

GEOMETRY AND ORDER: ON THE NEED FOR A THEORETICAL FRAMEWORK FOR THE ANALYSIS OF THE PLANS OF THE HOUSES OF CULTURE IN MACEDONIA

Erda BESIMI¹, Nuran SALIU², Kujtim ELEZI³

¹ Department of Architecture, Faculty of Applied Sciences, University of Tetova

² Department of Architecture, Faculty of Applied Sciences, University of Tetova

*Corresponding author e-mail: erda.besimi@unite.edu.mk

Abstract

This theoretical article proposes a framework for the analysis of the plans of the Houses of Culture in Macedonia, with a particular focus on the relationship between geometric form, functional organisation and architectural order. Rather than treating the plan as a purely technical document or a passive reflection of the programme, this theoretical article reads it as a structure of thought, in which geometry operates as the organising mechanism of space, movement and hierarchy. The discussion draws on a theoretical synthesis of the principal authors of architectural analysis and plan morphology Francis D. K. Ching, Simon Unwin, Roger H. Clark and Michael Pause, Robin Evans, Christopher Alexander, Julienne Hanson and Nuran Saliu who all approach the plan as a geometric, spatial and meaningful structure, moving from form and order to the vocabulary of forms and the logical construct. The aim is not to present case studies, but to build a transferable analytical model that can be applied to the Houses of Culture in Macedonia. The argument is that the geometry of the plan is neither neutral nor merely compositional: it determines how the building is oriented, how functions are distributed, how movement is generated, how clarity or fragmentation is produced, and how the public character of the building is shaped. The analysis is therefore developed in layers geometric contour, axes and organising centre, functional zoning, spatial hierarchy and circulation, and the relationship between form and architectural meaning. Only through such a multi-layered reading can the plan be understood as the place where geometric form is translated into a functional and spatial system, and where the Houses of Culture articulate a specific public order within socialist modernism.

Keywords: Houses of Culture; geometry of the plan; architectural order; planimetric analysis; modernism; Macedonia.

Introduction

In the former Yugoslavia, during the period of socialist modernism, the Houses of Culture were created as part of a wide public infrastructure, in which the institution of the “house of culture” became the basic unit for the development of the cultural network and for the architectural materialisation of the goals of socialist culture. Houses of Culture appeared almost immediately after the Second World War, as an institutional response to rapid urbanisation and to the need for collective infrastructure in the new industrial cities. They had a dual function: on the one hand, the transformation of “the working person” from a passive consumer into an active subject of culture and the consolidation of the social, political and cultural life of the local community around a shared core (Dimić, 1988; Varga, 1976).

Architectural modernism in Macedonia is closely tied to the shaping of public space and to the construction of a new urban identity, especially during the period of accelerated urbanisation and industrialisation that followed the war. Architecture did not function only as a functional solution, it operated as an active instrument of socialist modernisation. Public buildings simultaneously articulated the idea of cultural democratisation, decentralisation and the social cohesion of the new urban communities. (Saidi et al., 2024) Macedonian architects also aimed to encode national elements in their buildings, producing a tension between modernist universalism and local identity. A tension that would mark the entire architectural production of the socialist period in the region. (Elezi & Saliu, 2014; Saidi et al., 2021) The modernist architectural language clear volumes, rational-functional plans and a legible constructive logic was gradually translated into regional interpretations, in which local materials and façade

articulations grounded modernism in a specific territorial identity (Kulić, Mrduljaš & Thaler, 2012; Stierli & Kulić, 2018). According to Saidi Qazimi (2025), modern architecture aspires to a more rational, functional and universal language, moving away from traditional and symbolic forms; this approach reduces the role of ornament and can introduce a distance between the building and the way users understand and experience it.

Houses of Culture should be understood not simply as service buildings, but as part of the broader modernist project of producing a public sphere and a contemporary urban identity. In most historical readings, these objects are discussed mainly from the standpoint of institutional function, urban history or stylistic categorisation. This theoretical article shifts the focus to the plan. The basic argument is that the plan of the House of Culture must be understood as the place where geometry, function and architectural order are most clearly intertwined. The central question of the study is therefore: how is geometric form converted into a functional and spatial system? To address this question, the paper does not present case studies, but builds a theoretical foundation and an analytical matrix that can be applied to the corpus of Houses of Culture in Macedonia. This matrix draws on the understanding of form, organisation, circulation and order in Ching (2014) and Unwin (2020), on the diagrammatic analysis of Clark and Pause (2012), on the active role of geometry in Evans (1995), on the concept of pattern language in Alexander, Ishikawa and Silverstein (1977), on the configurational reading of the plan in Hanson (1998), and on the morphological approach of Saliu (2018) to the “vocabulary of forms” and the logical construct of the plan. Recent developments in the field of artificial intelligence have demonstrated that the architectural plan can be read and generated as a logical structure of geometric forms and spatial relationships (Saliu & Elezi, 2025a; 2025b), further confirming the need for clear analytical frameworks for reading the plan as proposed in this article.

The Geometry of the Plan as a Theoretical Problem

For Robin Evans, geometry in architecture is not a neutral basis for form, but an active agent moving between thought, imagination, drawing and construction (Evans, 1995). It is precisely this idea that turns the architectural plan into something more than a technical notation: it becomes the trace of a conceptual and operational process. When Evans suggests that architects do not produce geometry but rather consume it, he implies that geometry operates as the medium through which form becomes thinkable, drawable and buildable. For the analysis of the Houses of Culture, this means that the form of the plan should not be read only as a figure, but as an instrument that organises the relationships between the entrance, the foyer, the auditorium, the stage, the backstage, the secondary spaces and the user’s experience.

Following the same line of thought, Francis D. K. Ching approaches architecture through the inseparable relationship between form, space and order (Ching, 2014). In his work, the organisation of space, the elements and relations of circulation, and proportion and scale are presented as the fundamental components of architectural reading. The geometry of the plan, cannot be reduced to its outer contour it must also be sought in the way spaces are organised, how they are connected, and how they orient movement. Simon Unwin extends this understanding by treating architecture as a “universal language of place-making”, in which the themes of spatial organisation include axis, grid, datum, transition, hierarchy and the heart the central or gravitational space of the building (Unwin, 2020). For the Houses of Culture, this approach is particularly relevant, since these buildings are typically articulated around a public core and around a distribution system that is either explicit or mediated. According to Ramani-Halili et al. (2025), geometry is a fundamental language of architecture, shaping spatial organization, structural order, and visual expression.

The geometry of the plan must be understood as an operational order. It is not merely the “appearance” of the plan, but the logic by which the plan generates clarity, orientation, separation or interweaving. The first questions are not simply whether the plan is rectangular, linear or compact. The more important questions are: is there a clearly defined entrance axis? Is there an organising centre? Is the auditorium dominant, and how does it relate to the foyer? Does the plan generate a centred, radial, sequential or fragmented order? At this level, geometry becomes a form of the language of architectural thinking.

From Form to Function and Movement

Christopher Alexander shifts the focus from form as a closed object to form as a system of repeatable solutions. In *A Pattern Language*, “patterns” are defined as units of a language that respond to design problems and that can be combined to produce a variety of coherent solutions (Alexander, Ishikawa, & Silverstein, 1977). For the Houses of Culture, this approach is useful because it allows the plan to be read not as a unique and inexplicable composition, but as a configuration of recognisable patterns: the entrance as a point of transition, the foyer as a distributing space, the auditorium as the dominant core, the backstage as a controlled zone, and the clubs or galleries as semi-public areas. Geometry is not only a formal abstraction; it is the way in which patterns become legible and combine into a whole.

Julienne Hanson, in *Decoding Homes and Houses*, deepens this reading by understanding the plan as a “pattern of organised space” (Hanson, 1998). Although her book focuses on the dwelling, her thesis is directly transferable to public buildings, the plan is not merely an aggregation of rooms, but a configuration of relationships. Hanson shows that space carries social and symbolic information, and that this can be read through relations of visibility and permeability. In the case of the Houses of Culture, this means that the geometry of the plan can show not only how functions are placed, but also who has access where, which spaces are more exposed, which are deeper, and where institutional control begins. The relationship between the public and the backstage, between the foyer and the auditorium, or between the administration and the main body of the building thus becomes a question that is at once geometric and social. These spaces are organised hierarchically, and the transition from one to another is characterised by a threshold; according to Limani (2025), such transitional elements generate distinct spatial experiences, articulating the boundary between public and private through the same logic of hierarchy and accessibility that governs the architectural plan.

This logic is reinforced by Clark and Pause, who propose architectural analysis through a diagrammatic vocabulary: geometry, massing, plan-section, circulation, part-to-whole unity, hierarchy, symmetry and use relationships (Clark & Pause, 2012). Their value for this article lies in the fact that the plan can be divided into analytical layers that can be compared with one another, rather than only described in text. A parallel approach is found in Saliu’s doctoral dissertation (Saliu, 2018), in which built form is translated into a “logical construct” and architectural complexes are read through a “vocabulary of forms”, based on contours, basic units and morphological relationships. Saliu develops this approach in the context of hospitals, the underlying principle has direct value public buildings as Houses of Culture: the plan can be reduced to geometric elements and fundamental relations without losing its architectural intelligence.

For Saliu, the plan is not seen merely as a final drawing, but as a logical structure that can be decomposed into basic forms and rules of combination. The significance of his work lies in the way it reads the plan: as a composition of contour, principal units and the morphological relations between them. This reading converges directly with Ching’s order, with Unwin’s themes of place-making, with Clark and Pause’s analytical diagrams, with Evans’s active geometry, with Alexander’s patterns and with Hanson’s configurational space. Saliu offers a

methodological bridge between the descriptive vocabulary of these authors and an operational framework for reading the plan, one that can be transferred from the hospital to the Houses of Culture, where the same question reappears: how do basic geometric units organise themselves into a public order?

The Proposed Framework for Analysing the Plans

Based on this theoretical framework, a clear reading model can be built for the plans of the Houses of Culture in Macedonia. The first step is the identification of the principal geometric principle. This means determining whether the plan is compact, linear, central, axial, fragmented or hybrid. At this stage, the analysis is concerned with the basic contour, with the relationship between the main blocks, and with the way in which the body of the auditorium is connected to the entrance, the foyer and the secondary segments. The aim is not the formal naming of the figure, but the understanding of its logic, is the building organised around a central mass, does it develop sequentially, is it divided into functional wings; or is it composed of volumes linked by transitional spaces?

The second step is the reading of the axis, the centre and the datum. Here the question is where the order of the plan begins and what holds it together. In the Houses of Culture, this is often *the entrance-foyer-auditorium relationship*. If this sequence is direct, the plan produces clarity and a high degree of orientation. If it is mediated by turns, splits or lateral distributions, it can generate a more complex experience sometimes more ceremonial, sometimes more fragmented. The dominance of a central foyer, of an auditorium placed at the core of the building, or of a strong frontal axis are indicators of geometric order and of the public character of the object. In Unwin (2020), these elements are linked to axis, datum, transition and hierarchy; in Ching (2014), to the organisation of space and to the relations of circulation.

The third step is functional zoning. It is precisely here that the formula:

"geometry → organises the plan → distributes functions → generates movement → produces order → conveys architectural meaning"

becomes operative. In the Houses of Culture, the plan typically contains at least five fields: the public zone of the entrance and the foyer; the zone of the auditorium and the stage; the backstage and the technical spaces; the administration; and the secondary cultural functions, such as clubs, galleries or multi-purpose rooms. The analysis must observe not only where these fields are placed, but also how the geometry distributes them: are they grouped around a core, divided into linear strips, placed symmetrically around the auditorium, or do they form two parallel systems public and serving? At this point, the correspondence between form and function becomes a direct evaluation criterion.

The fourth step is the analysis of the dominant space and of the user's movement. Every successful plan of a Houses of Culture has a gravitational space: sometimes the auditorium, sometimes the foyer, sometimes the mediation between them. The decisive question is whether this dominant space is only the largest, or whether it is also the one that organises the others. This is linked to hierarchy, but also to the user's experience: how the public enters, where it stops, where it disperses, how legible the passage to the auditorium is, and how separate the movements of staff, performers and technicians are. Hanson (1998) is particularly valuable here for understanding depth, accessibility and control, while Clark and Pause (2012) offer a diagrammatic representation of circulation and of part-to-whole relationships.

The fifth step is the interpretation of what the geometry produces. This is the phase in which analysis moves from description to meaning. An axial and centred geometry can produce monumentality, ceremoniality and high legibility. A compact geometry can produce functional efficiency and institutional concentration. A fragmented geometry can produce a plurality of uses, but also disorientation. A clear foyer positioned as a node can create a genuine internal

public space; a plan in which the auditorium dominates absolutely can reduce the experience of the building to the logic of the performance. The analysis of the plan does not stop at “how it is made”, but reaches “what it does”. It is at this point that architectural order appears as the result of the interaction between geometry, function and experience.

The Evaluation Matrix

The analytical model outlined above can be made operational through the evaluation matrix shown in Figure 1. The matrix translates the five steps into a comparative instrument with guiding questions, indicators, theoretical references and a numerical score from 1 to 5 for each layer. The points are intended to support comparative readings across the analysed Houses of Culture, while the qualitative columns preserve the architectural specificity of each case. The matrix is therefore not a substitute for analysis, but a structured device that allows the reader to move systematically from geometric form to architectural order.

Figure 1. Evaluation Matrix — Planimetric Analysis of the Palaces of Culture					
Five-layer analytical framework: from geometric form to architectural order					
Analytical layer	Guiding questions	Indicators	Theoretical references	Characteristic diagram	Score (1-5)
I. Geometric figure	Is the plan compact, linear, centralised or hybrid? How does the hall relate to the entrance and foyer? What logic governs the form?	Basic contour Principal mass Entrance-link Dominant formal principle	Ching (2014) Evans (1995) Saliu (2018)	 Ching (2014)	
II. Axes and centre	Where does the order of the plan begin? Is there a legible entry axis? Is there an organising centre? How does the datum operate?	Frontal axis Central foyer Entrance-hall sequence Spatial hierarchy	Unwin (2020) Ching (2014) Evans (1995)	 Evans (1997), Fig. 10 Amesbury House, Webb, 1661	
III. Functional zoning	How are the five principal fields distributed? Are they grouped or separated? Public-to-backstage ratio? Do form and function correspond?	Entrance / foyer zone Auditorium and stage Backstage / technical Administration / secondary	Alexander et al. (1977) Hanson (1998) Saliu (2018)	 Saliu (2018), Fig. 4.19	
IV. Movement and hierarchy	How does the public enter? Are flows separated (public/staff)? Which space dominates? How deep is the institutional control?	Depth of accessibility Public / staff separation Gravitational space Circulation diagram	Hanson (1998) Clark & Pause (2012)	 Hanson (1998)	
V. Architectural meaning	What does the geometry produce? Monumentality or efficiency? Genuine public space? Clarity or fragmentation?	Public order Institutional character Spatial meaning Form → functional system	Evans (1995) Unwin (2020) Clark & Pause (2012)	 Clark & Pause (2012)	
Total					/ 25
Geometric form → organises the plan → distributes functions → generates movement → produces order → conveys architectural meaning					

Source: Framework proposed by the authors, based on Ching (2014), Evans (1995), Unwin (2020), Alexander et al. (1977), Hanson (1998), Clark & Pause (2012), Saliu (2018).

Figure 1. Evaluation matrix for the analysis of the plans of the Houses of Culture (a five-layer analytical framework, from geometric form to architectural order).

Each layer of the matrix is accompanied by a characteristic diagram of the corresponding author, illustrating the analytical logic on which that layer rests. The first layer the geometric figure is grounded in Ching's spatial organisations (Ching, 2014): centralised, linear, radial, clustered and grid organisation, which represent the basic principles by which the plan of a House of Culture can be classified as compact, linear or hybrid. The second layer axes and centre is illustrated by the plan of Amesbury House by John Webb (1661), as cited by Evans (1997) in “Figures, Doors and Passages” (Fig. 10): a plan with directly interconnected rooms and no intermediate corridor, in which the organising centre and the axes of circulation are legible as the spatial structure of the building itself. The third layer functional zoning is supported by Figure 4.19 of Saliu's dissertation (Saliu, 2018), where the planar cuboids A, B, C, D and E with orientation arrows show how simple states are organised in order to distribute functions within the architectural form. The fourth layer movement and hierarchy is illustrated by Hanson's justified graph (Hanson, 1998): plan, spatial graph and justified graph with depth from 0 to 5, which measure accessibility, visibility and the institutional control of spaces. The

fifth layer architectural meaning closes with the full analytical panel of Clark and Pause (2012), in which structure, geometry, parti, circulation, hierarchy and part-to-whole relationships are overlaid on the same plan, moving the reading from the description of the form to the interpretation of order and architectural meaning.

Conclusions

The Houses of Culture in Macedonia should be read as public objects in which the plan is the principal carrier of architectural order. Within the brief history of socialist modernism in the region, these buildings were part of a wider cultural infrastructure and of a project for the education of the population and for the active participation of the citizen. Their contribution cannot be fully understood without entering the geometry of their plans. Only there does it become visible how form organises function, how functional distribution generates movement, and how movement, in turn, produces hierarchy, orientation, clarity or fragmentation.

This article has proposed a theoretical foundation for such a reading. By synthesising Evans (1995), Ching (2014), Unwin (2020), Alexander, Ishikawa and Silverstein (1977), Hanson (1998), Clark and Pause (2012) and the morphological approach of Saliu (2018), it argues that the plan must be analysed in layers: as a geometric figure, as a system of axes and centres, as a functional organisation, as a scenario of movement and as a structure of meaning. The plan is not only a division of spaces, but a document of architectural thought. Future research on the Houses of Culture in Macedonia should move from typological or stylistic description towards comparative planimetric analysis, in which the fundamental question remains the one that has guided the present study: what does the geometry of the plan produce, and how is it converted into a public architectural order?

References

- [1]. Achten, H. H. (1997). *Generic representations: An approach for modelling procedural and declarative knowledge of building types in architectural design* [Doctoral dissertation, Eindhoven University of Technology].
- [2]. Alexander, C., Ishikawa, S., & Silverstein, M. (1977). *A pattern language: Towns, buildings, construction*. Oxford University Press.
- [3]. Babić, M. (2018, August 1). Curating the Yugoslav identity: The reconstruction of Skopje. *post: notes on art in a global context*. The Museum of Modern Art.
- [4]. Ching, F. D. K. (2014). *Architecture: Form, space, and order* (4th ed.). John Wiley & Sons.
- [5]. Clark, R. H., & Pause, M. (2012). *Precedents in architecture: Analytic diagrams, formative ideas, and partis* (4th ed.). John Wiley & Sons.
- [6]. Dimić, Lj. (1988). *Agitprop kultura: Agitpropovska faza kulturne politike u Srbiji 1945–1952*. Rad.
- [7]. Elezi, K., & Saliu, N. (2014). Analogy in elements: Breaking the national identity. *International Journal of Business and Technology*, 2(2), Article 5. <https://doi.org/10.33107/ijbte.2014.2.2.05>
- [8]. Evans, R. (1995). *The projective cast: Architecture and its three geometries*. MIT Press.
- [9]. Evans, R. (1997). Figures, doors and passages. In *Translations from drawing to building and other essays* (pp. 54–90). Architectural Association Publications.
- [10]. Hanson, J. (1998). *Decoding homes and houses*. Cambridge University Press.
- [11]. Hillier, B., & Hanson, J. (1984). *The social logic of space*. Cambridge University Press.
- [12]. Konstantinović, D. (2018). The houses of Yugoslav culture. *Kultura*, 161, 70–88. <https://doi.org/10.5937/kultura1861070K>
- [13]. Kulić, V., Mrduljaš, M., & Thaler, W. (2012). *Modernism in-between: The mediatory architectures of socialist Yugoslavia*. Jovis.
- [14]. Limani, A. (2025). Ownership in the context of kapijnik: A spatial phenomenon in Tetovo. *Journal of Applied Sciences-SUT*, 11(21–22), 30–39.
- [15]. March, L. (1974). The logic of design and the question of value. In L. March (Ed.), *The architecture of form* (pp. 1–40). Cambridge University Press.
- [16]. Markus, T. A. (1987). *Buildings and power: Freedom and control in the origin of modern building types*. Routledge.

- [17]. Ramani-Halili, R., Ramadani, E., Bajrami, M., Abduramani, G., & Kamberi, L. (2025). Application of geometry in architecture, focusing on metal constructions. *Journal of Applied Sciences-SUT*, 11(21–22), 239–245.
- [18]. Saidi Qazimi, A. (2025). Is it a house or a school? Interdisciplinary reflections on the importance of meaning in architecture. *Journal of Applied Sciences-SUT*, 11(21–22), 49–62.
- [19]. Saidi, A., Besimi, E., & Limani, A. (2024). The impact of socio-cultural developments on the urban structure of Tetovo during the period of Yugoslavia. *JAS-SUT Journal of Applied Sciences-SUT*, 10(19–20), 27–46.
- [20]. Saliu, N. (2018). *Metoda automatike në projektim me aplikim në projektimin e spitaleve* [Doctoral dissertation, Polytechnic University of Tirana, Faculty of Architecture and Urbanism].
- [21]. Saliu, N., & Elezi, K. (2025a). Integration of artificial intelligence in floorplan layout planning: a systematic review of models, methods, and applications. *European Chronicle*, 10(1), 57–65.
- [22]. Saliu, N., & Elezi, K. (2025b). The transformative integration of artificial intelligence in architectural practice: from generative design to sustainable building performance. *European Chronicle*, 10(1).
- [23]. Stierli, M., & Kulić, V. (Eds.). (2018). *Toward a concrete utopia: Architecture in Yugoslavia, 1948–1980*. The Museum of Modern Art.
- [24]. Unwin, S. (2020). *Analysing architecture: The universal language of place-making* (5th ed.). Routledge.
- [25]. Varga, L. (1976). *Domovi kulture: Programski i prostorni okvir*. Centar za kulturnu djelatnost SSO Zagreba.
- [26]. Zoranić, A. (2020). Modernism in the case of cultural architecture in Yugoslavia. *IOP Conference Series: Materials Science and Engineering*, 960(2), 022073. <https://doi.org/10.1088/1757-899X/960/2/022073>