of Yad Vashem Museum Center
Figure 33: Entrance of Yad Vashem Museum Center

Figure 34

Figure 35

Figure 34: Interiors of Yad Vashem Museum Center
Figure 35: Interiors of Yad Vashem Museum Center

All visual data for the Yad Vashem Museum shown above are retrieved from the archives of (Moshe Safdie in Archdaily.com), otherwise stated.

Table 6: Analysis of Yad Vashem Museum (authors)

CRITERIA	ARCHITECTURAL EXPRESSION	INTERIOR AND SPATIALITY	MATERIALS APPLICATION	ARCHITECT'S STATEMENTS	RELATIONSHIP WITH CONTEXT
IDENTIFIED POINTS UNDER THE VARIABLES	● It is rejuvenating and brighter with the top glass prism on the top. ● It is a modernist form that symbolize brutalism and desolation of the Jews. ● It is a contemporary image that is recognizable globally. ● The use of the Mevoah pays tribute to the Succah that was temporary local structures used for the celebration of Jewish Festival of Sukkot.	● It is rejuvenating and brighter with the top glass prism on the top. ● It is a modernist form that symbolize brutalism and desolation of the Jews. ● It is a contemporary image that is recognizable globally. ● The use of the Mevoah pays tribute to the Succah that was temporary local structures used for the celebration of Jewish Festival of Sukkot.	● Natural plaster in creamy color to capture visitor's interest in curious manner. ● Cracks in the concrete denoting oppression. Natural surface finishes bring to a normal life awful feeling dehumanized mixed with metal, bones ashes. ●Museum is crafted with concrete and glass, is soaked with natural light.	● The architect in charge of the museum , Moshe Safdie in an interview opined, quote "There have been more meetings per square meter on this project than any other project I ever undertook" one possible interpretation of this statement relates the very long prism from the beginning of the museum to the end view of Jerusalem. ●Safdie tells about the museum as "Bursting out towards the north, a volcanic eruption of light and life"	● The museum brings in the atmosphere and ambience that places in context and perpetuates the memory and lessons of the holocaust. ● The pillars at the entrance of the children's memorial accompanied with small white pebbles scattered in the stature in diverse places which seem to be delicate petals of flowers fallen from a tree representing the value of children in Jerusalem.

In Yad Vashem, we see the architectural language configured a contemporary model, as shown in "Table 6" and "Figure 29-35". It vouched for the liberation of solemnity about the genocide of Jews by Nazi anti-Semitism, apart from the glazed transparent triangular form that delineates the landscape in a soft material feel. On the other dimension, the application of hard materials is underground. The ecological composition of the Zionists' pastoral landscape of Mount Herzl flanked awaken to look ahead the next location to the city ahead-Jerusalem.

CONCLUSION AND DISCUSSION

At the end of this study that focused on analysing the architecture of museums of remembrance to examine how tragedy is communicated through to the users. The three museums exemplified the remembrance of tragedy through the communication of specific architectural vocabularies to meet both the social structure and the symbolical functions of architecture in society.

When architects design buildings, the process generally follow a concept that is only familiar with the architect and progresses to the realization of it on the physical environment where it can interact with a different class of people, part of the intentions is to command public attention with the building (Spacey, 2013). However, Spacey went further to explain the efforts designers invest in getting people and the general public informed and understood the different systems and ideologies that the architects or designers wanted to portray during its design.

Different thoughts and emotions can be shown by how the architectural team designs the museum. It is vital to recall that museums are places that hold artefacts and collections of objects or memories of past events (Roth & Clark, 2014). The objects may hold different values that relate differently to different societies and it can also portray certain design values that point to the architect's interest/intentions, which Ukabi (2015) referred to as the architect's jewel.

The presence of weirdly shaped structure designs to portray different emotions. Shapes are a very ingenious way to portray messages, and different architects can use different shaped structures to portray different messages. A roughly looking and shaped structure can portray emotions of tragedy while perfectly shaped structures can provide a sense of belonging.

- The different color, lighting, and texture schemes of the spaces, to illustrate different messages to the visitors. Different museums have different messages and schemes they want to give to the general public, with well-lit and colored spaces may depict messages of joy, while darkly lit spaces and roughly colored walls giving out the sense of grief and remorse.
- The presence of sized openings, windows, and hallways either widely spaced or narrowly spaced to depict different themes to the visitors. The size of openings is also one characteristic of museums, and they show different emotions to the public to captivate different interests. However, the architect's main intention was to give off different notions.
- The location of the museum in context can also characterize different messages. Locating the museums close to what they commemorate also gives this sense of feeling, which connects the visitors to the reason at hand. Also, the positioning of the museums at different locations to capture different environmental features, like rivers, can be very intriguing and splendid to the public. This in a way show respects for the existing context and adds to the image of the city.
- The use of different materials for the structure can also render different ideas to visitors. The different messages that the designers and architects want to express achievable through different materials to evoke different emotions. For instance, using metal to show more of a rough and conventional feel while using glass and concrete to give a more modern and contemporary feel.

- The positioning of different sections and the spatial configuration of the museum can also represent different messages.

The three museums analogized the remembrance of tragedy through the communication of specific architectural vocabularies to meet both the social structure and the symbolical functions of architecture in society. Moreover, in the Hiroshima Peace Museum and Apartheid Museum, substantive connotative signs were engaged on the building expression to convey tragic past happenings to the public. On the contrary, in Yad Vashem Museum, the horrific experiential is filtered to the kind we experience inside spiritual worship centers- penitent via devoting more connotative signs to the spaces of exhibits. All the museums examined are international icons conceptually situated on the various contexts considered but significantly paying homage to modernist philosophy. It has been also observed that the functions that were footed by museums of architecture that are critical discourse and dissemination over the years penetrated museum institutions, valorising the platform for architects to celebrate their originality.
As a matter of urgency, pragmatic approaches in the design of museums, not taboo, but architects' intentions and interests should accept discipline for value on what they do rather than gains and 'Legend Shows'.

REFERENCES

Amritha, B. & Geijerstam, J. (eds.)(2011). Introduction to Bhopal 2011: Landscapes of Memory, In Bhopal 2011: *Landscapes of Memory*. New Delhi: Space Matters with Norwegian University of Science and Technology, XII-XVI.

Amritha, B., Joshi, M., Wahi, S., Bhattacharya, U. & Sinha, S. (2005). *Memorial Complex for the Victims of the Bhopal Gas Tragedy In ...to Construct, Photo Essays.* New Delhi: Space Matters.

Anonymous. *Apartheid Museum*. Retrieved from https://www.apartheidmuseum.org Accessed 23/04/2020.

Anonymous. *Definition of Tragedy*. Retrieved from https://www.lexico.com/en/definition/tragedy. Accessed 12/05/2020.

Davis, S. & Bowring, J. (2011). Connecting with Tragedy Through Landscapes of Memory: Memorial Design, Tourism, and the Post-Genocide Memoryscapes of Cambodia, Rwanda, and Germany. *Memory Connection Journal-The Memory Waka*, 1(1), 377-91.

Hiroshima Peace Memorial Museum. *Media slide show of Exhibits.* Retrieved from hymmuseum.jp. Accessed 23/04/2020.

Hyunjung, C. (2012). Hiroshima Peace Memorial Park and the Making of Japanese Postwar Architecture. *Journal of Architectural Education,* 66(1), 72-83.

James, J. (2010). *Design for preservation and commemoration of historic events: A case for the south African Anglo Boer Wars 1881 & 1899 - 1902*. MSc Thesis, School of Architecture,University of KwaZulu-Natal, Durban.

Kushner, M. (2015). *The future of architecture in 100 buildings.* Simon & Schuster/TED.

Liefooghe, M. (2019). Buildings for Bodies of Work: The Artist Museum After the Death and Return of the Author. *Architectural Histories,* 7(1), 12, doi: http://doi.org/10.5334/ah.296.

Mashabane Rose Associates (2008). *Aparthied Museum.* Architects & Urban Designers. Retrieved from mashabanerose.co.za/apartheid-museum. Accessed 07/04/2020.

Roth, L. & Clark, A. C. (2014). Understanding Museums. In L. Roth, & A. C. Clark, *It's Elements, History and Meaning*. London: Westview Press, 521-534.

Safdie Architects. (October 31, 2011). Flashback: Yad Vashem Holocaust Museum. *ArchDaily*. https://www.archdaily.com/179679. Accessed May 13, 2020.

Samuels, A. J. (Feb.9, 2017). The world's 10 most Important Memorial Museums. *Culture Trips*. Retrieved from https://theculturetrip.com/asia/articles/the-world-s-10-most-important-memorial-museums. Accessed 07/04/2020.

Soudien, C. (2008) Emerging Discourses Around Identity in New South African Museum Exhibitions. *Interventions,* 10 (2), 207-221, doi: 10.1080/13698010802145119.

Spacey, J. (2013). *Simplicable, User Experience Design in Museums.* Examples of User needs, pp.15-18.

Tugend, A, (March 23, 2012). Praise is Fleeting, but Brickbats We Recall. *The New York Times.*

Ukabi, E. (2015). Conserving the Architects' Jewel in the 21st Century. *Architecture Research -Scientific Academic Publishing*, 5 (1), 10-15.

Williams, R. (1962). A Dialogue on Tragedy. *New Left Review*, 13(22).

Konaklarda Uygulanan Restorasyon ve Yeniden İşlevlendirmelerin İç Mimari Değerlendirmesi: Mardin Butik Otel Örneği

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Özet
Zaman içerisinde değişen koşullar sebebiyle işlevini yitirmiş tarihi yapıların, çevresel, ekonomik gibi çeşitli faktörler nedeniyle restore edilip yeniden işlevlendirilmesi gerekmektedir. Bunların belli kurallar çerçevesinde yapılması, tarihi yapıların kültürel mirasın bir parçası olmasından dolayı zorunludur. Güneydoğu Anadolu bölgesinde yer alan Mardin, değişik kültürleri, inanç ve etnik kökenleri bir arada barındıran, tarihinden kaynak alarak gelişen ve bu gelişimi sürdüren, geleneksel dokusu ve yapılarındaki özgünlüğünü büyük ölçüde korumuş bir kenttir. Son yıllarda Mardin ilinde artan turizm faaliyetleri ile tarihi yapıları değerlendirme ve yeniden işlevlendirme yoluna gidilmiştir. Bu çalışmada kentin tarihsel gelişimi ile sürdürülebilirliği süresince konaklarda yapılan yenilemelerin ve yeniden işlevlendirmelerin, butik otel işlevi verilen Darius Konağı isimli bir örnek üzerinden, kent dokusuna uygunluğunun mimari ve iç mimari irdelemesi yapılmıştır.

Anahtar Kelimeler: Mardin, konaklar, yeniden işlevlendirme, geleneksel konutlar, butik otel

The Evaluation of Interior Architecture of Restorations and Re-Uses Applied in Mansions: The Case Study of Mardin Boutique Hotel

Abstract
Historical buildings, which lost their functions due to changing conditions over time, should be restored and re-used due to various factors such as environmental and economic. It is compulsory to make these within the framework of certain rules since historical buildings are a part of cultural heritage. Located in the South-eastern Anatolia region, Mardin is a city that hosts different cultures, beliefs, and ethnic origins together, develops and maintains this development based on its history, and preserves its originality in its traditional texture and structures to a great extent. With the increasing tourism activities in the province of Mardin in recent years, it has been aimed to evaluate and re-used historical buildings. In this study, the architectural and interior architecture analysis of the compatibility of the renovations and re-functions made in the mansions during the historical development and sustainability of the city with the urban texture through an example called Darius Mansion, which has been given the function of a boutique hotel.

Keywords: Mardin, mansions, re-uses, traditional houses, boutique hotel

GİRİŞ

Tarihin farklı dönemlerinde kent içinde yaşamış ve hâlâ yaşamlarını sürdüren bireyler, kendi kültürlerini ve yapılarını bütünüyle yaşam dokusuna işlemiş, yansıtmıştır. Fiziksel ve fonksiyonel olarak eski olarak nitelendirilen yörenin yaşam tarzını bütünüyle tarihi mekânlara da yansımıştır. Bireylerin kültür olarak tarihin bir parçası olduğu mekânlar içerisinde asıl olan yaratılanı kullanma ve ihtiyaca göre geliştirme güdüsü asla yok olmayacak bir yaşam bütünüdür.

Zaman içerisinde tarihi yapılar için ihtiyaç ve gereksinimleri karşılayamama gibi durumlar ortaya çıkmaktadır. Bu durum çoğunlukla yapıların terk edilmesine neden olmaktadır. Yapıların terk edilmişliği çevresel, ekonomik ve kültürel sürdürülebilirlik sorunlarına yol açmaktadır. Bu nedenle korunması istenen tarihi yapıların, yeniden işlevlendirme ve yeni kullanım olanakları ile günümüz isteklerini karşılar duruma getirilebilmektedir.

Koruma kavramı yapım-yöntem, dönem, koşul, mimari stil, yapım teknolojilerine uygun olmak üzere, fiziksel anlamdaki koruma metotları, iyileştirme, koruma, rehabilite etme, restorasyon ve yeniden yapılandırma olarak belirlenmiştir (Kuban, 2000).

Yeniden işlevlendirme, zamanla değişen yaşam biçimi ve ona bağlı isteklerle işlevini yitirmiş tarihi yapıların farklı bir işleve uyarlanması ya da işlevleri devam eden, ancak konfor koşulları eskiyerek standart altı kalan tarihi yapıların güncelleştirilmesidir (Ahunbay, 2011).

Venedik Tüzüğü'ne (1964) göre tarihi yapıların korunması, onları herhangi bir yararlı toplumsal amaç için kullanmakla kolaylaştırılabilir. Bu sebeple böyle bir kullanım yapılabilir, fakat bu sırada yapının planı veya bezemeleri değiştirilmemelidir. Ancak bu kurallar çerçevesinde yeni işlevin gerektirdiği değişiklik tasarlanabilir ve buna izin verilebilir.

Çevresel özellikleri nedeniyle korunması istenen tarihi yapıların yeni kullanımlarında, yeni işlevin dış görünümü bozmadan gerçekleştirilmesi istenilir. Bu binaların kurtarılması için tek ekonomik yol olan yeniden kullanım sırasında, iç düzenlemede daha esnek uygulamalara gidilmesi söz konusudur. Yangın, bakımsızlık nedeniyle döşeme ile tavanlarını yitirmiş ve ilk tasarıma ait yeterli veri bulunmayan yapılarda, yeni bir iç düzenleme yapılmasına izin verilebilir. Çok önemli mimari öğeler, plan ve iç mekân değerlerine sahip olan yapılarda ise yeni kullanıma elverişli, serbest iç düzenlemeler uygulanmaktan çok tarihi mekânların dokusunu koruyan düzenlemelere gidilmesi doğrudur (Ahunbay, 2011).

Mardin, yüzyıllardır kendi içinde barındırdığı geleneksel mimarisi ve yapıları ile birçok mimari tasarıma ışık tutmuştur. Eski yapılara ilgisi oldukça yüksek olan turistlerin belirli dönemlerde kenti ziyaret etmesi, kullanım dışı kalan birçok tarihi yapıların, ihtiyaçların ve gelenekselliğin korunması adı altında yeniden işlev kazandırma çalışmaları başlatılmıştır. Bu süreçte yapıların hatalı fonksiyon çözümleri ve gelenekselliğin yok olması sonuçlarının ortaya çıkması söz konusudur.

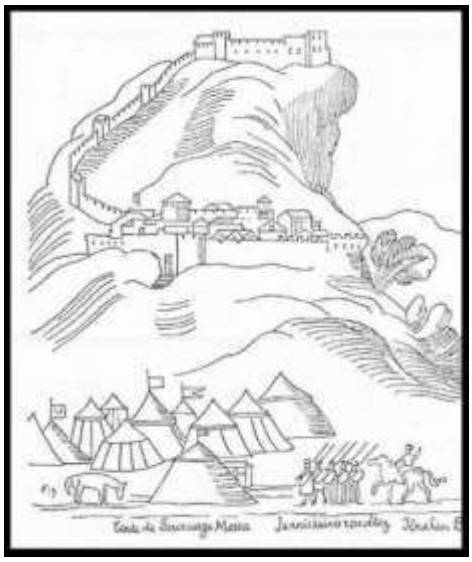
Bu çalışmada yapılarda yapılan yenilemeleri, yeniden işlevlendirme çalışmalarını, yerleşim yerlerine ve ihtiyaçlara göre iç mekân tasarımlarında hangi tasarım biçimleri ve yöntemler kullanıldığını belirlemek amaçlanmıştır. Öncelikle seçilen alanın kent dokusunu daha iyi analiz edebilmek için, onu oluşturan öğeler, geleneksel Mardin evleri ve bu dokudaki yeri ele alınmıştır. Daha sonra alan çalışmasını oluşturan yapının işlev öncesi ve sonrası durumu incelenerek, kullanıcı ve mekân analizleri oluşturulmuştur. Bu analizleri yapabilmek yapının restorasyon öncesini, sonrasını ve yeniden işlevlendirme sonrasını içeren çizelgeler hazırlanmıştır. Burada kullanılacak görseller için, yapı için akademik çalışma ve inceleme izinleri verilmediğinden, kullanıcıların paylaşımları ve site verileri referans alınmıştır.

Sonuçta yapının yeni işlevine uygunluğunun iç mimari değerlendirmesi yapılmıştır. Ayrıca bu işlev değişikliği ile yapıların kent dokusuna ve mimari düzene uygunluğu saptanmıştır. Bununla birlikte yenileme ile sunulacak hatalı tasarım ve ergonomik düzen bozukluklarını belirleyerek alternatif tasarım önerileri sunarak sürdürülebilir yeniden işlevlendirme çalışmalarına katkı sağlanması hedeflenmektedir.

MARDİN

Her kültür kendine özgü bir medeniyet anlayışı yaratır. Mardin ise toplum değerlerinin önemsendiği, dini ve etnik unsurların iç içe geçtiği medeniyetler topluluğunu andıran şehirdir. Her medeniyetin kendi üslubunu yarattığı gibi Mardin de sanatı, dinsel yapısı, insanı ve tarihiyle kendi üslubunu yaratmıştır.

Türkiye'nin güney doğusundaki Dicle bölgesindeki illerden biri olan Mardin, Kuzeyde Diyarbakır ve Batman, Güneyde Irak ve Suriye, Batıdan Şanlıurfa, Doğudan ise Siirt ile şehir ve ülke komşulukları bulunmaktadır. Yüz Ölçümü 12.760 km2 olan kentin, 2018 "TÜİK" (Türkiye İstatistik Kurumu) verilerine göre nüfus 809.720 olarak belirlenmiştir. Şehirlerin oluşumu ve gelişimi değer bakımından coğrafi prensiplere bağlıdır. Şöyle ki; "Anadolu'daki tarihi şehirler belli dönemlerin çevresel kaygılarına göre kurulmuş gelişmiş veya sona ermişlerdir (Özcoşar, 2007).



Şekil 1: XVII. yy Mardin ait bir gravür (La Boullaye Le Gouz) (Alioğlu, 2000)

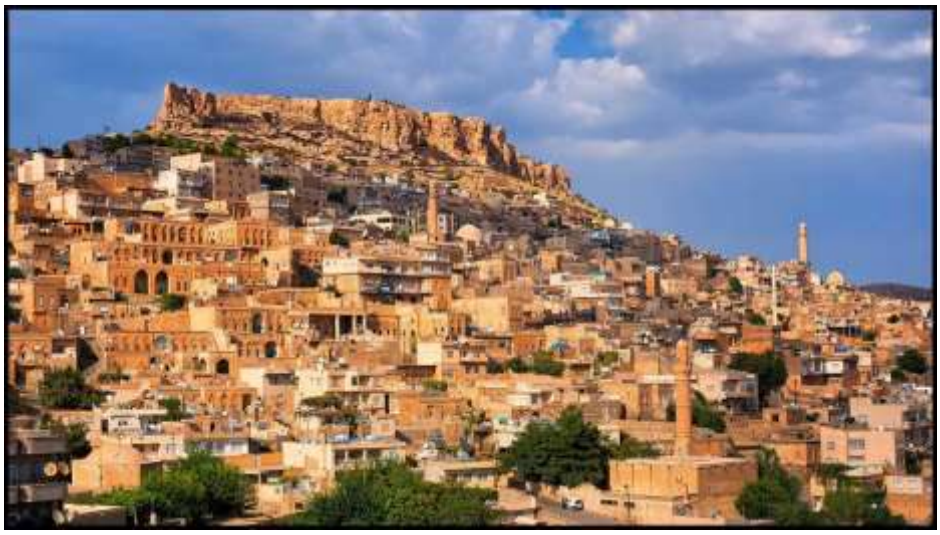
Mardin, tarihin kitaplarda yazdığı kadar gerçek ve diri, verimliliği ve bereketi ile Mezopotamya ovasının ortasından yükselen, boylu boyunca bir dağın yamacında hayat bulmuş tarihi bir kenttir (Şekil1, 2). Anadolu'yu Mezopotamya'ya bağlayan bu kent, tarihi boyunca birbirinden farklı uygarlıkları bu topraklarda barındırmış olup, birçok din, etnik köken ve mezhepleri bir arada tutup sevgi ve hoşgörü içerisinde farklılıkları koruyarak asırlar boyu yaşamasını bilmiştir. (Dolapönü, 1972).

Kent Dokusunu Oluşturan Öğeler, Geleneksel Mardin Evleri ve Kent Dokusundaki Yeri

Önemli bir kısmı dağlarla kaplı olan Mardin, topoğrafyasına özgün gelişim gösteren kentlerden biridir. Zirveden eteklere doğru, günümüzde Mezopotamya ovasının düzlükleri üzerinde gelişimini devam ettiren kent, biri kale ve çevresi, diğeri ise kalenin dış mahallesi olarak nitelendirilen eteklere kurulu iki bölümden oluşmuştur. Dini, sosyal, sivil ve anıtsal yapılar bu iki bölümüne yayılarak, tarihi ile kentin dokusunu oluşturmuştur.

Tarihi evlerin ve anıtsal yapıların bulunduğu, şehrin genellikle yüksekte kalan eğimli bölgelerinde, günümüzde halk arasında "Eski Mardin" olarak adlandırılmış olan bölgede tarihi miras yaşatılmaya ve geleneksel doku korunmaya devam etmektedir.

Bu dokunun oluşumunda organik bir gelişme görülmektedir. Şehir doğu ve batı yönlerine doğru enine gelişme-ilerleme gösterir. Bu gelişim ve yerleşme sırasında parselin boyut olarak yetmediği durumlarda arazinin belirli kısımlarında eğimden kaynaklanan kot farkları (Yükseklik-alçaklık değerleri) yapıların sabit bir planlama kurgusu yerine eğimin izin verdiği ölçüde kat eklenerek inşa edilmesine neden olmuştur.

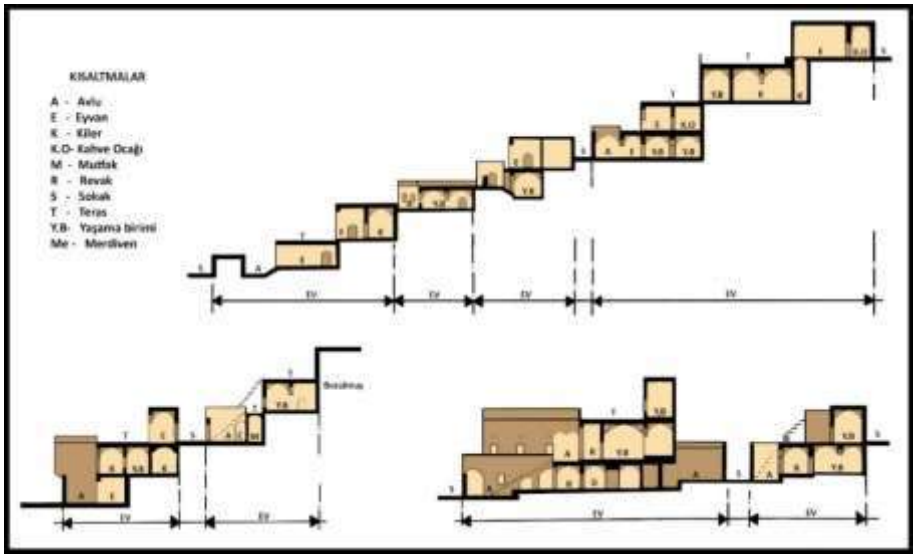


Şekil 2: Mardin Kent Dokusu ve Geleneksel Evlerin Yerleşim Düzeni (Ayanoğlu, 2018)

Eğimli arazinin yapı için yeterli görüldüğü kısımlarda, parsele oturacak olan yapıların düzeninde bir sıkışıklık yaşanmamış ve terasların eklenmesi ile inşaatları gerçekleştirilmiştir. Alioğlu'nun açıklamasına göre; "Evlerin toprağın düzenlenerek, bazen de mevcut zemini olduğu gibi kabul ederek ve kendiliğinden var olan mağara gibi mekânların da yapıya katılmasıyla doğal yapının oluşturduğu düzen" değerlendirilmiştir (Alioğlu, 2000).

Şehrin yapısı yüzey biçimleri ile birlikte dokusuna uygun bir bütünlük sağlanmıştır. Eteklerden doruk noktasına uzanan basamaklar, merdiven gibi algılanan tarihi doku, evlerin birbirlerine bakan cephelerinin kapanmamış olması gibi çok katlı yapıların belirli kurallar dâhilinde yapılmış olması, şehir dokusunun düzenli bir çevre ve yapılanmadan oluşumuna neden olmuştur. (Şekil 3).

Planlı yerleşme düzeni bulunmayan, doğal bir yapılanma görünümü yakalamış olan bu şehir dokusunun büyük bir kısmını geleneksel evler oluşturmaktadır. Bölünen parseller arasında yapıların birbirine yakın ve bitişik oluşu genellikle akrabalık ilişkilerinden kaynaklanmış, sosyal birliktelik kent dokusuna olumlu yönde birlik katkısı sağlamıştır (Şekil 4).

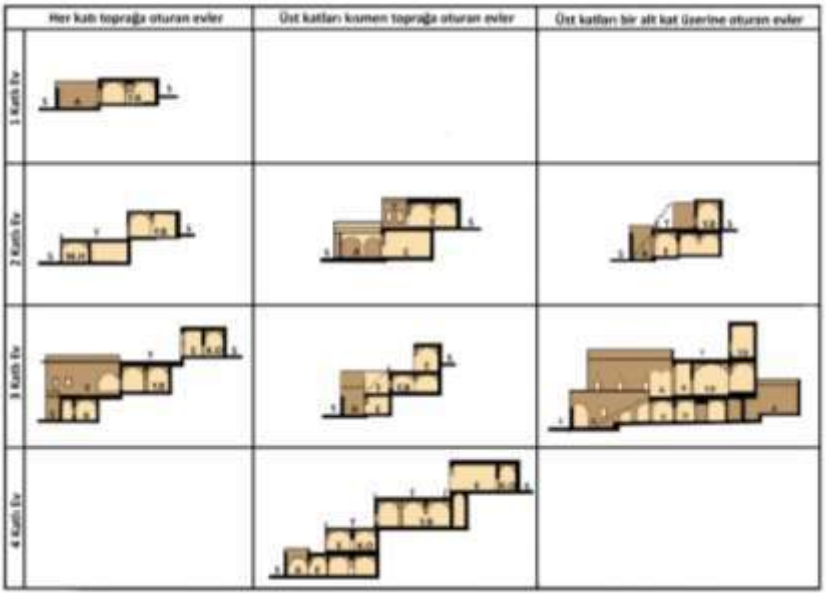


Şekil 3: Mardin'in Şehir dokusundan Kesit (Alioğlu,1988) Düzenleme (Ayanoğlu,2018)

Geleneksel evlerin parsel düzeninden ayrı kat oluşumuna bakıldığında, yapı eğimli bir arazi üzerine kurulurken alt katların zemin düzeni ve inşası bitirildikten sonra üst katların eğime göre giriş katının

hemen üzerine değil de eğimden kaynaklı üst kısımlara denk gelen toprak üzerine oturtulduğu görülmektedir.

Ortaya çıkan tasarım bu şekilde alt katın çatı bölümü (dam) teras olarak kullanılmakta, bazı koşullarda ise yine ek kat olarak değerlendirilmekte, arazi ve eğimin izin verdiği ölçüde bu çok katlılık tasarımı devam ettirilmektedir.



Şekil 4:Geleneksel Evlerin Araziye Yerleşimi (Alioğlu,1988) Düzenleme (Ayanoğlu, 2018)

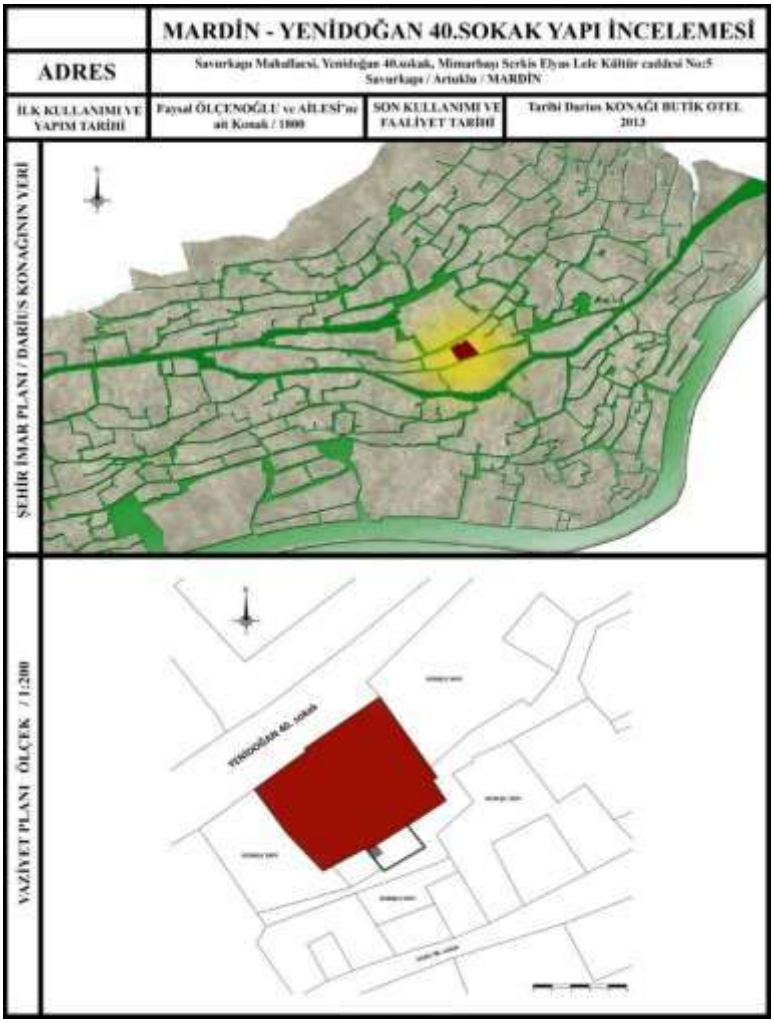
RESTORASYON SONRASI BUTİK OTEL İŞLEVİ VERİLEN TARİHİ KONAK DEĞERLENDİRMESİ

Kentsel sürdürülebilirlik ile ilgili gerçekleştirilebilecek yöntemler arasında, araştırmacıları tarafından, yeniden işlevlendirmelerin önemi belirtilmiştir. Gramann'a göre, "Turizm sektörüne dâhil olan kurum ve kuruluşlara çevre bilinci kazandırmak, yeni yapıların inşasının desteklenmesi yerine, var olan yapıların yeniden işlevlendirilmesi (tatil amaçlı konaklama/yaşama), güneş, rüzgâr ve su kaynaklarının altyapı sistemleri planlamasında rol alması, kentsel mekânın yoğunluğuna göre, akıllı bir mimari tasarım geliştirilmesi, yerel yönetim mekanizmaları tarafından, tarihi birikimin gözetilerek, yeni yapıların uygunluğunun sağlanması" önemlidir. (Gramann, 1990).

Çalışmanın amacına bağlı olarak işlevini sürdüremeyen ve terk edilen yapıların, yeniden işlevlendirilmelerini değerlendirmek üzere, alan çalışmasında Mardin ve çevresinde bulunan tarihi konaklar ele alınmıştır. Bölge içerisinde artan turizm-nüfus faaliyetlerinden kaynaklı ihtiyaçları karşılamak üzere, konaklardan konaklama birimi olan otel/butik otel işlevine dönüştürülen Darius Konağı Butik Otel yapısının gözlem ve araştırması yapılmıştır (Tablo 1). Yeniden işlev kazanmış bu yapının seçilmesinde etken en erken tarihli yapılardan biri olmasıdır. Konakta tarihi dokunun korunması ve kullanıcı gereksinimlerine cevap verip vermediği incelenmiş, yapının işlev öncesi ve sonrası durumunu gösteren çizelgeler hazırlanarak sonucunda değerlendirme yapılmıştır.

Bu araştırma aşamasında Darius Konağı yenileme öncesi planlar, kesitler ve görseller kültür varlıklarını koruma kuruluna, yapının yenilemesi kararında çıkan raporlardan elde edilmiştir. Konut olarak yenileme işlevi tamamlanan yapının, otel işlevinin incelenmesi üzerine akademik çalışma ve inceleme izinleri verilmediğinden kullanıcıların paylaşımları ve site verileri referans alınarak mekân öğeleri yerleştirilmiştir.

Darius Konağı



Çizelge 1: Darius Konağı Vaziyet Planı, Yapı Bilgileri (Google harita, düzenleme: Ayanoğlu)

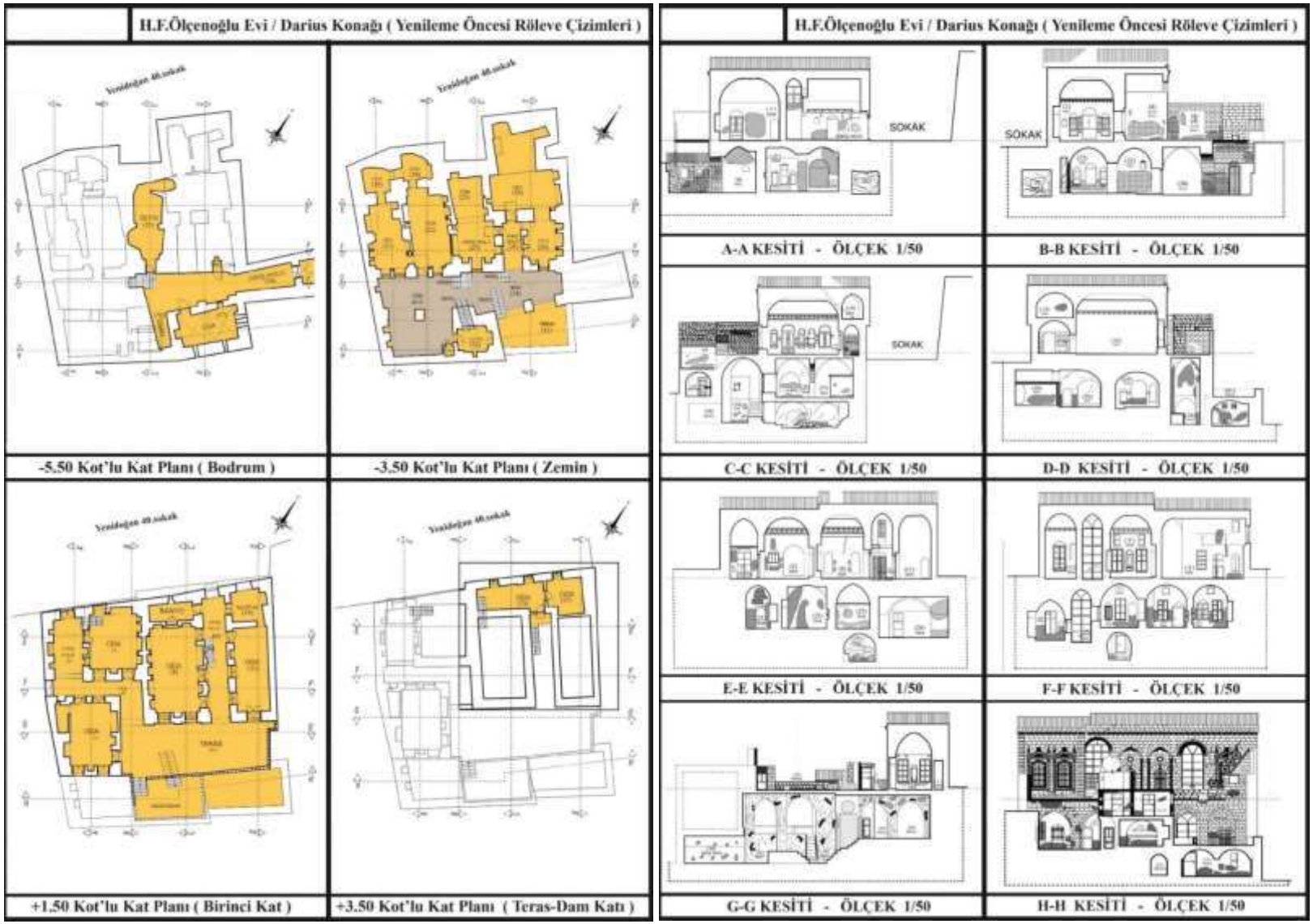
Yapının Tarihi

Şuan Hacı Faysal Ölçenoğlu adına kayıtlı olan konak, yağ tüccarı olan dedesi Hacı Hamza tarafından 1800'lü yılların ortalarına doğru o zamanlar sadece bodrum katın bulunduğu evi gayri Müslim bir aileden satın alınmıştır. 1800'lü yılların son zamanlarına doğru yapının mimar ve yörenin işinin ehli taş ustaları çağırılarak evin 2. katı, mevcut olan bodrum kat üzerine inşa edilmiştir. Kat eklemesi, süslemeler ve peyzajı ile bir konağa dönüşen yapı aile fertlerinin yapıya yerleşmesi ile düzenini sürdürmüştür. Ailedeki nüfusun artması ve o zamanın yaşam standartlarına daha uygun hale getirilmesi amacıyla sonradan eklenen üst kat, iki ailenin kalabileceği bir şekilde taş duvarla ikiye ayrılmıştır. Alt katlarda kısa zaman içerisinde yine iki farklı kardeş ailenin kalabileceği bir şekilde ikiye bölünerek günümüze ulaşmıştır. Mimar Şakir Güler'den edinilen bilgiye göre, 1950 yıllarında ise yapının üst katın avlusunda bulunan bir dış odanın tavanı çökmüş, aynı zaman diliminde onarılmıştır (Şekil 5) (Çizelge 1-3).

Şekil 5: F.Ölçenoğlu ait Konağın İlk Durumu (Güler, 2012)

Günümüze yakın yıllar içerisinde tescillenen tarihi yapı, kent içerisinde gelişen turizm faaliyetlerine ve kullanıcı gereksinimlerine bir katkı ve destek olarak, butik otel faaliyetinde kullanılması amaçlanarak 2012 yılında Mimar Mehmet Şakir Güler tarafından yenileme yapılmış, güncel işlevine-butik otele dönüştürülmesi kararı alınmıştır (Güler, 2012).

Yapının "Restorasyon Öncesi" İncelemesi (İç Tanımlama)



Çizelge 2: Restorasyon Öncesi Röleve Çizimleri Çizelge **3:** Restorasyon Öncesi Röleve Çizimleri, Kesitler (Güler, 2012, düzenleme: Ayanoğlu)

(-5.50) Kotlu Kat Planı (Bodrum Kat):

Yapının bu katı ilk zamanlarında depo ve giriş katı olarak kullanıldığı tahmin edilmektedir. Zemin katta avlunun kuzey yönünde kalan merdivenler ile iç kısmına ulaşılmaktadır. Zamanında 1 adet Oda(37), 2 adet Depo(35), (36) ve 1 adet WC (39) işlevi görmüş mekân bölümlerinden oluşmaktadır. Yapının doğu yönünde giriş kapısı bulunmaktadır. Mekân duvarları genel olarak düzgün kesilmemiş yığma bir taş dizimi ile yükseltmiş olup örtü sisteminde tonozlar kullanılmıştır.

(-3.50) Kotlu Kat Planı (Zemin Kat):

Yapının bu bölümü ailenin büyük bir bölümünün yaşadığı, yapının tarihi boyunca en fazla değişiklik yapıldığı katıdır. 7 Oda, 2 Giriş Holü, 1 WC, 1 Mutfak, 2 Avlu ve 1 Teras mevcut mekân diziminden oluşmaktadır.

Yapının Güneydoğu yönünde iki adet dikdörtgen planlı avlu bulunmaktadır (30, 34). Güneyde bulunan üst kottaki (30) nolu avluda, kemerli bir geçişe sahip, bir tuvalet ve mutfak kısmı bulunmaktadır. Mutfağın üst örtüsü çapraz tonoz, duvarlar taş, zemini inkara harcıdır. Alt kısımda bulunan (34) nolu avludan üst kısımda bulunan (41) nolu terasa çıkılmaktadır. Avlu ve teras duvarları moloz taş, döşemeler ise taştır. Avlu girişini sağlayan güneydoğu duvarı üzerinde iki kapıdan biri basık kemerli olup, diğeri sivri kemerlidir.

Güney avludan ulaşılan yapının güneybatı köşesinde yer alan (22) nolu oda dikdörtgen planlıdır ve arkasında bulunan geçiş (20) numaralı odaya açılmaktadır. Aynı geçiş yollarına sahip (21) nolu oda da (19) nolu odaya açılmaktadır. Bu dört oda arasında geçişi sağlayan boşluklar bulunmamaktadır. (21) nolu odada metal parmaklıklı iki pencere açıklığı ve altı niş bulunmaktadır. Zemin inkara harç, duvarlar taş, üst örtüsü çapraz tonozludur (22) nolu odada metal parmaklıklı bir adet pencere açıklığı ve on niş bulunmaktadır. Zemin inkara harç, duvarlar taş, üst örtüsü çapraz tonozludur. (19) ve (20) nolu odalar kayaların oyulması ile oluşturulmuştur (Çizelge 4).

Doğu avlu aksında basamaklarla çıkılarak ulaşılan (28) nolu giriş holü bulunmaktadır. Bu giriş holünden (26), (29) nolu oda ve (27) geçiş holüne geçiş sağlamaktadır. (27) nolu geçiş holü (25) nolu odaya geçit vermektedir (Çizelge 4).

(25) nolu odada üç adet niş bulunmaktadır. Duvarlar taş, zemin inkara ve üst örtü beşik tonozdur (Çizelge 4). (26) nolu odada üç niş bulunmaktadır. Duvarlar taş, zemin inkara ve üst örtü beşik tonozdur. (27) nolu giriş holünde üç adet pencere açıklığı ve dört niş bulunmaktadır. Duvarlar taş, zemin inkara üst örtü diğer odalardan farklı olarak çapraz tonozludur. (29) nolu odada metal parmaklıklı iki pencere açıklığı ve yedi niş bulunmaktadır. Duvarlar taş, zemin inkara ve üst örtü beşik tonozdur. (30) nolu avluyu (34) nolu avludan ayıran merdivenin olduğu kısmında bir başka merdivenle üst kattaki geçiş terasına ulaşılır (Çizelge 5).

Çizelge 4: 3.50 Kotlu Zemin Katı Bölümlerinin Durumu (Güler, 2012, düzenleme: Ayanoğlu) **Çizelge 5:** -3.50 Kotlu Zemin Katı Bölümlerinin Durumu (Güler, 2012 düzenleme: Ayanoğlu)

(+1.50) Kotlu Kat Planı (Birinci Kat):

Yapıda ikametin gerçekleştiği bir üst kat olan birinci katta 4 oda, 1 mutfak, 1 banyo, teras ve odalara geçişi sağlandığı iki ayrı geçiş holü bulunmaktadır. Zeminleri taş kaplama olan teras ve korkuluklar yine taş sınırlandırmalar ile örülmüştür. Terasta 1 adet niş bulunmaktadır. Batıda sokak girişi olan yapının (3) nolu giriş holüne bakan iki adet odası bulunmaktadır. Bu giriş holünden geçilerek (4) nolu hole ulaşılır ve ardından geçiş, terasa kadar devam eder (Çizelge 6).

(2) nolu odada hole bakan üç pencere açıklığı, sokağa bakan bir demir parmaklıklı pencere açıklığı ve on niş bulundurmaktadır. Odanın zemini inkara harçlı olup, duvarlar taş ve üst örtüsü süslemelere sahip beşik tonozludur (Çizelge 6).

(1) nolu odaya giriş holünden ulaşılır. Geçiş boşluğu içinde olan odanın içerisinde ayrı bir bölüm bulunmaktadır. Odada hole bakan bir pencere açıklığı, terasa bakan üç demir parmaklıklı pencere açıklığı ve dört niş barındırır. Odanın zemini inkara harçlı olup, duvarlar taş ve üst örtüsü süslemelere sahip beşik tonozludur (Çizelge 6).

Giriş holünden sonra gelen (4) nolu holün zemini inkara harca sahip, duvarlar taş ve üst örtü beşik tonozdur. Terasa geçişi sağlayan kapının üzeri yarım daire kemerli geleneksel motifler ile süslenmiştir. Terastan doğrudan geçişi sağlanan, (9) nolu geçiş holü dikdörtgen plana sahip, geçiş holünde (8), (11) nolu odalara ve (7) nolu banyo (10) nolu geçişe imkân veren dört adet kapı bulunmaktadır. Terasa çıkılan kapının üzeri diğer hol gibi yarım daire kemerlidir ve geleneksel motifler ile süslenmiştir (Çizelge 6-7).

(8) nolu odaya (9) nolu giriş holünden geçilmektedir. İki tane giriş holüne bakan pencere açıklığı, iki tane terasa bakan demir parmaklıklı pencere açıklığı ve on yedi niş bulunmaktadır. Terasa bakan pencerelerin bulundukları açıklıktaki kemerler sivri kemer olup geleneksel motifler ile süslenmiştir. Odanın zemini inkara harçlı olup, duvarlar taş ve üst örtüsü süslemelere sahip beşik tonozludur. Bu odanın bitişiğinde bulunan (7) nolu banyoda sokağa bakan demir parmaklıklı pencere açıklığı ve bir adet niş bulunmaktadır. Odanın zemini inkara harçlı olup, duvarlar taş ve üst örtüsü beşik tonozludur.

(11) nolu odaya aynı giriş holünün bağlantısı ile ulaşılmaktadır. Bu odadan mutfağa geçiş yapılan bir boşluk bulunmaktadır. İki adet giriş holüne bakan pencere açıklığı, bir tane terasa bakan demir parmaklıklı pencere açıklığı ve bir niş bulunmaktadır. Terasa bakan pencerenin bulunduğu açıklıktaki kemer sivri kemer olup geleneksel motifler ile süslenmiştir. . Odanın zemini inkara harç, duvarlar taş ve üst örtüsü beşik tonozludur. (10) mutfak (11) nolu odadan bağlantısı ile bir adet sokağa baka demir parmaklıklı pencere açıklığı ve bir niş bulunmaktadır. Odanın zemini inkara harçlı olup, duvarlar taş ve üst örtüsü çapraz tonozludur (Çizelge 7).

Çizelge 6. +1.50 Kotlu Birinci Kat Bölümlerinin Yenileme Öncesi Durumu (Güler, 2012, düzenleme: Ayanoğlu) **Çizelge 7.** +1.50 Kotlu Birinci Kat Bölümlerinin Yenileme Öncesi Durumu (Güler, 2012, düzenleme: Ayanoğlu)

(+3.50) Kotlu Kat Planı (Teras-Dam Katı):

En üst katta 2 adet oda bulunduran, yörenin dilinde ihtiyaca göre boş alan değerlendirmesi olarak nitelendirilen ihtiyaç-katı (dam katı) bulunmaktadır. (9) nolu giriş holünden çıkılan merdiven ile bu kata ulaşılır. Merdivenin basamaklarının bittiği noktada tam karşıda (14) nolu odaya açılan odaya ulaşılır. İki adet sokağa bakan demir parmaklıklı pencere açıklığı bulunmaktadır. Bu mekânın zemini inkara harçlı olup, duvarları taş, üst örtü ise çapraz tonozdur. Odanın batı sınırın da "dama" çıkan bir merdiven bulunmaktadır (Çizelge 8-9).

(14) nolu odadan, (15) nolu odaya geçilir. Bir tane sokağa bakan demir parmaklıklı pencere açıklığı bulunmaktadır. Bu mekânın zemini inkara harçlı olup, duvarı taş duvardır. Üst örtü ise çapraz tonozdur.

Yapının "Yenileme Öncesi" İncelemesi (Dış Tanımlama)

Kuzeybatı Cephesi

Cephe üzerinde üst katta demir parmaklıklı dört ahşap pencere, alt katta yapıya girişi sağlayan ahşap iki kapı ve demir parmaklıklı iki pencere bulunmaktadır. Teras duvarı görülen cephe de, kuzeybatı cephesi komşu yapı ile birleşiktir. Restorasyon zamanı alınan rapor bilgilerine göre derzlerin çimento esaslı harç ile doldurulmuş, kaplı kalker taşlarında yenileme öncesi kararmalar tespit edilmiştir (Güler, 2012).

Kuzeydoğu Cephesi

Cephede genel itibariyle moloz taş kullanılmıştır. Cephe üzerinde demir parmaklıklı ahşap bir pencere, en alt katta sokaktan girişi sağlayan ahşap bir kapı bulunmaktadır. Kapının kemer bölümü yarım daire, ikinci sıra sivri kemerle çevrelenmiştir. Restorasyon zamanı alınan rapor bilgilerine göre derzlerin çimento esaslı harç ile doldurulmuş, kaplı kalker taşlarında yenileme öncesi kararmalar tespit edilmiştir.

Güneybatı Cephesi

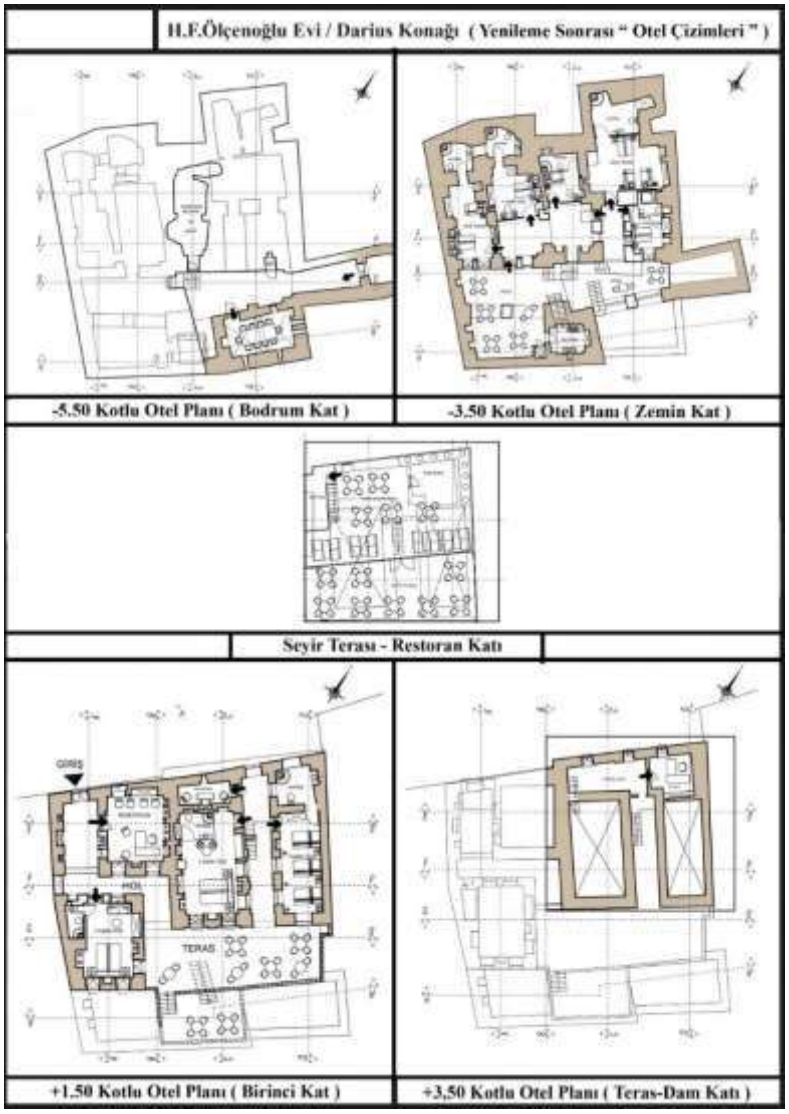
Yapının güneybatı cephesi düz bir hacme sahip olup, etrafında komşu yapılar bulundurmaktadır. Cephe üzerinde demir parmaklıklı ahşap bir pencere, en alt katta sonrada kapatılmış avludan geçişi sağlayan ahşap bir kapı ve demir parmaklıklı iki pencere boşluğu bulunmaktadır. Restorasyon zamanı alınan rapor bilgilerine göre derzlerin çimento esaslı harç ile doldurulmuş, kaplı kalker taşlarında yenileme öncesi kararmalar tespit edilmiştir.

Güneydoğu Cephesi

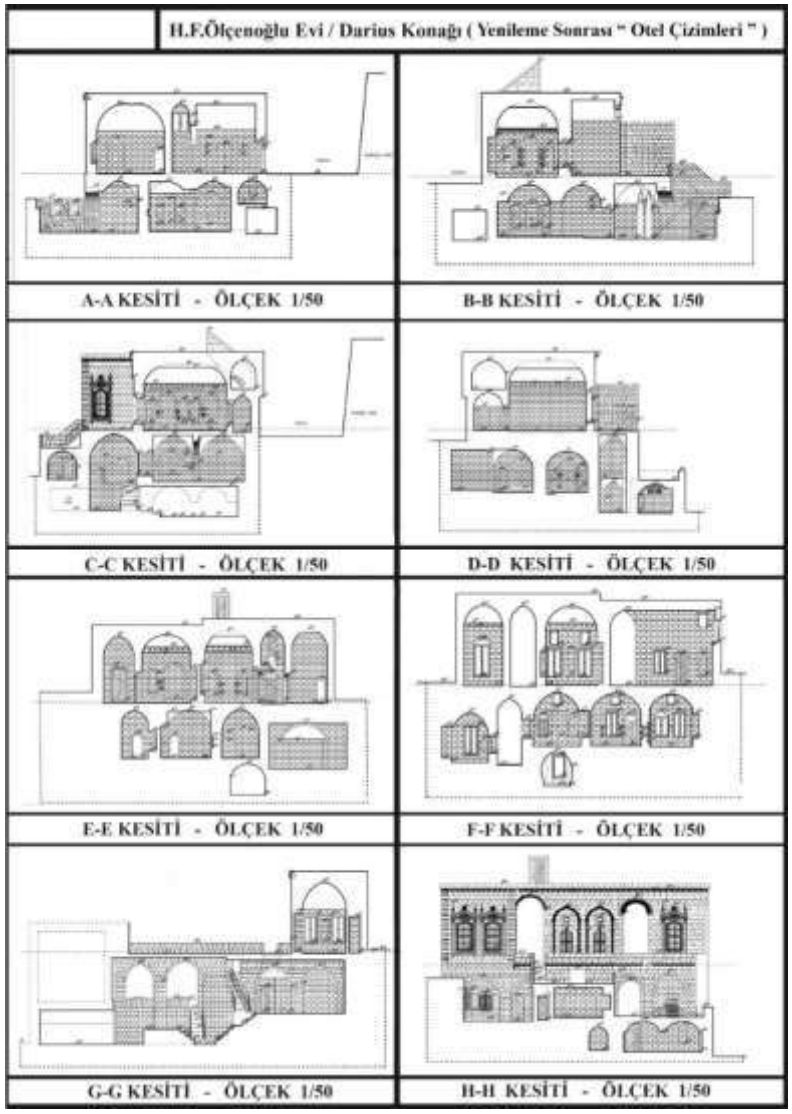
Güneydoğu cephesinde komşu yapıdan kaynaklı, yüksek kotlarda kalan kısımlar görülebilmektedir. Yapının bu cephesi düz hacimli bir yapıya sahip değildir. Cephenin ön tarafında +1.50 kot hizasına kadar avlu duvarı, +1.50 kot katında teras, bir alt kottaki ikinci teras ve odaların yer aldığı kısımların bir bölümü görülebilmektedir.

Üst kat avlu duvarlarında kesme taş kullanılmıştır. Üst katta beş adet demir parmaklıklı ahşap pencere bulunmaktadır. Cephe silmelerindeki taşlarda çeşitli bitkisel süslemeler görülmektedir.

Yapının "Yenileme Sonrası" İncelemesi (İç Tanımlama)



Çizelge 8: Darius Konağı Yenileme Sonrası Otel Çizimleri (Güler, 2012, düzenleme: Ayanoğlu)



Çizelge 9: Darius Konağı Yenileme Sonrası Röleve Çizimleri, Kesitler (Güler, 2012, düzenleme: Ayanoğlu)

Kurul Raporuna göre yenileme sonrası incelemeler; (Çizelge 10-14)

(-5.50) Kotlu Kat (Bodrum Kat):

Giriş Holü – Oda – Depo: Mevcut zemindeki çimento şap kaldırılıp temizlik çalışması yapılmıştır. İnkara harç dökülerek zemin kaplaması yapılmış, kirlenen ve kararan yüzeyler temizlenmiş, boşalan derzler harç ile doldurulmuştur. Tonoz iç yüzeylerinde inkara sıva kaplanan ve sonradan dökülen yüzeyler temizlenerek geleneksel sıva ile tekrar düzenlenmiştir. Sonradan önceki pencereler kaldırılmış ahşap pencereler yerleştirilmiş, duvardaki mevcut boşluklara uyum sağlayan ahşap kapılar yerleştirilmiştir.

WC: Yer döşemesindeki inkara harç kaldırılıp seramik kaplanmıştır. Kirlenmiş olan duvar yüzeyleri temizlenmiş, eskimiş ve kırılmış tuvalet kapısı yerine geleneksel teknik kullanılarak yapılan ahşap kapı yerleştirilmiştir.

(-3.50) Kotlu Kat (Zemin Kat):

Giriş Holü – Odalar - Mutfak: Odalarda yer alan tarihi yapıya uygunsuz sonradan eklenen bölümler ve zeminde bulunan çimento şaplar kaldırılmıştır. Kirlenen ve kararan duvar yüzeyleri zımparalanarak yapıya uygun hale getirilmiştir. Duvarlarda bulunan geleneksel bezemeler, onarılmış, dökülen parçalar aynı uygunlukta tamamlanmıştır. Tavanda bulunan inkara sıvalar sökülmüş, temizlik ardından geleneksel sıvalar ile yenilenmiştir. Tüm kapı ve pencereler boşluklara uygun şekilde doldurulacak ahşap ürünler ile tamamlanmıştır.

WC: Yer döşemesindeki inkara harç kaldırılıp seramik kaplanmıştır. Kirlenmiş olan duvar yüzeyleri temizlenmiş, eskimiş ve kırılmış tuvalet kapısı yerine geleneksel teknik kullanılarak yapılan ahşap kapı yerleştirilmiştir.

Avlu: Yer döşemesinde çimento kaldırılmış, yerine taş döşenmiştir. Avluda iyice parçalanmış ve dökülmüş şekilde bulunan merdiven özgün haliyle yeniden eklenmiştir.

(+1.50) Kotlu Kat (Birinci Kat);

Odalar-Hol-Giriş Holü: Yer döşemelerinde çimento ve bazı odalarda bulunan karo seramikler yapıya zarar vermeden kaldırılıp zemin temizlenmiş olup, inkara harç ile kaplanmıştır. Yapıda bulunan zarar görüp dökülen kısımlar onarılmış, duvardaki kararmalar zımparalanarak temizlenmiş ve eskimiş olan niş kapakları kapatılmaması tercih edildiğinden sökülmüştür. Tonoz yüzeylerinde dökülen sıvalar inkara sıva ile geleneksele uygun yenilenmiştir. Tüm kapı ve pencereler boşluklara uygun şekilde doldurulacak ahşaplar ürünler ile tamamlanmıştır.

Teras: Yer döşemesindeki mozaik kaplama sökülmüş, yerine taş kaplama yerleştirilmiştir. Kirlenen duvar yüzeyleri temizlenerek taş korkuluk düzenlemesi yapılmıştır.

Mutfak: Yer döşemesindeki karo mozaik kaldırıp özgün döşemede temizlik çalışması yapılarak inkara harç ile kaplanmıştır. Duvarlarda kirlenen yüzeyler ve boşalan derzler harç ile doldurulmuştur. Tonozlarda dökülen sıvalar, geleneksel sıva ile tekrardan kaplanmıştır. Kapılar geleneksel tekniğe ve duvardaki boşluğa uygun tekrar yapılarak yerleştirilmiştir.

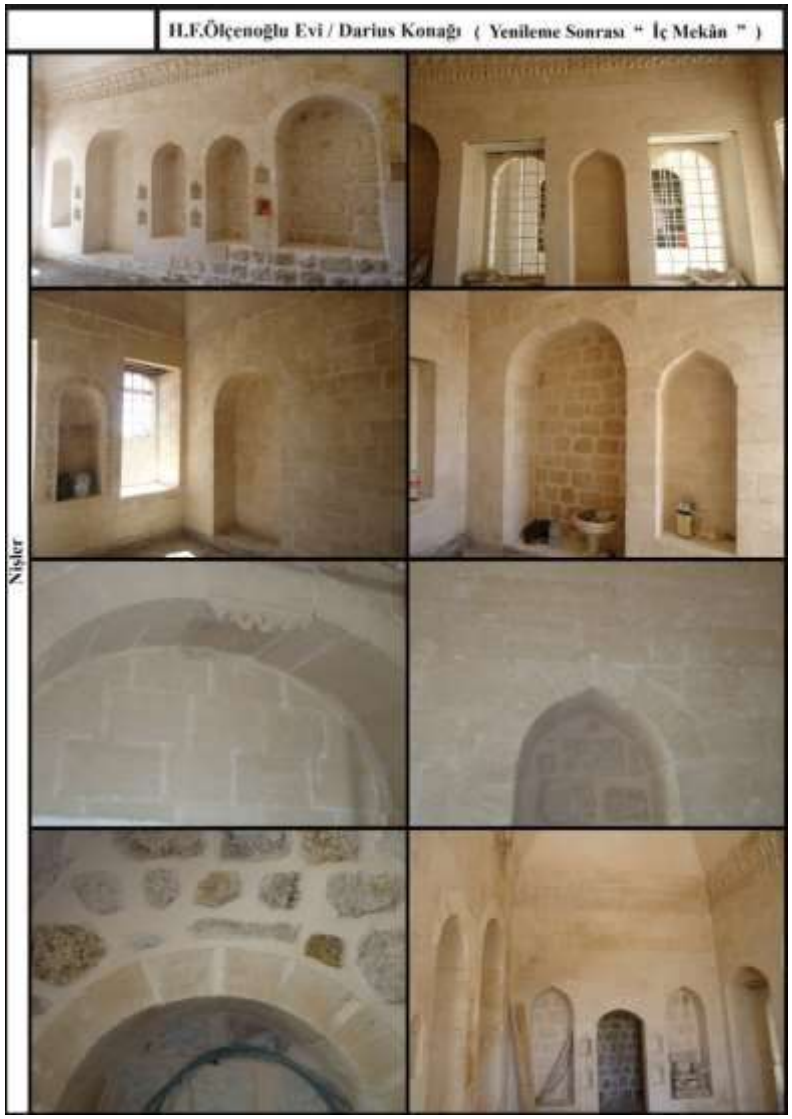
(+3.50) Kotlu Kat (Teras-Dam Katı):

Odalar: Yer döşemesindeki karo mozaik kaldırılarak, özgün döşemelerde temizlik çalışması yapılmış, inkara harç ile kaplanmıştır. Duvarlarda kirlenen yüzeyler temizlenip taş duvardaki boşalan derzler inkara harç ile doldurulmuştur. Tonoz yüzeylerdeki dökülmeler ve mevcut sıva sökülerek geleneksele uygun sıva ile kaplanmıştır. Yapıya uygun olmayan sonradan takılan ve eskimiş kapı ve pencereler geleneksele ve boşluklara uygun bir şekilde yeniden yapılarak yerleştirilmiştir.

Dam-Teras: Oda içerisinden yukarı çıkan merdiven onarılarak daha sonra restoran olarak kullanılması planlandığı için dam izolasyonu ve yenilemeleri yapılarak sağlamlaştırılmıştır.

Çizelge 10: Yenileme Sonrası Aslına Uygun Düzenlenen Kapı ve Pencereler (Güler, 2012, düzenleme: Ayanoğlu)

Çizelge 11: Derzlerin Harç ile Doldurulması ve Kararan Bölümleri Temizliği (Güler, 2012, düzenleme: Ayanoğlu) **Çizelge 12:** Sıvalardan Temizlenerek Detay İşçiliği Yapılan Süslemeler (Güler, 2012, düzenleme: Ayanoğlu)



Çizelge 13: Nişlerin Temizliği ve Kemerlerinin Detaylandırılması (Güler, 2012, düzenleme: Ayanoğlu) **Çizelge 14:** Tonoz Sıvalarının Yenilenmesi Detaylandırılması (Güler, 2012, düzenleme: Ayanoğlu)

Darius Konağı Butik Otel

Yapının yenileme işlemlerinden belirli bir zaman sonra konak, butik otel olarak işlevlendirilmiş, , "Darius Konağı" olarak isimlendirilmiştir. Bu isim, yapının bulunduğu kent Mardin'in geçmişte Persler tarafından yönetilmesi ile ilişkilidir. 1. Darius, M.Ö 549 yılında doğan hükümdar, tarihte Büyük Darius olarak bilinmektedir. M.Ö 552-485 yılları arasın İran'ı yönetmiştir. Modern Farsçada adı Daryüsh, Yunancada Darios, Romalı tarihçilerin notlarında ise Darius olarak geçmektedir. Pers İmparatorluğu, Darius döneminde en geniş sınırlarına ulaşmıştır. Sınırlar içerisindeki istikrar sayesinde ekonomik faaliyetler gelişmiş ve Akdeniz'in batısına kadar uzanan ticaret hatları kurulmuştur (Url.1).

Otel içerisinde 9 adet oda bulunmaktadır. Odalar genel olarak tarihi yapıya uyum sağlayan mobilyalarla döşenmiştir. Ahşap yataklarda süsleme işçiliği barındıran motifler ile desteklenerek koyu ceviz renk kullanılmıştır. Pencere ve kapılar geleneksele uygun bir biçimde onarılmış olup, perdeler yine işleme ve motifler ile uyumlu desenler ile desteklenmiştir. Oda içerisinde daha önceden ahşap kapaklı vitrin olarak kullanılan (Çizelge 4) nişler, kapaklar sökülerek sadeleştirilmiş ve niş içine antika objeler eklenmiştir. Aydınlatmalar ise tarihi yapıda kullanılan taş renginin tonuna göre belirlenmiş led türü aydınlatma elemanların yerden duvara, duvardan-tavana şeklinde yerleşimler ile tarihi hava desteklenmiştir.

Temizliği ve bakımı yapılan dış cephelerin otelin tasarım temasına uygun olması için yine led aydınlatmalar kullanılmıştır. Dam katı olarak nitelendirilen bölümde ise otelin restoranı ve kafesi olarak kullanılması amacıyla, etrafı mevsime göre açılır ve kapanır sistem ile kapatılmıştır. İşlevine uygun olarak kullanılarak, mobilya olarak 2 kişilik ahşap sedirler tercih edilmiş mekânın düzenine göre yerleşimi yapılmıştır. Restoran aydınlatması iç bölümde standart led ve sarkıtlar ile, teras bölümünde ise korkuluklar üzerine aydınlatmalar ile çözümlenmiştir (Çizelge 15- 20). Otelin yenileme sonrası iç ve dış tanım görselleri de çizelgelerde verilmiştir (Çizelge 15-20).

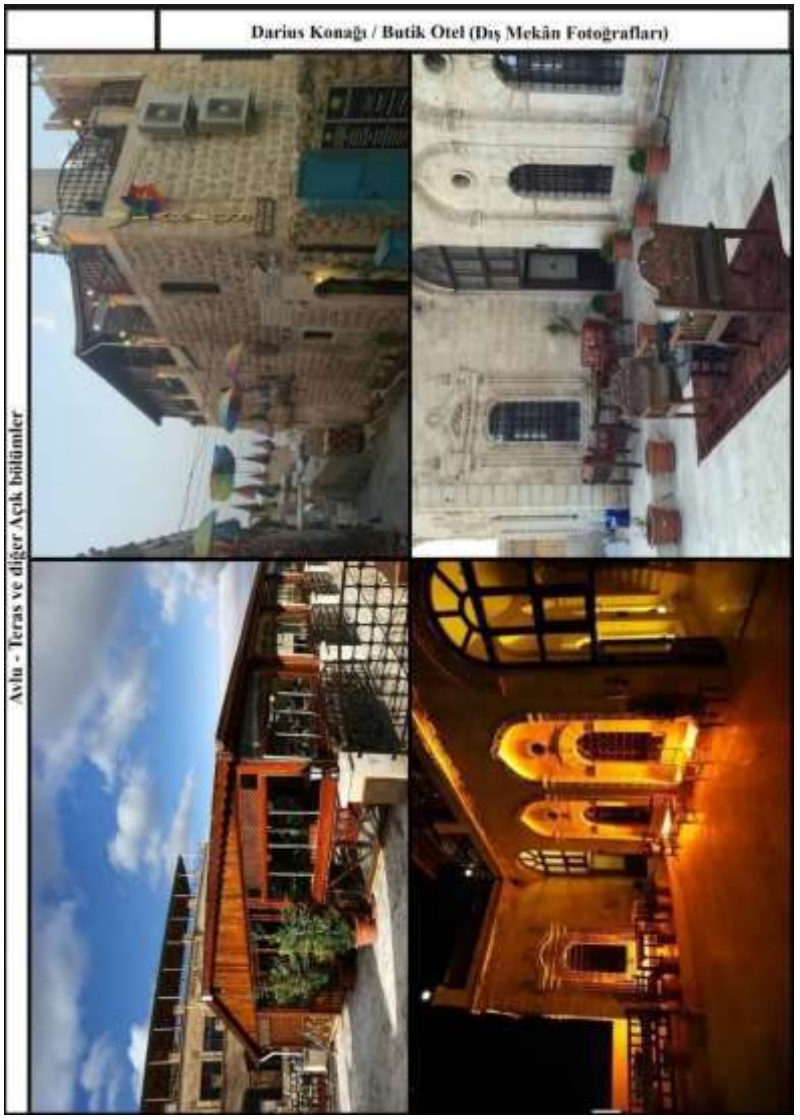
Çizelge 15: İç Mekân Görselleri, Odalar 1 (Url-2)

Çizelge 16: İç Mekân Görselleri, Odalar 2 (Url-2)

Çizelge 17: İç Mekân Görselleri, Odalar 3 (Url-2)

Çizelge 18: İç Mekân Görselleri, Odalar 4 (Url-2)

Çizelge 19: İç Mekân Görselleri, Avlu, Teras ve Açık Alanlar (Url-2)



Çizelge 20: İç Mekân Görselleri, Avlu, Teras ve Açık Alanlar 2 (Url-2)

Yapının Kullanıcı Gereksinimleri ile İşlev ve İç Mekân Analizi

Yapının restorasyon öncesi ve sonrası ile yeniden işlevlendirilmesinin incelenmesi sonucunda kullanıcı ve mekan gereksinimleri konusunda bir analize varılmıştır.

Kullanıcı Gereksinimleri ve Analizi:

Darius konağı, kullanıcı gereksinimleri arasında yerli ve yabancı turistlerin tercihi üzerine tarihle bütünleşik bir yapı bütününü oluşturmaktadır. Otel, tarihi bir yapının yeniden işlevlendirmesinden oluşan bir butik otelde konaklama tercihinde bulunan kullanıcıların ihtiyaçlarının karşılanabildiği, temel ihtiyaçlar olan uyuma, yeme-içme, oturma ve temizlik gibi tüm bölümleri barındırmaktadır. Şehrin konumu ve kültür kriterleri sebebiyle temel ihtiyaçlar dışında eğlence, bar mekânlarını, çevresinde bulunan yapılar ve kısıtlama sebebiyle de açık peyzaj alanı ve bunlara bağlı animasyon ve çeşitli aktiviteleri karşılayamamaktadır.

Mekân Gereksinimleri ve Analizi:

Otel'in giriş cephesinin konumu ve yapıya girişin ardından resepsiyon, bekleme alanı gibi kullanıcının ilk olarak eriştiği bölümler, ergonomik ve ulaşılabilirlik açısından boyutsal, görsel gereksinimleri karşılamaktadır. Tek düze standart ve üniteler kullanılarak yerleşimi yapılan mobilyalar tarihi yapıya uyum sağlayamamıştır. Giriş holünden geçilerek ulaşılan teras, Mezopotamya manzarasına hâkim bir konumda bulunmaktadır.

Odalara erişim ferah ve geniş koridorlardan sağlanmaktadır. Kullanıcıların yaşama birimleri ile ilk buluşmasında giriş yenilenen giriş kapıları malzemesi ile tarihi yapılara uyum sağlamıştır.

Oda içlerinde kullanılan mobilyalarda genel olarak yapının taş rengine göre koyu tonlar seçilmiş, yerleşim düzeni odaların boyutuna ve kapasitesine göre değişse de mobilyaların yığılması ve tasarımdan uzak sadece doldurma anlayışı içerisinde yerleşimleri yapılmıştır. Giysi dolapları ve depolama üniteleri, niş aralarında askı perdeleme yöntemiyle oluşturulmuştur.

Islak hacimler de bazı odaların her ne kadar kullanım amacını tamamlasa da yapıya uygunsuz seramik kaplamalar ve malzemeler kullanılmıştır. Aydınlatmalar ise mekân içerisine yapının taş tonuna uyum sağlamış renkler ve bütünlükleri ile tasarımını tamamlamıştır.

Genel olarak mekân içinde bulunan bölümlere ulaşımın rahat ve geniş geçişlere sahip merdivenler ve koridorlar ile tamamlanması kullanıcı açısından yeterli görülmektedir. Otel verilerine göre yapılan analizler kentin tarihi için sadece barınma yapılarıyla sınırlı olmadığından ihtiyaçların karşılanabilir düzeyde olduğu görülmektedir. Temel ihtiyaçların giderilebildiği otel, tarihi konseptine göre biraz daha iyileştirilebilir ve tasarım konusunda eklemelere dikkat edilebilir.

Odalarda standart fakat ergonomik yerleşim alanları yaratılmalı; böylelikle kullanıcıların gereksinimleri doğrultusunda kullanıcının bir sonraki konaklama isteğinde yapının tercih edilme grafiği yükselebilir.

SONUÇ

İnsanların en temel ihtiyaçlarından biri olan barınma kültürü, kendi içinde mekânlarının oluşumunu tamamladıktan sonra, farklı boyutlar ve amaçlar için bazı değişimlere uğramaktadır. Bu değişimler iki kategoride ve biçimde gerçekleşmektedir: Modern/Tarihi gibi ayırım yapılarak, yapı modern bir yapı ise tümden yıkım-yeniden yapım; tarihi bir yapı ise yenileme-işlevlendirme gibi mimari biçimlerde değerlendirilmektedir.

Çalışmada, eskiden mülki sahipleri tarafından kullanılmış tarihi konakların yeniden işlevlendirilmesinde barınma işlevine dönüşen örneklerden değil, turist gibi sürekli değişen kullanıcıların ihtiyacına cevap vermek üzere butik otel işlevi verilen bir yapı üzerine odaklanılmıştır.

Kent içerisinde artan turizm faaliyetleri, eski Mardin olarak adlandırılan bölümde yeni yapılar eklenebilecek parsel azlığı sebebiyle, mevcut yapılara ve onların kullanıcılara ihtiyaçları doğrultusunda cevap ve çözüm getirme isteği yeniden kullanımın öz kaynağını oluşturur. Turizm faktörünün getirisi olan yerli/yabancı süreli kullanıcıların tarihi merak ve yörenin kültürel özellikleri sebebiyle Mardin'de geçtiğimiz senelerde birçok yapı yeniden işlevlendirilmiştir.

Tarihi yapılarda yeniden kullanımın en başında konaklama birimlerinden oteller gelmektedir. Mardin için otel kavramının bir betonarmeden, yataklı yapıdan ibaret olduğu ilk zamanlarında birkaç iş adamının bu sektör için kente yapmış olduğu yatırımların olumlu sonuç vermesi ile bu gelişme Mardin halkına model olmuş ve kent içerisinde konakları bulunanlar mülklerini aynı işlev için değerlendirmeye başlamıştır.

Çalışmanın ana inceleme konusu olan tarihi yapılardan dönüşen oteller, böylelikle kentin gelişimine oldukça katkı sağlamıştır. Turist verileri ve yeniden kullanıma uygun yapıların fazlalığı bunu göstermektedir. Kentte yapılan yenilemeler bir süre sonra yatırım/getirim doğru orantısında ilerlemiş ve turistik getirilerin her sene artışı bu yenilemelerin bir sağlaması olarak görülmektedir.

Bu araştırmanın amacı doğrultusunda tarihi bir konak yapısının yeniden işlevlendirilmesi kapsamında Darius adı ile butik otele dönüşümünün analizi yapılmıştır. Mimari düzenlemeler ve iç mimari değişiklikler seçilen otelin gözlem ve incelenmesi ile değerlendirilmiştir. Otel olarak kullanılmaya başlanan yapının strüktürü, iç mekân öğeleri ve kurallara bağlı olan temel birimlere dokunulmadan sadece eklemeler yapılarak çözümlenmiş olduğu görülmüştür. Tarihi dokusunu hemen hemen bütünüyle korumuş olan kentte bu tür uygulamalarla özgün kent dokusunun devam ettirdiği gözlemlenmiştir.

Gözlemlerin iç mimari ile irdelenmiş olduğu bölümlerde otelin ilk iç oluşumuna dokunulmamış, fakat aydınlatma ve yerleşimde bu gibi öğeler ile günümüz teknolojilerine ayak uydurmaya çalışılmıştır. Otelin yenileme sonrası iç mekân analizinin yapılması sonucunda olumlu ve olumsuz veriler saptanmıştır (Tablo 1).

Tablo 1: Darius Konağı Yenileme Sonrası İç Mekân Analizi

Darius Konağı Butik Otel / Yenileme Sonrası İç Mekân Analizi	
Olumlu veriler	**Olumsuz veriler**
Giriş Bölümleri ve Hol; - Boyutsal ve Görsel yeterlilik - Yönlendirme ve Ulaşılabilirlik - Mekânlar arası Geçiş Resepsiyon; - Yeterli kapasitede bekleme alanı - Ergonomik iç düzen - Yeterli Aydınlatma Odalar; - Yapının temel rengine uyumlu iç tasarım elemanları - Mahremiyet sağlanmış Islak Hacimler - Temel İhtiyaçlar karşılanabilir	Genel: - Resepsiyon Standart Mobilyalar ve İç Mekân öğeleri - Odalar içerisinde yetersiz aydınlatma ve iç mekân öğeleri yerleşiminde plansız iç düzen - Nişler değerlendirilmemiş - Depolama üniteleri yetersiz - Islak hacimlerde yapıya uygunsuz malzeme kullanımı - Yapı Cephelerine asılan tarihi yapıya uygunsuz üniteler

Mekân incelemelerinin analizleri neticesinde yapıda kullanıcı gereksinimlerinde sadece giriş, çıkış ve temel ihtiyaçlar kategorisinde karşılanabildiği gözlemlenmiştir.

İç mimari tasarımda kuralların fazlaca ihmali ve kullanılan iç mekân öğelerinin zaman kavramına uymadığı belirlenmiştir. Yapıda yapılan incelemeler sonucunda, bu öğelerin her ne kadar temel ihtiyaçların giderilmesinde açığı kapatıyor olsa da günümüz zaman dilimine ait olması, yapıda özensiz bir çalışma ve tasarım anlayışının benimsenmesi sebepleriyle olumsuz analize varılmıştır.

Yeniden işlevlendirilen bu yapının restorasyon kurallarına ve dokuya uyumluluğunu da içeren analiz çalışmasının, Mardin kentinin gelişiminde ve yapılacak yeni işlevlendirmelerde doku uyumluluk konusunda katkısı beklenmektedir.

KAYNAKLAR

Ahunbay, Z. (2011). *Tarihi Çevre Koruma ve Restorasyon*, Yem Yayınları, İstanbul.

Alioğlu, F. (2000). *Mardin Şehir Dokusu ve Evler*, Tarih Vakfı Yayını, İstanbul.

Dolapönü, H. (1972). Tarihte Mardin / Itr-El-Nardin Fi Tarih Merdin, Nşr. Cebrail Aydın, Hilal Matbaacılık, İstanbul.

Gramann, J. H. Tourism and Resource Developement Proceedings, (1990), presented in *The Third Symposium On Social Science in Resource Management*, USA.

Güler, Ş. (2012), *Darius Konağı Yeniden İşlevlendirmesini Yapan Mimarın Raporu*.

Kuban, D. (2000). *Tarihi Çevre Korumanın Mimarlık Boyutu, Kuram ve Uygulama*, Yapı-Endüstri Merkezi Yayınları, İstanbul.

Özcoşar, İ. (2009). Merkezileşme sürecinde bir taşra kenti (1800-1900). Mardin: Mardin Artuklu Üniversitesi Yayınları.

Venedik Tüzüğü, " Uluslararası Tarihi Anıtları Koruma Kuralları ", 1964.

Url-1., Şahtana konağı eski resimleri ve yapı tarihi 11.10.2018 tarihinde https://team-aow.discuforum.info/t15934-Mardinli-Mimarba-Lole-Serkiz-Gizo.htm adresinden alındı.

Url-2., Darius konağı iç mekan görselleri 8.8.2018 tarihinde https://www.tripadvisor.com.tr/Hotel_Review-g672951-d10040322-Reviews-Darius_Konagi-Mardin_Mardin_Province.html adresinden alındı.