

SEVILLA

IDA

**IDA: ADVANCED  
DOCTORAL RESEARCH  
IN ARCHITECTURE**



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Antonio Tejedor Cabrera, Marta Molina Huelva (comp.)

IDA: Advanced Doctoral Research in Architecture  
Sevilla: Universidad de Sevilla, 2017.

1.408 pp. 21 x 29,7 cm

ISBN: 38765987928376375

Legal Dep.: 236235768336

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Seville, november 2017

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## FOREWORD

The Instituto Universitario de Arquitectura y Ciencias de la Construcción (IUACC), in collaboration with the Escuela Técnica Superior de Arquitectura (ETSAS) and the Escuela Internacional de Doctorado (EIDUS) of the University of Seville are pleased to welcome the heads of research from both Spanish and overseas universities, consolidated researchers and young doctoral researchers to the First International Congress of Doctorates in Architecture IDA Sevilla, from 27th to 28th November 2017.

The **IDA\_Sevilla 2017** Congress offers a general perspective of doctoral studies in the field of Architecture and its related disciplines: urban planning, heritage, landscape, construction technologies and sustainability. In the new context generated after the elimination of the doctoral programs prior to RD 99/2011, it is necessary to carry out an analysis of the complex panorama that the former programs and the new doctoral programs have drawn up, in order to know in detail both what has been achieved so far, as well as the challenges of the future of advanced doctoral research in Spain, in the European and international context.

The startling changes that are taking place in our society call for a vision of research that is not compartmentalised into traditional disciplines or areas of knowledge. Doctoral research in Architecture must adapt to changes in society and to the sustainable productive needs of territory.

The congress will take place at the Escuela Técnica Superior de Arquitectura de Sevilla, organised in four simultaneous thematic tables, a workshop on the administration of doctoral programs and two plenary sessions.

The **thematic tables** are aimed at young doctors and doctoral students of the different participating universities who will present their experiences and methods of their research - in development or recently concluded. The participation in the thematic tables is carried out through the selection procedure with blind peer review established in the call for papers and through express invitations to the debate. The almost 70 communications have been structured in four thematic areas representative of the PhD programs in Architecture.

The **open workshop** will be held in two sessions with the participation of the coordinators of each of the collaborating programs of the Congress, and professors with extensive doctoral experience. Its objectives are multiple: to discuss the experiences undertaken in the different universities, exchange ideas about the approaches and models applied, address the challenges of internationalization and management, launch the new Industrial Doctorate with companies and public agencies, and so on.

There are two **plenary sessions**: one, a plenary session of introduction to the congress, with the participation of coordinators of national and foreign doctoral programs; and a closing plenary session, with an open debate for the going-over of the conclusions drawn from the thematic tables and the workshop, and the presentation of final conclusions.

We thank the Escuela Internacional de Doctorado of the University of Seville, and the Escuela Técnica Superior de Arquitectura de Sevilla for the support they have provided for the holding of this meeting, which contributes so much to the clarification of the future of doctoral studies in Spanish universities in the face of the great challenge of internationalization and the continuous improvement of the quality of research in Architecture. We also thank those responsible for the participating Doctoral Programs, the Architecture library of the US and all the participants and attendees.

Antonio Tejedor Cabrera  
Marta Molina Huelva

## PRÓLOGO

El Instituto Universitario de Arquitectura y Ciencias de la Construcción (IUACC), con la colaboración de la Escuela Técnica Superior de Arquitectura (ETSAS) y la Escuela Internacional de Doctorado (EIDUS) de la Universidad de Sevilla, se complacen en recibir a los responsables de investigación de universidades españolas y extranjeras, a los investigadores consolidados y a los jóvenes investigadores de doctorado en el I CONGRESO INTERNACIONAL DE DOCTORADOS EN ARQUITECTURA IDA\_Sevilla, del 27 al 28 de noviembre de 2017.

El congreso **IDA\_Sevilla 2017** ofrece una perspectiva general de los estudios de doctorado en el campo de la Arquitectura y sus disciplinas afines: urbanística, patrimonio, paisaje, tecnologías de la construcción y sostenibilidad. En el nuevo contexto generado tras la extinción de los programas doctorales anteriores al RD 99/2011 es necesario realizar un análisis del complejo panorama que han construido los programas extintos y los nuevos programas de doctorado, con el objeto de conocer con detalle tanto lo conseguido hasta ahora como los retos que depara el futuro de la investigación doctoral avanzada en España, en el contexto europeo e internacional.

Los vertiginosos cambios que se están produciendo en nuestra sociedad reclaman una visión de la investigación no compartimentada en disciplinas o áreas de conocimiento tradicionales. La investigación doctoral en Arquitectura debe adaptarse a los cambios de la sociedad y a las necesidades productivas sostenibles en el territorio.

El congreso se celebra en la Escuela Técnica Superior de Arquitectura de Sevilla organizado en cuatro mesas temáticas simultáneas, un taller sobre la gestión de los programas de doctorado y dos sesiones plenarias.

Las **mesas temáticas** están dirigidas a los jóvenes doctores y a estudiantes de doctorado de las diferentes universidades participantes que exponen sus experiencias y métodos sobre las investigaciones en desarrollo o recientemente concluidas. La participación en las mesas temáticas se realiza por el procedimiento de selección con revisión por pares ciegos establecido en la *call for papers* y por medio de invitaciones expresas al debate. Las casi 70 comunicaciones se han estructurado en cuatro áreas temáticas representativas de los programas de doctorado en Arquitectura.

El **taller** de puesta en común se realiza en dos sesiones con la participación de los coordinadores de cada uno de los programas colaboradores del Congreso y de profesores con amplia experiencia doctoral. Sus objetivos son múltiples: debatir sobre las experiencias desarrolladas en las distintas universidades, intercambiar ideas sobre los enfoques y los modelos aplicados, abordar los retos de internacionalización y de gestión, poner en marcha el nuevo Doctorado Industrial con empresas y agencias públicas, etc.

Las **sesiones plenarias** son dos: una sesión plenaria de introducción al congreso, con la intervención de coordinadores de programas de doctorado nacionales y extranjeros; y una sesión plenaria de clausura, con un debate abierto para la reelaboración de las conclusiones extraídas de las mesas temáticas y del workshop y la presentación de las conclusiones finales.

Agradecemos a la Escuela Internacional de Doctorado de la Universidad de Sevilla y a la Escuela Técnica Superior de Arquitectura de Sevilla el apoyo que han proporcionado para la realización de este encuentro que tanto contribuye a clarificar el futuro de los estudios doctorales en las universidades españolas ante el gran reto de la internacionalización y la continua mejora de la calidad de la investigación en Arquitectura. Damos las gracias también a los responsables de los Programas de Doctorado participantes, a la Biblioteca de Arquitectura de la US y a todos los participantes y asistentes.

Antonio Tejedor Cabrera  
Marta Molina Huelva

## OBJECTIVES

1. Analyze the research lines of the various programs and build a map of doctoral research in Spain with the support of coordinators, tutors / thesis supervisors, doctoral students and young doctors in the disciplines related to Architecture and their related areas.
2. To know the status of doctoral theses in progress or defended in the last three years, selected by means of a call with blind peer evaluation of the doctoral programs participating in the congress.
3. Discuss the structure and university management of doctoral programs in relation to employment challenges, collaboration with the productive sector and national research programs.
4. Exchange experiences with other international doctoral research programs on international mobility management, theses with international mention, co-supervised theses, theses with industrial mentions, etc.
5. No less important, consolidate a national and international network of Doctoral Programs related to Architecture, Urban Planning, Heritage, Landscape, Technologies and related disciplines.



**LT 1**

ARCHITECTURE  
TECHNOLOGIES

**LT 2**

HOUSING, CITY  
AND TERRITORY

**LT 3**

HERITAGE AND  
REHABILITATION

**LT 4**

ANALYSIS AND  
ADVANCED PROJECTS



## **FORMAT**

### **Thematic tables**

The thematic tables are places to present the methodologies and experiences of young doctors and doctoral students from different universities. They are managed by the doctorate students themselves, who generate conclusions to be debated and reworked in the final plenary session. The sessions are developed simultaneously with the presentation of the papers selected in the call, organized in four areas or thematic lines:

1. Architectural technologies
2. Housing, city and territory
3. Heritage and Rehabilitation
4. Analysis and advanced projects

### **Workshop**

The workshop of the Congress is oriented towards the analysis of the problems and management needs of the Doctorate Programs, with the objective of arriving at conclusions that may be useful to the Universities involved. The coordinators of the Doctorate in Architecture programs and the doctoral students' representatives will participate in the workshop. The following are topics for debate: lines of research, methodologies, organizational needs of the doctoral programs, the International Doctorate and the Industrial Doctorate, and the future of doctoral research.

### **Plenary Sessions**

The plenary sessions are held at the beginning and end of the Congress. In the first session of welcome and introduction to the Congress, researchers from the national and international scene and the coordinators of the doctorate programs are invited to participate. In the second plenary session an open debate is proposed for the going over of the proposals drawn from the workshop and the thematic tables. It also serves as a closing ceremony with the presentation of the final conclusions of the 2017 IDA\_Sevilla Congress.

## OBJETIVOS

1. Analizar las líneas de investigación de los diversos programas y construir el mapa de la investigación doctoral en España con el apoyo de los coordinadores, los tutores/directores de tesis, los doctorandos y los jóvenes doctores en las disciplinas relacionadas con la Arquitectura y sus áreas afines.
2. Conocer el estado de las tesis doctorales en marcha o defendidas en los últimos tres años, seleccionadas por medio de una *call* con evaluadores por pares ciegos de los programas de doctorado participantes en el congreso.
3. Debatir sobre la estructura y la gestión universitaria de los programas de doctorado en relación con los retos de empleo, colaboración con el sector productivo y los programas nacionales de investigación.
4. Intercambiar experiencias con otros programas de investigación doctoral a escala internacional sobre gestión de la movilidad internacional, tesis con mención internacional, tesis en cotutela, tesis con mención industrial, etc.
5. No menos importante, consolidar una red nacional e internacional de Programas de Doctorado relacionados con la Arquitectura, la Urbanística, el Patrimonio, el Paisaje, las Tecnologías y sus disciplinas afines.



## **FORMATO**

### **Mesas temáticas**

Las mesas temáticas son lugares de presentación de las metodologías y las experiencias de jóvenes doctores y de estudiantes de doctorado procedentes de las diferentes universidades. Son gestionadas por los propios estudiantes de doctorado que generan unas conclusiones para ser debatidas y reelaboradas en la sesión plenaria final. Las sesiones se desarrollan de manera simultánea con la presentación de los *papers* seleccionados en la *call*, organizados en cuatro áreas o líneas temáticas:

1. Tecnologías de la Arquitectura
2. Vivienda, Ciudad y Territorio
3. Patrimonio y Rehabilitación
4. Análisis y Proyectos Avanzados

### **Taller**

El workshop del Congreso se orienta hacia el análisis de los problemas y las necesidades de gestión de los Programas de Doctorado con el fin de extraer conclusiones que pueden ser útiles a las Universidades implicadas. En el workshop participan los coordinadores de los programas de Doctorado en Arquitectura y los representantes de los doctorandos. Son temas de debate: las líneas de investigación, las metodologías, las necesidades organizativas de los programas de doctorado, el Doctorado Internacional y el Doctorado Industrial, y el futuro de la investigación doctoral.

### **Sesiones Plenarias**

Las sesiones plenarias se realizan al inicio y al final del Congreso. En la primera sesión de bienvenida e introducción al Congreso se invita a participar a expertos investigadores del panorama nacional e internacional y a los coordinadores de los programas de doctorado. En la segunda sesión plenaria se propone un debate abierto para la reelaboración de las propuestas extraídas del taller y de las mesas temáticas. Sirve también de clausura con la presentación de las conclusiones finales del Congreso IDA\_Sevilla 2017.

**ICF**

SEVILLA

LT1

TECNOLOGÍAS DE  
LA ARQUITECTURA

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# TOWARD A CONTEMPORARY PLANNING METHOD: TECHNOLOGICAL AND CITIZENSHIP COMMITMENT

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## Abstract:

Cities are growing exponentially, raising new demands and complexities that, combined with an unexpected and accelerated technological, multisectoral and massive transition, generate scenarios and challenges that conventional planning - with conventional methods - has not solved. This paper –as summary of some outcomes from a PhD Thesis- responds to the research question: How contemporary urban planning could improve its outcomes through urban technologies implementations? In order to be able to respond the question the thesis researched within the past looking for techniques, methods, success and failures which could be useful as reference to understand our knowledge and potential future goals to enhance the use of technologies. Such technology combined with the actual information and data available nowadays could allow us to face the raising complexity of a society that demands new improvements within the cities. The use of technological techniques such simulation and modelling using artificial intelligence would move further toward rigorous, accurate and resilient outcomes from spatial planning. It could support to avoid the negative consequences after applying inadequate actions and unnecessary sources that –usually- do not cover the demands from the citizens. Therefore, it needed to move further, in a realistic and factible way, toward a methodological alternative that filters itself within the current urban planning processes. This proposal is tested in the PhD thesis with some potential outcomes to support further research and that are highlighted in this paper.

**Keywords:** Urban planning, Artificial intelligence, Collaborative planning, Urban technology, Urban simulation.

## 1. Introduction

At the end of century XIX Reclus (2014) said:

Al observar nuestras inmensas ciudades expandirse cada día y casi cada hora, engullir año tras año nuevas colonias de inmigrantes y extender sus tentáculos, como pulpos gigantes, sobre el espacio que las rodea; se siente una especie de estremecimiento, como si se presenciaran los síntomas de alguna extraña enfermedad social[...]. Sin embargo, es fácil demostrar que este crecimiento monstruoso de la ciudad -resultado complejo de una multiplicidad de causas- no es pura patología.

Nowadays over 54% of the world population live within urban areas, forecasting an increment toward 66% within the horizon 2050 (UN Habitat, 2016). This trend is because of the foreseeable growth of the population combined with their preference to live within urban areas. Hence, this is our current scenario, but also it is our future. A panorama in which cities will become more important, probably more than the states (Castells, 2001). Every time is more evident that the city is a complex system but incomplete (Sassen, 2015). This statement is useful to set position and drive the goals to move further in the methods and techniques within contemporary urban planning toward a successful outcomes.

These moments begin to be a juncture where the population and the urban management is one of the main challenges of our immediate future. The new urban Agenda approved within Quito in 2016 deal the demand of social inclusiveness, equity and an urgent change in the current urban growth trends. This Agenda also remarks the need to face the climate change challenges and the resilience to the critic scenarios as consequence of the natural disasters and circumstances out of control.

On that note, the United Nations has settled seventeen goals to transform our world, the so called “17 Sustainable Development Goals” which are detailed within 169 aims dealing the basic elements defining this guide for the future transformations: economic growth, social inclusiveness, and environmental protection.

Scales, demands, circumstances and challenges in the local and global level that show us a heterogeneous and complex panorama that is going to require substantial changes within planning

and management of our cities. Ascher studied in his book "Los nuevos principios del urbanismo" saying (2004):

Las sociedades occidentales están cambiando y entran en una nueva fase de la modernidad que ve evolucionar profundamente las formas de pensar y actuar, la ciencia y la técnica, las relaciones sociales, la economía, las desigualdades sociales, los modelos de democracia. Estas mutaciones suponen y hacen necesarios cambios importantes en el concepto, la producción y la gestión de las ciudades y de los territorios, y ponen de actualidad una nueva revolución urbana moderna, la tercera después de la revolución de la ciudad clásica y de la ciudad industrial.

These words begin to be part of urban planning's future while other authors remain showing the gradual and irrelevant role of urban planning with a wide acknowledge of its failures due to it did not face on time and spatially the actual issues of the cities. A generic position which depends of every case presenting different palate of failures and successes. Therefore, the failure of planning practice has been widely reported (UN Habitat, 2016; Hall, 1980; among others) although there are also several exceptions reporting good practices (Tojo & Naredo, 2010)

Contextualized in Andalusia, the situation presents an alarming framework specially for the high law production –even contradictory sometimes- on the last decades. Along the time has been shown its useless and inefficiency due to nowadays it still keeps excessive urban planning proposals belonging to other times and promoting speculative growing dynamics. It generated some of the irreversible territorial effects and a critic social and economic situation (Belil, 2012; I Díaz, 2008; among others).

The research by Martín (2016) underpins these thoughts about the details and effects above mentioned based on three main analysis: a) assess the current status of regional and urban planning, b) the valorisation of the actual regional planning models from the analysis of the current urban planning, and c) assess the incidence and the impact on the current "urban models" (translated from Spanish term "modelo urbano") from the regularization and integration in the urban fabric of the irregular building processes which are happening in the "non-urban" (translated from the Spanish term "no urbanizable") land. On that sense, clarity is expressed by "Adaptaciones Parciales a la LOUA":

[...] ha certificado en muchos casos, con una actitud contemplativa y condescendiente, la desfiguración del tradicional sistema de asentamientos existente en su ámbito territorial sin adoptar medidas que fomenten la contención y, porque no, la reversión de esta situación, obligando a la reconducción de estos modelos consumistas de territorio hacia patrones de ordenación encaminados hacia la sostenibilidad y, por tanto, al establecimiento de modelos de ciudad razonablemente compactas, funcionalmente complejas, dotacionalmente proporcionadas e infraestructuralmente eficientes.

Processes, tools, culture, education, learning, and interests are converted in causes and effects of the inability from planning of the incorporation of criteria and guiding principles useful to rule, coordinate and orientate dynamics as accelerated as the ones that we have lived the last decades. Besides, they do not only have reported a gap between the plan and the citizens, but a gap between what is executed and what could be convenient to execute.

It is evident that planning is dreamy with the radical changes happening nowadays, not just referred to the discipline, methods and tools itself, but to its role and habits. Therefore, it should move further toward the enhancement of its obsolescence integrating other disciplines and interacting with other sectorial competences (environmentalist, engineers, artists, so on), with the stakeholders and with the citizens. On that way, it could have the possibility to find the essence of planning practices to become the suitable tool toward the best social, economics and environmental actions which are needed. In order to do so, it has to gather the respect and disciplinary credit to be successful in the processes, generating criteria for the proposals beyond the classic parameters.

Un urbanismo enfocado a la producción flexible que sustituya a la producción fordista, un urbanismo zonificador tradicional que tiene que dar paso a un nuevo urbanismo que incide más en la forma de producir que en la propia naturaleza de aquello que se produce (Trullén, 2014, p. 105).

The technology is not only an element that affects the city, but it performances the revolution in its understanding and functional working system (Hajer & Dassen, 2014). However, we are still not able to appreciate and understand the whole picture of its potential applications and capabilities. While there are still some discussions and debates about the dilemma whether the technology should be implemented or not within planning, in other disciplines there is a strong and clear interest and application of the technology. They are moving further very quickly in order to have accessible the tools, also because they take in account all the raising available data that allow us new scope and solutions. Advanced technology makes its way and begins to set as an unquestionable reality in the planning of cities

In addition, the technology also starts to have a role within urbanism practices such urban management, communication, participation, and even within sociological analysis. However, in the meanwhile planning remains refusing to incorporate technological advances to regard that processing data, the systematization, and the scientist become to cancel one of the most important moment of



planning: the decision-making process by the intuitive process by practitioners. Therefore, the contemporary planning approach has to understand and assume the role as coordinator between experts, actors, and stakeholders in order to use the best information and technology available. On this line, Offenhuber and Ratti (2014) on their book called "Decoding the city" was key inspiration source on the beginning of this literature review:

But planners, policy experts, and economists are no longer the only specialists responding to these challenges. New actors enter the stage and bring new approaches to the field. Perhaps the most significant developments have happened in the domain of data-intense methodologies.

Hence, regarding the literature review, we reflect on the original research question: How contemporary urban planning approach can improve its outcomes through the urban technology? Either planning or urbanism are at this moment at the level which is demanded by the society. Regarding the lack of usability of technological tools and the possibilities that are open with the citizen collaboration, we underused the opportunity to bring together finally the two opposite side of the dilemma between humanistic and technocratic experts (Portugali, 2011).

In definitive, there is needed to assume the new transition as a positive challenge, where planning has a main role in the future of cities, and that the planner is presented as the essential agent who is able to read the general picture and being the integrator of all the disciplines interacting within the decision-making processes (Haselsberger, 2017).

In this paper, it is synthetize the PhD thesis where was generated a methodological alternative exploring the new paths to enhance and to transform the current situation, proposing that technology and collaborative processes become in key elements in order to respond to the raising complexity in our cities. It is proposed by practices which go beyond of the readings, visualizations and performances of the urban dynamics. It is more about allowing us to study that complexity through specific tools (Batty, 2013). On that sense was developed the test on a case study: Intramuros de Jerez de la Frontera.

## 2. Objectives

Responding to the research question, this PhD thesis was proposed to: approach a historical and theoretical reflection on the dilemma of planning; to find the keys to integrate the advantages of each one of the extremes of the pendulum; to study the evolution in the time and in the positions of each one of the parts; and to concretize a methodology that allows positive addition by translating them into practice in a useful way, and also to test this methodology to verify the results in an empirical case. They are the objectives and focuses of the research.

Therefore, the line of work is centered on proposing: 1) a theoretical-methodological model that fuses the main contributions of extreme positions between humanists and technocrats. 2) to establish a specific technological channel for the discussion of complex situations. 3) to propose a process that contemplates the insertion of these objectives. 4) develop and experience a concrete application with the simulation of urban scenarios that allows to reflect and learn from the conjunction of an intelligent process between people and machines. 5) to test viability in an urban study of a specific area in which theoretical key concepts (complexity and dilemma) are combined with other thematic aspects (heritage values, depopulation and progressive deterioration). At the end, some lines to attend the objectives presented below:

- Show the set of improvements that can be incorporated into the planning as a result of technological advances.
- Study the incorporation of a new dimension and formats for the processes of citizen participation facilitating an important civic advance.
- Contribute to incorporate a greater degree of success in urban projects.
- Minimize the negative effects of cabinet decisions and imperatives.
- Pursue the values of the academic world by ensuring that research and technology transfer also reach urban planning in a useful way.
- Renew the toolbox in the drafting and monitoring processes of urban and territorial planning.
- To inventory, to review and to join cases of investigation and experimentation on the urban simulation to elaborate a state of the art.
- Reflect on the advantages and disadvantages of these techniques, both in their preliminary applications and in their consolidation phase.

### 3. The active past and the theoretical framework of the new alternative

We have studied and learned to keep in mind our past, a past that (Terán, 2009) throughout his book "The Active Past" reminds us of the lessons of history. A history that expresses to us not only the reality of the political, social, economic, cultural and urban events already lived, but we must reread to reinterpret the keys of our search so that they can be applied to the right place and moment.

It is in this sense that we consider the different versions of the two extreme positions of the dilemma, asking which of them is the utopia and in which the dystopia, the pendulum's comings and goings for decades, until the moment of integrative lines. It seems simple, but it is not. Many decades of sterile debate, so far, the author-based criteria that defend and argue for integration and convergence begin to emerge. The city is complex and needs to be approached with the people and with the appropriate technologies to process the complexity. The city needs the intelligence of people and machines.

The criticism of the classical and/or technological planning coming from different types of humanistic movements is diverse. In the literature review we focused on the interest of two key authors. While Alexander (1967) in his essay called "the city is not a tree" analyzed the problem of designers and planners in their eagerness to simplify urban complexity (to create cities without urban vitality), Jacobs (1973) was promoting planning processes posed as collaborative exercises.

Has progress been made in urban planning in the last fifty years? Is the city being understood as a complex system, both in theory and in practice? And in such a case Why is it still unusual for the city to continue to plan without citizen collaboration in a real way? Why are not the information and advanced technological resources that are now so accessible? This series of questions has led us to look at the understanding of the city as a complex system, and to consider that a more collaborative planning process is the most convenient way to approach it, and in turn confronts a multitude of situations that urgently need to be resolved.

But we were at one end of the pendulum until the so-called third movement (Portugali, 2011) takes shape that converges the positive contributions of both ends of the dilemma, these moments become the point of inflection, and that already emerges in documents such as the latest World Cities Report (WCR) report (UN Habitat, 2016) that identifies the changing trend in planning processes: "The plan is dead: long live the planners! From Master plan to community vision" and developed based on the idea of moving from the planned city, translated as the planned city, to the city that plans, translated as the city that plans.

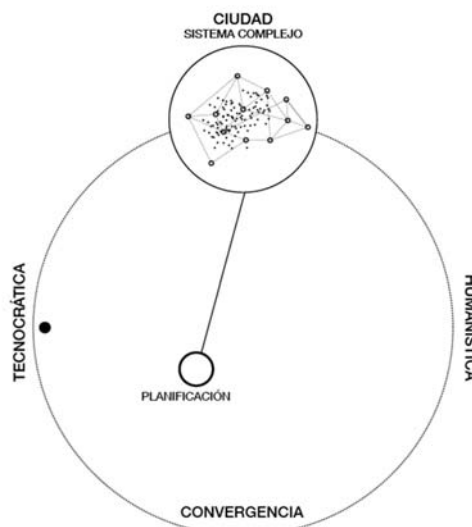


Fig. 1 Diagram about the dilemma of planning. Source: PhD thesis Irene Luque Martín, 2017

The city can no longer be understood without recognizing that it is a complex, and therefore indefinite, spontaneous, chaotic and arbitrary system. Authors who in the last decades have defined this thinking (De Roo & Silva, 2010) as well as (Innes & Booher, 2010) agree on the need to know the discipline of complexity not as a mere adjective, but as a concept of a discipline that is key to understanding our urban spaces and how to plan them.

In terms of the urban technologies we refer to them grouped into three elements according to its usability: Geographic Information Systems (GIS), Visualization Tools (HV) and Urban Simulation Models (MSUs). The set of these elements is known as Planning Support System (PSS), and that in the words by Portugali (2011) we have analyzed its usefulness and applicability in each of them, especially the Urban Simulation Models (MSUs) which is the option that has been worked by using the technique of Agent-Based Models (ABM).

The PSS can be considered as a theoretical tool without practical application, the ambiguities of its definition defended by authors (Harris, 1989; Klosterman, 1997; Vonk, 2006; Geertman & Stillwell, 2006; among others), can not dissuade us from our alignment with the postulates of Portugali, which considers that PSS arise as a demand to support a planning process that has from the origin a collaborative method, and considering these tools as a support to establish a decision making process more participatory than classic planning. Therefore, the PSS in origin and theoretically seek the convergence of the dilemma, making the PSS in the appropriate toolbox to work on urban complexities and urban challenges.

#### **4. Toward a methodological alternative**

The emphasis in the previous sections is to highlight each of the nuances covered until we come to construct an alternative that arises from theories and with the fundamentals already mentioned, from the review of the state of planning, from the approaches and the own experimentation to configure a method that is consistent with these theoretical foundations, here synthesized, and developed in more depth in the thesis. In short, a methodology that can be summarized with the motto used in the Intramurals process: Knowing to diagnose. Diagnose to share. Share to act.

Even in spite of the difficulties to apply the PSS, it is necessary to insist on the convenience of its use. The analysis of georeferenced information is no longer fully valid statistical information, but we have to consider the data that collect the habits of consumption and movement of people, incorporating in turn the variable time as an expression of the dynamism of citizenship, the rigor and the complexity that contemporary urban analysis requires. Likewise, the applications of the visualizations so convenient in the moments of showing and sharing information, data, analysis, diagnostics and proposals. And especially, Urban Simulation as an essential exercise for the processing of information and the proposals converted into scenarios to test, evaluate, participate and conclude with decisions sufficiently validated.

We are looking for the adequate fit of all these resources within the current legal framework, on the one hand to already have procedures coined and approved in the processing of planning documents, but on the other, to find ourselves in a state of rights and obligations strongly rooted, as well as complex instrumentation that is not intended to be altered. The strategy conceived is to incorporate citizen debate and advanced technological applications simultaneously to the drafting processes of the plans, a criterion that pretends in principle not to alter the current situation but to enrich it with the new added value that is incorporated. This conception is essential in the configuration of the Alternative.

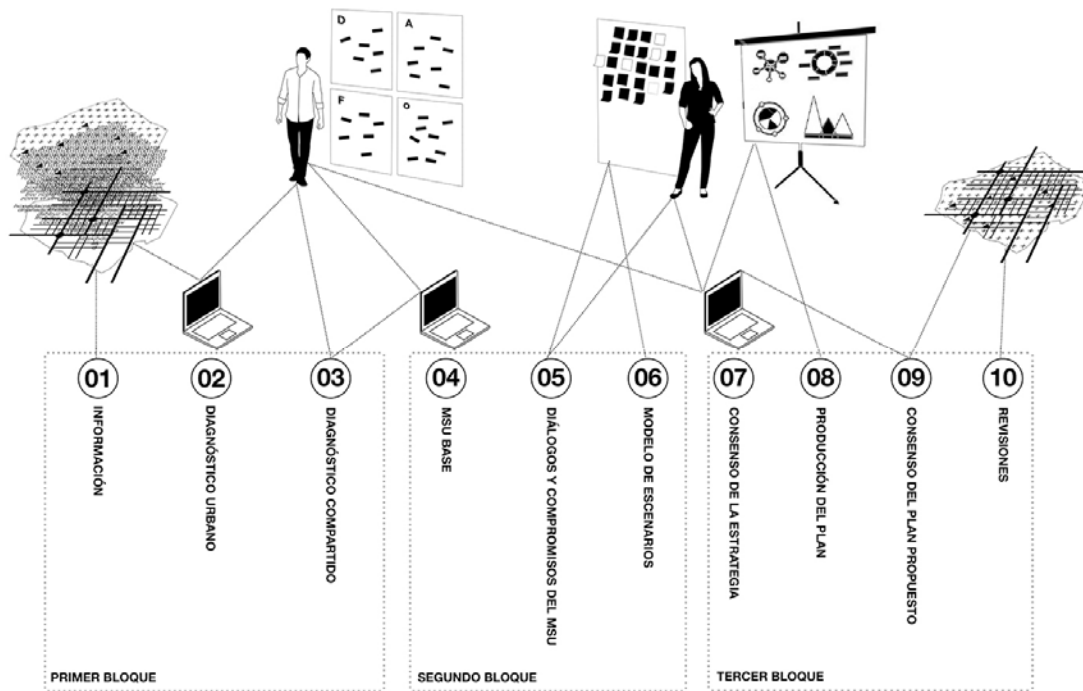
An alternative that is now generically expressed to achieve broad applicability and which seeks the key themes of contemporary planning, a planning that Haselsberger (2017), detailed us in a review of the work of sixteen notorious urban thinkers who pointing out what the main theoretical objectives and how to put them into practice.

The initial research question that we were asking is now finding an answer in the proposed Alternative that takes the form of a ten-step process that interweaves current procedures, citizen collaboration and the use of advanced and specific PSS-based tools to deal with urban complexity. A basis for motivation and for the illusion directed to those who want and who are looking for an operational change in the current planning and who also look for a planning that explore alternative paths, but right, a base that represents a roadmap in which to incorporate practices and contemporary tools.

The alternative that is detailed as a general guide to adapt to each place, to each situation, in each moment, maintaining its characters, collaborative and intelligent, open to advanced technological incorporation to understand and deal with urban complexity. The work done in the thesis is not only an academic exercise disconnected from the practice, nor a theoretical development of how to approach the problems of professional practice, but it has been tried to merge both spheres, academic and professional, values of research integrated with the pragmatic point of view of professional practice.

It is noteworthy the significance that represents that the advances that are expressed can be operative from tomorrow; a nuance that although for many can be considered a weakness, in fact it is a fortress. It is possible to incorporate the Alternative –detailed below (Fig 2)- from the following day after its generation, so it is able to be implemented easily within current practices. This consideration is part of the alternative script.

Simultaneity adds the advantages that we sought, these emerge in the final document with a greater efficiency in the material production of the writing works, more rigor by the provision of data and analysis, greater certainty to conjugate the technological tests of the MUS (Model of Urban Simulation) with the citizen collaboration, and greater commitment of the agents in charge of its execution having participated in its elaboration. We are facing intelligent urban planning.



**Fig. 2** Diagram about the methodological alternative and its three blocks. Source: PhD Thesis Irene Luque Martín, 2017.

An alternative that has two fundamental principles: 1) that the planning method is collaborative, and 2) that the planning uses the technological intelligence to know how to read the urban complexity. Two issues that are generally in its own nature but represent an alternative in the current scenario besides meeting an important criterion for its applicability, that this is not imperative, nor that its application responds to a universal pattern. Therefore, collectively built local responses and taking advantage of the best existing resources become a key to the alternative that we are trying to configure and which, after validation, aims to give the answers and the arguments to the challenges of the object of planning.

Ten steps that define an itinerary in a process of simultaneous, convergent planning, and that consolidated in the current administrative processes of processing and drafting make it a possible and useful process. An alternative that is not only based on which phases are composed but which agents are included in them and what types of techniques and / or tools are used in each one of the milestones, obtaining a concrete utility that will be detailed and detailed in each territory, in each case. The grouping in three distinct blocks of steps responds: 1) the first block, groups the first, second and third points, relating to the phases of information, diagnosis and participation. Basically, they coincide with the professional work carried out, namely the work of the Diagnostics of Intramurals, now interpreted from the academy, 2) the second block corresponds to the fourth, fifth, and sixth points in which the Urban Simulation Model and the different scenarios to be tested. These works have been experimented in a prototype that shows results that encourage their contrast and experimentation in a real practice, and 3) third and final block refers to the seventh, eighth, ninth and tenth points that are would be the result of a project of research configurable to these ends and that with multidisciplinary resources allow to carry out it, or as a consequence of a suitable professional practice allows such experimentation.

## 5. The alternative's test: Intramural Process

The case study called "Intramurals" is located in Jerez de la Frontera, the most populated city of the province of Cadiz and fifth of Andalusia, a city that has a strategic and territorial position differentiated and it is important in the interior-coastal connection of the southwest area of Andalusia, as well as in the area of the Urban Agglomeration of the Bay of Cadiz of which it is part of. Its choice is justified because the Intramurals is a complex area, with important patrimonial values, origin of the city and with outstanding identities considerations. A space that has an urban structure of historical character and with problems more accentuated than other urban areas. It emphasizes the critical state in which the building is and the notable loss of population in the last decades. This integral decline forms an interesting and complex case study to test planning alternatives to those already established, as well

as new tools to experiment with measures and actions that, through Urban Simulation, allow to opt for the most appropriate ones to reverse the described situation.

An essay that has covered the steps established in the Methodological Alternative, a process that is synthetically highlighted: a) in the first block, the configuration of the Geographic Information System of Intramurals (GIS INT) and with which a diagnosis has been made which shows the capacity of analysis provided by the georeferenced data, precise and rigorous reflections for each of the territorial units identified: degrees of vitality, states, uses, endowments, water consumption, among others, which have allowed to recognize that the scope is 50% of its capacity of population load and that there are twenty of the hundred apples existing, those that present a critical situation b) that the thread of the Modeling Base was raised through participatory activities in which it was detected, verified, and monitored the main concern: depopulation. The questions raised revolved around: Why was not an area with so many values considered attractive? What needs to be done to make it attractive? How to attract people to Intramurals de Jerez? Giving answers to these questions, three scenarios were modeled and configured to validate, test and evaluate them, c) The third section contains the analysis of all the results, the assessments made to design and implement the regular process in the drafting of the planning.

## CARACTERIZACIÓN

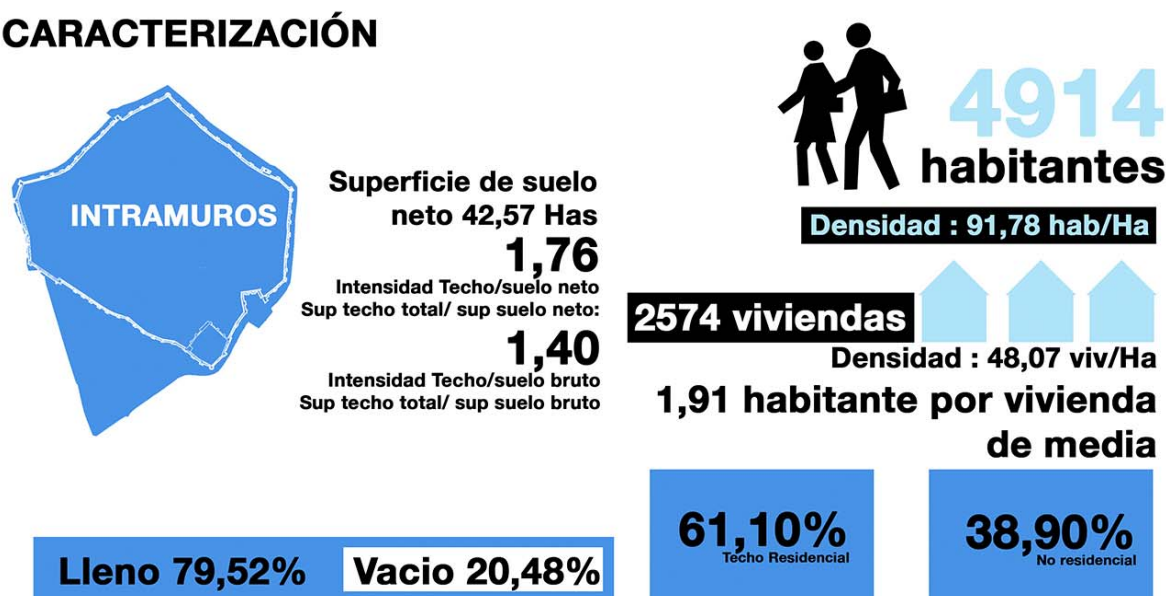


Fig. 3 Basic characterization he case study Intramurals. Source: PhD Thesis Irene Luque Martín, 2017.

A multidisciplinary modeling exercise to obtain a pilot simulation model to aid decision making by exploring and testing measures and actions that will be part of a future Action Plan. To this end, a simulation model is developed on the criteria of residential-location choice models and based on the most determinant urban factors in the area, extracted from the diagnostic document, were corroborated by the citizens who participated in the processes of participation of the previous phases. With the scenarios validated, the following scenarios were proposed supported by three lines of work obtained during the process of urban diagnosis:

- The "scenario 01 experiment" comes from a group, mostly neighbors of the field, who express their main concern: to avoid that the deterioration continues. On this sense we proposed measures of containment of the degradation although it is not ruled out the convenience of a long-term plan. In the translation to the simulation it is proposed to act in the percentage of buildings in poor condition, that is 24% of the constructed area.
- The "experiment of scenario 02" comes from ideas generated with the multidisciplinary group of experts and agents, professionals and actors related to the city and the real estate promotion. They coincide in the idea of obtaining external investment (European funds) to achieve the physical renewal of the area and convert this investment into the engine of revitalization. These criteria are translated into the simulation in actions and measures of physical renovations.

- As for the scenario "scenario 03", it comes from initiatives on the field from the work prior to the diagnosis, these were interventions ordered in time and space consisting of: a) rebalance the distribution of land uses b) renew the three most emblematic public spaces in Intramurals, urban centers, points of activity and attraction verbs c) intervene in the twenty blocks in critical condition and d) intervene on the increased mobility of pedestrian zones.

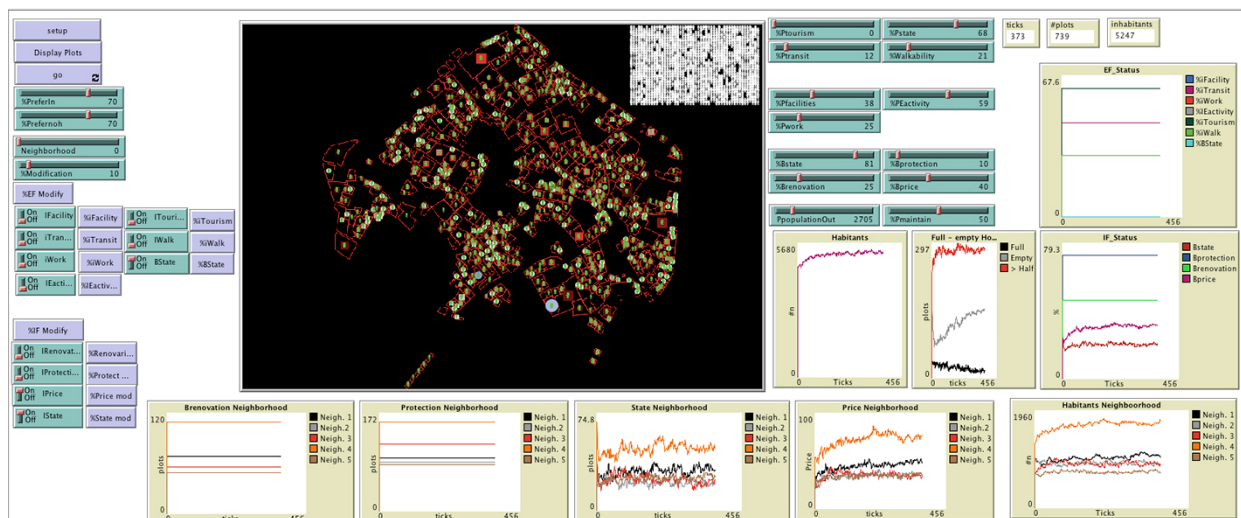


Fig. 4 Screenshot of the USM Intramurals. Source: PhD Thesis Irene Luque Martín, 2017.

The detailed analysis shows that while the four strategies of scenario 03 have produced a pattern of continuous population growth, and has managed to stabilize the population. However, it offers better and more lasting results with the strategy d) as seen in Figure 4.

The opportunity to make available 50% of available space, currently vacant, means that the Capacity of Reception is 5000 new inhabitants and 4500 jobs in a space such as the Intramurals de Jerez and that would mean a saving in ground of new order growth of 150 Has. These new neighbors would give new life, regenerating it, and thus saving a unique built heritage with undoubted historical values that are currently at risk of disappearing. A balance of uses that optimized its operation, a resolute mobility with contemporary criteria and a commitment to the global challenges would also mean new life in the city center.

In this case study, it is remarkable the correlation between the revitalization of the center of the cities and the decrease population of cities, in view of the data previously provided. The challenges that urban planning has to face are enormous and quite diverse. That's why we must be open to incorporating new methods and new tools that allow us to analyze large pockets of data and to study and simulate actions and measures to achieve those that are more convenient and possible for the institutions and, of course, the most exciting for citizens.

## 6. Conclusions and Future Research

The following conclusions are described within ten bullet points that indicate reflections, discoveries and results of an experimental thesis that tries to open new alternative ways to perfect the current planning.

- The discovery of the need for an open and transparent dialogue on complex urban processes. From theory to practice, from practice to theory, defining collective and collaborative processes incorporating them normally from the origin of the writing processes of the plans, with dialogue, debates, and interaction simultaneously with the writing process of the plan.
- The opportunity to have the resources that are needed for the inflection. Framed in the transition brought about by the technological revolution, we are now presented with another context that we have to take advantage of because when we wanted it, we could not; but now that you can, it seems you do not want to. We are in the right circumstances, we have the appropriate toolbox for these methods are possible. It may seem complicated but if we assume the methods, we focus on the key concepts to define: the why, when, how and with whom, along with the repositioning of citizenship we will be reoriented towards a rigorous and accurate alternative process.

3. The repositioning of citizenship. If the success of planning today is to have reached final approval of the plan, a bureaucratic goal that makes us forget the really important thing is to get the citizenship to identify with the outcomes from the planning process.
  4. From experimental science to experimentation in the virtual laboratory. The methodological proposal seeks to strengthen and support the evaluation of the actions proposed by the planning through virtual laboratories. In addition, constructed collectively. Urban planning, so consuming of resources, only allows us the trial/error method. The economic, but above all social, environmental and opportunity costs require us to end these intuitive practices, especially now that we are aware that there are techniques and tools available to be able to evaluate the consequences of the decisions we make. The advance of virtual experimentation represents a strong argument for the urgency of incorporating advanced urban technologies into planning processes.
  5. The search for synthesizing and implementing the theoretical values of the past with contemporary needs is inherent to the human condition and allows us to reach the best conditions to advance. Convergence provided an opportunity for us in the path of rationality to perfect methods and tools that combine the advantages of the extreme positions of the past.
  6. The technological finding for the debate: the urban simulation. We start from scratch, we have tried to reuse and reinterpret theories, techniques and successful methods of the past learning from their mistakes and their successes, reflecting on the usefulness of technologies and which are possible and feasible today. Research carried out based on the transfer of technology and knowledge that is part of the values of the academic world.
  7. The definition of scenarios to test measures, actions and models in urban planning could allow us to envisage a horizon for planning similar to that which has already been pursued in other disciplines.
  8. With the versatility of universal applicability, it is possible to configure a local application. When the technological implementation incorporates the thematic or territorial, temporary, social and political conditions adapted to specific circumstances become a strength. Methodologies that adapt to the place and the moment, being versatile and flexible.
  9. These contributions to share in their local applicability are intended to open a horizon that incorporates their own tools to analyze and evaluate complex systems, connecting and favoring sectorial, interdisciplinary dialogue between technical and non-technical actors in processes of collective construction of the city.
  10. An integrating alternative for planning as a discipline that could coordinate and integrate all disciplines with competencies in the city that can overcome watertight competencies and provide channels for debate and institutional and citizen dialogue. It also aims to be comprehensive, containing all the urban components that urban planning should address. An Alternative that focuses on the vision of the planner allowing him to understand the general picture as he remembered us (Haselsberger, 2017).
- The experiments carried out have shown that they are useful tools to deal with the complexity in a collaborative way within planning process. We have observed how the translation of complicated ideas into a model containing complex dynamics has been visible and understandable in the debate, with interconnections, preferences and priorities aligned in one direction or another according to the outcomes obtained.
- Future lines of research lead us to the different fronts of conflicts and debates in contemporary planning, and although the purpose of the thesis has been to deepen the applicability in collaborative processes of advanced technological environments in urban planning, it also allows the opportunity and the convenience in the current planning context. We seek to continue advancing in the applicability of the new urban technologies in real problems within diverse scales and that this approach is made through collaborative processes.

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## 8. Acknowledgment

Special thanks to my thesis supervisors Victoriano Sainz Gutiérrez and Antonio Piñero Valverde of the University of Seville, for accompanying me and guiding me in the process of writing and reviewing the thesis. To Karin Pfeffer and the doctoral students with whom I shared an international research stay at the University of Amsterdam.