TOWARDS AN ANALYTICAL HABITABILITY GRID FOR HERITAGE: THE MEDINA OF MOSTAGANEM AS A CASE STUDY

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1. Introduction

The historic city teaches man[1] to live in the space he inhabits, not just to see it; it provides him with the experience of living in ancient houses and of living with historical monuments. It also offers him the ambiance of *halkats*[2], grandmothers' accounts of their experiences, cries, smells, etc.; in other words, it is sending people back to the distant and the near past with all the emotions, representations and practices they have experienced within the space of the historic city. These experiences will serve as a conductive thread in the present research that leads to thinking about the habitability of space and to better contextualize the experience of the places to those who live there.

In this research, the historic city is used to designate *Al madina*, a term that describes, particularly in the Maghreb, the oldest part of major Islamic Arab-Berber cities. An urban universe that goes on evolving according to a model embodying a cultural diversity 'each city has its particular architecture which depends on the knowledge and skills of its inhabitants, of their fortune and the climate. All this differs from city to city' [1]. The goal is to design a habitability grid in order to examine the relationship between man and space. Nowadays, several discourses question the future of historic cities. The issues discussed in this research are structured around the following question: will the medina remain inhabited?

To examine these issues a methodology was adopted as part of an experimental strategy to assess habitability in the medinal space. It relies on the building of the grid and its projection.

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2. Habitability

Man exists by inhabiting space; by inhabiting space it is possible for him to exist. He inhabits the city, the streets, the communal areas (squares, gardens, public spaces) and lives with the monuments that stand therein, as well as in the houses. All these places have their own identity, memory and signification. According to Norberg-Schulz C. '*man lives when he succeeds in orienting himself in his environment and identifying with himself when he experiences the meaning of an environment*' [2]. According to Heidegger M. to *live* means '*to be present in the world together with others*' [3], the concept of habitability of space is based on this basic definition.

Habitability is essentially interpreted as the quality of life; it is therefore qualified as the product of the interaction between man / livable spaces: in another sense it is about a reading of the human experience, which is defined by the personal, family and social life of the individual within his home.

The diagram below is a synthesis of the relationship between man and his livable space (Figure 1).

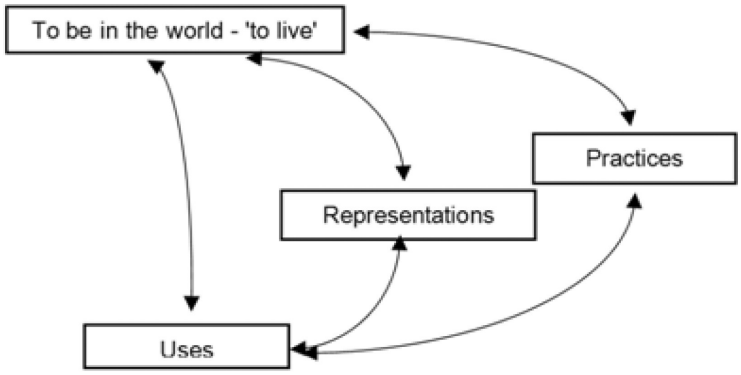

Figure 1. Synthesis of the relationship of man with his livable space (Source: authors 2018).

3. Elaboration of the analytical habitability grid of medinal heritage

Several authors have developed grid analysis methods based on the observation of spatial interactions. The grid is generally composed of criteria and each criterion is divided into several levels.

The approaches used in studying habitability involve many disciplines, such as urban habitability [4], landscape [5], territory [6], geography and the countryside [7]. Many scholars such as Newman, Young *et al.* have affiliated the idea of urban livability with the concept of sustainability [8, 9]. However, few studies have focused on observing the different ways of living in ancient fabrics [10, 11, 12], despite the historic city representing one of the striking elements in the landscape of the inhabitants and which today represent forms that differ from those of the era of their constitution and foundation, spatially, visually, symbolically and materially.

3.1. Construction of the theoretical framework

The term *habitability* appears for the first time under the pen of Louis-Sébastien Mercier in 1801 when he wrote, '… *the universe's ability to be filled with celestial bodies. This term will favor all beautiful cosmological dreams. In the time of bloody proscriptions, happy are those who had the courage to believe in the habitability of the forests or that of the caves*!' [13].

The notion has grown since the nineteenth century. The actual meaning of habitability was taken from its derivatives *habitable, inhabit, inhabitation* and *habitat*. Etymologically, it is derived from the word '*habitable',* which comes via old French from the Latin *habitabilis* [14] and designates the quality of a space to be occupied. Defined legally, in relation to certain sustainability requirements, to be habitable is to be viable[3].

In another body of literature, the term *livable cities* appeared in popular literature during the1980s in connection with growing environmental concerns and increasing competition among world cities to attract foreign investments and boost their economies [15]. Livability is known both as a holistic concept [16] and as a human concept [17] and has been described as the qualities that a place offers for the life of the inhabitants, such as dimension, light, insulation and hygiene.

According to Blanc Nathalie, a habitable place is a place that offers sufficient opportunities for creation and adaptation for individuals to appropriate it. The appropriation of a place and its transformation in a living environment are based on a detailed knowledge of the living conditions offered in this location [4].

The human, social and political sciences as well as philosophy have shown for a long time that the expression' living space' contains much more meaning than the relationship between man and his house, his shelter, his roof, his vehicle [6]. It concerns a set of everyday practices named, according to De Certeau [18] *'arts of making'*, these arts enable users to act, otherwise, '*they tinker, in all senses of the word, to fight against what is unhabitable*' [6]. In exploring literature, three criteria of habitability have been distinguished, according to P. Devaux: the body dimension, the social dimension and the temporal dimension [19]. These criteria come from an anthropological reflection, presented as dimensions of the human being and then as dimensions of habitability.

3.2. Grid design

In order to operationalize the conceptual framework and build the habitability analysis grid, it is important to identify the variables, sub-variables and indicators of the habitability criteria as well as to keep in mind that the goal is to design a habitability grid in order to examine the relationship man-space.

In the first place, it is essential to identify the criteria. Based on several references that deal with the concept of habitability, three criteria were drawn up.

The first criterion that comes from the basic definition of livability is *the quality of place*.

The second criterion of habitability is *the evaluation of place* [20-22]. The habitability of a place is the evaluation of a place depending on whether it is lived in as livable or not, binding or offering many possibilities, freedom of development and this in relation to our expectations, our needs, our ideal home. Otherwise called *'arts of* making'.

The third is *appropriation*, according to Blanc N. and Fischer G.N. [20], seen as a consequence of the cognitive evaluation of habitability which reveals adaptation and adjustment, the two mechanisms of appropriation.

The present research aims to evaluate the interior livability of the medina, in other words, how the traditional house is inhabited and whether it will continue to be. In the discourses of the inhabitants, the appropriation of place is a highlight of their feelings of security, intimacy and practices in daily life. The latter is made up of an infinity of localized interactions in time and space; the evaluation of these interactions is translated by the evaluation of the following variables and sub-variables which have been inferred from several definitions of habitability.

The variables for the criterion quality of place are:

• Dimension includes sub-variables: surface and form.

• Comfort includes sub-variables: lighting, isolation and aeration.

• Hygiene includes the sub-variables: sanitation and household waste.

• Technology.

The variables for the criterion evaluation of place 'arts of making' are:

• Liberty of planning includes sub-variables: versatility of space, integration of nature and modularity of space.

• Needs include sub-variables: adding parts (place / room), adding amenities and integrated activities.

• At home includes sub-variables: satisfaction and belonging to the place.

The variables for the criterion appropriation of place are:

• Transformations includes sub-variables: plan modifications, facade and structure.

• Heritage [27] includes sub-variables: historical dimension and cultural dimension.

• Identification [27] includes sub-variables: marking space and representations.

The meta-concept habitability does not have specific indicators, as they are synthesized to evaluate sub-variables. It is essential to specify them for a correct progress of the analysis. The most used and general indicator in this evaluation is the *'Vl.L.M.H.Vh',* this abbreviation expresses a qualitative indicator presented in the form of 5 degrees: *very low (weak), low, medium, high, very high*.

It is important to specify the other indicators that are forged for the evaluation of specific variables, the table below represents the indicators with the sub-variables to be evaluated (Table 1).

Table1. Indicators with sub-variables to be evaluated. (Source: authors 2018)

Abbreviation	Indicator	Sub-variables to be evaluated
Hm.Mm.U	Highly Modified / Moderately Modified / Unmodified	Form
Ta.Ma.I	Too much addition / Medium addition / Initial	Surface
S.Ns	Supported / Not Supported	Sanitation and household waste
U.N.C.	Useless / Necessary / Complementary	Adding parts
0.2 +3	0/ 2/ more than 3	Adding amenities and integrated activities
Ls.As.H.s	Low Satisfaction / Medium Satisfaction / High Satisfaction	Satisfaction
Lb.Mb.Hb	Low belonging / Medium belonging / High belonging	Belonging to the place
-. ±. +	Negative / More or less / Positive	Plan modification /Facade /Structure

The diagram of the habitability analysis grid

The diagram in Figure 2 explains the organization of the conceptual framework of the habitability analysis grid. It is structured around 3 criteria, 10 variables and 23 sub-variables, as well as indicators relating to each sub-variable.

4. Projection and analysis

The purpose is to highlight the criteria of habitability resulting from different scenarios, then to identify the variables and sub-variables for each criterion. By articulating the sub-variables, several indicators result. They compare research with the use of a barometer, a tool to measure and combine indicators. It is inspired by the barometer of sustainability [23].

Each sub-variable must be evaluated by its own indicator, this assessment is made by using a field diagnosis and a questionnaire survey. The results of the evaluation are presented by graphs and each graph is represented globally by a value expressed on a scale ranging from unhabitable to habitable, that is, a value from 0/10 to 10/10. The table below shows the weight of each indicator.

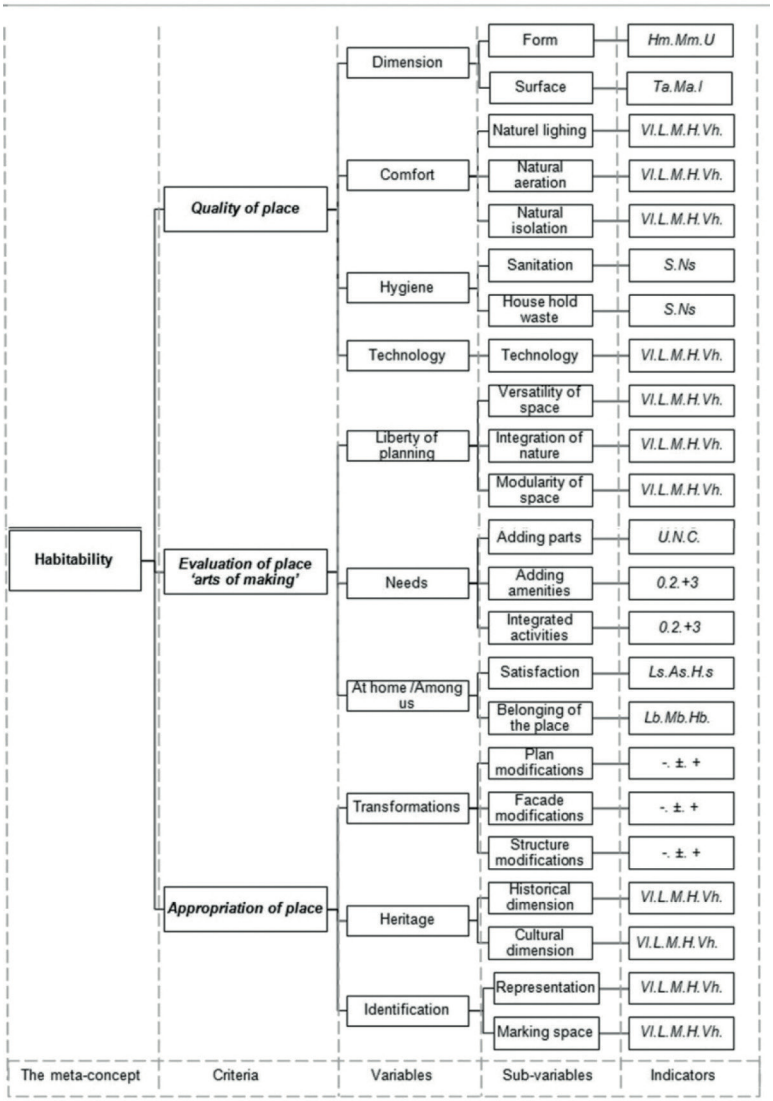

Figure 2. Overall diagram of the habitability analysis grid (Source: authors 2018)

Table 2. Barometer of habitability (Source: authors 2018)

Indicators / degrees of livability habitability	Qualitative indicators
0-2: unhabitable	Highly modified – too much addition – very weak – zero (0) – negative (-).
2-4: almost uninhabitable	Low – unsupported – useless – low satisfaction – low affiliation.
4-6: medium	Moderately modified – medium addition – medium – needed – two (2) – medium satisfaction – average membership – more or less (±).
6-8: almost habitable	High – supported – complementary.
8-10: habitable	Unmodified – initial – very high – more than three (+3) – high satisfaction – high membership – positive (+).

4.1. Space frame of study

Located in western Algeria, the city of Mostaganem spreads over a coastal band of about 124 km. It lies at a distance of approximately 365 Km from the capital Algiers and is limited to the North by the Mediterranean Sea, to the west by the *wilayas* (from the Arab term province) of Oran and Mascara, to the east by the *wilaya* of Chleff and Relizane (Figure 3).

Known as *Misk al ghaneim*[4] in the imagination of its inhabitants, Mostaganem was in antiquity an aggregation of villages named *Muristaga*, whose traces are found less in the ruins that cover the surrounding area of the current city than in their location on the flanks of a ravine that runs through the *Wadi Ain-Safra*.

Founded by Hamid el Abed in the M'hal period, it had a population of around 12000 inhabitants[5] occupying 2263 housing units[6] on an area of 21.32 hectares[7]. It was composed of two distinct zones separated by the ravine *Ain-Safra*: Derb, Tobana, Metmore and Tigditt "*twin city rather than single city of Mostaganem*" [24].

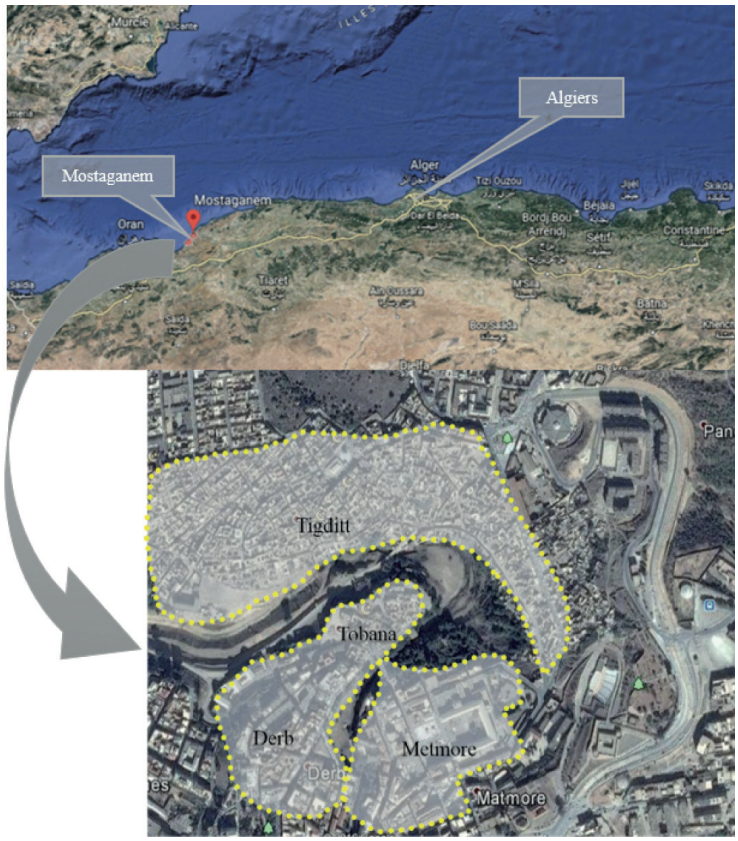

Figure 3. Location of the study site Mostaganem medina (source: Google earth 2018)

4.2. Implementing the grid

In order to operationalize the conceptual framework, it is important to identify the tools and techniques used for investigation. Firstly, we collected a huge amount of data in order to study the '*medina of Mostaganem'.* To proceed methodically in our research and find the necessary information, a great deal of fieldwork was required. This, namely, involved a direct diagnosis and a questionnaire survey of the inhabitants.

The direct diagnosis was made using a building sheet, presented in the form of a four-part *memorandum*. The aim of the first part was to establish the general profile of the house, the second to represent the layout plan as well as some interior and exterior views. The third part was devoted to a description of the house, its general condition and to a specification of the activities and amenities therein. The fourth part was designed to obtain information on any modifications and/or transformations made in the house.

The questionnaire for the survey is an important step; its main advantage being that it allows access to data of very diverse nature. Its role is essential in understand-

ing the behavior of the occupants and their attitudes and perceptions. Other data required for the purpose of our research are mainly based on the observation of existing interactions between the inhabitant and the inhabited space as well as the history of the place.

After collecting the necessary data, the analysis of each sub-variable was undertaken, for example, the analysis of the natural lighting in the houses which were visited. The results are shown on the graph in Figure 4. According to the field survey and directive diagnosis, 15% of the inhabited houses have a very low level of natural lighting, 7% low, 11% medium, 48% high and 19% very high. The highest indicator was selected and measured according to the habitability barometer.

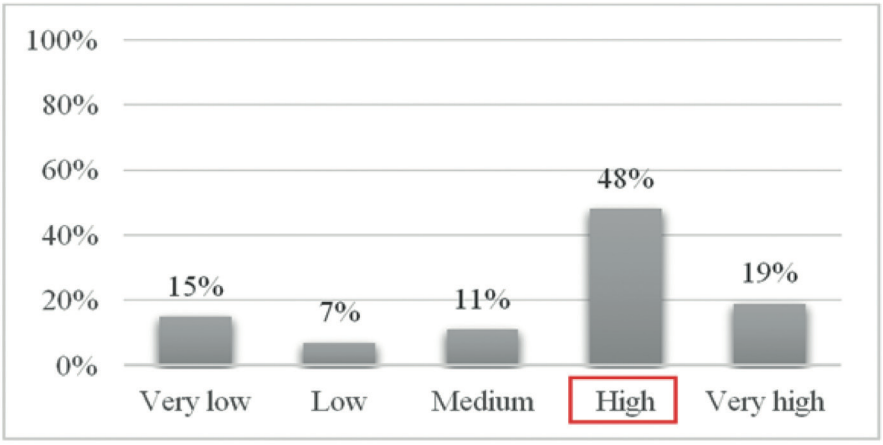

Figure 4. Natural lighting (Source: authors 2018)

By applying the habitability analysis grid, and after measuring the weight of each indicator selected for each sub-variable, the results obtained are shown in Table 2.

5. Results

The compiled results are presented primarily as a graph for easy reading. The description of the data led to an interpretation of the results. This was based on the search for relations between man and space in the traditional house according to the different sub-variables.

Figure 5 shows the habitability of the medina of Mostaganem. The results are for the 22 sub-variables. The sub-variable Ih.5 could not be evaluated due to lack of data.

Figure 6 illustrates the profile of the medina of Mostaganem taking into consideration the 10 variables of habitability and compares it to medium habitability. It can be observed that there is a desire to move towards an ideal type of habitability by improving the quality of life. Figure 7 below illustrates the overlapping criteria of habitability of the medina of Mostaganem and those of ideal habitability.

Table 2. The habitability analysis grid with a real evaluation of the case of the medina of Mostaganem (Source: authors 2018) – (Ih. = Interior habitability)

Criteria	Sub-variable	N°	Indicator	Weight of habitability	Source of measurement
Criterion 1: Quality of place	**Variable 1: Dimension**				
	Surface	Ih. 1	*Ma.*	5	On-site investigation + diagnostics
	Form	Ih. 2	*Hm.*	5	On-site investigation + diagnostics
	Variable 2: Comfort				
	Natural lighting	Ih. 3	*H.*	6	On-site investigation + diagnostics
	Natural ventilation	Ih. 4	*H.*	7	On-site investigation + diagnostics
	Natural acoustic insulation	Ih. 5	x	x	Absence of data
	Variable 3: Hygiene				
	Sanitation	Ih. 6	*S.*	5	On-site investigation + diagnostics
	Household waste	Ih. 7	*Ns.*	1	On-site investigation + diagnostics
	Variable 4: Technology				
	Technology	Ih. 8	*Vl.*	1	Questionnaire survey
Criterion 2: ***Evaluation of place 'arts of making'***	**Variable 1: Liberty of planning**				
	Versatility of space	Ih. 9	*M.*	5	On-site investigation + diagnostics + Questionnaire survey
	Integration of nature	Ih. 10	*Vh.*	8	On-site investigation + diagnostics + Questionnaire survey
	Modularity of space	Ih. 11	*F.*	3	On-site investigation + diagnostics
	Variable 2: Needs				
	Adding parts	Ih. 12	*N.*	6	On-site investigation + diagnostics
	Adding amenities	Ih. 13	*M.*	4	On-site investigation + diagnostics + Questionnaire survey
	Integrated activities	Ih. 14	*L.*	3	On-site investigation + diagnostics + Questionnaire survey
	Variable 3: At home				
	Satisfaction	Ih. 15	*L.*	4	Questionnaire survey
	Belonging	Ih. 16	*Vh.*	8	Questionnaire survey

Criterion 3: *Appropriation of place (appropriation of the medinal houses)*	**Variable 1: Transformations**				
	Plan modification	Ih. 17	±	5	On-site investigation + diagnostics + Questionnaire survey
	Façade modification	Ih. 18	-	2	On-site investigation + diagnostics + Questionnaire survey
	Structure modification	Ih. 19	±	6	On-site investigation + diagnostics + Questionnaire survey
	Variable 2: Heritage				
	Historical dimension	Ih. 20	*Vh.*	9	Questionnaire survey
	Cultural dimension	Ih. 21	*Vh.*	8	Questionnaire survey
	Variable 3: Identification				
	Representation	Ih. 22	*H.*	6	Questionnaire survey + direct/visual observation
	Marking space	Ih. 23	*H.*	8	Questionnaire survey + direct/visual observation

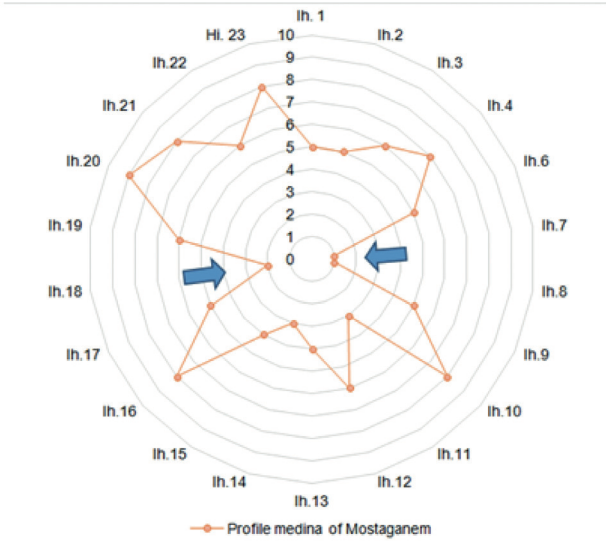

Figure 5. Analysis of the interior habitability of the medina of Mostaganem (Source: authors 2018).

Figure 6. Habitability of the medina of Mostaganem compared to medium habitability (Source: authors 2018).

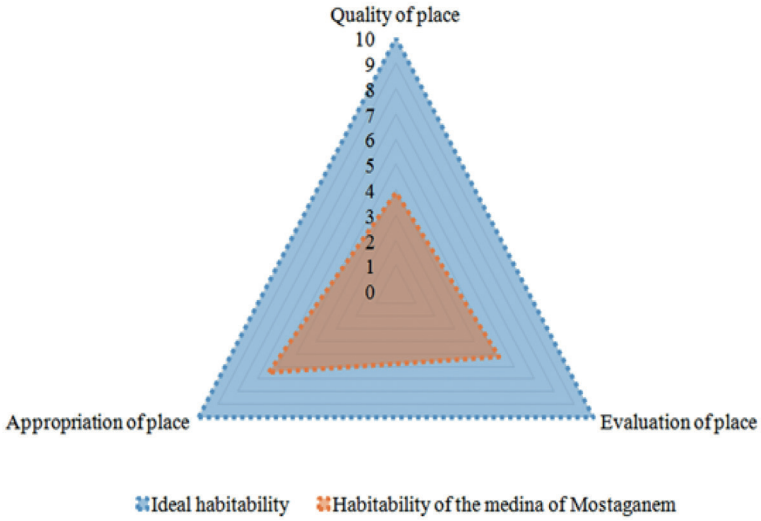

Figure 7. Habitability of the medina of Mostaganem compared to ideal habitability (Source: authors 2018).

5.1. Discussion of results

There is no need to idealize the dynamics of transformations made by man in this situation, it is about relying on the conception that *"it's life that's right"* [25] and questioning the way people live and the limits that exist in the use of the spaces.

There are many criteria to define the livability of a city with criteria differing according to people's personality, cultural and national background, conditions and expectations.

On the whole, there are two rationales that define user practices. The first is conservative, which corresponds to the acts of the native inhabitants of the medina "*Ouled el bled"* and is an adaptation to everyday life 'to live'. It fits into a trend of medium habitability. The photos below present some attempts to inhabit various spaces (Figure 8).

Figure 8. Patio cover with (a) reeds and plants; (b) sheet metal; (c) and glazing. (Source: authors 2018).

The second rationale is *degrading,* which concerns tenant and squatter inhabitants. It is about greatly modifying the place "to take advantage of the place". For example, the fragmentation of the patio and its complete closure, to lodge in a garage, the brutal opening of windows and their closures (Figure 9). These are acts that contribute to the loss of the place, especially when these transformations are irreversible.

Figure 9. Closure / brutal opening of a door and a window (Source: authors 2018).

The logics of habitability / unhabitability of space, however, are faced with a variety of conflicting aspects. On the one hand there is a conflict related to appropriation of the place, as well as the dynamics of transformations used to inhabit and, on the other hand, to capitalize on the historic place, as well as taking into account interventions of preservation and reconversion relating to monuments and houses of notables.

5.2. Challenges and perspectives

In the present research, setting aside the statistical vision of habitability qualified as the interaction between man and traditional houses, it is important to consider the sensory relationship of this interaction which may range from the redistribution of internal spaces to the modification of the facades. These are strategies that highlight the process of the quest for autonomy and is shaped by a given kind of life. It does not remain constant and its unpredictability is a factor in the evolution of user expectations.

To understand the condition in which man lives, we must first understand the history and the memory of places. It is a redefinition of the past through present experiences. Man aspires to align himself with a series of imperatives of modernity through the introduction of commodities, the ambition of some comfort and to offer a new model occupying a space that is closer to the image that the inhabitants want to offer of themselves; '*a group takes possession of a space and transforms it into its image*' [26]. This image corresponds to a quest for ideal habitability which might distort the space of the traditional house.

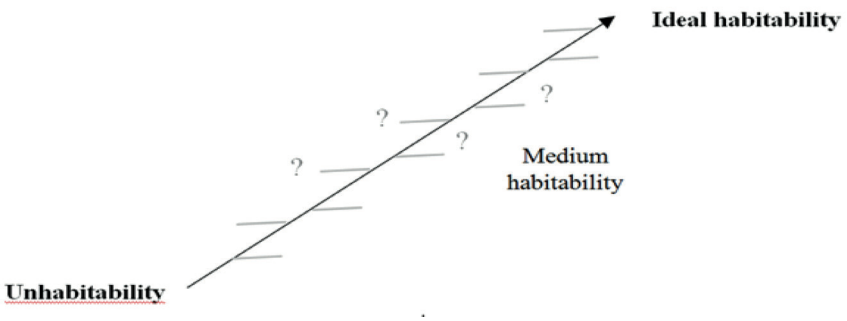

Figure 10. Trend towards ideal habitability (Source: authors 2018).

From the diagram in Figure 10 it was concluded that the ideal is to move towards medium habitability, which varies according to each occupant but as a whole gives the same result that takes into consideration the adaptation of a traditional house to modern life. The action is considered in a historical continuity by articulating data inherited from the past with those envisaged in the future [27].

6. Conclusion

As in any field of research there are limits and constraints that structure the work, such as missing information and difficulty in obtaining some data, the present research is no different.

The medina of Mostaganem represents the site chosen for the application of the grid conceived to analyze its habitability. From the application, two rationales relating to the transformation of the medina were highlighted: habitability / in-habitability of the space. According to this logic, three actors stand out: the actors who live, the actors who reside and the actors who profit from the places. These actors are determinant in the fate of the medina and whether it will be able to remain inhabited or not.

In a more general way, *to live* does not mean *to reside* but rather *use the historic place*; it is to have the use of the historic place and to perform the acts of everyday life, in a process that leads to an ideal form of habitability.

In the role of the analytical habitability grid of heritage, it is essential to know, on the one hand, if the inhabitants are aware of the heritage they inhabit, and on the other, whether habitability makes it possible to ensure a continuity of the living spirit of an inherited place together with a continuity of the life in the historic place.

As a final consideration, it is important to highlight the originality of the present research which resides in the fact that the grid is designed to be used as a model of analysis of the habitability of the historic tissue, qualified as the oldest part of major Islamic Arab-Berber cities, the *'medina'*. This grid model not only allows the analysis of the quality of life in an ordinary residential area, but also analyzes a living inherited object.

More generally, putting the grid into perspective helps to develop a critical perspective of the current state of the medinas and opens up prospects for participatory medina preservation in the long term.

Notes

1 In this research, the term “man” is used to refer to the term “human being”.

2 «*Halkats*» plural of «*halka*»: street art, local art that consists of reinventing tales, stories and songs by a man named ‘El medah’ in a specified place in the presence of curious.

3 Habitable space 03-096/1. According to the “By-law concerning the sanitation and maintenance of dwelling units”, CANADA, habitable space is a space or a room used or intended to be used for cooking or eating, sleeping or living purposes, excluding a bathroom, a water closet, a storage space, a closet, and a laundry room. Available at http://ville.montreal.qc.ca/sel/sypreconsultation/afficherpdf?idDoc=1039&typeDoc=1, [Accessed the 12/06/2018].

4 Local nomination which means “precious spoils”.

5 According to the POS – Mostaganem [Ground Occupation Plan] Long-term demographic perspectives, 2022.

6 According to the field survey established by the author (October 2016 to September 2018).

7 According to PDAU-Mostaganem [Master Plan Of Development And Urban Planning], December 2006, phase III.

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Biographical notes

Fatima Bouzid is an architect and a PhD student at the Science and Technology University of Oran, Algeria. She is specialized in medinal heritage in the Maghreb in general, and in Algeria in particular. She started her research with all forms of heritage (restoration, rehabilitation). She then focused more in detail on a participatory conservation method. She has actively participated in several events of earthen architecture and preservation of heritage. She has presented different articles in several conferences related to the theme of heritage preservation, adding a digital dimension to valorize and preserve heritage, tourism, and more specifically the preservation of the medinal heritage in Algeria. She is particularly interested in calligraphy, mosaic and sculpture.

Malika Kacemi Maghfour is a Professor of Architecture at the University of Science and Technology of Oran, Algeria. Her main interest is urbanism and heritage. Her PhD thesis is about the integration of the littoral specificities in town planning documents. She has furthered her research in the sustainable development and conservation of architectural heritage. She has recently become interested in tourism and nineteenth century heritage. She is currently the President of the scientific committee of the Department of architecture at the Science and Technology University of Oran, Algeria.

Emmanuel Amougou Mballa is a doctor in sociology, qualified to conduct research, professor-researcher at the National School of Architecture of Paris La Villette. His research work focuses on heritage issues – material and immaterial – in contemporary societies. This research orientation takes a critical look at the objects

he tries to analyze, from a sociological point of view, as all of his publications attest. His work involves attempting to understand the mechanisms, logic and effects that are at the beginning of phenomena such as: the passage of tangible or intangible objects to heritage status; the logic of social domination in the construction of peri-urban spaces; urban spaces (cities) as places of staging and reproduction of social and symbolic differentiations.

Summary

Conservation of historic cities is limited in many countries to valorization and safeguarding which is performed utilizing several types of interventions. Many countries aware of the importance of their heritage in the development of human life, are currently concerned with their inhabitants' participatory role in conservation. The historic cities in Algeria are not immune to this fact.

Nowadays, particular attention is paid to the quality of life in historic Algerian cities which are in continuous transformation. It has become an urgent issue to inquire into the state of these medinas. The aim of this article is to design an analysis grid of habitability for these historical cities in order to interpret the quality of life, as well as the understanding of the man-made quest for ideal livability.

The adopted methodology is divided into two parts: first, making the grid and second, its projection and analysis. Application of the grid requires very diverse data and a field of study. For this purpose, several tools were mobilized: a questionnaire survey, field measurements and direct diagnosis. For a positive outcome to the research, fieldwork is essential. This is the case study of the Medina of Mostaganem.

Riassunto

La conservazione delle città storiche è limitata, in molti Paesi, alla valorizzazione e alla salvaguardia che viene eseguita utilizzando diversi tipi di interventi. Molti Paesi, consapevoli dell'importanza del loro patrimonio nello sviluppo della vita umana, sono attualmente interessati al ruolo partecipativo dei loro abitanti nella conservazione. Le città storiche in Algeria non sono immuni da questo fatto.

Oggigiorno, particolare attenzione è rivolta alla qualità della vita nelle città storiche algerine che sono in continua trasformazione. Analizzare lo stato di queste città storiche è diventato un problema urgente. Lo scopo di questo articolo è di progettare una metodologia di analisi di abitabilità al fine di interpretare la qualità della vita e comprendere gli standard di vivibilità ideale.

La metodologia adottata è divisa in due parti: la griglia e la sua proiezione e analisi. L'applicazione della griglia richiede dati molto diversi e un settore di studio. A tal fine, sono stati utilizzati diversi strumenti: un questionario, misurazioni sul campo e analisi diretta. Per il positivo risultato della ricerca è essenziale il lavoro sul campo: il caso studio presentato é relativo alla città di Mostaganem.