



VOLUME 1

NEW FOUNDATIONS FOR A SUSTAINABLE GLOBAL SOCIETY

Topic Coordinators

Eduardo Moyano Estrada
& Tomás García Azcárate

CSIC SCIENTIFIC CHALLENGES: TOWARDS 2030

Challenges coordinated by:
Jesús Marco de Lucas & M. Victoria Moreno-Arribas

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& Tomás García Azcárate

CSIC SCIENTIFIC CHALLENGES: TOWARDS 2030

What are the major scientific challenges of the first half of the 21st century? Can we establish the priorities for the future? How should the scientific community tackle them?

This book presents the reflections of the Spanish National Research Council (CSIC) on 14 strategic themes established on the basis of their scientific impact and social importance.

Fundamental questions are addressed, including the origin of life, the exploration of the universe, artificial intelligence, the development of clean, safe and efficient energy or the understanding of brain function. The document identifies complex challenges in areas such as health and social sciences and the selected strategic themes cover both basic issues and potential applications of knowledge. Nearly 1,100 researchers from more than 100 CSIC centres and other institutions (public research organisations, universities, etc.) have participated in this analysis. All agree on the need for a multidisciplinary approach and the promotion of collaborative research to enable the implementation of ambitious projects focused on specific topics.

These 14 “White Papers”, designed to serve as a frame of reference for the development of the institution’s scientific strategy, will provide an insight into the research currently being accomplished at the CSIC, and at the same time, build a global vision of what will be the key scientific challenges over the next decade.

VOLUMES THAT MAKE UP THE WORK

- 1 *New Foundations for a Sustainable Global Society*
- 2 *Origins, (Co)Evolution, Diversity and Synthesis of Life*
- 3 *Genome & Epigenetics*
- 4 *Challenges in Biomedicine and Health*
- 5 *Brain, Mind & Behaviour*
- 6 *Sustainable Primary Production*
- 7 *Global Change Impacts*
- 8 *Clean, Safe and Efficient Energy*
- 9 *Understanding the Basic Components of the Universe, its Structure and Evolution*
- 10 *Digital and Complex Information*
- 11 *Artificial Intelligence, Robotics and Data Science*
- 12 *Our Future? Space, Colonization and Exploration*
- 13 *Ocean Science Challenges for 2030*
- 14 *Dynamic Earth: Probing the Past, Preparing for the Future*

CSIC scientific challenges: towards 2030

Challenges coordinated by:

Jesus Marco de Lucas & M. Victoria Moreno-Arribas

Volume 1

New foundations for a sustainable global society

Topic Coordinators:

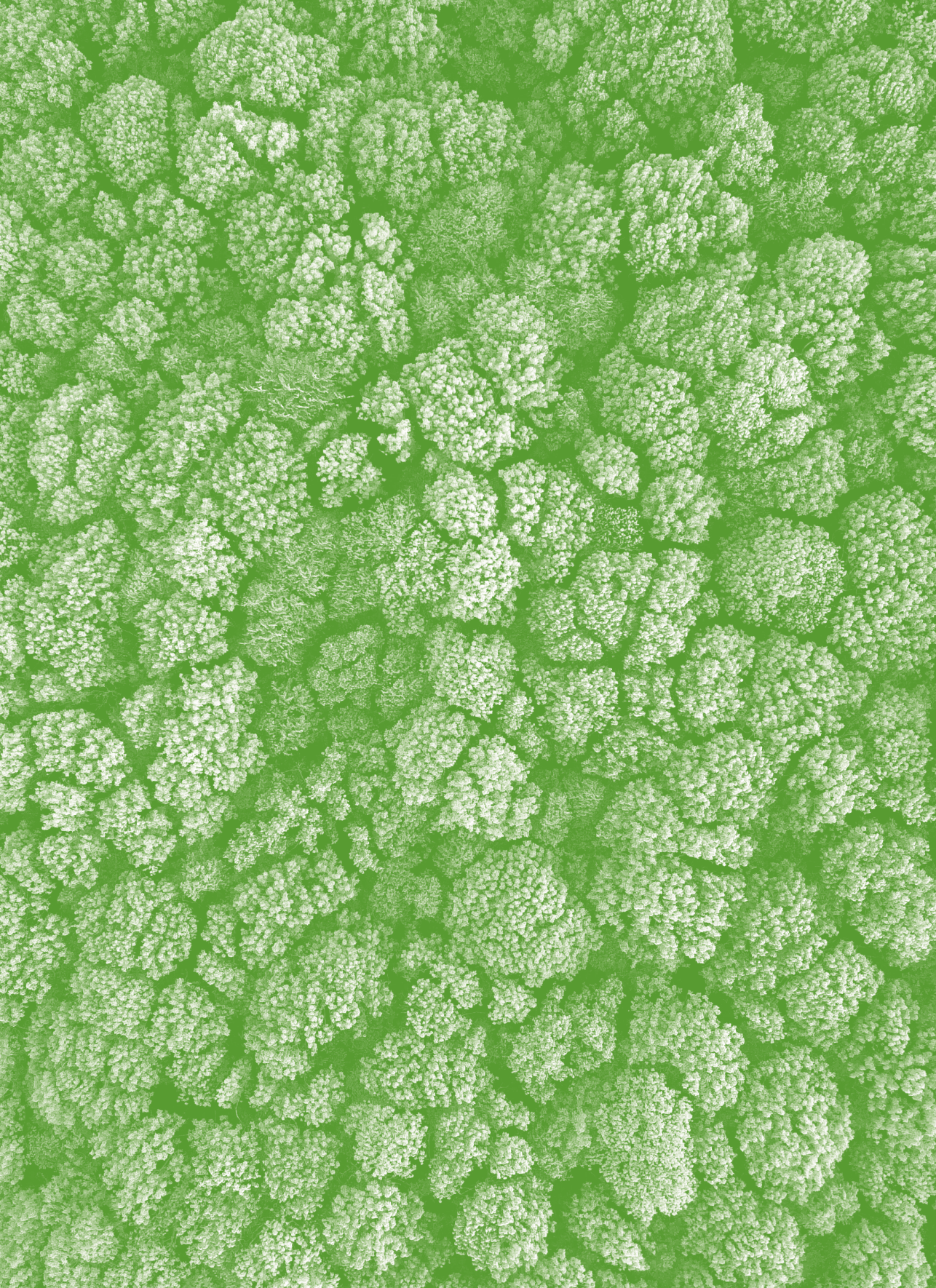
Eduardo Moyano Estrada (IESA, CSIC) & Tomás García Azcárate (IEGD, CSIC)

Chapters Coordinators:

Jordi Brandts Bernad (IAE, CSIC), Carolina Cañibano Sánchez (INGENIO, CSIC-UPV), María Dolores del Castillo Bilbao (CIAL, CSIC-UAM), Teresa Castro Martín (IEGD, CSIC), Francisco Colom González (IFS, CSIC), Felipe Criado Boada (INCIPIIT, CSIC), José Fernández Albertos (IPP, CSIC), Gloria Fernández-Mayoralas (IEGD, CSIC), Francisco Ferrándiz Martín (ILLA), Ada Ferrer i Carbonell (IAE, CSIC), Joan Font Fàbregas (IESA, CSIC), Amparo González Ferrer (IEGD, CSIC), Ana López Sala (IEGD, CSIC), Josep Martí Pérez (IMF, CSIC), Oscar Martínez Alvarez (ICTAN, CSIC), Catalina Martínez García (IPP, CSIC), Reyes Mate Rupérez (IFS, CSIC), Fco. Javier Moreno Fuentes (IPP, CSIC), Idoia Murga Castro (IH, CSIC), Vincenzo Pavone (IPP, CSIC), Manuel Pérez Yruela (IESA, CSIC), Blanca Ramírez Barat (CENIM), Juan Carlos Velasco Arroyo (IFS, CSIC)

Participant Centers:

Centro de Edafología y Biología Aplicada del Segura (CEBAS, CSIC)
Centro Nacional de Investigaciones Metalúrgicas (CENIM, CSIC)
Instituto de Investigación en Ciencias de la Alimentación (CIAL, CSIC-UAM)
Estación Biológica de Doñana (EBD, CSIC)
Escuela de Estudios Árabes (EEA, CSIC)
Escuela de Estudios Hispano-americanos (EEHA, CSIC)
Instituto de Análisis Económico (IAE, CSIC)
Instituto de Arqueología (IAM, CSIC-Junta de Extremadura)
Instituto de Agroquímica y Tecnología de Alimentos (IATA, CSIC)
Instituto de Ciencia y Tecnología de Alimentos y Nutrición (ICTAN, CSIC)
Instituto de Economía, Geografía y Demografía (IEGD, CSIC)
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Instituto de Estudios Sociales Avanzados (IESA, CSIC)
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- 10 **CHAPTER 1**
INTRODUCTION
Coordinators Eduardo Moyano Estrada and Tomás García Azcárate
- 14 **CHAPTER 2**
FRAME OF REFERENCE
Coordinators Eduardo Moyano Estrada and Tomás García Azcárate
- 20 **CHAPTER 3**
CHALLENGES AND PROPOSALS FOR A FUTURE
RESEARCH PROGRAM
Coordinators Eduardo Moyano Estrada and Tomás García Azcárate
- ANNEXES**
- 96 **ANNEXE 1**
- 102 **CHALLENGE A**
SCIENCE, INNOVATION, AND KNOWLEDGE FOR SUSTAINABLE
DEVELOPMENT MODELS
Coordinators Carolina Cañibano Sánchez and Vincenzo Pavone
- 130 **CHALLENGE B**
HUMAN SCIENCES IN TRANSITION SCENARIOS
Coordinators Josep Martí Pérez and Idoia Murga Castro
- 144 **CHALLENGE C**
TERRITORIAL DEVELOPMENT IN NEW SCENARIOS OF RURAL-
URBAN INTERACTION
Coordinators Francisco Colom González and Ana M^a López Sala
- 174 **CHALLENGE D**
DEMOGRAPHIC CHALLENGES IN A SOCIAL SCENARIO OF LONGEVITY
AND AGING
Coordinators Teresa Castro Martín and Gloria Fernández-Mayoralas
- 208 **CHALLENGE E**
INTERNATIONAL MIGRATIONS IN A CONTEXT OF GLOBAL CHANGE
Coordinators Juan Carlos Velasco Arroyo and Amparo González Ferrer

- 228 **CHALLENGE F**
FOR A HEALTHY DIET IN A GLOBAL AND SUSTAINABLE WORLD
Coordinators María Dolores del Castillo Bilbao and Oscar Martínez Alvarez
- 254 **CHALLENGE G**
TECHNOLOGICAL CHANGE AND ITS EFFECTS ON EMPLOYMENT
Coordinators Jordi Brandts Bernad and Catalina Martínez García
- 266 **CHALLENGE H**
THIRD SECTOR, SOCIAL, AND COLLABORATIVE
ECONOMY IN CONTEMPORARY SOCIETIES. THE CASE OF SPAIN
Coordinator Manuel Pérez Yruela
- 308 **CHALLENGE I**
DEMOCRACY, GOVERNANCE, AND PARTICIPATION IN SCENARIOS
OF SOCIAL AND POLITICAL PLURALITY
Coordinators Joan Font Fàbregas and José Fernández Albertos
- 318 **CHALLENGE J**
STRATEGIES AND POLICIES FOR SOCIAL INCLUSION IN
SUSTAINABLE WELFARE SYSTEMS
Coordinators Francisco Javier Moreno Fuentes and Ada Ferrer i Carbonell
- 350 **CHALLENGE K**
WHAT REMAINS OF THE FUTURE: SUSTAINABILITY
THROUGH HERITAGE
Coordinators Felipe Criado Boado and Blanca Ramírez Barat
- 372 **CHALLENGE L**
MOBILIZED MEMORIES. DEPLOYMENTS OF THE PAST
IN THE PRESENT AND THE FUTURE
Coordinators Francisco Ferrándiz Martín and Reyes Mate Rupérez

CHAPTER 1

ABSTRACT

In this Introduction, UT-1 coordinators expose the general structure of the document, which is focused on the axis “New foundations for a sustainable global society”. This title is a commitment to convergence between areas and lines of research. Talking about “globalization” and “sustainability” implies a multidisciplinary approach, because both terms affect practically all dimensions of contemporary society. Therefore, they are appealing to cooperation between all disciplines of scientific research. For this foresight exercise, general coordinators have organized the UT-1 into TWELVE Thematic Challenges and they have entrusted the coordination of each Challenge to some researchers of the staff scientific staff of the CSIC who are considered the most suitable for this task.

INTRODUCTION

Coordinators

Eduardo Moyano Estrada (IESA, CSIC)
and Tomás García Azcárate (IEGD, CSIC)

The objective of the CSIC White Paper is to place the Council before the challenge of responding to the profound changes taking place in the current Spanish society, assessing their effects with a 30-year perspective on the horizon of 2050.

To face this challenge, the VICYT has defined 14 Thematic Units (UT), with which it seeks to cover, from all areas of the CSIC and with a transversal and integrating vocation, the broad and complex panorama that makes up the current process of change.

For example, the management of natural resources; the spread of viral pandemics; the recurrence of natural disasters; new sources of energy production and use; road mobility and intra- and inter-territorial transport; the new forms of economic organization; the preservation of ecosystems; the advancement of robotics and artificial intelligence; genetic engineering; biomedicine; the preservation of rivers, seas, and oceans; the exploration of interstellar space; governance matters; mitigation of the effects of climate change; the sustainability of health and sanitary systems; changes in eating habits; international relations; demographic changes and increased life expectancy; social inequality and exclusion.

Therefore, cooperation between the various scientific disciplines of the CSIC is essential if we want to rigorously address these great issues, cumulating all the knowledge accumulated in an institution as rich and diverse as ours.

The White Book is also a document prepared by the CSIC, but to be read outside our institution and, especially, in the different areas of public administration. This forces us to use an informative style that, without falling into the trivialization of the topics discussed, is aimed at a public not specialized in scientific matters, and public powers on which the economic and financial sustainability of the CSIC depends.

It is a prospective document where we give our ideas and proposals on what the CSIC can contribute for a better understanding of the current process of change, thus contributing to fulfill our mission as an institution at the service of society.

This is the task that the presidency of the CSIC has transmitted to us to the different coordinators of the TUs, a task we have reflected through the structuring of each TU into Thematic Challenges (DT), each coordinated by scientific staff from our institution.

Of the 14 Thematic Units of the White Paper, UT-1 focuses on the axis “New foundations for a sustainable global society,” the title of which is a commitment to convergence between areas and lines of research. Talking about “globalization” and “sustainability” implies a multidisciplinary approach, because both terms affect practically all dimensions of contemporary society; therefore, appealing to cooperation between all disciplines of scientific research. For this foresight exercise, we have organized the UT-1 into TWELVE Thematic Challenges, entrusting the coordination of each Challenge to the scientific staff of the CSIC we have considered the most suitable for this task.

The result of the work conducted in UT-1 is the report presented in these pages, a report that, with the other UTs, will make up the CSIC White Book. The UT-1 report results from the effort to integrate the ideas transmitted by the different Challenges through their corresponding documents into a single text. These documents are incorporated as Annexes to this report as they have been sent by the coordinators and with no modification.

Under the instructions received from the VICYT and transmitted by the coordinators of the UT-1 to the Challenges, this report is divided into these three sections, besides this introductory section:

- *Framework*, where the relevance and social and scientific interest of the topics that have been the subject of the UT-1 are exposed, and the most relevant characteristics of the environment in which they are inserted.

- *Future challenges* (both scientific and social) of the different Challenges of the UT-1, where the possible answers that can be given from the CSIC are exposed and recommendations are made to enhance the existing strengths, neutralize the detected weaknesses, and take advantage of the possible opportunities.
- *Conclusions*, where a synthesis of the major results is made and proposals and recommendations are made for the whole of the UT, giving rise to an Executive report.

ABSTRACT

In this chapter, general coordinators expose the frame of reference of UT-1. They consider it is necessary to include the historical perspective in a transversal way, and to incorporate the gender dimension as well as an ethical-normative component. However, the frame of reference is focused on aspects related to demography, aging, health, wellbeing, and the organization of family nuclei, giving rise to new roles and family models, to new systems of care and to new forms of inequality. Besides that, it also focuses on the way food is produced and in the attitudes and behaviors of consumers. The coordinators also consider that social change has important effects on everything related to forms of employment / work, new models of economic organization, and the role to be played by public policies, as well as the modes of citizen participation in political life and migratory flows. Finally, they consider it is necessary to focus on matters related to the conservation and enhancement of heritage and historical memory. This explains why this UT-1 report groups the TWELVE Challenges into FOUR Thematic Blocks.

CHAPTER 2

FRAME OF REFERENCE

Coordinators

Eduardo Moyano Estrada (IESA, CSIC)
and Tomás García Azcárate (IEGD, CSIC)

UT-1 focuses on the axis “New foundations for a sustainable global society” and refers to the important process of global change that affects all dimensions of society, altering the context in which it has taken place. We have been developing our scientific work in recent decades.

It is a process of change not comparable to what happened decades ago, due to its breadth, multidimensionality, and interdependence, and to the fact this process manifests itself simultaneously in many areas, territories, and social groups.

Therefore, its analysis requires us to conduct a convergence exercise between areas and lines of research, considering a multidisciplinary approach, because both “globalization” and “sustainability” are, as we have indicated, concepts that affect all the dimensions of contemporary society.

The UT-1 frame of reference starts from the fact that social life always flows in changing scenarios, and that any scientific approach to social facts must be done considering their variability in the space / time coordinates. Therefore, we have considered it is necessary to include the historical perspective in a transversal way, because events of today can only be understood and explained by resorting to the knowledge that history provides. For those same reasons, any exercise of foresight cannot be done only in the present, but through the investigation of the key elements that have led us here.

We also understand that the current dynamics of change have unequal effects on the population, depending on the territorial environment where we live, and according to sociodemographic characteristics, especially those related to age and sex. Hence the need to incorporate the gender dimension in our prospective analyzes, and to include an ethical-normative component. Therefore, we affirm that, due to the unique nature of their object of study, the human and social sciences are not neutral and aseptic disciplines in the face of what they analyze, but that they must adopt an ethical commitment without this implying renouncing objectivity that should guide scientific work.

In certainty, the UT-1 frame of reference is manifested in aspects related to demography, aging, health, wellbeing, and the organization of family nuclei, giving rise to new roles and family models, to new systems of care and to new forms of inequality. It also manifests itself in the way food is produced and in the attitudes and behaviors of consumers. Furthermore, all this is linked to the growing awareness of citizens about the environment and the relationship of humans with nature, giving rise to new dynamics of rural-urban interaction.

However, the process of change also has apparent effects on everything related to forms of employment / work, new models of economic organization, and the role to be played by public policies. To this should be added everything that refers to the modes of citizen participation in political life and the forms of governance with which it is endowed. Likewise, migratory flows and the cultural diversity this entails in open and inclusive societies are issues at the forefront of change processes. The same happens with matters related to the conservation and enhancement of heritage and historical memory, as displayed in the past, present, and future of citizens.

We also consider that the current process of change should be studied defining new concepts, using new methodological tools, and incorporating the advances taking place in the techniques of collection, treatment, and analysis of empirical information, both in humanities and social sciences.

We also consider it is necessary to establish bridges of cooperation with other scientific areas of the CSIC to understand the complexity of the processes of change, and especially everything related to the perception of risk, physical vulnerability, and its social implications and implementing communication and prevention protocols that allow us to improve the resilience of contemporary societies.

This explains why this UT-1 report groups the Challenges into four Thematic Blocks (see Table 1).

THEMATIC I: THEORETICAL AND METHODOLOGICAL ASPECTS OF THE HUMAN AND SOCIAL SCIENCES

Challenge A: “Science, innovation, and new forms of knowledge for sustainable development models.” Refers to how the social sciences are addressing the current processes of change, both in theoretical and methodological terms, redefining and expanding the concepts of science, innovation, and sustainability.

Challenge B: “The human sciences in transition scenarios.” A similar exercise of analysis is conducted regarding how the human sciences face the challenges of the disciplines that form them.

THEMATIC II: POPULATION, TERRITORY, AND FOOD

Challenge C: “Territorial development in new rural-urban interaction scenarios.” The territory where the population sits and the physical space where social and economic dynamics take place are analyzed, studying the observed trends and choosing an innovative approach that goes beyond the traditional separation between rural spaces and urban spaces.

Challenge D: “Demographic challenges in a social scenario of longevity and aging.” This tries to analyze the changes in demographic processes, both those already observed, and the trends expected.

Challenge E: “Migratory flows in open and inclusive societies.” Addresses migration and the public policies in charge of managing it, issues closely related to the two previous challenges, given its link with demographic trends and the evident effects of migratory flows on developing rural and urban territories.

Challenge F: “Safe and healthy eating in sustainable food system.” This analyses the nutrition and food-related issues, because of changes in consumer eating habits.

Table No. 1

THEMATIC SECTIONS, CHALLENGES, AND COORDINATORS

Thematic I: Theoretical-methodological aspects of the social and human sciences

- A. Science, innovation, and knowledge for sustainable development models
Coordinators: Carolina Cañibano Sánchez (INGENIO, CSIC-UPV) and Vincenzo Pavone (IPP, CSIC)
- B. Human sciences in transition scenarios
Coordinators: Josep Martí Pérez (IMF, CSIC) and Idoia Murga Castro (IH, CSIC)

Thematic II: Population, territory, and food

- C. Territorial development in new scenarios of rural-urban interaction
Coordinators: Francisco Colom González (IFS, CSIC) and Ana López Sala (IEGD, CSIC)
- D. Demographic challenges in a social scenario of longevity and aging
Coordinators: Teresa Castro Martín (IEGD, CSIC) and Gloria Fernández-Mayoralas (IEGD, CSIC)
- E. Migratory flows in open and inclusive societies
Coordinators: Juan Carlos Velasco Arroyo (IFS, CSIC) and Amparo González Ferrer (IEGD, CSIC)
- F. Safe and healthy eating in sustainable food systems
Coordinators: Dolores del Castillo Bilbao (CIAL, CSIC-UAM) and Oscar Martínez Alvarez (ICTAN, CSIC)

Thematic III: Social and political effects of the process of economic and technological change

- G. Technological change and new forms of work / employment
Coordinators: Jordi Brandts Bernad (IAE, CSIC) and Catalina Martínez García (IPP, CSIC)
- H. Third sector, social, and collaborative economy
Coordinators: Manuel Pérez Yruela (IESA, CSIC)
- I. Democracy, governance, and participation in scenarios of social and political plurality
Coordinators: Joan Font Fábregas (IESA, CSIC) and José Fernández Albertos (IPP, CSIC)
- J. Strategies and policies for social inclusion in sustainable welfare systems
Coordinators: Francisco Javier Moreno Fuentes (IPP, CSIC) and Ada Ferrer i Carbonell (IAE, CSIC)

Thematic IV: Heritage and memory

- K. Sustainability through heritage
Coordinators: Felipe Criado Boado (INCIPIT, CSIC) and Blanca Ramírez-Barat (CENIM)
- L. Mobilized memories: deployments of the past in the present and the future
Coordinators: Francisco Ferrándiz Martín (ILLA) and M. Reyes Mate Rupérez (IFS, CSIC)

THEMATIC III: SOCIAL AND POLITICAL EFFECTS OF THE PROCESS OF ECONOMIC AND TECHNOLOGICAL CHANGE

Challenge G: “Technological change and new forms of work / employment in a contemporary society.” The impact of automation and robotics on employment and labor market conditions is precisely analyzed, with the emergence of new forms of employability (such as teleworking) that entail new social relationships and with evident effects on the population’s attitudes, preferences, and motivations regarding the very act of working.

Challenge H: “Third Sector, social, and collaborative economy in a contemporary society.” This tries to analyze the forms of economic organization, complementary to those that are regulated in the labor market and that play an increasingly relevant role in the new economy (cooperatives, foundations, associations...) paying special attention to the emerging forms of the so-called “collaborative economy.”

Challenge I: “Democracy, governance, and participation in scenarios of social and political plurality.” Addresses the involvement of civil society in decision-making processes, analyzing the new forms of participation that emerge in modern democracies (referendums of popular initiative, participatory budgets, telematic administration...) and that give rise to new forms of governance.

Challenge J: “Social inclusion strategies and policies in sustainable welfare systems.” This deals with how to face the challenge of neutralizing the problems of inequality and exclusion associated with the process of globalization and technological change from the field of public policies.

THEMATIC IV: HERITAGE AND MEMORY

Challenge K: “Sustainability through heritage.” Addresses the challenges related to heritage science by analyzing issues related to the origin, history and meaning of cultural assets and their influence on economic development, given their importance as a mobilizing asset of resources and as an essential element in constructing collective identity.

Challenge L: “Mobilized memories: deployments of the past in the present and future.” This deals with the challenges posed today, to memory studies, as a fundamental factor in the configuration of human societies and also as a key element, with the issues of conservation and valorization of heritage, of individual and collective identities.

CHAPTER 3

ABSTRACT

In this chapter, coordinators highlight a set of CHALLENGES and a series of PROPOSALS so the CSIC can continue to play a relevant role as a scientific institution. Therefore, they have organized the results of this report by grouping the 12 Challenges in 4 Thematic Blocks, presenting a synthesis of the documents prepared in each Challenge, which are included in their entirety in 12 Annex.

CHAPTER 3

CHALLENGES AND PROPOSALS FOR A FUTURE RESEARCH PROGRAM

Coordinators

Eduardo Moyano Estrada (IESA, CSIC)
and Tomás García Azcárate (IEGD, CSIC)

From the information provided by the TWELVE Thematic Challenges in which UT-1 has been structured, it is worth highlighting a set of CHALLENGES and a series of PROPOSALS so the CSIC can continue to play a relevant role as a scientific institution.

Although the thematic convergences between the different Challenges are evident, and the duplication observed in some proposals and recommendations, there are also differences that exist in the theoretical and methodological challenges of each Challenge, and in the questions addressed by the scientific personnel who have participated, are also true throughout this discussion.

Therefore, we have organized the results of this report by grouping the 12 Challenges into four Thematic Blocks, presenting a synthesis of the documents prepared in each Challenge, which, as we have indicated, are included in their entirety (Annex¹). Thus, the content of this report is the sole responsibility of its two coordinators (Drs. Moyano and García Azcárate).

1. The phrases in quotation marks in the Report have been taken literally from the documents produced in each Challenge.

THEMATIC I: THEORETICAL AND METHODOLOGICAL ASPECTS OF THE SOCIAL AND HUMAN SCIENCES

Challenge A: Science, innovation, and knowledge for sustainable models of development

Coordinators

Carolina Cañibano Sánchez
(INGENIO, CSIC-UPV)

Vincenzo Pavone
(IPP, CSIC)

Researchers and centers

Davide Consoli (INGENIO, CSIC-UPV), Ricardo Díaz Delgado (EBD, CSIC), Manuel Fernández Esquinas (IESA, CSIC), Pablo Fernández Méndez (INGENIO, CSIC-UPV), Pedro Marques (INGENIO, CSIC-UPV), Irene Monsonís Paya (INGENIO, CSIC-UPV), Elisa Oteros Rozas (University of Vic-UCC), François Perruchas (INGENIO, CSIC-UPV), Sergio Segura (INGENIO, CSIC-UPV), Richard Woolley (INGENIO, CSIC-UPV)

1. Introduction

Current scientific evidence convincingly demonstrates that “the entire Earth system faces changes on a global scale that affect human survival capacity” and that these changes affect “the climate, sea level, land use, and human societies themselves.” Humanity “faces the inescapable challenge of moving toward more sustainable futures, which will require interdependent sociocultural, economic, and technological changes that must be carefully designed and coupled at different geographical and sectoral levels.”

Social and human sciences, in collaboration with other scientific disciplines, have a responsibility to respond to multiple emerging challenges, including: “i) the identification and management of the most pressing problems for the sustainability of societies; ii) understanding the nature of these problems and their underlying mechanisms; iii) searching for innovative solutions and answers to these problems in diverse social, cultural, and geographical contexts; and iv) supporting institutions and governance structures to design and implement solutions that directly benefit both societies and the planet as a whole.”

The concept of “sustainability” is at the center of many current social, political, and scientific debates. Considerable concern exists regarding the dominance of a narrow vision of sustainability that privileges the ecological and technological dimensions of the term. We consider it essential to broaden this horizon and incorporate the social, ethical, and political dimensions of sustainability, opening the field of sustainable development to the widest possible range of social sciences and humanities.

The key concept of innovation has also been affected by these debates, with a more holistic approach to innovation being promoted in which the social dimension plays a fundamental role. In these debates about the relationship between sustainability and innovation, three positions can be distinguished: i) emphasizing technological innovation, but placing it within a historical context and trajectory; ii) focusing on institutional innovation, including governance networks and systems; and iii) focusing on socio-ecological transitions and on local resilience and adaptive capacities.

A further conceptualization of innovation is advanced by defenders of a “strong” approach to sustainability. Studies of “systems innovation” critically examine the fundamental direction of change driven by innovation and demand that the negative effects (externalities) of technological innovation are accounted for. In addition, the innovation for sustainability approach involves the concept of “social borders,” as a complement to the concept of “planetary borders,” thus incorporating socio-political issues into debates about development and the future. Here, the disconnection between the level of innovation dynamics at a local scale and that of the phenomena of global innovation is highlighted. From this perspective it is necessary to reconnect these levels of innovation, emphasizing the role of so-called “sustainability intermediaries” in understanding the nature and direction of emerging transformations.

In summary, the frame of reference proposed for this Challenge is the need to “advance toward an innovation that can integrate the social with the ecological,” and where social innovation and social sustainability are more explicitly and reflexively connected. Moreover, within this framing the fundamental scenarios for a future research program can be defined.

2. Research scenarios

Science and knowledge in the transition toward sustainability

The “scale and complexity of the problems and challenges confronting human societies exceed the capacity of single disciplines or fields, requiring a shift toward transdisciplinary ‘post normal’ approaches to scientific research and technological innovation that incorporate social and political dimensions in their design and implementation”. The effects of science and technology have been increasingly perceived as ambivalent in society. “Public realization that science and technology cannot guarantee perfect solutions to ‘wicked problems’ has been combined with evidence of negative unforeseen consequences from the deployment of science and technology – some of which threaten to overwhelm

the planet's ecosystem.” For social and environmental sustainability to be the priority aspiration it is therefore necessary to rethink the bases on which scientific and technological knowledge is produced and used. This includes rethinking “how scientific knowledge is produced, how technological and social innovation are implemented and managed, and anticipating the effects of these processes for the transition to sustainable development.” The “active participation of citizens and other social actors becomes necessary in this scenario, encouraging scientists and innovators to adopt a more thoughtful and ‘responsible’ approach to their activities, and preventing products or processes from being launched in the market without adequate prior reflection on their design and societal readiness”. Likewise, effective coordination and transdisciplinary collaboration among the Society, Life, and Matter areas of CSIC can generate crucial contributions to sustainability transitions.

Sustainable technologies

Any scenario to limit the impact of human activities on the environment must prioritize the development and diffusion of ‘green’ or ‘clean’ technologies, be they mitigation or adaptation focused. Such technologies can contribute to “mitigating greenhouse gas emissions, adapting socio-technological systems to climate change, managing water and air pollution, and limiting humanity’s impact on biodiversity”, for example. However, it is important to study, monitor and intervene in “ecosystems of technologies, because not only must an individual technology be sustainable, but all those that support it.” In addition, as the various ‘green’ technologies have different characteristics and technical configurations, the diffusion of ‘green’ technologies requires a variety of skills among those who develop, install and maintain them. This requires a concerted approach to public policies for education, training and the provision of human capital that takes into consideration the type and degree of maturity of these technologies. Addressing the challenges of these socio-technical processes of transformation therefore requires the formation of interdisciplinary teams that combine technical and scientific disciplines with the human and social sciences.

Sustainable societies in transition

The transition toward more sustainable societies requires consideration of changes in forms of employment, labor markets, and education and training. In particular, it is necessary to consider future scenarios related to the outcomes of research in the field of the bioeconomy (both in terms of biotechnological innovation and of the economy of biomass), and to particular forms of territorial socio-economic development.

Regarding *employment*, “one scientific challenge is to better understand the connection between ‘work’ and ‘life’ (personal), in a socio-technical context in which technology can be an ally of a fruitful and enriching connection between both spheres, but can also be alienating and destructive.” Likewise, work and production processes have become progressively more complex and knowledge intensive, such that work is undergoing a profound transformation hand-in-hand with digitization and technical change, modifying the structure of jobs and the distribution of wages (see Challenge G). A better understanding of these dynamics and their effects is therefore a crucial challenge for social science disciplines.

Regarding skills and workplace *training*, it is clear that “the complex adaptation of knowledge to the ecological transition implies changes in the demand for occupations, which implies modifying the educational systems to adapt their offer in terms of training and advanced education, such as vocational training.” However, as the ecological transition is still in its initial phase, good practices that are compatible with sustainability objectives, have not yet been consolidated, but rather remain subject to experimentation and learning based on trial and error. A continued programme of monitoring and analysis of the adaptation of the education and training opportunities offered to young people, the design of ‘re-skilling’ for mature workers, and the relevance of training module contents for organizations involved in sustainable socio-economic transitions, thus constitutes another area in which the social sciences can make a vital contribution.

The *transition to the bioeconomy* has the purpose of leaving behind the fossil fuel-based economy, for an economy in which biotechnologies and biomass play a determining role. Transition toward the bioeconomy entails the emergence of multiple and potentially radically new scenarios. The involvement of all scientific disciplines, including the social and human sciences, will be needed to ensure a deeper more comprehensive integration of sustainability in socio-economic development, both in time (considering the needs of future generations) and in space (considering that sustainable solutions must be addressed equitably to the entire world).

Regarding the role of cities and regions, we draw on the debates about how territorial dynamics contribute to transitions toward sustainability, while recognizing that the research available to date is limited. Further work will in part demand methodological innovations that can understand how different types of innovation (social, technological...) intersect with territorial

heterogeneity, since cities or regions are characterized by different institutional and legal frameworks (see Challenge C). This research should also examine the multiscale coordination of public policies and, specifically, it should be able to identify and/or help design monitoring systems for innovation policy that are adapted to the characteristics of each territory, and that aim for impacts that go beyond growth in the number of patents or R&D spending. A better understanding of this issue will also depend on examining key issues or challenges, such as: the capacity to identify territories that have been able to change their trajectory and identify the agents of change that led to this outcome (companies, governments, NGOs...); the potential of alternative models of local and regional development (e.g. circular economy, foundational economy); a more developed understanding of the organizational and institutional factors that impede structural economic change and keep territories in a situation of stagnation.

3. Theoretical and methodological challenges

Transitions to sustainability present a set of interrelated challenges that will shape communities and societies and their future relations with nature. Research to generate, experiment with, and implement preferred future scenarios that can support transitions to sustainability is essential. The theoretical and methodological challenges posed, and the multiple levels of governance and socio-economic development involved, require multidisciplinary responses and the expansion of transdisciplinary initiatives that bring together scientific and societal actors to co-create scenarios and implement transformative policies and practices that will profoundly re-shape institutions.

Due to the urgency of solutions to advance transitions toward sustainability, “challenges must be addressed in the short and medium-term (5–10 years). Systemic thinking perspectives conceptualize complex and adaptive interactions between humans and nature as socio-ecological systems (SSE). SSEs comprise networks of interactions between human entities and other elements of nature, at various spatial and temporal scales, which produce patterns, structures, and emergent dynamics that interact with the same processes that generated them, adapting and evolving continuously”. In the medium-term, research must thus engage at different territorial scales (regions, cities and localities) framing sustainable socio-development in terms of concrete socio-cultural, environmental, administrative, and industry sector challenges. This research needs to use multiple methods, including

participatory approaches, to embed transdisciplinary research networks that stretch across science and society. These networks should include societal stakeholders and experts from natural and social sciences and engineering fields, and operate as institutional assets that can mobilize diverse types of knowledge resources in a timely and responsive manner for the benefit of both communities and nature.

Fundamental challenges for research include:

- i)** Development of collaborative research frameworks supporting transformation toward socio-ecological sustainability.
- ii)** Recognition of diverse epistemological, theoretical, and methodological traditions in building a multi-perspectival understanding of the values and contributions of nature to communities and people.
- iii)** Incorporation of the multiple interactions that occur between science and society throughout the entire research process.
- iv)** Focusing on social inclusion and transparent decision-making processes to expand knowledge co-production, democratize territorial socio-economic development, and strengthen the legitimacy of science and technology-based transformations toward sustainability.
- v)** Enhancement and promotion of robust science-politics-society interfaces, including interdisciplinary teams of experts from the social and natural sciences, working from design phases to develop participatory and transdisciplinary action-research methodologies and the co-design of long-term monitoring systems.
- vi)** Facilitating access and familiarization of social actors with Earth observation technologies and data, promoting citizen science contributions to evidence-based decision making.

Challenge B: Human sciences in transition scenarios

Coordinators

Josep Martí Pérez (IMF, CSIC)
Idoia Murga Castro (IH, CSIC)

Researchers and Centers

Ángel Alloza Aparicio (IH, CSIC), Ivan Armenteros Martínez (IMF, CSIC), Jon Arrizabalaga Valbuena (IMF, CSIC), M^a Luisa Ávila Navarro (EEA, CSIC), Montserrat Benítez Fernández (EEA, CSIC), Salvador Bernabéu Albert (EEHA, CSIC), Esmeralda Broullón Acuña (EEHA, CSIC), Miguel Cabañas Bravo (IH, CSIC), Luis Calvo Calvo (IMF, CSIC), José Manuel Cañas Reillo (ILCMOP), Ana María Carballeira Debasa (EEA, CSIC), Juan R. Castilla Brazales (EEA, CSIC), Lorenzo Delgado Gómez-Escalonilla (IH, CSIC), Emilio J. Gallardo Saborido (EEHA, CSIC), Laura Giraudó (EEHA, CSIC), César González Pérez (INCIPIT, CSIC), Leoncio López-Ocón Cabrera (IH, CSIC), José Antonio López Sáez (IH, CSIC), Jesús R. Navarro García (EEHA, CSIC), Antonio M^a Orihuela Uzal (EEA, CSIC), José Pardo-Tomás (IMF, CSIC), M^a Teresa Penelas Meléndez (EEA, CSIC), Luis G. Pérez Aguilar (IAM), Irene Rincón Narros (IFS, CSIC), Roberto Rodríguez Aramayo (IFS, CSIC), Roser Salicrú i Lluçh (IMF, CSIC), Delfina Serrano Ruano (IFS, CSIC), Sandra Souto Kustrin (IH, CSIC), Pablo Toribio Pérez (IFS, CSIC), M^a de los Ángeles Utrero Agudo (EEA, CSIC), Pere Verdés Pijuan (IMF, CSIC), Jaime Vindel Gamonal (IH, CSIC), Débora Zurro Hernández (IMF, CSIC)

1. Introduction

Talking about “humanities crisis” is commonplace in some sectors of society and also in certain academic fields, thus wanting to express some loss is not of social relevance, but of institutional trust. This loss is manifested in budget cuts, in the suppression of humanistic subjects in high school, and even in the closure of humanities faculties.

It gives the impression that the humanities are undervalued and the usefulness and application of disciplines that study the past and its artistic, literary, or linguistic production, which propose ethical, political, and legal reflections, and which analyze multiculturalism, religions, bioethics, or gender issues, are not well known.

It is precisely the conviction that the humanities are necessary in a world like the current one where discrimination, violence, or social injustice continues to exist, which leads us to formulate this Challenge in terms of “humanities in transition.” This is to indicate the need for these disciplines to adapt to the changes in contemporary societies to achieve the social weight that due to their intrinsic relevance they should have.

We know the outlook is adverse for developing the humanities, above all because of their low presence in CSIC (less than 10% of the total number of researchers) and the scant consideration they receive. Sometimes they are called “human sciences,” sometimes simply as “humanities,” and, among their specialists, there are also those who prefer to understand their work within the scope of the social sciences.

2. Challenges for the human sciences in a future research program

Regarding the challenges of the humanities in a world as changing and dynamic as the current one, it is worth highlighting those related to objects of study, conceptual and analytical tools, and values.

The objects of study

Considering the current transition scenarios does not mean having to abandon the research fields typical of this area, which have a long tradition in CSIC, and which must continue to be supported. However, it is necessary to add new objects of study closely related to the problems and themes of current reality.

There is no doubt about the effects that great technological advances are having on the generation, dissemination, and reception of information in all fields of scientific research, besides their theoretical and methodological implications. These changes are evident in the appearance of the so-called “digital humanities.”

Likewise, “the severity of climate change and growing ecological awareness constitute a new object of study for the humanities, as far as it can provide new concepts and categories of analysis to understand today’s world, marked by the strong incidence of human beings in the planet’s evolution (Anthropocene) and by the profound crisis of values associated with it. In addition, humanities can help promote changes in individual and collective behaviors, in such a way that progress is made in the principles of sustainability and in the formulation of new models of material culture and regulation of human relations with nature.”

All this, however, arises in a scenario of economic and cultural globalization, but that manifests its effects on local realities (hence the concept of “glocalization”). Therefore, the humanities have to know how to interconnect the “global” and the “local” if they want to be scientifically relevant in today’s world. It is what authors call the “practice of proximity,” as a feature that should characterize the human sciences.

In this global context and the intensification of economic and social exchanges, it is worth noting the relevance that the phenomenon of geographical mobility acquires, and within it, migratory processes. It is a fact that, although migrations are inherent phenomena with the human species, those that occur in the 21st century acquire a special visibility due to the speed in which they occur and the intensity in which it manifests itself in certain areas of the world. Faced with this reality, the humanities have the challenge of reflecting on how to approach these phenomena and on how their social and political management should be approached in accordance with the values of human dignity (see Challenge E).

Nevertheless, “the globalization process generates situations of growing inequality in society, which makes it difficult, if not impossible, to advance along the path of human development if such inequalities are not reduced.” This is manifested in all areas of social life, from distributing income and wealth, to job insecurity, consumption, or gender identity, among others, and gives rise to new waves of social movements that seek to redirect the development model toward a path of greater equality. However, the humanities have much to say about the social and economic inequalities associated with globalization, one of their challenges being to contribute to promoting this ethical and regulatory change.

It is also necessary to address collective identities, which has always been an important object of study in the humanities, and which is now a relevant element of the transition scenarios in which the human sciences must be situated. Besides those identities that have drawn the attention of researchers more frequently, such as those related to gender, ethnicity, religion, or social class, there are also those of a more fluid and unstable nature, continually emerge related with lifestyles, age, body, and conditions. In current globalization scenarios, with their identity frictions, the human sciences face the challenge of analyzing, to understand, the processes that configure and reconfigure identities, especially those that emerge in economic social and political conditions of the contemporary world.

The friction of identities that occurs in current societies, and the inequalities generated by the globalization process, makes it necessary to implement what specialists call decolonial perspectives. They are perspectives aimed at promoting awareness, empathy, and understanding of otherness, of the existence of “other” identities, to enable new relationship models, alternatives to the logics of exploitation associated with the capitalist system. Such perspectives become an interesting new object of study for the human sciences.

A feature that marks today’s social structures is related to demographic dynamics (see Challenge D). This is a dynamic that not only concerns the exponential growth of the world population, although it comes with population declines in certain areas and regions of the planet, but also with the changes that occur in terms of aging, and that generates significant differential relationships between age groups. The effects of these dynamics in the different areas of social and political life constitute a new study scenario for the humanities to define their future research programs.

Advances in the field of biotechnology also are a feature of today's world, with all that is associated with it: cyborgization, robotics, artificial intelligence, genetic manipulation, nanotechnology... These advances are what it needs to be gradual and progressive integrated among the population. This is where the human sciences have much to say, reformulating the meaning of concepts such as "progress," and their social, economic, and political implications.

However, perhaps the great potential that humanities provide are alternatives and new models of interpretation of a world as complex as the current one. In this sense, concepts such as utopia, memory, or poetics, can be key to a dialog with our past, and analyze the situation of our contemporary societies and provide solutions that can improve our future. Besides, the emergence of new forms of citizen participation and developing social movements are also objects of study in which the humanities must anchor their research programs.

Developing conceptual and analysis tools

Besides defining new research objects, the human sciences have the challenge of developing conceptual and analytical tools consistent with the needs that emerge from current reality.

Therefore, humanities research in CSIC cannot be left out of the new trends emerging internationally, but must adapt, from an epistemological viewpoint, to current times, with critical visions toward humanistic tradition while propo- sitive for the present. At the core of these trends is the explicit recognition of the need to reformulate, rethink, or even go beyond the very humanist thinking from which the humanities have emerged. These trends constitute an important epistemological challenge for both the humanities and the social sciences, and represent a response to the 'so-called' crisis and inherent loss of social weight of the humanities.

An equally important challenge for the humanities today is the need to counteract the progressive fragmentation of knowledge through inter- and cross-dis- ciplinary approaches, building bridges with the so-called "hard sciences." With CSIC, collaboration with other scientific areas outside the humanities is already a reality in several research groups, although for this culture of cooper- ation to spread, it is necessary to provide resources and the establishment of in- centives that facilitate the implementation of joint projects.

The values

Intrinsic to the work conducted in the human sciences are the values that are part of the humanistic tradition, values that must be present when researchers engage in the challenges of the new scenario that make up the processes of change.

Talking about values in the humanities does not refer only to scientific practice, something that is common to other disciplines, but also to the need for the actions undertaken from the humanities to conform to the values that predominate in today's world, like feminism, environmentalism, or the recognition of diversity. It also concerns the moral commitment to overcome individualism for more collaborative attitudes and to include ethical values in scientific research.

THEMATIC II: POPULATION, TERRITORY, AND FOOD

Challenge C: Territorial development in new scenarios of rural-urban interaction

Coordinators

Francisco Colom González
(IFS, CSIC)

Ana M^a López Sala
(IEGD, CSIC)

Researchers and Centers

Javier Martínez-Vega, Tomás García Azcárate, Gloria Fernández-Mayoralas, Samir Mili, Javier Sanz, Fermina Rojo (IEGD, CSIC), Julio Navarro Palazón (EEA, CSIC), Pedro Tomé Martín (ILLA), Alberto Corsín (ILLA), Inés Sastre, Javier Sánchez-Palencia, Almudena Orejas, Manuel Lucena Giraldo (IH, CSIC), Carolina Boix (CEBAS, CSIC), Teodoro Lasanta (IPE, CSIC), Fernando Garrido (IESA, CSIC), Roberto Goycoolea (University of Alcalá), and Aylin Topal (Middle East Technical University).

1. Introduction

The profound social and economic changes of recent decades have reduced the differences between the levels and ways of life of rural and urban areas in advanced societies, also intensifying the economic and social relations and exchanges between the two.

Added to this is the accelerated urbanization process, which has made urban areas the predominant spaces for human settlement in the 21st century. In 2007, and for the first time in history, the population of urban areas exceeded that of rural areas, and the projections are that by 2050 the urban population will already be almost 70% of the world population.

The improvement of road and service infrastructures and technological advances has greatly contributed. There has also been a change in rural-urban migration processes, which have ceased to be, as they were in the past, permanent and

unidirectional flows from the countryside to the city, to become today more complex and multi-sense flows. It is not only geographical mobility but also a virtual, favored by access to new technologies as factors that contribute to these changes.

Issues related to the environment, climate change, and the conservation of natural resources are another factor of change in rural-urban relations. In fact, the transversality of environmental and landscape requirements, and the sustainable use of natural resources and actions to combat the effects of climate change condition the use of the territory and restrict the development of extractive activities (the agriculture among them, but also mining or fishing). Added to this are the new demands of the urban population regarding natural spaces, which means that territories are no longer perceived by citizens only as places of production, but also as places for aesthetic contemplation, leisure, or recreation.

Another element of change has been the growing number of economic activities established in rural areas, largely from urban areas, and that take advantage of the comparative advantages offered by rural territories. Likewise, it is worth noting the full integration of the rural environment into the general guidelines that govern social and economic life, and that makes the rural world lose its uniqueness as a living space. This integration is neither subordinate nor dependent as in the past but produced within the framework of a new rural / urban synthesis that revalues rural territories as spaces of wellbeing.

Within the framework of this process of change, the way of facing the future of rural and urban territories is transforming, both from the political sphere and from public opinion. In this sense, the focus on rural territories is broadened, considering them no longer as singular spaces, but as open spaces integrated into the global dynamics that occur in their surrounding environment (on a local and larger scales, thanks to the possibilities offered by telecommunications networks and new technologies).

Furthermore, the impact of “this process on territorial development, the environment and the settlement of the population has enormous consequences in terms of environmental sustainability, territorial balance, food production, and political governance” should be considered. In fact, large cities

“consume vast amounts of energy, natural resources, and food, which, added to the expansion of their areas of influence, is leading to the transformation of habitats and the progressive Anthropization of natural spaces.” All these dynamics pose new scenarios of rural-urban interaction for the future.

2. Challenges for the analysis of rural-urban interaction

Changes in the conception of rural development and agricultural activity

The production and supply of food has historically constituted the traditional axis of the interaction between the rural and urban environments. However, “the opening of world markets and the progressive elimination of agricultural protection systems, added to a whole series of demands and limitations on agricultural activity, has opened the debate on territorial development.” An approach based “on local / regional dynamics and on opening up to new functions, such as mitigating the effects of climate change, incorporating leisure circuits, and reintegration and social insertion of certain sectors of the population, is now being proposed.” The challenge is therefore “to devise a collaborative eco-development between urban and rural areas that will help generate a circular and sustainable economy adapted to the challenges of climate change.”

Landscape management like heritage and economic resource

It is an obvious reality that “the rural environment is less assumed as a place exclusively for production and more as an especially valuable element for the quality of life.” The conception of the territory as a landscape has also made it look like a space with an aesthetic, leisure, and recreational value. However, nowadays natural landscapes have practically ceased to exist, as the landscape is today the direct result of human activities. The landscape is “an object of historical knowledge because of its own content and is also an object of disclosure, management, and patrimonial protection in its condition as an economic resource.” Hence, “the landscape’s conservation criteria can only be successful if it is conceived as a living, active and changing reality.” The challenge here is “to harmoniously develop landscape research in such a way that they are combined with sustainable tourism and with all the productive sectors that affect the development of the rural environment.”

Rural depopulation and migratory flows

It is commonly accepted that the primary criterion to guarantee the demographic sustainability of the territory is “its adequate management and organization, so that the territorial hierarchy does not imply social exclusion.”

In this sense, “depopulation is a complex phenomenon with multiple causes,” although, more recently, “it has been linked to the concentration of investments, services, and employment opportunities in urban and metropolitan areas, as opposed to rural areas.” Thus, we consider that “the population retention and

the generation of wealth in rural areas will be hampered if their work is not valued and it is not possible to live with dignity, which implies opening it to new sectors and economic initiatives.” The challenge would therefore be “to manage territorial development in such a way as to avoid imbalances, dualities, and ruptures in socio-spatial cohesion.” Thus to face this problem should comprise “a management of the rural environment more focused on the promotion of its functionality (agrarian, livestock, cultural),” not to repopulate strongly aged nuclei that have lost their function, unless that repopulation is accompanied of a redefinition of the functions of these territories.

Aging and quality of the living environment

Although rural areas have an aging demographic structure in Spain, the older population, like the population, also concentrated in urban areas. The quality of the living environment is important for the elderly, because it is considered that the physical living space in this age group constitutes a space of prevalent use. Therefore, it can be said that “the residential environment not only constitutes the current living space, and in many cases the past, but the place where a good part of the social relations and the dynamics of community integration take place.” The friendliness of the space allows “the elderly population to remain in their usual environment of residence for as long as possible, but this is only feasible if the pertinent projects are designed and executed to make the residential space, be it urban or rural, a habitable place.” The idea of “healthy aging” is, therefore, linked to that of habitability and friendliness of the environment. The challenge, therefore, comprises “integrating healthy aging into a social conception of sustainable development,” for which it is necessary to “modify the vital perspectives in old age and address the environmental and social determinants of the aging process” (see Challenge D).

Urban expansion and sustainable mobility

The problems faced by cities have common features: congestion, pollution, concentration of population and activities... These phenomena “are linked to intra-urban demographic imbalances caused by the expulsion of the population from city centers, the degradation of non-gentrified urban centers, inequalities in access to services and means of transport and the large-scale growth of the metropolises over the peri-urban areas.” This also affects rural areas and, increasingly, on the depopulation of intermediate cities. Moreover, this mode of occupation of the territory affects the quality of the landscape and the environmental degradation of the territory. In this sense, “the survival of the rural environment increasingly depends on efficient means

of trans- port that link its population with work and service centers.” Therefore, the challenge comprises “developing new sustainable mobility services in the field of a circular economy of reuse and recycling of materials.”

Spatial segregation and habitability of the urban environment

It is a fact that “impoverished and affluent areas, neighborhoods receiving international migratory flows and old urban centers subjected to gentrification processes coexist in a territorially hierarchical manner.” To this, should be added the growing financialization of urban space, the transformation of real estate into financial assets aimed at making them profitable in international markets, a process closely linked to those of “verticalization, densification, uncontrolled urban growth, and formation of real estate bubbles, with their consequent repercussions on public policies and the most vulnerable social sectors.” Therefore, with the challenge of generating healthy and livable spaces in cities, there is the fairly general problem of the growing lack of empathy of citizens with the places they inhabit. “The globalization of culture, tourism, franchises, a functional and speculative urbanism, the disappearance of local commerce, among other factors, are creating cities in which residents do not identify with their environment or are not motivated for its improvement.” Hence the challenge is “the creation of sustainable and inclusive cities through the generation of healthy and livable urban spaces,” which, as far as possible, also contribute to the slowdown of climate change.

Conurbation processes and territorial governance

As is well known, many ideas that we oversee about the political government of human groups are historically associated with cities. However, with the advancement of conurbation processes, this conceptual framework has been overwhelmed. Despite the eminently technocratic approach with which the implementation of territorial meso-governments has been applied, it is “evident that any decision that affects the jurisdictional structures of a country will end up involving political stakeholders, joint municipal bodies, and public opinion.” To this, should be added that “the formation of metropolitan areas has not always been accompanied by the corresponding institutional framework.” This has led to political-administrative fragmentation preventing these types of metropolitan areas from equipping themselves with adequate means and developing effective policies to face problems characterized by the interdependence of their causes and the overflow of the territorial frameworks in which they originate. For this reason, the government of these areas cannot consist “of simply transferring the municipal governance

models to a higher scale.” The challenge, therefore, comprises “the creation of supra-local forms of government over and above the traditional rural / urban division, which cushion territorial differences and balance the different interests of politics and administration at stake” (see Challenge I).

Challenge D: Demographic challenges in a social scenario of longevity and aging

Coordinators

Teresa Castro Martín
(IEGD, CSIC)

Gloria Fernández-Mayoralas
(IEGD, CSIC)

Researchers and Centers

Antonio Abellán García (IEGD, CSIC), M^a Ángeles Durán de las Heras. (IEGD, CSIC), Ana López Sala (IEGD, CSIC), Silvia Marcu (IEGD, CSIC), Teresa Martín García (IEGD, CSIC), Julio Pérez Díaz (IEGD, CSIC), María Dolores Puga González (IEGD, CSIC), Diego Ramiro Fariñas (IEGD, CSIC), Vicente Rodríguez Rodríguez (IEGD, CSIC), Fermina Rojo Pérez (IEGD, CSIC), Javier Sanz Cañada (IEGD, CSIC), Vincenzo Pavone (IPP, CSIC), Francisco Colom González (IFS, CSIC), Mario Toboso Martín (IFS, CSIC), Juan Carlos Velasco Arroyo (IFS, CSIC), Rafael Huertas García-Alejo (IH, CSIC), Fernando Garrido Fernández (IESA, CSIC), Belén Peral Fuentes (IIBM, CSIC-UAM), M. João Forjaz (ISCIII), Carmen Rodríguez Blázquez (ISCIII), Rocío Fernández-Ballesteros (UAM), Diego Sánchez González (UNED), M^a Eugenia Prieto Flores (National University of La Pampa, CONICET), Verónica Montes de Oca Zavala (National Autonomous University of Mexico)

1. Introduction

We begin the analysis of this Challenge by stating that “demography currently occupies a central place on the political agenda” both internationally, with the existence in the European Commission of a Vice-Presidency for Democracy and Demography, and nationally, with the creation of the Ministry for the Ecological Transition and the Demographic Challenge.

Also, in the media and in social debate, increasing attention is paid to the influence of demographic issues on the economy, the labor market, housing, health, pensions, the environment, intergenerational equity, and gender issues.

We consider that the demographic scenarios of the near future “pose multiple social challenges, but also endless opportunities,” and several examples can be given. The first is related to the aging of the population, which we see as an important problem in everything related to spending on pensions, health, and dependency, and the organization of formal and informal care. However, we also see it as an opportunity for the silver economy and the development of “sustainable and inclusive residential communities and environments that could help curb depopulation trends” in some rural territories.

Therefore, as a society, we must change the ageist paradigm “old age equals burden” and replace it with the promotion of “active and healthy aging.”

Furthermore, this change will reduce costs, lead to better management of public services, and to an improvement in the quality of life at all ages without putting intergenerational solidarity at risk.

Another example is related to the important problem of fertility decline. We consider it is a social problem because it accelerates the rate of population aging, but also an individual (or couple) problem because it reflects a growing gap between aspirations and reproductive realities. We also point out this problem is largely associated with the fact that “the social revolution of gender equality is still incomplete,” so we consider that, from the field of public policies, it should be made easier for mothers to work and parents to care for children, as this could have “a positive effect not only on the fertility rate and the level of demographic stability but also on the economy and progress toward gender equality.”

Likewise, we affirm that “the demographic perspective can contribute to the analysis and understanding of emergency situations in the field of public health.” An example is the case of the COVID-19 pandemic, which has highlighted the importance of demographic structures and dynamics to understand and model the course of said pandemic (the volume of the older population and its spatial distribution, the structure of the households, the housing conditions, the profile of the elderly population institutionalized in nursing homes, the degree of intergenerational interaction or the population density). We also consider the challenge for demographic studies to analyze the consequences of the pandemic in the coming years.

2. Demographic trends

The current demographic trends (relatively gradual and predictable) entail several important challenges for public policies, so they need to be considered when formulating them to promote sustainable and inclusive development.

Seven major trends can be distinguished, which can be seen as major challenges. i) The aging of the population and the quality of life of the older people. ii) The possible persistence of fertility below people’s reproductive aspirations. iii) The impact of growing family diversification on child wellbeing and care networks. iv) Health throughout the life course. v) The increasing volume, complexity, and diversity of migratory flows. vi) Rural depopulation.

vii) Access to and methodological management of new data. (A broad development of these seven great challenges can be seen in the complete document attached in Annex D to this report)

Given the current demographic trends, “demography and population sciences provide the ideal theoretical and methodological instruments to address them, both from a macro (causes and consequences of the change in size, structure, and composition of the population) and micro perspective (interrelation between individual, family, work and health biographies, past, present and future).” Likewise, we consider it necessary to address these demographic challenges from an international perspective (because “they are global changes with different rates at the local scale”) and always with a look to the future (because “trend projections are an essential component of these disciplines”).

In all this there is no doubt the help that “technological advances provide to population studies, both in the typology of the data sources available for research, and in the means to store them, statistically analyze them, represent them graphically, and cartographically transmit and spread them.” Over just a few decades, the information and communication revolution “has triggered the capacity for analysis, has made possible new strategies for national statistical systems,” and has generated a new universe of data, massive and of great heterogeneity, such as Big Data.

Notably, “the aforementioned engines of change, so powerful and rapidly emerging, force demographic research to consider some major changes in its work plan,” at least in these directions: i) Update the topics under investigation, paying more attention to emerging patterns and trends. ii) Expand dialog and collaboration with multiple disciplines. iii) Propose new explanatory frameworks that account for demographic change, its causes, and consequences. iv) Take advantage of contemporary technological innovation in all its facets (advanced statistical analysis, data visualization, longitudinal linkage of multiple data sources, Big Data, and new infrastructures). v) Assume a renewed ethical and social commitment to a subject, such as the study of populations, which is very sensitive from a social viewpoint and unavoidable for government action and planning. vi) Incorporate the people themselves as supplying subjects, but also recipients of scientific information and evidence (social transfer of knowledge).

Challenge E: International migrations in a context of global change

Coordinators

Juan Carlos Velasco Arroyo
(IFS, CSIC)

Amparo González Ferrer
(IEGD, CSIC)

Researchers and Centers

Antonio Campillo (UMA); MariaCaterina La Barbera (UNNE);
Sebastian Rinken (IESA, CSIC); José Antonio Zamora (IFS, CSIC);
Héctor Cebolla-Boado (UNED); Gemma Pinyol-Jiménez (UPP);
Silvia Marcu (IEGD, CSIC); Francisco Fernández-Jardón (IFS, CSIC).

Respondents to short survey on the Challenge:

Lidia Farré (IAE, CSIC); Ana López Sala (IEGD, CSIC); Margarita del Olmo (LLA); Francisco Javier Moreno Fuentes (IPP, CSIC); Francisco Colom (IFS, CSIC); Astrid Wagner (IFS, CSIC); Antolín Sánchez Cuervo (IFS, CSIC); Marta Irurozqui (IH, CSIC); Chelo Naranjo (IH, CSIC); Lola Elizalde (IH, CSIC); Miguel Cabaña (IH, CSIC); Idoia Murga (IH, CSIC); Thierry Desrues (IESA, CSIC).

1. Introduction

Despite the intensity of globalization processes over the last three decades and the growing integration of countries and economies, “international migration remains relatively moderate.”

Compared to what happened a little over a century ago, migrations were, in proportion to the population of the time, almost double that of today. However, “in recent decades there has been a certain reversal of the trajectory and, consequently, a certain concentration of migratory flows (including those involving refugees fleeing conflict zones) to developed countries.” In fact, international migrants have increased by 50% (almost 100 million people in absolute terms), with a notable difference now, and that is that, “if during the first globalization (1865–1910), Europe was the continent of origin of most of the emigrants, now it is the first region of destination.”

In this sense, contemporary global migratory flows can hardly be separated “from the great disparities between the global South and the global North, terms taken not in the sense of geographical references, but of political-social configurations that crystallize in formidable gaps in economic prosperity, social conditions, human rights, health, and security.” They are also disparities connected with the asynchrony in the demographic transition registered in the different regions of the planet: low birth rate, higher life expectancy, and increasing aging in the global north; medium-high birth rate, lower life expectancy, and very young populations in the global South.

2. Cross-cutting dynamics associated with migratory processes

War conflicts and refugees

It is a dynamic that will increase and that is already destabilizing migration models based on the distinction between “economic migrants,” on the one hand, and “displaced by war or political violence,” on the other. It involves a clear reconfiguration of the migratory and refugee regime with obvious political consequences. It is a scenario in which it is difficult to clearly separate between who is a migrant for economic reasons and who is deserving of refugee status or another form of international protection.

This forces state governments to interconnect the increasingly mixed nature of migratory flows with admission policies and human rights. Therefore, it would be necessary to establish “separate channels of access that respond to the growing diversity of migration flows, ensuring legal, orderly, and secure migration.”

Human mobility and adaptation to climate change

Natural disasters associated with climate change are already one of the principal causes of migratory flows and therefore constitute one of the new features that characterize contemporary migrations. Its combination with the traditional factors of migration (economic inequalities, armed conflicts, demographic differentials...) gives rise to a diversification of the circuits of displacement. However, although the UN, in its Human Rights Committee, has opened the debate on this matter, the reality is that the right to asylum caused by climate change is not yet fully recognized, and there is no consensus on the magnitude of the cause-effect relationship between both phenomena. Therefore, these questions will be “a growing field of research in the coming years.”

Transformation, diversification, and feminization of migratory flows

It is a fact that the profile of people involved in international migration processes is diversified, either by origin, by level of qualification, or by gender. Hence, new analysis tools are necessary to learn more and better the composition and nature of migratory flows. Likewise, the increasing presence of women is one of the outstanding features of current migration processes. This feminization is taking place not only in the area of care (where there is a strong job insecurity), but also in qualified areas of the labor market (whose family dynamics and differential integration are unknown). It is therefore necessary to “definitively integrate the gender dimension as a basic social structure that induces intersecting vulnerabilities within and across national borders.” Therefore, it is possible to propose that international migration processes be analyzed, complementing the perspective of “gender” with the perspective of “intersectionality.”

Crisis of the “neoliberal” migratory regime

It is a fact that the crisis of the liberal model of regulation of the economy is affecting the migratory regime associated with that model, to where the logic of rights is subordinated to the economic logic. This can be verified by analyzing the legislative reforms in immigration policy undertaken by the European States, whose objective is to make it difficult for the

immigrant population to settle in their respective territories. Therefore, it is possible to propose two complementary lines of intervention: i) design a migration policy that combines procedures for regularization at origin with ex-post systems, and ii) develop instruments to protect the civil, political, social, and labor rights of migrants.

Biased perception and politicization of the migration phenomenon

It is a reality that there are important changes in the perception that the indigenous population has on immigration. This leads to a contraction of universal rights and a strong political instrumentalization of the migratory issue, being a breeding ground for the emergence of authoritarian contexts. Hence, the dominant political discourse on immigration is of “control,” based on the perception that migrants are a threat to national security and identity. It is urgent to reverse this discourse, for which “a huge investment in pedagogy, communication, and dissemination will be needed to reconstruct negative perceptions.” The human and social sciences must also face “the challenge of developing new conceptualizations to address the situation of migrants and develop theoretical and legal categories capable of protecting and guaranteeing the ‘right to have rights’ of every human being, regardless of their nationality and/or place of birth.”

The challenge of incorporating diversity in host societies

The increasing diversity of migratory processes and the intensification of mobility have raised questions about the relevance of issues, such as the legal and sociocultural integration of the migrant population. Likewise, they have redefined identity in more flexible terms to address the lived experiences of multiple belonging of migrants. This makes it difficult to elaborate a “general theory on integration (or incorporation) as was intended in the past,” giving rise to notions such as “segmented assimilation” or “adverse inclusion,” which are useful to refer to the diversity and difficulty that “reflect the trajectories of inclusion of migrants and their descendants in host societies.” It is therefore necessary to complement studies on the material dimensions of integration, with others focusing on aspects such as psychological wellbeing, health or the social and political participation of migrants.

The impact of migration in receiving countries

The aggregate effects of migration on employment and wages of the population of the receiving countries are small, and that they have a positive effect on the economy of these countries. However, the existence of negative effects in certain sectors or groups is also recognized. Hence, a debate should be opened on the competition between migrants and the low-income indigenous population regarding access to public services and aid and their “deserving” of beneficiaries. Perhaps this occurs within the framework of the growing concern about the aging of the population in the most developed countries and the debate on the mitigating role that immigrants in these countries can play in this. Therefore, it is necessary to better understand “the economic and demographic effects of migration flows, on the sustainability and characteristics of the Welfare State and on the configuration and change of the views that citizens of receiving societies have toward immigration.”

The impact of migration in the countries of origin

Given that most of the studies on the migration phenomenon have focused almost exclusively on its impact on host countries, little information is available on the effects of migration on countries of origin. Except for economic studies on the impact of remittances, little is known about their effects on the growth and social structure of the countries where the migrants come from. Therefore, the effort should be focused on studying the exit dynamics and better understanding the return and circulation movements. Specifically, it is necessary to “decompose the development-migration binomial,” broadening the analysis perspective to include topics related to “the changes experienced in ways of life, ways of thinking, being, and relating to the world” of the migrant population.

“Bordered globalization” and proliferation of walls

Starting from the increasingly widespread vision of “borders” as devices for the obstruction of exchanges and not for regulating traffic, the debate on the “legitimacy of states to close and open borders” should be raised. Besides modifying the ways of conceiving and governing borders, “traditional migratory patterns have also been transformed causing displacement of the arrival routes to the borders,” with the consequent increase in the risks that migrants must assume. Likewise, the “externalization of borders” has contributed to the fact that migration management is not seen “as a sociodemographic issue, but as a global security issue.”

Global governance of migration

It is an obvious fact that international migration cannot be managed lastingly at the national level, not even in a grouped way, as is the case within the European Union. This reality makes this issue aggravated by the absence of global governance of international migration processes, leading to a “unique anomaly” scenario. Therefore, it is possible to suggest as the only way out the “establishment of a global migratory regime with solid institutional and normative support.” In this sense, the “Global Compact on Refugees” and the “Global Compact for Safe, Orderly and Regular Migration,” promoted in 2018 by the United Nations, can be valued as a ray of light, acting as an alternative to the current policies developed by states.

Challenge F: Safe and healthy eating in sustainable food systems

Coordinators

María Dolores del Castillo
Bilbao (CIAL, CSIC-UAM)
Oscar Martínez Alvarez
(ICTAN, CSIC)

Researchers and Centers

Daniel Ramón Vidal (Archer Daniels Midland Co.), M^a Victoria Moreno-Arribas (CIAL, CSIC-UAM), M^a Begoña Bartolomé Sualdea (CIAL, CSIC-UAM), Raquel Abalo Delgado (URJC), Amaia Iriondo De Hond (CIAL, CSIC-UAM), Tomás García Azcárate (IEGD, CSIC), Cristina de Lorenzo Carretero (DG for Research, Teaching and Documentation, Department of Health, Community of Madrid), Daniel Martínez Maqueda (CIG-CM, IMIDRA), Tiziana Fornari Reali (CIAL, CSIC-UAM), José María Lagarón Cabello (IATA, CSIC-UGR), Sergio Torres-Giner (IATA, CSIC-UGR), Micaela Carvajal Alcaraz (CEBAS, CSIC), Eduardo Moyano Estrada (IESA, CSIC), Belén Peral Fuentes (IIBM, CSIC-UAM), Cecilia Díaz Méndez (Department of Sociology, University of Oviedo)

1. Introduction

Food production has undergone a profound change in recent years to adapt to scientific and social advances and promote a safer and healthier diet, with products aimed at meeting specific needs and promoting business models inspired by the Circular Economy. It is necessary to advance in the commitment to the sustainability of the planet and to moderate the environmental impact throughout the entire food production chain, while increasing the capacity of the system to respond to the demands of increasingly connected, informed consumers responsible and aware of their habits.

The concept of sustainable food encompasses aspects of environmental, social, nutritional, and economic durability. In this sense, the production processes must be economically sustained until high autonomy is accomplished, achieving economic sustainability. Likewise, it must contemplate and fulfill criteria of social justice and fight against precariousness, and thus contribute to the greater social sustainability of the system. Intrinsically, the processes

must preserve the planet as much as possible, contributing to its environmental sustainability. Last, they should ensure that they maximize the long-term health of people they feed, thus working a nutritional sustainability. In this last aspect and from a transversal approach, “personalized nutrition” emerges as one of the crucial elements to achieve a healthy diet, as the one that ensures a degree of sustainable health preventing the risk of diseases.

In this global scenario, social sciences use concepts such as “food sovereignty” (the right of people to feed themselves) and “food citizenship” (the right of citizens to healthy and quality food and the duty to perform responsible food consumption, informing themselves of what they consume, and evaluate the effects that this has on future generations, in other populations, and on the environment). In this same scenario, the concept of “conscious eating” is also proposed, defined as the ability of individuals to learn of physical and emotional sensations in relation to eating, also being the basis of an essential strategy for healthy eating of the population.

Critical aspects for achieving a healthy diet include the environment, the aging of the population, and the economic and social contexts. However, the relevance of the holistic perspective is highlighted as: a perspective that starts from recognizing the socio-economic and environmental influence of production processes that goes through the personalized design and creation of ingredients and foods. The exploration of new sources of ingredients and foods employing biotechnology, in particular “blue biotechnology”, such as the reformulation of foods with more suitable nutritional profiles, the optimization of processes in each link of the food system to the consumer, and the increase in organic farming and the new relationships between the actors of the food system.

Concepts recommended as an ethical framework for the development of a safe and healthy diet are health, safety, sensory, sustainability, and solidarity. To achieve this challenge, “blockchain” technology, the technological innovation in the food sector led by digital transformation (industry 4.0), the involvement of consumers as co-creators, the development of the “Circular Economy” necessary to achieve climate neutrality from efficient management of raw materials, resources, and surpluses are presented as strategies; for example, by reducing, reusing, and recycling. At the same level, consumer involvement is needed to reduce food waste that will also contribute to reducing the “carbon footprint” of the food chain.

From the perspective of nutritional sustainability, it is necessary to highlight the key role of omic tools that allow us to provide essential information about the genes of consumers, the different microbial ecosystems in the human body (microbiota) and the food we eat as part of our daily diet. A “healthy diet” implies the maintenance of a healthy and diverse microbiota, considering the genetic individuality of the organism itself, its living habitat, and the health of the brain-gut axis. The microbiota of the gastrointestinal (GI) tract is an essential component of this axis. The gut participates in the endocrine, immune, and nervous systems. GI health determines the nutritional support and general health status of the individual (physical, mental, and emotional). Brain-gut axis disorders affect quality of life, social function, labor productivity, and resilience in both health and social crises (such as COVID-19) and place a major burden on public health systems.

To maintain a healthy intestinal microbiota and brain-gut axis, the Mediterranean diet is recommended, along with a daily intake of foods with a low glycemic index (whole grain cereals), rich in proteins of high nutritional quality (legumes, insects, algae...), probiotics, mainly soluble dietary fiber from natural sources (by-products of the food industry...), vitamins (C, D), omega-3 fatty acids, minerals, and phytochemicals (melatonin, caffeine, cannabidiol...). To this should be added an active and healthy lifestyle, and the use of suitable culinary processes to preserve nutrients and bioactive compounds with health-promoting properties in food.

However, in this Challenge we understand that this food ideal has not yet been achieved, perhaps, among other reasons, because of the complexity of the governance structures in which the food production, distribution, and consumption system is articulated, always subject to tensions and conflicts that prevent consensus on actions to achieve the goal of healthy, safe, and sustainable eating. The global food system possesses the challenge over the next 30 years of how to feed more population, with fewer water resources, less arable land, and in an environment of globalized and urban societies. The European Commission, aware of this challenge, has recently published its “from farm-to-fork” strategy included in the Green Deal for 2030 where it proposes to reduce the use of pesticides by 50%, fertilizers by 20%, antimicrobials in farm animals and aquaculture by 50%, and achieve 25% organic farming on arable land. Considering this framework of action, several future challenges arise, to move toward safe and healthy eating in sustainable food systems.

2. Challenges and future scenarios

The “Circular Economy” as a strategy to achieve a sustainable food industry

Controlling waste or recycling are aspects that, at present, are very much considered when buying food or cooking. This change in attitude does not refer only to the consumer’s habits, but also includes a greater demand on companies to promote a more careful, committed, and sustainable production. Therefore, models inspired by the circular economy are emerging rapidly, committed to “upcycling” (recycled materials transformed into higher-value products) and “zero waste” (avoidance of the generation of waste) for the environment. The recycling of plastics is posed as a challenge for technologists and scientists, within the broader objective of valorizing by-products and reducing the generation of waste. Likewise, developing materials and packaging from biomass (Circular Bioeconomy) is proposed. New emerging lines in this field of research include the functional development of natural polymers, such as starch, cellulose, and other polysaccharides, proteins, lipids, and more important, polyhydroxyalkanoates (PHAs) of microbial origin, combined with new processes based on nanotechnology. The work is proposed to obtain new packaging materials, which would be processed through traditional or emerging routes, based, for example, on nanotechnology to make single-use packaging, thus closing the cycle of the Circular Economy.

Reduction of food product’s “carbon footprint”

It is necessary to increase research on emission / fixation balances, because it is difficult to determine the climatic impact caused by a certain product, and this impact varies according to the source material, production system, processing industry, packaging model, and transport system. The challenge provides the data and tools to the stakeholders in the food system to understand and influence key issues such as the potential for carbon sequestration (produced only by plants and algae) and the reduction of emissions in primary production, both vegetable (including the reduction of the negative effects of certain agricultural practices), and animal; also in the processing industry and transport.

Tools to energize and promote conscious nutrition

Another key challenge is to promote healthy and conscious eating education in the population, especially in schools, starting with early age students. It is considered an essential strategy to prevent future pathologies, many due to ignorance of healthy eating habits. The progressive increase in non-communicable diseases associated with diet in the population is largely caused by the

distancing of a healthy nutritional profile supported by a gastronomic heritage. The culinary techniques and ingredients used to prepare traditional recipes have been substantially modified. Therefore, the experiences developed in some countries (such as Brazil) in so-called “institutional markets” of food, which guarantee the supply of food to school canteens with production from family-owned agriculture (in many cases, organic production) are of the utmost interest.

Rational and intelligent use of genomic knowledge in agri-food

To achieve a sufficient diet, accessible to all and personalized, it is worth considering the need to exploit all types of existing agriculture (conventional, organic, precision, and genomics), highlighting the interest and potential of applying genomics in the improvement of the agro-alimentary raw material. However, it is necessary to solve the problem that arises around using transgenic crops, given the suspicion this arouses in a part of society and the obsolescence of European legislation. Similarly, the advantages offered by gene-editing tools (CRISPR) in agriculture and livestock must be addressed without delay, in contrast to the reluctance that most European society has toward genetically modified organisms (GMO). For example, gene editing allows decreasing the content of gliadins in wheat, being more suitable for consumption by celiac patients.

Development of effective ingredients / foods / diets / habits to achieve a healthy microbiota

It is necessary to advance in the knowledge of the microbiota and its interaction with the components of food, to reduce the risk of disease in healthy individuals and using it as a therapeutic strategy in populations affected by specific pathologies. For this, it is considered essential i) to create new integrated structures / platforms with less invasive and faster instruments / infrastructures that keep research at the forefront. ii) to design analytics for daily use of the microbiome and its interindividual variability. iii) to create protocols for action in the field of primary care, which allows detecting states of dysbiosis in the microbiota to act in its earliest stages. iv) to develop bioinformatics applications to perform a meta-analysis of data (Big Data). v) to integrate the information obtained in platforms with genetic data to store, organize, and make the information accessible to all interested sectors. vi) to develop prediction models; and vii) to build a new precision nutrition model, based on scientific evidence and technology.

Formulation / identification of food for the health of citizens

The existence of groups with vastly different nutritional and vital needs, as well as the heterogeneity of the pathological processes associated with the brain-gut axis, which affect the health of consumers, requires the design of nutritional regimens and / or weapon therapies that benefit all individuals. To achieve this objective, it would be necessary to obtain relevant information on the impact of the digestion process (biotic and abiotic) on the bio-availability of nutrients and bioactive compounds and their effects on the physical, mental, and emotional health of individuals. Likewise, it would be necessary to extrapolate the knowledge of the mechanisms of action of drugs to the area of food science to identify molecules of interest for the optimal maintenance of the health of the brain-gut axis. Consequently, these actions would contribute to achieve a sustainable health and to reduce public health expenses. To reach this goal, multidisciplinary interaction and innovation in methodologies to obtain precision information on the biological processes is required.

Research to avoid the social and food gap in times of crisis

It is a fact that, in the short and medium term, our society will experience recurring health and economic crises. Therefore, there is a risk the social and food gap will increase between consumers with the willingness and purchasing power to bet on the consumption of certified quality products, and consumers without that capacity or attitudes. Thus, the eating habits of the population should be studied, considering their connection with the environment, demographic change (aging), and economic and social cohesion. In relation to the environment, progress should be made in the production of healthier foods with fewer additives, with simpler formulations where ingredients are prioritized, reducing the “transport footprint,” developing Territorialized Food Systems, penalizing intensive livestock farming, and promoting the consumption of vegetable products. Concerning the demographic crisis, to face the challenge of feeding an aging population, it is necessary to bet on imposing nutritious diets that contain “nutraceuticals” and minimize public health problems associated with this population. Finally, it is important that food production must adapt to the changes associated with the impending economic crisis that threatens to produce a serious social fracture. To face the challenge of feeding an aging population, it is necessary to bet on imposing nutritious diets that contain “nutraceuticals” and minimize public health problems associated with this population.

Argumentation against food neophobia

So-called “creative foods” are complementary to fresh and / or minimally processed products, but they cannot and should not be substituted for these in the daily diet if a healthy diet is to be achieved. However, creative foods are very useful to serve groups with special nutritional, vital, and cognitive needs (frail elderly, cancer patients, allergic people and those with food intolerances, subjects with cognitive-sensory impairment or affected by neurodegenerative diseases,...) Likewise, these creative foods facilitate the consumption of ingredients with inalienable nutritional values, but which present serious problems of cultural acceptance, production, sustainability, or access (such as the consumption of insect protein). Therefore, in the future, it is an important task in the field of creative food, to work toward a compelling argument against food neophobia.

The consumer as a key element in food production

The selection of food by consumers responds to motivations of health, convenience, experience, and sustainability. There is a trend towards greater demands on companies to promote a more careful and sustainable production. Therefore, and in line with the concept of “food citizenship,” the consumer could be identified as an active component of the food production chain, with a fundamental role in achieving healthy eating in a sustainable global world. The consumer as an active subject of rights and duties regarding food is a key factor in helping to guide the objectives and innovation of the food system. In a top-down view (“from fork-to-farm”), needs are identified from the kitchens of consumers, challenges, and new ideas, to collect preferences and acceptance, encouraging consumer participation to configure, test, and refine food and / or services. Progress should be made in applying science-based strategies that help consumers choose foods that allow them to enjoy a balanced diet as part of a healthy lifestyle, an example being the implementation of harmonized nutritional labeling on the front of the container, and access to information on the complete traceability of the food from origin.

Improved relationships between stakeholders in the food system

To have a healthy, sustainable, safe, and fair diet, it is necessary to organize the relationships between the stakeholders in the food system. Therefore, exploring these relationships with scientific rigor is a priority challenge to achieve an efficient governance structure. In this way, new analytical perspectives can be opened, such as those related to producer-consumer interaction, the role of the large distribution, or the public policies that would be necessary to balance the asymmetric relations between consumers and food companies. Likewise, objective criteria should ensure a fair economic return to each link in the food chain.

THEMATIC III. SOCIAL AND POLITICAL EFFECTS OF THE PROCESSES OF ECONOMIC AND TECHNOLOGICAL CHANGE

Challenge G: Technological change and new ways of work / employment in contemporary society

Coordinators

Jordi Brandts Bernad
(IAE, CSIC)

Catalina Martínez García
(IPP, CSIC)

Researchers and Centers

Laura Cruz (IPP, CSIC), Luis Miller (IPP, CSIC), Ana Rute
Cardoso (IAE, CSIC), Luis Sanz (IPP, CSIC)

1. Introduction

The fear of unemployment caused by technology recurs throughout history. In the 1930s, Keynes spoke of it as if it were only the temporary phase of a maladjustment of the economic system. Yet 30 years later, economists concluded that “technology eliminates jobs, but not work.” Technological change affects the types of jobs required and their wages, but the key question is this: if some jobs are eliminated in the process of technological change, what new ones are created?

As the 2019 OECD Employment report noted, 14% of current jobs could disappear because of automation processes in the next 15–20 years, and another 32% are likely to change radically when individual tasks are automated. Many people have been left behind by globalization, and the digital divide persists in access to new technologies, which will lead to inequalities based on age, gender, and socio-economic variables.

The report adds that not the entire population has benefited from the best jobs that have emerged in the context of the global change process, leaving many people trapped in precarious, underpaid labor markets with limited or no access to learning and social protection systems, excluded besides collective bargaining.

Likewise, there is genuine concern about the hollowing out of the middle class as the advance of technological change comes with new precarious and increasingly low-quality jobs. According to the OECD report, in some countries, the probability that the group of non-conventional workers will receive income support if they become unemployed, is already 40–50% less than conventional workers. Moreover, the probability that the low-qualified adult population participates in training courses is already, in OECD countries, 40% lower than highly qualified countries.

However, while this is true, there is also an emerging economy characterized by new forms of employment that can lead to greater social inclusion if measures are taken to protect the less favored and to make inequalities less exacerbated. These new forms of employment imply higher labor flexibility, tele-working, part-time jobs, collaborative jobs... The EU survey on the Collaborative Economy and Employment shows that flexibility is the reason most cited by respondents who prefer these jobs.

Worker protection in these new work environments is hardly considered but should not be forgotten. In this sense, welfare systems and collective bargaining should not ignore the rights of women, immigrants, and other minorities, because these groups tend to choose these forms of work more frequently than other social groups.

2. Future scenarios

In this section, three key challenges in the relationship between technological change and employment are analyzed: automation, labor polarization, and social preferences in the new conditions of the labor market, and some broader issues are presented schematically.

Automation / automation

The process of job creation and destruction due to technological change needs to be properly understood for governments to intervene effectively. The impact of technological change on the labor market has several dimensions, the first being its effect on the total number of jobs. The fear that the adoption of different types of machinery will lead to a reduction in the total number of jobs and, hence, to massive unemployment, is not new (it is enough to refer to the Luddite movement against machines, which spread through England in the first third of the 19th century).

Beyond that historical reference, it has been shown this fear is not justified, because the number of people employed has increased significantly over the last two centuries. However, it is necessary to reflect on whether the great progress taking place today in information technologies and digitization will this time lead to the much-feared reduction in jobs.

Recent studies suggest there is no real problem in terms of the total number of jobs thanks to the complementary effects between sectors, the increase in global demand due to increases in productivity, and the emergence of new ideas and new jobs. Technological change and the automation associated

with it is a positive process, because it frees people from repetitive work and the most onerous tasks, but it has some potentially negative effects, which must be considered.

The polarization of the labor market

The last two decades have seen a major shift in the academic treatment of the effects of technological change on employment. At the end of the 20th century, the dominant theory affirmed that technological change influenced employment through skills and abilities. In this sense, some said that any technological change benefited, in terms of employment and salary, those with the highest qualifications, and harmed those with fewer qualifications.

However, at the beginning of this 21st century a new theory emerged that emphasized the importance of the process of “routinization.” Thus, the most routine jobs are those that can be more easily automated, and, therefore, those with the most tendency to disappear. They are also jobs in an intermediate position in the labor market in terms of salary and occupational prestige: office, manual, and factory workers.

Faced with these clearly declining intermediate jobs, the two extremes of the labor market are growing and polarizing. In the lower part of the salary and occupational scale, the demand for service and support personnel increases. They are low-skilled and low-wage workers, but they are in high demand today. At the top of the job market, the demand for highly skilled jobs such as managers, professionals, and technicians are also growing. This process leads to a polarization of the labor market, concentrating the demand for employment at both ends.

There is ample empirical evidence of this polarization process in many countries, including Spain. For example, some studies show this polarization occurred in our country during the last economic-financial crisis and in other countries. These studies also confirm the effect that the process of routinization and robotization of jobs has on the labor polarization.

In Spain, for example, between 1994 and 2014, there was a gradual disappearance of jobs at the midpoint of the occupational scale, the destination of these workers varying according to their level of qualification: those with lower levels of education moved to less qualified jobs, whereas those with a higher level of studies moved toward the best paid segments in the market.

Psychosocial effects of the new working conditions

A crucial question is whether and in what way technological change affects the population psychologically. Relationships worldwide of work are not based only on monetary incentives, but also depend on other factors, such as the intrinsic motivation to conduct certain activities, the preferences of individuals, the comparative grievance, social ties, reciprocity...

These aspects of human motivation have been well analyzed by experimental and behavioral economics, as well as by other disciplines in the social sciences. Social preferences have been studied, showing that self-esteem, the subjective wellbeing of individuals when compared to others, and a set of circumstances associated with social interactions have great relevance.

Regarding the specific issue of labor relations, specialized literature tells us that the emergence of work environments, where a large part of the performance is discretionary and not fully associated with formal contracts, is increasingly relevant. This is a situation in which the exchange of rewards between workers and their employers becomes important (I compensate you if you do any extra activity outside what is formally established), especially in occupations with complex tasks, that involve creative work.

Intrinsic motivations are the internal vector that makes people go to work, not because of the external rewards they may receive, but because the very act of working is interesting and satisfying for people. People strive to work out of intrinsic and extrinsic motivations. Humans create social bonds through repeated interactions. The strength of these social ties, and whether they are positive or negative, depends on the characteristics of the interaction.

Similarly, humans are often reciprocal in their behaviors. This may be a positive thing (in the sense they reward the favorable behavior of others with similar behavior on their part), but it can also be a negative thing (punishing the bad behavior of others with bad behavior). Furthermore, humans have a strong tendency to compare themselves with others, and this affects their behavior. Moreover, other dimensions of sociability interact with relationships worldwide of work, such as the perception that procedures are fair.

The key question is, therefore, to analyze how these motivational elements will be affected by restructuring labor relations taking place within the framework of the current process of technological change. For example, it must be

analyzed whether new forms of work organization can lead to changes in the monitoring and control of work processes, and whether and which effects can have on the performance of workers.

Another context where changes in work organization may affect people's motivations is related to the growing importance of online work and telework. The reduction of the direct and face-to-face control that this work embodies can have important implications still far from being understood. Working in these new environments implies the absence of physical contact with other workers, and this can have effects whose meaning is still unknown. In fact, there are studies that have found diverse results on this matter; thus, research on these issues should continue to be developed to have a complete view.

A matter of special relevance is the impact that a possible increase in wage inequality, resulting from technological change, may have on the motivation and effort of workers. Some studies suggest that salary comparisons are a key factor in workers' decisions to endeavor to perform their jobs.

Using survey data and experimental techniques, studies show the effect of social comparison on the willingness of workers in equally productive jobs to engage in work. The results of these studies tell us that social comparison plays a role, but that the way it does so is complex, thus conclusions should not be drawn lightly about its effects.

The systematic study of these questions should be approached by the different disciplines of the social sciences and may also involve multidisciplinary research. The important thing is these issues are studied with appropriate methods, so it is possible to identify causal relationships and discover the specific mechanisms behind the observed events. Furthermore, regarding the negative effects of the consequences of technological change, it would be important to identify what kind of social and management interventions are appropriate to counteract these effects.

Other broader challenges

Besides the three challenges to which we have referred, it is worth adding five more questions, which are broader and which we only point out here schematically: i) the distribution of work on a large scale (how to redistribute work among the members of households and different social groups?). ii) The organization of the leisure society (how to occupy free time?). iii) The distribution of the benefits of technological change (how to redefine the ownership of robots?). iv) The decoupling of citizens' rights regarding the status and position of each worker in the

labor market (how to measure satisfaction and subjective wellbeing at work?). v) The reconciliation of remote control of work with its exercise through local scale (how to reconcile consumption patterns and the sustainability of the planet?). vi) Automatization, collaboration and polarization in science (how to address precarization and dualization in the scientific labor market?).

Science system dynamics

The societal challenges described in the previous section could also apply to some of the dynamics of transformation of research activities and science systems. The automatization of scientific work is related to increasing capital investments and equipment needed to carry on research activities. Automatization is also connected with the expansion of scientific collaboration and team science, and the most important effect is the demand of new scientific skills required to perform the work.

Polarization and dualization are only partially related with the impact of technology on research activities and, probably, are much more linked to the way in which a new division of labor is to be established. The way in which science has traditionally operated (mentorship and apprenticeship system) has also changed following new processes of massification.

In the scientific labor market, social relations and the new labor market conditions are governed mainly by the specific institutional qualities of the labor markets in the different countries; this, rather than the effects of technical change, is the main driver. If precarization (e.g. low salaries and high levels of fix-term contracts) of the working conditions becomes embedded in the science system the effects will be serious, not just regarding the stress of scientists but also their decreasing creativity, levels of excellence and quality and, in the mid term, a reduction of the attractiveness of science.

Csic's advantaged position and interdisciplinarity

So far we have emphasized the economics aspects of the current debate about the effects of technical change on employment. But the debate around this is much broader, it involves economic, political, social, psychological, historical, and many other aspects which CSIC is in a privileged position to address. These and other issues direct and indirectly related to the effects of technical change on employment from a social sciences and humanities perspective, could be included in a multidimensional research agenda where the study of labor markets has an important presence of projects looking at academic and scientific labor markets, which are also impacted by new forms of work and experience the effects of technical change and globalization.

Challenge H: Third sector, social, and collaborative economy

Coordinator

Manuel Pérez Yruela
(IESA, CSIC)

Researcher and Center

Gregorio Rodríguez Cabrero
(University of Alcalá)

1. Introduction

The subject to which this Challenge refers is “with the recent evolution, emerging sometimes, of forms of production, exchange, consumption, mutual aid, and aid to third parties, which are conducted through collective actions arising from within society and its civil and religious institutions.” This challenge emphasizes the importance of these entities as civil society strategic actors in modern democracies. Nevertheless, although originally, and not always, the organizations that conduct this action are independent of the state, many depend on the public power for financing and all are regulated by the corresponding public bodies.

As stated in the document (see Annex H), “it has been common for these organizations to make compatible the waiver or limitation of the economic benefits of the activity they carry out, the values of the cooperation, solidarity, participation, and voluntary action with the economics of the production of goods and the provision of social services.”

Another current characteristic feature is that “their actions are governed by modern criteria of organizational rationality and direct their economic activities to the market, without prejudice to maintaining the cited social values on which they are inspired.” These types of organizations, specially those of the social economy are old in terms of its origin, although it has been diversifying and acquiring greater complexity, because of the wide and varied set of organizational fields in which it is present, being also a changing phenomenon in relation to the limits in which it acts.

It is a fact the persistence in our cultural context of these cooperative formulas, which coexist with other organizational models, such as the state, profit-oriented companies, and families, and which contribute to the sustainability of welfare systems. The great variety of organizations that make up the Third Sector is also a fact, thus it is necessary to distinguish two large categories: the Third Sector of Economic Action (TSEA), formed by entities that carry out economic activities (cooperatives, mutual societies, labor societies...), and the Third Sector of Social Action (TSSA), formed by non-profit organizations that carry out social activities (particularly associations and foundations).

Along with these two organizational categories of the Third Sector, attention must be paid to the emerging forms of collaborative, alternative and, solidarity economy becoming a relevant social and economic phenomenon today. Therefore, as adequate regulation is still pending and has not been the object of sufficient interest from the field of social sciences, it should be a fundamental objective for future research programs.

2. Classification of the Third Sector: a methodological challenge

The Third Sector of the Economic Action (TSEA)

It comprises organizations whose activity is the production of goods and services, such as cooperatives, mutual societies (labor companies, agrarian transformation companies, fishermen guilds, among others). Of these, the most important, in number, employment, and turnover, are those that integrate co-operativism, which are also the ones that have the best information, being articulated in cooperative formulas of second and third degree.

All the entities that make up the Third Sector of the Social Economy, whether cooperatives or other organizations, converge in the Spanish Confederation of Social Economy Entities (CEPES), which is its highest representative body, without prejudice to the weight maintained by sectoral and territorial organizations in representing their specific interests. These national representation entities are part of those that exist at EU level.

It should be noted the importance of the cooperative sector in Spain, although it is still far from what it represents in other countries in our European environment. A 2018 report from the World Cooperative Monitor shows how, among the three hundred cooperative and mutual organizations worldwide with a turnover of over 1.1 billion dollars, there are only 4 Spanish, 10 Italian, 23 German and 48 French. In 2017 there were 20,958 cooperatives in our country, and the number of workers was 319,792 (1.6% of total employment in Spain in the fourth quarter of that year), highlighting those in the industrial and services sector.

Within the cooperative sector, agricultural cooperatives are the most traditional in Spain, significantly contributing to developing rural areas and the maintenance of the population in them, as well as the creation of territorial identity. The image of cooperativism is associated for many consumers with the idea of an economy with a human face, quality, and trust, which is “an important intangible asset.”

Regarding the other organizations (non-cooperatives) that are part of the social economy, the second most important group is that of *labor companies*,

conceived as entities for the creation of employment under the formula of joint-stock or limited companies. In 2017 there were 9,324 labor companies (90% as limited companies), which employed 63,471 partners and workers. Most (88%) are micro-enterprises with less than 10 workers and an average size of 7, and their primary activities are services and, at a great distance, industry, and construction.

The next most important groups within the Third Sector of the Social Economy are the special *employment centers* (designed to promote the employment of people with disabilities, of which in 2018 there were 670 centers employed 84,946 people with disabilities), companies of insertion (designed to help people with social problems of access to the labor market, of which in 2108 there were 185 that employed 7,154 people) and the fishermen's guilds (of which that year there were 198 that employed about 35,000 workers).

A unique case is that of foundations, which can be considered part of both the Third Sector of the Social Economy and Social Action, because they conduct activities related to both areas (economic activities and non-economic activities, such as culture, leisure, and sports). In 2014, there were 8,866 active foundations in Spain.

The Third Sector of Social Action (TSSA)

Social Action entities are the most important group in the Third Sector, their objectives being the production of welfare services, the vindication of social rights and the stimulation of civic participation through social volunteering.

The Third Sector of Social Action comprises some 30,000 active entities, among which the associations (70%) and to a lesser extent social action foundations (18%) predominate. In addition, in Spain there are three special entities whose size, volume of activity and special form of regulation make them unique; *Cáritas* (a well-known organization of the catholic church), the Spanish brand of the international organization Red Cross, and the National Organization for the Blind (ONCE).

The actual social action entities started from the second half of the 1960s, where a period of reconstitution began, to the end of the 1980s. Since 1980 they have been growing and consolidating, driven by the restoration of democracy, by developing the Welfare State in Spain during those years, and by our incorporation into the EU. Their relationship with public administrations is constant, because they cooperate in the provision of services and in the management of welfare programs and strategies, while they depend financially on them.

However, “political cycles condition it, because they are not alien to the views that different governments have about the function of this sector of social action, hindering its continuity and impairing the effectiveness of its activity.”

Making a comparison with the rest of the EU countries, in each country, the nature of the Third Sector of Social Action reflects their respective welfare systems. Thus, these entities are more developed in Northern Europe, because they have more robust welfare systems than in Southern countries. This explains why in Spain and Italy they represent, for example, only 3.9% of total employees, whereas in the Netherlands it is 10.3%, in the United Kingdom 5.9% and in Germany 5.4%.

Despite the variety of entities that make up the Third Sector of Social Action, some common features can be indicated, namely: the importance they give to provision of social services, in collaboration with the public sector; competition with the commercial sector in the provision of services; the participation of volunteers; collaboration between entities; its growing interconnection with the entities of the social economy; the perception that their interventions are increasingly personalized to have a greater capacity for social integration of the recipients; and the concern to improve autonomy and financial stability...

Another feature that characterizes these social action entities is their constant renewal (56.5% of the entities were created between 2000 and 2019, many after 2008) and their proximity to the groups and people they serve. It also highlights the precariousness of their economic situation. In 2018, almost half of the entities had an annual income of less than €30,000, 30% had between €30,000 and €300,000, and only 8.5% had more than €1 million, among which are the three unique entities, the Red Cross, ONCE, and Cáritas.

By sectors, most of its activities are naturally focused on social action, followed remotely by social insertion and social and health care. The profile of the groups to which they direct their activity are homeless; people at risk of exclusion or in a situation of dependency; disabled; people with addiction problems; childhood, adolescence, youth, and seniors with problems; battered women, migrants, and refugees, among others. The other activities are the defense of rights and the sensitization and training on the problems they address. Regarding the origin of the income, most of it is public financing, followed by private financing, and of own financing (see Annex H).

Regarding the employment generated, in 2018 the entities of the Third Sector of Social Action employed 577,230 people, having increased the weight

generated by the three unique entities (Red Cross, ONCE, and Cáritas), which is today 15% within all the sectors (See Annex H). Given the characteristic of having volunteer personnel, in 2018 the sector had the collaboration of almost a 1.5 million volunteers, with an average of almost 30 volunteers per entity. These volunteers are preferably engaged in direct care activities and participation in awareness and promotion campaigns.

In qualitative terms, these strengths of this sector of social action stand out: the internal cohesion of the entities; the stability of collaboration with the public sector; the growing openness to other Third Sector (TS) entities; the quality and commitment of its human resources at all levels; the value and importance of volunteering; the speed of response to the failures of the public sector and the market, insufficient however because of the scarcity of resources; and a management that, as a whole, is transparent and avoids indebtedness to ensure the viability of the entities.

However, among its weaknesses is its low social visibility; difficulties in transmitting the value of their results; the dual structure of organizational size; financial insufficiency despite the growing diversification of financing sources; and the still insufficient internal articulation of the sector.

Changes in social needs have made this sector of social action aware of better at using its institutional and organizational capacity to establish a medium-term sustainability agenda. This can allow the entities that comprise it to anticipate social change, and improve their financial strength, broaden the social base, establish stable alliances with the public sector and other civil society agents, and expand collaboration with the commercial sector in projects of mutual interest.

Emerging social action organizations and sharing economy

As an example of social collective actions that show affinity with the principles of the TS, and specifically with the social economy, it is worth referring to other types of entities, such as social enterprises, social cooperatives, and solidarity economy enterprises. In addition, some more recent initiatives such as the community foundations and some recent collaborative economy initiatives.

Social enterprises

Social enterprises are “organizations that address unmet needs or solve a social or environmental problem through a market or business approach.” These companies include “a range of cases, ranging from a company whose

activities are socially useful or beneficial, to a non-profit organization that allocates all its profits to social objectives, to companies that dedicate only part of their social objectives to social objectives.”

However, they present a set of economic, social and participatory traits, which they must comply with: having a continuous activity of production and / or sale of goods; assume a significant degree of economic risk; have a minimum number of salaried workers; have an explicit goal of benefiting the community; arise at the initiative of a group of citizens or a civil society organization; limit the distribution of profit; have high autonomy; have a participatory governance that involves the groups affected by the company’s activity (partners, employees, service recipients...).

Notably, the effort that the EU is making to promote social enterprises, through the Initiative for Social Entrepreneurship (2011), recognizing the role they can play in the smart, sustainable, and inclusive growth model proposed in the Europe Strategy 2020. Insertion companies to help the employability of excluded people, and special centers to promote the employment of the disabled and policies for integrating people with disabilities in the labor market, could be classified as social enterprises, along with those that provide opportunities meaningfully to excluded and disabled people.

A particular case of social enterprises is the social cooperatives (no presence in Spain). They are companies created specifically to develop two functions, which are remarkably similar to the two types of companies contemplated in the Europe Strategy 2020 mentioned above: i) social and health care activities (social and assistance services); and ii) activities of training through employment for people with difficulties to integrate into the labor market. Unlike traditional cooperatives, the governance model of social cooperatives is the business one, like that of private companies that compete in the market, differing from classic cooperatives in that their primary objective is not profit, but the social function that they develop.

The solidarity economy

The solidarity economy is an example of new economic initiatives that, although indebted to the tradition of the social economy, are based on values and objectives that go beyond the limits of traditional entities. The entities of the solidarity economy rely on the concept of “social market,” understood as “a network of production, distribution, and consumption of goods and services and common learning that works with ethical, democratic,

ecological, and solidarity criteria...” As established in the Charter of Solidarity Economy is based on six principles: equity, work, environmental sustainability, cooperation, non-profit purposes, and commitment to the environment. Therefore, it can be said these entities are part of a new culture that reflects the advancement of social movements such as environmentalism, feminism, pacifism...

The Spanish Network for Alternative and Solidarity Economy (REAS) brings together some five hundred entities grouped into regional and sectoral networks. Its activities cover a wide range, from recycling and waste recovery to financial and fair trade, through agricultural, industrial, and service activities, especially social and educational services. The entities of the solidarity economy are associated to the great confederation of the social economy CEPES, and many of its entities are cooperatives or associations.

The sharing economy

The collaborative economy is a social and economic phenomenon of our time, which is growing exponentially. Although there is no agreed definition of what it is, the communication of the European Parliament (EP) on “A European agenda for the collaborative economy” defines it as “business models whose activities are facilitated through collaborative platforms that create an open market for the temporary use of goods and services generally offered by private individuals.”

This EP Communication includes three categories of stakeholders within the collaborative economy entities: i) providers, who share their assets, resources, time and / or capacities; ii) consumers or users of the goods and services offered; and iii) intermediaries, who put suppliers in contact with consumers or users through a platform. An essential factor for developing the collaborative economy is the existence of the internet and information and communication technologies, without which it would not be possible.

Although the relationships between providers and users of this economy can be between equals (like people who want to exchange their homes or offer part of them as accommodation occasionally) or between companies that want to offer their services or sell your products to consumers by paying for it through their platforms (such as those that exist for hotel accommodation), only the sharing economy developed between equals through a platform, for free or through payments is considered that are not considered benefits (time banks, crowdfunding, crowdsourcing, co-working, local currencies...)

In the varied casuistry that exists of this type of relationships, “undesirable effects of their development have been seen: touristification of neighborhoods, abusive labor relations (lack of security in transactions), among others,” thus it would be necessary conduct their regulation. In Spain, over 500 platforms operate between economy and collaborative consumption and economy on demand for the most diverse activities.

From the viewpoint of this report, it is interesting to highlight the relationships that the collaborative economy can have with the TS, and the potential it offers. It is a fact that many entities of the collaborative economy are close to the values of the TS, because they fulfill aspects that characterize it, such as non-profit and social objectives. Likewise, the collaborative economy is a clear example of how much can be done in the TS using new technologies.

However, the relationships established within the framework of the collaborative economy “is a type of exchange that can be done without using digital platforms, at the level of smaller communities, such as neighborhoods or municipalities with little population.” In this sense, the collaborative economy has always been practiced, albeit on a small scale and between people with close relationships, so with these new initiatives the aim is to recover it.

These innovations have opened a window of opportunity of extraordinary scope, because of the possibilities they offer to develop collective actions that can be based on the values and objectives that have inspired the actions of the traditional TS. The entities of the collaborative economy are the least studied and known for their youth and intense dynamism, not yet having sufficiently reliable data to draw a map of them.

Community foundations

Community foundations still have little tradition in Spain, compared to neighboring countries, although there are some that, due to their system of organization and operation, can be considered as such. They are philanthropic organizations, closely linked to the territory, with which they establish a long-term commitment, to contribute to developing its endogenous potential and the well-being of its inhabitants. To do this, they mobilize financial, cultural, patrimonial, human, and organizational resources from the community, and attract external private investors and collect public resources. In their system of government, they actively involve the members of the territory.

Currently, there are over 1,800 community foundations worldwide. These institutions are very common in the United States and Canada, also in some EU

countries, such as the United Kingdom, France, Italy, and Germany, and they have also spread to other geographical areas such as Latin America or Africa.

Their work spheres are very diverse, predominantly a territorial vocation and helping the people who live there. Their configuration, positioning, and strategic options vary depending on the countries and the environments in which they operate. This diversity is manifested in aspects such as the relationship and cooperation they have with governments, the origin of the economic resources at their disposal, their financing and the action they conduct. The importance of the territorial connection of the inhabitants of the territories and their proximity to the principles and values of the social, solidarity, and collaborative economy constitute the substrate from which they usually emerge. Unlike most foundations, which arise at the initiative of a natural person, the promotion of community foundations is usually collective and social in nature, the result of the citizen initiative.

Challenge I: Democracy, governance, and participation in plurality scenarios

Coordinators

Joan Font Fábregas
(IESA, CSIC)
José Fernández Albertos
(IPP, CSIC)

Researchers and Centers

Enriqueta Aragonés (IAE, CSIC), Txexu Ausín (IFS, CSIC), Joan Esteban (IAE, CSIC), Laura Mayoral (IAE, CSIC), Eva Anduiza (UAB), María Jesús Funes (UNED), Gema García Albacete (UC3M), Patricia García-Leiva (UMA), Sonia Royo (UNIZAR)

1. Introduction

The recognition of a global crisis of representative democracy is the starting point of this Challenge. The symptoms of this crisis are evident: the increase in feelings of discontent with the political system; electoral volatility and fragmentation; and polarization, partisan among elites, and affective among voters.

At the electoral level, these patterns could be “degenerating into a kind of vicious circle by provoking a more confrontational political debate.” It is a debate that either paralyzes the political systems in which there are many stakeholders with veto capacity (United States, European Union...) or makes the imposition of constitutional policies “on the side” viable (democratic setbacks in Eastern Europe...).

In either of these two scenarios, what is called new politics seems to have “an intrinsic inability of political stakeholders to reach agreements on public

policies and institutional reforms, which could contribute to correcting the problems that these dynamics originate, which makes the delegitimization of democratic rules and customs continue.”

Notably, the social and political centrality of these issues is observed in many areas, one of them, for example, in the Sustainable Development Goals (specifically goal 16). Likewise, the high levels of social conflict this implies have important consequences regarding aspects related to coexistence and quality of life. Furthermore, it also “has effects on everything related to the economic field, to where the World Bank considers civil conflicts as the greatest impediment to economic growth.”

Analyzing these conflicts, some observe that they have an increasingly less economic class component, being more frequently “motivated by non-economic confrontations, structured around cultural or ethnic elements.” Democracy “reveals the order of the preferences of citizens, but does not indicate the intensity of these preferences.” Likewise, “how the different groups indicate the intensity of said preferences is through the organization of public events (demonstrations, protests, strikes...), events and mobilizations with which they direct the intensity of their discontent to governments.” Therefore, it is necessary to pay attention to the study of the causes of protests and civil conflicts, given the interest these issues are generating.

A review of the literature on the root causes of these processes shows the huge amount of published works, which can be divided into three blocks: i) economic transformations (secular stagnation, increased inequalities associated with robotization and globalization, new structural gaps associated with the outsourcing of post-industrial economies...). ii) Complexity of the way of exercising political power (supranational institutions, crisis of legitimacy of multilevel governance models, shared sovereignties, “deselectorisation” of public policies, expansion of populist and far-right proposals...). iii) Social changes (new forms of social interaction, increasing role of information and communication technologies, change in the media model, fake news, social networks, and structural deterioration of social intermediation institutions that anchored individuals in the political system...).

In addition, “the freedom of movement of capital has extraordinarily reduced the capacity of national governments for the redistribution of income,” as seen in facts such as: the corporate tax was 40% in the countries of the OECD 40 years ago and today it is half; the rate for the highest incomes of income tax

was 90% 50 years ago in the US and today it is 40%. Evaluation companies, such as Standard and Poors, Moody's or Fitch, have a potent influence on the economic policies of governments. This means that "the margin of action of democratic governments is reduced," and this causes "the disaffection of citizens, because the democratic expression of political preferences does not materialize in effective decisions."

Likewise, confidence in the "market" as a mechanism for distributing rights over the social product "is reaching very high levels of bias in benefit of capital income." Thus, "the weight of wage income in Gross Domestic Product (GDP) is rapidly decreasing in all OECD countries," generating "enormous economic polarization, which the Welfare State can hardly counteract."

Finally, "a growing part of the business profits of large corporations does not come from innovation or efficiency, but from the hold on the governments these organizations practice." In this sense, it is a fact that "government decisions can bring great benefits and can be obtained through the widespread practice of the 'revolving doors' of politicians or through direct corruption." That is why colonization of public space by large private companies and their possible control is a matter of growing importance.

2. The social, institutional, and scientific-technological scene

To correctly diagnose this thematic area, it is necessary to consider the scientific-technological, social, and institutional environment.

Regarding the scientific-technological environment, one of the fundamental changes is "the growing use of Big Data by analysts, organizations, companies, administrative entities...," something that will radically change (if it is not already doing so) "the nature of empirical testing in all social sciences." This poses enormous challenges in terms of the anonymization of data and the preservation of privacy, and from the viewpoint of new analysis techniques, including artificial intelligence tools. Nonetheless, although some potential lines of work opened with Big Data within the framework of collaboration between different scientific disciplines, are very useful, they also require large economic investments.

However, the ambivalence of the social environment must be admitted for developing these lines of research. It can be favorable, due to the visibility that the results of these projects have in the public debate, thus enabling the availability of sufficient financial resources. Nonetheless, "the use of its

conclusions in partisan political debate can create difficulties for the scientific relevance of these issues to be accepted.” Although, it should be remembered how in the last decade initiatives in this line have been emerging (promoting transparency and accountability of institutions, and creating technological tools that facilitate public debate), both in the social activism sector and in foundations, which must be considered, although they are still very weak compared to other countries (see Challenge H).

Regarding the institutional environment and the presence of these topics on the research agenda, “the panorama is different depending on whether we focus on the international arena where a good part of the main international calls already shows a strong concern and sensitivity toward these topics.” “Or if we do it at the scale of our country, where these lines” have been much more absent from the priorities set by the research calls, perhaps except for some calls in the Autonomous Communities.

Depending on where the causes of these phenomena are located, reform proposals emerge. Thus, in the *economic sphere*, it is worth highlighting the new redistributive public policies, as well as a “renaissance of interest in industrial policy and the growing rethinking of the institutional framework in which the processes of integration of global markets for goods and capital have occurred.”

Regarding the *socio / cultural sphere*, issues such as “the reform of the communication media or the strengthening or creation of a new pluralist democratic culture through different approaches and public policies are worth highlighting, among them the educational, as a promoter of active citizenship, and maintenance of pluralistic values.”

In the *political / institutional sphere*, transparency, electronic democracy, and new deliberative mechanisms, but also the delegation to “experts” or independent agencies, can be observed as possible proposals for the future. The objective of these proposals for transparency and electronic democracy is to “improve representative mechanisms and institutions,” facilitating their control and accountability, and facilitating communication with citizens.

Regarding deliberative proposals (participatory budgets, referendums promoted from below..) we consider that the purpose of these proposals “is to increase the role of citizens in political processes” and show how the dilemma of “how much prominence to give to the face-to-face spaces and how much to the online” or “what role to give to individual citizens and to representatives,

associations and organized groups.” However, these deliberative proposals may also be aimed at “alleviating the participatory gaps generated by social inequality or by strong generational differences,” identifying “objective populations whose voice is most absent from political life,” and therefore, more necessary if their incorporation can be encouraged, “through quotas, campaigns, or pilot experiences aimed primarily at these sectors.”

Finally, and within this same political-institutional sphere, those solutions that emphasize the delegation to “experts” or independent agencies, such as “mechanisms of search for greater efficiency and less linkage between public policies and electoral considerations, without the need to give greater voice to citizens,” deserve to be mentioned.

However, and generally, it must be admitted that “the main protagonists of the process of political representation have also undergone strong changes (both in the internal functioning of the existing stakeholders and in the appearance of new ones and / or in the rebalancing of forces between them).” This would give rise to an increasing “questioning of institutional spaces without it being clear in which direction the emerging alternatives will evolve.”

Besides the causes of these crises and the possible strategies to deal with them, it is necessary to recognize the existence of some unknowns about their results, for example, in terms of quality of life for citizens. Both “the debate on how these results should be measured (what type of indicators), and on what would be the foreseeable results with each of the possible reform strategies, are questions without clear answers.” Specifically, the future research agenda should try to answer these questions: “what is the political appeal of each of these reform proposals? How can you expect them to be successful? What are the principal obstacles they face? What is its ‘political economy,’ that is, to what extent is it foreseeable that social and political demand for its adoption emerges in the current institutional context?”

It should be noted the existence of cross-cutting issues that affect the three thematic areas: i) the dilemma of the territorial scale (or its combinations) to which each of the possible proposals can be applied (for example, if face-to-face deliberative solutions appear to be more suitable for micro scenarios, but more difficult to carry out on more global scales). ii) The institutional fit between all the proposals to avoid causing unnecessary dissonances or conflicts. iii) The unknowns about the achievable results of each proposal, in terms of quality of life for citizens.

Challenge J: Strategies and policies for social inclusion in sustainable social welfare systems

Coordinators

Francisco Javier Moreno Fuentes (IPP, CSIC)
Ada Ferrer i Carbonell (IAE, CSIC)

Researchers and Centers

Luis Moreno (IPP, CSIC), Eloisa del Pino (IPP, CSIC), Gibrán Cruz Martínez (IPP, CSIC), Roberta Perna (IPP, CSIC), Jorge Hernández Moreno (IPP, CSIC), Jordi Brandts (IAE, CSIC), Ana Rute Cardoso (IAE, CSIC), Lúdia Farré (IAE, CSIC), Esther Hauk (IAE, CSIC), Gloria Fernández-Mayoralas Fernández (IEGD, CSIC), Txetxu Ausín (IFS, CSIC), Melania Moscoso (IFS, CSIC), Concha Roldán (IFS, CSIC) and Remedios Zafra (IFS, CSIC)

1. Introduction

Over recent decades, the Welfare States have experienced various types of pressures, which question their sustainability and pose new challenges. These pressures, known as the “new social risks”, result from: i) changes in the economy and their effects on the labor market, due to globalization and technological advances; ii) the changes produced in the system of values and social practices, and iii) the demographic changes in scenarios of greater longevity and aging.

Regarding the first element of pressure (*economic transformations and their effects on the labor market*), the dissociation between economic growth and prosperity can be pointed out. This dissociation occurred in most advanced industrial economies from the 1970s and has continued with greater intensity since the beginning of the 21st century, leading to a growing increase in social inequalities. To this must be added the effects of economic globalization and offshoring, which have displaced several low-skilled jobs in the manufacturing sector from Western countries to countries with lower wage levels. Likewise, technological advances have also reinforced the trend toward rising inequality by reducing demand for certain medium- and low employment profiles, creating new sources of vulnerability and forms of precarious jobs (see Challenge G).

A second group of factors that pressure the Welfare States derives from the changes that have occurred in *the values and social practices of the population*, such as the greater individualism, secularization, or democratization of social relations. Especially noteworthy is the growing incorporation of women into the labor market, which, besides giving them economic autonomy and empowerment, but can also strain to the traditional family structures.

The third axis of transformation that affects the Welfare States is the aging of the population (see Challenge D). This trend breaks the economic equilibrium of the pension system and increases the demands on the care of the elderly.

These changes pose challenges to the structure and operation of the Welfare States, which we analyze in the next section, focusing on the uniqueness of the welfare systems existing in Mediterranean countries, including Spain.

2. Fundamental challenges

The European Social Model and its future

The “European Social Model” is a political project articulated around the values of social equality, collective solidarity, and productive efficiency. In line with it, the EU’s recommendations on social policies are inspired by two fundamental principles: “flexi-security” and “social investment.” At the regulatory level, these European policies are embodied in the “European Pillar of social rights” the purpose of which is to guarantee, through intervention programs, equal opportunities, and access to the labor market, fair working conditions, social protection, and promote the social inclusion of the most vulnerable groups (youth, women...). However, the increasing visibility of the aforementioned “new social risks” puts pressure on the “European Social Model” with, especially since the 2008 recession, a clear tension between the “European market” (mainly concerned with economic competition and fiscal austerity) and the “Europe that corrects the market” (which advocates strengthening social protection).

The uniqueness of welfare regimes in Mediterranean European countries

Within the European Social Model, the countries that form the “Mediterranean welfare regime” (among which is Spain) share defining features. Among them, its relatively late economic development, its family-oriented character, its relatively low taxation, lower levels of social spending and the coexistence of universal benefit systems (health, education...) and social insurance systems, whether contributory (unemployment benefits, pensions...) or non-contributory (care for orphans, the disabled, widows...). Because of this specific configuration, the Mediterranean model reproduces gender inequalities, being criticized for its weak redistributive capacity and high levels of poverty and inequality and for its low performance in terms of employment, and its marked duality between relatively well-protected groups (*insiders*: permanent workers with seniority in companies, public employees...) and the numerous precarious and less protected groups (*outsiders*: young people, immigrants, single-parent families...). The crisis that began in 2008, and the cuts in public spending associated with it, clearly revealed the weaknesses in the institutional balances of the Mediterranean welfare regime, reducing the

effectiveness of its social protection programs and deteriorating the quality of benefits. Since then, the future of the Mediterranean welfare model has been openly questioned and must adapt to a very different socio-economic environment.

Gender equality

The existence of strong family support networks and the delegation of the burden of caregiving responsibilities to women have a major impact on how risks and social needs are managed and, on the structure and functioning of Welfare States, especially in the Mediterranean model. However, some distinctive features of this model are changing rapidly, driven by transformations within families and changes in values, beliefs, and social practices. Spain is the Southern European country in which these transformations have most intensely affected the ability of families to respond to the needs of their members, forcing public administrations to intervene in different areas of social policy.

Families and childhood

Family policies were a residual field of the Spanish Welfare State before the 2000s, when a wide range of measures were introduced to meet the needs of families. Because of the application of these measures, spending on social protection for families / children increased well above the average in the rest of Europe between 2004 and 2010, which represented a significant change regarding the traditional welfare systems of Southern Europe. Still, this expansion of family policies did not last long enough to overcome institutional inertia. The austerity measures introduced after the fiscal crisis that began in 2008 led to a severe reduction in policies to support families. The future of gender and family policies is uncertain in a fiscally restrictive context, considering that regulatory policies (with little budgetary impact) appear to be a deficient strategy to achieve progress in these dimensions. Families are reacting to the lack of support policies by having fewer children and delaying the age of emancipation for young people, as has been the case in Spain for the past two decades.

The emancipation of youth

The “new social risks” in the Welfare States affect people with special intensity during the early stages of active life, because they are linked to problems of integration into the labor market and the consolidation of a job. Besides structural trends, the economic crisis that began in 2008 significantly affected youth unemployment in Spain. Between 2007 and 2013, the youth

employment rate (16 to 24 years) went from 45.2 to 17.6%, which represents a decrease of 27%. However, this phenomenon is nothing new, as youth unemployment rates have always been high in Spain compared to other European countries. This problem has had serious consequences at different levels, among them the great economic instability and uncertainty and its implications in the life trajectory of young people (delaying, or even truncating, their emancipation process). It is also known that people who suffer long periods in this situation, or who enter the labor market in times of economic recession, are more likely to have precarious and poorly paid jobs throughout their working lives and, therefore, worse social protection in general and very poor protection in periods of unemployment, because they have not achieved a sufficient contributory career to receive adequate benefits.

Unemployment and precariousness of the labor market

Deregulation policies adopted in most European countries in recent decades have led to the emergence of “dual labor markets” with a clear division between stable and precarious workers (see Challenge G). The 2008 crisis aggravated this situation, bringing to light the traditional problems of the unemployment protection system in Spain (low level of protection for the unemployed, increase in the number of unemployed workers at risk of poverty, youth unemployment...). Besides those who do not receive support to cope with the unemployment situation, the problem of the “working poor” (workers with low wages and / or precarious employment whose income is below the poverty line) is very common among low-skilled employees. This problem has clearly worsened in recent years, as wage cuts have particularly affected workers at the lower end of the pay distribution. The growing percentage of workers at risk of poverty is joined by young unemployed people, which constitutes a particularly challenge for the future of the country.

Inequality and poverty

The transition from industrial societies to so-called post-industrial ones implied profound transformations in labor markets, in the family and in social protection structures, widening the gap between the most privileged and the most disadvantaged segments, opening new spaces for social exclusion.

Because of the financial and economic crisis of 2008, not all citizens are integrated into the circuits of “civic normality” through access to paid employment. Spain suffered intensely from the effects of this crisis, becoming a country with the highest levels of poverty and income inequality in all of Europe. However, the macroeconomic imbalances that affected Spain were already

present before the crisis, because many of these problems are related to the configuration of its labor market and the relative weakness of its welfare system. In growing budget constraints, concentrating resources on disadvantaged groups has been gaining popularity.

Residential exclusion

Housing vulnerability is simultaneously a cause and a consequence of social exclusion. The Spanish residential structure is characterized by the enormous weight of home ownership and the residual role of rent, and by low intervention by public administrations in this area (Spain dedicates the lowest percentage of GDP to public spending in housing, around 1% compared to the average of 2% in the EU). Social inequality is expressed geographically through the articulation of territories and the location of social groups in them. Therefore, processes of social exclusion are usually accompanied by processes of territorial segregation that enhance social exclusion through processes of stigmatization, precariousness of the provision of services and public goods... The development of an urban policy that intervenes in the most disadvantaged neighborhoods to curb the processes that operate by increasing vulnerability and the risk of social exclusion appears as an extremely necessary and urgent political tool.

Health and healthcare

Although the improvement produced in the major health indicators in our country over the last decades is true, it is also a fact this improvement has not been dispersed and that health inequalities within the Spanish society have increased in recent years. In the economic crisis, the budgetary austerity measures adopted in 2012 regarding the National Health System radically altered the functioning of this system, leading to an obvious deterioration in its functioning. These reforms and budgetary limitations implied a deterioration in the quality of care provided due to the closure of hospital beds, the reduction in the ratio of health professionals per patient and the general underfunding of primary care centers and hospitals. Likewise, the demotivation of professionals in the health sector, the deterioration of public perception about the functioning of the National Health System, and the growing tendency of the more affluent segments of the population to resort to private health insurance plans, constitute additional threats for the sustainability of the public health system. A greater emphasis on primary care and a better articulation between the health dimension and the field of social services could be essential to respond to the social challenges posed by advanced contemporary societies such as Spain.

Dependence

Policies for the care of dependent persons in Spain have been very deficient in resources, based on relatively few monetary transfers, and only marginally on the public provision of services. Thus, the supply of public care homes and assisted living centers for the elderly is notably limited. Despite the large volume of dependent people who live with their families, the home care system has been underdeveloped, both in terms of quantity (hours of assistance provided) and coverage (number of elderly people served). A key measure adopted to respond to the growing demand of the Spanish society was the development of the Law for the Promotion of Personal Autonomy and Protection of People in a Dependency Situation (known as the “Dependency Law,” approved in 2006), which involved the creation of new institutions and the strengthening of some existing ones. However, the fiscal austerity measures applied since the 2008 crisis made it difficult to implement this legislation and encouraged public administrations to reorient the system towards measures that could reduce the total costs of the program. These factors displaced the provision of care toward an informal market capable of offering flexibility and lower costs.

Sustainability of the Welfare State

Reflection on the future sustainability of the Welfare State has traditionally revolved around the question of the financial viability of social protection programs. However, there are other relevant aspects in defining possible future scenarios, such as those that refer to the role played by the political debate on the Welfare State, the normative preferences of citizens (regarding what is considered the highest degree of cohesion and solidarity within a society), and ultimately, the level of social support for the redistribution of wealth.

These elements are fundamental to determine the context in which economic and financial considerations are framed and interpreted and, therefore, to establish the limits of citizen support for the programs and plans included under the umbrella of the Welfare State.

The crisis that began in 2008 once again placed the question of the economic sustainability of welfare policies at the center of social and political debate.

Thus, the discussion on reforms and the possible reduction of spending in this policy area was once again at the forefront of the political debate, especially in Southern European countries particularly affected by the economic and fiscal crisis. The challenges for the transformation of the economic systems of these countries are undoubtedly very important.

There is room for a profound redefinition of the balances in the functions performed by the state, the market and the civil society (including not only families but also TS organizations) in the regulation, financing, and provision of the different social protection programs and welfare policies in Europe (see Challenge H). Consequently, the European Welfare States have sought a redefinition of their programs through cost containment measures and modification of the priorities assigned to each of the different schemes.

Regardless of how debates about the Welfare State take place in the political arena, citizens' attitudes toward social protection are largely based on the shared social values that constitute the foundation of a society. It is worth noting the broad support of European taxpayers for the redistribution of wealth through the state, and that public policies should be financed through taxes without resorting to debt (which should be used mainly to finance expansive policies and programs of an “extraordinary” nature).

THEMATIC SECTION IV: HERITAGE AND MEMORY

Challenge K: What remains of the future: sustainability through heritage

Coordinators

Felipe Criado Boado
(INCIPIT, CSIC)

Blanca Ramírez Barat
(CENIM, CSIC)

Researchers and Centers

David Barreiro (INCIPIT, CSIC), Montserrat Benítez (EEA, CSIC), Emilio Cano Díaz (CENIM, CSIC), Marta Castillejo Striano (IQFR, CSIC), Judith Farre Vidal (LLA, CSIC), Rafael Fort González (IGEO, CSIC-UCM), Mariano García Fernández (MNCN, CSIC), Esther Hernández (LLA, CSIC), Sagrario Martínez Carrera (IEM, CSIC), Julio Navarro Palazón (EEA, CSIC), Almudena Orejas Saco del Valle (IH, CSIC), Antonio Orihuela Uzal (EEA, CSIC), Cristina Sánchez-Carretero (INCIPIT, CSIC), Mónica Verges Alonso (MNCN, CSIC), María Angeles Villegas Broncano (IH, CSIC), Amalia Zomeño Rodríguez (ILC, CSIC).

1. Introduction

In the relationship of all societies with their past, there is a set of inherited elements and practices that must be preserved for present use and bequeathed to future generations. We call this heritage.

Heritage is increasingly being recognized as a key element for social cohesion, sustainable socioeconomic development and people's welfare. Resources dedicated to heritage conservation have gone from being considered an expense to being regarded as an investment, with a high revenue. The heritage industry has been an active part of this transformations in recent decades, it has generated employment, contributed to the worldwide expansion of tourism

and has become a coveted sign of identity for political communities. Today there is no social or political process that does not use heritage in some way. Hence the actuality of the subject, and the importance of an organization such as the CSIC having research capabilities in this field.

The role of heritage in the objectives of sustainable development, in improving the future of the people and the planet have been highlighted by various international organizations, such as ICCROM, ICOMOS, UNESCO and Europa Nostra, and reflected in various national and international strategic documents, highlighting the importance of scientific and technical research to achieve these objectives. The launch in 2010 of the Joint Programming Initiative on Cultural Heritage and Global Change (JPI-CH), in which Spain has participated from the beginning, relies on the recognition that scientific and technical research is a key element for preserving, understanding and disseminating heritage, and ensuring its positive impacts.

This makes it a highly topical and relevant subject for scientific and technical research, in which Europe clearly occupies a world leadership position in the creation and development of heritage science. In this context, and having Spain one of the richest and most diverse heritages in the world, it needs to play its corresponding role in the advancement of scientific research in heritage in tune with the leadership that its heritage has on a worldwide scale.

The scientific study of heritage or heritage science, has unique characteristics and a high interdisciplinary component, making the scientific issues that arise in the field of heritage particularly complex.

Heritage science is based on three key ideas that are closely related to each other, although with different approaches: safeguarding or conservation, valorization and analysis of the social processes that generated that heritage. In addition, the creation or execution process, together with the transformations undergone throughout its history, often make heritage objects unique, requiring a particular approach to each problem. Finally, because of their dual material and immaterial nature, it is necessary to address issues originating in the human sciences using scientific techniques and tools, in a framework that requires collaboration between professionals from a wide range of disciplines. When approached from the field of humanities and social sciences, it seeks to resolve questions related to the origin, history and meaning of cultural assets and practices, their influence on development, and their value and meaning for the societies that have generated, guarded, possessed, disputed or dispossessed

them. When it does so from the field of experimental sciences, heritage science studies the material composition, construction systems and technology of cultural property, the deterioration mechanisms, and addresses conservation problems and the development of new materials and new analytical techniques.

2. Challenges and future scenarios

The current situation, with the crisis of our socio-economic model, the polarization, the threat of climate change, the disruption of the COVID-19, etc. raises the need to rethink and resolve how the memory of the experiences that we as a society and as individuals are living will be constructed, which fully concerns heritage: how heritage influences and has an effect on our lives, and how our lives change an environment that tomorrow will be memory and heritage.

The challenge facing heritage research at this time represents a return to the origin: what do we want and should we select for its safeguarding, and why? At the same time, it raises new questions in relation to the heritage of the future: what role should we experts play in a process that is no longer our exclusive competence? How do we approach jointly from research the materiality of our world and of ourselves with the symbolic and imaginary dimension, social relations, culture and language, which are the instances in which the need to safeguard certain entities is generated?

In this context, heritage science faces a series of global and specific challenges that we have to consider.

The main and immediate challenge is the strengthening of heritage science as a research strategy, which results in the use of the heritage value chain as its conceptual framework. This chain, which links the basic processes of knowledge generation and socialization (recording, analysis, interpretation, intervention, management, circulation and valorization) with the environment in all its phases (interaction between scientific agents and social agents in all its variety), is what makes it possible for heritage to be a resource that contributes to the Sustainable Development Objectives to varying degrees. To address this major challenge, we must also look to Europe, to the new strategies of scientific cooperation in this field, such as the Joint Programming Initiatives (JPI) and other initiatives like the future European Research Infrastructure for Heritage Science, E-RIHS. These types of initiatives will lead to the development and excellence of research in heritage science.

To this purpose, an important challenge is the *strengthening of interdisciplinarity* and collaboration between disciplines, not only in the terms in which there is already a well-established background (projects and networks), but also in the design of interdisciplinary research lines, with different but complementary projects. This interdisciplinarity that describes heritage science is essential in the scientific strategy that points towards the need to contribute, within a horizon of sustainability, to an alternative model of society and citizenship. A model which seeks to manage the real local and global problems of a world in which the conflicts arising from periodic human and economic crises continue to grow. Heritage is not a neutral entity, far less an intrinsically positive one, in this world; it is part of it. Therefore, the challenge is that heritage can function as a medium for the transformation of reality: this is what ultimately justifies a heritage science, its social relevance. The heritage science must contribute, to increase the critical conscience of the citizenship, as well as to produce alternative forms of social relationship, based on equality, cooperation, solidarity and sustainability, understood as respect to the memory of those who preceded us, to ourselves and to those who will succeed us.

3. Specific challenges

Within the global challenge, it is worth highlighting some research issues, that have recently aroused the interest of heritage science, and will undoubtedly continue to be relevant in the near future and will give rise to new challenges that can be addressed by the CSIC:

Territory, landscape and heritage

From historical knowledge to the understanding and transmission of the spatial context of heritage: heritage is a vehicle of utmost importance in providing today's society with the networks of meaning needed to understand the phenomena of accelerated change in which we are immersed, as well as to help manage the processes of change at both the symbolic (collective identities) and territorial levels. Knowledge about the past is essential to be for managing the present reality, to contextualize the present time and space and to project them towards a horizon of sustainability.

Archaeological research on landscapes, and their patrimonial recognition, have been and are generators of community and lasting resources in rural areas.

Critical study of the processes of patrimonialization.

The objective of this challenge is to study the processes of formation and use of heritage in the present and the past. Until recently, a heritage has been seen

as something intrinsically positive, and not as a social field in which values and interests, often conflicting, are displayed, and whose effects are not always positive for the community, or for the most vulnerable sectors of it. In order to build sustainable and innovative heritage valorization strategies, it is necessary to start from critical research and analysis: that is, from the production of critical knowledge on how societies appropriate and use heritage.

Social innovation and cultural heritage

The aim is promoting actions for the social valorization of heritage, in such a way that both the communities that possess it, and the citizenship can benefit, as it is an important integrating element and a significant part of the national and European identity. Within this approach, a new dimension of valorization towards society is beginning: citizen science. Developing an optimized working methodology and establishing citizen science networks would make it possible to exploit this phenomenon, both to contribute to the creation of knowledge, and to make both scientific research and heritage more visible and valued. In this sense, it could also be considered to involve society, from the premises of scientific knowledge, in the definition of heritage research strategies and even in the study processes, along the lines of the SwafS programs of Science with and for Society of national and European programmes.

Heritage, languages and communication

The study of language from the perspective of heritage is a priority in almost all current heritage regulations, since languages are considered heritage assets. The great challenge is to coordinate a strategy for the research and safeguarding of languages and their variants that integrates the immanent dimension of the linguistic system with its different historical, geographical, social and stylistic manifestations

Development and application of non-destructive analysis techniques

The development and application of non-destructive or non-invasive techniques that provide information on the cultural assets without damaging or modifying the object. In this regard, it is particularly relevant to emphasize in situ evaluation techniques, which allow the study of objects that for various reasons cannot be transferred to the laboratory, and the development of diagnostic techniques that provide information on the state of conservation of the materials or the heritage object as a whole. These techniques can be applied to all types of assets in remote sensing mode, from the scale of the object to that of the site or territorial units.

Advances in preventive conservation

These advances would include the establishment of monitoring systems and developing mathematical prediction models in the long-term. One of the current difficulties is the time limitation of the projects (3 years), which prevents the development of ambitious long-term projects, which are very important due to the nature of the assets under study. For this reason, it is necessary to use accelerated tests, the results of which are not always well interpreted. In this aspect, the identification and prediction of problems derived from climate change, the appearance of new pollutants, the development of knowledge of their interactions with heritage materials, etc., are of great importance. Regarding the development of monitoring and analysis systems, the use of digital tools, artificial intelligence, mobile applications, etc. for monitoring and diagnosis must be considered.

Development of new materials, standardization, and data management

This challenge would include developing new materials for conservation a, compatible with the existing ones, with special attention to the use of non-toxic products and sustainable and durable materials. One of the most important aspects of this challenge is the study of the interaction between the new material and the old one, with particular focus on its long-term evolution.

Standardization and data management

Methodological and data standardization, which facilitates access and dissemination of knowledge and information exchange, in alignment with current Open Science approaches, and fulfilling the FAIR criteria. Data standardization and interoperability is a challenge with different aspects. On the one hand, it is necessary to consider the methodological standardization in the performance of measurements and laboratory tests, definition of protocols, etc. This makes it possible to obtain comparable data between different research groups and techniques, considering that in many cases the instrumentation and methodology used are not standard, but have been specifically developed for heritage. On the other hand, is the standardization and management of data in the field of digital humanities, where the heterogeneity of the scientific and documentary data poses a challenge for its definition and efficient management. Finally, the possibility of including the tests and methodologies applied in European standards should be facilitated.

Protocols for the management of heritage material

Heritage is guarded by public and private institutions that, in most cases, need and seek to enhance the value of their properties. This often requires a

methodology for intervention, management and conservation of heritage that goes in hand with multidisciplinary scientific research. In fact, it is necessary that the CSIC can offer a holistic analysis of this heritage, forming, maintaining and strengthening a management protocol that provides these institutions with the confidence and prestige of scientific research, to design and promote conservation and restoration programmes.

Challenge L: Mobilized memories: deployments of the past in the present and the future

Coordinators

Francisco Ferrándiz Martín
(ILLA, CSIC)
Reyes Mate Rupérez
(IFS, CSIC)

Researchers and Centers

José Antonio Zamora (IFS, CSIC), Antolín Sánchez Cuervo (IFS, CSIC), María Jesús Santesmases (IFS, CSIC), Leoncio López Ocón (IH, CSIC), Alfredo González-Ruibal (INCIPIIT, CSIC), Pedro Tomé (ILLA, CSIC), Marije Hristova (University of Warwick), Alejandro Baer (University of Minnesota), Stef Craps (University of Ghent), Astrid Erll (Goethe-Frankfurt University) and Memory Studies Association (MSA)

1. Introduction

We begin the analysis of this Challenge by pointing out that “memory is a fundamental category for knowledge because it is a temporary concept.” However, “it is not just any time,” because it refers, from the outset, to the past, and the past is “a rich fishing ground of meaning in which all disciplines cast their nets.” Therefore, and given that each discipline has its own particular theory about memory, we consider it necessary, on the one hand, to address all this plurality, but, on the other, to put order in all this, so memory can be spoken of from an interdisciplinary perspective.

Likewise, we affirm that memory is presented to us today as a category that, besides feeling, produces knowledge, and that besides being private, it is public. The fact that memory also belongs to the order of knowledge (the hidden part of reality) makes it a hermeneutical faculty, besides presenting itself in our time as a moral imperative to prevent certain historical facts from falling into oblivion. Therefore, memory has become the inspiring principle of a theoretical and practical program, “alternative to the one that governed in the past and continues to govern, capable of novelty and, therefore, of the future.”

There has been an explosion of memory studies in the academic field, going from a supposed “deficit of the past,” due to the vertigo of globalization processes, to a “memorial surplus or saturation.” Regardless, an interdisciplinary field of research has emerged in which the relationships of different human

groups with the past are studied, including both individual and family memory, as well as memory policies developed on a national or supranational scale.

This is a field in which there is a tendency to “conceive of memory more as a fluid, diversified and flexible process than as a static object,” especially because of the use of new digital technologies. Hence, memory has “more transcultural, transgenerational, and transmedia qualities,” and makes the interdisciplinary perspective especially recommendable, even creating a new lexicon and analytical vocabulary. Disciplines such as sociology, political science, psychology, literary studies, religious studies, neurobiology, anthropology, or cultural geography contribute significantly to this emerging field of research.

Therefore, we propose that the vocation of this Challenge is to explore both the neurological bases of memory, “as well as its theoretical and philosophical foundations, modes of representation, relationship with collective identities in its different scales, forms of political mobilization, institutional models, protocols and rituals, literary and artistic expressions, tensions and communicating vessels with formal history, and with other alternative memorial registers...”

2. Social environment and transversal lines of research

As occurs in any other thematic field, the social environment conditions (in its cultural, political, and economic dimensions), determines the lines of research of memory studies. In our case, a set of transversal lines can be highlighted, which are those that characterize this thematic area, and which should be the basis of future research programs.

Neurobiological bases of memory

Memory studies have been incorporating lines of research related to neurobiological processes, to analyze the patterns of brain activity at the base of memory. Such initiatives open the field of interdisciplinarity in this thematic area by allowing the convergence of interests between the memory studies of a more biological nature and those with a more sociocultural base. In this way, the studies are open to topics such as memory diseases or the dynamics of active forgetting, questions very present today in institutional memory policies.

Memory and representation

We consider that “individual memory operates in collective frameworks, bringing the past to the present and opening the possibility of restorative justice for suffering.” This contains an important potential for the future, which

is reflected in the policies that from public institutions are implemented for reparation. In this sense, representation acquires a special relevance, how “memory makes present or represents the past,” which allows the witnesses to play a significant role in this Challenge.

Memory processes and collective identities

The authoritarian temptation is implicit in the way it is today, and states always forge collective identities through invention of their past. Therefore, it is impossible to “face the authoritarian manifestations of the present without considering these memories of the past...” Hence the interest in studies on the connection between memory and new forms of authoritarianism, and within them, the risk that the insufficiency or failure of the memory of the past allows the resurgence in today’s societies of authoritarian regimes and of their associated discourses of racism, xenophobia, or exclusive nationalism. Therefore, we value this line of research, because to understand neo-authoritarianism, we believe it necessary to conduct research on the insufficiencies and limits of historical memory.

Memory policies

Struggles between different social groups to promote certain versions of the past are increasingly frequent. In this context of controversy and debate, memory politics emerge as institutionalized ways of managing the past. They are policies that incorporate remedial measures, retroactive justice, and new commemoration cycles, as well as formulate new categories of victims. However, within the current globalization process, all are influenced by transnational dynamics, giving rise to memories in continuous negotiation (hence the term “multidirectional” is used to describe them) of memories that must be analyzed.

Memories of conflicts

The relationship between “memory” and “conflict” is broad and complex, which explains the current interest of researchers in analyzing the reappearance of memories of wars and violence in the past. We believe it is necessary to distinguish three models of memory: i) antagonistic memory (which builds homogeneous communities in terms of “good” and “bad”); ii) cosmopolitan memory (which puts the victim at the center and has as its mainstay the testimony of the survivors, even at the risk of decontextualizing and depoliticizing the past), and iii) agonistic memory (which, although it places witnesses and survivors in the center, also advocates considering the political aspects of the past, including incorporating the perpetrators’ viewpoint into the analysis).

Diasporas and exiles

The relationship of memory with exiles and diasporas can be approached on two levels: one, subjective in scope, based on the autobiographical experience of the exile, and the other of objective scope, is less descriptive and more critical, which aims to reveal areas of reality hidden or unnoticed. In both cases, the memory of the exiles collects an absent past, proposing other ways of narrating, in accordance with the new (more plural) ways of understanding citizenship. The memory of exiles and diasporas is a “great source of inspiration to unmask the nationalist matrix inscribed in modern nation stories and to illuminate new ways of narrating the latter from otherness, dislocation, and plurality, much more than identity, territory, and unity.”

Memories with genre

It is a fact that memory studies conform to gender hierarchies, so the perspectives of men predominate over those of women. We consider that, although the advance of feminism has made it possible to alleviate this deficiency, the reality is that this imbalance persists. Therefore, we insist “the sources of women and the so-called tasks of women must be included in the narratives of historical memory and forgetfulness analysis.” By doing so, the gender perspective contributes to a more inclusive memory, giving women a function of gathering, archiving and agency of historical memory. This is a great challenge in memory studies that must be enhanced.

Memories of science

Although the logic of scientific activity comprises a constant advance toward the future discarding theories and interpretations from the past, it is not advisable to “relegate to oblivion the set of ideas, knowledge, and practices that have shaped the global history of knowledge.” Thus, we value the desire to “recover and activate the memory of the initiatives accumulated by human societies (in such a way that it is possible) to have a long-term perspective of the adventure of knowledge,” a subject endorsed by UNESCO for 30 years. This dimension of the Challenge can contribute to mobilizing the memory of science stored in the CSIC (in its archives, libraries and, museums) and which are testament to the historical swings of the Spanish system of production and distribution of scientific knowledge.

Memory and materiality

Memory studies must consider both a conscious (or intentional) materiality displayed in constructing collective memory (museums, memorials, monuments, photographs...) and another of an unconscious nature (or

unintentional), represented by the ruins and traces of past events associated with traumatic episodes. The tension between both types of materiality of memory is one of the most productive fields of analysis of collective memory, which requires interdisciplinary cooperation to address it. In Spain, we have numerous examples of this tension, which makes this Challenge dimension consider the analysis of the tangible aspects of conflicting memories, with the role archeology being of special relevance.

Geographies of memory

Landscape, which is culture before nature, is part of memory, and that is why we value that this memory is a transversal line of research in this thematic area. Natural spaces are memory because the landscape plays a relevant role in constructing national or regional identities, as well as in constructing “patriotic topographies” through literary, artistic, or other productions. Therefore, we positively value that “the re-spatialization processes inherent to globalization are addressed in, at least, three dimensions: urban relocations and relocations; extension of urbanization processes, and the dynamics derived from tourism, as far as they have given landscapes new social, political, and economic values, mobilizing particular but social memories.” Closely related to this is the issue of the transformations of landscapes due to climate change, changes that affect the role they play in individual and collective memory.

3. Future scenarios

Given the set of transversal lines set out in the previous section, and which the CSIC has been addressing with greater or lesser intensity through its research groups, there are future scenarios that our institution should incorporate into its memory programs and studies if it wishes to continue to play a relevant role. We will now expose some elements that make up these future scenarios in memory studies.

Study of the perpetrators

Along with the study of the experiences and testimonies of the victims, a line of investigation is being promoted that focuses on the perpetrators, to better understand the social, cultural, political, economic, and identity contexts in which the violence occurred in the past. This is a line in which the ethical positioning of the researchers is essential to avoid justifying the behaviors of the perpetrators. Along this same line of approach, the horizon of analysis is broadened to the forms of perpetration made possible by new technologies as well as the trans-nationalization and mutation of conflicts.

It is a new field in the challenge of memory studies, constituting frontier research in which the CSIC must position itself with an interdisciplinary perspective.

Memory and forensic turn

Forensic science practices and discourses have inaugurated a new epistemology of memory in which “the violated body, and its technical-scientific decipherment procedures, have been placed at the center of the stage.” This so-called “forensic turn” in the analysis of memories of violence has led to the clarification, for example, of war crimes and crimes against humanity. It is a wide-ranging paradigm shift that raises new questions for researchers working in memory studies, such as the need to get closer to the wounded body and its effects on memorialization modalities that seemed long established. This forces us to consider how this “corpocentric” model modifies the way of managing the traumatic past.

Memory and digitization

The effects that new technologies, devices, and digital platforms are having on the production, circulation, and consumption of past knowledge is a fact. Notably, there is an obvious intersection between “social memory” and “digitization,” which, by transforming the relationship with the past, makes new memory communities emerge, new circuits of diffusion, new modalities of visibility and deployment of the past... In summary, the digital formulation of social memory is having drastic effects on the relationship between past and present, besides transforming social movements and their forms of activism. We are facing a rapidly evolving landscape of memory connected to digital technologies, technologies that open paths to research creating new ways of witnessing, new political identities, and new places of memory. Thus, we consider it is a scenario to consider when designing new research programs.

Utopias: Memories of activism and hope

In memory studies, those referring to traumas generated by violent conflicts have predominated, although recently an area of research focused on memories of utopia and hope has been developing. Examples of this are memory studies of social activism and political processes that led to advances in human rights. The objective of these studies is two-fold: on the one hand, “to inject optimism toward the future in a time marked by hopelessness,” and on the other, to compensate for the dominant traumatic paradigm of memory and avoid the danger of “feeding stories of cutting victimization of the populist, nationalist, or xenophobic.” However, as there are few

analytical tools to capture the memorial transmission of optimism, a theoretical-methodological challenge for researchers is to have a precise new arsenal to analyze this thematic line.

Dystopias: eco-traumas and new environmental memories

Expanding on the relationship between landscape and memory, it is worth observing a new field of research that focuses its attention on the traumatic impact of climate change on these processes, coining new concepts (ecotrauma, solastalgia, climatic anxiety, preliminary mourning...). This is to analyze a type of memory based on nostalgia not only for the past but also for the present in the face of an uncertain future of ecological transformation and even destruction. They are “memories of the present or anticipatory memories” in dystopian scenarios, in which “the classic parameters of memory studies are subverted in terms of scale and directionality.”

Alternative epistemologies of memory and time

It is a fact that social memory is determined not only by collective frameworks but also by cultural paradigms. Hence, the concepts of the past and time are not universal and do not coincide in different cultures. This explains why there is tension and conflicts between the different memorial paradigms, making reconciliation or mourning processes difficult. For this reason, we consider it very important to include research aimed at understanding the different ways of building and transmitting stories at the local scale, and the social actors specialized in this task and the rituals associated with memory, in the future scenario. It would be a way to counteract the dominance of Western hegemonic epistemologies, giving voice to those other peripheral ones that have been forgotten.

ABSTRACT

In this chapter, topic coordinators expose CONCLUSIONS and make PROPOSALS and RECOMMENDATIONS. Some conclusions are general (common to all CSIC centers in the area of human and social sciences), by raising them here we have tried to show weaknesses observed in the institution itself, and face them taking advantage of their evident strengths and opportunities arising in the social, political, and institutional environment. Other conclusions are more specific to the thematic areas associated with each of the 12 Challenges, and therefore the recommendations and proposals have their own uniqueness. In order to not make this last section of conclusions excessively lengthy, general coordinators refer the reader to the corresponding sections of each Challenge, where they will find a detailed description of the theoretical-methodological challenges and the proposals raised. Now, in these CONCLUSIONS section we include those only of a general nature and cross-sections to the Challenges.

CHAPTER 4

CONCLUSIONS, PROPOSALS, AND RECOMMENDATIONS

Coordinators

Eduardo Moyano Estrada (IESA, CSIC)
and Tomás García Azcárate (IEGD, CSIC)

The writing of this report has had the prior cooperation of almost 200 scientists from the CSIC and about 30 external collaborators from universities and research centers, as well as from the private sector.

It has been a very participatory process, organized into 12 Thematic Challenges. Each of these Challenges has been coordinated by CSIC scientific personnel, following the general instructions drawn up by the VICYT and transferred to them through the two coordinators of the UT-1 (Drs. Moyano Estrada and García Azcárate).

The 12 Thematic Challenges have been grouped into four blocks (see Table 1). The first block is cross-sectional and theoretical-methodological in nature and includes more general challenges related to the social sciences (Challenge A) and the human sciences (Challenge B). The second block comprises challenges associated with more specific areas of research and refers to issues related to the territory (Challenge C), demographic trends (Challenge D), migratory flows (Challenge E) and food issues (Challenge F). The third block comprises challenges associated with the process of technological change and its effects on the labor market (Challenge G), in organization of economic activity (Challenge H), in social participation and governance (Challenge I), and in inclusion policies and welfare systems (Challenge J). Finally, the fourth block includes challenges associated with the human sciences on issues of conservation and valorization of heritage (Challenge K) and on issues related to memory studies (Challenge L), while opening bridges of cooperation with the social sciences and other scientific areas of the CSIC.

The information collected in each of the 12 challenges comprises several sections: a state-of-the-art of the issues associated with each Challenge; an analysis of the major scenarios in which scientific research is currently being conducted in the corresponding subject area; a diagnosis of CSIC in each Challenge; a presentation of the scientific challenges that our institution faces, and, finally, a set of proposals and recommendations so CISC can respond effectively to those challenges.

All the information from the Thematic Challenges has been synthetically integrated into this UT-1 report, extracting CONCLUSIONS to make proposals and recommendations. Some conclusions are general (common to all CSIC centers in the area of human and social sciences), by raising them here we have tried to show weaknesses observed in the institution itself (aging of the scientific staff; low replacement rate; atomization research groups; low level of dissemination of the results...) and face them taking advantage of their evident strengths (multidisciplinary and cooperative vocation; internationalization; centralized structure, but at the same time very widespread in the territory; interaction with universities...) and opportunities arising in the social, political, and institutional environment.

Other conclusions are more specific to the thematic areas associated with each of the 12 Challenges, and therefore the recommendations and proposals have their own uniqueness. In order to not make this last section of conclusions excessively lengthy, we refer the reader to the corresponding sections of each Challenge, where they will find a detailed description of the theoretical-methodological challenges and the proposals raised. Now, in these CONCLUSIONS section we include those only of a general nature and cross-sections to the Challenges.

The strength of the CSIC as an institution with a vocation to cover all areas of knowledge is widely accepted, making room for certain interdisciplinary fields. Its very existence is already a strength for developing research that requires cooperation between different scientific disciplines, with the opportunities offered by ITP being valued positively. However, it is recommended this multidisciplinary vocation be valued in promotion competitions and in the curricular evaluation of the scientific staff of the CSIC.

The open attitude of the CSIC to collaboration with other scientific institutions (especially with universities) as well as with the Autonomous Communities is also valued positively. However, it is considered this potential for openness to cooperation is not sufficiently exploited, so the creation of

Associated Units with universities should be promoted with more intensity in order, based on innovative research programs, to promote the development of synergies between both institutions. Likewise, it is considered necessary to redefine the figure of the mixed CSIC-Autonomous Communities centers to give it a new impetus within the framework of current social challenges.

The internationalization of a large part of the research staff in human and social sciences and the wide recognition they receive in the international scientific community is evident. However, there is also an atomization problem of the CSIC research groups in this area, which creates difficulties to successfully participate in the large calls for increasingly competitive and demanding research projects. Therefore, it would be advisable to promote cooperation formulas among scientific personnel to form larger groups.

Regarding collaboration with the private sector, a significant deficit in the human and social sciences is admitted, except for specific cases of groups that, because of their applied vocation, have kept this cooperation open. Therefore, the creation of hubs is proposed transversally to collaborate with social and economic agents to jointly seek sources of financing and thus be able to advance in the design of more sustainable development models.

Likewise, and given the growing importance of large databases for developing research in human and social sciences, the creation of collaborative platforms to create and share these relevant information bases is proposed.

The scarce vocation of scientific dissemination of the research staff in the areas of humanities and social sciences of CSIC is recognized, focusing as a priority on the publication of articles in scientific journals of impact. Therefore, it is recommended to make a special effort from CSIC communication area to promote the culture of dissemination within the centers and institutes, and this activity should be valued appropriately in developing the research career.

With some exceptions, there is little interest in applied research by scientific personnel in human and social sciences, at a time like the present when the right conditions exist for these disciplines to acquire a notable presence in the whole of society. Therefore, it would be advisable for CSIC to assess the importance of research agreements and contracts in this area with other public entities and, especially, with the private sector.

With humanities, the need for CSIC to have a broader and more purposeful vision than it has had until now is admitted, creating adequate mechanisms

to help articulate research in this field according to current challenges and reinforcing the interaction between its different dispersed groups.

There is a broad consensus among the scientific staff on the problem of aging of CSIC scientific staff, which, if not remedied, will soon lead to a worrying cascade of retirements for a large part of the research staff. Added to this is the scarce creation of stable scientific positions, which does not allow for continuity or consolidation of new lines of research. Only with an effective policy of replacement of scientific staff positions could this problem be corrected, even pointing out the convenience this policy can be associated with another policy for the renewal of staff of retirement age, so that upon reaching that age (65 years) their position can be replaced by another of young personnel.

There is also consensus on the difficulties of advancing in the research career of the scientific staff of the CSIC, due to the low number of positions for internal promotion, at least in the area of human and social sciences. This problem, with evident demotivating effects between TC and CI, could be solved without high economic cost, but it would have a very positive impact on the motivation of scientific personnel.

The insufficient endowment of technical support personnel is also recognized, which makes it difficult to launch innovative initiatives in new fields of human and social sciences, which require qualified personnel in the management of large databases.

With the above, the shortage of management personnel to respond to the complex and growing procedures involved in the management of the investigation is admitted.

The excessive bureaucratization and rigidity of the procedures related to scientific activity are criticized, and this is reflected in the difficulties of hiring personnel, in the purchase of equipment, in the signing of agreements or in the management of trips and stays abroad, detracting from efficiency and competitiveness to research.

The existence of serious difficulties in developing permanent mechanisms and a certain stability for the training of young researchers is recognized (high levels of turnover). For this reason, it would be positive for CSIC to continue with its own training programs without ceasing interest in national or regional programs.

Absence of a medium-term strategic vision in the agendas of research programs in human and social sciences. In the context caused by the special circumstances of the COVID-19 pandemic, the scientific activity of CSIC has been placed at the center of the political and social agenda, receiving never-before-known attention from the media. We believe it is a context of opportunity that should be exploited with a strategic plan that responds to the great challenges of Spanish and European society in its objective of economic recovery and the creation of new governance structures in the prevention of future risks.

Finally, there is a consensus on the need to take advantage of the synergy generated by preparing the White Paper to advance in the renewal of CSIC's research agenda. The spirit of cooperation and convergence expressed in this process of debate between the different groups, centers, and institutes of the three global areas of CSIC (Life, Matter, and Society) is considered very positive. Further, the presidency of CSIC is urged to generate concrete political actions aimed at making effective the multi-disciplinary vocation of our institution, defining a real interdisciplinary research agenda to face the great challenges of our society in the 2050 horizon.

ANNEXES

ANNEX I

Executive summary

The UT-1 focuses on the axis “New foundations for a sustainable global society” and refers to the important process of global change that affects all dimensions of society, altering the context in which our scientific work has been developed over recent decades.

It is a process of change not comparable to what happened decades ago, mainly due to its breadth, multidimensionality, and interdependence, and to the fact this process manifests itself simultaneously in many areas, territories, and social groups.

Its analysis therefore requires conducting a convergence exercise between areas and lines of research, betting on a multidisciplinary approach, because both “globalization” and “sustainability” are, as we have indicated, concepts that affect society.

Framework

In a general way, the UT-1 frame of reference starts from the basis that social life always flows in changing scenarios, and that any scientific approach to social facts must be done considering their variability in the space / time coordinates. Therefore, we have considered it necessary to include the historical perspective in a transversal way, because many events of today can only be understood and explained by resorting to the knowledge that history provides. Furthermore, any exercise of foresight cannot be done only from the present, but through the investigation of the key elements that have led us here.

We also understand that the current dynamics of change have unequal effects on the population, depending on the territorial environment where they live and according to sociodemographic characteristics, especially those related to age and sex. Hence the need to incorporate the gender dimension in our prospective analyzes, as well as to include an ethical-normative component in them. In this sense, we affirm that, because of the singular nature of their

object of study, the human and social sciences are not neutral and aseptic disciplines in the face of what they analyze, but that they must adopt an ethical commitment, without this implying renouncing rigor and the objectivity that should guide the work of the scientific personnel who work in them.

More specifically, the UT-1 frame of reference is manifested in aspects related to demography, aging, health, wellbeing, and the organization of family nuclei, giving rise to new roles and family models, to new care systems, and new forms of inequality. It also manifests itself in the way food is produced and, in the attitudes, and behaviors of consumers. All this linked to the growing awareness of citizens about the environment and the relationship of humans with nature, giving rise to new dynamics of rural-urban interaction.

However, the process of change also has apparent effects on everything related to forms of employment / work, new models of economic organization, and the role to be played by public policies. To this should be added everything that refers to the modes of citizen participation in political life and the forms of governance with which it is endowed. Likewise, migratory flows and the cultural diversity this entails in open and inclusive societies are issues at the forefront of process of change. Likewise, everything related to the conservation and enhancement of the historical, natural, and cultural heritage and with the historical memory, as long as deployments of the past in the present and the future of citizens.

We also consider that the current process of change should be studied defining new concepts, using new methodological tools, and incorporating the advances taking place in the techniques of collection, treatment, and analysis of empirical information, both in humanities and social science. Moreover, we consider it necessary to establish bridges of cooperation with other scientific areas of CSIC to understand the complexity of the processes of change, and especially everything related to the perception of risk, physical vulnerability, and its social implications, as well as implementing communication and prevention protocols that allow us to improve the resilience of contemporary societies.

Structure of the report

The content of this report has been structured into 12 challenges grouped into four Thematic Blocks (see Table No. 1). Each of these Challenges has been coordinated by scientific staff from CSIC, with the participation of external personnel, both from other public research centers (especially universities), and from the private sector.

Table No. 1

Thematic block I: Theoretical-methodological aspects of the social and human sciences

- A. Science, innovation, and knowledge for sustainable development models
Coordinators: Carolina Cañibano Sánchez (INGENIO, CSIC-UPV) and Vincenzo Pavone (IPP, CSIC)
- B. Human sciences in transition scenarios
Coordinators: Josep Martí Pérez (IMF, CSIC) and Idoia Murga Castro (IH, CSIC)

Thematic block II: Population, territory, and food

- C. Territorial development in new scenarios of rural-urban interaction
Coordinators: Francisco Colom González (IFS, CSIC) and Ana López Sala (IEGD, CSIC)
- D. Demographic challenges in a social scenario of longevity and aging
Coordinators: Teresa Castro Martín (IEGD, CSIC) and Gloria Fernández-Mayoralas (IEGD, CSIC)
- E. Migratory flows in open and inclusive societies
Coordinators: Juan C. Velasco Arroyo (IFS, CSIC) and Amparo González Ferrer (IEGD, CSIC)
- F. Safe and healthy eating in sustainable food systems
Coordinators: María Dolores del Castillo Bilbao (CIAL, CSIC-UAM) and Oscar Martínez Álvarez (ICTAN, CSIC)

Thematic block III: Social and political effects of the process of economic and technological change

- G. Technological change and new forms of work / employment
Coordinators: Jordi Brandts Bernad (IAE, CSIC) and Catalina Martínez García (IPP, CSIC)
- H. Third sector, social, and collaborative economy
Coordinators: Manuel Pérez Yruela (IESA, CSIC)
- I. Democracy, governance, and participation in scenarios of social and political plurality
Coordinators: Joan Font Fàbregas (IESA, CSIC) and José Fernández Albertos (IPP, CSIC)
- J. Strategies and policies for social inclusion in sustainable welfare systems
Coordinators: Javier Moreno Fuentes (IPP, CSIC) and Ada Ferrer i Carbonell (IAE, CSIC)

Thematic block IV: Heritage and memory

- K. Sustainability through heritage
Coordinators: Felipe Criado Boado (INICIPIT, CSIC) and Blanca Ramírez-Barat (CENIM, CSIC)
- L. Mobilized memories: unfolding of the past in the present and the future
Coordinators: Francisco Ferrándiz Martín (ILLA, CSIC) and M. Reyes Mate Rupérez (IFS, CSIC)

Thematic challenges and coordinators

Thematic I: Theoretical and methodological aspects of the human and social sciences

Challenge A, “Science, innovation, and new forms of knowledge for sustainable development models,” refers to how the social sciences are addressing the current processes of change, both in theoretical and methodological terms, redefining and expanding the concepts of science, innovation, and sustainability. In Challenge B, “The human sciences in transition scenarios,” a similar exercise of analysis is conducted regarding how the humanities face the challenges of the disciplines that form them.

Thematic II: Population, territory, and food

In Challenge C, “Territorial development in new rural-urban interaction scenarios,” the territory where the population sits and the physical space where social and economic dynamics take place are analyzed, studying the observed trends and choosing an innovative approach that goes beyond the traditional separation between rural and urban spaces. Challenge D, “Demographic challenges in a social scenario of longevity and aging,” analyzes the changes in demographic processes, both those already observed, and the trends expected. Challenge E, “Migratory flows in open and inclusive societies,” addresses migration and the public policies in charge of managing it, issues closely related to the two previous challenges, given its connection with demographic trends and with the evident effects that migratory flows have on developing rural and urban territories. Nutrition and food-related issues, given changes in consumer eating habits are the focus of Challenge F, “Safe and healthy eating in sustainable food systems.”

Thematic III: Social and political effects of the process of economic and technological change

In Challenge G, “Technological change and new forms of work / employment in contemporary society,” the impact of automation and robotics on employment and labor market conditions is precisely analyzed, with the emergence of new forms of employability (such as teleworking) that entail new social relationships and with evident effects on the population’s attitudes, preferences, and motivations regarding the very act of working. Challenge H, “Third Sector, social, and collaborative economy in contemporary society” tries to analyze the forms of economic organization, complementary to those that are regulated in the labor market and that play an

increasingly relevant role in the new economy (cooperatives, foundations, associations...) paying special attention to the emerging forms of the so-called “collaborative economy.” Challenge I, “Democracy, governance, and participation in scenarios of social and political plurality,” addresses the involvement of civil society in decision-making processes, analyzing the new forms of participation that emerge in modern democracies (referendums of popular initiative, participatory budgets, telematic administration...) and that give rise to new forms of governance. Challenge J, “Strategies and policies for social inclusion in sustainable welfare systems,” deals with how to face the challenge of neutralizing and mitigating the problems of inequality and exclusion associated with the process of globalization and technological change from the field of public policies.

Thematic IV: Heritage and Memory

Challenge K, “sustainability through heritage,” addresses the challenges related to heritage science by analyzing issues related to the origin, history and meaning of cultural assets and their influence on economic development, given their importance as a mobilizing asset of resources and as a crucial element in constructing collective identity. Challenge L, “Mobilized memories: deployments of the past in the present and in the future,” deals with the challenges posed today to memory studies, as a fundamental factor in the configuration of human societies and as a key element, with the issues of conservation and valorization of heritage, of individual and collective identities.

The information from each Challenge has been synthetically integrated by the two coordinators of the UT-1 (Eduardo Moyano Estrada and Tomás García Azcárate), with the content of the report presented here being their sole responsibility.

However, the documents corresponding to each Challenge are incorporated without changes as Annex II to this report, these 12 documents being the sole responsibility of the coordinators who have drafted them.

CHALLENGE A

ABSTRACT

Current scientific evidence convincingly demonstrates that the entire Earth system is facing changes on a global scale that affect the ability of humans to survive. These changes affect, among many others, the climate, the sea level, the uses and health of the soil, and human societies themselves. Humanity faces the inescapable challenge of moving toward more sustainable futures, which will require interdependent sociocultural, economic, and technological changes that must be carefully designed and coupled at different geographical and sectoral levels. Our futures, therefore, must be built on the principle of sustainability. The social and human sciences, in collaboration with other scientific disciplines, have a responsibility to respond to the multiplicity of emerging challenges: i) the identification and management of the most pressing problems for the sustainability of societies; ii) understanding the nature of these problems and their underlying mechanisms; iii) searching for innovative solutions and answers to these problems in diverse social, cultural, and geographical contexts; and iv) supporting institutions and governance structures to design and implement of solutions that directly benefit both societies and the planet.

SCIENCE, INNOVATION, AND KNOWLEDGE FOR SUSTAINABLE DEVELOPMENT MODELS

Coordinators

Carolina Cañibano Sánchez
(INGENIO, CSIC-UPV)

Vincenzo Pavone
(IPP, CSIC)

1. INTRODUCTION AND GENERAL DESCRIPTION

The concept of sustainability has been at the center of many debates recently. The debate has been articulated in several disciplines, in which a certain disagreement with the narrow vision and scope of the classic definitions of sustainability has manifested, focused on the domain of ecology and technological innovation. What can or should be understood by ‘sustainable’ has been questioned from feminist economics to ecological economics, from studies of social innovation to studies of degrowth. One of the most controversial issues continues to be the overlap of the concepts of renewable and sustainable. Various studies and perspectives have questioned whether what is renewable is also sustainable (Pavone and Goven, 2017). For example, biomass fuels are renewable but not sustainable, as they continue to emit pollutants when burned, and conflict with other food crops for their production (Thompson, 2012; Tomei and Helliwell, 2016).

Criticisms are not limited to highlighting this overlap, but also suggest that sustainability should not be viewed from a merely economic or environmental perspective, but also from a social and political perspective. From the ecological economy, for example, the question arises regarding what kind of humanity and people are being nurtured while fostering sustainability (Becker, 2006; Siebenhüner, 2000). It is evident, these studies argue, that a hopeful vision of sustainability must focus on the integral wellbeing of people and must be able to integrate perspectives from the human and social sciences (Becker, 2011; York and Becker, 2011).

From an economics perspective, proposals have emerged challenging the imperative of economic growth. Studies focused on degrowth proposals criticize the dominant definitions of sustainable development and its most recent reincarnation, “green growth,” because they ultimately depoliticize the most controversial issues and impede a serious debate on alternative visions of the future. In fact, they claim these dominant definitions cause environmental problems to be defined exclusively in terms of possible or available technical solutions, to encourage the impossible dream of perpetuating economic growth without harming the environment. The degrowth proposals argue that greening society amounts to imagining and promulgating alternative visions to modern growth-based development. Alternative practices exist that promote a shift toward a more local grassroots economy with short production and consumption cycles and emphasize reproduction and care, to satisfy user values, not profits. They do not have a built-in tendency to accumulate and expand, and they are less resource intensive than their counterparts in the formal economy. These “sharing” practices cultivate solidarity and human interpersonal relationships and generate non-monetary shared wealth (Serge, 2009; Valérie, 2008; Kallis et al. 2010; Schneider et al, 2010).

However, these proposals are not without problems, for example, those associated with scale and the governance of sustainable, non-growth-oriented local economies. There is tension between a desire for local autonomy and the need to act on a broader scale. Furthermore, commitment to global governance is largely absent from discussions within the degrowth movement. This is especially problematic, given the centrality of issues like climate change, free trade, and relentless global competition. Finally, global interdependence makes it impossible for a country to undertake a degrowth transition on its own (Kallis, 2017; Kallis, 2019; Cosme et al., 2017).

2. IMPACT ON THE SCIENTIFIC HERITAGE AND POTENTIAL APPLICATIONS

2.1. Feminist economics and the concept of sustainability of life

Alternative proposals, on how to think about sustainability for example, have emerged in the environment of feminist economics. There are several contributions that propose the concept of “sustainability of life,” which places its emphasis not only on fostering the possibility that life continues in human,

social, and ecological terms, but also that sustainability implies developing acceptable living conditions for the population (Bosch et al., 2015). Feminist approaches to the sustainability of life insist on two fundamental criteria: universality (that all people can live a life in dignified conditions) and that uniqueness is respected, that is the diversity of experiences and life conditions are respected (Calderón, 2015). In the words of Cristina Carrasco, the sustainability of life is a concept that “allows us to account for the deep relationship between the economic and the social which places the economy in a different perspective, which considers the close interrelation between the various dimensions of dependency and, ultimately, that it prioritizes the living conditions of people, women, and men (Ferraro and Reid, 2013).”

The particularity of approaches focused on the sustainability of life, is that they consider the socio-economic system as integrating various spheres of activity (some monetized and others not) whose articulation must be valued according to the final impact on life processes. Specifically, as Pérez Orozco explains, it is about addressing two questions: “what do we understand by life worth living and worth sustaining; and what are the socio-economic structures through which we organize and manage it.” (Orozco, 2011).

Within contemporary feminism, approaches to life sustainability are inspired by work published in the 2000s on feminization of the economy, which emphasized the importance of attributing a monetary value to women’s unpaid work. The goal was, and still is, to obtain an accurate representation of the “entire” economy. Furthermore, these contributions sought to think differently about how goods and services are or could be produced. As Cameron summarised, feminist economics considers how to imagine or enact alternative forms of economic organization (Cameron and Gibson-Graham, 2003).

2.2. Social innovation and sustainability, beyond technological determinism

on sustainability have not been limited to questioning the dominant definitions of the concept and its limited approaches to the environment but have also strongly questioned the role and dominant conceptualizations of innovation. The most critical voices have not only questioned the narrowness of innovation conceptualizations that overlap the idea of innovation with technological innovation and of this with commercial applications, but they have also defended the importance of adopting a more holistic approach to innovation, in which social innovation also plays a fundamental role.

Most of the studies that try to open up debate on the relationship between innovation and sustainability, have been differentiated into three branches, all focused on transitions, but with an emphasis on different aspects and from different disciplines. A first group, focused on socio-technical transitions, emphasizes technological innovation but places it in context and on a historical trajectory. Under this approach, technology ceases to be a neutral tool conducive to problem-solving innovation, to become a fundamental element of a more complex strategy. The second group emphasizes institutions, networks, and governance of the transition toward sustainability. In this vision, political and institutional changes become central and key to transition. A third group, focused on socio-ecological transitions, moves interest to social and ecological relationships, studies the local resilience of communities, assesses their adaptive capacities, and reorders innovation in their specific contexts (Loorbach et al., 2017).

However, beyond the studies that propose to encourage transitions, there is an intense debate, which in sustainability conversations is reflected in the growing force gained by advocates of a *strong sustainability* approach, in innovation studies articulated around *system innovation*.

The latter, in contrast to the more traditional approaches to innovation systems, asks what we are innovating for, what is the fundamental direction of change. Emphasizing the potential negative consequences of technological innovation, which traditional innovation studies bracketed off as negative externalities and rarely studied or questioned. This approach attempts to re-conceptualize innovation to allow for analytical accommodation to the changes necessary to achieve sustainable development at human, social, and global levels (Chaminade, 2020). For example, drawing on recent work from the Stockholm Resilience Center, the Tellus Institute, and the STEPS Center, Melissa Leach and colleagues argue that achieving the ambitious Sustainable Development Goals (SDGs) requires a major transformation, not just in policies and technologies, but in modes of innovation themselves. These authors insist on the need to measure and value innovation based on three criteria: the “three D’s” of Direction, Diversity, and Distribution (Leach et al., 2012). Meanwhile, other work has raised the need to add to the concept of innovation for sustainability the notions of “social borders,” as a complement to planetary borders (Raworth, 2012). Leach and colleagues argue that finer attention needs to be paid to what kind of sustainability and development is pursued, for whom and how, and what this implies for better stewardship of

our planet. From this perspective, innovation raises fundamental socio-political and justice questions, which lead to questioning decision-making processes and their consequences for the management and sustainability of ecosystems.

2.3. Potential applications

The disconnection between the dynamics of innovation at the local level and the phenomena of global innovation, whose borders are planetary, has been highlighted. The key that would allow these alternative visions of sustainability to have the necessary and expected impact lies in the ability to reconnect these two dimensions of innovation. Thus, so-called “sustainability intermediaries” are gaining more importance, as playing a key role in understanding emerging changes. Moreover, potential future applications of science and innovation for sustainable development go through a growing acceptance and implementation of two fundamental concepts. First, a growing number of academics are drawing attention to the potential role of social innovation as a path to sustainability. Whereas historically the emphasis has been on how to translate innovations in science and technology into commercial applications, social innovation is distinguished by its interest in improving the wellbeing of people in society (Dawson and Daniel, 2010). Within the contributions articulated around social innovation, the Anthropocene concept has acquired a special visibility and strength. Current scientific evidence convincingly demonstrates that the entire Earth system is facing changes on a global scale that affect human survivability. These changes include climate, atmospheric, and oceanic circulations, biogeochemical cycles, sea level, the state of frozen surfaces, land uses, health, and human societies themselves. Drivers of change can be external (solar variations, tilt of the Earth’s axis, natural changes in climate and biodiversity), or anthropogenic (population growth, pollution, and use of natural resources, energy production, urbanization, etc.) (Steffen et al., 2004). The reality of this evidence has revealed to us that we might have entered a new geological era characterized by the unmistakable imprint of our activity on the planet - the Anthropocene. Some argue that, because of this, human societies must urgently orient themselves toward more sustainable futures, through interconnected and carefully designed sociocultural, economic, and technological change processes at different levels, across multiple sectors, and diverse geographies (Avelino et al., 2017; Fuenfschilling, 2017; Pellicer-Sifres et al., 2018; Geels, 2019). Olsson and colleagues suggest it is necessary to move toward an innovation capable of integrating the social with the ecological (Olsson et al., 2017).

Finally, there are studies that more explicitly connect social innovation with social sustainability. For example, the connection between social innovation, agricultural, and rural innovation is being addressed. Some studies identify social innovation as requiring a society to have more sustainable production methods and higher levels of collaboration and social learning in order to revitalize society, including rural communities (Bock, 2012). Social sustainability and social innovation are posed as complementary in searching for answers to how to promote and conduct new sustainability projects (Parra, 2013). In the next section, examples of cutting-edge studies that move science and innovation toward a new horizon of sustainability will be described in relation to the key challenges that characterize transitions toward sustainability.

3. Key challenges

3.1. Science and knowledge in the transition toward sustainability

The challenge of transitions to sustainable modes of socio-economic development is above all one of knowledge: how it is produced and how it is used. In particular, technological innovations based on scientific discoveries are increasingly understood in an ambivalent light. Far from simply reducing uncertainties through the application of science and technology (S&T) it is now evident that S&T-driven development has also contributed to the generation of significant uncertainties and unforeseen consequences, some of which now threaten to overwhelm the planetary eco-system. Imagining and working toward a future in which environmental and social sustainability are the joint primary values associated with knowledge production and use thus means thinking anew about these processes.

Voices critical of the way science and innovation are articulated with the economic, environmental and social challenges of communities and populations have often struggled to be heard in the face of seemingly irrepressible technological progress and economic growth. However, as Funtowicz and Ravetz (1993) point out, the complexity and scale of many of the problems confronting humanity have long since surpassed the capacity of 'normal' science to supply complete solutions and a calming sense of certainty. Rather, when S&T-based solutions are sought for problems characterised by uncertain facts, disputed values, high stakes and an urgent need for decisions, then we are in the territory of post-normal science and the active involvement of citizens and other societal actors is essential. A somewhat similar conclusion has been

reached by scholars of science and society who advocate that researchers and innovators take a more reflexively ‘responsible’ approach to their activities (Stilgoe et al 2013). They question whether the current direction of research and innovation is well-suited to addressing existing social, economic and environmental challenges, not to mention those which are taking shape before our eyes on the future horizons of humanity.

We thus come back to the fundamental need to re-think how knowledge is produced, the governance of innovation and what this can mean for transformations toward sustainable development. The key principles are clear: there must be an opening up of both who is involved in the production of knowledge and a re-configuration of processes of innovation and application to build shared expectations that dissolve the frontier between science and society, between the research community and citizens. No longer can science-based innovations simply be ‘thrown over the fence’ into a community or a marketplace. Rather, what emerges from knowledge production and innovation processes must be fundamentally shaped by inclusive processes of anticipation and co-creation that increase the relevance and legitimacy of such innovations. Nowhere is the enlargement and democratization of the space of knowledge production, innovation, and application more crucial than as it pertains to sustainable development. To transition toward sustainability requires science, technology, and innovation to pay attention to the values that matter to diverse communities, to their natural environment, and to the cultural, social and economic activities on which their well-being depends.

3.2. Sustainable technologies

Transitions toward sustainable development that pass only through thinking about technological solutions have significant limitations and intrinsic difficulties (Sarewitz and Nelson, 2008). Any scenario to limit the impact of human activities on the environment must involve the development and diffusion of “green” or “clean” technologies. The primary objectives of such technologies are to mitigate greenhouse gas emissions, adapt socio-technological systems to climate change, manage water and air pollution, and limit humanity’s impact on biodiversity. Mitigation technologies make it possible to reduce greenhouse gas emissions in production and technological systems, such as energy production or transport. Adaptation technologies are those that allow socio-technological systems to function, even if the temperature rises or the availability of water falls due to climate change, or the quality of air and water decreases due to pollution. The first investigations conducted on the

characteristics of green technologies point out differences with other technologies: they are newer, more complex and have a greater impact when they succeed but their implementation is riskier (Barbieri et al., 2016).

Although scientific studies have tended to treat green technologies as homogeneous, there are crucial differences among them (Barbieri et al., 2020). For example, technologies for the capture, storage, and sequestration (CCS) of greenhouse gases, and technologies for limiting air pollution are very different. CCS is still in an emerging phase of development, with limited demonstration projects and relatively weak likelihood of mass future deployment, whereas the latter are relatively mature and are widely deployed worldwide. The heterogeneity of green technologies generates the need to adapt skills for their development and policies for their promotion, tailored to their evolving maturity. Analyzing the interactions between green technologies and the skills base needed for their development and implementation, and assessing the policies that can support their implementation, is as challenge requiring social science expertise.

One of the primary objectives of green technologies is to reduce the impact of human activities on the environment. For example, limiting the increase in global temperature to 1.5 °C requires that global CO₂ emissions decrease by 7.6% each year from 2020 (United Nations Environment Program, 2019). We still do not know if the maturity and effectiveness of available technologies will allow us to meet this objective on time. Addressing this issue is therefore a pressing challenge. It is also important to study green technologies as part of an ecosystem of technologies (Rosenberg, 1976), because not only must a technology be sustainable but so must all those that support it. An example is the sustainability of transport: even if all means of transport are electrified, the sector will not be sustainable until the production, transport, and storage of electricity are sustainable, creating an interconnection between various technologies needed to achieve the goal of sustainability (Inderwildi and King, 2012). The analysis of the interactions between technologies and their respective developments is therefore essential.

Due to their different characteristics, green technologies generate demand for different skills among the workers who develop, install and maintain them, such as the ability to recombine diverse bodies of knowledge⁸. However, there is only a limited knowledge base on the relationships between human capital, technical and interactive skills, developing green technologies, and R&D and training policies (Ghisetti, 2017). The diffusion of technologies that can

support transitions to sustainable socio-economic development thus require training and human capital strategies that can complement the type, maturity and ubiquity of the emerging technologies; this is a set of relationships that we must understand and address from the perspective of future training policies (see also section 3.3.1 regarding employment).

Finally, territorial resilience when faced with the destruction of the natural environment vary greatly across the world. Whilst climate change is a global phenomenon it has varying local affects. Regions and countries differ both in their exposure to its consequences and in their ability to respond (Perruchas et al., 2020). The study of green technologies must therefore be approached with an extensive consideration of the characteristics of the localities and regions. The challenges for social sciences and humanities involve understanding what promotes or limits socio-technical responses in specific contexts, including the willingness and capacity of communities to limit human impact on the environment and to adapt to climate change. Such challenges and likely only be adequately mess through interdisciplinary research and practice networks, which combine the efforts of the technical, scientific, human, and social disciplines with the knowledge of societal stakeholders.

3.3. Sustainable society

3.3.1. Employment in transition

Debates around sustainability, innovation, and technical change go hand in hand with profound socio-economic changes, including the transformation of working lives, jobs, and the structure of occupations and labor markets.

The “sustainability of life” approach links directly to the concept of “sustainable work” that Eurofund (Eurofund, 2020) defines as the achievement of living and working conditions that favor permanence in, and commitment to, employment throughout a long working life. Underlying the concept of sustainable work are issues related to work organization, work-life balance, health and safety, wellbeing, pay, training, and skills. Cottam refers to work that supports a “good life” by providing material means, but also purpose, identity, and sense of belonging (Cottam, 2018) as “*good work*.” A key scientific challenge is to better understand the connection between work and “life” (personal), in a socio-technical context in which technology can be a component of a fruitful and enriching connection between these spheres, but also potentially an alienating and destructive force.

Perceptions of what is “quality of life” and the relationship of individuals with work are changing, due to both internal (psychological, biological) and external (technological, political) conditions. On the one hand, the sustainability of employment will likely require more frequent periods of training and retraining, with implications for the ways of conceiving and organizing education and unemployment protection systems. In contrast, demographic changes experienced in more developed societies raise questions regarding the lives of the growing cohort of citizens older than 65. These questions include their relationship to the world of work after the formal retirement age, and the role that technology and (social) innovations can play in re-shaping this relationship.

Work and production processes have become progressively more complex and knowledge intensive. The increasing intensity in knowledge implies a progressive transition from the preponderance of strength and skill in the productive process to that of information processing and evaluation of ideas; from muscle to intellect (Hodgson, 2016). Work is undergoing a profound transformation simultaneously with digitization and technical change, which is modifying the structure of jobs and the distribution of wages. The unemployed workers with the best prospects are those with the training, skills, and abilities necessary to fit into these new productive structures, and to adapt to their changes and requirements. In contrast, less qualified workers are often relegated to precarious employment and economic hardship, linked to the performance of tasks and jobs that offer little nourishment for a “good and sustainable” life. Further understanding these dynamics is another crucial challenge for the human and social sciences. Our societies and political systems thus face tensions emerging from growing inequality and face the challenge of alleviating social conditions that can fracture and divide communities.

Understanding the nature of employment and work poses specific challenges to economics. The traditional conception of human capital as knowledge in autonomous individuals, obtained through investment in training, migration, and experience (Becker, 1964; Schultz, 1961), exchanged with greater or lesser success in labor markets and applied to defined production processes, does not fit well with the reality of the world in which we live. Human capital is more of a structure than an aggregate of knowledge and experiences (Boulding, 1968). The knowledge of each worker is interdependent with that of other people, the technologies with which they operate, and the

institutional environment in which they are embedded, which itself changes and evolves. If we adopt a perspective from which we conceive of jobs as “knowledge networks” whose structure evolves, we come closer to describing the fabric of socio-economic reality, but we also face the scientific challenge of explaining how these networks of knowledge emerge, reproduce, evolve, and deteriorate. This understanding is key to knowing, for example, what skills are in demand and how the structures that give rise to new jobs and the disappearance of others emerge.

Likewise, the identification of the forms of knowledge that will be essential to promote new production and distribution systems that are compatible with sustainability objectives, constitute another important scientific challenge. Recent studies show how the scant attention paid to conceptual aspects has implications for the empirical analysis of the transformation of work toward employment structures where “green jobs” are gaining more weight. The traditional method so far used to measure green employment has been based on a ‘binary’ approach, considering ‘green’ and ‘non-green’ occupations as if they were mutually exclusive (Becker and Shadbegian, 2009; Peters et al., 2011; Deschênes, 2013; Consoli et al. 2016), with ‘green’ employment conceptualized as jobs in which work tasks associated with environmental sustainability have the greatest weight. This dichotomy represents a barrier to understanding this transition, and to the formulation of public policies for sustainability and equal labour market opportunities.

The available evidence indicates that most occupations are experiencing, to varying degrees, an increase in the performance of work tasks related to environmental sustainability. Therefore, green employment is not a binary phenomenon but a gradual qualitative transformation of occupations (Vona et al., 2019). To understand this transformation, it is necessary to delve into the intrinsic characteristics of occupations, such as the set of tasks and skills that define their fields of action. The study of the evolution of the structure of employment represents a key scientific challenge to monitor whether, and to what extent, economic systems are adapting to the ecological transition. Operationally, collaboration of statistical offices will be key to guaranteeing the availability of time series of detailed data on employment by occupational categories, and their territorial and sectoral distribution¹.

1. To date, the only data source that allows this type of analysis is the O * NET repository of the United States Statistical Office: <https://www.onetonline.org/find/green>.

However, the evolution of employment is only one face of the complex adaptation of knowledge to the ecological transition. As the demand for occupations changes —increasing for some and decreasing for others— education systems will be forced to adapt the supply of skills. This adjustment will affect both higher education and vocational training. The reconfiguration of work within the sustainable paradigm will drive the demand for new occupations and skills, and the transformation of existing occupations that will experience an evolution in the objectives and criteria for the execution of their tasks (Maclean, 2018; CE-DEFOP and ILO, 2010). In addition, changes in the training offer will affect the content and the way of providing education. The ecological transition is in its initial phase, which implies that good practices compatible with sustainability have not been consolidated, are subject to experimentation, and learning based on trial and error (Rosenberg, 1976). Transferring knowledge in this phase requires adaptability and flexibility, more common in vocational training, along with the active participation of experts beyond the academic circle, such as businesspeople, technicians, and managers².

The analysis of the adaptation of the training offer, its contents, and its organization, constitutes another important scientific challenge for the social sciences. It is key to supporting the formulation of policies to support the ecological transition. The education system is the crucial platform to enhance the dissemination of effective knowledge to adapt production and distribution systems toward sustainability and correct labour market imbalances due to structural changes in the demand for employment.

3.3.2. Economies in transition: The Bioeconomy

One of the transitions considered most promising in the last 20 years is undoubtedly the transition toward the bioeconomy, first proposed and promoted by the OECD and then by the European Union (OECD, 2006; EU Commission, 2012). This transition is in line with the purpose of leaving behind the economy based on fossil energy, to move to an economy in which biotechnologies and biomass have a determining role. The concept of the bioeconomy has been changing over the last 10 years and remains elusive (Styhre and Sundgren, 2011). In this discussion we refer to two of the meanings of bioeconomy: the bioeconomy as an economy of biotechnological innovation and the bioeconomy as an economy of biomass, as these are most closely related to the concept of sustainable development.

2. An example of this type of learning platform at the European level is <https://www.climate-kic.org/programmes/education/>.

The bioeconomy as an economy of biotechnological innovation

In formulating a vision of the bioeconomy, the OECD has played a vital role emphasizing above all the role of biotechnology. Under this vision, the bioeconomy is characterized by the significant contribution of biotechnology to economic production (OECD, 2009); the emphasis is on using present and, especially future, biotechnologies to generate economic growth and solve global challenges. Here, the use of the term “bio” addresses the emphasis assigned to biotechnological knowledge, such as “the understanding of DNA, RNA, proteins, and enzymes at the molecular level; of the ways of manipulating cells, tissues, organs, and whole organisms; and from bioinformatics for the analysis of genomes and proteins (OECD, 2009).” From this vision of the bioeconomy, strategies that rely on the enormous promises of biotechnologies are fostered in a wide range of sectors. Thus, climate change, environmental pollution, loss of biodiversity, disease threats, hunger, malnutrition, and resource scarcity can be addressed, so it simultaneously boosts national competitiveness and rates of return to capital. This version of the bioeconomy has been criticized for promoting an overtly neoliberal model of economic development (Parry, 2007), by treating the economics of biotechnology as central, treating risks and ethical issues as secondary concerns (Hilgartner, 2007), and representing complex socio-political problems as challenges that can be addressed only through technological innovation (Goven and Pavone, 2015; Pavone and Goven, 2017).

The bioeconomy as a biomass economy

In this second vision, the essence of the bioeconomy lies in the growing and novel use of biomass, and especially the substitution of biomass for fossil energy sources and industrial raw materials. This bioeconomy is presented as an inherently more sustainable economy from an environmental viewpoint. Using the prefix “bio-”, addresses the material used (biomass, bio-resources), rather than the technology applied. The replacement of fuels by biomass was the central theme of the first policy documents in which the bioeconomy was first mentioned. This vision is central in Europe and defines the bioeconomy as the sustainable production and conversion of biomass into a range of food, health products, fiber, industrial products, and energy. According to the EU (EU Commission, 2012), “bioeconomy encompasses the production of renewable biological resources and their conversion into food, feed, bio-based products, and bioenergy.” The link between the biomass economy and sustainability is very explicit and is associated with the transition from an economy based on fossil fuels to an economy based on renewable raw materials (FORMS, 2012). In general, proponents of this view believe that a bioeconomy can obtain the building

blocks of materials, chemicals, and energy from renewable biological resources (de Besi and McCormick, 2015) and can be configured as an economy in which all (or most) of the fossil sources used for consumption and production are replaced by biomass resources (Pfau et al., 2014).

This version of the bioeconomy has been criticized for equating the use of renewable biomass with sustainability. Critics point out that increased use of biomass can have destructive effects on the environment and are unfair to society. These criticisms are linked to the way the term “bioeconomy” was first used by Georgescu-Roegen, who in the 1970s warned that continued growth that depends on the depletion of non-renewable resources and the continuous production of waste is not sustainable. Georgescu-Roegen considered that the market could not prevent bioeconomic catastrophes, nor equitably distribute natural resources between successive generations (Georgescu-Roegen, 2011). Contemporary critiques of this view of the bioeconomy, known as agroecological approaches, question whether the simple substitution of biomass for fossil resources will allow addressing the broader questions raised by Georgescu-Roegen (Asveld et al., 2011; Smolker, 2008; Sheppard et al., 2011; Birch et al., 2010; Ramcilovic-Suominen and Pülzl, 2016; Bugge et al., 2016).

Bioeconomy and eco-economy

Despite the above-mentioned differences, both visions of the bioeconomy converge in proposing i) increased public investment in science and its infrastructure, with a growing emphasis on applied research and commercialization-oriented technological innovation, ii) Public support for private commercial agents, with a strong emphasis on public-private partnerships, iii) Ensuring that regulation meets the needs of innovators and marketers, iv) The promotion of private environmental regulation, especially through consumer purchase options, v) Government intervention to create new markets, and vi) Active government cultivation of public acceptance of the bioeconomy (Goven and Pavone, 2015).

In response to climate change and resource depletion, the bioeconomy aims to improve the most wasteful aspects of traditional industrial and agri-food processes, intensifying production and supply. This translates into an attempt to redesign living organisms, to limit dangerous externalities, and minimize resource depletion, while boosting economic growth. Thus, some argue, the transition to the bioeconomy is displacing other approaches that seek to address the real (structural) causes of pressing problems. Therefore, the fundamental and problematic attributes of the political-economic status quo are being protected from the environmental and social crises they

have generated while weakening opposition to the underlying causes of these problems. This approach to the bioeconomy, committed to economic growth and global competitiveness, makes local ecosystems largely irrelevant (Horlings and Marsden, 2011; Horlings and Marsden, 2014; Kitchen and Marsden, 2011).

The transition to the bioeconomy entails the emergence of several challenges. First, questioning whether this transition will really materialize, since more than a decade after its inception very few of its promises have been fulfilled. Second, the technocratic approach that sustains the transition toward the bioeconomy is sowing doubts about the real scope of technological solutions to complex problems with many social, economic, cultural, ethical, and political aspects. Third, public policies introduced over the last decade are fostering, rather than counteracting, patterns of global and intergenerational inequality. Last, bioeconomy is accelerating a radical change in the way science is understood, increasingly far removed from basic science and more focused on commercial innovation oriented based on public-private collaborations where various conflicts of interest between the worlds of politics, enterprise, and science are neither being recognized nor addressed.

While the bioeconomy represents a historic opportunity to address humanity's great challenges, one wonders whether it is possible to imagine a different transition, where problems can be addressed in a more complex way, introducing all social, economic, and political variables and taking advantage of collaboration of many disciplines; with a vision of solidarity in time and space; preserving the importance of basic science, recognizing conflicts of interest, and power between the different members involved, while addressing them clearly and forcefully (Luoma et al., 2011; Schmidt et al., 2012; Marsden and Farioli, 2015).

CSIC faces the scientific fundamental challenge of redefining the problems to be addressed by the bioeconomy without reducing their complexity and without limiting the focus to technical solutions. All disciplines, including the social and human sciences, may actively take part in this redefinition and contribute to a new phase in which the bioeconomy will be characterized by a deeper approach to sustainability that takes into account time (including the needs of future generations) and space (keeping in mind that sustainable solutions should apply globally).

3.3.3. Territories in transition: cities and regions.

The concept of transition in the debates about the future of cities and regions has two interrelated, but still different, meanings. One is related to the issues addressed in this document and concerns the role of territories in transitions toward sustainability (Grin et al., 2010). The international scientific community highlights the role of cities in the transition to sustainability, because of their importance in demographic terms and due to their potential as the hubs of innovative disruptive initiatives (Frantzeskaki et al., 2017). As such, they have potentially a crucial role to play in the emergence and acceleration of technologies and other forms of innovation that can sustain the transition towards a more sustainable world (Wolfram et al., 2019). Despite this, the research available to date on the role of the territory in transition processes is limited (Köhler et al., 2019), with some exceptions (Binz et al., 2012; Coenen et al., 2012; Coenen et al., 2010). Improving our knowledge of this issue would require, among other things, the capacity to develop real, small-scale experimentations that could then be used for further conceptual development (Köhler et al., 2019). It would also require methodological innovations that integrate different types of innovation (social, technological), with the heterogeneity and variety of institutional and legal frameworks that characterize territories around the world. Importantly, the goal of these research experiments and empirical research should be about system wide learning and problem solving.

Another phenomenon that has attracted the attention and efforts of the EU and the OECD is that of territorial industrial transitions (OECD, 2019). While mentioning the need to implement environmentally and socially sustainable development models, the primary objective of these activities is to understand how the economy of stagnant or declining regions can move toward the production of high value-added goods and services. This would allow them to increase their productivity, generate employment, improve performance, and change their growth trajectory (EC, 2017). Although this is a crucial challenge for many institutions and governments at the regional, national or international scales, this type of transition faces two main challenges: i) the progressive concentration of economic activities that are technology and knowledge-intensive, and of scientific knowledge more broadly, in an increasingly reduced number of cities and territories, which entails a continuous increase in territorial inequalities (Balland et al., 2020; Kemeny and Storper, 2020. ii) The inability of regional policies, with some exceptions, to reverse or even attenuate these inequalities, at the national and international level (Barca, 2009; Pike et al., 2016). The challenges faced by these lines of research and

action are multiple and include: identifying regions that have been able to change their trajectory and the agents of change (companies, governments, NGOs, etc.) that have allowed them to do so, as well as the institutional changes that have been fundamental in the process; investigating the potential of alternative models of local and regional development, such as the foundational economy (Collective, 2018) or the circular economy (OECD, 2019), which focus on economic sectors that serve local populations and on reducing the environmental impact of economic activities; understanding what organizational and institutional factors prevent structural economic change and keep territories in a “lock-in” situation (Isaksen, 2015).

Additionally, given the persistent issue of low governance quality in some territories, one challenge is the implementation of mechanisms for the coordination of public policies at a vertical (local, regional, national, international) and horizontal (government, companies, NGOs, civil society, etc.) level. Without these mechanisms, the commitment to policies oriented to specific objectives (mission-oriented policies) at the European or Spanish level, can have negative consequences for less developed territories (Foray et al., 2018; Morgan and Marques, 2019). This is because a large-scale investment to solve urgent problems (such as climate change) means directing resources toward organizations (public and private) with scientific and economic capacity to seek advanced technological solutions (Mazzucato, 2017). From a territorial viewpoint, this means directing resources toward the regions where these capacities are concentrated and therefore a reinforcement of existing inequalities. It is therefore necessary that policies aimed at tackling major challenges come with policies that pay attention to the territory (place-based policies) and that help peripheral regions to develop critical mass to contribute (Barca, 2009; Barca et al., 2012). This can be achieved only by coordinating local, regional, national, and international actions, which also implies the development of new decision making, monitoring, and evaluation tools (Morgan and Sabel, 2019). In this area, it will be necessary to invest in research on multiscale coordination of public policies and in the identification or design of monitoring systems for innovation policy that are adapted to the characteristics of the territories, and that can encourage actions that go beyond growth in the number of patents or spending on R&D. It will also be necessary to investigate the role of institutions in regional and local economic growth.

In this sense, the study of the “quality of institutions” also represents a key area of future work. Institutional quality is defined as a set of internal and

external features of institutions that condition development and wellbeing policies in the countries and regions where they are located. To date, the following dimensions have been used to study institutional quality: i) bureaucracy and autonomy allowed by law; ii) meritocracy in the selection and promotion of personnel; iii) absence of particularistic interests; iv) absence of islands of power that subvert the objectives of the institution, v) proactivity toward fulfilling its objectives; vi) openness to technological and organizational innovation; and vii) external alliances with influential social stakeholders. It is also appropriate to analyze the performance of system institutions through traditional methodologies based on scientific publications, patents, and R&D contracts, using alternative metrics on the impact of R&D and proximity knowledge transfer measures in local innovation systems (Fernández-Esquinas et al., 2019; Fernández-Esquinas et al., 2018).

3.4. Interrelation between social and natural systems

Due to the urgency of solutions to advance transitions toward sustainability, this section prioritizes challenges that must be addressed in the short and medium-term (5–10 years). We start from a systemic thinking perspective that conceptualizes complex and adaptive interactions between humans and nature as socio-ecological systems (SSE) (Berkes and Folke, 1998; Schlüter et al., 2019). SSEs comprise networks of interactions between human entities and other elements of nature, at various spatial and temporal scales, which produce patterns, structures, and emergent dynamics that interact with the same processes that generated them, adapting and evolving continuously (Levin et al., 2013). Thus, the emerging results at the macro or systemic level of these interactions may have new properties or generate new conditions against which humans and biophysical elements might adapt. This complex and evolutionary nature of SSE implies high uncertainty and sometimes the emergence of unexpected behaviors (Folke et al., 2016), posing important challenges at the level of governance, planning, management, and design of policies and institutions (Galaz, 2019).

Theoretical challenges

In the medium-term, it will be necessary to adapt the concepts used to explain the anthropogenic origin of global change at a more regional and local scale (“downscaling”), considering both specific contexts (e.g., sociocultural, administrative, and multisectoral), such as the connections between the different spatial and temporal scales (Biermann et al., 2016). This should be complemented with an effort to update the theoretical, methodological, and synthetic

developments in sustainability sciences, with special emphasis on the transformations toward socio-ecological sustainability (Balvanera et al., 2017), incorporating the advances made in socio-technical transitions (Schot and Steinmueller, 2018), and the explicit articulation of the normative component of both fields.

It will also be necessary to develop and apply conceptual frameworks that allow the integrated analysis of multiple social dimensions of interest in solving socio-ecological problems. Specifically, it is necessary to integrate the dimensions that govern individual behavior and collective action, both endogenous (e.g., cognitive, emotional, learning) and contextual (e.g., cultural, historical, discursive, political, institutional - “rules of the game”) (Méndez et al., 2019). These frameworks should incorporate the multiscale nature of socio-ecological problems, including adaptive adjustments between: environmental components, levels of governance (“polycentricity”), spatial scales, and inter-territorial interactions and asymmetries of power. It will also seek this integration has diagnostic capabilities, allowing, through case studies, the design of institutions and policies for just transitions toward local and global sustainability.

Methodological and technical challenges

Advancing a better understanding of the relationships between communities and societies, and the nature that surrounds them, also requires overcoming challenges³ of an empirical and methodological nature, among which we highlight the following, with special emphasis on its trans-disciplinarity:

- Recognition of the need to interweave multiple epistemological, theoretical, and methodological approaches for an understanding of the values and contributions of nature to people (Martín-López et al., 2014). Some methods to make these values and contributions visible are the multi-criteria analysis (Martinez-Alier et al., 1998), network analysis (Bodin et al., 2019), the experimental design that integrates biophysical; sociocultural; and monetary evaluations (Martín-López et al., 2009), or the participatory design of future scenarios (Oteros-Rozas et al., 2015). To identify knowledge gaps, results triangulation, methodological and epistemological redundancy, and kaleidoscopic experimental designs can be useful to reveal and address patterns that are difficult to observe in another way (Nightingale, 2016).

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- Incorporate the multiple interactions that occur between science and society throughout the research process. In line with what some feminist and ‘decolonial’ proposals, tools can be implemented to weave different types of knowledge and evidence: i) paying attention to those who (do not) participate in these processes and those who decide (subjectivities). ii) Involving habitually marginalized social groups in decision-making. iii) Recognizing the power dynamics between types of knowledge (e.g. scientific-technical, traditional, and indigenous) and between those involved. iv) Assuming the incommensurability of the different knowledges (situated knowledges). v) Showing the validity of different ontologies and epistemologies (Haraway, 1988; Pérez Prieto, 2017; Iniesta-Arandia et al., 2020). At this last level, a high impact example is the effort made by the Intergovernmental Science-Policy Panel for Biodiversity and Ecosystem Services (IPBES), sponsored by the United Nations (Díaz et al., 2015). Within this framework, scientific concepts and indigenous local communities have been discussed, giving rise to the term “*nature’s contributions to people*” (NCPs) (Kadykalo et al., 2019).
- Enhancement and promotion of robust science-politics-society interfaces that incorporate, from the design phase: i) work in interdisciplinary teams of experts from the Social and Natural Sciences (taking into account the historical asymmetry of power between disciplines). ii) Participatory and transdisciplinary action-research methodologies, aimed at describing, understanding, and transforming socio-ecological systems and problems, and the challenges of transitions toward sustainability. iii) The co-design of long-term monitoring systems endowed with stable human and financial resources, which help to evaluate and monitor the impact of research and management actions, and changes in socio-ecological systems. iv) Iterative processes to incorporate available knowledge into management and decision making, with special attention to the co-production of knowledge with the members involved (Polasky et al., 2011; Wolff et al., 2019).
- Facilitate familiarization of social actors with Earth observation technologies and data, thus contributing to evidence-based decision-making. This information allows us to understand the effects of the different drivers of global change at different spatial and temporal scales in a synoptic and detailed way (Lucas et al., 2017). For a more efficient use of the massive information proceeding coming from these technologies, different experts and social and economic members must

be involved to ensure the identification and validation of the most suitable products and services to support decision making and integrated management of the landscape, environment, and natural resources. Examples of this approach are the Copernicus Program of the European Union or the European Research Infrastructure for Long-Term Socio-Ecological Monitoring (eLTER RI). Likewise, it is convenient to promote participatory environmental monitoring for transparency in decision-making and socio-ecological justice (Radjawali et al., 2017).

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CHALLENGE B

ABSTRACT

This challenge is formulated in terms of “humanities in transition,” that is, their approach and articulation in the face of the changes they must undergo to achieve the social weight that, due to their intrinsic relevance, should correspond to them. Faced with these situations that would demand a reinforcement in research and dissemination in diverse aspects of the humanities, from multiple perspectives, paradoxically an adverse panorama is drawn for the development and dissemination of humanistic knowledge, which concerns different factors. Some are related to the consideration of the area of knowledge itself, its organization within the scientific system, the questioning of its own limits, and the interaction with another knowledge. Considering current transition scenarios does not mean having to abandon old objectives, but it adds to the work conducted new objects of study closely related to current reality, such as: the informational revolution; the relations with the ecosystem and the environmental crisis; globalization; the intensification of human mobility and migration flows; the growing economic and social inequality; the frictions derived from the articulation of collective identities; the decolonization of discourses; demographic dynamics; integration of technological advances; and viability and support for alternative models of society.

HUMAN SCIENCES IN TRANSITION SCENARIOS

Coordinators

Josep Martí Pérez (IMF, CSIC)

Idoia Murga Castro (IH, CSIC)

1. INTRODUCTION

For some time, in some sectors of society, and even in certain academic fields, there has been talk of a “crisis of the humanities.” In practical terms it manifests itself in a certain loss, not of social relevance — the humanities are still relevant and necessary— but of institutional trust. There is a progressive loss of social weight of this type of disciplines in many countries, therefore, budgets are cut, schools are closed, or humanistic subjects are eliminated in secondary education. Except for issues such as the exploitation of humanistic knowledge as a cultural product of consumption or the preservation and enhancement of heritage, the bulk of research in human sciences is often undervalued and considered of little use and application. While prioritizing a vision of social sciences, exclusively focused on the present, in some sectors there does not seem to be a clear idea of what the wide range of disciplines that study the human past and its artistic, scientific, linguistic, and literary production are for; proposing ethical, political and legal reflections; or analyze religions, multiculturalism, functional diversity, bioethics, and gender issues, among other diverse problems.

It is disheartening to observe how the important technological advances, that humanity has experienced, do not correspond to the impact that the achievements that a long humanistic tradition advocating for the respect and dignity of humans should have (plus non-humans as well). Researchers working in the humanities help to unravel, among other questions, how technology

develops within varying socio-economic frameworks; how environmental affects the cumulative result of millennia of human activity are; how global change is a socio-economic and geopolitical phenomenon, not merely a physical one; how culture, religion, or political ideas condition and convey scientific and technical advances.

Discrimination, social injustice, use of violence, are phenomena that in today's world not only continue to occur at the level of individuals but also, on certain occasions, at the institutional level, even political formations that openly admit denial emerge —according to particular interests— of values that humanism already believed to be well established.

In this sense this challenge is formulated in terms of “humanities in transition,” that is, their approach and articulation in the face of the changes they must undergo to achieve the social weight that, due to their intrinsic relevance, should correspond to them. Faced with these situations that would demand a reinforcement in research and dissemination in diverse aspects of the humanities, from multiple perspectives, paradoxically an adverse panorama is drawn for the development and dissemination of humanistic knowledge, which concerns different factors. Some are related to the consideration of the area of knowledge itself, its organization within the scientific system —including within the CSIC—, the questioning of its own limits, and the interaction with another knowledge.

It is difficult to divide the sphere of knowledge into specific disciplines, despite the attempts made to do so in the administrative field or in inquiries of a statistical nature. The image of a tree-like construction reflected by these attempts is opposed to the fact of a stubbornly rhizomatic reality. This means there is no consensus on the definition of “humanities,” for some a term synonymous with “Human Sciences” whereas others prefer to differentiate them, based not only on objectives but also on methodological criteria.

In CSIC both one term and the other appear, for example: Center for Human and Social Sciences (CCHS of Madrid) or Center for Research in Humanities (the IMF of Barcelona). Nonetheless, researchers from both CSIC centers, in the same way as from others in the organization (including the six institutes part of the CCHS: IEGD, IFS, IH, ILC, ILLA, and IPP; and the institutes and schools found in other parts of the country, EEA, EEHA, EEHAR, IAE, IAM, INCIPIT, IEGPS, IESA, and INGENIO¹; conduct research that concerns the

1. <https://www.csic.es/es/investigacion/institutos-centros-y-unidades>.

humanities², with one of the two cultures of which P. Snow spoke, who distinguished between the sciences and the humanities in his book *The Two Cultures* (1959).

In the White Paper on Humanities research for the year 2006 prepared by the FECYT, the low presence of the Humanities in the CSIC was confirmed, putting 9.8% of the number of researchers of the organization belonging to this area (FECYT, 2007). Currently, the percentage should be similar.

To open participation to those who wanted to collaborate in the formulation of this challenge, a survey was proposed to find out the different sensitivities and opinions of the CSIC researchers who work in schools, institutes, or centers of humanities —specifying that some of these people consider that their research is conducted in social sciences, as may be the case of social history.

The survey (see the final section of this challenge) included several questions addressed both to general aspects of the humanities, to possible transition scenarios on which research in human sciences could have something to say, and to the work of the groups themselves research in relation to these realities. The survey was sent to 435 recipients³ being completed both individually and on behalf of the entire group. Twenty-five completed surveys were obtained, but this report collected opinions from 22 research groups among the total of 66 CSIC groups that work in human sciences⁴. Although the value of the results from the quantitative viewpoint is limited because of the low participation, from the qualitative viewpoint, the answers obtained have been useful to us in preparing this report. Likewise, the opinions received in writing from some researchers who have preferred not to use the survey format to convey their perspectives on this challenge have been incorporated into the contents of this report.

In the survey conducted, only one response was obtained from a person who did not identify with the label “humanities.” The rest did it completely (18) or quite a lot (6). There are those who prefer the name “Human Sciences” or even those who expressly affirm that their field of study belongs rather to that of “Social Sciences.”

2. At the CSIC, research is conducted in characteristic areas of Human Sciences such as philosophy, linguistics, history, musicology, geography, anthropology, or theory of knowledge.

3. The shipments were made, on the one hand, using the internal distribution lists of the CCHS by institutes, choosing only those of Human Sciences as well as that of the IMF. On the other hand, for the rest of the centers, institutes and research groups, the e-mails available on the CSIC website were retrieved.

4. The information has been extracted from the respective web pages of the institutes and the CSIC.

According to the survey conducted, the researchers who consider the humanities in crisis are more than those who deny such a situation. Further, if we talk about a crisis, it is due to a set of factors, such as the ideas and values of today's society in relation to what is expected of science, the little institutional support (derived from the previous point), the own work of its specialists –the so-helpful metaphor of the ivory tower– and the inadequacy to the reality; all are interrelated.

Whether you agree with the crisis situation, the majority opinion of the researchers surveyed is that the current situation of knowledge generation requires giving a new direction to the humanities (affirmative: 19; negative: 4; don't know: 2). This new course, according to the surveys, could be oriented toward three areas:

1. Explore new methodologies that allow us to advance in research in the humanities.
2. Consilience. Contribute to breaking the boundaries of scientific disciplines to generate an interconnection in terms of theoretical and methodological convergence.
3. A greater adaptation to the new challenges, social values and socio-political-economic-cultural and ethical requirements of society and the world of the 21st century.

Not all groups that explicitly state that a new direction must be given to the humanities consider themselves well prepared for it. System deficiencies and little support from the CSIC are the principal reasons given. If you want to improve the situation of the humanities, reflect, among other issues, on the work of specialists.

2. THE CHALLENGES

The world and human societies, from their very beginnings, are always in constant change and one of the important challenges typical of any scientific practice is not only to detect the characteristics of transition scenarios but also to contribute to their management within your means. Through the survey conducted, there are various aspects that, related to this, are part of the interests of the humanities research staff, either as part of the work being conducted, or as a future possibility.

Learning of these transition scenarios implies both focusing the research on objectives of social relevance and reflecting on the same research practice, not only in relation to the theoretical and methodological frameworks applied but also in relation to the values that underlie and that, from new humanist positions, are the object of criticism. Thus, we understand that the challenges for the humanities in transition scenarios should give due importance to issues such as, among others, the objects of study related to current reality, developing conceptual and analytical tools, and certain values.

2.1. Objects of study related to the current reality.

The production of knowledge in humanities contemplate a vast field of interests. Considering current transition scenarios does not mean having to abandon old objectives, but it adds to the work conducted new objects of study closely related to current reality and that can be approached from humanistic perspectives. Thus, the humanities of the 21st century cannot ignore these realities, among others:

2.1.1 The informational revolution.

The new processes of generation, dissemination, and reception of information articulated around ICT constitute an area of interest for humanist research, besides the epistemological and methodological implications it has, as is evident in the appearance of the so-called “digital humanities.”

2.1.2 Relations with the ecosystem and the environmental crisis.

The severity of the climate emergency requires attention from all potential points of view and the humanities can play a vital role. The so-called “environmental humanities” contribute to developing a necessary ecological and eco-social awareness at the planetary level. The concept of “Anthropocene” helps us to be aware of the anthropic excesses that endanger the continuity of the planet. The Anthropocene implies a time of deep crisis of ethical and epistemological values. Further, the humanities are fundamental to promoting changes in individual and social behaviors that favor sustainability and collaborate in the formulation and consolidation of new models of material culture and socio-environmental regulation.

2.1.3 Globalization.

A forced transition scenario must consider the reality of the current globalization. This does not mean thinking in a simply in a global scenario formed by interconnections at the planetary level, but in terms of “glocalization,” a

neologism that refers to the need to interconnect the global and the local. However, socially relevant humanities require both “thinking globally and acting locally” and “thinking local and acting globally.” If CSIC researchers are already fully aware of the need to move internationally, there is now the danger of forgetting about the local, especially when current scientific policies, through their evaluation procedures, undervalue the local.

2.1.4 The intensification of human mobility and migration flows.

Migration is something inherent to the human species. For mainly economic, political, and environmental reasons, migratory flows have intensified considerably in recent decades worldwide, making diasporic rearticulation and displacement a central issue to direct our attention and input. The humanities constitute a key piece to reflect on how these phenomena should be understood and what their social and political management should be, in accordance with the values of human dignity.

2.1.5 The growing economic and social inequality.

A positive human development is incompatible with the great economic inequalities that can be seen both between different societies and within the same society. The current transition scenarios present a worrying reality given that the way of generating and distributing wealth, increased in recent decades through important technological advances, increases, instead of mitigating, causing economic and social inequality to grow. Inequalities and precariousness related to care, consumption, citizen participation, sexual orientation, or gender identity, among others, are still perpetuated. These inequalities still generate blights as serious as sexist violence. These are issues that are emerging strongly fourth wave feminisms. If what is pursued is to achieve more equitable societies, increasing our knowledge of inequality and ways of combating it is essential.

2.1.6 The frictions derived from the articulation of collective identities.

The subject of collective identities has concerned all areas of human sciences in a transversal way in recent decades and constitutes a central aspect in the new transition scenarios. Besides those identifications that have more recurrently attracted the attention of researchers, such as those related to gender, ethnicity, religion, or social class, there are also those that continually arise related to lifestyles, age, body conditions, etc. Likewise, scientific studies of the human past have been deconstructing, analyzing, and critiquing ideas, motives, and myths about collective identities and loyalties for generations. The past is

a good that is competed for in many settings, so in disciplines such as, among others, History, Art, and Geography have been assigned the primary role of producing and legitimizing identities, imaginaries, and stereotypes —falling into the trap of methodological nationalism (Beck, 2006)— rather than producing scientific knowledge about the past. Current situations show it is necessary that the investigations of the human’s past contribute to understanding the human phenomenon as a long-term multidimensional process. In scenarios dominated by globalization and its identity frictions, the humanities cannot ignore how identities are maintained, configured and reconfigured, and especially which are those that emerge in the new economic, political, and ecological conditions that humanity is currently experiencing.

2.1.7 The decolonization of discourses.

In a globalized world, of friction of identities and imaginations, which must fight against inequalities, it is necessary to implement decolonial perspectives that favor awareness, empathy, and mutual understanding in the presence of otherness, and that favor new alternative relationship models to late capitalist exploitation logics.

2.1.8 Demographic dynamics.

Demographic dynamics is a major challenge for today’s societies. Not just the exponential growth of the planet’s human population, but also about the changes that occur in many societies in the differential relationship between ages, registering a progressive general aging.

2.1.9 Integration of technological advances.

The near future of humanity will be characterized by great advances in technological issues of all kinds, but especially in those of a biotechnological nature that imply a strong impact on the population: cyborgization, artificial life, robotics, nanotechnology, genetic manipulation... These advances should not occur without considering their progressive integration among the population, ethical issues or equity, and social justice. The humanities must be directly involved in this question, also critically addressing the underlying question of what “progress” means, its implications and its intelligent management.

2.1.10. Viability and support for alternative models of society.

The humanities can provide alternatives, new solutions, and models for the problems of our societies. With concepts such as utopia, memory or poetics can be key to dialog with the human past, analyze their situation and improve

their future. The waves of popular proposals, from the Arab Spring to the 15M and others, have revealed new scenarios for citizen participation. Among the challenges is the channeling of these criticisms and deconstructions toward new affirmative ways of understanding the place of the human in its complexity. For this, the role of the humanities is key.

However, despite this list of some challenges identified in which, without a doubt, researchers in human sciences can contribute knowledge, experience, and tools to address them, other research areas, typical of this area and with a long tradition in the CSIC, should not be forgotten. Although among social emergencies, they should continue to be the object of research in the present and, with human and economic resources, with freedom of research and professorship, and with an appropriate space to encourage creativity and the formulation of potential results.

3. DEVELOPMENT OF CONCEPTUAL AND ANALYSIS TOOLS

When research objectives related to aspects that characterize transition scenarios are addressed, research in the humanities also has the challenge of developing conceptual and analytical tools in accordance with the needs that emerge from current reality. CSIC research staff knows that “there is no greater intellectual crime than to address with the equipment of an older period the challenges of the present one” (Latour, 2004). At least a large majority of the responses obtained from the groups in the survey mention this need, although the lack of means, time, and personnel, to face these challenges is often commented on.

Humanities research at CSIC cannot be left out of the new trends emerging at the international level to adapt human sciences from the epistemological, theoretical, and social viewpoint to current times, with critical visions toward humanist tradition, and propitious for the present (Braidotti, 2013). At the core of these trends are the explicit recognition of the need to reformulate, rethink or even go beyond the very humanist thinking from which the humanities have emerged. These trends, as they constitute an important epistemological challenge for the social and human sciences because of the alternative schemes of thought they develop, constitute a likely response to the crisis and inherent loss of social weight of the humanities.

An equally important challenge for the humanities today is the need to counteract the progressive fragmentation of knowledge through inter and

transdisciplinary approaches, including in terms of the consilience advocated by the humanist biologist Edward Osborne Wilson (1999), such as the will of build bridges between the so-called “hard sciences” and the humanities.

In nine of the research groups that completed the survey, collaboration with other scientific areas outside the humanities is already a reality. However, for five, this joint work would be desirable although they do not see how it can be done, whereas in another seven responses it was specified that the institutional establishment hinders this collaboration.

4. VALUES

Addressing challenges such as those raised in the previous sections and others that may be considered required, being aware of the need to construct research in an intertwined way with those values of the humanistic tradition we consider appropriate. In fact, the same transition scenarios listed already emerge as the need to marry humanistic research with certain social values. Not only the research objects should reflect the importance given to these values but also the research practice itself. It is about implementing those values thought not only for the best of all possible worlds but also for the best science.

The question of intellectual fraud is something that we have well assumed, although it should always be remembered (remember the scathing criticism of Sokal and Bricmont with their *Intellectual Impostures* 1997 that, although it was answered, it is not entirely inappropriate). Besides the values usually associated with scientific practice, those that arise when considering the social reality marked by the need for scientific actions to conform to the values of feminism should be considered, environmentalism and the recognition of diversity, considering the interest to overcome individualism for attitudes more typical of a collaborative ethos, and the need to avoid unethical exploitation of research. It is about taking care of the balance between those different aspects that motivate the research work: strictly personal interests —the taste for research or wanting to pursue a career—, fidelity to what Alvesson et al. (2017) called the microtribe. Of the researcher and wanting to provide a service beyond these limits, thinking in terms of social relevance, being aware of the need to counteract the pressure of liberal individualism.

If in recent decades we can talk about implementing macdonalization processes in academic and science management areas (Ritzer, 1996), the interest in resorting to alternative thinking of movements such as slow science

must be calibrated⁵ for the different values it implies. It is also essential to recognize that in research not only “thinking” plays a role, but whether conscious, feeling or the inextricable relationship between the mind and the emotional dimension, with its derivatives of affectivity and empathy, is important to understand scientific practices. The question of values also clearly belongs to the challenges that research must face in the new scenarios presented to us.

SURVEY CONDUCTED: Human sciences in transition scenarios. Poll

Name:

Investigation Group:

1. To what extent do you feel that your research work is identified with the field of humanities?

- Completely
- Quite
- Not at all (Reasons?):

2. There is talk of “crisis of the humanities.” Do you agree?

- YES
- NO
- If so, what do you think are the reasons?

3. Do you think that the current situation of the generation of knowledge requires giving a new direction to the humanities?

- YES
- NO
- I don't know

5. <http://slow-science.org/>

If so:

What could this new course comprise?

To what extent does your group consider itself ready to tackle this new course?

To what extent does your group consider itself supported by the CSIC to tackle this new course?

4. In relation to the previous question, changes always require an adaptation effort. They involve a reflective and critical process on the work itself that has been conducted within the disciplinary field in past decades, and thinking about new scenarios. Are there possibilities in your group to make this effort?

- We don't take it into account
- We are aware of this, but due to lack of time / personnel we do not consider it
- We are aware of this and it is already part of our daily work
- Others:

5. What transition scenarios worldwide does your group detect that should influence the study of the humanities?

6. For some decades now, there has been talk of the (for some controversial) idea of the “two cultures” to refer to a separation between sciences, whose most opposite extremes would be the so-called “hard sciences” and the humanities. What do you think about establishing bridges between the two, for example, collaborating with research groups of different kinds?

- It is already part of the work of my group.
- I have never thought about it.
- It's impossible for my scope of work.
- It would be desirable, but I don't see the way.
- The institutional establishment makes it difficult
- Others:

7. Would you consider it interesting if there was a greater institutional effort by the CSIC to promote transversality between these “two cultures” in research?

YES

NO

If so, can you think of any specific measure by the CSIC?

8. What do you think of this idea? Currently, research staff publications be an end rather than being a real consequence of innovative research work and representing an advance in science. It is about the publish or perish philosophy.

Completely disagree.

-Sometimes it is like that.

-It happens more often than desirable.

-Others:

9. What strengths can your group offer in the framework of the transition toward global and sustainable societies?

10. What are the future challenges that Humanities researchers should face to improve our society?

11. Do you want to add any comments?:

Thank you for your collaboration!

Shipping address for the completed survey:

challenge.cchh.transicion@gmail.com

Deadline for submission: February 7.

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CHALLENGE C

ABSTRACT

The urbanization process is not homogeneous. In Europe, for example, large conurbations act as a pole of attraction for the population, whereas rural territories have also improved their living conditions and increased their demographic density, although others have suffered a notable economic decline, and a particularly acute and a progressive depopulation of their aging population. Therefore, the structural problems and the forms of interaction of North American and European cities with rural areas differ from Asian and Latin America megacities. The institutional responses to ensure the governance of these large conurbations and the balance with the rest of the state territory have not been the same either. All these dynamics pose, therefore, new rural-urban interaction scenarios with challenges for the future that can be classified into (sub)thematic areas analyzed by various CSIC researchers and foreign groups consulted to conduct this document.

TERRITORIAL DEVELOPMENT IN NEW SCENARIOS OF RURAL-URBAN INTERACTION

Coordinators

Francisco Colom González (IFS, CSIC)

Ana M^a López Sala (IEGD, CSIC)

1. INTRODUCTION

Urban areas have become the predominant spaces for human settlement in the 21st century. The consequences of this process for the evolution of the human species are fundamental, as in 200,000 years, *Homo sapiens* have gone from being a small species of hunters and gatherers, which roamed the African savannas, to becoming an authentic *Homo urbanus* whose main habitat comprises cities. In 2007, for the first time in history, the population of urban areas exceeded that of rural areas. According to United Nations data, in 2050 the urban population is projected to constitute 68% of the world's population, with the largest increases in Asia and Africa.

The structure of this universal urbanization process is, however, very heterogeneous. The most urbanized regions of the globe are North American (82%), Latin America and the Caribbean (81%), Europe (74%), and Oceania (68%), whereas the percentage of the population living in urban areas in Asia is about 50%. Africa is still predominantly rural (43%) but is experiencing an accelerated process of urbanization. The growth of large conurbations constitutes a quantitative phenomenon that has resulted in a qualitative change. The impact of urbanization on territorial development, the environment and the settlement of the population is enormous, because if in previous historical periods cities were areas of high morbidity, at present, with better access to medical and health services, urban life generally offers higher rates of longevity than rural areas. Large cities consume enormous

amounts of energy, natural resources, and food, which, added to the expansion of their areas of influence, is leading to the transformation of habitats and the progressive Anthropization of natural spaces.

The creation of large metropolitan areas assumes a historical continuation of the sociocultural change from the rural to the urban, but the acceleration of this process has exponentially increased the interdependence of both spaces. The profound social and economic changes that have occurred during the last three decades, added to the investments in infrastructure and equipment, have notably reduced the differences between the levels and ways of life of rural and urban environments in advanced societies. Specifically, the existence of a differentiated prototype of rural and urban subject is less recognizable. The sociological differences between the country and the city are blurring.

This process, however, is not homogeneous. In Europe, for example, large conurbations act as a pole of attraction for the population, whereas rural territories have also improved their living conditions and increased their demographic density, whereas others have suffered a notable economic decline, and a particularly acute and a progressive depopulation of their aging population. Therefore, the structural problems and the forms of interaction of North American and European cities with rural areas differ from Asian and Latin America megacities. The institutional responses to ensure the governance of these large conurbations and the balance with the rest of the state territory have not been the same either. All these dynamics pose, therefore, new rural-urban interaction scenarios with challenges for the future that can be classified into (sub)thematic areas analyzed by various CSIC researchers and foreign groups consulted to conduct this document.¹

2. CHANGES IN THE CONCEPTION OF URBAN-RURAL INTERACTION, RURAL DEVELOPMENT, AND AGRICULTURAL ACTIVITY

Among the multiple definitions tried to define cities, one particularly useful for our interests is described as a human settlement, highly dependent on rural spaces (more or less close), whose inhabitants cannot produce the food for their subsistence. Food production and supply has been the traditional axis of interaction between rural and urban environments. To date, the conventional form

1. For this purpose, a questionnaire was designed with various questions that were circulated among researchers from different CSIC centers.

of intervention in agriculture and rural development has been through sectoral policies and aid aimed at guaranteeing the income of a certain sector of the population. The opening of markets and the progressive elimination of agricultural protection systems, coupled with a range of demands and limitations on agricultural activity, whether because of criteria of environmental sustainability or food security, has opened the debate on other types of policies that support a comprehensive approach to development based on promoting exchanges economic and social relationships between rural and urban populations. This new logic includes more issues such as the design of road networks, broadband communication, and the location of educational, cultural centers or technology parks than give direct aid to farmers and production. The underlying idea is to approach agricultural development from a territorial perspective of public goods, of goods consumed in common, without prioritizing the dimension of their rival consumption. Behind this is that the profitability of agricultural holdings depends less on their productive capacity and more on their insertion into markets and marketing networks. This implies the integration of rural territories into local and regional dynamics, and their opening to new functions beyond the traditional food function, such as mitigating the effects of climate change, incorporation and reintegration into leisure circuits and social insertion of certain sectors of the population.

In principle, it might seem that the urban population “exploits” the rural environment without contributing to it and does not value the services provided by it sufficiently because of this disconnection. We are assisting in Madrid, Barcelona, and a few other cities in Spain to engulfing, emptying, and impoverishing their environment. The same is true in other countries, particularly those in development. Rather, the great question of the future consists in conceiving a co-development that is also eco-development. Agriculture and the population dedicated to it produce much more than food: if the farming systems are sustainable, they maintain biodiversity, allow the recharge of aquifers, regulate water and sediment flows, avoiding erosion and dumping of reservoirs, they moderate the floods of rivers, and can sequester carbon and mitigate the effects of climate change. Research in food and raw material technology has been focused for centuries on increasing productions and yields. Conversely, sustainable agriculture functionally integrated with the dynamics of the urban environment allows us to maintain ecosystem services for support, provisioning, and regulation that provide well-being to society and without which we cannot survive. These new more virtuous modes of production require another type of research: genetics, technique, machinery, soil work, phytosanitary treatments, etc.

This new coexistence represents a paradigm shift toward the production of food and raw materials for a circular economy. The growing interconnection between urban and rural areas should promote modes of production not only compatible with the coexistence of different populations and activities on the territory, but also help to create virtuous cycles. This is even more true if we put the resilience of agricultural productions and rural areas into the equation for an interconnected world like today's, where globalization of pests and diseases is taking place in a context of climate change.

However, "low cost" food systems give rise to unsustainable intensive monoculture landscapes, exploiting the field as a mere support and abandoning it when it has been degraded, with a tremendous loss of biodiversity and other added ecosystem services. These intensive monoculture systems are the result, among other factors, of insufficient awareness of the need for healthy and sustainable eating, of difficult access to it in many places (with the growing appearance of "food deserts" in rural and urban areas) and the high demand based on unresponsive consumption, which generates large amounts of food waste. This is one aspect in which agriculture can play a vital role through organic production systems or by integrating into movements such as slow food. In terms of food production and marketing, the patterns of the rural / urban relationship are also changing. It is no longer a one-way flow from the countryside to the city, in which agricultural products are directed to urban markets for commercialization through a wide network of intermediaries. Now, besides this flow, which continues to exist, other phenomena and forms of interaction are developing, such as urban agriculture, urban farms, short marketing chains, peri-urban agriculture, etc. that bring consumers closer to producers and vice versa,

Challenge:

Conceive a collaborative eco-development between urban and rural areas that helps to generate a circular economy of services, work and production of food and raw materials adapted to the challenges of climate change. This is linked to the promotion of responsible consumption policies to facilitate access to healthy and sustainable food.

Weaknesses:

- The need for a cultural and mentality change: that life in rural areas is as attractive as that in urban areas. Unequal distribution of cultural, social, educational, and technological facilities that allow access to them under equal conditions.

Threats:

- Collapse of natural ecosystems.
- Urban expansion within protected areas and their surroundings (buffer zones).
- Fragmentation and loss of connectivity between protected areas.
- Lack of generational change in using the territory.
- Productive extension. Homogenization of the landscape. Waste of biodiversity.

Strengths:

- The CSIC has several research groups in different institutes (IEGD, Pyrenean Institute of Ecology, CEBAS, EEAD) dedicated to the sustainable management of soils and sediments in agricultural and forestry systems, and to the prospective, promotion of public policies and monitoring of the structural changes to take place. It also has specialists in analysis of agricultural policies, circular economies, food security, and agri-food circuits (IESA and IEGD).

Opportunities:

- Greater connection between environmental disciplines, agricultural disciplines, and social sciences. Links between environmental, agricultural, and social dynamics.
- Promotion of Local Food Councils.
- More virtuous production modes. Other genetic and technical research, in machinery, in soil work, and in phytosanitary treatments.
- Generation of eco-systemic services produced in the rural environment that benefit the urban environment. For example, networks of local farmers' markets (up to 50km apart).
- Development of new systems and techniques for Earth observation to collect geographic information of interest.

Design of a system of sustainability indicators to guide decision making for land planners (urban and rural), managers of protected areas, forest areas, etc.

3. LANDSCAPE MANAGEMENT AS HERITAGE AND ECONOMIC RESOURCE

The transformations in the interaction between rural and urban environments have been seen accompanied by the appearance of new social values and forms of perception of the environment. The rural environment is less assumed as a place exclusively of production and more as an especially valuable element for the quality of life. Besides considering it a resource, an object susceptible to economic exploitation, the conception of the territory as a landscape has made it a space with added aesthetic, leisure, and recreational value. Addressing territorial development from the perspective of public goods, allows us to understand the configuration of the landscape as a spatial synthesis of social relations and a diachronic expression of community exploitation of natural resources. The landscape is the object of historical knowledge for its own content and is also the object of disclosure, management, and patrimonial protection as an economic resource. Research and management of territorial heritage are, therefore, two intertwined realities. In this context, archeological research provides added value by generating the knowledge that gives the landscape a historical meaning and allows understanding the social and temporal dynamics that explain what it is today, including the human impact on the environment and historical strategies resilience and adaptation. This knowledge facilitates its evaluation and conservation, but it also makes its rational exploitation possible through various means of diffusion and dissemination. The beauty or monumentality of the landscape are just one more element of its complexity and spatial and temporal depth. Landscape, therefore, encompasses the notion of environment by including cultural intervention as an essential factor in its configuration, both in its historical formation and in its present perception and assessment.

An additional challenge therefore comprises the adequate management of tourism in heritage areas. Heritage is integrated into its environment; it is not segregated from it. Landscape conservation criteria can be successful only if it is conceived as a living, active, and changing reality. If land uses and traditional activities disappear, the viability of the landscape as a heritage resource is put at risk. However, if the mechanisms put in place to protect the landscape fossilize, there is a risk of turning that space into a mere stage for tourist visits but is emptied of its own life. The double dimension of landscape and heritage, taken as a factor for quality of life and as an object of economic exploitation, forces researchers to consider the utility and

profitability of their research object. This is particularly evident in archeological projects. An archeological action is not justified without a social projection. However, given the conservation requirements for future generations of heritage, and of the landscape in particular, economic profitability must be sieved by social profitability. This is a conflictive aspect that places heritage in an ambiguous situation in which a balance must be sought between its social and economic value. This forces researchers to interact with regional and local governments, responsible for heritage management, and with local communities and associations. Besides this, although the methods are similar, archeological practice is very different in the countryside and in the city. Archeology is more viable in the field where it can be excavated on a recurring basis and there are usually fewer interests at stake. In rural areas, archeological research on landscapes and their heritage recognition constitutes a source of durable and alternative resources to aggressive activities on the environment – such as extractive or industrial activities— and abandoning the rural world. Although these alternative resources directly affect the services sector, to combine heritage preservation with sustainable tourism, a harmonious development of all productive sectors is necessary, using it as an incentive for the primary and secondary sectors, especially in its artisanal or traditional version. It is essential to have an innovative primary sector that updates the traditional uses of the land and local resources that characterize the landscape.

Nonetheless, in the urban environment, especially in Spain, archeology is immersed in an apparently insurmountable conflict with urban interests. Thus, their interventions are aimed at administratively freeing urban plots to allow their construction. The result is a tremendous loss of archeological information. Where archeology is less conflictive is in the restoration of architectures. The fundamental challenge on this front is to save the archeological heritage of the urban peripheries as part of the effort to humanize these spaces, in continuous expansion since the 70s.

Challenge:

Harmoniously develop research on the landscape, in such a way they are combined with all the productive sectors that affect the development of the rural environment. It is essential to achieve sustainable tourism supported by management tools and the proactive involvement of local agents, and an innovative primary sector that updates the traditional uses of the land and local resources that characterize the landscape.

Weaknesses:

- Conflict of urban archeology with urban interests.
- Disappearance of land uses and traditional activities.
- Risk for the viability of the landscape as a heritage resource.

Threats:

- Abandonment. Patrimonial and environmental degradation.
- Need to save the archeological heritage of the urban peripheries.
- Artificiality. Risk of falling into the “culture of simulation,” with the conversion of space into a mere stage for tourist visits.

Strengths:

- The CSIC has groups such as the archaeo-biology of the Institute of History, the Environmental Economics group of the Institute of Goods and Public Policies, the Management of Game Resources and Wild Fauna group of IREC or the urban archeology group of the School of Arab Studies, who work with a multidisciplinary approach on landscape archeology and its heritage recognition.

Opportunities:

- Archeological research on landscapes and their heritage recognition are generators of lasting resources in rural areas.
- Fixation of the rural population, repopulation, and rural revitalization through art and culture.
- Income diversification of rural areas. Profitability of the economic potential of the heritage.
- Rural archeology can rescue traditional agricultural techniques that, once excavated, can become agro-tourism farms.

4. RURAL DEPOPULATION AND MIGRATORY FLOWS

The fundamental criterion to guarantee the sustainability of the territory is its adequate management and planning, so intermediate populations can provide services and resources to the smallest ones and help to generate a system not based on extractivism and in which the hierarchy does not assume exclusion. Thus, in the medium-term, large infrastructures that seek to provide services to large cities are unsustainable if this implies generating

“demographic deserts” in other parts of the territory. It is easier to bring the population where the wealth is than to bring the resources to where the population is. The retention of population and the generation of wealth in rural areas is hindered if their work is not valued and they cannot live with dignity from it. It is essential to promote a change in perception in society that considers life in rural areas as attractive as that in urban areas, creating a diversified productive structure that sets the female and young population and, helps to generate family. Otherwise, rural areas will continue to decapitalize from the natural (degradation of agro-ecosystems due to poor management or use), social (depopulation), and financial (impoverishment) viewpoint. The lack of generational change in using the territory will have therefore the extension of production, the homogenization of the landscape, and the loss of biodiversity.

However, the traditional process of migration from the countryside to the city that accompanied the first periods of industrialization has changed in societies that have reached the maturity of their cycle of urbanization. Today, urban societies can see a greater flow of workers from the city to the country. This has been helped by the expansion of peri-urban areas, which have engulfed old rural populations, and the emergence of new lifestyles inspired by health, personal autonomy and integration with the environment, as reflected in phenomena such as that of the “neo-rurals”: people who return to their parents’ villages to take over their old lands and livestock farms or originally urban subjects who started a new life through an economic activity with added value linked to the rural environment (tourism rural, organic farming, etc.). In contrast, today’s agricultural wage earners live often in urban areas, from which they travel to the workplace in the field, like what happens in industrial or service centers. Most farm owners today reside in towns and cities and only go to their businesses to supervise their management. Both examples reflect notable changes in population interaction and rural / urban mobility.

Migratory phenomena have also influenced this transformation. Although the flows of foreign migrants to Spain during the last decades prioritized city destinations, causing phenomena of spatial segregation of new invoice, many immigrants have found a niche job in agricultural activities, particularly those that require a temporary but intensive use of labor. This has led sometimes to the revitalization of small towns almost unpopulated, to the emergence of itinerant routes for new seasonal workers in rural areas (temporary circuits) and to the consolidation of slum ghettos on the margins of large

farms with an intensive labor demand, with the consequent need for flexible accommodation resources adapted to this residential seasonality. High informality in labor relations that promote this internal migration has generated pockets of marginalization that risk becoming structural and require interventions linked to a comprehensive, sustainable, and innovative concept of territorial development. Other demographic imbalances caused are linked to the high masculinization of these workers and the needs for social resources available to this temporary resident population.

Depopulation is a complex phenomenon with multiple causes, but more recently it has had to do with the concentration of investments, services, and employment opportunities in urban and metropolitan areas, as opposed to rural areas. The consequences of this have been great imbalances, strong dualities, and a decrease in territorial, social, and political cohesion. It is difficult to find a solution to this problem that does not comprise specific initiatives that decline when the generation for which they are intended does. The way to address this problem should comprise a management of the rural territory more focused on promoting its functionality (agricultural, livestock, cultural), with associated jobs and services, that in the (re)settlement of the rural environment through initiatives that try to maintain demographically strongly aged nuclei that have lost their function. The demographic sustainability of the territory is closely linked to the conditions of accessibility, social and civic participation, inclusion, etc. of the communities based in the closest surroundings. The promotion of these qualities should consider all age sectors of the population from a life course approach.

CHALLENGE:

Manage territorial development in such a way as to avoid major imbalances and disruptions in socio-spatial cohesion. To attract and retain the population in the areas where resources are generated, it is necessary to support intermediate populations, which provide services to the smallest ones, thus helping to generate a system in which territorial hierarchization does not imply exclusion.

Weaknesses:

- Little appreciation of rural work. Scarcity of resources and services.
- Existence of too abrupt a line of separation between urban agglomerations and rural areas in Spain.

Threats:

- Depopulation and aging. Masculinization. Demographic mismatches.
- Creation of “geographic deserts” and “food deserts.”
- Difficulty of access to resources and services.
- High residential seasonality in rural areas during the summer. Tensions on seasonal resources.
- Irreversible degradation of some residential and productive spaces.

Strengths:

- Anthropological studies at ILLA on rural depopulation and on how cultural processes substantially modify the ways of relating to the environment.

Opportunities:

- Growing social similarities between rural and urban populations.
- Management focused on the functionality of the rural environment.
- Design of financing systems for rural women’s cooperatives and credit mechanisms for start-ups led by youth cooperatives.

5. AGING AND QUALITY OF THE LIVING ENVIRONMENT

In 2020, 9.3% of the world’s population is over 65, but according to the most recent demographic projections, by 2050 that percentage will reach 15.9%. These projections indicate that developing countries will have the greatest increase in this population, but advanced countries will continue to be the oldest. The population, however, is not dispersed over the geographic space. There is a marked tendency to concentration in urban areas. Although rural areas have an older demographic structure in Spain, the older population, is like the population concentrated in urban areas. Many dimensions converge in this phenomenon. The quality of the living environment is extremely important for the elderly, because it is considered that the physical space of life in this age group constitutes a space of prevalent use. It ages over time, but its ages occupying a place in geographical space. This, with the fact that the elderly population has not been subjected to much mobility during their life, influences that the elderly have associated a good part of their memories and life memory with that space. The residential environment not only constitutes the current living space, and often past, but

the place where a good part of the social relations and the dynamics of community integration take place. The friendliness of the space allows the elderly population to remain in their usual environment of residence for as long as possible, but this is only feasible if the relevant projects are designed and implemented to make the residential space, whether urban or rural, a habitable place.

The idea of “healthy aging” is therefore linked to that of habitability and friendliness of the environment. The World Health Organization is promoting the friendly cities model in response to the population concentration in urban areas, the aging of the population, and the need to provide environments for active and healthy aging. In short, a better quality of life is proposed in old age. According to the WHO conceptualization, age-friendly city must adapt its structures and services to be accessible to include older people with diverse needs and abilities. With the project on friendly cities and communities, there are several frameworks for action in this direction. Most intend to bring together the collaboration of various sectors (governments, civil society, professionals, academia, etc.) and give voice to the elderly themselves and their families to develop proposals and actions to improve their lives. Under the term of healthy aging, it is not only intended to promote health but also to address the environmental and social determinants of the aging process. An adapted residential or housing environment can facilitate the lives of the elderly and their personal development. It also helps to fight against social, economic, gender, and age discrimination inequities and to guarantee social, health, and long-term care. This environment can help change life prospects in old age. Therefore, healthy aging in rural and urban settings must be coordinated with the objectives of sustainable development. In addition, it is necessary to delve into the new residential forms that have emerged in recent years, linked to this active aging and which often are pointed out as good and pioneering practices (cohousing).

Challenge:

Integrate the idea of healthy aging into the social conception of sustainable development. To do this, it is necessary to modify the vital perspectives in old age and address the environmental and social determinants of the aging process. This includes taking care of the quality and friendliness of the living environment of the elderly in urban and rural areas.

Weaknesses:

- The elderly population in Spain has not been subject to great mobility during its life.
- Need to modify social and vital perspectives on old age.
- Need to develop prospective and medium-term actions that consider not only the current elderly population but also the aging trend and the relative increase in the number of people over 65 in the population.

Threats:

- Anomie. Uprooting Alienation of the elderly with their living environment, especially in urban areas.
- Short-term stocks.

Strengths:

- Long tradition in the CSIC of the studies of old age and aging (active), geriatrics and gerontology.
- Senior Portal.

Opportunities:

- Alignment of research in the IEGD on active aging and friendly cities for the elderly with the framework of action of the World Health Organization in this field.

6. URBAN EXPANSION AND NEW FORMS OF SUSTAINABLE MOBILITY

If we review the challenges that cities face, we find common problems, although these also depend on the scale of the cities: congestion, pollution, and concentration of population and activities, etc. These phenomena are linked to intra-urban demographic imbalances caused by the expulsion of the population from city centers (gentrification, touristification, spaces where one does not live, but travels), the degradation of non-gentrified urban centers, inequalities in the access to services and means of transport and large-scale growth of metropolises over peri-urban areas, which ultimately also affect rural areas and, increasingly, on the depopulation of intermediate cities, which provide services to the former. This largely unpublished mode of occupation of the territory affects the quality of the landscape and the environmental degradation of

rural areas. The survival of rural areas, in the broad sense of the term, depends increasingly on cities, the global economy, and some efficient means of transport that link its population with work and service centers. Abandoning the rural environment feeds back the chronic deficit of access of these areas to resources and basic services, such as health, banking, education, etc.

In the medium-term, it is very possible that technological development produces a transformation or mismatch between the residential place and the workplace that leads to major changes in the residence and mobility systems. This will not affect the population but it will affect a considerable proportion, and it may generate new residential forms and new patterns of daily mobility. For this to take place, a change is required in the face-to-face logic of public administration and private enterprise and in the extensive dependence on private transport. However, the sustainability of these new mobilities must come with a “circular economy” capable of recycling and reusing materials to reintroduce them into the production chain, thus trying to reduce the carbon footprint.

Challenge:

Develop new sustainable mobility services within the framework of a circular economy of reuse and recycling of materials.

Weaknesses:

- Suburbanization.
- Extensive dependence on private transport.
- Radio-centric structure of transport systems.

Threats:

- Congestion.
- Pollution and poor air quality.

Strengths:

- Strength and affordability of public transport in the main urban and peri-urban areas of Spain.

Opportunities:

- Transformation of daily mobility (pendulum movements, interprovincial).

- The CSIC has institutes (CENIM) that investigate the technological dimension of sustainable mobility.
- Possibility of linking studies on “circular economy” in mobility with planning of transport policies.

7. SPATIAL SEGREGATION AND HABITABILITY OF THE URBAN ENVIRONMENT

Very heterogeneous socio-political dynamics converge and can be jointly analyzed in cities. Impoverished and affluent areas coexist territorially hierarchically, and neighborhoods receiving international migratory flows and old urban centers subjected to processes of gentrification. The growing financialization of the urban –the transformation of real estate into financial assets aimed at making it profitable in international markets– is closely linked to the processes of verticalization, densification, uncontrolled urban growth, and the formation of real estate bubbles, with their consequent repercussion on public policies and the most vulnerable social sectors. The justice or injustice of social relations is spatially reproduced through urban structures: the way the territory is organized, public endowments are assigned, transportation and communication routes are traced, land use is determined, or urban density is managed. All these factors have an unequal impact on the lives of citizens and are the object of political negotiation and public management. Along with the challenge of generating healthy living spaces and cities that contribute to the slowdown of climate change, a general problem is the growing lack of identification and empathy of citizens with the places they inhabit. The globalization of culture, tourism, franchises, a functional and speculative urbanism, the disappearance of local commerce, among other factors, are creating cities where residents do not feel identified or motivated.

The suburbanization process in the United States was anticipated in other areas of the world and to acquire their own characteristics. The epigones of urban ecology of the Sociological School of Chicago interpreted the spatial segregation of large American cities at the beginning of the 20th century as the result of two different forces: the tendency of economic interests to expand and the centrifugal impulse exerted by the new residential areas, more attractive to the inhabitants than the old urban centers. The processes of spatial segregation and ethnic sedimentation in cities are intimately linked to these processes. From early on, the great North American cities were spatially articulated around the class structure

and the ethnic affiliation of their inhabitants. Looking at the displacement dynamics of immigrant communities in cities like Chicago, this school found that different ethnic groups occupied the areas from which previous residents were expelled. Large-scale urban sanitation projects undertaken in the United States after World War II still reflected this initial idea. Constructing large complexes of urban blocks, the infamous projects dislodged poor ethnic minorities from the center of big cities to make space for new urban highways and corporate skyscrapers. Thus, a diverse and socially integrated urban community seemed inconceivable from the perspective of Social Darwinism.

With the spread of the automobile in the 1920s, vast areas around large American cities suddenly became potentially urban areas. After World War II, financial support for war veterans, coupled with serial construction techniques, and the creation of large road structures, led the white middle classes to migrate to the new residential suburbs. Ethnic minorities and the poor were left behind in the city centers, where productive, residential, and commercial spaces were mixed. The local character of many of the social services and their reliance on real estate taxation further accentuated the ethnic and social segregation of American urban space. In this context, it is possible to distinguish conceptually and materially between urban enclaves, socially differentiated spaces, but without physical boundaries, where self-defined groups voluntarily locate themselves to promote their social, economic, or cultural development, and ghettos, in which deferred groups are unintentionally concentrated and limited in their residential location capacities by the dominant interests in society. Before many of these urban enclaves became ghettos, particularly those of African-Americans who emigrated from Southern states, the ethnic neighborhoods of large American cities frequently functioned as spaces of integration. Immigrants who recently arrived in the country, landed and found local support networks there. Ideally, immigration evolved in the second generation with upward mobility (the ‘American dream’), cultural assimilation, and abandonment of the neighborhood. Nevertheless, this spatial structuring contrasted the ethnic affiliations and the economic status of the urban population. Eventually, differentiated social values were also sedimented: the familism of the homogeneous white suburbs versus the preferences for more cosmopolitan personal fulfillment of the urbanites of gentrified urban centers.

In Europe and Latin America, conurbation processes have assumed other characteristics. After independence, civic equality of citizens and free land tenure in Latin America helped to dissolve the ethno-corporate structure of colonial

society, with its urban-centric administrative system, its “Indian republics” and free neighborhoods. The colonial urban layout in a checkerboard format was often overwhelmed by massive immigration from the countryside and abroad. With the railroad and the proliferation of tenements, favelas and shanty towns, a new type of segmentation of urban space was generated. At the end of the 19th century, the railway line generally marked the boundary between the old neighborhoods and the new floodplain settlements. The disproportionate growth of Latin America capitals also prompted the emergence of endemically underemployed popular classes protesting deeply unequal and exclusionary social systems. In Latin America modern mass politics, populism, and urban growth went hand in hand. However, Latin America megalopolises are not conurbations of middle-class residential suburbs, as in the United States. The historical fiscal weakness of Latin America states and security problems have not facilitated the construction of road infrastructures that allow suburbanization in the American style. In its place we find processes of urban polynucleation and securitization of some residential spaces with different ethnic and economic connotations. Dependence on the private car and the endemic lack of adequate public transport have also set different patterns of mobility: whereas the middle classes use the car and public roads collapse; the popular classes suffer from the endemic insufficiencies of collective transport. In this context, large shopping centers have assumed the role of meeting places that public squares played in the past. However, these are spaces that encourage action, not social interaction, because, as Zygmunt Bauman recalled, modern and monetarized consumption is an essentially individual act.

The systems of fiscal redistribution typical of the European States have generated spatially less segregated cities than the Americans. However, the tendency to let the market govern housing policies has created growing urban inequalities in Europe. In the late 1970s, in the French May riots, the philosopher Henri Lefebvre famously made an expression that has since gone viral: the right to the city. According to Lefebvre, the dynamics of capitalism not only take place in the cities but because of the cities. In a post-industrial context and with the deregulation of global financial flows, urbanization has become an engine of capitalist revaluation, and not the other way around, as in the past. Lefebvre’s analysis claimed urban life as a democratizing instrument and as a necessary condition for a renewed humanism. The city dweller would thus be the bearer of specific rights, a right to the city understood as the enjoyment of the goods of urban life, a right to live in its center and not be expelled to the suburbs and ghettos of the periphery. Marxist political

geography expanded on this diagnosis. Thus, for authors such as David Harvey, urbanization plays a crucial role in absorbing surplus capital, particularly during crises of over-accumulation. In these contexts, real estate financialization provides a ‘spatial fix’ to appreciation crises through a process of destructive creation: speculative outbursts in urban property that expel the masses from certain areas and take away their right to live in the city. This would have happened in France after the crisis of 1848, when Napoleon III commissioned Baron Hausmann to remodel Paris with grand boulevards, or in New York after World War II,

In urban planning, Le Corbusier and the International Congress of Modern Architecture (1928–1959) became the main laboratory of ideas of modernist functionalism during the last post-war period. Le Corbusier maintained a utilitarian vision of the city understood as *à habiter machine*. His urban doctrine was proposed to respond with economy of means to the urgent needs of post-war reconstruction, increasing urban density and efficiency in the face of overcrowding and unhealthy old industrial cities. After there was a broader vision of social modernization as homogeneity induced through the geometric planning of the built environment. This deurbanization and massive intervention in cities provoked the reaction of authors such as Jane Jacobs, whose defense of the capacity for spontaneous self-organization of local communities is already a classic. In the 1980s, a new humanistic urbanism flourished that claimed the role of the built form in developing the economic, social, and cultural conditions of urban life. This trend denounced the modernist ideology as a renunciation of accepting the complexity of the urban fact and a surrender to a type of designs that actually constitute anti-urban utopias. Behind this, it also recognized the dependence of urban planning professionals disconnected from the interests and experiences of the recipients of their products, and the unfair priority in urban design to the access patterns of the more affluent social sectors. Looking ahead, therefore, the habitability of urban spaces will depend both on intra- and peri-urban mobility systems and on the environmental sustainability of urban mass through building materials, to reduce the energy expenditure of buildings and the effect of the “hot island” on cities.

Challenge:

Creation of sustainable and inclusive cities through the generation of healthy and livable urban spaces that contribute to the slowdown of climate change.

Weaknesses:

- Large-scale growth of metropolises over agricultural areas.
- Predominance of the commercial function of the home.
- Predominance of international economic interests over the interests of the inhabitants in the design of public policies.
- Deindustrialization and migration of industry and industrial employment to outermost areas.

Threats:

- Degradation and expulsion of the population from urban centers.
- Gentrification and touristification.
- Increased insecurity.
- Environmental degradation of rural areas and radical change of traditional landscapes.
- Increasing dependence of the rural environment on the urban one.
- Older, feminized, and racialized populations.

Strengths:

- Existence of a line of research at the Institute of Philosophy on the normative dimension of urban space and the political theory of the city.

Opportunities:

- Development of spatial justice linking it to the built environment, public goods of an urban nature. and the theory of capacities and human development.

8. CONURBATION PROCESSES AND TERRITORIAL GOVERNANCE

Several ideas about the political government of human groups is historically associated with cities, but with the advancement of metropolitanization processes that overwhelm the conceptual framework. Cities constitute a space for the representation of human relationships and identities whose increasing complexity requires innovative forms of articulation that do not arise spontaneously from the mere accumulation of inhabitants. This means that the city, to function as such, must be conceived to some extent as a common good and not as a mere aggregation of individual purposes. The American sociologist

Richard Sennet described civility as a praxis that protects each person from others while allowing him to enjoy his company. Civility, like language, thus cannot be a virtue or a private capacity. It is a character trait generated in a social and collective framework. If the inhabitants of the city are to acquire the difficult skills of civility, the urban space must be conceived as a civil space, capable of generating contexts of interaction between public subjects. Hence the semantic links of sociability with urbanity and civility with city life.

The decision on the territorial structure of a country, the option for a centralized and unitary model, by a federal and decentralized one or by a multilevel structure of administrative competences is a political decision that refers to the history and identity of the *demos*. Despite the eminently technocratic approach with which the implementation of territorial meso-governments has been approached, it is evident that any decision that affects the jurisdictional structures of a country will involve political members, joint municipal bodies, and public opinion. Although often there lacks representative character, the government of the metropolitan areas must *de facto* confront the vested political interests, it must overcome the resistance of the other political-administrative levels to give up powers and resources, and it must seek operational credibility in the face of the citizens. This was precisely the experience of some unsuccessful attempts at municipal regionalization in Europe in the 1970s.

The formation of metropolitan areas has not always come with the corresponding institutional framework. Political-administrative fragmentation prevents these areas from equipping themselves with adequate means and developing effective policies to deal with problems characterized by the interdependence of their causes and the overflow of the territorial frameworks in which they originate. The governance of metropolitan areas cannot, therefore, consist in simply transfer municipal governance models to a higher scale. In the European context, in the countries inheriting the Napoleonic or Latin / Mediterranean tradition (France, Spain, Italy, Belgium, Portugal, and Greece), local governments are conceived as territorial communities that defend local interests against a higher instance. Conversely, In the Anglo-Saxon tradition (United Kingdom, Ireland, Australia, New Zealand, Canada and, to some extent, the United States), local governments have a lower legal and political status, but enjoy a wide level of autonomy and operational discretion *vis-à-vis* to higher levels of government. Finally, the Nordic and Central European countries show a balance between the democratic and the functional political component.

In 1972, six *metropolitan counties* were created in the United Kingdom under a direct choice regime, specifically to define tax powers, land use, and transport responsibilities. Outside of them, there was already the *Greater London Council*, a two-tier local government system focused on managing emergency services and recycling waste. The London Council shared policies for housing, road infrastructure, and urban planning with the city's districts. Likewise, in the first decentralization processes, four *urban communities* were created in France in 1966 with a wide range of responsibilities for planning, sanitation, transportation, and housing. Moreover, the Italian regions made use in 1975 of their newly acquired powers to establish *comprensori* or urban districts, among which those of Turin, Bologna, and Milan stood out. In all three cases, its implementation was justified for technical-functional reasons and implemented from *top to bottom* by the state authority, without the collaboration of the governments and local political actors. The absence of member participation in the process led to strong resistance to the handover of functions and the failure of the model. Both the British metropolitan counties, including London, and the Italian urban districts were abolished in 1986. The criticism of this type of decentralization coincides in exceeding verticality in its formulation. Instead of creating complementary dynamics of interaction between the members involved, generating a metropolitan governability legitimized by co-involvement, everything relied on pressure from the state government. Perhaps, the creation of the *Greater London Authority* in 2000 started from premises very different from those of previous experience, endowing itself with an executive power by direct election and an assembly of 25 members with powers of review.

This criticism has been extended to the experience of metropolitan areas in Latin America. The management, financial and institutional structures of these areas are weak, and are ill-prepared to conduct the functions expected of them. Their local government structures were generally designed to function in a vertically with state authority, and not so much in a horizontal sense, to make territorial interdependence governable. Sometimes, as in Brazil, these metropolitan structures were established by authoritarian regimes and guided by technocratic criteria, with little member participation.

The multiplicity of variants in the management of metropolitan areas makes it very difficult to establish parameters with a claim of general validity. Historical, political, institutional, socio-economic, and cultural conditions make each meso-government format and experience unique. Even

recognizing the multiple possible combinations, it is nevertheless possible to ideally identify variables that intervene in the configuration of the different regimes of metropolitan government.

TYPES OF GOVERNMENT OF METROPOLITAN AREAS

LEVELS OF GOVERNMENT	UNIQUE	DOUBLE	POLYCENTRIC
LOCAL GOVERNMENT REGIME	Extended urban district	Metropolitan district	Intermunicipal
FORM OF ASSOCIATION	Fusion / Absorption	Pooling	Cooperation
POLITICAL LEGITIMATION	Direct	Mixed (direct / indirect)	Decentralized

The creation of an **extended urban constituency** implies the merger or absorption of all the local governments of a metropolitan area into a single level of government. This was the path followed by the *Greater London Authority* in the UK following the dissolution of the *Greater London Council* by Margaret Thatcher in 1986. It was also the option implemented in Toronto and Montreal in the late 1990s, despite strong local opposition. In the United States, where the constitutional and political obstacles to such mergers are greater, because they require a double majority (at the local and county level), we can find a comparable process in the cases of Nashville with Davidson County and Indianapolis with Duval County.

The creation of a **metropolitan district** implies the establishment of a supra-municipal or meso-government regime between the central, provincial / state / departmental, and local governments through a federative or joint process. This local government regime may be limited to a few territorial functions or receive the simultaneous transfer of some functions from lower levels. Its form of political legitimation can take various forms, but we usually find a mixed legitimation, with direct election of the mayor and indirect election of the metropolitan authority. A good example of this is the *twin cities* of Minneapolis-Saint Paul, in Minnesota, which maintain different municipalities, but are integrated into a metropolitan region with its own council. An interesting case is that of the Portland Metropolitan District (*Portland Metro*) in the United States, as although it does not have a dual level of government it encompasses urban spaces in two different states (Oregon and Washington), it has a governance structure directly chosen by voters and was created from a model of intermunicipal cooperation between 24 municipalities and three counties.

A third variant is the one presented by **intermunicipal regimes**, which maintain the polycentric condition of the local government and rest on a cooperative principle. At the functional performance level, this cooperation may comprise a single government performing a service for more than one local unit, two or more local governments sharing a common service or infrastructure, or helping each other in cases of emergency or need. A weaker variant comprises the voluntary association of local governments to create a common forum for analysis and discussion of problems, but devoid of authority. An example of this is the agglomeration communities and the French urban communities, which cover different functional areas because of the volume of population, or the Metropolitan Community of Montreal, which was created in 2001 and covers 64 municipalities. In Spain, the adoption of the Autonomous Communities model in the 1978 Constitution, the preservation of the municipal regime and the maintenance of the provincial councils, added to the decision to convert Madrid and its metropolitan area into an Autonomous Community and not something like a federal district, has created a multilevel administrative and political system with various overlaps and without a clear and closed distribution of powers.

The success and consolidation of the government systems of metropolitan areas is conditioned in the long-term by their political legitimacy. Such legitimation not only meets criteria of technical efficiency and managerial probity but also the co-involvement of the parties directly interested or affected by its implementation (multilevel governance). In this sense, the support of the state authority alone is not enough to create the local synergies. However, the governance of the interdependence processes generated by a metropolitan area, and indirectly its legitimacy, is linked to a clear legal-administrative delimitation of distributing responsibilities and powers. Finally, the political and functional viability of a metropolitan government, as of any form of meso-government, is related to the balance between spending capacity and fiscal co-responsibility. In a model in which there is no direct political representation, the dissociation of fiscal and managerial responsibilities can generate serious dysfunctions. The effective complication of the constituent parts of the metropolitan area is, therefore, strongly conditioned by the territorial equalization of the services that its governing body intends to offer.

Challenge:

The creation of supra-local forms of government over and above the traditional rural / urban division that mitigate territorial differences, and politically and administratively balance the different interests at stake.

Weaknesses:

- The consolidation of meso-governments is conditioned in the long-term by their degree of political legitimacy, not just technical.
- The governance and efficiency of a metropolitan area is linked to a clear legal-administrative delimitation of distributing responsibilities and powers.
- At CSIC, the lines of research linked to urban studies have been dissolved because of the aging workforce and the difficulties in maintaining research groups through the recruitment of young researchers.

Threats:

- Disappearance of academic teams competent to participate in national and European calls and advice on urban public policies.

Strengths:

- Existence of small groups and lines of work on urban anthropology at the ILLA and Milá y Fontanals Institution.

Opportunities:

- Resurgence in recent years of political and academic interest in urban issues (“right to the city,” etc.).
- Shift of interest in sustainability toward the conceptualization of “green data”: digital technologies that will allow us to “dataify” the information we obtain about the living and organizational systems that surround us.

EXECUTIVE REPORT

The profound social and economic changes that have taken place over recent decades have reduced the differences between the levels and ways of life of rural and urban environments in advanced societies. The acceleration of the urbanization process has increased the interdependence of both spaces. Its impact on territorial development, the environment, and settlement of the population has enormous consequences in terms of environmental sustainability, territorial balance, food production, and political governance. Large cities consume vast amounts of energy, natural resources, and food, which, added to the expansion of their areas of influence, is leading to the transformation of habitats and the progressive Anthropization of natural spaces. All these dynamics pose new scenarios of rural-urban interaction for the future.

Changes in the conception of rural development and agricultural activity

Food production and supply has been the traditional axis of interaction between rural and urban environments. However, the opening of world markets and the progressive elimination of agricultural protection systems, added to the demands and limitations on agricultural activity, has opened the debate on a comprehensive approach to territorial development based on local dynamics / regional and in the opening to new functions, such as mitigating the effects of climate change, incorporating leisure circuits, and the reintegration and social insertion of certain sectors of the population. This paradigm shift requires another type of research: genetics, technique, machinery, soil work, phytosanitary treatments, etc.

Landscape management as heritage and economic resource

The rural environment is less and less assumed as a place exclusively of production and increasingly as an especially valuable element for the quality of life. The conception of the territory as a landscape has made it be a space with added aesthetic, leisure, and recreational value. However, today natural landscapes have practically ceased to exist, because the landscape results directly from human activities. The landscape is the object of historical knowledge for its own content and is also the object of disclosure, management, and patrimonial protection as an economic resource. Landscape conservation criteria can be successful only if it is conceived as a living, active and changing reality. The challenge here is to harmoniously develop research on the landscape so it combines with sustainable tourism and with all the productive sectors that affect the development of the rural environment.

Rural depopulation and migratory flows

The fundamental criterion to guarantee the demographic sustainability of the territory is its adequate management and organization, so the territorial hierarchy does not imply social exclusion. Depopulation is a complex phenomenon with multiple causes but has more recently been linked to the concentration of investment, services, and employment opportunities in urban and metropolitan areas, opposed to rural areas. The retention of population and the generation of wealth in rural areas will be hampered if their work is not valued and it is impossible to live with dignity, which implies opening it to new sectors and economic initiatives. The challenge is managing territorial development in such a way as to avoid imbalances, dualities and breaks in

socio-spatial cohesion. How to face this problem must comprise a management of the rural environment more focused on the promotion of its functionality (agricultural, livestock, cultural) than to repopulate heavily aged nuclei that have lost their function.

Aging and quality of the living environment

Although rural areas have an aging demographic structure in Spain, the older population, like the population is also concentrated in urban areas. The quality of the living environment is important for the elderly, because it is considered that the physical living space in this age group constitutes a space of prevalent use. The residential environment not only constitutes the current living space, and often past, but the place where a good part of the social relations and the dynamics of community integration take place. The friendliness of the space allows the elderly population to remain in their usual environment of residence if possible, but this is only feasible if the projects are designed and executed to make the residential space, be it urban or rural, a habitable place. “Healthy aging” is linked to that of habitability and friendliness of the environment. The challenge is to integrate healthy aging into a social conception of sustainable development. To do this, it is necessary to modify the vital perspectives in old age and address the environmental and social determinants of the aging process. This includes take care of the quality and friendliness of the living environment of the elderly in rural and urban areas.

Urban expansion and sustainable mobility

The problems faced by cities have common features: congestion, pollution, concentration of population and activities, etc. These phenomena are linked to intra-urban demographic imbalances caused by the expulsion of the population from city centers, the degradation of non-gentrified urban centers, inequalities in access to services and means of transport, and the large-scale growth of the metropolises over the peri-urban areas, which also affect rural areas and, increasingly, on the depopulation of intermediate cities. This mode of territory occupation, largely unprecedented, affects the quality of the landscape and the environmental degradation of the territory. In this sense, the survival of the rural environment depends increasingly on efficient means of transport that link its population with work and service centers. The challenge on this front is to develop new sustainable mobility services in the field of a circular economy of reuse and recycling of materials.

Spatial segregation and habitability of the urban environment

Poor and affluent areas, neighborhoods receiving international migratory flows, and old urban centers subjected to *gentrification* processes coexist in the cities in a territorial hierarchical manner. The growing *financialization* of urban space—the transformation of real estate into financial assets aimed at making it profitable in international markets—is closely linked to the processes of verticalization, densification, uncontrolled urban growth, and the formation of real estate bubbles, with their consequent repercussion on public policies and the most vulnerable social sectors. The justice of social relations is spatially reproduced through urban structures. Along with the challenge of generating healthy living spaces and cities that contribute to the slowdown of climate change, a general problem is the growing lack of empathy of citizens with the places they inhabit. The globalization of culture, tourism, franchises, a functional and speculative urbanism, the disappearance of local commerce, among other factors, are creating cities in which residents do not identify with their environment or feel motivated for their improvement. Looking to the future, the habitability of urban spaces will depend both on intra- and peri-urban mobility systems and on the environmental sustainability of the urban mass through construction materials, so energy expenditure is reduced of buildings and the effect of the “hot island” in cities. The challenge here is the creation of sustainable and inclusive cities through the generation of healthy and livable urban spaces that contribute to the slowdown of climate change.

Conurbation processes and territorial governance

The good part of the ideas we manage about the political government of human groups is historically associated with cities. With the progress of conurbation processes, this conceptual framework has been overwhelmed. The decision on the territorial structure of a country is, a political decision that refers to the history and identity of the *demos*. Despite the eminently technocratic approach with which the implementation of territorial meso-governments has been made, any decision that affects the jurisdictional structures of a country will involve political members, joint municipal bodies, and public opinion. The formation of metropolitan areas has not always been accompanied by the corresponding institutional framework. Political-administrative fragmentation prevents these spaces from being equipped with adequate means and developing effective policies to face problems characterized by the interdependence of their causes and the overflow of the territorial frameworks in which they originate. The government of metropolitan areas

cannot, therefore, consist to simply transfer municipal governance models to a higher scale. Its success and consolidation are conditioned in the long-term by its political legitimacy, which not only meets criteria of technical efficiency and managerial probity but also the complication of the parties directly affected by its implementation and a clear legal-administrative delimitation of distributing responsibilities and competencies. The challenge on this front consists in creating supra-local forms of government above the traditional rural / urban division that cushion territorial differences and politically and administratively balance the different interests at stake.

Weaknesses:

- Aging of the staff. Lack of generational replacement. Disappearance of lines of research on these issues because of staff retirement.
- At CSIC, the lines of research linked to urban studies have been dissolved, and rural and agricultural studies have fewer personnel.
- Fragmentation by areas of CSIC and science systems, including calls. Weakness of multidisciplinary studies. Lack of incentives to design and develop multidisciplinary studies.
- The hyper-bureaucratic systems for managing scientific projects make it difficult to form teams with other institutions and erode the leadership potential of CSIC centers. Difficulties leading projects because of eligibility constraints for young researchers.
- Difficulties in developing permanent training mechanisms for young researchers and fixation problems (high levels of turnover).
- Multidisciplinary structure of research on paper, but not in practice. Multi-disciplinarity is sanctioned in promotion competitions and in curricular evaluation.
- Short-term nature of the priorities and strategic themes on the agendas of the research programs where rural / urban dynamics do not appear as priorities.
- Scarce human and material resources.

Threats:

- Disappearance of competent teams with sufficient human and material resources to participate in European calls and in public policy advice.
- Disappearance of these lines of investigation.
- Difficulties in maintaining strategic lines of research that have produced results, and that have given CSIC visibility.

Strengths:

- CSIC has a plurality of institutes dedicated to the study of the territory from different perspectives (development and agrarian economy, sustainable agriculture, ecology, landscape, and heritage management). Experience and training for prospective diagnoses.
- High degree of internationalization and access to national and international funds.
- Potential to promote multidisciplinary platforms.
- Revival and new centrality of urban and rural studies in the humanities and social sciences.

Opportunities:

- The treatment of challenges must be multidisciplinary and include all those disciplines that incorporate the territory as a dependent or independent variable.
- Multidisciplinary approaches that improve synergies and are in tune with new approaches in international research programs.
- Possibility of combining quantitative, qualitative, and normative perspectives.
- Consolidation of the social effects of the research and wide possibilities for the dissemination of results.
- Ability to produce new data systems (Big Data) and develop innovative technological designs (study mobility, circular economies, heritage...)

CHALLENGE D

ABSTRACT

In this chapter we have selected some demographic challenges that we consider priorities: i) the ageing of the population and the quality of life of older people, ii) the possible persistence of fertility below people's reproductive aspirations, iii) the repercussions of increasing family diversification on child wellbeing and care networks, iv) health throughout the life course, v) the increasing volume, complexity, and diversity of migratory flows, vi) rural depopulation, and vii) access to and methodological management of new data. Demography and population sciences provide the theoretical and methodological instruments suitable for addressing demographic challenges, from a macro perspective (causes and consequences of the change in size, structure and composition of the population) and a micro perspective (interrelation between individual, family, work and health biographies); from an international approach –because demographic changes are generally global changes with different pace in national contexts–; and always looking to the future, as trend projections are an essential component of population studies.

DEMOGRAPHIC CHALLENGES IN A SOCIAL SCENARIO OF LONGEVITY AND AGING

Coordinators

Teresa Castro Martín
(IEGD, CSIC)

Gloria Fernández-Mayoralas
(IEGD, CSIC)

1. EXECUTIVE SUMMARY

Demography currently occupies a central place in the international political agenda —as reflected by the Vice-Presidency of the European Commission for Democracy and Demography— and nationally —Ministry for the Ecological Transition and the Demographic Challenge—, as well as in the social and media debate. *Demography matters!* There is now widespread recognition of the crucial role that demographic structures and dynamics play in the economy, the labor market, housing, healthcare, pensions, the environment, gender and intergenerational equity, and even electoral results. Despite conventional labels, *there is no single “demographic challenge,”* but demographic changes —which are relatively gradual and predictable— involve several challenges and opportunities that need to be considered when adapting the socio-economic organization, formulating relevant policies, and promoting sustainable and inclusive social and spatial development.

In this chapter we have selected some demographic challenges that we consider priorities: i) the aging of the population and the quality of life of the older people, ii) the possible persistence of fertility below people’s reproductive aspirations, iii) the repercussions of increasing family diversification on child wellbeing and care networks, iv) health throughout the life course, v) the increasing volume, complexity, and diversity of migratory flows, vi) rural depopulation, and vii) access to and methodological management of new data. These demographic trends will condition essential aspects of future social and economic life. Therefore, the

formulation of policies that aspire to face demographic challenges will require objective information and to be endowed with solid scientific rigor, to counteract the ideological narratives of demographic catastrophism.

The demographic scenarios of the near future suppose multiple social challenges, but also endless opportunities. The aging of the population, for example, constitutes an important challenge due to spending on pensions, health, and dependency, as well as for the organization of formal and informal care. However, it also offers opportunities based on the “silver economy” and developing sustainable and inclusive residential communities and environments (Age-friendly Cities and Communities) that could help curb depopulation trends. As a society, we must change the ageist paradigm “old age equals burden” by promoting active and healthy aging, from a human rights-based approach to aging, emphasizing social participation and lifelong learning, as well as making educational paths more flexible and reconciling reproductive and labor trajectories. This change will cause cost reduction, better management of public services and an improvement in the quality of life at all ages, without putting intergenerational solidarity at risk. *Excessively low fertility* is both a social challenge —because it accelerates the rate of population aging— and an individual (or couple) challenge —because it reflects a growing gap between aspirations and reproductive realities. However, there is strong evidence that excessively low fertility is largely because of the social revolution of gender equality being still incomplete. Well-designed policies that make it easier for mothers to work and for fathers to care would have a positive effect not only on the fertility rate and the level of demographic stability but also in the economy and progress toward gender equality. The economic and social integration of the migrant population is a complex challenge, but the opportunities it opens are also multiple: migration drives economic growth, connects different societies and cultures, and contributes to international development by sending remittances.

The demographic perspective can also provide important elements for analysis, understanding and intervention in public health emergency situations, such as the one we find ourselves in today. The COVID-19 crisis has highlighted the importance of demographic structures and dynamics in understanding and modeling the course of the pandemic. The volume of the older population and its spatial distribution, the structure of the households —in particular, multi-generational households or single-person households of the elderly—, the housing conditions, the profile of the older people institutionalized in nursing homes,

intergenerational social interaction, or population density are some sociodemographic factors with a considerable influence on the spread, severity, and lethality of the pandemic. The demographic consequences of the pandemic will also be the object of study in the coming years. Besides over-mortality—differentiated by age, gender and social class—, which will probably affect life expectancy at advanced ages, it is also likely that the pandemic will have a negative impact on fertility and marital stability, will amplify inequalities in health by social class, and will lead to a review of the model of long-term social and health care in nursing homes for the elderly. Although the closure of borders has meant and will mean a halt in migrations for a while, it is still too early to assess to what extent and in what way this pandemic will affect migratory movements in the medium and long-term.

Demography and population science provide the theoretical and methodological instruments suitable for addressing demographic challenges, from a macro (causes and consequences of the change in size, structure and composition of the population) and a micro perspective (interrelation between past individual and family, work or health biographies, present and future); from an international approach, because demographic changes are usually global changes with different rates at the local level; and always looking to the future, as trend projections are an essential component of these disciplines. Population studies find a great ally in the leap of technological innovation, both in the typology of the data sources available for research, and in the means to store, analyze them statistically, represent them graphically and cartographically, transmit, and broadcast them. In just a few decades, the information and communication revolution has triggered the capacity for analysis, made possible new strategies for national statistical systems (such as abandoning traditional censuses and opting for the longitudinal link of administrative records), and has generated a new universe of data, massive and of great heterogeneity; *Big Data*. In addition, the participation of the population, the persons, in the research processes is enhancing the qualitative analysis of the demographic behaviors of individuals and a review of the process of social transfer of knowledge.

2. INTRODUCTION

Faced with the previous absolutisms, the modern state recognized, from its origins, that the source of its power and sovereignty resided in the population. This fundamental recognition is visible in the parallel development of national statistical systems, with implementing modern population

censuses or the civil registry of vital events —births, marriages, and deaths— in the 19th century, the realization of representative periodic surveys of the population or the statistical use of administrative records in the 20th century, and the exploitation of Big Data in the 21st century. Statistical and analysis techniques (quantitative and qualitative) have been developed on this universe of data that today make up the disciplines that study demographic phenomena and dynamics, such as Demography, Population Geography (incorporating the spatial dimension) or Population Sociology (adding sociological approximation).

Besides their strategic relevance for good governance, demographic issues occupy a central place in political and social debate, both in national and international forums. Issues such as population aging, low birth rates, the evolution of life expectancy and longevity, the future of migration or rural depopulation have a growing presence not only in the scientific sphere but also in the political and media.

The COVID-19 crisis, for example, has highlighted the importance of demographic factors in understanding and modeling the course of the pandemic. The older population volume and their spatial distribution, the structure of the households —multigenerational households or single-person households of the elderly—, housing conditions, the profile of the elderly people institutionalized in nursing homes, the degree of intergenerational social interaction, inequalities in health according to socio-economic stratum, international mobility and the density of urban areas are some sociodemographic factors with a considerable influence on the incidence, spread and lethality of the pandemic.

Both the demographic evolution —on a global, regional, national, and local scale— and the object and instruments of the disciplines that study this evolution have undergone substantial changes in at least four areas: i) in the characteristics and dynamics of contemporary populations; ii) in the function, origin, and type of data available for research; iii) in the statistical tools and technical means for their storage, communication, treatment, and analysis; and iv) in the role that population studies have for the political, scientific, and social ecosystems.

Contemporary populations are the result, in their dynamics and structures, of a radical, unrepeatable, and historically very rapid alteration in the efficiency of the reproductive balance between births and life span. Both components of the current reproductive model, intrinsically linked, are moving toward a radically different relationship than they had in all previous human

history. Consequently, all the characteristics and behaviors linked to social reproduction and human life, from gender relations to the relations between ages and generations, are undergoing a drastic and unprecedented modification. The ability to understand and anticipate such demographic and social changes raises the need to review concepts and theoretical frameworks. Individuals (the formal unit of analysis, whose aggregates make up “populations”), but also “society,” “social groups” or “communities,” have changed in this process, while promoting new behaviors. The ancestral precariousness of the relationship between life and death has been broken thanks to an enormous, unprecedented, and very rapid expansion in the average duration of life. Until the 20th century there were few populations with an average life expectancy exceeding 35 years, yet a century later, the average worldwide is 70 years, and over 80 in Spain. Such a radical change has been possible after a substantial transformation in terms of health, food, housing, education, working, and domestic conditions. Only in this way is it understood why current populations should be studied and conceived in a new way, different from that occupied by previous human thought, given their new capacities, demands, rights, concerns, or aspirations. The best example is the epidemiological and health transition, demographic aging, and the displacement of the majority ages with the associated profiles. It is the entire life cycle, in all its stages, that has been subverted. Only a multidisciplinary approach can aspire to understand demographic dynamics in all their complexity.

Globalization (social, political, environmental, and economic) also drives a new role of population science, which is in a strategic position to address understanding and responses to multiple facets of this process. Traditional branches of demographic studies, such as the study of mobility and residential distribution in the territory, acquire a renewed importance. The definitive urbanization of the world population and the great increase in international migrations, also its growing symbolic and political relevance for states and nationalist or internationalist ideologies, or the increasing relevance of migrations caused by conflicts or by climate change, are some reasons why demographic research must intensify in the immediate future. Another traditional branch, such as the geographical and historical study of global pandemics, in particular the 1918 influenza, which is estimated to have infected a third of the world’s population, caused 50 million deaths and decreased life expectancy by around 12 years in the United States, can also provide useful lessons for the critical situation we are currently experiencing with the COVID-19 pandemic.

To the new characteristics and population behaviors, and the renewed relevance that the current historical context gives them, we must add a leap in the technological scale (quantitative and qualitative), both in the typology of data sources available for research, and in the technological means to store them, analyze them statistically, represent them graphically and cartographically, transmit and diffuse them. In just a few decades, the information and communication revolution has triggered the capacity for analysis, made new strategies possible for national statistical systems (such as abandoning traditional censuses and opting for the longitudinal link of administrative records), and has generated a new universe of data, massive and of great heterogeneity, Big Data. Furthermore, the fundamental participation of the population —the people/the persons— in the research processes supports the qualitative analysis of the sociodemographic behaviors of individuals, as well as a review of the process of social transfer of knowledge. These are fields of the future in which the research conducted by CSIC must innovate. CSIC is specially prepared, because of the size and variety of its means, the richness and diversity of its technical and scientific personnel, but also because of the strategic importance that rapidly developing these innovations have for the State itself.

The drivers of population change require demographic research to be deployed by CSIC in particular to make some major changes to its work plan, at least in the following directions:

- Update the topics under research, paying more attention to emerging patterns, and trends.
- Expand dialog and collaboration with multiple disciplines.
- Propose new explanatory frameworks that account for demographic change, its causes, and consequences.
- Take advantage of contemporary technological innovation in all its facets: advanced statistical analysis, data visualization, longitudinal linking of multiple data sources, Big Data, and new infrastructures.
- Assume a renewed ethical and social commitment to a subject, population, especially socially sensitive and crucial for government action and planning.
- Incorporate people themselves as subjects and objects of research, providers but also recipients of information and scientific evidence —social transfer of knowledge—.

Although the demographic challenges that societies will face in the coming decades are multiple, we have selected those that we consider most

important: i) the aging of the population and the quality of life of the older people; ii) the possible persistence of fertility below people's reproductive aspirations; iii) the impact of increasing family diversification on child wellbeing and care networks; iv) health throughout the life course; v) the growing volume, complexity, and diversity of migratory flows; vi) rural depopulation; and vii) access and methodological management of new data. Here are each of these demographic challenges.

Challenge 1. Aging, longevity, and old age. The need for a paradigm shift based on active and healthy aging.

As stated by Prof. George W. Leeson (2017), the demography of the 20th and 21st centuries has been and is above all an aging demography, both at the individual and population level; and the aging of the population, which was once considered a matter of the developed economies of Europe and North America, is today a truly global phenomenon that is reaching Latin America, with the only notable exception being the Sub-Saharan African region, which maintains a relative youth in demographic terms.

The trend toward an aging demographic structure is therefore a global, generalized process that affects all societies and territories. United Nations (2019) estimates that over 1 billion people worldwide are 60 years old and over, representing almost 14% of the world's population, and the rapid growth of this age group will mean that by 2050 all regions, except Africa, will have a quarter or more of their populations in this age group. Most of these are women, with a global ratio of 85 men for every 100 women aged 60 and over, and a more pronounced gender gap in the figures for developed countries.

The evolution of society has produced a greater longevity of the population and, its demographic aging is an achievement and a success of humanity, because never have entire generations been able to have such high life expectancies, and the expectation of living a longer old age and so many generations living together. Indeed, we are entering a time of long lives worldwide. This 21st century will also be the century of centenarians (Leeson, 2018).

Among the most aged societies in the world, Spain is aligned with the European region. In the year 2050 it will be one of the "oldest" countries. The greatest increase in aging will occur within the oldest group. If today in Europe over-aging is 27.2% (people aged 80+ over people aged 65+), that figure will reach 36.0%, and in Spain 37.6%; thus, almost 4 out of every 10 elderly people in Spain will be 80 or over.

Considering the current situation, and the fact that the population projections indicate a growing trend, aging constitutes a challenge, but also an opportunity, both for society and for individuals. The implications of the population aging require scientific knowledge and its transfer to society, to develop social policies that promote and facilitate the living conditions and quality of life of the older people aging in place. Its repercussions range from the personal experience of aging, the social image of old age, inclusive physical and social environments (Age-friendly Communities and Cities) or policies on health systems, and social services —formal or informal care—, the social and cultural context of aging, or the digital divide and technological developments.

At the beginning of this century, the United Nations held its Second World Assembly on Aging in Madrid. The seminal document of the World Health Organization “Active aging: a political framework” (WHO, 2002; ILC-BR, 2015) was the beginning of a strategy of policies and activities developed by many countries, to develop a new and more positive image of aging and of the older people. Along the same lines, more recently, the WHO presented its World Report on Aging and Health (WHO, 2015), which warned of the incidence of age stereotypes in policies and behaviors, thus making it necessary to fight age discrimination. Furthermore, in keeping with the Sustainable Development Goals, the WHO (2019) has defined the Decade of Healthy Aging, 2020-2030, through an Action plan with 10 priorities:

1. Establishing a platform for innovation and change that connect ideas and people.
2. Supporting country planning and action in creating policies that facilitate longer and healthier lives.
3. Collecting better global data on Healthy Aging to get updated information.
4. Promoting research that addresses the current and future needs of older people.
5. Aligning health systems with the care that older people require.
6. Laying the foundations for a long-term-care system for the older people and their care givers in every country.
7. Ensuring the human resources necessary for integrated care for older people.
8. Undertaking a global campaign to combat ageism.
9. Defining the economic context that allows the design of sustainable, equitable and effective solutions.
10. Enhancing the global network for age-friendly cities and communities .

In this context of promoting active and healthy aging, free from prejudice, understanding old age and aging will be key to enabling demographic sustainability and being able to face social and economic challenges in the 21st century. Thus, the future of research on aging must be approached from an interdisciplinary perspective, and understood as a challenge with social, economic, and environmental implications, but also as an area of opportunity for development for society.

Health, Disability, Dependency

Living and working conditions, throughout the life course (income level, educational level, food, unemployment, housing, supplies, transportation, etc.), besides access to health and social care systems, will continue constituting a fundamental issue that can be summarized in the need to continue to remember the relationship between health, wellbeing, and social inequalities, at different territorial scales, as recommended by the WHO.

The increase in the older population has led to an increase in the prevalence of chronic diseases, which highlights the need to investigate conditions of frailty, disability, and dependence, also closely linked to research on changes in family structure, on the role of women in the family and in the labor market, and on the social effects of caring for the elderly dependents, spending on pensions and health expenditure. Therefore, it will be necessary to make estimates of the increase in the population with more advanced age (octogenarians, nonagenarians, and centenarians) and its spatial distribution, because it shows greater and more frequent health, disability, and dependency problems. Thus, the population with dementia (Alzheimer's) and neurodegenerative diseases (Parkinson's) is expected to increase, posing significant challenges in the provision of services (social and health) and long-term care (see *Theme 5. Aging and Mind, Challenge 7. Aging and Neurodegeneration*).

However, globalization and climate change are favoring the periodic appearance of epidemiological emergencies based on acute infectious diseases with a more negative impact on the most fragile elderly. The crisis of COVID-19 focuses on addressing the environmental and social determinants of morbidity and mortality in the older population, also considering the gender perspective, and its relationship with the challenges of social inequality. Here it is urgent to implement new public health strategies, aimed at understanding epidemiological behaviors and causes of death among the aged population,

which are associated with social factors (poverty and social inequality) and environmental factors (housing and neighborhood conditions, residential environments for care, etc.).

It will also be necessary to evaluate the family solidarity systems in the care of the dependent population, from the intergenerational and gender perspective. It is important to study aging single-person households in relation to care needs and support, caregiver networks (following an informal family model or a formal professional model, or a mixed model), and the problem of unwanted loneliness and access to social and assistance services (long-term care). In fact, these services will undergo important transformations, derived from social and cultural changes, and from incorporating new technologies aimed at this group and their potential caregivers (telecare, virtual communication, multisensory systems for people with dementia, domestic and building automation and security in home). Thus, it is necessary to analyze the supply and demand for facilities (senior residences, assisted housing, collaborative cohousing, shared housing) and social and welfare services (Home Help Service and other assistance) to adapt them to new residential strategies in old age and the preferences of new social groups, such as LGBTQI and immigrants (gender and cultural diversity).

Special mention should be made of research on long-term care, and, specifically, on social and health care provided in long-term residential institutions. COVID-19 has highlighted the need to investigate the ratios of personnel and resources, as well as private vs. shared space, established in these institutions for social and health care, institutions that in this pandemic have become true comorbidity and mortality clusters for the older population. In some social areas, a substantial change is already being demanded in the model of care in residential centers for the elderly.

In terms of health, research will also be needed on the ethical issues of technological advances that can prolong life in very poor-quality conditions at the end of life.

Participation, Physical, Social, And Work Environments

Participation is based on various dimensions and channels. One channel concerns labor integration for people aged 50 and over and their maintenance in the labor market, for which it is key to promote policies that improve this labor market and the working conditions of workers, which will undoubtedly result in optimizing the pension system and its sustainability and guaranteeing

social protection for old age. Retaining the senior talent will also be key. The scenario of active aging foresees a cultural change that transforms the traditional sequence of training, work, and retirement. The stages must alternate tailored to each person, to configure personalized life scenarios that integrate the options of each one and the social challenges of their environment. Companies propose entrepreneurship formulas, in a broad sense, especially after a certain age, implementing regulatory conditions that lead to take advantage of the pension, without excluding that it can be done in the company where they have been working. Likewise, new contractual forms are proposed after a certain age or a new replacement employment contract, introducing greater flexibility in the retirement process, including retirement by mutual agreement. There are also proposals on planning and incorporating senior talent into project work. They are all a challenge in themselves and for labor market regulations and workers' rights, which must be carefully studied.

Another channel of participation concerns the performance of activities, multiple and diverse, although essentially cultural, physical, and social activities, during the free time that one has after retirement. This behavior results in the improvement of physical and mental health, the increase of social relationships, and the prevention of loneliness, among other aspects. Among these activities, the offer of opportunities for learning is noteworthy, highlighting the importance of training for personal development throughout one's life. Lifelong learning, as a specific dimension or as a tool, clearly contributes to the improvement of aging, especially if you do not have a reductionist vision of continuous training to mere formal activities offered by centers and residences in which there is a greater involvement of women. In this dimension of learning, training in ICT should be considered, to reduce the digital divide, and training aimed at ensuring citizenship rights.

A third dimension of active participation would concern fostering the capacity for action of older people in society. The challenge focuses on promoting it to improve individual quality of life and, consequently, social or community life. In particular, the population in Spain presents social participation ratios, also in old age, lower than the average of the European Union. It is therefore, a matter of favoring the social integration of all ages in community life, through:

- Active participation in social initiatives.
- The construction of social structures of participation.
- The volunteering.
- The involvement of older people in the generation of knowledge and the design and application of policies, plans and programs.

A good part of the lower rate of social participation in Spain concerns family participation, which places socialization and integration efforts into help and support within the family. This familistic vocation of Mediterranean societies have so far been concerned with minimizing isolation and loneliness in the aging process. The transformation of society, with incorporating women into the labor market, the reduction in the number of descendants, and the greater life expectancy in good health, is promoting an increasing independence and autonomy in old age, which can bring with it, greater social isolation, and forms of loneliness not always desired.

Faced with this, new formulas for coresidence are also being developed based on developing collaborative communities. These are residential spaces or collaborative cohousing formed between people who choose that way of living and living together, sharing common spaces and activities, but maintaining the intimacy and privacy of their own home.

The challenge focuses on trying to keep older people integrated in society and in communities of residence of their own choosing, avoiding age ghettos, creating multigenerational environments. In line with this, the geographical space and the residential environment constitute an extraordinarily relevant dimension. Facilitating aging in place or aging at home is seen in recent decades as one of the best ways to integrate community but also, and from a public policy approach, it is considered that it can help in the sustainability of economic resources. This approach is being approached under the paradigm of age-friendly cities and communities. The unsustainability of many individual households at advanced ages and in conditions of fragility must be overcome by transforming urbanism to make it friendly.

It is necessary to analyze the scenarios of the urban demographic aging process and its spatial distribution, as well as its implications in the gerontological planning of cities. In the 21st century, the population ages, especially in cities, which forces us to rethink the way cities are designed and to plan, from a gerontological perspective, infrastructures, facilities, and services, to avoid processes of social and urban exclusion. Likewise, it is a priority to promote longitudinal studies at the national and international level, from the perspective of environmental gerontology, focused on unraveling the environmental keys that promote cities and communities friendly to active aging (health, security, active participation and lifelong learning).

Security, Social Protection, And Rights

Aging actively advocates, in terms of safety, guaranteeing the protection and dignity of the older people, considering their rights and social, financial, and physical security needs as they age. As it is a global framework, the elements that can be included in the field of security are many and varied. In this way, the aspects that underpin people's safety concern all those who define their quality of life: health (health coverage and dependency), economic resources (pension system), support networks (family and social), and social protection in general.

The perspective of the rights of older persons unfolds an extraordinary field for research. One argument concerns job discrimination and the demand for voluntariness at retirement age. Mandatory retirement is associated with the loss of value of the human once it ceases to be economically productive. The debate that opens, shows the opposition established between the right to autonomy in the decisions that humans must have, regardless of their age, sex, race or creed, and the guardianship / protection that society confers on the older population, once they leave the labor market, widow or suffer from a disease, because of the fact of having an advanced age.

From this discrimination by age, or ageism, other aspects to be considered arise, such as equity in access to health care and aid to dependency, prevention and protection against violence and abuse toward the elderly, and in particular that which is exercised against older women (multiple discrimination), and the dignity, autonomy and control over one's life, including decisions on one's sexual orientation and sexuality in old age, as well as on the care you want to receive at the end of life (living will) or also about euthanasia or the good death. The health emergency derived from the COVID-19 pandemic has made this debate on the criteria for action in health procedures and the value of life to live up to date.

The fight against ageism must involve society, because in this long-lived society we can all become old, to the media because they are transmitters of ideas and stereotyped images, and to politicians and decision-makers, because aging must be understood as a vital process, not something to avoid and hide.

It is therefore necessary to raise society's awareness of the aging process, to facilitate intergenerational integration. It is about promoting education and social awareness about aging and old age. Thus, it is essential that aging and old age are transversal curricular contents in university degrees and postgraduate

degrees, as well as promoting greater training in gerontology and geriatrics content. It is also important to prepare the population, over the years, about old age, enabling a better adaptation and use of opportunities (health, participation, lifelong learning, work, leisure) offered by this stage of life. It is necessary to provide greater knowledge and advice on rights, security, autonomy, control, and environment (pensions, health and care systems, living will), aimed at promoting the quality of life in old age.

Demographic, Social, And Economic Sustainability

The aging of the population represents a window of opportunity for research to stimulate creativity, productivity, and competitiveness, through collaboration and transferring knowledge between the public and private sectors at the national and international levels: it is expected that the aging as a global phenomenon will generate one of the most dynamic economic sectors in the coming decades.

To implement measures for economic sustainability and the silver economy, it is necessary to make estimates of the scenarios of population aging and its geographical distribution, to contribute to the promotion of public policies (in particular, regarding pensions, health and social services, dependency, or housing, also including the non-monetarized economy in the national accounts), and the promotion of new areas of opportunity for the private sector (commerce, services, health, leisure, accommodation, new technologies, communication, and automation).

Likewise, the services sector should be adapted to the increase in migratory movements of the older people at the international level (International Migration of Retirement), which will also have important economic and social effects in the places of destination (tourism, leisure, commerce, transport, accommodation, health, and care). Furthermore, tourist markets and destinations are expected to compete to attract this growing sector of the population, thus it will be necessary to adapt the service sector to the demands of an aging society at the international and national level.

Moreover, it will be necessary to identify the environmental factors that determine the increase in longevity and quality of life in aging, also incorporating the gender perspective. Thus, from the epigenetics and environmental gerontology approaches, it is a priority to identify physical and social environmental factors, determinants of longevity, and their influence on physical and mental health and on the quality of life of the population at advanced ages,

thus as in the promotion of active aging and the prevention of the risk of disability and dependency. Said scientific evidence would have beneficial effects on public spending and would help to generate sustainability policies (See *Topic 5. Aging and Mind, Challenge 7. Aging and Neurodegeneration*).

Similarly, it is necessary to promote local development policies to curb depopulation and its effects (social, economic, environmental) on the aging population. In this regard, in these regions it is important to promote gerontological planning of social and health services to guarantee access for the older people and avoid the risk of relocation. Also, in areas at risk of depopulation it is necessary to encourage the active participation of older people and take advantage of their experience in the design of policies for spatial planning and adaptation to climate change at the local level (See *Challenge 6: Rural depopulation, the 'empty' Spain: a socio-territorial and economic challenge*).

Finally, it will be necessary to evaluate the effects of demographic sustainability policies in the context of an increasingly aging society, which must be more efficient in productive and reproductive terms. Likewise, it is urgent to establish provisions to prevent and adapt structures and public spending in the face of demographic, economic and climatic uncertainties.

Challenge 2. Possible persistence of low, late fertility, and below people's reproductive aspirations

A low level of fertility and the sociodemographic transformations it entails are among the major challenges facing many societies in the 21st century. Hence, the debate on its causes and consequences not only has a growing presence in the academic world but also on the national and international political agenda. The fertility rate largely determines the evolution of the population's age structure, the pace of demographic aging and the size of the future economically active population. Therefore, the persistence of a low level of fertility in an increasingly long-lived population poses a major challenge for the Welfare State, which is largely structured based on intergenerational transfers, and for the organization of the provision of care. Although population aging is an unavoidable, gradual, and predictable process in demographically advanced societies, the persistence of a low fertility level can accelerate this process.

In the international context, fertility below the so-called generation replacement level (2.1 children per woman), which recently was an exclusive feature of economically advanced societies, will become the norm at the global level in the next

few decades, except on the African continent. According to the latest United Nations projections, approximately half of the world's population currently resides in countries with a fertility rate below the replacement threshold, and in 2050 almost two-thirds of the world's population will do so. However, the fertility level of the countries that have completed their demographic transition is far from homogeneous. Societies with a moderately low fertility level and close to the replacement threshold—the countries of northern and central Europe—coexist with societies with a low fertility level (less than 1.3 children per woman), such as the countries of Southern and Eastern Europe, or some countries in East Asia. In advanced societies that promote gender equality—both in the workplace and in the family—the balance between work, family and personal life, and public support for parenting, fertility is situated closer to replacement level.

Demographically, Spain leads several rankings globally; besides having one of the highest life expectancies, it has a fertility among the lowest and latest worldwide. The fertility rate has now been below 1.5 children per woman for three decades, and since 2011 around 1.3 children. The pattern of low fertility in contemporary Spanish society is closely related to the growing postponement of the decision to have children, which is linked to the late economic and residential emancipation of young adults and job insecurity. Likewise, the increasing delay in maternity and paternity—the average age at first child is 31 for women and 35 for men—is associated with the increase in the proportion of women and men who end their reproductive stage without offspring. One in four women of the generation born in the early 1970s has recently completed their reproductive phase without having had a child. It is foreseeable these trends will be accentuated in the near future if there is not a significant increase in job stability in the labor market and progress in public policies and private initiatives to facilitate conciliation, joint responsibility and care for descendants and ascendants.

Due to the late fertility pattern, Spain is among the European countries with the highest use of assisted reproductive techniques. It is foreseeable that the use of these techniques and their success rate will increase considerably in the coming decades, expanding the border between fertile and non-fertile age. However, there will continue to be a clear gap between the relatively late ages at which residential, marital, labor, and economic conditions are achieved that allow adequate parenting, and those established by the biological clock as suitable. Social, political, ethical, and legal debates on egg freezing at an early age, the anonymity of gamete donations and surrogacy will remain open in the coming decades in an international context.

The continued expansion of assisted reproduction in Europe, and that in Spain more than half of the egg donation cycles are conducted throughout Europe, poses many challenges for the coming decades. First, the routine adoption of egg vitrification is raising many doubts about the voluntary and altruistic nature of donation. The latest data from the SEF (Spanish Fertility Society) registry indicate that for each donor and each donation cycle an average of 19 eggs are extracted (there were 12 in 2009), which is facilitating the vitrification of many eggs that, instead of being used by a couple in the same clinic where they were donated, are stored and sold to other clinics in the national or European environment, generating significant benefits for the clinics or egg banks. These benefits no longer come from assisted fertilization treatment, as provided for in the Assisted Reproduction Act 2006, but from the sale of gametes.

Egg donation is also reinforcing a pattern of social and ethnic stratification that generates controversy, because it has become a major option of access to pregnancy for women over 40 years with medium and high purchasing power, whereas egg donation has become a form of generation of income for women between 18 and 25 years old, who find egg donation —compensated with over 1,000 euros— attractive compared to what the Spanish labor market offers right now. This means there is a market based on transferring reproductive capacity from young women, with low purchasing power and often of immigrant origin, to older women, with high purchasing power, Spanish or from developed countries.

Although the fertility rate has fallen to low levels, reproductive preferences have remained surprisingly stable in Spain. The average number of children desired, by both women and men, continues to be around two children, as in most European countries, and there is still no sign of change in these preferences. In this regard, Spain is among the countries with the greatest distance between the average number of children desired and those that are finally had. The distance observed between desired fertility and attained fertility reflects a deficit in individual and collective wellbeing and indicates the existence of barriers that make it difficult for many people and couples to make their family project a reality. For this reason, very low fertility poses an important demographic challenge: it not only conditions the collective evolution of society but also the life trajectories of individuals.

Some main obstacles that make it difficult for people to have the number of children they want are the precarious working conditions, the economic

uncertainty that exists in many homes, low wages, the high price of housing, penalties in the work career, insufficient public policies to support parenting and work-life balance, and inequality in the care responsibilities assumed by men and women—which translates into a “double shift” for women. Demographic research indicates that until gender equality becomes the norm in society, both in the public sphere and in the family sphere, we will not likely witness a recovery in fertility. To reach that goal, clear institutional support is necessary. The progressive extension of paternity leave and its equalization to the maternity leave scheduled for 2021 is a measure in the right direction to establish patterns of shared parenting and promote joint responsibility in caregiving. However, more measures and public policies based on scientific evidence will be necessary if the gap between aspirations and reproductive realities is to be reduced.

The scientific, political, and social debate on whether a recovery in fertility is possible in those societies that present low levels and on what type of policies can promote this recovery will continue to be open in the coming decades. In the case of Spain, fertility likely will not rise above the generational replacement threshold in the medium or long-term, but it should be possible to go from a low fertility level to a moderately low one, and thus reduce the gap between wishes and reproductive realities. To do this, demographic research can inform the debate and the design of policies that encourage people who want children, to have them. An upgrade in level, protection, and quality of employment among young adults would lessen the gap that exists between the biological clock and the social clock of reproduction. Another important challenge is to reduce the difficulties in combining family and work responsibilities, avoiding focusing the debate on work-life balance on women and fostering joint responsibility through mechanisms that facilitate the full incorporation of men into care, and promoting a more flexible organization of time of work. Public policies can also redistribute the costs associated with upbringing in a more equitable way, for example, guaranteeing universal access to quality nursery schools and minimizing the economic insecurity of many families with children.

It is not foreseeable that the increase in immigration flows will have a significant impact on the fertility rate. On the one hand, fertility continues to decline in most societies of origin of the immigrant population. Furthermore, studies show a gradual convergence of the reproductive patterns of the immigrant and native population. Although the impact of immigration on the aggregate fertility rate in Spain will remain modest, its contribution to the

volume of births will continue to be notable —one in four born to a foreign mother or father—, which implies that the Spanish society of the future will have an increasingly plural and multicultural configuration.

Regarding the impact that the COVID-19 pandemic will have on the fertility rate in the coming years, everything indicates we will observe a further reduction in the already low fertility rate. Confinement is likely to cause an increase in couple breakups —as has happened in China—, the suspension of assisted reproduction treatments will leave its mark and, above all, the foreseeable economic crisis associated with the paralysis of the economy, the increase in unemployment, and the feeling of collective and individual uncertainty will negatively influence reproductive decisions.

Challenge 3. Repercussions of growing family diversification on child wellbeing, equal opportunities, and care support networks

Family structures and intra-family relationships have undergone a rapid transformation in recent decades and will continue to change. The family will continue to be considered one of the main platforms for socialization, security, and protection of its members, but the diversity of family configurations and models of coexistence will increase. In contemporary society, families made up of a married couple with their biological children are joined, among others, by families without children, families with adopted children, families formed by couples without a marriage bond, families formed by couples from the same sex, single-parent families, families reconstituted from second or third conjugal unions, transnational families, separated couples who share the care of their children, stable couples who choose separate residences, or people who choose motherhood (or paternity) as a vital project not framed in a couple relationship. The plurality of family forms will increase in the coming decades and an important challenge is to guarantee that they all have the same degree of legal recognition and social protection.

The family changes of the last half century have been closely linked to three transformative “revolutions”: the contraceptive revolution, the sexual revolution and the gender relations revolution, the latter still incomplete, as gender equality has advanced faster in the educational and labor sphere than in the family sphere, where there is still a long way to go to achieve the full co-responsibility of men and women in domestic and care work. It is foreseeable that the freedom of individuals to define their conjugal, reproductive, and family project will increase in the coming decades, which implies a growing diversification of family forms.

If the dissociation between sexuality and reproduction —thanks to the widespread use of contraceptives— was one of the great catalysts for the decline in fertility and family transformations in the second half of the 20th century, the dissociation between marriage and reproduction, the coexistence of biological and socio-affective motherhood / fatherhood, and the evolution of gender relations toward more egalitarian models will be the axes that will shape family biographies in the coming years. However, a major challenge that families will face is that of caregiving. The foreseeable reduction in the potential intra-family support network, associated with sociodemographic trends such as the decline in fertility —which has among its components the increase in people without children and with only one child—, increasing partner breakdown or increasing mobility and migration, make it essential to expand public support for families and the co-responsibility of men and women in providing care.

In most countries, the growing plurality of family forms, and their unequal distribution by socio-economic strata, have come with an intense scientific and political debate on the links between family structure, child wellbeing, and inequality of opportunities. In this sense, one challenge that must be addressed is inequality in education, health, and risk of poverty among minors living in different family configurations. Although numerous studies show that family structure is less important for the wellbeing of children than the quality of family relationships, it is necessary to advance in the design of policies to support families, regardless of their configuration.

The COVID-19 crisis has highlighted the importance of having a good knowledge and understanding of the structure and composition of households (for example, elderly people who live alone, unemancipated young adults who live with elderly parents, grandparents who participate in the care of their grandchildren, single-parent families who cannot share care...) and the degree of intergenerational contact or of the strength of family support networks, when estimating the vulnerability of the population to the pandemic.

Challenge 4: Health and Mortality: Are We Ready for Biodemography, Social Genomics, and Digital Demography?

The most influential definition of health is undoubtedly the one set out in the preamble to the Constitution of the World Health Organization, signed in New York on July 22, 1946: “Health is a state of complete physical, mental and social wellbeing, and not only the absence of affections or diseases.” Health is, therefore, a multidimensional and multi-causal phenomenon, which

transcends the exclusively medical field, relating to biology, genetics, epigenetics, psychology, sociology, economics, and policy. That is why the study of health can only be approached in its complexity considering many variables (biological, social, environmental, economic, cultural, health system...), with strong interaction between them.

The analysis of health conditions throughout the life course—from birth to death— makes it possible to study health inequalities between different territories, different social classes or between men and women, and to assess in which phases of this process there should be interventions to improve health. The morbidity process is influenced by individual resources (education, income...), personal factors (genetic, epigenetic, intellectual, social, behavioral...) and context variables (social and residential situation, care networks, quality of health services...), which contribute (or harm) to the maintenance of personal health. Although we can measure health inequalities fairly accurately, much remains to be learned in relation to the mechanisms underlying observed differences, such as gender differences.

Among the most promising lines of research is that which examines how survival and health conditions throughout the life course are determined by conditions experienced at previous ages—in the stage of child development—, also incorporating a generational, geographic and demographic perspective. For this, it is essential to use longitudinal information, with links to biomedical and genetic records, a type of data already present in many countries, and Spain is no exception. A multilevel analytical perspective is also essential, identifying which differences observed between individuals are because of their own previous trajectory or to more general factors of the social or geographical environment, and integrating the aggregate population analysis in birth cohorts.

Within this line of research, there is more empirical evidence—in demography and epidemiology— on some mechanisms by which life and health conditions in early childhood can condition the appearance of chronic diseases in adulthood, in the onset of diabetes (type II diabetes) and cardiovascular diseases. Some of these mechanisms are very specific, such as the sequelae of processes that begin in the uterus, during developing the fetus and around birth or during other critical periods in the growth of human organs, sequelae that have led to “hypothesis of origin or fetal programming.” There are other less specific mechanisms, such as those that operate through socio-economic conditions in early childhood, including stressful

environments or acute episodes of some childhood diseases and their cumulative influence on the later onset of chronic diseases. Another set of effects would derive from the recurrent exposure to infections and parasitic diseases at an early age.

From an aggregate population perspective, the effects of children's health conditions on successive cohorts can be contradictory. It is possible that, contrary to what they produce at the individual level, the subsequent health and survival conditions of the cohorts improve by having eliminated especially vulnerable members (*selection*), or because they have provided survivors with mechanisms to combat certain morbid processes or environments (*immunization*). However, it is equally possible that the aftermath of problems or poor initial conditions in a generation translate into lower resilience and higher mortality in later life stages.

From an individual perspective, the hypothesis of Barker on fetal programming through epigenetic changes, argues that malnutrition in the perinatal stage is associated with higher mortality in the adult stage because of cardiovascular disease and the metabolic alterations that condition said disease (metabolic syndrome, insulin resistance, hypertension). If one disorder, such as hypertension, occurs during the pregnancy of a woman born underweight, the metabolic consequences can be replicated in the next generation. That epigenetic changes are permanent and may have transgenerational effects underscores the need for further investigation of the perinatal origin of adult diseases.

Until now, there were hardly any research projects with access to historical records with detailed information about the child and the mother, which would allow us to test the hypothesis of fetal programming throughout the 20th century. However, this study is now feasible, thanks to the work conducted by CSIC researchers over the last decade to develop various longitudinal historical databases, both of the population of Madrid and Andalusia.

The complete trajectories of the generations are the classic object of study of demography —based on them, the typical indicators of mortality, marriage and fertility are constructed. Traditionally, generational trajectories have been approached from an aggregate perspective, given the difficulty of linking individual data from various records. Despite this limitation, the longitudinal perspective was achieved thanks to the prolonged continuity and comparability of the information in the Censuses and in the Civil Registry, an infrequent continuity in other types of sources for the social sciences, and

whose triple time frame (period, age, generation) constitutes one of the main advances in modern official statistics. From about the eighties, this panorama was revolutionized by the appearance of new longitudinal sources —with retrospective biographical data and panel data with follow up in successive waves—, and with new methodologies for analyzing biographical data, including those censored by observation time. More recently, the possibility of linking individual stock data (census or register) with those collected in previous or subsequent administrative records of very diverse events (demographic, but also educational, labor, income, health...) has opened enormous possibilities for demographic and social statistics. Good proof of this is that population censuses —drawn up every decade for more than two centuries— are being replaced by a constant updating of population numbers from entry and exit, migration or natural movement records.

Demographics & COVID-19

The health crisis caused by COVID-19 has promoted an unprecedented collaboration of multiple disciplines not always close. Researchers from different scientific areas have made themselves available to society, through their own initiatives and those of their institutions, to face the serious health crisis and contribute to decision making in the face of the pandemic.

Demography and population science have many tools that can help explain the behavior of a pandemic, project its trends, and study the effects it generates. Besides having health and mortality among its classic themes, demography has a valuable methodological arsenal for modeling population dynamics at a global level, making standardized comparisons across multiple countries, and projecting plausible future scenarios. Likewise, it has an ideal location on the scientific map to study the evolution of the pandemic, as it is at the intersection between the biological and the social, the “two souls” of demography, according to the well-known formulation of Massimo Livi-Bacci.

Besides the age structure of the population, the population density, the daily contact between generations or the modalities of households, the mobility flows of the population throughout the planet and in its closest environment —all traditional objects of study for demographic research— are key to understanding the singularities of this pandemic compared to similar phenomena in the past. We know, for example, that human mobility has played and will continue to play a crucial role in the evolution of the pandemic. The drastic

reduction in mobility during the decreed period of confinement in our homes has made it possible to stop the exponential increase in infections. Once confinement is relaxed, the evolution of the epidemic until a vaccine exists will depend to a large extent on compliance with social distancing measures.

The data compiled in the wake of the COVID-19 pandemic will undoubtedly provide a unique opportunity for future researchers to contrast the impact of the pandemic in many areas already examined by those involved in pandemic research in the past. Longitudinal studies to monitor the population cannot be postponed. It will be important to analyze the effects of the pandemic based on exposure to it during embryonic life, fetal growth, early infancy, and childhood. Furthermore, the economic crisis that will follow the (possibly) multiple waves of the COVID-19 epidemic will amplify the adverse health consequences.

One line of research could be a longitudinal study of the child population. The study would be based on a national sample of pregnant women during the pandemic, of women who gave birth during the pandemic, and of women with children aged 0 to 4, with hospital records containing information on pre-pregnancy, pregnancy and delivery, with samples of blood of mothers and children, and with a protocol to follow up for a sufficiently long period—for example, until physical growth stops. Furthermore, demographic and socio-economic information of the family would also be included, besides biomarkers of adults and children (including having or not contracted the virus and having been exposed to it). All these linked data would allow adequate investigation of the aftermath of the pandemic in numerous crucial areas of child wellbeing, from physical growth markers to cognitive outcomes, school performance, exposure to risk behaviors (poor diet, lack of exercise, initiation smoking...). If, in addition, the study of minors helps to create a large database with identifiers, it will be possible to formulate additional studies to investigate the medium and long-term impact of the pandemic in the different stages of the life course of the “generation COVID-19.”

In line with this proposal, there is also the possibility of monitoring cohorts linked to health surveys, social health records and sociodemographic data that, with prior anonymization, allow monitoring the health conditions of the Spanish population, measuring the short-, medium- and long-term effects of the pandemic. From a more focused viewpoint, studies of population subgroups are already being conducted, like people living in collective residences, where access to unique anonymized data will allow multidisciplinary

studies of the health of the most fragile and most vulnerable people affected during the pandemic. These works, which are proposed within the Global Health Platform, will give way to lines of work on Biodemography and social genomics with a longitudinal approach, not addressed so far in sufficient depth, but which it can now be done thanks to collaboration between research groups from different areas of knowledge.

Challenge 5. Increasing volume, complexity, and diversity of migratory flows

According to data provided by the United Nations Population Division, the number of international migrants reached an (estimated) number approaching 272 million people in 2019, representing 3.5% of the world's population. Regarding the distribution by sex and age, 47.9% of the total were women, 14% were less than 20 years old, and 74% were between 20 and 64 years old.

Regarding the distribution by world regions, Europe is home to the largest number of international migrants, followed by North America, the northern part of the African continent and the Western part of Asia. These last two regions have experienced the fastest growth rate (with the countries of sub-Saharan Africa) in recent years. International migrants also show a pattern of relative concentration in their territorial settlement, because around two-thirds reside in only 20 countries. This pattern of concentration is also observed if we look at the countries of origin, because a third of migrants come from only 10 countries.

This number is joined by the international volume of so-called forced migration (*forcibly displaced people*) that reached in 2019, according to UNHCR data, just under 71 million people (70.8 million), of which about 29 million and a half were refugees and asylum seekers and just over 40 million internally displaced persons. We must not forget that, despite its different name and legal status, for demographic purposes this migration must be incorporated into the total volume of international mobility.

Migratory movements are one of the most difficult demographic processes to quantify. This situation is due not only to poor quality or the absence of records in many countries worldwide, but also to the nature of the phenomenon itself. Besides migratory flows' implying long-distance territorial displacement and with a vocation of permanence, the reality shows the enormous complexity and diversity of international mobility in terms of space / time variables, including forms of migration pendular, circular, seasonal,

re-emigration, return, or resettlement that have in addition made its registration and, therefore, its quantification difficult. Likewise, advances in research have made it possible to observe significant changes in the determinants of international mobility, creating new concepts and “migratory typologies” that have recently been incorporated into classification and registration systems (as with so-called climate or environmental migrants).

Here are five of the main axes of research on migratory processes, which include various lines of inquiry and study and which focus on the most outstanding migration challenges of the next two decades, and their derived affects.

1. Analysis of flows and types of mobility

- Measurement and characterization of international mobility. Migrations and demographic growth / decline.
- Study of the (causal) determinants of international migration.
- Analysis of migratory patterns. Structure and change of migratory systems.
- Internal dynamics of mobility in migratory systems (example: intra-European migrations and “mobile citizens”) and regional migrations. New types of international migration. Retirement migrations.
- Emigration and effects in countries of origin.

2. Interactions between migration flows and migration management

- Labor regulation. Regulation of highly qualified migrations. Regulation of seasonal and circular migration. Migration programs.
- Border management.
- International protection regimes.

3. Demography of migrations

- Fertility and family dynamics of the immigrant population. Family reunification. Mixed or intercultural families. Health conditions, aging and mortality patterns of immigrant populations. Demographic dynamics in countries of origin and emigration.
- Second generation.
- Acquisition of nationality and dual citizenship.

4. Economic, social, and political effects of migration

- Migration dynamics and labor market conditions. Migrant incorporation into the native labor market.
- Migration and inequality. Migrations and social stratification. Second generation and social mobility.
- Migration and the Welfare State. Conditions of access to social, health and educational services.
- Reactions of public opinion to immigration. Racism and xenophobia. Labor and social discrimination.
- Structural and social integration of the immigrant population. Social cohesion.
- Migration and political participation.
- Migration and development. North-South inequalities and migrations. Migration and remittances.

5. Public management of diversity

- Public management of linguistic, cultural, and religious diversity.
- Regarding the future challenges of research on migratory processes, we find some of a more conceptual nature and others of an empirical nature. In relation to the former, the most important issue in the literature of migration studies is the current revision of the concepts and the too rigid distinction between voluntary migration and forced migration favoring a new label whose perhaps more successful term is that of mixed flows.

In terms of sources, improving existing data (both flow and stock) and their accessibility, and their robustness (detailed, disaggregated, potentially comparable), will continue to be a challenge. Other important elements are the need to develop registration mechanisms beyond those conducted in the receiving countries and, therefore, throughout the entire migration process (origin, transit, returns, etc.) or the improvement of the production of data on irregular immigration. Last, it is necessary to point out the opportunities offered in the study of international mobility by the data generated in social networks and the increasingly frequent data produced by private organizations (e.g., Gallup index on potential net migration).

It is still too early to assess the impact that the COVID-19 pandemic will have on migratory flows. With borders being closed globally to mitigate the spread of the virus, international mobility is on hold and significant numbers of people have been trapped in transit points. The situation of the refugee camps in Europe and in the rest of the world, where it is impossible to adopt the most basic measures to prevent contagion, deserves special mention. In the near future, maybe this pandemic will reinforce the discourse of border closure and restrictive migration policies. However, it is also possible that many societies recognize the vital role that the immigrant population plays in providing basic services and care. In any case, the global economic crisis that will follow the pandemic will be an additional factor for people to migrate and seek better living conditions.

Challenge 6. Rural depopulation, ‘empty’ Spain: a socio-territorial and economic challenge

Rural depopulation is not a new issue, but it has taken on some relevance in recent years, also in the shadow of the aging phenomenon, placing both as pillars to address the “demographic challenge.” However, the challenges derived from demographic change are complex and include not only demographic dimensions but also territorial, social, economic, institutional, and political dimensions, so research must be directed toward finding comprehensive responses of all these dimensions.

First, rural depopulation is a challenge on a European scale, going hand in hand with the progressive loss of demographic weight of the continent, on the one hand, and on the other, with migratory flows from third countries, but also internal ones, between East and West, South and North, and from rural to urban areas. Second, rural depopulation reveals the contrasts in the territorial model, with the concentration in urban and metropolitan areas that absorb investment, employment, and population in contrast with rural desertification in demographic terms. The underlying problem of all this complex matter lies in the attractiveness that life in urban centers continues to have, an attraction that has always existed.

For Spain, the consequences have been accumulating since the 1960s, with a worrying outlook in the Autonomous Communities in the interior of the Iberian Peninsula, and with special incidence in the provinces of Soria, Teruel, and Cuenca. Besides this intense evolution toward depopulation, policies on infrastructure, industrial, forestry, or hydraulic matters have added the dismantling, and sometimes the elimination, of difficult-to-exist rural communities. Currently,

depopulation contributes to territorial imbalances, while favoring the decrease of territorial, social, and political cohesion. The trend toward depopulation of some areas leads to concentration in others, therefore, the problem in the medium or long-term of the emptying of some rural territories coexists with the problem on how to manage macro-populations and the provision of services to them.

In recent years, this phenomenon of depopulation has become a citizen, social, and political emergency, fostering initiatives, plans, programs, and strategies that, however, do not seem to have stopped this trend. The experts consulted coincide in emphasizing that policies based on sectoral “solutions,” such as focusing only on agrarian problems, are not the answer, and that the research should be directed toward aspects related to the definition of the territorial model and spatial planning, the breaking of the rural-urban dichotomy and its articulation, sustainability, the new uses of rural space, using underused resources, such as the land factor (“land without people vs. people without land”), the importance of social capital in rural development, or accessibility to basic services for people of all ages (education, health, social services, dependence, care). Businesses should also be involved, including infrastructures for mobility, reducing the digital divide, training for the labor market (in particular, of the young and female population), and economic diversification into sectors other than agricultural, such as the food industry or tourism.

This myriad of components involved in the phenomenon of rural depopulation therefore requires holistic and multidisciplinary approaches. In addition, another aspect to consider in Spain concerns the heterogeneity and diversity of the rural environment, which requires the use of large measurement scales, for example, regions or counties, being more appropriate for the analysis and resolution of problems, both local and for its global projection.

The COVID-19 pandemic has called into question the sustainability of very dense cities, threatened—as in past centuries—by the danger of the exponential expansion of infectious diseases. At the same time, the pandemic has sparked the largest teleworking experiment in history, opening the door to new post-pandemic scenarios in which working remotely is much more powerful than before. If teleworking is consolidated in some labor sectors and the network economy develops, proximity to the workplace will no longer be so decisive when choosing where to live. This possible residential relocation—and business—would not only reduce housing, infrastructure, and environmental costs, but would also increase the human and virtual connection between “empty” Spain and hyperdensified cities.

Challenge 7. Adapting to the digital data revolution with new approaches and methodologies

There is no doubt that the progressive digitization of the world has an innovative impact on all areas of people's lives. Since the beginning of the 21st century, digital technology has permeated all aspects of modern society, becoming an integral part of our daily lives. This offers great opportunities and new challenges for the research community of demographic processes in an ever-changing and revolutionary context, in the sense it implies changes in established paradigms and applying new study approaches. However, not only scientists face the challenge of how to adapt to these new realities in the most efficient way. Many government agencies in developed countries are moving decisively toward new statistical systems, abandoning costly statistical operations, and making greater use of administrative data routinely collected by state departments and agencies. Furthermore, the industry itself (for example, the telecommunication, energy or transport sectors) has realized the need to take advantage of the large data they have to analyze the population, main producer, and main consumer of this data, which has led to rapidly developing data science departments as part of R & D & i initiatives.

Several ongoing projects show common interest, both from the academic world and from the private sector, and they imply a successful collaboration between these two sectors. These projects include, for example, using mobile phone data for urban and tourist mobility statistics, or applying Big Data for transport statistics and labor market indicators. Within statistical institutes and the academic world there is a growing interest in reusing and linking administrative data from widely different sources and creating population records, or long longitudinal records based on digitized historical sources. Good examples of these initiatives are the project inventory United Nations Big Data, the project Digitising Scotland, or the Census Longitudinal Infrastructure Project (CLIP). In Spain, the Longitudinal Demographic Database of Andalusia, created in collaboration with CSIC, or the next Population Census 2021, which will be based entirely on the link of administrative records and using Big Data, are also excellent examples. These new initiatives bring together different areas of research, from computer science and life sciences to digital humanities and social sciences.

This new data is a true gold mine for academia, industry, and government, because they will provide a deeper, richer, and more timely view of demographic and social changes, if they are approached with the right tools and

methods. Based on the accumulated experiences and the lessons learned in the last 20 years, it seems feasible to build a comprehensive framework to study the processes of fertility, aging, mortality, and migration through continuously generated Big Data, involving the latest technological and methodological achievements, like artificial intelligence and machine learning.

To enable conclusive empirical evidence, it is also essential to implement longitudinal approximations on various aspects of population evolution, ranging from birth cohort monitoring, to measuring the effects of conditions in early childhood on health throughout the life course, or to evaluate the effects of sudden socio-economic changes, produced by economic crises or pandemics such as the one we are experiencing, on fertility, health, old age or mortality. Longitudinal databases and the life course perspective allow a better understanding of the interrelationship between individual, generational, economic, social, environmental, and temporal factors. Spain is the only country in our sociocultural environment that does not have extensive longitudinal studies to monitor the main demographic dynamics in detail, such as partnership formation, fertility, migration, health, disability, or aging.

Along with this, the geographical perspective at different scales (macro, meso and micro) is essential for the investigation of socio-spatial inequities, the distribution and accessibility of services, the influence of the place of birth and residence on health, physical and mental health of individuals, or the promotion of friendly community environments for all ages. Geographic Information Systems and Spatial Data Infrastructures will be very useful to explore the influence of the environment on multiple demographic indicators, such as the presence of educational or early childhood care facilities in the evolution of fertility, proximity to parks or sources of pollution in mental or physical health, or for more specific aspects such as gerontological planning of equipment, facilities and services for the older people. Incorporating environmental indicators (climate, pollution) in research on the influence of environments on longevity, disease-free life expectancy, and quality of life in old age, or using drones to understand the spatial behavior of risk groups in public spaces faced with future health and climatic emergencies will also be valuable. Other technologies, such as virtual reality, can also provide new tools in the study of dementias and in the design of age-friendly environments.

From another perspective, it is also necessary to promote qualitative methods to complement the quantitative approach with the depth and richness of people's opinions, which will help to understand the phenomena and explain

the processes, as well as will promote the participation of the public citizenship in research. Aging is a phenomenon that affects the entire society, so all individuals must be given a voice, not only the aging population, to know the life trajectories also through longitudinal techniques applied to qualitative analysis. These methods will also be of great interest in their application in other groups, such as women and men of childbearing age, to better understand their reproductive decisions, or migrants, to deepen their immigration decisions and trajectories.

Systematic reviews (following, for example, international procedures such as Cochrane), with or without meta-analysis, on the aspects related to demographic phenomena and processes to consolidate the knowledge acquired are also of crucial importance.

Research on population requires interdisciplinary, multidisciplinary, and transdisciplinary approaches. For this, the creation of research groups and centers made up of researchers from the social and human sciences, health sciences, data sciences and engineering are a priority, as well as promoting broad research networks, to exchange knowledge, sharing material and human resources, and develop research projects on an international scale. Likewise, the interconnection of areas such as demography, epidemiology, epigenetics, biomedicine, and Big Data is increasingly present on an international scale. An example of this is the creation of centers for Biodemography and doctoral studies, such as the one created by the Max Planck, combining these areas, following the example of the project Longpop, a H2020 ITN project coordinated by CSIC and which is a central part of the project ERC Advanced ECHO, which is also coordinated within CSIC. European support in financing these lines of work is a good indicator of lines of action to be promoted. Specializations such as evolutionary demography, statistical demography, geodemography, and demographic epidemiology, especially for monitoring, modeling health, and the risks that threaten it, from poor health habits to the incidence of infectious diseases, have shown in its starkest reality, the need for this profile.

Within the strategy for sustainable development and the adaptation of the field to the digital revolution of the 21st century, we believe that in the near future it will be inevitable for demographers, population scholars and social scientists, to focus on building a methodological and theoretical bridge between the traditional understanding of demographic / population processes and the new reality, with the aim of:

- Understand the broader impact of the digital revolution on populations in different sociodemographic groups using data on Internet penetration and broadband coverage.
- Create new measures of diversity and cultural integration in modern societies for prediction and forecasting purposes using social media platforms.
- Integrate a broader range of Big Data sources in multiple spheres (environment, infrastructure, economy, housing, communications) to study the present and sustainable future of urban and rural populations.
- Finally, the research process must involve the whole of society, not only to collect information but also to return (social transfer) the information analyzed and prepared to design and apply public policies based on knowledge, and to promote a positive lifestyle to achieve good health, a good old age, and an optimal quality of life throughout the life course.

CHALLENGE E

ABSTRACT

International migration is a highly complex and global phenomenon, an ideologically charged and polarizing topic of enormous symbolic and political relevance, a phenomenon that requires an interdisciplinary approach from both a descriptive as well as normative perspective. Migratory flows have increased and are incrementally caused by armed conflicts or climate change, as well as by acute global inequalities. Given that the causes and implications of migration exceeds state limits a comprehensive study needs to abandon “methodological nationalism”. The economic and social integration of the migrant population is a complex challenge, but the opportunities it opens up are also manifold: migration drives economic growth, connects different cultures, and contributes to international development.

INTERNATIONAL MIGRATIONS IN A CONTEXT OF GLOBAL CHANGE

Coordinators

Juan Carlos Velasco Arroyo
(IFS, CSIC)

Amparo González Ferrer
(IEGD, CSIC)

1. INTRODUCTION AND OVERVIEW

Despite the intensity of the globalization processes experienced over the last three decades and the growing integration of countries and economies, international migrations remain at relatively moderate magnitudes: 3.5% of the world population lives in a country other than the one in which they were born, about 272 million people (UN DESA, 2019). Migrations in the late 19th and early 20th centuries were, in proportion to the population of the time, almost double that of today: 6% of the planet's inhabitants. Some authors have highlighted the need to explain immobility before mobility, considering the multiple push and pull factors that, in a globalized world, define the daily context of hundreds of millions of people. Nevertheless, in recent decades there has been a certain reversal of the trajectory and, consequently, a certain concentration of migratory flows—including those of refugees fleeing conflict zones—to developed countries. Since the beginning of the third millennium, international migrants have increased by 50%, some 99 million in absolute terms. Among the many differences, it is noteworthy that, whereas during the first globalization (1865-1910), Europe was the continent of origin for most emigrants, it is now the first destination region.

Just as the European migrations of the first globalization were directed towards the colonies and former overseas colonies, the contemporary world's migration flows can hardly be separated from the great disparities between the *global South* and the *global North*, understanding these terms not in the

sense of geographic references, but of political-social configurations that crystallize in tremendous gaps regarding economic prosperity, social conditions, human rights, health, and security. These disparities are connected to the asynchrony in the demographic transition registered in the different regions of the planet: low birth rates, higher life expectancy, and increasing aging in the global North; medium-high birth rate, lower life expectancy, and very young populations in the global South.

2. KEY POINTS OF THE CHALLENGE

In the global and complex socio-political and socio-economic context mentioned in the previous section, multiple dynamics and conflicts related to international migration processes are detected. Without pretending to be exhaustive, it is worth highlighting some of them that define and, above all, will define the policies of each State both in relation to other States and within its own internal sphere, namely:

2.1. War conflicts and refugees: a historical constant that will increase

Substantive changes in current forms of warfare will lead to an increase in the arrival of asylum seekers in the richer countries. This already produces, and will continue to produce, an even greater destabilization of a migratory model based on the distinction between economic migrants, on the one hand, and those displaced by military and political violence, on the other, as well as a reconfiguration of the migration and refugee regime with obvious political consequences. We are witnessing a decisive reconfiguration of the political self-understanding of post-war Western democracies.

Humanitarian crises caused by the massive displacement of people trying to escape extreme violence and destruction are not exceptional in the last century and a half. The chain of successive crises on the borders of Europe has not been interrupted in recent decades, although the triggering causes have varied, from the war in the Balkans to the war in Syria, throughout the war in Afghanistan, the Iraq war, the different conflicts in sub-Saharan Africa, and the so-called “Arab springs.” Nor are the lethal effects of shielding the borders a novelty. The debates and negotiations between receiving countries, countries of origin, and transit have also marked the agenda of all these crises, with a progressive deterioration of the framework of rights established by international conventions. One striking issue in this process is that the

same governments that used to appeal to the distinction between “economic migration” and “asylum” to reject the entry of so-called “irregular” immigrants, have ended up using the term “migrants” to refer to asylum seekers fleeing situations of armed conflict and political persecution. What successive humanitarian crises have brought about is, above all, a change the migration regime. This regime has mainly (though not only) consisted in a process of building walls around Europe and the United States and in an increasing subordination of human rights established in each nation law under police and military actions to repel immigrants.

Challenge. Interconnect the increasingly mixed nature of migratory flows, in which it is difficult to clearly separate between those who are economic or family-reunification migrants and those who deserve refugee status or some other subsidiary form of international protection, with admission policies and the commitment of liberal democracies to human rights. In this line, it would be necessary to articulate admission policies in such a way they allow differentiated access channels that respond to the growing diversity of migratory flows (see section 2.3.), guaranteeing their true effectiveness as tools to ensure legal migration, orderly and safe, as established by the Global Compact on Migration (see section 2.10.).

2.2. Human mobility and adaptation to environmental change

The current flows of people do not seem to stop, they may even increase notably, not only because global inequalities have become more pronounced in recent decades and because new outbreaks of war conflict have exploded, but also because a new cause of forced mobility has been added: anthropogenic climate change and the environmental catastrophes derived from it. According to the latest reports and studies on the subject, climate change was already in 2018, the main cause of migratory flows. On a planet whose extension remains constant and whose habitable territories have been diminishing for a long time because of, among other reasons, climate change, the predictable increase in world population in the coming decades—more pronounced in the less prosperous regions— will push many people to leave their own country of origin. In some Pacific islands (e.g., Kiribati or Tuvalu) the effects are more visible, to where they are becoming uninhabitable and the authorities of the country are already looking for places at other states to relocate the population. These cases, and others such as those in certain coastal areas of Honduras, Myanmar, Dominica, and some Caribbean islands of Panama, which are expected to soon be under the sea,

although they affect relatively small populations for the time being, indicate a trend of enormous risk. We must also think about the effects of desertification in large areas of Africa, or in hurricanes and floods in various areas of America and Southeast Asia. The continuous growth in the number of immigrants from climatic deterioration (droughts, desertification, rise in sea level, salinization of aquifers, etc.) is already among the new features that characterize mobility on a planetary scale, with the increase in the number of people displaced by global inequalities and armed conflicts who seek refuge in other countries.

Therefore, the forecast is not that migratory flows will decrease, but that they may increase considerably because of the intersecting effects of socio-economic inequalities, demographic differentials, armed conflicts, and environmental catastrophes. What is observed is a multiplication and diversification of the travel circuits: South-North, South-South, North-North, country-city, etc. It should be noted that migration from the countryside to the cities in the interior of each country is an increasingly accelerated global phenomenon, and that international migrations also have cities as their preferred destination, so it is these that must face increasingly the problems derived from the ethnic and national diversification of its residents.

Challenge. Regulating the right of asylum caused by climate change. The powerful normative reasons that assist people fleeing violence or persecution (the reasons contemplated by the 1951 Convention Relating to the Status of Refugees) to obtain refuge are basically comparable to those that can be adduced by those who seek refuge. They find themselves in a situation of real risk of irreparable damage to their life and dignity. This would be the case, among others, of those who flee not so much from wars in the traditional sense as from structural violence or of those other people whose lives are at risk for environmental reasons. The UN Human Rights Committee has recently (in January 2020) opened the door to recognize that international asylum law can be applied to cases, increasingly frequent, of displacements caused by environmental disasters. However, the debates and disagreements about the magnitude of the displacements caused directly and exclusively by climate change are still important. Therefore, the strength of the causal relationship between climate change and migratory flows toward developed countries remains open and will be a growing field of research in the coming years.

2.3. Transformation, diversification, and feminization of migratory flows

Globalization has made it even more evident that all places are linked by a complex network of connections, capable of generating intense mobility and immobility and disconnection. Whereas most of the world's population continues to live their entire lives in the same country in which they were born—often even in the same city—among those who participate in some displacement, especially if it involves the crossing of state borders, it is increasingly common for the average number of journeys throughout life to be greater than one. There are round-trip, repeated, seasonal, circular migrations, etc. Displacements of less than a year still escape our measurement systems, as do complex migratory trajectories, or even simple return, which continues to be the younger brother of international migration studies, often due to the difficulty in gathering reliable statistical information on it. Recent research points to the relevance of this and its prevalence as a voluntary decision of the subjects, much higher than forced expulsions from the territory because of irregular residence or unauthorized entry, to illustrate the spontaneity and fluidity of migratory movements, as well as their crucial role in dismantling the methodological nationalism and 'Eurocentrism' that predominate in migration studies.

Along with the intensification of mobility, there has been a diversification of the profile of the people participating in international migratory movements toward developed countries, with a clear increase in diversity by origin (see introduction), an increase in the presence of women compared to other times, but also greater diversification by level of qualification. The feminization of certain flows has been closely linked to the demand in the care sector in richer countries. About one in five domestic workers is an international migrant. Moreover, it is estimated that migrant domestic workers worldwide number 11.5 million (UN Women, 2016). This job niche is undervalued, associated with a precarious and unprotected legal status. Curiously, recent studies also indicate that women predominate in the most skilled migration flows. The labor market is structurally segmented, both in origin and destination, according to the gender differential. Employment selection policies have different effects on migrant women and men and generate increasing polarization by skill level that overlaps with gender in ways not necessarily assumed. Precariousness and labor exploitation in the care sector, which employs many migrant women, also entails legal precariousness and difficulty for family reunification, with consequences on the forms of mobility of relatives, especially

the children of these women, and their subsequent integration paths in the host societies (see sections 2.8. and 2.9.). However, we hardly know the family dynamics and differential integration (if this is the case) of migrant women who are inserted in the most qualified segment of the labor market.

Challenge. Knowing more, and better the composition and nature of increasingly intense and diverse migratory flows requires new instruments, which include better origin-destination measurement infrastructures, and incorporating short term and repeated mobility to traditional statistical instruments (censuses and population registers), by incorporating new tools from Big Data, biographical survey research, and digital sources. However, the diversification of the profile of migrants and, especially, the growing presence of women in all its segments, but especially in the most disadvantaged and vulnerable, requires the definitive integration of gender as a basic social structure that induces intersecting vulnerabilities within and across national borders. Hence, the analysis of international migration from the gender perspective must be complemented with the intersectionality perspective: both perspectives become crucial to understand the situation of special vulnerability of migrant women and to rethink not only regulations and practices in matters of foreigners but also the theoretical categories of social justice. The configuration of national borders and movements across them, the intersection of gender with class, immigration status, and race shape the particular vulnerability of migrant women working in the care sector.

2.4. Crisis of the “neoliberal” migratory regime

The crisis that affects the liberal mode of regulation of the economy, today globally hegemonic, has also affected the migratory regime structurally associated with this mode. The phase of profound changes in social and economic policies that followed the crisis of the labor-intensive industrial production system —a phase called “neoliberal” because of its ideological matrix— helped to create a single market in Europe in open competition within the global market, something that required control of access to the European labor market under certain conditions. This set of decisions has affected migration policies distinctly: in few areas is the subordination of the logic of rights to economic logic as perceptible as in migration. Migration policies —even the most “generous” of the post-war phase in Europe— have always been a variable dependent on labor policies and labor market regulation, as well as on the evolution of public policies that we have agreed to call Welfare States.

The neoliberal migration regime –whose implementation differs significantly from country to country– seems to be at the service not only of containing flows and a certain shielding of borders but also of a “differential inclusion” of those who cannot be expelled, inclusion that supposes a vulnerability of migrants in economic, social, and political terms. Most developed states have recently conducted a set of legislative reforms in immigration policy presided over by what has been called the “logic of haggling,” establishing a true obstacle course with a permanent threat of relapse into “illegality.” Reducing guarantees and increasing the discretion of administrations, legally promoting labor discrimination and the precariousness of migrants, etc. The change in immigration regime has been associated with the transformation of the labor markets, which largely explains the new strategies for the regularization of immigration in Europe (with certain exceptions, such as in Spain, in where regularization by roots has become a reasonably accessible route). This concerns the processes of mobilization and fixation of the workforce under certain conditions of exploitation that make use of modifications in the “border” device understood in a broad sense.

Challenge. In contrast to the “neoliberal” migratory model, progress should be made in two complementary lines of intervention: on the one hand, and to design a different labor migration policy, combine procedures of regularization at origin with ex-post regularization systems; and, on the other, to develop instruments to protect the civil, political, social and, especially, labor rights of migrants.

2.5. Biased perception and politicization of the migration phenomenon

Even considering growth forecasts, it can be affirmed that radical changes are not taking place in migratory processes, but only gradual ones, for example, in relation to their global scale and in the multiplication and diversification of migratory processes, travel circuits, and the profiles of migrants. Instead, there are considerable changes in the way migration is perceived and represented, as well as a significant increase in its political instrumentalization.

At the dawn of this new millennium, the hyper-politicization of the immigration issue constitutes evidence difficult to ignore, especially in the most prosperous societies. Increasingly, perceptions and responses to immigration are influencing electoral results. Nothing is more contagious than fear. The policies of democratic countries are increasingly being conditioned by xenophobic discourses

toward migrants and by the consequent proliferation of far-right parties and governments. In addition, the hardening of policies toward migrants is generating a hierarchy of social categories that undermines a basic principle of democracies (equal rights), with which it threatens social cohesion and coexistence.

Public opinion studies have been pointing out for some time that, in the street, attitudes toward immigration vary greatly depending on two elements: i) representations about the number of immigrants who arrive (flows) and settle (stocks) in the reference country; and ii) the degree of economic, cultural, and competition threat for scarce resources (such as public services) perceived in relation to immigrants in the country and frequently conceptualized as “invasion” (or equivalent euphemisms).

Especially after the 9/11 attacks, and in Europe in an even more accentuated way after the so-called “refugee crisis” of 2015, international migrations are perceived by the public opinion of many countries—and this is a fact that must be borne in mind—as a “migratory crisis” of unmanageable magnitude. Public opinion barely considers that, on a global scale, South-South flows of both refugees and economic migrants are larger than South-North flows (UN DESA, 2017). Sheltered by the fears and anxieties generated by current migratory flows, many political speeches use the understandable desire to protect the population to promote a state of general prevention in the face of immigration—especially in the face of irregular immigration—and to toughen migration policies. The obsession with security, which because the beginning of the new millennium has colonized so many aspects of contemporary politics, also has direct repercussions on the management of human mobility.

On a global scale, the dominant political discourse on immigration in the last decade has been the discourse of control, based on tolerance thresholds or sometimes, as already noted, on the threat of invasion (with the consequent adoption of a warlike language of fear and hostility, as if it were about literally defending the country by land, sea, and air against an external enemy that wants to invade and dominate the territory). Reversing this discourse and its effects to make room for a new approach that allows, in a real way, a much more flexible and liberal management of migratory flows will require resources to cushion undesirable effects, and a huge investment in pedagogy, communication, and dissemination to redirect negative perceptions.

Challenge. If the construction of a social climate dominated by a negative representation of immigration has succeeded, few tasks in the human and social

sciences are more urgent —although it is not an easy task and it may be insufficient— than putting data on top of the Table and try to project clarity on a multifaceted reality clouded by subjective perceptions and intersubjective stories of doubtful foundation, but endowed with undoubted persuasive power. These cognitive shortcuts must be dismantled so new, more inclusive discourses can make their way. Therefore, first, requires, among other measures, actions of political pedagogy that also consider the risks associated with the migratory phenomenon in a context of hyperpolarization and fake news. The role of the media and digital social networks must be the object not only of careful analysis but also of criticism. Second, to introduce migration in the educational and training curricula at the different levels (from primary education to university studies, or the training of public administration employees). Historical knowledge is essential to protect citizens from populist manipulation. Effective migration policies often subsist on the (created) perceptions of a large part of the population that votes for who decides such policies. This is undoubtedly the challenge of our time: how can we change our discourse? How to improve knowledge about the benefits of mobility worldwide? How to take advantage of the opportunities opened by the forms of displacement preferred by many migrants and adapt policies to the internal diversity of migration? It is not only a question of data, nor is everything framed as a demographic problem, but also of categories and concepts.

2.6. Migrations in the vortex of political confrontation and the authoritarian threat

The contraction of migration policies based on universal rights goes hand in hand with a growing politicization of the migration phenomenon in the emergence of neo-authoritarianism. Social dynamics, public speeches and acts of racist violence associated with this resurgence of authoritarianism are coming back to the fore. The migratory phenomenon will not stop gaining presence and relevance on the political scene and it will become one catalyst for confrontation. Therefore, the immigration debate is a spearhead in the debate on neo-authoritarianism and the emergence of illiberal democracies.

Faced with recurring economic crises, we are witnessing a growth in xenophobic and anti-immigration discourses and practices. The migratory phenomenon has become a catalyst for a withdrawal of identity and authoritarian tendencies. If these tendencies impose their discourses on the general political agenda, it may become a fundamental axis of social and political confrontation. Simplistic slogans proliferate that spread certain political formations and that

appeal to recode social rights in a national key, to establish access priorities, and to dismantle the mechanisms of legal equalization of the people who live in a territory. Such appeals can be legitimized with supremacist arguments, but a growth in the acceptance of different types of priority in access to resources and rights, whether of an ethnic-national or social nature, is observed in European societies. More or less crude, more or less explicit racism allows supporting policies of segregation or political stratification or even harsh, discriminatory, and even violent control of borders. Beyond the visible hardening, the transformation and proliferation of borders (administrative, health, social protection, etc.) indicates an evolution that may include a growing part of the former national subjects of law that may be affected by the fate of the “excess humanity” because of the contraction of the scope of national citizenship.

Challenge. It has gone from talking about *ius migrandi* (the right to emigrate) to framing the immigration phenomenon as a matter of national security, neglecting the needs of those who migrate and their rights and wellbeing. The demand for the right to migrate is therefore subordinated to the instrumental demands of the destination countries or is confused with the “flight” imposed by a situation of need. The human and social sciences must face the challenge of developing new conceptualizations to address the situation of migrants and develop theoretical and legal categories capable of protecting and guaranteeing the “right to have rights” of every human, regardless of their nationality and / or place of birth.

2.7. The challenge of incorporating diversity in host societies

The processes of legal and sociocultural integration of migrants constitute a fundamental challenge for contemporary societies. In this context, acquiring permanent residence and citizenship as an instrument of integration plays a vital role and has been the subject of extensive scientific debate. While acquiring citizenship has traditionally been the official recognition of belonging and fidelity to the country of destination, more recently some studies have suggested that acquiring nationality may be not so much the culmination of an integration process, but more well a channel to acquire certain social advantages and improve their mobility opportunities.

The established consensus on the situation of economic disadvantage in which most migrants find themselves, compared to the autochthonous population, has been nurtured in the last decade by important nuances depending on the origin of the migrants, the receiving context they find at the destination, at

the macro and micro level, and the specific dimension of the integration analyzed. Such nuances and the growing diversity of contemporary migration make a general theory of integration (or incorporation) difficult, as intended in the past. Notions such as ‘segmented assimilation’ or ‘adverse inclusion’ have been adapted to different contexts correctly simply to refer to the diversity and difficulty reflecting the trajectories of inclusion of migrants and their descendants in receiving societies.

Among the least examined dimensions of inclusion are those that are associated with the non-material aspect of integration, and in general any other than the educational and work career income indicators. Although the perception of discrimination has received a lot of attention as compensation for this excessively materialistic orientation of integration; other aspects such as psychological wellbeing, health, behaviors in the family environment (formation of families, fertility, divorce, cohabitation, etc.), social and political participation, have been examined less frequently. A field with its own entity is that of studies dedicated to the descendants of immigration, if their installation in the host societies to which they belong—although not always as full citizens—is assumed to be definitive. In his case, the studies have paid much more attention to the symbolic, identity, and civic-political dimension, than to studies on the generation of parents, especially in the more qualitative literature. However, the intensification of mobility (see section 2.3.), influences the reinterpretation of the identity, belonging, and sense of place of mobile citizens, and demands a reconceptualization of identity in more flexible terms. This avoids the approximation statocentric approach and addresses the lived experiences of multiple belonging of people of migratory origin who, besides feeling “citizens” from multiple places contribute to the economic and cultural development of more than one country.

Challenge. Resolving the deficiencies of innovative statistical information, with a longitudinal perspective and, above all, introducing methodological advances of a more experimental type, which have been produced in the study of similar elements with non-immigrant populations, will be crucial in the progress of this area of knowledge, although broad crucial in constructing an intercultural society. Research is required on the impact of integration and inclusion programs and policies on the results, to guarantee an adequate design of programs aimed at facilitating it. Understanding and exploiting the role of cities better, which are becoming increasingly diverse, is fundamental as a laboratory for the true development of inclusive policies and the construction of interculturality.

2.8. The impact of migration

In the destination societies

Since the 1980s, economists have paid enormous attention to studying the economic effects of migration and, specifically, the effect that the arrival of immigrants has on the employment and wages of indigenous workers. Most of these studies conclude that the effects, at the aggregate level, are non-existent or small; and, the prevailing consensus is that the aggregate effect of immigration for host economies is positive. However, a positive effect at the aggregate level is compatible with negative effects for certain sectors and / or groups, and this raises the eternal debate on the distributional consequences of immigration in the receiving countries. This is giving rise to a whole stream of new studies focused on identifying whether the prominence of the migration issue responds to a greater effect of migration on the low-income population in the societies of destination. Moreover, if the undeniable and growing politicization of this issue responds to real causes or is an excuse to avoid and hide a broader debate on the true causes of growing inequality in rich countries. In fact, the whole public discussion about competition for services and public aid between immigrants and natives, the idea that the Welfare States of developed - and especially European - countries act as a magnet that attracts the arrival of a mass of unemployed people who will become dependent on social aid by jeopardizing the sustainability of our welfare systems, and discourses on the haul of such aid are debates that are setting the ground for many of the latest research on immigration.

Specifically, in this debate on 'merit,' categorizations aimed at establishing hierarchies within the diverse collective of migrants have multiplied, with important consequences in the configuration of attitudes toward immigration and its correlation in the migration policies. To the already difficult legal distinction between migrants and refugees, the distinction between regular and irregular, temporary, and permanent is added and overlaps, and all directly or indirectly linked to the idea of 'integrable' or not, 'beneficial' or not. Furthermore, there is often an enormous distance between what such categorizations evoke in the mind of the ordinary citizen, and its factual or scientific basis, a distance frequently exploited and reinforced by politicians from different positions on the ideological spectrum.

This debate about how much each person contributes and the extent to which what we receive as members of a society should correspond to what we contribute, also reappears linked to the growing concern about the aging of the

population in the most developed countries and the convenience-necessity, according to many, of admitting many more immigrants in the coming decades as the only way to guarantee economic growth and the wellbeing of our societies. However, these assertions are not always based on realistic and rigorous data, studies, and projections.

Challenge. A better understanding of the economic, social, political, and demographic effects of migratory flows, and specifically of the growth-equality binomial, of the sustainability, operation, and characteristics of the Welfare State, further of the configuration and change of opinions that the citizens of the host societies have toward immigration as a phenomenon and toward immigrants. These assertions are not always based on realistic and rigorous data, studies, and projections. It is difficult to predict how attitudes toward immigration will change in aging societies increasingly dependent on it to rejuvenate their own demographic structure and their workforce.

The impact on societies of origin

The perception of migration suffers much in literature from a strong destination-centric bias, in which the social, economic, political, and demographic dynamics imbricated with the phenomenon of human displacement in a broad sense are almost unknown. This has a lot to do with the lack of information on return movements, the processes of sustained mobility of migrants who do not settle permanently at their destination but maintain a continuous close link with their countries and communities of origin, the reintegration processes of those who return, and the accumulated effects of a phenomenon as dynamic as migration on the societies of origin. Faced with a detailed study of the economic effects of migration in rich recipient countries, much less scientific effort has been devoted to the study of the impact of migration on growth and equality-inequality in countries of origin, beyond a curriculum focused on the macroeconomic importance of remittances.

Challenge. We must update our knowledge of exit dynamics, which are still interpreted in 20th century terms. We need new measurement infrastructures (origin-destination), starting with a much more in-depth study of the dynamics of return and circulation. Thus, they are linked to different effects of migration on the areas and populations of origin of the migrants. There is an urgent need to break down the famous development-migration binomial, beyond the specific discussion on the effects of remittances, and to introduce in the analyzes a much richer examination of the socio-political dimensions

of the effects, remembering the changes experienced in ways of life, ways of thinking, being, and relating to the world because of out-of-life flows, increasingly intense return and circulation.

2.9. “Bordered globalization” and proliferation of walls, is there no alternative?

Since the fall of the Berlin Wall (1989), over 26,000 km of borders have been drawn as a result of the establishment of new states: some 12,000 km in Europe and over 13,000 km in Central Asia. Borders have not only proliferated but have also been fortified to stop the flow of people.

In 1991, at the end of the Cold War, there were 15 border walls worldwide. In 2018 there were about 70. The total length of walls built does not stop growing and may have already exceeded 50,000 km. Moreover, it is important to point out that their function is not to defend the sovereign state territory or to put barriers to international trade or illicit smuggling, but to prevent the right of the most vulnerable people to find a place where they can live in peace. In short, “the wall has become a new norm in international relations” (Vallet).

The understanding of borders as an essentially obstructive device, as summarized in the image of the walls, represents only a simplifying perception that has been successfully disseminated. Borders and walls are not two names of a single concept. The functions attributed to one and the other clearly differ in relation to the movement of people and goods: the primary function of borders, unlike walls, is not to impede exchanges, but to regulate transit. However, in the daily practice of border management, the objective of migratory containment prevails over that of respecting the basic rights of people, in such a way that in the interests of the national interest, international law is infrequently violated.

Although border walls have become enormously deadly barriers, they are often dysfunctional as effective instruments of closure. This impotence brings into play opposing rhetorical strategies. In fact, the proliferation of walls and of many barriers and containment tactics throughout the planet has reopened the never-resolved debate about the legitimacy of states to close or open borders, about the question as to whether the states have the exclusive right to control the access of foreigners to their own territory or whether it is a decision that must be justified before all those affected, be they members of the particular political community in question or not.

As the ways of conceiving and governing borders have changed, traditional migratory patterns have also been transformed. The operations conducted by refugee-receiving states or by cooperative border control systems have had a powerful influence on the number and conditions of access, but above all they have caused displacement of the routes of arrival to the borders and the increase of the risks those fleeing extreme threats must bear.

The securitization of policies or the externalization of borders (buying at a low price the complicities of countries with little respect for human rights to do the dirty work of containment), and inventions of euphemisms such as “safe third country,” have contributed to that the “management” of migration is no longer seen so much as a sociodemographic issue but as a global security issue, a resignification that affects the political imagination to understand migration and the consequent elaboration of new frameworks for interpreting this phenomenon.

Challenge. Besides strictly normative reasons (human rights, global justice, solidarity, etc.), the most prosperous states will find themselves in the difficult situation of having to decide, for prudential reasons, between significantly helping the development of vast impoverished regions of the planet, or open borders to a much larger volume than the current. That challenge will become increasingly pressing, and the states must decide whether to proceed in an orderly manner or reluctantly accept dynamics that will eventually overwhelm them.

2.10. Global governance of migration

The idea that there are no local solutions to global problems also applies to migration. By adopting a Westphalian state-centric view alone, migration processes are hardly comprehensible, and even less manageable. If a state tries to adopt more open and flexible policies towards migrants and refugees on its own, it will be accused - unless it succeeds without drawing too much attention - of provoking the “pull effect”, which leads governments to compete for the tightening of their migration policies.

The almost permanent failure of migration policies implemented by individual states alone (or even together with some other states, as in the case of the European Union) is exacerbated by the lack of appropriate instruments for a global governance of international migration processes. In this matter, the scenario is quite anomic, a circumstance that could only be overcome by establishing a global migration regime with a solid institutional and regulatory support that would allow to take more advantage of the undoubted benefits of migration.

However, something has been changing in recent years. Based on the New York Declaration for Refugees and Migrants, approved in 2016 within the UN, an intense multilateral process of negotiations at international level has been launched, a process in which, along with governments, the active participation and impulse of non-governmental actors has been key. This process has led to the ratification of both the Global Compact on Refugees and the Global Compact for Safe, Orderly, and Regular Migration in 2018, two documents that in themselves represent significant progress and are expected to become the main normative landmark on the matter for the coming years. A good indication that these agreements offer an alternative horizon to hegemonic policies is the fact that a number of countries have refused to sign them even though, as such, they are not binding norms. This fact is also, on the other hand, a sign of the reluctance and resistance of States to adopt binding decisions that imply the ceding of sovereignty.

FINAL, BUT NOT CONCLUSIVE, REFLECTIONS

Prerequisites for advancing in a comprehensive study of the migration phenomenon include broadening the scale of analysis and abandoning “methodological nationalism” along with its unjustified presupposition of the nation-state as natural form of social organization. Methodological nationalism leads to a fundamental misunderstanding of social reality by failing to recognize that, in addition to the State, there are sub-, supra- and transnational forms of political and economic organization, as well as social and cultural dynamics that escape state control.

Indeed, no social phenomenon can be described uniquely from a state perspective if its causes do not lie exclusively within its territory and its implications go beyond its boundaries. Notwithstanding, and international migration processes are a clear example of such phenomena, it is precisely this restrictive methodological approach - and its myopic overemphasis on the “national interest” - which underlies most of the migration policies currently in place.

Another methodological error in which the social sciences frequently incur is the so-called “presentism,” with the consequent disregard for the procedural, dynamic and conjunctural dimensions that every event or fact that develops over time, possesses. This methodological historicism (or systematic loss of historical perspective) can lead to serious inaccuracies for gauging the

relevance of certain allegedly novel phenomena, and to the loss of antecedents with which to compare long-standing trends (*longue durée*), ultimately influencing the effectiveness of the decisions, measures, or public provisions to be taken.

Through developing analysis and empirical studies in all the regions involved –countries of origin, destination, and transit– the social sciences can contribute to analyzing, dismantling, and creating frameworks of possible alternatives to address migration and situations of vulnerability in which migrants live. In close collaboration with philosophy and the human sciences, they can also contribute to rethinking the categories and concepts that define international migration in a globalized world.

By developing empirical analyses and studies in all the regions involved - countries of origin, destination, and transit - the social sciences can offer an invaluable contribution to analyzing, dismantling, and creating frameworks of possible alternatives of how to deal with migrations and the situations of vulnerability in which migrants live. In close collaboration with philosophy and human sciences, they can also help rethink the categories and concepts that currently define international migration in a globalized world.

Likewise, theoretical and practical progress in this field depends extraordinarily on a genuine interdisciplinary approach, in which approaches and knowledge not only from different places and groups but also from different disciplines, not restricted to human and social sciences, engage in a conceptual and methodological dialogue in order to address the phenomenon in its complexity and multidimensionality.

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CHALLENGE F

ABSTRACT

International migration is a highly complex and global phenomenon, an ideologically charged and polarizing topic of enormous symbolic and political relevance, a phenomenon that requires an interdisciplinary approach from both a descriptive as well as normative perspective. Migratory flows have increased and are incrementally caused by armed conflicts or climate change, as well as by acute global inequalities. Given that the causes and implications of migration exceeds state limits a comprehensive study needs to abandon “methodological nationalism”. The economic and social integration of the migrant population is a complex challenge, but the opportunities it opens up are also manifold: migration drives economic growth, connects different cultures, and contributes to international development.

FOR A HEALTHY DIET IN A GLOBAL AND SUSTAINABLE WORLD

Coordinators

María Dolores del Castillo Bilbao
(CIAL, CSIC-UAM)

Oscar Martínez Alvarez
(ICTAN, CSIC)

1. PERSONALIZED NUTRITION. THE KEY TO HEALTHY EATING

1.2. Foods adapted to the genome

In 2003 the first two drafts of the human genome sequence were published. It was the result of the work of 3000 scientists for the past 10 years and had a cost of 3 billion dollars. At the end of last February 2020, just 17 years later, the Chinese mass genomic sequencing company BGI announced it could sequence a human genome for the modest price of 100 dollars. This is the speed at which genomics has flourished, a scientific discipline that stays and imposes itself in many facets of our life and, among others, in food.

What a few years ago was unthinkable, defining a diet according to the genetic passport, is becoming more possible every day. Moreover, not only because of this reduction in sequencing costs but also because of other factors such as the generation in recent years of data on hundreds of mutations in genes that predispose to pathologies that can be prevented with adequate nutrition, applying new “Big Data” management tools to this knowledge, developing devices that allow quantifying biochemical and physical parameters of the individual in an immediate and non-invasive way, or the availability of applications on our phones that digest all this information in a pleasant way. The result has been the birth of something that some call personalized nutrition and others call precision nutrition, a new way of defining what we eat in a much more rational way, considering the genes of our genome, the global set of microorganisms that live in our body (the so-called microbiome that other colleagues talk about in another chapter of this book) and our cultural, social, and gastronomic collection.

Let us close our eyes and think about year 2030. Many children who are born in Spain will probably immediately have their genome sequenced. We will know which mutations accumulate and which of them can lead to serious health problems, for example, a mutation in the B-RAF or KRAS genes that lead to a higher probability of developing colorectal cancer. If this circumstance occurs, that child will have controls throughout his life that allow detecting this disease in its early stages, when therapeutic treatment is most effective. Nevertheless, you must also assume dietary habits that prevent the appearance of the problem, for example, following a diet rich in fiber and low in fat that prevents the appearance of this cancer. What is important is that you will not only know this mutation, but you will also know thousands of them present in your genome that, analyzed by experts in bioinformatics, will define your healthiest diet. You will have that precise nutrition, that personalized nutrition we talked about earlier.

This area of the consumer genome is one of the three angles at which genomic studies affect diet. We talked about the second previously, the microbiome of our body and the genes of those microorganisms. The third angle is, however, is more unknown, but relevant as the previous two. It is the application of genomics in the improvement of agro-food raw material. The genomes of most of the animal and plant species that constitute 99% of our diet have been sequenced. The genomes of hundreds of microbial species that produce the fermented foods and beverages we consume in different regions of the planet have also been sequenced. We know the genetic bases of the organoleptic properties, textural, and nutritional aspects of our food and beverages, so we can improve them. We have no excuse. Over the next few years, the scientific community and the companies in the sector must be able to take advantage of this enormous molecular heritage to develop a new healthier, safer, and more sustainable agri-food chain from knowledge.

It will not be an easy task for two reasons. First, the complexity of the problem we are facing. A planet with 7.2 billion people, of which over 800 million go hungry, although we produce enough food for everyone, and over 1.6 billion of them are obese or overweight. An agri-food system exposed to climate change, with exceeding water footprint and a demography in which the points of consumption have moved away from the points of production. The second problem, as serious as the first, is the conversion of a debate that should be merely scientific-technological into an ideological debate. There are many types of agriculture: conventional, organic, precision, and the one we talk about in this

chapter, agriculture based on genomics. We need them all, none are perfect, and none are diabolical. Each region of the planet will require the joint work of many of them. We cannot ignore that genomics raises fears in a sector of the population, a sector that has been suspicious, if not viscerally opposed, to transgenic agriculture. Hopefully, given the seriousness of the problem we are facing, no one will impose their ideology on the common good and we will reach a consensus on how to smartly use genomic knowledge in agri-food.

1.2. Foods adapted to the microbiome

The human organism harbors different microbial ecosystems (microbiota) in the oral cavity, the gastrointestinal tract, the urinary tract, and the skin. The collective genome of this microbiota (microbiome) encodes 200 times more genes than the human genome. In recent years, the international scientific community has turned to the study of the human microbiota and microbiome, and their involvement in various pathologies (oral, respiratory, intestinal, urinary, neurological, etc.) and in human health in general. There are already several large public consortiums that have addressed this issue by recruiting large population groups. In this sense, the projects The Human Microbiome in the USA and MetaHits in China and Europe are pioneers in this area. Parallel scientific studies increasingly confirm the importance of diet in maintaining the health of our microbiota. Specifically, food is considered an effective therapeutic route to treat intestinal diseases, associated with an imbalance in the diversity and / or functionality of the microbiota (intestinal dysbiosis). In this general conception of food adapted to the microbiome, specific ingredients (probiotics, including non-conventional, prebiotics, post-biotics, and other bioactive compounds), the diet and its interaction with other lifestyle habits (physical exercise, cognitive, emotional activity, etc.) are important. However, it is increasingly evident that the physiological response derived from the intake of certain ingredients / foods varies between individuals, due largely to the great interindividual variability in the gut microbiome. In this framework of scientific knowledge, the microbiome (and its interindividual variability) is perceived as a target of exciting study of the beneficial effects of ingredients / foods in the human organism. The so-called “healthy diet” implies the maintenance of a healthy and diverse microbiota in the human organism, considering the genetic individuality of the organism itself and its living habitat.

The great scientific challenge that will arise in the coming years is the development of effective ingredients / foods / diets / habits in the care of the

microbiota—in the protection / treatment against pathologies related to it—and particularized to specific individuals and / or population groups. It is a multifaced challenge, at the interface between food / nutrition, intestinal biology, and health, which is not only an unquestionable scientific reality but also has great industrial value. This challenge could be broken down into three linked challenges:

1. Development of a new landscape to understand the interaction of food with the microbiome: efforts are based on understanding the complex interaction at the molecular level between the microbiota and the host, which will be the basis for developing foods adapted to the microbiome. In addition, to understand the relationship between our metabolome as hosts and the metabolites that derive from target groups of the human microbiota (metabolic mutualism). To identify the significant changes in the microbiome that cause disease, and the mechanisms responsible for the transition of the microbiota from a healthy to a diseased state. To discover the complex interactions between the gut microbiome, gut epithelial cells, and the immune system in response to pathogens. Also, to understand how the gut connects with the central nervous system: the gut-brain axis. To characterize how the intestinal microbiota metabolizes food, to know which genes are present or which are expressed, which metabolites each microbial group produces and what their role is in protecting the health of both the intestinal tract and that of the rest of the body, once those metabolites are absorbed.
2. Food and diet as prescription and as therapy: to determine the effects of ingredients / foods / diets specifically designed for the maintenance of the healthy state (homeostasis) or for the correction of a diseased state of the microbiota (dysbiosis) related to inflammatory bowel diseases, obesity, food allergies, urinary infections and others, neurological diseases, metabolic changes in old age, etc. To validate the effectiveness of the therapies / strategies (supplements containing probiotics, prebiotics, post-biotics, and other bioactive compounds, foods, dishes / recipes, diets combined with lifestyle habits, etc.) for the proposed purposes. To design rapid, precise, and less complex interventions and analytical methods that allow diagnosing states of early dysbiosis in the microbiota, candidate to therapy / correction strategies based on diet. For this challenge, the connection with the medical records is essential, and sustained collaborations with hospitals and with the health clinic are needed. The food industry pays attention to the effect on the

microbiome of polyphenols, peptides, polysaccharides and / or their combination with prebiotics and probiotics. The pharmaceutical industry is open to including these ingredients in nutritional supplements and devices for clinical use toward groups of the population. Therefore, this is a business niche with short- and medium-term perspectives.

3. New integrated structures / platforms with the most advanced, least invasive, and fastest instruments / infrastructures that keep research at the forefront while designing analytics for daily use of the microbiome and its interindividual variability are needed. To create action protocols in primary care that allow detecting states of dysbiosis of the microbiota to act in its earliest phases. To develop bioinformatics applications to perform meta-analysis of data (Big Data). To integrate the information obtained in platforms with genetic data and others. To create databases to store, organize, and to make information accessible to all interested sectors. To develop prediction models.

To meet these challenges, the complementary work of various human teams and entities will be required to make possible a complete scientific-technical approach, from basic science studies to industrial developments of ingredients / foods and nutritional recommendations for the general population and prescriptions for specific groups.

Specifically, specialists in food science and technology, microbiology, computer engineering, nutrition, and medical specialties will have to work together toward innovative organizational structures created ad hoc, with specific objectives (ingredient / food, population group, specific pathology, etc.) involving research centers, companies, and health services. These three vertices (research, business, and administration) will be articulated in a single triangle.

1.3. Food for optimal physical, mental, and emotional health.

The brain-gut axis.

The brain-gut axis is the term used to describe the dynamic and intimate communication network between the two organs that constitute it. The brain regulates motility, the release of digestive enzymes and hormones, blood flow, and the nutritional support of the gastrointestinal (GI) tract ensuring it remains healthy. The gut contains and regulates parts of the endocrine, immune and nervous systems. The enteric nervous system, the autonomic nervous system, and hormones regulate mucosal functions and intestinal motility. Thanks to

the communication between the nervous and hormonal systems, the correct functioning of the brain-gut axis is guaranteed, essential for the physical, mental, and emotional health of individuals. The microbiome of the GI tract is also an essential component of this axis. The gut is a route of entry to the brain for pathogens such as viruses, prions, and substances such as beta-amyloid, which facilitates the appearance of neurodegenerative diseases. Maintaining microecological balance is essential to reduce the risk of this axis disorders.

GI health determines the nutritional support and general health of the individual. In 2018, the total percentage of the population diagnosed with GI diseases in Spain was 20%, with a higher prevalence in women, many of whom also suffer from fibromyalgia, migraine, chronic pelvic pain, chronic fatigue syndrome, and depression. Besides organic GI pathologies such as colorectal cancer, inflammatory bowel diseases or intolerance and sensitivity to proteins such as gluten or other allergens, there are other disorders, such as irritable bowel syndrome or functional dyspepsia, considered “functional or brain-gut axis disorders.” These affect quality of life, social function, labor productivity, and resilience in the face of both health and social crises (such as COVID-19), and they represent a great burden on public health systems. Psychological and psychiatric symptoms (mainly anxiety and depression, but also bipolar, obsessive-compulsive, and sleep disorders) are more frequent in patients with gut pathologies and *vice versa*. Many neurodegenerative pathologies (such as Parkinson’s disease) can begin in the gut long before clinical symptoms and “spread” to the central nervous system using the neural connecting pathways of the brain-gut axis (vagus nerve, for example). Other diseases, such as autism and schizophrenia, considered neurodevelopmental disorders, present GI motility disorders, whose relief is essential in the management of these patients.

The strategies for the treatment and prevention of disorders of the brain-gut axis should be directed to a healthy diet and lifestyle, which allow achieving a sustainable health, understood as “healthy and active aging that prevents the risk of diseases.” Due to the heterogeneity of the pathogenesis of these disorders, it is difficult to design dietary regimens and / or pharmacological therapies that benefit all individuals. Therefore, a global and sustainable food industry must be directed towards a safe, sufficient food, available to all, precision and / or personalized diet. A diet with beneficial effects on the intestinal microbiota and the brain-gut axis includes the Mediterranean diet, and the daily intake of foods with a low glycemic index (whole grain cereals), rich in proteins of high nutritional quality (legumes, insects, algae), probiotics, mainly soluble

dietary fiber from natural sources (by-products of the food industry, algae), vitamins (C, D), minerals, omega-3s, and phytochemicals (melatonin, caffeine, cannabidiol). However, culinary and industrial food processing affect its composition and safety, and it is essential to promote nutritional education programs and healthy food preparation for the general population. All these recommendations help to maintain health and reduce the impact of pandemics of chronic non-communicable diseases (obesity and diabetes) and infectious diseases such as COVID-19, affecting the brain-gut axis.

Among the future lines in this discipline, using humanized animal models, artificial intelligence (intelligent packaging and labeling for optimal health with simple applications), imaging techniques, organoids proposed to obtain information on the role of the microbiota, enzymatic digestion of the components of the diet in the health of the brain-gut axis, the extrapolation of the knowledge of the mechanisms of action of drugs to the area of food science, and to identify food molecules for a healthy brain-gut axis. To reach this milestone, the interaction between pharmacologists specialized in the organs involved in the axis, experts in food sciences, health personnel (gastroenterologists, neurologists, psychiatrists, and psychologists), the food industry, and experts in artificial intelligence, social sciences, and humanities is needed. CSIC has a multidisciplinary team. However, to address this challenge, it is necessary to strengthen the existing CSIC-URJC collaboration and promote and strengthen a sustained collaboration with the clinic.

2. FOOD IN TIMES OF CRISIS

Over the next 30 years, three of the most important challenges, pertinent for our analysis, that can be transformed if they are not adequately addressed in crises, are related to the environment, the aging of the population, and economic and social cohesion.

Block 1: Environment (and health)

The “convenience effect” has been one of the main engines of the food industry to present new foods to the consumer: more elaborate, with a longer shelf life, suitable to consume at the moment.

In this process, it has encountered competition from centers that prepare takeout, take it home, or supply ready to eat meals to restaurants so that consumers have only to heat them, often in the microwave.

Change 1: Healthier products

All this multiplies the use of additives, preservatives, glutamate, stabilizers, multiplying waste. The “global and sustainable world” of the future will internalize the environmental costs of production, transport of the corresponding waste (edible packaging) and will see a strengthening of sanitary regulations with a limit to the number of additives and other additions.

Change 2: The return of the ingredients

This whole process has been guided by the lack of time. Shopping and cooking are time- and mind-consuming activities. With robots, time will no longer be a limiting factor. The goods will be delivered by robots, received by other robots, and robots also will prepare the dishes, that will be ready for consumers when they get home.

We will see a decrease in “food” understood as ready to eat dishes to see the resurgence of “ingredients,” the basic raw materials with which “food” is prepared.

Change 3: Local, then global too

Food and ingredients will be fresher, more seasonal on the one hand and more varied on the other, ecological or without pesticide residues.

In a first phase, we will see an increase in local products (where possible), because of the internalization of transport costs. However, the industry will respond with a drastic reduction in these logistics costs, with renewable energy, robotization, intermodal transport...

The result will be the development of Territorialized Food Systems, and a smaller footprint of transport.

Change 4: Change in the global mapping of meat consumption

Meat consumption will have decreased in the developed world and will increase in developing countries. In addition, the mix of meat consumed in the first world will be different, with more products from extensive livestock farming and less consumption of granivores: the internalization of the costs of the “Land use change” will penalize intensive pork and poultry farming that consume soybeans.

Change 5: Increased consumption of plant proteins

The explosion of the vegetable meat (or the “cheese analogs”) does not seem possible, because its development will be limited by the greater controls of additives (see change 1).

However, in relation to change 2, a strong resurgence of vegetable proteins, chickpeas, lentils, and other comparable products is likely.

Block 2: Aging (and health)

Two effects of the aging of the population are identified, complementary to the changes in block 1:

Change 6: A more varied diet, with more fruits and vegetables

Concern for health and the awareness of its fragility will make the growing population of older age take even more care of the dietary quality and variety of their diet.

The “healthiest” foods such as fruits and vegetables, cheeses and yogurts, olive oil... will consolidate their importance.

Change 7: Rise of “functional foods”

Aware of this reality, the food industry will react by putting even more compound foods on the market that provide not only nutritional but public health value. Some of the best known are dairy products with sterols or stanols to lower plasma cholesterol levels, but we will have foods with artichoke included to aid our livers, anti-rheumatism, anti-osteoarthritis, anti-depression foods, etc.

Block 3: Economic and social cohesion

“The” consumer does not exist, there are many consumers with different behaviors. Even the same person behaves as one type of consumer in certain times and for some products (for example, wine), and as another type with other products in other occasions (for example, yogurts).

In the short and medium-term, our society will experience an economic crisis without precedent since the post-Spanish war. The trends observed during the 2008 crisis will reappear, but will be stronger, and longer lasting. For example, the purchase of distributor brands, entry-level products, and offers that can devalue products (olive oil or milk) will increase.

The social division will widen, with consumers willing to continue (or even increase) consuming organic products of certified quality.

The trends stated in the previous blocks will not be distributed evenly among the social categories. There is a significant risk that the social and food gap will widen.

There are many factors, outside the scope of this challenge, which influence this gap. Nonetheless, there is a specific field of research on how to make the six possible changes work so they are inclusive.

3. WHEN CREATIVITY IS AN INGREDIENT: TRYING THE NEW AND FEEDING THE NOVELTY

“Don’t eat anything your great grandmother wouldn’t recognize as food”
Michael Pollan

In the complex ecosystem that food supposes, in the last decade, a holistic concept has gained relevance that starts from the socio-economic and environmental influence of the productive processes linked to the land, goes through the personalized design and creation of ingredients and food, and integrates the nutritional, sensorial, and gastronomic quality of the result. Ingredients, foods, and processes are taken out of their traditional niches of production and used to interact in the food laboratory. The sciences and areas of knowledge that support this phenomenon extend their scope, and food is not only based on chemistry, nutrition, bromatology, or food technology, but also on sustainability, design, neuropsychology, bioactivity, sensory sciences, omics, energy efficiency, and artificial intelligence.

The emergence of gastronomic sciences - interaction of those areas previously mentioned with culinary techniques, customer service, marketing, communication and arts - has focused on the role of the culinary preparation in meeting the increasingly individualized public in their nutritional requirements, sociocultural context and health

In this field of work for the researcher and the agri-food market, the generation of “new” foods from the laboratory and the industry cannot be ignored, but it seems necessary to establish the key axes for the generation of these products. A recommendable ethical framework for its development would be one based on the 5S: salubrity, safety, sensory, sustainability, and solidarity.

From this perspective, a creative food cannot be an elitist elaboration or be based on a “new experience” for a society hungry for sensations. Making use of an evolutionary or disruptive research / innovation process, a food based on creativity must be a response:

1. To an expressed or perceived demand of a nutritional, welfare, or health nature.
2. Presented in a sensory appropriate and satisfying way.
3. Integrated —or at least acceptable— in the social and cultural perspective of the individual.
4. To reduce imbalances from different perspectives.
5. Transparent in its objectives and development, always accompanied by educational-informative actions.

3.1. Are creative and disruptive foods necessary?

A solid argument against food neophobia is the first and most important task of the creative food researcher, and without it, their work is meaningless because:

- They are input vectors for the consumption of foods and ingredients with different values from the merely nutritional ones. An example is the use of ingredients that alleviate poverty of a social minority or ethnic group.
- They facilitate the consumption of foods and ingredients with high nutritional value but that present serious problems of cultural acceptance, production, sustainability, or access, as the case of insect protein consumption may be.
- They attend groups with special nutritional, vital and cognitive needs: functional foods, foods for vital situations with sensory compromise (frail elderly, cancer patients, toothless), foods for allergies and food intolerances, or safe, attractive, and autonomy-promoting foods for disorders of the autism spectrum, cognitive-sensory impairment, or neurodegenerative diseases.
- They stimulate the agri-food industry in a competitive environment, allowing the reconversion of productive activities. For example, using algae, microalgae, and new products from the sea.
- They allow progress in disruptive innovation, exploring synergies with other areas of knowledge. An example are the culinary elaborations based on combinations optimized by neural networks, fed with biochemical and sensory data and with scores of sensory pleasure, novelty, and surprise.

- They provide tools for food diversification, through the possibility of progressive adaptation in composition and / or sensory characteristics: thus, those based on texturizations and emulsions, or “trick” or simulated foods.

3.2. What characteristics must a creative food have?

In a market with a low success rate for new food developments, a solid basic approach and rigorous monitoring of the characteristics desired by the researcher are the best guarantees.

- They must present adequate, satisfactory, and educational sensory properties, not this being the determining factor to mere novel experiences.
- They must be healthy, with a correct nutritional intake and / or content of functional compounds.
- They must present versatility in their culinary preparation and consumption.
- They must be satisfactory from multiple ethical points of view: sustainability and environmental care in production, and solidarity in their manufacture, distribution, and access.
- They must be integrated into the culture and history of the target individual or population. Often, this aspect will be determined by the age and social and ethnic background of the consumer.
- They must prioritize simplicity in its formulation, limiting the number of ingredients, aggressive processes, and making use of GRAS-type standards and Clean Label certifications.
- They must be especially transparent and accurate in their target audience and the information they accompany, always based on ethical and rigorous disclosure and careful observation of food legislation in terms of labeling and claims.
- They must be affordable, have a wide, supportive, and easy distribution, and have a sufficient useful life.

3.3. Is there a niche for this food?

Creative foods appear as complementary to a diet based on fresh and / or poorly processed products. This being the diet that should predominate, there is space for developing these foods because:

- They are highly demanded by consumers with an “early adopter” profile: restless, explorers, highly informed.
- They present a significant commercial acceptance by groups with special food needs.
- They are foods committed to long-term visions and objectives, such as meeting the Sustainable Development Goals (SDGs): SDG2 Zero Hunger, SDG3 Health and Wellbeing, and SDG12 Responsible Consumption and Production.
- Its incorporation into haute cuisine and food services is simpler and highly advantageous, with significant economic benefits.

4. TECHNOLOGICAL INNOVATION IN A CONSUMER-CENTERED FOOD SYSTEM

Food production has undergone a great change in recent decades to adapt to scientific and social advances towards a healthier diet, with products oriented to meet specific needs, based on the need for transparency and on business models inspired by the Circular Economy, committed to recycling and the sustainability of the planet. At present, besides the traditional relationship of Food Technology with the agricultural sector, technological innovation is linked to many other sectors, because of the need to respond to the premises of more advanced nutrition, progress in developing foods for specific health use, the appearance of new materials, the need to consider their environmental impact throughout the production chain, and to the demand of consumers that are more connected, informed, responsible, and aware of their habits. Innovation in the technology sector demands systemic thinking in the food chain, to include all its actors, from the primary sector to the consumer (“*from farm-to-fork*”).

Consumer participation as a key element in food production that companies use, today more than ever, to decide their production and marketing strategies. Until recently, few consumers were concerned about knowing the origin of the food that reaches their plates; however, today’s consumer is demanding more transparency and traceability in what they consume. The advancement of “*blockchain*” technology provides a new environment for sharing data and digital records, which links producers, distributors, and retailers, allowing the resolution of problems, and connecting with small stores and consumers, who can follow the traceability of the products simply by scanning a QR code.

Although discovering what the consumer wants is not an easy task, today's health, convenience, experience, and sustainability have become substantial in our purchasing decisions. For example, over 45% of Spanish consumers have purchased some “*bio*” or “*eco*” product in 2019. The food company reacts according to this evidence, understanding the advantages of promoting the development of innovations in co-creation with the consumer. In a top-down vision (“*from fork-to-farm*”) from the kitchens of consumers, needs, challenges, and new ideas are identified, to collect preferences and acceptance, fostering consumer participation to configure, test, and refine food and / or services.

Leading to a healthier life, food plays a fundamental role in today's society. Many consumers are convinced of the need to maintain a healthy diet, trying to avoid the intake of ingredients perceived as harmful, following a diet model (vegetarian, vegan, sattvic, macrobiotic) or personalized diets according to their needs (lactose-free, gluten-free, low-salt, cholesterol-free). Smart Packaging, Biodegradable Materials, Edible Coatings, Non-thermal Preservation Methods, Ultrasonic Cutting, Compressed Solvent Extraction, High Pressure Homogenization, Enzyme, and Microbial Engineering, are new technological alternatives present in the modern food industry that play an essential role in producing food of improved quality and safety, with characteristics that make them being perceived as healthier. Products with functional properties will soon be like “*commodities*,” the public will end rejecting what is unhealthy, and the clamor of public administrations will add to this trend, because unhealthy eating is closely linked to a high expenditure on health-related issues.

However, consumers are increasingly aware of the impact of their purchases on the planet and feel more responsible for their actions. Controlling waste or recycling are aspects that are much considered when buying food or cooking. This change in attitude does not refer only to the consumer's own habits, but also includes a greater demand on companies to promote a more careful, committed and, sustainable production. Therefore, business models inspired by the Circular Economy, committed to “*upcycling*” (recycled materials are transformed into higher value products) and “*zero waste*” for the environment, are emerging rapidly. Automated systems that allow creating agricultural platforms to make plants grow with no soil (*vertical farms*), fish farming in urban gardens (*aquaponics*), 3D printing to create microstructures, products with insect protein (*entomophagy*), filets made with cells (*in vitro meat*) and their extension to other foods of animal origin such as eggs, milk or cheese, are some new challenges facing food production.

Technological innovation in the food sector must guarantee large-scale production, within the cities themselves, the welfare of animals, using renewable resources, and respect for the environment, to respond to the needs, preferences, and acceptance of the consumer, and to allow us to live in a more sustainable and responsible way. Precision nutrition to prevent disease, modular product design, ultra-fast formulation, minimally processed foods, acceptance of alternative food sources, artificial intelligence applied to the analysis of the millions of data generated in the study of all aspects that are involved in food and nutrition, are examples of the essential role of the consumer as co-creator, to help guide the objectives and innovation of the food system.

5. NEW SUSTAINABLE MATERIALS COMPATIBLE WITH CIRCULAR ECONOMY STRATEGIES FOR FOOD PACKAGING

Within food preservation technologies, packaging has had and continues to have a prominent place as it directly contributes to reducing food waste and improving food quality and safety. However, the abusive use of plastic packaging materials, their high impact on the carbon footprint, their short shelf life, and their linear economic model of ‘produce-use-throw away’ have made food packaging a difficult potential contaminant to eradicate. Most plastic food contact containers and disposables are not sustainable, because they are made from petroleum-derived polymers, which are chemically stable in the environment, and therefore, unless incinerated, make a very long-lasting residue.

Because of this undesirable and endemic panorama, consumers, governments, retailers, and other social vectors have drawn a line already considered irreversible. An extensive list of use restrictions is to be foreseen, which will begin in 2021 with disposables, and whose most ambitious limitation horizon will be 2030 with food packaging. This strategy generically called the Circular Economy strategy, promoted at European level by the “DG Environment” of the European Commission, has already begun with the articulation of action mechanisms as Directives to reduce the consumption of plastics, prohibit some disposable items, and promote the elimination of “single use” through different initiatives.

Circular Economy, which promotes sustainability in using materials based on the recovery of value and the non-generation of waste, creates new challenges for research. Petroleum-based packaging will continue to exist for the next 30 years, but it will also be required to be useful in reducing food waste

and that it can be reused and / or recyclable. Recycling, whether mechanical or chemical, will present great challenges to the community of technologists and scientists. However, plastic materials degrade during industrial reprocessing, which makes mechanical recycling, based on the recovery and continuous reprocessing of plastic packaging, very difficult to apply widely in the medium and long-term. Therefore, the mechanical recycling process with current technology does not offer sustainable solutions and can even pose food safety problems due to the potential migration of certain components generated during reprocessing. Chemical recycling, which comprises applying depolymerization processes that allow the polymers of plastic waste to be converted into their starting monomers, so they can be repeatedly re-polymerized, offers more guarantees of sustainability. However, this technology is only at an early stage of development and is therefore a target to be pursued by scientists working in the area.

Another alternative, closer and more complementary to recycling technologies, but which will still involve a lot of research activity, is related to developing materials and packaging technologies obtained from biomass, and more generically, to developing interdisciplinary strategies based on Bioeconomy. This pathway must contribute importantly to global sustainability, because it promotes very interesting aspects of the use and valorization of natural resources. Thus, obtaining biopolymers from renewable resources not only offers materials with a lower impact on the carbon footprint but also new possibilities in terms of end-of-life scenarios. Polylactide (PLA) has been the paradigm of industrialized biopolymers for a long time. However, the main problems posed by this biopolymer are the competition of agri-food resources between food and plastics production, its low toughness and thermal resistance and high permeability to gases and vapors, and that its biodegradation is problematic unless run under industrial composting conditions. New emerging lines contemplate the functional development of natural polymers such as starch, cellulose and other polysaccharides, proteins, lipids, and more important polyhydroxyalkanoates (PHAs) of microbial origin, combined with new processes based on nanotechnology. Especially PHAs, offer the possibility of being produced in microorganisms existing from agri-food waste or algae, and in its most current and innovative aspect, from CO₂, and even from municipal waste such as sewage, park, and garden waste, as well as the organic fraction of solid waste. This newest line of approaching sustainability in food packaging is compatible with strategies called Circular Bioeconomy, where biomass, agri-food, marine and municipal waste will be transformed into higher value products (“upcycling”).

In this way, new packaging materials can be obtained that will be processed through traditional or emerging routes based, for example, on nanotechnology, to make single-use packaging.

6. REDUCTION OF THE CARBON FOOTPRINT OF FOOD PRODUCTS

The carbon footprint in food is a measure of the exclusive total amount of greenhouse gas emissions (directly CO₂ and / or equivalents expressed in CO₂) caused directly and indirectly by the production and processing activity, and that accumulates during all life stages of a product. These gases include CO₂, NO₂, and methane, most of which are released by industry, agriculture, livestock, and the burning of fossil fuels. This environmental indicator has been implemented in many countries for years (in Spain since 2014). However, there is scarce scientific literature on the subject. Most of the studies have been conducted by private organizations and companies predominantly guided by their business sense rather than their environmental responsibility. Considering that the consumption of food products contributes approximately 25% of the total emissions of greenhouse gases (GHG), with the growing public awareness about climate change, there is also a growing willingness for people to reduce their GHG emissions through changes in their eating habits. Therefore, if the carbon footprint in food can be a tool to verify the emissions of a certain product or diet, it is necessary to increase the investigations on the emission / fixation balances.

The carbon footprint of food, the impact of food on CO₂ emissions, is one of the most important issues that need to be considered to improve the environmental responsibility of the food chain, and one of the most discussed topics within the scenario of global climate change of developed countries. Farmers, industry, commerce, and consumers are interested in reducing the impact of climate change, but lack the means and information to address the problem. Therefore, the main challenge for science is to provide the necessary data and tools to those involved in the food system to understand and influence key issues such as the potential for carbon sequestration (produced only by plants and algae) and the reduction of emissions in primary production, both plant (including reducing the negative effects of certain agricultural practices) and animal, processing industry, and transportation.

Therefore, the absorption of CO₂ by plants and algae constitutes a key point in the global carbon balance. Plants and algae can capture atmospheric CO₂, and through photosynthetic processes, can metabolize it to obtain sugars and all the metabolites they require for developing their life cycle. It can be concluded that plants, through photosynthesis, extract carbon from the atmosphere (in CO₂) and convert it into biomass. In this sense, biomass, which fluctuates between 40 and 50% carbon of the dry weight of the plant or algae, can function as a highly effective carbon fixation system. Therefore, agriculture can become one of the most effective means to mitigate the increase in atmospheric CO₂ if certain agronomic practices are followed to reduce the emissions it entails. In this way, research on land treatment, fertilization, irrigation, tariffs, and the use of by-products is essential.

However, research on reducing emissions from animals is also essential. In this sense, making the right choice regarding the animals to be consumed, their diet, their way of growth, and their subsequent treatment can become an effective strategy to reduce emissions. However, incorporating new sources of food based on invertebrate animals with sustainability must be investigated.

Regarding the energy aspect, the search for electrical and thermal energy generation solutions that help reduce the carbon footprint and polluting emissions in the production cycle of any food, will be essential. New concepts of energy generation equipment will be needed in which research promotes a more sustainable management of certain wastes currently considered as such and that require specialized management. In the case of by-products or surplus food in the production chain, the choice of waste management system must be understood and accounted for within the calculation of the carbon footprint, regardless of the consideration as energy generators.

7. ETHICAL ATTITUDES AND HEALTHY EATING

The Challenge “For a healthy diet in a global and sustainable world,” allows opening the debate around food production and consumption, reviewing old terms, based on sectoral (agricultural) approaches, and incorporating new ones of a more comprehensive nature and all-embracing.

The first thing to highlight is that, for several years now, FAO’s campaigns are no longer exclusively focused on the fight against hunger, but now focus on issues related to food (nutrition, health, sanitation, environmental effects, diet

balance...). This indicates that the UN is addressing the problem from a multidimensional perspective, given the challenges to be faced in this 21st century in relation to this issue.

7.1. Limitations of sectoral approaches

Regarding “food security” (citizens’ right to basic and safe food), this perspective follows the line of sectoral (agricultural) approaches based on increased food’s being an indispensable condition for solving the problem of hunger worldwide. Thus, it does not matter how or where food is produced, because what is relevant here is whether there is a high level of agricultural production worldwide, and whether trade ensures the supply of the population.

However, it is a fact that sectoral approaches are not facilitating the achievement of the planned objectives in the fight against hunger (according to FAO, there are still 800 million people living in hunger and with malnutrition). In addition, they are promoting the expansion of intensive production and consumption models with serious effects on the deterioration of natural resources, models that generate important imbalances in terms of nutrition and food supply to the most disadvantaged populations. These models, with the total opening of markets, also cause strong volatility of agricultural prices, with the consequent impoverishment and abandonment of peasant-type farms in different areas of the planet. This explains much of the discomfort of farmers in many countries.

The perspective of “food sovereignty” (the right of people to feed themselves) is also framed within a sectoral approach (agrarian), also focused on a way of seeing the North-South relationship as a conflictive relationship (the hunger and poverty of the South because of the abundance and wealth of the North). The right of people to their own food is raised by this approach based on a firm commitment to peasant-type models, denouncing the strategies of multinationals (producers of seeds, pesticides, fertilizers...) and rejecting the policies that protect agriculture in rich countries (such as the European PAC).

However, and given that these problems are present throughout the planet (hunger and malnutrition exist in both rich and poor countries, although in different magnitudes and with different expressions), the approach of “food sovereignty” should be valid for all countries. Rich countries may also feed themselves, which would justify the existence of agrarian policies aimed at promoting agricultural systems capable of ensuring food supplies for their populations. Another different thing is whether such protectionist policies have distorting effects on world markets, and whether they negatively affect peasants in poor countries.

7.2. Food Citizenship as an integrative approach

The limitations of sectoral approaches have led to the emergence of new, more comprehensive, and multidimensional perspectives in addressing these issues. One is the perspective of “Food Citizenship” (coined by authors such as Renting, Gómez Benito, Lozano...), according to which citizens have the right to healthy and quality food, but also the duty to consume food responsibly, discovering what they consume and assessing the effects this has on future generations, on other populations (in our immediate surroundings, and the rest of the world), and on the environment.

This perspective also conceives food producers and consumers (from rich and poor countries) as active subjects with the right to participate in the public sphere to reorient production and consumption models. It promotes the creation of social movements and encourages the development of cooperation experiences between producers and consumers (short channels, local markets, slow food...).

In contrast to the “food security” approach, this more comprehensive perspective posits that hunger and malnutrition are not just a problem of food production, but of development models. It is a perspective of an ethical nature, which is also in tune with the approaches of the “integral ecology” of which Pope Francis speaks in his encyclical “*Laudato si*.”

According to this new perspective, the problem of food is not exclusive to poor countries (which would have to be helped for humanitarian reasons), but a global problem that manifests itself both in developed countries (obesity, unbalanced diets...), as in developing countries (hunger and malnutrition).

The “Food Citizenship” approach also goes beyond the sectoral approach to “food sovereignty,” subsuming the sectoral ideas of the latter in the broader and more comprehensive approaches of the former. For example, declaring, as does “food sovereignty,” the right of citizens to food and of peoples to feed themselves does not guarantee that food is healthy and of quality, if this right is not linked to that of being informed about what we eat, and the duty to exercise a proactive attitude, both individually and collectively.

As active subjects, citizens must be informed about food production models and ensure that what is consumed meets valid guidelines for environmental sustainability (including issues such as animal welfare). Further, to verify that they have not occurred within the framework of policies harmful to

peasants in other parts of the world, and finally mobilize to undertake actions that seek alternative systems to conventional production and consumption models. It is a responsible consumption that also affects the diet, affecting new food trends (vegetarianism, veganism...) that emerge in certain segments of the population.

And it is in this broader and more comprehensive perspective where the approach of “food citizenship” makes sense, by opening new perspectives of analysis (producer-consumer interaction, consumer behavior, consumerist attitudes, the role of large distribution, public policies...). And new challenges for researchers.

8. TOOLS TO STIMULATE AND PROMOTE CONSCIOUS NUTRITION.

Food is an essential part of our life, it is a source of pleasure and it is the main way we celebrate, share, and enjoy important moments in life with other people. Our eating habits are rooted in our culture, in family customs, in the country where we are born, live, etc. These habits are usually harmless to health, but sometimes unconscious habits appear that lead to a mismatch in our relationship with food.

In our fast-paced society, because of the multitude of tasks we take on daily, we eat quickly and unconsciously. This has serious implications for health in the medium and long-term, such as the appearance of obesity and other eating disorders. In addition, and importantly, eating produces immediate satisfaction, so it is used to alleviate feelings of anxiety, boredom, dissatisfaction, or sadness. Eating hides, in these cases, an attempt to calm our suffering, originating an internal struggle with food that could lead to intense emotional agony, along with feelings of guilt and shame.

In the United States, tools appeared a decade ago to re-learn how to raise awareness in the eating process, giving birth to *Mindful Eating* or “Conscious Eating.” This initiative spread rapidly through Western countries. We define “Mindful Eating” as the ability to learn from the thoughts, physical and emotional sensations that appear in relation to eating. These tools are encompassed within the broader concept of “Mindfulness,” a discipline that teaches how to pay attention to the present moment, with acceptance and curiosity. Because of mindful eating, we learn from the mental patterns that our eating habits follow, to create healthier ones. This ability must be

cultivated (re-learned) by directing deliberate attention to the process of eating. Young children retain the ability to pay attention to the surrounding environment, and therefore to what they eat, a quality we tend to lose when as we grow up.

When conscious eating is practiced, learning is promoted to freely eat foods that are, while pleasant for us, nutritious for our body, using all the senses (taste, smell, sight, hearing, and touch) to explore, savor and enjoy. We develop the dexterity to recognize what feels good to our body, which will affect health, improving our physical and mental wellbeing, and our quality of life. In addition, it leads us to discover the physiological signals of fullness and satiety and to distinguish between physical hunger and emotional hunger. Physical hunger is felt gradually, it is felt in the stomach, no food is the objective of craving, and it is easy to satisfy. Emotional hunger, however, is felt suddenly, it is mental, characterized by craving specific foods, usually hypercaloric, and it is difficult to satisfy (because you are trying to indulge an emotion). Emotional hunger often leads to compulsive overeating of unhealthy foods, compromising our health.

Scientific publications endorse that the cultivation of conscious eating promotes neural plasticity in various regions of the prefrontal cortex involved in qualities such as discipline, will and self-control. Promoting conscious nutrition therefore allows us to cope with “certain discomforts,” developing resilience or the ability to tolerate adversity, which strengthens us psychologically. Today’s man panics at the thought of “starving.” This is a negative bias in the evolution of *Homo sapiens*. For tens of thousands of years our ancestors suffered great famines, and the genome bears the imprint that starving means dying.

Some tips to apply to mindful eating would be: sit well at the table and eat without interruptions, such as television, mobile, or computer; put the right amount of food in the mouth to taste and chew it well, thus helping the digestive process; eat slowly trying to leave the cutlery between bites; realize the energy needs of the body according to daily activity.

It is essential to promote education in healthy and conscious eating in the population, especially in schools, starting with early age students. It is a way to prevent future pathologies, many because of ignorance of healthy eating habits.

9. WHY IS HEALTHY AND SUSTAINABLE EATING IMPOSSIBLE FOR EVERYONE? AN ANSWER FROM THE ANALYSIS OF THE RELATIONSHIPS BETWEEN THE MEMBERS OF THE FOOD SYSTEM

In a society like Spain, with food sufficiency, one would expect a progressive transition towards an increasingly healthy and sustainable diet, and accessible to all social layers. You have to wonder why we have not yet achieved this nutritional ideal. One of the possible answers is the difficult governance between the actors of the food system, with tensions and conflicts that prevent consensus on actions for this archetype. Some disagreements are exemplified below.

9.1. Relations between consumers / citizens and public administrations

Food regulation, highly developed in Spain, allows a safer environment for food consumption, but it affects food companies unevenly and the weakest ones have more difficulties in adapting to regulatory requirements. When this happens, citizens increase their perception of risk and demand greater regulation of food risk. Here appears a conflictive scenario among those for the regulation of the processes that intervene in the food chain, backed by a more critical and demanding public opinion; and those for less regulation, who sponsor the self-control model.

9.2. Relations between consumers / citizens and food companies

The existence of public arbitration agents is a sign that situations of tension occur in relations between consumers and companies. To understand these conflicts, it is necessary to consider whether the relationship between food and health is an individual matter, of individual eating habits based on issues such as education, lifestyles, food tastes or preferences, or if besides this, these habits also have structural roots that escape individual decisions. The conflict is shown through advertising, where the legitimate interests of the industry to promote and offer its products collide with protecting the most vulnerable.

9.3. Relations between consumer associations and companies

The new values associated with consumption offer responses from citizens increasingly politicized: boycott and buycott toward companies and food, fair trade or ecological purchases, groups of direct consumption to the producer,

consumption options for social justice or sustainability. Often this political consumption is blurred into anonymity and consumer associations, which are the organized face of this anonymous consumer, do not act with the same forcefulness and pressure with which they do with other products or services, such as financial or technological products or services. There is also no support for this politicization of consumption in the traditional social movements (unions and political parties) that continue to focus on the problems of agri-food production and pay little attention to consumption. Moreover, there are new food movements, which were marginal a few years ago, and today they are integrated into the media debates about a healthier, sustainable, and fair diet. There is a new consumption scenario to which the attention is not being paid.

9.4. Relations between food industries and administrations

Historically, the interests of the industries have had the support of the state. However, the disagreement between the administrations and the food industry is also common: the initiative of the Ministry of Health to control the consumption of alcohol among the younger population was questioned by the producers of alcoholic beverages; the PAOS code (ethical rules on advertising to curb obesity) appears to be active, but without penalties for those violating it. There are multiple examples in which there is a lack of agreement to respond emphatically for the citizenry.

9.5. Relations between scientists

Obesity is a good case to exemplify the scientific disagreements for research aimed at achieving a healthy and sustainable diet. In food problems linked to health such as overweight and obesity, there is a strong domination of the biomedical conception of food and its disorders, although the social origin of this epidemic has been confirmed. Experts in health and those in society do not seem willing to discuss the best way to face a public health problem like this. Interdisciplinarity and cooperation between sciences are far from being achieved. The rigidity of scientific disciplines to assume postulates and methodologies from other sciences is a major difficulty, but the structures of science also make this collaboration difficult.

To have a healthy, sustainable, and fair diet, it is necessary to try to organize the relationships between the actors of the food system. Exploring these relationships with scientific rigor is a priority to achieve the food governance.

CHALLENGE G

ABSTRACT

In this chapter we develop key challenging points in the relation between technical change and employment and new labor market conditions in general and as regards science system dynamics. Then, taking those key points into account, we also provide an overview of CSIC advantaged position to address these aspects in an inter-disciplinary research agenda in social sciences and humanities, ideally with a strong communication with CSIC researchers from other areas to understand the sources and broader impacts of technical change.

TECHNOLOGICAL CHANGE AND ITS EFFECTS ON EMPLOYMENT

Coordinators

Jordi Brandts Bernad
(IAE, CSIC)

Catalina Martínez García
(IPP, CSIC)

1. INTRODUCTION

The fear of technological unemployment is recurrent in human history. Back in the 1930s, Keynes spoke of it as only a temporary phase of maladjustment. But, as argued thirty years later: “Technology eliminates jobs, not work” (Bowen, 1966). Technological change affects the types of jobs demanded and their pay, but the question is: if some jobs are eliminated, what new jobs are created?

As noted in the 2019 OECD Employment Outlook “14% of existing jobs could disappear as a result of automation in the next 15-20 years, and another 32% are likely to change radically as individual tasks are automated. Many people and communities have been left behind by globalization and a digital divide persists in access to new technologies –resulting in inequalities along age, gender, and socio-economic lines. Not everyone has been able to benefit from the better jobs that have emerged, and many are stuck in precarious working arrangements with little pay and limited or no access to social protection, lifelong learning and collective bargaining. Moreover, there is a very real concern of a “hollowing out” of the middle-class as technological advancements have been accompanied by the emergence of many lower-quality and precarious jobs. In some countries, for example, non-standard workers are 40-50% less likely than standard employees to receive any form of income support when they are out-of-work. And low-skilled adults across OECD countries, on average, are 40 percentage points less likely than high-skilled adults to participate in training.” (OECD, 2019).

In contrast, there is also an emerging sharing economy characterised by new forms of work that can shift the balance towards more inclusion, if measures are taken to protect the least advantaged and it does not exacerbate inequalities. These new forms of work involve higher work flexibility, work from home, part-time jobs, collective platforms, job sharing, phased retirement, etc. The EU Collaborative Economy and Employment survey data show that workers cite a preference for flexibility as a reason for working in these forms (OECD, 2019).

The European Foundation for the Improvement of Working and Living Conditions classified these new forms of work as falling into one or more of the following categories (Mandl and Biletta, 2018), that we copy next:

- *relationships between employers and employees that are different from the established 1:1 employment relationships*
- *provision of work on a discontinuous/intermittent basis or for very limited periods of time rather than on a continuous or regular basis*
- *networking and cooperation arrangements between the self-employed –especially freelancers– going beyond ‘standard’ relationships along the supply chain, sharing premises or traditional conducting of project work.*

Protection for workers in these new environments is also of outmost importance. Welfare regimes and collective bargaining need not forget the rights of women, immigrants and other minorities, who tend to adopt these new forms of work more than other groups.

In the remainder of this chapter we develop key challenging points in the relation between technical change and employment and new labor market conditions in general and as regards science system dynamics. Then, taking those key points into account, we also provide an overview of CSIC advantaged position to address these aspects in an interdisciplinary research agenda in social sciences and humanities, ideally with a strong communication with CSIC researchers from other areas to understand the sources and broader impacts of technical change.

2. KEY CHALLENGING POINTS

CSIC is a responsive organization supporting and developing high quality research. The general aim, in social science, is to advance knowledge regarding our societies, economies and political systems and to provide the best evidence available to improve public policies. However, as a Research

Performing Organization, CSIC is committed with the efficient use of R&D public resources to better understand the changes in the Science system resulting from general societal trends and to identify the challenges that PROs will face in the future as a result of technical change. In what follows we present some of the most relevant issues related to technical change and its effect on employment, first regarding societal challenges in general, and then with respect to the dynamics of the science system.

2.1. Societal challenges

Automatization

The impact of technical change and digital transformation on labor markets and work context has several dimensions. The first one is the impact of the total number of jobs. The fear that the adoption of different kinds of machinery would lead to a decrease in the total number of jobs and, hence, to large-scale unemployment is not new, dating back to rebellions of the Luddite movement and some historical precedents. Up to this point in history this concern has turned out not to be justified; the number of employed has been steadily increasing.

However, at present we need to re-evaluate whether the current formidable advances in information technology and digitalization will this time lead to a reduction in employment, and more importantly, what effects these changes may have on new forms of work and social welfare in general. Current research suggests that again there is no real problem with the total number of jobs (Autor, 2015). The principal factors behind this are the effects of complementarities between jobs, the increase of overall demand due to productivity increases and the emergence of new ideas and new jobs. Overall technical change is a positive process since it liberates people from all kinds of repetitive and unpleasant tasks, but it also has some potentially negative effects.

Job Polarization

The last two decades have seen a change in the academic treatment of the effect of technological change on employment. At the end of the 20th century, the main theory (Autor and Katz, 1999; Autor et al., 1998) was that technological change influenced employment through skills. In this sense, any technical change has prompted demands of new skills, with benefits in terms of employment and wages for some scarce skills and disadvantaging those with lower skills.

However, at the beginning of this century a new theory emerged (Autor et al., 2003; Autor and Price, 2013) that emphasized routinization. That is, jobs that can be easily automated will tend to disappear. Interestingly, these jobs are in an intermediate position in the labor market in terms of salary and occupational prestige. They are the office workers, manual workers and operators in the factories.

Faced with these intermediate jobs in clear decline, the two extremes of the labor market are flourishing. At the lower end of the occupational and wage scale, the demand for personal services and sales workers increases. These are low-skilled, low-wage jobs, but they are in high demand today. At the top of the labor market, more skilled occupations such as managers, professionals and technicians are also increasing. This process of increasing the two extremes of the occupational scale is called “job polarization”.

The evidence about this polarization in many countries, including Spain, is wide and varied. For example, Anghel et al. (2014) show that the Great Recession increased this polarization of work in Spain. Fernandez (2019) does the same exercise for 16 European countries. Sebastian (2018) confirms the effect of the routinization and computerization of jobs on the increase in labor polarization. In Spain, between 1994 and 2014, there is a gradual disappearance of jobs from the middle of the wage scale. The fate of these workers with intermediate pay in the labor market depends on their qualifications: those without higher education tend to move to low-skilled occupations, while there is also a movement of graduates to occupations in the upper segment of the market.

Social relations in the new labor market conditions

A crucial question is whether and how technological change affects people psychologically. Relations at work are not only based on monetary incentives, but depend also on intrinsic motivation for work and on many other dimensions of the relations between people at work, such as social comparison, social ties and reciprocity. These aspects of human motivation have been carefully analyzed in the experimental and behavioral economics as well as in other social sciences. Cooper and Kagel (2015) survey the social preferences literature mostly in economics. The term *social preferences* refers to the fact that people’s preferences are typically not fully selfish, but depend partially on the well-being of others and on circumstances pertaining to the interaction between people.

In relation to the specific topic of work relations they have recently been studied by Charness et al. (2020). There is a very large literature on this and here

we can give only a snapshot of some relevant issues. All these may become increasingly important due to the rise of work environments in which a large part of the performance is discretionary and not fully tied down by formal contracts, a situation in which so-called gift exchange between workers and between workers and employers become relevant (Akerlof, 1982; Fehr et al., 1993). This may be particularly important in occupations with complex tasks and involving creativity.

Intrinsic motivation is the inner drive that makes people work, not for external rewards, but because working is itself interesting or enjoyable. In most cases people exert effort at work due to a combination of extrinsic and intrinsic motivation. Humans create social ties through repeated interactions and how strong these ties are and whether they are positive or negative depends on the characteristics of the interaction. Similarly, humans are often reciprocal in their behavior. They may be so both positively, in the sense that they tend to reward others' favorable behavior with favorable behavior, and negatively, in punishing bad behavior with bad behavior. Finally, humans have a strong tendency to compare themselves with others and to be affected by such comparisons.

There are other dimensions of sociality that interact with relations at work, such as the perception of procedural fairness, and the big question is how all these motivational elements will be affected by the rearrangements of work relations that are the consequence of technical change. For example, new work arrangements may lead to changes in monitoring and control and this may impact performance (Falk and Kosfeld, 2006).

Another context where changes in work arrangements may be affecting motivation is in the increasing importance of working on-line and from home. The decrease in direct monitoring that this kind of works entails may have important implications, which at this point are hard to assess. A different implication of working in such environments is the lack of contact with co-workers. Existing research (Bloom et al., 2015) has found mixed results on this issue and, hence, more research is necessary to get a more complete view of the issue.

The arguably most important effect to study is the impact of possible increases in wage inequality, resulting from technical change, on worker motivation and effort. Bewley (2002) and Card et al. (2012) have suggested that wage comparisons are an important determinant of workers' effort decisions. Using both survey and experimental data Gächter and Thöni (2010)

and Clark et al. (2010) study the effect of social comparison on worker effort of workers of equal productivity. Their findings show that social comparison matters, but the way in which it does is complex. When workers are differentially productive and when pay secrecy is a possibility, social comparison becomes more multi-dimensional and difficult and the effects of the impact of technical change will be harder to ascertain. Social comparison is, hence, a complex matter and one sh

ould not jump to conclusions about its effects. However, if technical change lead to very high wage inequality these differences may become very salient and impact worker motivation negatively.

The systematic study of these developments should be approached by the different social sciences and can also potentially benefit from interdisciplinary research. An important issue is that they are studied with the appropriate methods so that it is possible to identify causal links and to find out specific mechanisms behind observed phenomena. In addition, in case of negative effects of the consequences of technical change it will be important to be able to identify management and social interventions that will counteract such negative consequences.

Broader challenges

Apart from the topics just discussed, other broader challenges deserve further attention, as summarized by the following open questions:

1. Work sharing at a grand scale: How to redistribute work among household members and groups in society?
2. How to organize a leisure society?
3. Sharing the benefits of technological change: re-arranging the property of the “robots”?
4. How to decouple citizen rights and psychological well-being from labor market status
5. Work remotely and consume locally: How to reconcile consumption patterns and planet sustainability?
6. Automatization, collaboration and polarization in science: how to address precarization and dualization in the scientific labor market?

2.2. Science system dynamics

The societal challenges described in the previous section could also apply to some of the dynamics of transformation of research activities and science systems.

The automatization of scientific work is related to increasing capital investments and equipment needed to carry on research activities. Automatization is also connected with the expansion of scientific collaboration and team science, and the most important effect is the demand of new scientific skills required to perform the work.

Polarization and dualization are only partially related with the impact of technology on research activities and, probably, are much more linked to the way in which a new division of labor is to be established. The way in which science has traditionally operated (mentorship and apprenticeship system) has also changed following new processes of massification.

In the scientific labor market, social relations and the new labor market conditions are governed mainly by the specific institutional qualities of the labor markets in the different countries; this, rather than the effects of technical change, is the main driver. If precarization (e.g. low salaries and high levels of fix-term contracts) of the working conditions becomes embedded in the science system the effects will be serious, not just regarding the stress of scientists but also their decreasing creativity, levels of excellence and quality and, in the mid-term, a reduction of the attractiveness of science.

3. CSIC'S ADVANTAGED POSITION AND INTERDISCIPLINARITY

So far we have emphasized the economic aspects of the current debate about the effects of technical change on employment. But the debate around this is much broader, it involves economic, political, social, psychological, historical, and many other aspects which CSIC is in a privileged position to address. These and other issues direct and indirectly related to the effects of technical change on employment from a social sciences and humanities perspective, could be included in a multidimensional research agenda taking into account all the areas displayed in Figure 1, where the study of labor markets has an important presence of projects looking at academic and scientific labor markets, which are also impacted by new forms of work and experience the effects of technical change and globalization.

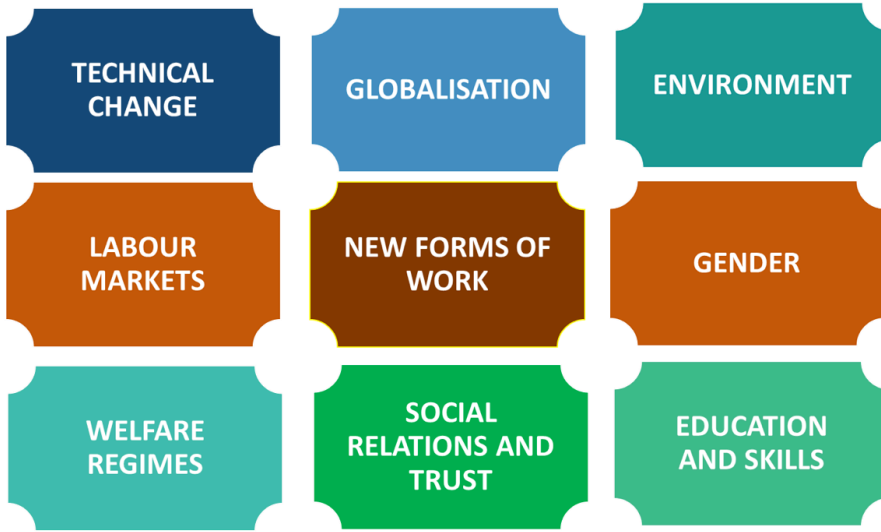


Figure 1: Interdisciplinary research agenda

Such a broad research agenda could be undertaken by CSIC researchers active in projects related to these areas in social sciences and humanities research agenda, most of whom are presented in Table 1 in an attempt to provide a non-exhaustive but rather inclusive selection of CSIC researchers with relevant lines of research. However, not only this list may not include all CSIC researchers in social sciences and humanities who could contribute to a broad and interrelated research agenda on these issues, but it is also important to stress that researchers in other areas of CSIC should also contribute substantially to take advantage of CSIC’s transdisciplinary advantage in research fully. Researchers working on issues directly or indirectly related to technical change and its effects on employment should thus be included in a truly interdisciplinary research agenda. It is through a dialogue between researchers in social sciences, humanities and other areas that novel and more radical research approaches and results may arise.

Table 1. CSIC Social Sciences and Humanities Researchers in Areas Related to Technical Change and Effects on Employment

THEME	ICU	RESEARCHER	DISCIPLINE	RESEARCH RELATED TO TECHNOLOGY AND EMPLOYMENT	PUBLICATIONS/PROJECTS
Social relations and trust / Gender	IAE	Jordi Brandts	Economics	Psychology and economics, gender, social preferences	Distributional concerns, social status ranking, gender
Labor markets / New forms of work	IAE	Ana Rute Cardoso	Economics	Labor economics, economics of inequality	Labor economics, economics of inequality, gender
Technical change / Globalization / Labor markets / New forms of work	IPP	Catalina Martínez	Economics	Microwork platforms, Employment of S&T workers, Patents and inventors	Microwork platforms, Innovation capabilities and S&T workers, Patents and inventors, Pasteur's quadrant, economics of software and software patents
Social relations and trust / New forms of work	IPP	Luis Miller	Political Science	Skills and employment	Youth employment, minorities and jobs, income inequality
Labor markets / Gender / Education and skills	IPP	Laura Cruz	Sociology	S&T workers, academic careers, gender, internationalization	Academic employment and careers, Innovation capabilities and S&T workers, International research mobility, gender
Labor markets / Technical change / Gender / Education and skills	IPP	Luis Sanz	Political Science	S&T workers and academic careers, gender	Academic employment and careers, Innovation capabilities and S&T workers, gender
Globalization / Technical change	IPP	Adelheid Holl	Economics	Location and spatial organization of economic activity	Multinationals, corporate investment in R&D, logistics
Environment	IPP	Pablo del Río	Economics	Employment in green sectors, ecoinnovation	Employment in renewable energy sectors
Welfare regimes	IPP	José Fernández Albertos	Political Science	Political economy, welfare, income and taxation	Income perception and taxation, basic income
Welfare regimes	IPP	Eloisa del Pino	Political Science	Welfare regimes, healthcare systems	Welfare regimes, healthcare systems
Welfare regimes	IPP	Javier Moreno	Political Science	Welfare regimes, immigration and urban policies	Welfare regimes, immigration and urban policies
Welfare regimes	IPP	Luis Moreno	Political Science	Welfare regimes, robotised democracies	Robotized democracies
Welfare regimes	IPP	Angel Paniagua	Geography	Human geography, depopulation	Human geography, depopulation
Social relations and trust	IPP	Vincenzo Pavone	Political Science	Bioethics, civil society participation in science	Bioethics, civil society participation in science
Social relations and trust	IPP	Sara Degli Esposti	Economics	Artificial intelligence and ethics	Artificial intelligence and ethics

THEME	ICU	RESEARCHER	DISCIPLINE	RESEARCH RELATED TO TECHNOLOGY AND EMPLOYMENT	PUBLICATIONS/PROJECTS
New forms of work	IEGD	M ³ Angeles Durán	Sociology	Non-remunerated work at home	Unpaid work for women
Technical change / Globalization	IEGD	Ruth Rama	Economics	Multinationals and R&D	Multinationals, subcontracting, technology sourcing
Welfare regimes	IEGD	Amparo González Ferrer	Sociology	Migration policies	Migration policies and inequalities
Welfare regimes	IEGD	Antonio Abellán	Demography	Ageing and services	Ageing and services
Population dynamics	IEGD	Diego Ramiro	Demography	Population dynamics	Demographic dynamics
Environment	IEGD	Francisco J. Martínez Vega	Geography	Geographic analysis of Global change	Land use, protected areas, sustainability
Skills	Ingenio	Davide Consoli	Economics	Skills and innovation	Low skill jobs, e-skills, green skills
Education and skills	Ingenio	Adela García Aracil	Economics	Education and skills	Students skills and employability
Technical change	Ingenio	Joaquín Azagra-Caro	Economics	Patents and inventors	Pasteur's quadrant
Technical change	Ingenio	Pablo D'Este	Economics	Collaboration networks and R&D	Biomedicine knowledge generation
Labor markets / Gender	Ingenio	Carolina Cañibano	Economics	Science research careers, gender	Science research careers, gender
Labor markets	Ingenio	Richard Wooley	Sociology	Education and skills, Science research careers	Education and skills, Science research careers
Technical change	Ingenio	Jordi Molas	Economics	Collaboration and knowledge co-creation	Collaboration and knowledge co-creation
Gender	IFS	Eulalia Pérez Sedeño	Philosophy	Science, technology and society	Science, technology and society, gender
Social relations and trust	IFS	Txetxu Ausín	Philosophy	Care ethics, inclusivity and robotics	Inclusivity and robotics
	IFS	Jesús Rey Rocha		Science and Technology impacts on society	Business scientific culture
New forms of work	IH	Antonio Lafuente	History	E-science, digital commons	E-science, digital commons
New forms of work	ILLA	Alberto Corsín	Anthropology	Cities and Science	Anthropologist of cities and science
New forms of work	ILLA	Daniel Curto Millet	Anthropology	Information systems and social sciences	Openness, ethics in crowdsourcing
Labor markets	IESA	Manuel Fernández Esquinas	Political science	Research training and entrepreneurship	Research training and entrepreneurship
Welfare regimes	IESA	Sebastián Rinken	Political science	Migration	Attitudes to migration, integration of immigrants

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CHALLENGE H

ABSTRACT

This contribution is intended to highlight the singular importance of the functions performed by the entities that make up the broad and diffuse organizational field called Third Sector, for a sustainable and cohesive society. It tries to point out the need to advance in the knowledge of various aspects of this sector in Spain, such as: the conceptual delimitation and typology of the entities that comprise it; the main features that characterize these entities, especially considering the differences within them between traditional and emerging organizational forms; the dynamics of its recent evolution; and the analysis of some issues that its presence raises in societies like ours, in which the dominant logic is that of the market. In this work is also analyzed the limits of the information available to have the knowledge about the Third Sector that its importance requires a and the lines of a research plan that could resolve this limitation are suggested.

THIRD SECTOR, SOCIAL, AND COLLABORATIVE ECONOMY IN CONTEMPORARY SOCIETIES. THE CASE OF SPAIN

CoordinatorManuel Pérez Yruela
(IESA, CSIC)THIRD SECTOR: A NECESSARY CIVIL SOCIETY
ACTOR IN ADVANCED DEMOCRACIES

1. INTRODUCTION

This contribution to the collective work promoted by CSIC on “New foundations for a sustainable global society” is intended to highlight the singular importance of the functions performed by the entities that make up the broad and diffuse organizational field called Third Sector (TS), for a sustainable and cohesive society. But it tries to point out the need to advance in the knowledge of various aspects of this sector in Spain, such as: the conceptual delimitation and typology of the entities that comprise it; the main features that characterize these entities, especially considering the differences within them between traditional and emerging organizational forms; the dynamics of its recent evolution; and the analysis of some issues that its presence raises in societies like ours, in which the dominant logic is that of the market.

The approach with which the subject is seen can be considered, from the sociological viewpoint, as an exercise in reflective sociology. It is about offering an analysis that assesses the importance of this organizational field for modern, plural, democratic societies, with consolidated welfare systems, as in Europe, which we believe is a core issue of this challenge. An analysis of their strengths and weaknesses and their prospects, in the context of the sustainability of the welfare systems. The thoughtful use of the results can be useful so the organizations that make up the sector can see themselves reflected in them and analyze how they affect them and so the regulator, the state, can better guide public policies on this sector.

Finally, it is also useful to highlight the lack of information and analysis that exist to advance and improve the knowledge of the sector in Spain, which are not few because of the variety, complexity, and breadth, difficult to define, that it has and because of the novelty of many of its aspects. All this can define a research program on topics such as, among others; the role of the Supreme Court in advanced democracies and their welfare and social cohesion systems; the structure and dynamics of the organizational field that integrates it; the relations between the state and TS, and even between the commercial sector and the TS; and the role of volunteering in operating the TS.

2. THE THIRD SECTOR: CONCEPTUAL DELIMITATION

Using the term TS to refer to a specific set of entities part of the social structure of our societies, has a relatively recent origin but has been growing in recent decades. It emerged in the field of social sciences to identify a group of organizations born from within society, which are non-profit and usually have the participation of volunteers. Its objectives are varied, but they have the common denominator of being related to the denunciation of social problems, the provision of services to solve them, the defense of human rights, helping the most disadvantaged in society, international cooperation to help other countries in the above issues, and contribution to the promotion of general social wellbeing through cultural, sports, or leisure activities. In short, objectives in which the perspective of the wellbeing of citizens and, therefore, of society predominates. What draws the attention of this organizational field is its altruism and civic participation, its roots in civil society, its independence from the state, relative as it will be seen, and the separation of its operating criteria from the logic of the market. This group usually includes private non-profit organizations (NPOs), also known as Non-Governmental Organizations (NGOs) objectives in which the perspective of the welfare of citizens and, therefore, of society predominates¹. The NPOs dedicated to social problems in Spain are called Third Sector of Social Action (TSSA)². Most mainly adopt the legal figure of associations or foundations, but also include other figures.

1. The use of Private Non-Profit Organizations is preferable because the expression of Non-Governmental Organizations can be confusing. The reasons for this are various; companies are also non-governmental organizations; Public organizations that do not depend on governments are also governmental; many NGOs are financially dependent on governments.

2. The Spanish law of the Third Sector of Social Action (2015) states that they are "1. Those organizations of a private nature, arising from the citizen or social initiative, under different modalities, which respond to criteria of solidarity and social participation, with general interest and non-profit purposes, which promote the recognition and exercise of civil rights, as well as the economic, social, or cultural rights of individuals and groups that suffer from vulnerable conditions or are at risk of social exclusion. 2. In any case, associations, foundations, as well as federations or associations that comprise them are entities of the Third Sector of Social Action ". Curiously, it leaves out cooperatives and other entities of the Social Economy with other legal formulas,

Organizations with features like those above had emerged before, especially during the industrial revolution. They are cooperatives, mutual societies, and mutual aid associations, organized by workers to improve their poor living conditions through collective actions created with the scarce resources they had. Its origin is associated with the influence of utopian socialism, as initiatives of social organization alien, such as those that that doctrine proposed, to the market logic, already dominant then as a model to follow to achieve, according to its defenders, the progress of the society. As it is known, its development because the pioneers of Rochdale created the first cooperative in 1844, has far transcended the first objectives with which they were born, Nowadays, it is present significantly in most of the economic activities and sectors. Along with them, organizations have appeared with different legal formulas (labor companies, associations for economic purposes...) that share cooperative principles. Cooperatives and related organizations also arise from within society, are independent of the state, respond to social needs, and they put limits on profit, which the cooperative terminology name them this way but as economic surpluses of the activity they develop. This group is generically called Social Economy (SE)³, but as we will see, it could also be called the Third Sector for Economic Action (TSEA).

In addition, in the last decades, new ways of practicing economic activities have appeared that, from the viewpoint of the objectives and values they have, share those of the previous organizational forms. These are social innovations that, like most innovation, arise from the recombination of already known elements, which are given a new form presumed more useful or more effective. Among them are social enterprises, social cooperatives, solidarity economy companies, some collaborative economy and consumption initiatives, which have grown in a few years, and community foundations. Some of these initiatives, unlike the previous ones, do not have a specific legal recognition like that of the organizations of one of the two previous groups, but most of them could be part of one of them.

In a first approximation, these three types of organizations are different organizational fields and should not be under the common label of TS (Cabra de Luna and De Lorenzo, 2005). The first (NPOs) is aimed at serving and helping other people and society in the aforementioned issues, through collective

3. The Spanish law on the Social Economy states that "cooperatives, mutual societies, foundations and associations that carry out economic activity, labor companies, insertion companies, special employment centers, brotherhoods of fishermen, agrarian transformation societies and singular entities created by specific norms that are governed by the same principles ". In addition to these, others may be integrated in accordance with a catalog that the Law creates for it.

actions in which the main incentive is precisely the service or help provided, without prejudice to the fact that those who lend it may receive remuneration. The second SE is more oriented to the satisfaction of the individual needs economic, of those who are associated for it, often through activities inevitably linked to the logic of the market. The third, the most recent, it is the most diffuse from the legal and organizational viewpoint. Sometimes it is about innovations on traditional experiences, such as *social cooperatives* specifically dedicated to socio-health care and assistance and job placement, with a governance model similar to that of commercial companies, maintaining the limitations on distributing surpluses; or social enterprises, public limited companies or limited companies that, like cooperatives, incorporate into their statutes limitations on distributing benefits. In other cases, it is about social innovations with different legal formulas, whose objectives are explicitly social, such as the alternative and solidarity economy network; or social innovations based on new information technologies, such as the economy and collaborative consumption. Despite these differences, there are reasons to affirm that they share values and organizational similarities, in short, a certain common logic of operation.

To construct a synthetic account about the origin and evolution of these forms of collective action, about their importance in today's advanced democracies, about the similarities between them and about their institutionalization process, it is necessary to make a tight synthesis of some historical processes known, which configure the context that made them possible and, have conditioned their development⁴.

Since the industrial revolution and the consolidation on a large geographical and sectoral scale of the market economy and liberal democracy, criticism has been kept alive on the two main assumptions that served as a lever for this great change in Western societies. On the one hand, the constant affirmation, almost turning it into a natural law, that the self-regulating market is the institution that can best serve the progress of society, a basic principle of economic organization that permeates the entire social organization. This extensive commodification (Polanyi, 1989) is a change recognized today by citizens of any condition, who see it as one of the main rules that govern our societies, although sometimes it is recognition resigned to something that is not always shared or is only partially shared. But the growing prominence of

4. The development of this idea is based on the work of Pérez Yruela, M (2012). *The model of social cohesion in Europe*. IESA, Working Papers Series, in which it can be seen in more detail.

models of *Homo economicus*, possessive individualism and rational choice based on the calculation of interests, typical of a liberal and individualistic model of current society, which does not contemplate the obligations of some citizens regarding others (Macpherson, 1962), which forgets the idea strength of brotherhood, original companion of freedom and equality⁵.

Democracy and the liberal state today, dominant in most of the world, are based on both assumptions, which is reluctant to alter the rules of the market and intervene in society beyond what is strictly necessary for the market to function freely without possible hindrance. However, the state has had to go beyond these limits at various historical moments. It has done so when it has needed to intervene with social and redistributive policies to maintain social cohesion and the legitimacy of the political system in the face of problems such as those derived from disasters and armed conflicts, inequality, poverty and social exclusion or the risk of helplessness of those who, for various supervening causes, lost the job with which they obtained their livelihoods. This is one reason that most explains the origin and development of European welfare systems or of the European Social Model. It must also be remembered that when the state has faced those moments in which its intervention could alter the balance between economically orthodox budgetary discipline, corporate profits, and the social spending necessary to restore cohesion and legitimacy, it has tended to this expense did not significantly harm the first two.

The previous assumptions have been subjected to constant criticism with various arguments: those based on forms of solidarity and collective redistribution in times before the current market economy (Polanyi, 1944); those based on the rooting of the economy in society, which makes the previous principles see modulated, sometimes even annulled, by the culture of each society (Granovetter, 1985; Portes and Moony, 2002) the plurality of values that even in the most commercialized societies, altruism, mutual aid and voluntary participation for others survive, in short, the variety of different human behavior models that coexist with that of *Homo economicus*, even though it is dominant (Holies, 1977); due to the revision being made of the logic of collective action in the sense of the possibility that large groups can take collective actions to produce public goods with incentives other than economic interest (Weimann et al., 2019) because of the asymmetry, inequality, and erosion

5. Fraternity tends to manifest itself more in the face of external catastrophes and in times of crisis, such as the pandemic caused by the coronavirus that we are experiencing as we write these pages.

of social cohesion produced by the market economy (Piketty, 2014). It has been Marxism, and the trends derived from Marxist orthodoxy (progressive, social democratic, socialist, communist, and radical / left populist) that have inspired and continue to inspire these criticisms.

The struggle between both interpretations of social reality continues to live and has crystallized, as is well known, in conflicting political creeds or world-views: the conservative or right-wing vision akin to the individualist/ liberal creed, and the progressive, social democratic, or radical, more akin to the creed commonly labeled as left or, in another expression, collectivist/leftist. Within some countries, radical or moderate positions have recently emerged within each vision, some turned into new political parties, which have altered the traditional balance within each vision but have not substantially changed their original dual structure. They are visions with different logics difficult to reconcile in their principles, without prejudice to the fact that sometimes there have been pragmatic questions of government according to the history of each country. This division means that often the debates on public policies related to the objectives or the role that the TS performs above mentioned are resolved more with arguments based on these beliefs than with empirical evidence. The liberal vision prefers to market solutions through commercial organizations to achieve these objectives and the left vision prefers the statist solution through public organizations, although to varying degrees depending on the position it is more or less radical.

In this context, developing the TS has not been easy nor is it still, unless done with ideological ascriptions related to the previous visions. The right is related to a traditional TS both in terms of cooperation and mutualism and of non-profit welfare organizations. All heirs of the welfare tradition of Christian charity, although within them there have also been significant changes of rupture with that tradition. For example, the modernization of cooperatives promoted by Catholic agrarian circles because they began, or the case of *Cáritas Española*, an organization that, besides its important welfare work, has advanced in denouncing the social problems of Spain, based on the rigorous sociological studies that it has been conducting for several decades. The left of social assistance is theoretically related to state solutions, based on the recognition of legally enforceable rights by citizens and the public provision of services that satisfy them. However, social democratic governments have shown acceptance of public-private collaboration with this organization.

Despite the previous situation, there have been changes in the European state, societies, and democracies that have opened the door for the Supreme Court to consolidate itself as an important part of its civil society. From the last quarter of the 19th century, the idea of Social State developed in Europe, by which the mission of correcting, for historical reasons (the social question) and ethical (the dignity of people), is attributed to the state, the dysfunctions and inequalities produced by the market economy. The idea was not born linked to democracy, something that would be achieved later when it was constitutionalized in 1949 in the Basic Law of the then Federal Republic of Germany, in which it is defined in article 28 as a “social and democratic state of law.” The content of what the Social State should be was initially reflected in the idea of the protection of the contingencies of social life, also of German origin, which consists in the state “carrying out measures that assure man of the possibilities of existence that cannot be ensured by himself” (García Pelayo, 1985).

The state has thus gone from being the bearer of the values of the liberal-democratic state (freedom, property, equality, legal security and universal suffrage) to the bearer of other values such as: the redistribution of wealth; the organization of the existential search; the creation of conditions for economic development and even intervention in certain aspects of the economy; the direct provision of basic social services such as education or health; especially the collaboration with civil society organizations in many areas, from the provision of these services to the most varied issues that can range from traditional social agreement to the promotion of culture.

European societies have also changed. Today they are liberal democracies that combine the market economy with social rights. Societies with preeminence of individualism and consumption as fundamental axes around which existence revolves, but also in which mutual aid organizations or third parties, non-profit organizations and a wide range of objectives are an important part of their social structure. Societies in which the institutionalization of research and innovation plays a decisive role in their development. Further, societies with varying degrees of inequality and social cohesion depending on developing the Welfare State in each country, which require state interventions for the aforementioned reasons.

Western democracies change when the imperfections and failures of the liberal-democratic social order, on which they are based, conflict with the interests of the market itself and/or damage the expectations of improving the

wellbeing of citizens. The institutions of representation and defense of the interests of the citizens in the constitutions (political parties, unions...) are today insufficient to adequately manage the demands, interests, and proposals as diverse and specialized as those that exist in complex societies such as ours, reconciling particularity and diversity with the universal character of citizenship rights. The corporatization and particularism of parties and unions, the oligopolization of their activity and the tendency to broaden their influence on as many social spaces as possible, reduces their own possibilities to reflect and channel that social complexity. The response of civil society to these deficiencies is channeled, with some success according to the countries, through collective initiatives formalized in organizations such as those that make up the TS (Giner and Sarasa, 1995), whose starting point is usually social movements of protest and alternative social demand.

In this context, the TS organizations have grown. That they did so is explained by several sociological reasons⁶: a) because the traditional forms of organization, cooperativism, and mutualism, are still the solution to problems of workers and small owners who benefit from these collective actions, as in the past, to defend the prices received for their production, make supplies cheaper, provide security against illness or occupational accidents, or create jobs by producing goods and services for the market; today they have changed, with new objectives such as ecological production, renewable energies, social and health care or education, among others; b) due to the growth of non-profit organizations whose existence has popularized the expression of TS, which have a vital role in the Welfare State; c) due to the growth of associations for various purposes, from culture to participation by this means in public or collective affairs, important in the structuring of civil society; d) by the persistence over time of values such as altruism, solidarity and fraternity, which are part of the cultural change in recent decades toward what has been called post-materialist values, observed in Western societies; e) due to more general changes in the social structures that have facilitated the previous changes (higher education level, legal recognition and public support for the TS, availability of time to participate, service society...); f) due to the increasing complexity of social protection that has led to relatively mixed systems (Marbán and Rodríguez Cabrero, 2013).

6. It has also been explained in economic terms, arguing that they came to replace market failures in the provision of public goods for collective consumption that the State did not provide sufficiently or did so in a way that, due to these failures, did not conform to the wishes of the recipients. of those goods (Weisbrod, 1974 and Hansmann, 1987)

The TS emerges as an actor in civil society, different from those that make up the political order (public sector, parties, unions, and other institutions of representation) and the commercial economic order (commercial companies). It is a sector formed with the initiative of many citizens who for various reasons have created institutions to conduct activities through which to channel certain values. They are conducted differently from the regulated, impersonal, and bureaucratic sphere of the state, from the party system of representative democracy and from the model of possessive individualism of the market, although it is not independent of them, because all three are linked by ties of interdependence. In this sense, the TS represents a qualified extension of the *politeia*, because it not only widens in the field of political participation but also does so based on reinforcing the deep values of democracy that combine freedom, equality, and fraternity.

The interest in establishing a common analysis framework for all entities that can form the TS may be useful for several reasons: to facilitate articulation appropriate to its importance; to facilitate cooperation and integration between them that could lead to a substantial improvement in their effectiveness; to reinforce their social visibility; and to increase their bargaining power with other social actors in the public and commercial sectors. This is a long-term objective, if it is to be fulfilled, which is far from the starting scenario in which they now find themselves. Currently, the entities that make up the TS, despite sharing core aspects of their reason for being, respond to different legal figures⁷ with little connection between them, which facilitates the separate action of each subgroup that forms it. For that reason, their social visibility and bargaining power is weak.

There is, however, a reasonable basis to think that the effort to seek common principles among these entities that facilitate a more integrated treatment of TS is feasible. The entities of the SE and the NPOs, the most important and numerous, share more principles than those that separate them. Cooperatives, the most important subgroup within the SE, are institutions that develop their activity by producing goods for the market or organizing the provision of certain services to benefit themselves or for third parties, under certain principles—the cooperative principles—that they are specified in the following: they are voluntary organizations arising from the social initiative; they are independent of the government; they give primacy to social ends and

7. Cooperatives Law, Law of Labor and Investee Companies, Law of Foundations, Law of Associations, Law of Social Economy, Law of Mutualities, Law of the Third Sector of Social Action, Law of Volunteering, Law of Social Integration of the Disabled, among others.

people over capital; promote the values of solidarity, equality, and social cohesion; they are managed autonomously, participatively, and democratically; assign the results obtained from the economic activity to their own social purposes or distribute them among the partners based on the volume of transactions of each one with the organization and not on the capital they have contributed to the institution⁸.

Regarding the NPOs, today there is considerable consensus in accepting the proposal made by Salamon and Anheier (1992), which specifies the characteristics that define these organizations in the following: they are formal organizations of voluntary affiliation; they are private organizations independent of the government, although they can receive funding from them; they have autonomous management capacity; they must have volunteered in their management bodies and in carrying out their activities; they are non-profit and cannot distribute the economic surpluses generated by their activity among their members, which they must reinvest in the organization's social purposes.

The main formal differences between the SE organizations and the OPSFL are specified in the fact that two of the operating principles of the former are not enforceable with the latter. The first is the principle of participatory and democratic management and the second is that which allows the distribution of surpluses of economic activity among the partners. Regarding the first, many non-profit organizations practice the principle of participatory and democratic management, because most are associations, which because of their legal nature must do so. However, the difference remains with foundations that are neither obligated nor do they usually practice this form of management voluntarily. For the second, it is true that there is a difference in the fate that can be given to the economic surpluses of the activity, but it is also true that the distribution of surpluses among cooperative partners does not have the same meaning and treatment that the benefit has in non-cooperative commercial enterprises.

There are other differences, perhaps more important, related to the objectives and organizational culture of both types of organizations, which are the most influential in considering that both cannot be part of the same group. Those of the SE mainly conduct activities for the market or are conditioned

8. The International Cooperative Alliance (ICA) is the guardian of these principles, which have evolved over time to facilitate the adaptation of cooperatives to the changes and demands of the economic context in which they operate.

by it, which forces them to adjust their operation to the imperatives and conditions of competition. This brings them closer in certain aspects to the logic of operating non-cooperative companies, which may affect the practice and observance of their principles. For their part, the NPOs conduct altruistic activities, such as educational and cultural activities, attention to the neediest and groups with specific problems (people with disabilities, immigrants and refugees, homeless people, people who suffer from different addictions...), or activities to defend human and social rights and denounce inequalities and social problems. These activities require the commitment of those who voluntarily carry them out with the values they imply, both volunteering and the very objectives of social activities, and they develop in a culture of solidarity, helping those most in need, and social commitment.

However, these are not two areas of separate organizational cultures without contact between them. In the NPOs mainly dedicated to the provision of social services, there are salaried personnel besides the volunteers and they must incorporate economic and organizational criteria into their activity; like any other organization that must adjust its balance of income and expenses, although profit is not pursued. This brings them closer to the culture of cooperative societies that produce for the market. Within the SE there are organizations dedicated to social service provision activities whose organizational culture is closer to that of NPOs.

With emerging initiatives, some such as social cooperatives are a new version of the cooperative model that continues to share the same values. In other cases, such as those of the alternative and solidarity economy or social enterprises, they have different legal figures (associations and corporations or limited companies), but their statutes oblige them to apply principles like those of the ES and the NPOs. The case of the platforms on which the sharing economy is based is more complex, as we will see later, and not all of them can be said to be part of the TS. However, there are others more accepted because of its legal status because of the values (seeking social relationships, sharing expenses, exchanging time, recycling, extending the life of objects, responsible consumption...) on which they are based.

Finally, the organizational field of associations in one of the most developed and least known in Spain. Besides those that are dedicated to social action, those that are dedicated to cultural, leisure and sport activities are important. They are also part of the TS which could be called the Third Sector of Cultural Action (TSCA).

The TS can be considered an institutional and functional system with shared values and objectives that, although diverse, have a common denominator. In practice it operates through the organizational fields that comprise it. Both aspects, the functional-institutional and the organizational dimension, would be the object of the research objective we propose here. In this sense, the challenge would be to build a theory of intermediate scope on the TS, as exists for example in issues such as civil society, so similar that sometimes they are confused as the same thing, or as those of a political party or union, that until now have monopolized most of the entire function of representation and collective action and the attention of scholars. Such a theory should be part of a normative and empirical theory of democracy. The first, because of the role that democracy must recognize in the articulation of civil society to improve its quality by improving participation mechanisms, of which the TS is a good indicator. The second, because the TS is a reality in the most advanced democracies, which proves the possibility that society can be jointly responsible with the state in matters that concern it and not only when the state and the market fail.

This theory should consider the original asymmetry of the TS regarding the state and the market and the difficulties it has, to grow during both, which are much more developed and consolidated, with a tendency not to leave open spaces between them. This makes the TS seen as a minor sector, almost on the margins of the other two, unless it is necessary to release or externalize economic pressures (coming from the pressure of the commercial sector) and social pressures (coming from the incapacity of the state to develop social rights). In addition, to do so it would be necessary to produce sufficient information on the entities and their characteristics, through statistical operations by the state, through the National Institute of Statistics, partially provided for in the legislation that have not been conducted⁹.

3. THE THIRD SECTOR IN SPAIN

The objective of this section provides quantitative and qualitative information on TS in Spain, to show the importance it already has in absolute terms and in comparison, with some social, labor, and economic parameters of the country. Within the group of entities that make up the TS, we will refer here

9. There is extensive international literature on the Third Sector and there are specialized magazines (*Voluntas, Non-Profit and Voluntary Sector Quarterly, Voluntary Sector Review...*). Also in Spain there are specialized magazines (*Journal of Spanish Third Sector, Social Documentation...*). The theoretical aspects are the least discussed and even less in the Spanish case.

to those that are most important because of their size and activity: The TSAS and some entities of the SE, especially cooperatives, which are the ones for which more information is available. Information still lacks, the solution of which constitutes a challenge to advance more and better in its analysis.

A very important part of TS entities comprises those that act in the field of culture, R & D & I activities, training, leisure, sports, and religion, on which the available information of interest to the effects of this work are scarce and partial, which is why they can be included in the previous challenge. This assessment especially applies to entities constituted as associations, because in the area of foundations, which frequently act in several of the above fields, several reports have been made like those that exist for the TSSA. There are social action foundations (FAS), about which there is also some information.

3.1. The Third Sector of Social Action (TSSA)¹⁰

The TSAS is the quantitatively and qualitatively most important part of the TS. Its objectives are: the production of welfare services, the vindication of social rights or social advocacy, and the stimulation of civic participation through social volunteering (Marbán, Pérez Yruela and Rodríguez Cabrero, 2020). It is the sector par excellence of voluntary action, although this extends to other areas of the TS.

It comprises three unique entities, Caritas Española, the Spanish Red Cross, and ONCE (National Organization for Blinds), which are governed by specific regulations, and an estimated group of 30,000¹¹ active entities, among which associations (70%) and to a lesser extent social action foundation (18%) predominate. Almost two-thirds say they were created by citizen initiatives (63%) and 6% by initiative of religious entities, but it is likely that the influence of religious motives is greater, because part of those of citizen initiative have religious motives as underlying motivation.

Social action entities have deep roots in the social history of Spain, but it is from the second half of the 60s of the last century that a period of reconstitution begins that lasted to the end of the 80s. Since 1980 they have been growing and consolidating, driven by the restoration of democracy, by

10. This section is based on a broader text by Pérez Yruela, M., and G. Rodríguez Cabrero (2020). *The Third Sector of Social Action as a strategic actor of Spanish civil society*. Madrid: Botin Foundation.

11. This is the estimated figure in the four reports that have so far been made on the situation of the TSSA (Fundación Luis Vives, 2010 and 2012 and POAS 2015 and 2019)

developing the Welfare State in Spain during those years, and by our incorporation into the EU. The TSSA reached the reasonably consolidated economic and fiscal crisis of 2008, with quite a few internal differences, and showed its capacity to respond, in a restrictive context of resources to the increase in social demands caused by the crisis, with great effort. It had to face profound changes, not yet concluded, internal (creation of collaboration networks, organizational restructuring), and external (redefinition of the forms of collaboration with the public administrations at different levels, with the commercial economy and with the SE). It has been a very demanding adaptation, which within the sector is summarized in the expression “do more with fewer resources.” The post-crisis, part of whose social impact has reached the present, has generated new problems and social demands, which have required further changes in the dynamics of its three central objectives: social advocacy, service provision and civic participation. This new social and economic context has led the TSSA to worry internally about its future sustainability.

TSSA activity is closely related to economic and political cycles. Economic cycles generate changing social needs and demands, we saw it after the 2008 crisis, and we will see it after the 2020 pandemic. Political cycles create the mode of collaboration between the public sector and the TSSA and regulatory changes. Its relationship with public administrations is constant, because it cooperates in the provision of services and in the management of welfare programs and strategies and depends financially on them. However, the political cycles condition it because they are not alien to the different views that governments have about the role of the TSSA, which do not facilitate its stability and harm the effectiveness of its activity.

Developing the TSSA in Spain cannot be understood without including it in the joint development of this sector in the EU. Over the last two decades, the TSSA within the EU has been weaving relationships and forms of supranational articulation through which the exchange of knowledge and social innovation flow¹². The growing Europeanization of the TSSA is a reality, as comparative studies show. However, the nature of the TSSA of each EU country is a rough reflection of its social welfare system. As is well known, northern European and Scandinavian countries have more robust welfare systems than Southern ones. The indicator of the number of TSSA workers in each country

12. Examples of this are the European Network to Fight Poverty, the Social Platform, the European Federation of Organizations for Assistance to the Homeless (FEANTSA) or the European Forum of People with Disabilities (EDF), among others.

reflects this. In Spain and Italy, they represent 3.9% of the country's total employees, below the Netherlands (10.3), the United Kingdom (5.9), Germany (5.4), and Denmark (4.9) (Salomon and Sokolowski, 2018)

There are also some relatively common trends among them, such as: the importance they attach to provision of social services, in collaboration with the public sector; the selective competition of the TSSA with the commercial sector in the provision of services; the participation of volunteers in the governance of social organizations; the collaboration between entities through networking and joint project development, facilitated by national and European social policy strategies; The Growing interconnection between entities of the SE and NPOs; an explicit shared strategy to move toward a greater internal structure (where size matters, even if it is not the last ratio of efficiency and effectiveness) and achieve greater social visibility; the perception of the need for an increasingly transversal action, so their interventions are increasingly personalized and have a greater capacity for social integration of the recipients; shared concern about the need to broaden the social base, promoting social participation and intensifying the function of defense of rights; concern also about the need to improve autonomy and financial stability.

The TSSA¹³ in Spain is a consolidated sector, with an important renovation (56.5% of the entities were created between 2000 and 2019, many after 2008) whose characteristic feature is the proximity to the groups and people it serves. It is also a highly polarized sector according to the economic size of the entities. In 2018, almost half of the entities had incomes of less than €30,000 per year, 30% had them between €30 and €300,000 and only 8.5% had more than €1 million, among which are the three unique entities. The many entities with less than €30,000 per year is a weakness of the sector. It is not so much for its size as for its economic viability. Small entities can usually very close, provide quality services in those environments, with significant social roots and participation in volunteering, but their economic situation is precarious, they are the ones with the most debts and their fragility endangers the activities and services they provide, which are important. Something like what happens with SMEs in the country's economy.

13. The most important information available at the national level on TSSA comes from the four reports that have been made between 2008 and 2019, two of them promoted by the Luis Vives foundation published in 2010 and 2012 and another two promoted by the Platform of Social Action Organizations (POAS), published in 2005 and 2019. The authors of this work have participated in the scientific direction and preparation of these reports. All the data that is collected comes from that work and in those that are from another source, the source is cited

The 75% of activities in the sector focus on social action (37%), social insertion (14%) and social and health care (24%). The profiles of the groups targeted by the TSAS activity are: homeless people, at risk of exclusion, in a situation of dependency, with disabilities and with addiction problems; childhood, adolescence, youth and seniors with problems; battered women, migrants and refugees, among others. The rest of the activities are the defense of rights and the sensitization and training on the problems they address.

In 2018, its income reached 16,583 million euros, 1.37% of Spain's GDP, a figure higher than 2008, which was 16.824 million. Between 2008 and 2013, it lost €2,354 million because of the crisis. Singular entities represent 19% of the sector's income. It is a healthy sector in which indebtedness only occurs in entities with income below €30,000. Regarding the origin of the income, 41.4% is public financing, 20% less than in 2008; 26% is private financing, 3% more than in 2008; and 32.6% is own financing, 18% more than in 2008; almost double. During the crisis, the TSSA compensated for the drop in public funding by increasing private funding.

The TSSA has made a sustained effort during the most intense years of the economic crisis to meet the growth of new social needs. The number of direct services to beneficiaries increased from 42 million in 2008 to almost 53 million in 2018. The relative exit from the social impact of the crisis has reduced them to the 2008 level, some 42 million interventions.

In 2018 it employed 577,230 people, 3% of all jobs in Spain. During the crisis, to meet new demands, jobs increased from 529,029 in 2008 to 644,979 in 2013. Afterwards, it dropped to the figure in 2018. The employment of singular entities has gone from representing 8% in 2008 to 15% in 2018, which have absorbed most the increase in employment that occurred in the sector between those years, about 48,000 jobs.

The 62.4% of entities had someone hired in 2018, 15% less than in 2008 and the average number of people per entity was 28, about 3.5 more people than in 2008. Entities with more than €1 million of budget are those with the highest average number of employees and the one that has grown the most, which has gone from 70 in 2008 to 130 in 2018. In turn, the entities with less than five people hired have grown by 34.5% in 2008 to 45.7% in 2018, increasing polarization, a feature that closely resembles the distribution of employment in all companies in Spain.

Almost a third (35%) of the people hired have temporary contracts, an average somewhat higher than the Spanish (30%), and 46.5% have part-time work, both characteristics because of the financial fragility of a good part of the entities of the sector and the peculiarity of their activities. Two-thirds of those hired are women and three-quarters have undergraduate or bachelor level studies.

In 2018, the sector had the collaboration of 1,05 million volunteers, 31% more than in 2008, with an average of almost 30 volunteers per entity, whose dedication equals about 170,000 full-time jobs per year. Volunteers are preferably engaged in direct care activities and participation in awareness and promotion campaigns. The activities of organizing and maintaining services are also a growing part of their activities.

In qualitative terms, its demonstrated strengths are: the internal cohesion of the entities; the stability of collaboration with the public sector; the growing openness to other TS entities; the quality and commitment of its human resources at all levels; the value and importance of volunteering; the speed of response to the failures of the public sector and the market, insufficient however because of the scarcity of resources; and a management that, as a whole, is transparent and avoids indebtedness to ensure the viability of the entities.

Its weaknesses are: its low social visibility; difficulties in transmitting the value of their results; the dual structure of organizational size; financial insufficiency despite the growing diversification of financing sources; and the still insufficient internal articulation of the sector.

The 2008 economic crisis put the sector to the test and has been an opportunity to reinforce capacities it already had, thanks to the second and third level entities, which have facilitated the synergy of efforts between the smaller entities. They have done so by facilitating participation in collaboration networks, in common projects or in the joint acquisition of services. This does not solve the marked polarization, but it contributes to alleviating it and paves the way for the realization of friendly mergers that improve organizational efficiency and effectiveness. It has also helped to increase the strategic mentality of all entities, large, medium, and small.

Changes in social needs (labor inclusion, aging, child poverty, among others) have made the sector aware of better use of its institutional and organizational capacity to establish a medium-term sustainability agenda, which helps to

anticipate social change; improve financial strength; broaden the social base; establish stable alliances with the public sector, European organizations, and platforms and other civil society actors; and expand collaboration with the commercial sector in projects of mutual interest.

These brief figures give the importance and strengths that the TSSA already has and its weaknesses. As has been seen, it is an important sector, but the empirical studies on which this statement is based are very recent, there has been little historical accumulation of knowledge, and qualitative studies to complete the survey data are scarce (Casado, 2015). Therefore, the information on the sector is still incomplete to have a more exact idea about it. The data we have used come from the four TSSA reports cited since 2008, which refer to the entire country. They have been based on online surveys which, like any survey, have limitations because of the length of the questionnaires. As there are no homogeneous public records of entities the total was estimated from existing partial records, which may be incomplete. Due to the size of the samples used, conditioned by the resources with which they were made, the data cannot be disaggregated below the national level. For this reason, the results are still very general, and do not reach the details of the diversity that the sector has. It is necessary to know the structure and dynamics of the sector in the Autonomous Communities, responsible for social policy and even at the local level. It is also necessary to have information to make typologies of entities that allow to know the structure of the sector in more detail. Much has been written about their role in managing the social policy of the European welfare and social cohesion system, but it has been done more with general references than with concrete references to their situation. For this reason, it is necessary to expand the previous recommendations from the European level and to conduct more comparative studies. There is still a broad and necessary field of research ahead for the knowledge of the sector to match its social importance. This applies to other areas of activity of private non-profit organizations in the fields of culture, sports, or leisure, much less well known than the TSSA.

Over the last decades, the TSSA has grown, modernized and has become a necessary social actor in the production of wellbeing, in creating social cohesion and in the channeling of a diverse and increasingly qualified volunteer service. This process has been associated with two main causes. One, the crises through which the Welfare State has been going from the first oil crisis in the early seventies to the last economic crisis (Pérez Yruela, 2018), which have been

reducing its resources and promoting co-responsibility of the company in its management and financial maintenance. The TSSA and the families have been the main actors on whom this transfer of responsibilities from the state to society has fallen. Another, criticism of the lack of state attention to some social needs because of its difficulty in knowing and reaching all the groups that suffer them; criticism of the lack of quality and effectiveness in the public provision of healthcare services that need closeness, empathy, proximity, flexibility and even generosity to provide them, incompatible with the bureaucratic management model. The state's response has been to promote and accept the participation of the TSSA, which because of its characteristics, is the main actor to assume them, without renouncing that commercial companies can also do so.

The growth of the TSSA amid this dilemma has been both a weakness and an opportunity. A weakness, because some entities have grown in a fragile and precarious way when responding to problems that the state does not address, but that it helps to solve by transferring insufficient resources to the TSAS to do so adequately. An opportunity, because other entities grew under protecting the economic possibilities derived from the collaboration with the state sustained and because of the recognition that implies delegating tasks of general interest to them.

This dilemma is responsible for some of the most important tensions affecting the sector. The first, how to combine two functions of the sector entities sometimes difficult to reconcile: i) the function of defending social rights and denouncing their non-compliance, which includes denouncing public administrations for insufficient funding allocated to those problems; ii) to provide specific services to those who need them, which they carry out helped by public funding. They are functions with different realization logics, which require resources to fulfill them, not always available, especially when in scarce resources both compete for them. The second, guarantee their autonomy of operation by increasing financial autonomy and reducing financial dependence on the public sector. They are difficult tensions to resolve because the TSSA cannot give them up. It would be resolved only if the state were receptive to the criticisms made for not addressing social rights and public funding was sufficient for the TSSA to address them.

Both are issues that require normative analysis in a theory of TS that resolve the question of its recognition as an organized part of civil society, recognize the privileges that correspond to it, and other entities thus recognized, and order the relationships between its entities and public administrations

depending on the objectives each has. Legislation has advanced in this direction, recognizing the sector, its relations with public administrations and its participation in consultation bodies, but it has not developed specific rules for their application. The advances made through social agreements and social clauses in public procurement are insufficient,

3.2. The Social Economy¹⁴

The SE is formed, according to Spanish legislation, by cooperatives, mutual societies, foundations and associations that carry out economic activity, labor companies, insertion companies, special employment centers, fishermen's associations, societies of agrarian transformation, and singular entities created by specific norms governed by the same principles. As we have said before, it could be called Third Sector of Economic Activity (TSEA).

To underline the importance of SE and the gaps in its knowledge that are part of the challenge to which this work wants to contribute, we will refer more fully to cooperatives, which are the most important group of entities in the SE. At the end we will briefly reference the rest of the entities, if the same comments made on how to expand and improve the knowledge of cooperatives can be applied to them.

Cooperatives have legal recognition much older than NPOs. The first law of cooperatives was promulgated by the Second Republic in 1931. In 1987 the first law of cooperatives of democracy was promulgated, which was replaced in 1999 (Law 27/1999, of July 16, on cooperatives) by the one in force. This law introduced modifications on those previous to facilitate the activity of cooperatives, removing obstacles that could hinder it. It allows operations with third parties and increases their permitted economic volume, allows assemblies to introduce plural voting with limitations (abandonment of the traditional principle of one man one vote) and expands the forms of economic collaboration between cooperatives to facilitate merger and integration processes that facilitate the expansion of the size so necessary to improve competitiveness (Sáez Fernández et al., 2003).

An attempt has been made to bring the cooperative model close to the non-cooperative company to facilitate its adaptation to increasingly global and competitive markets. With these changes, cooperative companies do not abandon one of

14. This section is a summarized version of the summary section of section 4 of the work: Pérez Yruela, M. (2019). "Overview of the Third Sector in Spain during the crisis". FOESSA 2019 report. The data collected comes from this work and in those from another source, the source is cited.

their basic principles (the primacy of people over capital), but the global context in which they operate makes it sometimes difficult to comply. Therefore, it is a matter of debate to what extent the pressure of the environment, the evolution of the regulations that regulate them, and the culture of cooperatives as companies itself may have been moving them away from the original ideals of cooperativism as a space for defense and help mutual of the weakest sectors of society.

Cooperatives are strongly articulated under the formula of second- and third-degree cooperatives, in corporations representing interests at a territorial and sectoral level. All converge in the Spanish Confederation of Social Economy Entities (CEPES), which is the highest representative body, without prejudice to the weight that sectoral and territorial organizations maintain in representing their specific interests. In this they differ from the OPS-FL, whose articulation is much weaker. These representative entities at national level are part of those that exist at EU level.

For a long time, there has been a specialized public administration body, which is in charge of the approval and registration of the cooperatives created and the statistics of the SE entities. The body acts as an ordinary interlocutor of the public administration with the sector in matters of common interest and of each party. In the XIV legislature in progress, this body has reached the highest rank, because there is a Ministry of Labor and SE, a State Secretariat for Employment and SE and a General Directorate for Autonomous Work, SE and Social Responsibility of the companies. In this it also differs from the TSAS, which does not have a specialized body like this, although there are others that conduct the function of dialog with the entities of this sector according to the specific social programs (childhood, youth, elderly, disability...) in which they collaborate. These administrative bodies have depended on the competent Ministry for social affairs, which in the current legislature is Social Rights and the 2030 Agenda.

The importance of this sector can be seen in the following data: In 2017 there were 20,958 cooperatives in Spain. Between 2007 and 2017, just over five thousand cooperatives were lost, 19.5%, of which 90% were lost between 2007 and 2013. Between 2007 and 2017 the proportion of public limited companies that disappeared was 29%.

In 2017, the number of cooperative workers was 319,792, which represented 1.6% of total employment in Spain in the fourth quarter of that year. They were about 2,200 more than in 2007, which indicates that cooperatives have

recovered better than the Spanish economy and job loss caused by the crisis, which with cooperatives was 30,771 fewer jobs between 2007 and 2013.

Cooperatives have increased the average number of workers per cooperative, from 12.3 in 2007 to 15.2 in 2017, because of the decrease in the number of cooperatives and the increase in the number of workers in the same period. There has been a slight process of concentration necessary in the sector which had 76.6% micro companies with less than 10 employees.

Two-thirds of these jobs (66.4%) were in the services sector, just over a fifth (22.4%) in the industrial sector, one tenth in agriculture (10.2%) and 3.1% of the construction. In the industrial sector, the proportion of workers in cooperatives is 6% higher than the Spanish average and 9% lower in the services sector, which indicates a structure closer than the country's average to a productive model with greater weight of the industrial sector.

An interesting indicator of the proximity of cooperatives to TSSA entities is how many are engaged in similar activities. In 2017, there were 540 cooperatives that represented 2.6% of the total. About 19,000 employees worked there, 5.9% of the total. In addition, between 2007 and 2017 they have had a certain growth, without interruption in the peak period of the crisis that reaches 2013, since at the beginning of that decade the proportion of cooperatives dedicated to this activity was 1.9% and that of workers 4.6%. Growth, probably because of the social needs created by the crisis.

Agricultural cooperatives are the most traditional in Spain. They have fulfilled and continue to fulfill very important functions in modernizing agriculture and rural society. In 2017, the number of cooperatives in the food industry was just over half of those in the exclusively agricultural sector but they already generated more jobs than this, 35,000 jobs compared to about 32,000, respectively. It is an indicator of the contribution of these cooperatives to the process of transformation and industrialization of agricultural production. In 2016, three Autonomous Communities, Andalusia, Catalonia, and Valencia, accounted for 41% of agri-food cooperatives and 54% of the turnover of all Spanish cooperatives in this sector. Andalusia is the community that, far away from the others, concentrates most of this sector, with 22% of cooperatives and 38% of the total turnover of the cooperative agri-food sector. Agricultural cooperatives also accounted for a third of total sales and almost a fifth of total exports from the Spanish agri-food sector, responsible for two-thirds of final agricultural production.

The contribution of agrarian and agro-industrial cooperatives to the economy of rural areas and their modernization, to the maintenance of the population in them and the creation of identity, territorial loyalty, and social capital to help rural-territorial development, has been and continues to be important. The image of these cooperatives as a company is associated for many consumers with an economy with a human face, quality, and trust, which is an important intangible asset. Despite the historical and social importance of agri-food cooperatives, those in the industrial and services sector are today much more important in number and in creating jobs and wealth, as a reflection of the change experienced by the Spanish economy.

Cooperativism in Spain is less developed than in neighboring countries. According to data from 2015¹⁵, the number of cooperative workers was much higher in France (1,217,400), Italy (1,150,200) and Germany (860,00) than Spain (290,221). Thus, the number of partners was in Spain almost 3 million, in France 26 million, in Germany 22 million and in Italy 12.5 million. It was also the same in the volume of turnover that in Spain reached €62,000 million, in France €300,000 million, in Germany €195,000, and in Italy €150,000. According to the 2018 report of the World Cooperative Monitor¹⁶, which is not exhaustive, among the 300 cooperative and mutual organizations worldwide, which have a turnover of over \$1,100 million, there are 4 Spanish¹⁷, 10 Italians, 23 German, and 48 French. Because of these indicators, cooperativism in Spain has a wide margin of growth.

However, in Spain there are large cooperative groups. Spain has the first industrial cooperative group worldwide, the *Mondragón Cooperative Group*, with over 63,000 employees; *Cofares*, drug distribution guards, with over 2,500 employees; *Espriu Foundation* for health, education, and social assistance, with over 57,000 employees, *Consum* in the commerce sector, with over 14,000 employees; *Cajamar*, cooperative Group of banking and financial services, with over 6,000 jobs; *Coren* (287) from the agri-food sector, with over 3,000 employees. Besides these, others such as *Ilunion Group*, with over 35,000 employees, linked to the ONCE group, dedicated to the labor

15. These data come from the report by Carmen Quintana Cocolina for Cooperative Europe published in 2016. <https://coopseurope.coop/sites/default/files/The%20power%20of%20Cooperation%20-%20Cooperatives%20Europe%20key%20statistics%202015.pdf>

16. This annual report is made by the International Cooperative Alliance

17. The Spanish organizations among these three hundred, with the position they occupy and their scope of activity, are very different organizations such as: Corporación Mondragón (39, industry), Mutua Madrileña (102, insurance), Fundación Espriu (193, health, education, and social assistance) and Grupo Cooperativo Cajamar (248, Banking and financial services).

inclusion of people with disabilities through especially special employment centers. Or the *Clade Group*, a business group in the Catalan SE, multisectoral, with more than 5,500 employees.

Finally, we will add some information about other entities of the SE to complete the vision about their importance. The second most important group are the *labor societies* (LS) conceived as entities for the creation of employment under the formula of joint-stock or limited companies, which operate in accordance with some principles of the SE. In 2017 there were 9,324 LS, 90% as limited companies, employing 63,471 partners and workers. Most (88%) are micro-enterprises with less than 10 workers and an average size of 7. Between 2007 and 2017 they had a very important setback, losing 10,500 entities and 61,000 jobs. Its main activities are services (59%), industry (27%) and construction (12%).

The next most important groups are: *Special Employment Centers*, designed to promote the employment of people with disabilities, of which there were 670 who employed 84,946 people with disabilities¹⁸. *Social Insertion Companies* designed to help people with social problems of access to the job market, of which in 2108 there were 185 employing 7,154 people, 60% insertion workers and 40% technicians and company managers. *Fishermen's guilds*, of which there were 198 that employed about 35,000 workers¹⁹.

Foundations can be considered part of the TS because they conduct activities related to the TSSA, the SE and other activities such as culture, leisure, and sports. There are information available on Foundations in general and on Foundations of Social Action. In 2014, the latest information available, there were 8,866 active foundations in Spain. It is a sector in which around a third (34%) of its entities had a budget of less than €30,000 and another similar proportion had between €30,000 and €500,000. There are 270 associations with a budget greater than €10 million and some 40 of over 50, many promoted by large economic groups or by the public sector. It is a polarized sector according to the budget criteria, although to a lesser extent than the TSSA. Just over a third of the foundations had no employees (38%). The two-thirds that have them had 213,683 direct jobs. The annual income of all the foundations was approximately €7,400 million. Social action foundations are a small part of the foundational subsector and their

18. CEPES. https://www.cepes.es/social/estadisticas?e=personas_relacionadas_es Consult 20.03.2020

19. CEPES. https://www.cepes.es/social/estadisticas?e=personas_relacionadas_es Consult 20.03.2020

characteristics are closer to the TSSA entities than those of the subsector to which they belong. They had 3,025 workers, 8,079 volunteers and an income of €354 million.

Associations are the organizational field with the least accessible information. On the one hand, there are local, provincial, regional, and national registries, scattered and not integrated into a single registry which prevent comparative national and territorial analysis. The information in the registers is very brief and is not usually up to date. According to a recent study (Pérez Yruela, 2016) between 1993 and 2012 active associations at the state level grew, going from 9,190 to 44,206. Among the active associations, the cultural ones were the majority (40%), followed at a considerable distance by those of an economic and professional nature (18%), those of social, health and educational action, including those of care for the sick and dependent (16%) and sports, recreational and youth (11%). The group that grew the most between those years is that of social, health and educational action, which in 1993 only represented 8%. Depending on their activities, some associations could be part of the TSSA, others of the SE, others in the field of representing corporate interests and others in the generic field of culture, which are the majority. As we said before, they could be part of a different area that, as we have said before, could be called the Third Sector of Economic Activity (TSEA).

The organizational field of SE is important, varied, and complex. We have basic statistics to analyze it, such as those used here, but they are insufficient. Data and research are needed to provide more detailed information. Cooperativism has attracted the most attention in the academic field. There are quite a few institutions dedicated to study and research on this matter, almost all integrated into the International Center for Research and Information on the Public, Social, and Cooperative Economy (CIRIEC-Spain), a member of CIRIEC-International. Among them is the Spanish Interuniversity Network of Social Economy Research Institutes and Centers (RED EUNIES), of which over three hundred researchers from different Spanish universities form part. In Spain, three specialized magazines are published on this subject: *CIRIEC-Spain. Journal of Public, Social and Cooperative Economy*; *Journal of Cooperative Studies* (REVESCO) of the Complutense University; and *DEUSTO Cooperative Studies* of the University of Deusto. For all this, there is abundant scientific literature on cooperativism, especially in the descriptive aspects of the sector dimension, historical, legal, economic, and much less sociological.

The statistical information available until now comprised historical series on cooperatives registered with social security, classified by activity sector, Autonomous Community, and number of workers. As of 2017, this information has ceased to be directly accessible. This collects the number of cooperatives, the number of members and the number of workers according to the cooperative, sector of activity and Autonomous Community to which they belong. The same can be said of the other entities of the SA, whose basic information is similar but of private production and very recent, as with the other entities of the SE mentioned above. This information is insufficient to understand the entire SE sectors. It would be necessary to have records with sufficient and up to date information of mandatory public-private production and to promote research from them to better understand, according to the typology of organizations, sectors of activity and territories, the business dimension (strategic plan, organizational structure, management and leadership, personnel policy, cultural linkage to the principles of the SE, conflict management, participation of partners, characteristics of volunteering, institutional quality...) and the social dimension (human resources and social base, management and activities of the social work, collaboration with NPOs...) of these entities.

Information is even scarcer for associations. However, it would be worth doing, especially for cultural associations, because they occupy a front line position, as an infantry of the culture of civil society, which nourishes with ideas and human resources many subsequent initiatives of citizen participation...

4. EMERGING ORGANIZATIONS OF SOCIAL ACTION AND SOCIAL AND COLLABORATIVE ECONOMY²⁰

As an example of collective social actions related to the principles of SE, we will refer in this section to social enterprises, social cooperatives, solidarity economy companies, some collaborative economy and consumption initiatives, of recent origin, and developing the so-called community foundations. The objective is to analyze their proximity to the principles of the SE and the NPOs, to see to what extent the institutional renewal of these entities is possible using other legal formulas and new organizational models. If it is possible that in the delimitation of the TS it is possible to go from the formal criteria of the legal definitions of the entities to other criteria in which the principles, values, and objectives of the activity prevail, on the legal formulas in which they specify.

20. This section is a slightly modified version of section 7 of: Pérez Yruela, M. (2019). "Overview of the Third Sector in Spain during the crisis". FOESSA 2019 report.

4.1 Social Enterprises

Social enterprises are a movement that has grown in importance in the United States and Europe in recent decades. What is understood by *social enterprise* is different in both continents (Kerlin, 2006; Galera and Borgaza, 2009; Hulgard, 2010). In the US there is a lax conception of what a social enterprise is. The Social Enterprise Alliance of the USA, a very active organization in the representation and promotion of social enterprises, defines them as “organizations that attend to unmet needs or solve a social or environmental problem through a market or business approach.” It considers three types of social enterprises: a) companies that employ people with difficulties to enter the normal labor market; b) companies that offer innovative products or services that create positive social or environmental impact; c) companies that donate a part of their profits to non-profit organizations that serve unmet social needs. The social enterprise, they say, is not so much a specific legal figure, but a philosophy that aims to address social problems or socially useful causes through an organization within the market. It therefore includes a range of cases ranging from a company whose activities are socially useful or beneficial to a non-profit organization that allocates all its profits to social objectives, to companies that dedicate only one part of the benefits to social objectives. The social enterprise movement of this model is spread over many countries in Europe and other continents.

In Europe, the notion of social enterprise is more associated with traditional forms of SE, such as cooperatives and similar entities, and tries to define it clearly. The European Business Research Network (EMES) defines them through various economic, social, and participatory traits, which they must comply with (Defourny and Nyssens, 2012). The first are: having a continuous activity of production and / or sale of goods; assume a significant degree of economic risk; have a minimum number of salaried workers. The second: have an explicit objective to benefit the community; arise at the initiative of a group of citizens or a civil society organization; limit the distribution of benefits. Finally, the third are: having high autonomy; that the decision-making power is not associated with the capital owned by each partner (e.g., one partner one vote); have a participatory governance that involves the different groups affected (stakeholders) by the company’s activity (e.g., partners, employees, service recipients...) The definition proposed by EMES is more restrictive than the previous one, to include within it cooperatives and other entities of the SE, which have an important weight in Europe, and to specify what a social enterprise is.

The European Union is attempting to promote social enterprises, through the Initiative for Social Entrepreneurship approved in 2011, because it recognizes that they can play a very important role in the proposed smart, sustainable, and inclusive growth model in the Europe Strategy 2020. The initiative was launched without an accepted definition of them yet. A notion of social enterprise was used, taking features of the previous definition: companies whose main purpose is a social objective of common interest, whose profits are mainly reinvested in the achievement of that objective, and whose form of governance is democratic and participatory. Cases of social enterprises cites two types: a) those that provide social services or supply goods and services for a vulnerable public (social care, needy groups, training, and inclusion activities...); b) companies whose mode of production of goods or services pursues a social objective (social and professional integration through access to work for disadvantaged people at risk of exclusion, whose activity may include goods or services that are not social). It recognizes that the specific legal regimes of the SE (cooperatives, foundations, associations...) are the ones that best adapt to this conception of the social enterprise, but it also recognizes there are many social enterprises as a private company or a traditional joint-stock company. It cites several examples of social enterprises, some of which are entities like the Social Insertion Companies and the Special Employment Centers of Spain.

In 2018, the European Parliament approved a set of recommendations for the European Commission on the need to approve a statute for social and solidarity companies. They are very useful recommendations for the definition, consolidation, and growth of a European model. The most important recommendation is that the European label of SE be actively promoted, and that the economic and social benefits of social and solidarity enterprises are made known, including the creation of quality employment and social cohesion. It adds interesting observations, such as pointing out that the mere fact of having a corporate social responsibility strategy cannot be a condition for deserving the consideration of a social enterprise, in such a way as to clearly distinguish between one thing and another. That the member states be asked for a list of companies that, according to their legal system, should be considered social companies. Or on the importance of the principle that a considerable percentage of the profits obtained by the company must be reinvested or used in another way to achieve the social purpose of social and solidarity companies. Furthermore, it makes recommendations on the need to financially support these companies, create a favorable framework for their development, better integrate them into union legislation, and establish a more coherent and comprehensive legal framework supporting social economy-based

enterprises, in the field of public procurement, competition law and taxation, so these companies are treated in a manner consistent with their specific nature and their contribution to social cohesion. Finally, it points out that among the minimum requirements for obtaining this label must be the performance of an activity of social utility defined on a European scale. In addition, the social impact of the activity must be measurable in the field of social and / or labor integration of vulnerable people and at risk of exclusion, the reduction of inequalities of all kinds and especially gender, the improvement of equal opportunities, the fight against poverty and the best practices in the field of working and employment conditions must be respected.

The European Union vision on social enterprises and its expression in the initiatives it takes differs from that of the US, because it does not contemplate the case of companies that allocate their profits, or an important part of them, to social purposes, or take on activities of social or environmental utility that are broader than those included in the previous requirements. However, we must wait and see if the EU develops a definition of social enterprise, either with these recommendations or extending them to those other cases, and creates the European label of social enterprise, which would be a very important advance for the sector. Defining what is considered social utility would be a key aspect to delimit social enterprises, which is not an easy task. In any case,

The insertion companies to help the employability of excluded people, the special employment centers to promote the employment of the disabled and the policies for integrating the disabled in the labor market could be classified as social companies with those that give opportunities to excluded and significantly disabled.

4.2. Social Cooperatives

In 1991, Italy went ahead with the creation of social cooperatives to regulate these new forms of social and solidarity economy. Social cooperatives arise in the role that social enterprises and all entities of the TS, will have in the model of the Welfare State developing in Europe for years. A model in which, as it was said at the beginning, the state is transferring responsibilities to society to collaborate in the social policy it finances, especially through its application, and in meeting the needs it does not meet.

Social cooperatives were created specifically to develop two functions, which are very similar to the two types of companies contemplated in the aforementioned European strategy: a) social and health care activities, specifically, social and

welfare services (art. 1.a); b) training activities through employment for people with difficulties integrating into the labor market, in social cooperatives that carry out agricultural, industrial, commercial or service activities (art. 1.b).

The governance model of social cooperatives, unlike other cooperatives, is the business model, that of private companies that compete in the market. However, their main objective is not profit but the social function they perform. They can have three types of partners (Thomas, 2004): a) The founding partners who provide funds for their creation (65%); b) voluntary members who contribute work without pay (20%); c) the beneficiary members (5%) of the activity conducted by the cooperative who participate in the management of the entity; d) other partners (10%) that may include financing partners through actions, statutory members who can provide a relevant service to the entity, employees of the entity, or representatives of public institutions.

From the viewpoint of participation, social cooperatives incorporate innovations. Linking volunteers as partners, which makes them more involved in the project. Moreover, expanding the range of those who can participate in the creation and management of cooperatives. It is thus distinguished from traditional cooperatives, in which management is only in the hands of the members through the assembly and the management body it chooses. Furthermore, in the objectives which cease to be the traditional ones of mutual aid and defense of the interests of cooperative members. From the management viewpoint, these cooperatives, because of their business nature, seem to be in a better position to compete with other entities in attracting resources and have easier access to sources of finance (Thomas, 2004). They are so because of the experience they must undergo in competing and with other public or private entities in the market for the provision of services outsourced in the Welfare State model in which they do so. Social cooperatives can be a type of social enterprise, specified and regulated, combining the double aspect of social objectives and business operation. It is a model that TSAS entities could consider, moving from the legal formula of association, too generic and not suitable for entities that can compete and with the commercial sector.

Between 2005 and 2013, the number of social cooperatives has almost doubled, from 7,765 to 13,041 (in 2014 they dropped to 12,319). The total number of workers in social cooperatives in 2013 was 390,079, including permanent and temporary workers, of which 24,509 were people with disabilities or had other problems. In Spain there are no such cooperatives, although, as already mentioned, other figures fulfill similar functions.

4.3. Alternative and Solidarity Economy

The solidarity economy, which is part of the Network of the Alternative and Solidarity Economy (REAS), is an example of new economic initiatives that, although indebted to the tradition of the SE, are based on values and objectives that go beyond the limits of the traditional cooperativism. The solidarity economy is based on the principles set out in the Charter of the Solidarity Economy, which in the preamble says that “it is a way of life that encompasses the integrity of people and designates the subordination of the economy to its true purpose: to provide sustainable material bases for the personal, social, and environmental development of the human being... Therefore, it is not identified according to the material benefits of an initiative, but is defined by the quality of life and wellbeing of its members and society as a global system.”

The entities of the solidarity economy are based on the concept of social market: “A network of production, distribution and consumption of goods and services and common learning that works with ethical, democratic, ecological and solidarity criteria, in a given territory, constituted both by companies and entities of the solidarity and SE as well as by individual and collective consumers. Whose objective is to cover a significant part of the needs of its participants within the network and disconnect the solidarity economy from the capitalist economy, as much as possible”.

The Charter of the Solidarity Economy establishes six principles:

- *Equity*, equivalent to a principle of equality, which recognizes all people as subjects of equal dignity, absence of relations of domination.
- *Job*: recognizes its importance in the quality of life of people, the community and economic relations and the importance of recovering the human dimension of work considering that it is more than a job or an occupation.
- *Environmental sustainability*: the alliance with nature and the recognition of their rights is the starting point of the solidarity economy.
- *Cooperation*: favor cooperation instead of competition and seek collaboration with other public and private entities and organizations.
- *Non-profit*: the solidarity economy aims at the integral, collective, and individual development of people, and as a means, the efficient management of economically viable, sustainable and profitable projects, whose benefits are reinvested and redistributed. The balance sheets must consider not only economic aspects but also human, social, environmental, cultural, and participatory aspects.

- *Commitment to the environment:* participation in the sustainable local and community development of the territory. The solidarity economy organizations are integrated into the territory and social environment in which they conduct their activities.

It can be said these entities are part of a new culture that reflects the advancement of social movements such as environmentalism, feminism, pacifism, and anti-capitalism. The latter more in the sense of the rejection of aspects such as irresponsible consumerism, the culture of aggressive competition, wasteful luxury as a status symbol and the social inequalities this model generates. A culture that wants to have its place, even if it is small for now, in societies of a liberal democratic and possessive individualism, hegemonic in the developed countries where they have emerged.

The REAS groups five hundred entities, grouped into regional networks (in all the Autonomous Communities except three) and sector networks (AERESS, Spanish Association of Recovery of Social and Solidarity Economy); Ethical Finance Table (FIARE Banca Ética, Coop57, Oikocredit, and CAES) and Red de Finanzas Alternativas y Solidarias; Unión Renovables (Network of Cooperatives of Consumers and Users of Renewable Energies) and the State Fair Trade Coordinator). The activity of its entities covers a wide range, from recycling and recovery proposed by the circular economy to financial ones, through agricultural, industrial, and service activities, especially social and educational services.

The solidarity economy is undoubtedly part of the TS it is associated with CEPES, and many of its entities are cooperatives or associations, but compared to traditional cooperatives and similar entities it is almost a newcomer. However, it raises its activity from values and principles that can help the traditional sector to refresh its own, establishing contacts and projects in common with it.

4.4. Economy and Collaborative Consumption

The collaborative economy is a social and economic phenomenon growing exponentially. Although there is no agreed definition of the collaborative economy, some definition must be adopted to set the terms of any analysis on the subject you want to undertake. Thus, the European Union in its communication to Parliament on “A European agenda for the collaborative economy” defines it as “business models whose activities are facilitated through collaborative platforms that create an open market for the temporary use of goods and services generally offered by private individuals. The collaborative

economy involves three categories of actors: i) providers who share their heritage, resources, their time and/or skills (they may be private individual providers that offer them occasionally (peers) or providers that offer their knowledge and/or professional skills acting as such; ii) consumers or users of the goods and services offered; iii) intermediaries that put suppliers in contact with consumers or users through a platform. Sharing economy transactions do not involve a change of ownership and can be conducted for profit or non-profit.” As is well known, an essential factor for developing these platforms and, therefore, of the economy and collaborative consumption, is the existence of the internet and the ICT to develop and use them.

The relationships between providers and users of this type of economy can be between equals, like people who want to exchange their homes or offer part of them as accommodation occasionally. Or between companies that want to offer their services or sell their products to consumers who want to purchase it by paying for it through platforms, such as those that exist for hotel accommodation. The platforms function as a meeting place between providers and users, so they can charge a commission or not, depending on the platform. Or they are platforms that provide a service through people who hire for it, such as some messaging or home services.

A collaborative economy is considered one developed between equals through a platform, for free or through payments not considered benefits, such as: time banks, crowdfunding, crowdsourcing, co-working, local currencies, sharing services or accommodation goods, use of equipment or mobility by exchange, for free or for small compensations for the cost of the service (Rodríguez et al., 2017).

In the other cases, it is possible to speak of commercial relations between supplier and consumer (economy on demand, Sharing Spain, 2017), which are affected by taxes for exercising the activity and the legislation on consumption and consumer protection, besides the legislation on labor relations with platforms with employees to provide services, besides those they have for operating the platform. The communication from the European Commission cited, wants to warn about the legal implications (activity authorizations, tax and labor obligations, consumer rights, insurance...) that these economic relationships have, until recently unknown, to create the legal framework appropriate so its development conforms to the legal system.

In the varied casuistry that exists undesirable effects of its development have been seen: touristification of neighborhoods, abusive labor relations

(lack of security in transactions, among others). That is why its regulation is necessary. In Spain more than 500 operate between collaborative economy and consumption platforms and economy on demand for the most diverse activities.

From the viewpoint of this report, what is interesting on this subject is to highlight the relationships they may have with the TS and the potential it offers them. The collaborative economy is a relationship between equals, which fulfills important social functions: facilitating access to certain goods for people with fewer resources, using under used resources more efficiently, recycling products, donating, and exchanging products or services, putting people in contact through exchanges or creating communities of users or providers. In this it is close to the values of the TS. As for whether these platforms meet the formal requirements required of TS entities, perhaps they do in some respects (non-profit and social objectives) (Díaz-Foncella et al., 2016) especially if new figures such as social enterprises are incorporated into the TS.

It is an example of how much can be done in the TS using this technology. For example, the *Dónalo* platform, which is a meeting point where companies donate their surplus (stock remains, computer equipment, furniture...) in good condition and non-profit entities receive it free. However, it is also a type of exchange that can be done without the need to use digital platforms at the level of smaller communities, such as neighborhoods or municipalities with little population, because the collaborative economy has always been practiced, even if it is small scale and between people with close relationships and, in these cases, it is about recovering it.

In this sense, to take advantage of these new forms of economic relations, TS entities promote platforms for the collaborative economy, as suggested by T. Scholz for the specific case of cooperatives (Scholz, 2016). That would make those platforms, which are alien to those who use them, acquire a closer and more beneficial identity for them. For these purposes, it indicates examples of possible platforms that, under the cooperative regime, are owned by the workers, to offer to develop various activities they may be conducting through an external platform. It also suggests the example of “prosumers,” artists or artisans, with cooperative infrastructure for their activity (workshops, instruments, tools, showroom). Or publicly owned platforms, municipalities for example, to gather the offer of tourist accommodation. They are only a sample of the possibilities offered by the economy and collaborative action. There are many more examples, but here is not the place to discuss them.

These innovations have opened a window of opportunity of extraordinary scope, because of the possibilities they offer to develop collective actions that can be based on the values and objectives that have inspired the actions of the traditional TS, which should be open to them to face the challenge it faces. to broaden its social base and renew itself to guarantee its consolidation and future sustainability. This undoubtedly requires, on the one hand, a better understanding of these emerging forms of still incipient collective social action. On the other, closer relations between both parties.

However, they are the least studied and known among those that we have been dealing with in this work. As has been seen, we are still far from having a clear identification and definition of many and, even less, from knowing their effects on our societies and the best way to regulate them to avoid the undesirable ones.

4.5 Community Foundations

Community foundations (CF) still have little tradition in Spain compared to neighboring countries, although there are some that, because of their system of organization and operation, can be considered as CF²¹. They are philanthropic organizations, closely linked to the territory with which they establish a long-term commitment, to contribute to developing its endogenous potential and the wellbeing of its inhabitants. To do this, they mobilize the financial, cultural, patrimonial, human, and organizational resources of the community. They also attract outside private investors and raise public resources. In their system of government, they actively involve the members of the territory.

It is estimated there are over 1,800 CF worldwide. These institutions are very frequent in the United States and Canada, also in some countries of the European Union²², as in the United Kingdom, France, Italy, and Germany, in the latter there are over 400; They have also spread to other geographic areas such as Latin America or Africa.

The work areas of the CFs are very diverse, but the territorial vocation and helping people who are well there predominate among them. Their configuration, positioning and strategic options vary depending on the countries and the environments in which they operate. This diversity is manifested in aspects such

21. Examples of foundations close to community foundations can be the Fundación el Huevo (Soria) or the Fundación Santa María la Real (Palencia).

22. For more information on Community Foundations in Europe see <https://www.communityfoundations.eu/community-foundations-in-europe.html>

as the relationship and cooperation they have with governments, the origin of economic resources, their financing structure and the action they conduct.

The importance of the territorial connection of the inhabitants of the territories and their proximity to the principles and values of the social, solidarity and collaborative economy constitute the substratum from which they usually emerge. Unlike most foundations, which arise at the initiative of a natural person, the promotion of CFs is usually of a collective, social nature, the result of citizen initiative.

However, it is difficult to define their differences with other organizational modalities of the TS. Among its basic requirements are: private promotion; the assignment to a more or less extensive territory, be it urban or rural; the involvement of people in the daily activities of the foundation; and the raising of private funds, a large part of which must come from the territory itself.

The CFs have similarities with other organizations with a territorial vocation and development and welfare objectives, such as the local action groups promoted by the Leader program of the European Union. Like them, CFs can contribute to enhancing civic initiative in Spain and activating the resources of many territories to benefit their inhabitants.

5. CONCLUSIONS

There is enough empirical evidence on the importance of SW in Spain and in other neighboring countries with which we can compare ourselves. Its importance is not only because of the functional and economic aspects that characterize it but also to the democratic value it has as a sector with its own values, which is the backbone of an important part of civil society.

It provides participation and commitment to social and citizen welfare and has shown its ability to collaborate with the state, especially in our welfare systems, in activities as varied as those derived from the management and application of social policy and others such as the promotion of culture and sports.

Their orientation toward people, toward limiting profits, toward promoting volunteering and toward participatory and democratic management are important signs of their identity, which is reinforced by the favorable opinion that society has of them, generally much higher than they have from other public and private institutions.

It has also demonstrated the ability to produce goods and services within the framework of the market economy using the technology and organizational culture necessary for this, without renouncing participation, democratic management, and the containment of profits. It has demonstrated the capacity for collaboration between entities despite its ideological pluralism, which is less frequent in other institutional settings. There is also evidence that the TS is being renewed with the appearance of initiatives that follow the path of those that have traditionally been part of it, although they take shape in different organizations, which can be a stimulus to broaden its social and cultural base.

It is a functional-institutional environment in which there are no shortage of problems and weaknesses pointed out in this text: the polarization of the size of the entities and the asymmetric structure of their respective organizational fields; the conflicts and struggles for power within them; the economic weakness of a good part of the entities in all the subsectors that comprise it; dependence on public funding; a certain disadvantage regarding the great weight that public and commercial organizations have and their operating logic; and a lack of internal articulation that limits its institutional recognition and its power of dialog with the public and commercial sectors.

For the knowledge of the TS to be at the height of its functional and democratic importance, many aspects need to be significantly improved, because the information and studies that we have on it are, as we have said, insufficient. A greater effort than that which has been made in Spain is necessary to alleviate these deficiencies. It is enough to compare the economic, legal, and sociological knowledge we have about the public sector and that of the commercial business sector, with that we have about the TS to take charge of the distance. Throughout the text, indicative knowledge needs have been pointed out, which are summarized and expanded below, on which a basic and applied research strategy on TS could be built:

- Legal analysis of the current regulations on TS entities within the framework of the EU, to propose a common model for the definition of entities and recasts of regulations that integrate them as much as possible into a common regulatory framework.
- Design of public registers for TS entities of any territorial scope and activity, which can be updated, collect variables for analysis, and can be integrated into national registers.

- Design of periodic statistical operations through surveys and other techniques, to be conducted by public statistical agencies, among the entities of the different organizational fields of the TS, which complement the information provided by the records.
- Proposal for a field of research on TS within the National Plan and the European Framework Program that includes:
 - Theory of TS as a functional-institutional sphere of civil society within the framework of a normative theory of democracy, which helps its recognition as a relevant actor in public-private collaboration.
 - Study of the relationships between political culture, citizen participation, volunteering and TS.
 - European comparative studies on: institutional recognition of TS; organization of the relations between the state, the TS, and the market in the execution of public policies; recognition of special value to TS entities in public procurement; public financing regime for TS entities.
 - Comparative studies on the business and social dimension of TS entities, such as those cited in the text.
 - Comparative studies on the differences in the provision of services by public, commercial, and TS entities, including the effectiveness, efficiency, and satisfaction of the beneficiaries in each case.
 - Comparative analysis of cases to identify success and failure factors of TS entities.
 - Comparative studies on emerging experiences of the social and collaborative economy, on the conditions of its incorporation into the TS and on how to improve its operation²³.

23. An example of this topic is the project of a researcher from the CSIC's Economic Analysis Institute, Flip Klijn, to design a mechanism that, using a platform that collects preferences, participants can make exchanges in the most efficient way.

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CHALLENGE I

ABSTRACT

The thematic scope in this text is that of some important transformations and threats that our collective decision-making model is undergoing in democratic societies. Political distrust on the part of a large part of the citizenry shows the erosion of democratic practices in some countries or the appearance of proposals for profound transformation in various directions. The objective of this text is to be state-of-the-art, which places this thematic area within the framework of the instructions distributed by the CSIC. Therefore, its structure follows the proposal made, starting with a state-of-the-art with two main sections, one focused on the diagnosis of the great challenges that democracy faces today and the other focused on responses and potential solutions.

DEMOCRACY, GOVERNANCE, AND PARTICIPATION IN SCENARIOS OF SOCIAL AND POLITICAL PLURALITY

Coordinators

Joan Font Fábregas
(IESA, CSIC)

José Fernández Albertos
(IPP, CSIC)

1. INTRODUCTION

The thematic scope in this text is that of some important transformations and threats that our collective decision-making model is undergoing in democratic societies. Although the global extension of the countries that claim to be representative democracies is one of the widest that has ever existed, the symptoms of deep questioning of their normal operating logic are present in many countries.

Political distrust on the part of a large part of the citizenry shows the erosion of democratic practices in some countries or the appearance of proposals for profound transformation in various directions. Even by those who do not intend to question the existence of representative democracy as a system, their ways of functioning are profoundly transformed in several dimensions, from the erosion of the nation-state as a central decision-making space, to developing mechanisms of more complex and less obvious power and decision making, which come to incorporate new forms of democratic governance.

Many of the issues that appear in this text are connected with the challenges addressed by other working groups, thus the ideas presented in each will feed and intersect.

The objective of this text is to be state-of-the-art, which places this thematic area within the framework of the instructions distributed by the CSIC.

Therefore, its structure follows the proposal made, starting with a state-of-the-art with two main sections, one focused on the diagnosis of the great challenges that democracy faces today and the other focused on responses and potential solutions.

2. STATE OF THE QUESTION

2.1. An agenda of problems

The recognition of a global crisis of representative democracy is the starting point of this challenge. The symptoms of this crisis are clear and include a wide range of realities, from those that concern citizenship and are manifested in attitudes or behaviors, to those that are more in the field of institutional responses and capacities.

Among those that are manifested especially through attitudes and behaviors of citizens are the increase in feelings of discontent with the political system (increased distrust toward the system's ability to respond to the demands of citizens, which sometimes leads to less acceptance of basic democratic principles), electoral volatility, and fragmentation (especially in multi-party systems in Europe), as well as affective polarization among voters. Increasing support for populist ideas and / or parties would be part of this set of signals. Not all these indicators taken in isolation are to be considered problematic: a more distrustful citizenry can also mean a more critical citizenry, with the advantages this may entail in terms of controlling the actions of the authorities or reinvigorating participatory spaces. The same can be said for party fragmentation, which can enrich representation sometimes or lead to difficult situations of political blockade in others. However, the set of all these symptoms (clearer in some countries and times than in others), which are exacerbated in especially difficult contexts (for example, in Southern Europe with the Great Recession), make up a scenario of unsatisfied distrustful citizens with the capacity to show themselves at least partially attracted by not fully democratic solutions.

Along with these general patterns, in some countries new and old political inequalities persist or increase. In some areas, there are still strong patterns of political inequality linked to social class and gender and, in other cases, these appear in generational gaps (with important consequences such as voting in the Brexit referendum, for example) or linked to new inequalities. related to job insecurity, immigration, or territories isolated or affected by the dynamics of globalization.

These patterns at the electoral level could favor a vicious circle by provoking a more confrontational political debate (with manifestations such as increased polarization, also among political elites, the repeated use of the adversary's delegitimizing attacks, and fake news use), that either paralyze political systems in which there are many members with veto capacity (United States, European Union), or impose constitutional policies with high costs for part of the population (for example, democratic setbacks in Eastern Europe). In either scenario, the new political life seems to lead to an intrinsic inability to reach agreements around public policies and institutional reforms that could help correct the problems that these dynamics cause, resulting in the de-legitimation of democratic rules and customs.

The social and political centrality is observed in very diverse areas, for example, through their presence among the Sustainable Development Goals (goal 16). The high levels of social conflict have consequences both in coexistence and quality of life and even in the economic field, where the World Bank considers civil conflicts as the greatest impediment to economic growth. These conflicts have less of an economic and class component, and more frequently appear motivated by non-economic confrontations, structured around cultural or ethnic elements. Democracy reveals the order of citizens' preferences but does not indicate the intensity of these preferences. How different social groups indicate the intensity of these preferences is through the organization of public events —such as demonstrations, protests, strikes...— that signal to governments the intensity of their discontent. The study of the causes of protests and civil conflicts is gaining enormous interest that cannot be neglected.

The literature on the ultimate causes of these processes is enormous, and can be divided into three blocks: i) economic transformations (increase in inequalities associated with robotization and globalization, new structural gaps associated with the outsourcing of post-industrial economies). ii) More complex and less obvious power and decision-making mechanisms (supranational institutions, crisis of legitimacy of multilevel governance models, shared sovereignties, public policies adopted by institutions not exposed to the electoral control of the citizenry). iii) social changes (new forms of social interaction, growing role of ICT, change in the media model, fake news, social networks, and structural deterioration of the institutions of social intermediation that anchored individuals in the political system). This search for explanations can be extended even beyond the strictly social sphere, analyzing all the psycho-biological

processes that can be activated with this situation. Knowing how our brain and our bodies respond to certain contexts of crisis, conflict or institutional political participation can provide many clues on how to design solutions.

The weight of each political actor in current collective decision-making processes has changed with consequences we are not yet aware of. The freedom of movement of capital has dramatically reduced the ability of national governments to redistribute income. Corporate tax was 40% in OECD countries 40 years ago and today it is half. The highest income tax rate in the US was 90% 50 years ago and today it is 40%. Evaluation companies, such as Standard and Poors, Moody's or Fitch, have a strong influence on the economic policies of governments.

However, the "market" as a mechanism for distributing rights over the social product is reaching high levels of bias for capital income. The weight of wage income in GDP is rapidly declining in all OECD countries, and the market creates economic polarization, which the Welfare State can hardly counteract. A growing part of the corporate profits of large corporations do not come from innovation or efficiency, but from the capture of the governments that practice these organizations. Government decisions can bring great benefits, which can be obtained through the widespread practice of "revolving doors" by politicians or through outright corruption.

2.1. One possible proposal

Depending on where the causes of all these phenomena are located, different proposals for reform and approach to them emerge. We will point out some ideas about the three main groups of action (economic, sociocultural, and political-institutional), but given that the first two find a better accommodation in other challenges (E, H, and L, for example), here we will mostly develop responses for the political-institutional sphere.

In the economic sphere, we can speak of new redistributive public policies, a revival of interest in industrial policy, and a rethinking of the institutional framework in which the processes of integration of the global goods and capital markets have taken place.

In the sociocultural field, the action proposals point to issues such as the reform of the communication media or the strengthening or creation of a new pluralist democratic political culture through different approaches and public policies, including education, while promoting agent of active citizenship and maintenance of pluralistic values.

In the political-institutional sphere, the answers could be grouped in different directions. First, those that mainly seek to improve representative mechanisms and institutions, facilitating their control and responsibility. Here we could include both the entire thematic area of transparency and introducing digital tools to control and improve communication with institutions. Moreover, the main protagonists of the process of political representation (political parties, unions...) have undergone intense changes (both in the internal functioning of existing members, in the appearance of new members, and / or rebalancing of forces between them), with strong dynamics of questioning institutional spaces, without it being clear in which direction emerging alternatives will evolve.

Second, we can include those proposals that aim to increase the role of citizens in political processes, whether they abound in institutions with a logic closer to direct democracy or many experiences of participatory budgeting or referendums initiated from below, or if they move further toward deliberative spaces, often made up of people chosen at random. In all these tools there is also the dilemma of how much prominence to give to face-to-face spaces and how much to online spaces, or what role to give to individual citizens and representatives, associations, and organized groups.

To reinforcing participatory spaces, there would be a variant less designed to expand the offer of voice opportunities and more concerned with alleviating the participatory gaps generated by social inequality or by strong generational differences. Both the initial concern and the possible alternatives would be more focused on identifying target populations whose voice is most absent from political life and encouraging their incorporation in a particularized way, be it with quotas, campaigns, or pilot experiences aimed at these sectors.

Last, there would be solutions that emphasize delegation to “experts” or independent agencies, as mechanisms for seeking greater efficiency and less connection between public policies and electoral considerations, without the need to give the citizens a greater voice.

The research agenda on this set of issues should try to examine the political appeal of each of these reform proposals. What is its “political economy,” that is, to what extent is it foreseeable that in the current institutional context a social and political demand for its adoption will emerge? What are the main obstacles they face, what resources do they need and what are the appropriate techniques for their development? How can you expect them to succeed? How do we define and measure your success?

There are also cross-cutting issues that affect the three thematic areas:

- The territorial scale (or their combinations) to which each possible response can be applied is another open dilemma. Thus, for example, deliberative solutions of a face-to-face type are more suitable for micro scenarios, but more difficult to conduct on more global scales, which has opened a wide field of work on how to take them to broader spheres (*scaling up*).
- The fit between all the proposals. Since these are not exclusionary alternatives, but the actual options combine ideas and pieces of them, it is a question of reflecting on how to design an institutional fit where they are complementary and do not cause unnecessary dissonances or conflicts.
- There are also unknowns about the achievable results for each, for example, in terms of quality of life for citizens. Both the debate about how these results should be measured (through what type of indicators) and what the foreseeable results would be with each of the possible reform strategies are questions without clear answers.

As a closing of this state of the question, Table 1 summarizes the main themes indicated throughout.

Table No. 1. Synthesis of thematic agenda

Problems	Citizenship	Populism, electoral volatility, discontent, political inequalities
	Institutional blocks	Democratic setbacks, elite polarization
	Causes	Economic (robotization, market crisis...)
		More complex and less obvious power and decision-making mechanisms
	Social changes	
Solutions	Economic and sociocultural	See other challenges (E, H, K...)
	Political-institutional	Improvement of the channels and actors of representative systems
		Institutions for deepening democracy
		Technocratic solutions
Cross-cutting themes	Scaling up, results, institutional reserves	

3. ANALYSIS OF THE SOCIAL ENVIRONMENT

Regarding the scientific-technological environment, one of the fundamental changes is the increasing use of Big Data by analysts, scientists, and organizations. The availability and use of Big Data are going to radically change—it is already doing so—the nature of empirical testing in all social sciences.

The growing possibility of working with these databases (administrative, registration, from social networks, etc....) pose enormous challenges in terms of anonymization of data and preservation of privacy, as well as from the viewpoint of view of new analysis techniques, including artificial intelligence tools. Although much of this data is available, it is often difficult to use because it is in different formats, or there are regulations that make it difficult to use.

Likewise, some lines of work possible because of interdisciplinary collaboration and especially promising (for example, those involving biological factors with the study of organic samples or brain function) can provide a lot of useful information but involve large budgets.

Regarding the social environment, an apparently favorable factor for developing research is the visibility of many in the public debate, which could favor support for them having sufficient projects and budgets. But the use of the conclusions in the framework of partisan political debate can make it difficult to accept the scientific relevance of these issues.

Likewise, over the last decade, social initiatives have been emerging that work in this line (mainly to promote transparency and responsibility of institutions, and to create technological tools that facilitate public debate), with which it is possible to weave alliances and complicities. But these, both in the activist sector and in that of private financing (for example, Foundations) are very weak compared to the central role they have played in this thematic area in other countries.

Finally, regarding the institutional environment and these topics on the research agenda and the concerns of the institutions, the panorama is different depending on whether we focus on the international sphere where many of the main international calls already show a strong concern and sensitivity toward these issues, compared to the situation in our country, where they have been much more absent from the priorities set by the research calls, perhaps except for some calls at the regional level.

4. CONCLUSIONS

The thematic area that encompasses the transformations in binding collective decision-making modes is very much alive, both from the viewpoint of the strong dynamics of real change taking place, and of the research agenda being developed.

Although it is a broad field, we can structure it around two large areas: i) the diagnosis of the transformations and difficulties taking place and their causes in the first place; and ii) the set of potential solutions proposed. Table 2 summarizes the main topics.

Table No. 2

Problems	Citizenship	Populism, electoral volatility, discontent, and political inequality
	Institutional blocks	Democratic setbacks, elite polarization
	Causes	Economic (robotization, market crisis...)
		More complex and less obvious power and decision-making mechanisms
	Social changes	
Solutions	Economic and sociocultural	See other challenges (E, H, K...)
	Political-institutional	Improvement of the channels and actors of representative systems
		Institutions for deepening democracy
		Technocratic solutions
Cross-cutting themes	Scaling up, results, institutional reserves	

CHALLENGE J

ABSTRACT

Welfare Systems can be defined as the set of institutions that develop social policies aimed at protecting citizens, improving their living conditions, and ensuring equality of opportunities. Over the recent years, the WS in Spain is experiencing sustainability challenges that need to be carefully analyzed in order to ensure a strategy of “social investment” oriented towards the wellbeing of all citizens. We highlight the need to guarantee the “social escalator” with the goal of establishing a fairer and more prosperous society with effective family policies, equitable access to quality education, health, and jobs, and with a social safety net that protect households and individuals from temporary hardship. The Social Sciences and Humanities can have a key role in analyzing these challenges, as well as to study the design, implementation, and evaluation of the policies included under the scope of the WS.

STRATEGIES AND POLICIES FOR SOCIAL INCLUSION IN SUSTAINABLE WELFARE SYSTEMS

Coordinators

Francisco Javier
Moreno Fuentes
(IPP, CSIC)

Ada Ferrer i Carbonell
(IAE, CSIC)

1. INTRODUCTION

The significant development of social protection systems at the end of World War II led to the achievement of a high level of citizen wellbeing, and the emergence of mechanisms for equalizing life opportunities that considerably expanded the scope for upward social mobility for the working classes. The public financing and provision of education, healthcare, and welfare services significantly contributed to the legitimacy of the market economy, laying the foundations for social order in Europe during the second half of the 20th century. Spain joined this model after the transition to democracy in the early 1980s, with the gradual development of a welfare system that converged in its general traits with those of most Western European countries, although it never reached similar levels of funding.

The Welfare State (WS) is defined as a set of state institutions that implement social policies aimed at improving living conditions, protecting citizens from risks arising from the life cycle, and ensuring equal opportunities. In the European WS, public administrations intervene through policies and regulation to modulate market forces. This is basically done through three types of mechanisms: (i) guaranteeing citizens' income, regardless of the market value of their labor or property; (ii) minimizing insecurity by supporting individuals and families when exposed to vital risks associated to illness, unemployment, or old age; and (iii) providing key services which can be accessed through specific eligibility logics (insurance, residence, citizenship, etc.), such

as education, healthcare, or personal social services. In contrast to the period before the establishment of social protection schemes (when the material survival depended on a person's ability to sell their work in the labor market), the higher the level of decommodification, the greater protection against life risks. Public social spending in Europe (mainly in the areas of healthcare, education, employment, social security, and subsidies) represents between one-fifth and one-third of the total GDP, and accounts for about half of public expenditure in Western Europe.

The main trends observed in the last decades and affecting the WS are included under the so-called "New Social Risks" (NSR). These NSR result from the transformation of the economy and the labor markets, the changes in social values, and practices associated with the transition to the post-industrial order and the demographic changes, which pose new challenges to the WS. Growth and shared prosperity decoupled in most advanced economies in the 1970s and have diverged further since the early 2000s, with inequalities in income distribution increasing markedly in developed societies. Technological developments have relocated several low-skilled jobs in the manufacturing sector to countries with lower wage levels, thus increasing the risk of unemployment among large sections of the working class in the Western world, notably among those countries with less productive workforces. Technology has also reinforced the trend toward increasing inequality by reducing demand (and thus relative pay) for certain intermediate and low-skilled job profiles, while rewarding significantly more certain high-skilled profiles and those with capital income. Having professional skills that have become obsolete or being unable to retrain at the pace of technological progress, constitute new sources of vulnerability for workers who are unprepared to face the possibility of unemployment at an advanced age. However, the transition of occupational structures in the post-industrial order has opened new opportunities for precarious employment in the service sector. Low wages and poor-quality jobs have had a hard impact on the lives of some socio-economic groups, particularly those with low education levels such as some young people (notably those who dropped out of school), and immigrants. In some countries such as ours, young people face enormous difficulties in achieving financial independence, leaving their parental home, forming a couple, and/or becoming parents (which encourages disaffection and exclusion). Immigrants (particularly those in precarious administrative situations) have often been confined to the informal economy in conditions of high insecurity and vulnerability.

A second group of pressures on the functioning of the classical WS derives from the evolution of social values and practices, such as growing individualism, secularization, or the democratization of social relations. These factors have amounted to an unprecedented crisis of social reproduction, in which the available time to perform the basic chores of care decreases, creating a new divide between those who can afford to have families and taking care of them through paid domestic work, and those who cannot take care of their own families precisely because they are doing the work of the first group.

The growing financial autonomy of women entering the labor market has not only provided them with new negotiating skills, which are driving rapid and positive changes in gender relations within families, but can also strain couple relationships, decreasing satisfaction with family life, and increase the risk of break-up. A growing dissatisfaction with the work-family balance, the increasing “precariousness” of marriage, along with the propensity of many young people to enter fewer stable forms of partnership, brings to the Table new challenges and needs associated with single parenthood. More children are growing up in single-parent households, leading to higher risks of poverty and problems arising from the difficulties of parents (usually mothers) in reconciling work and family responsibilities.

In the 1970s, French sociologist Robert Castel described the joint effect of technological, financial, and political transformation resulting in large cohorts of people moving toward a state of comprehensive, cumulative social rupture as one of social disaffiliation (Castel, 1995). The global pandemic of loneliness is just one manifestation of this weakening of the social and community bonds.

Along with loneliness and social disaffiliation that decreases community resilience the ability of individuals and communities to minimize and overcome the adverse effects and contexts (Rutter, 1993; Werner, 2003), there is also a widening gap between salaried work and labor performed by women who care for people, causing people to excuse themselves from basic responsibilities of care because they have more important work to do. Joan Tronto (2005) has called this process of externalization of social reproduction “privileged irresponsibility,” referring to “a type of personal service in which the person who receives caregiving tasks from others simply takes it for granted to have a right to this care.” Moreover, the existence of this right allows it to be developed in a way that is ‘a bit hidden.’

The third axis of transformation of our societies, that affect the WS, is the aging of the population because of the increase in life expectancy and the decrease in birth rate. As addressed in Challenge C of this Thematic Unit, about demographic challenges, it is expected that in the next 5 years the proportion of people aged 65 and over will increase throughout Europe, but especially in the South, where birth rates are among the lowest worldwide. The increase in the absolute and relative number of older people may negatively affect job creation and wages, as higher social contributions from workers will be needed to meet the welfare expectations of the elderly. Financial constraints may also force governments to reduce public pensions and to encourage the expansion of private systems to supplement state pensions, which may leave segments of the population insufficiently protected to cope with the years of retirement. Besides the financial pressures it can cause, population aging also increases the demands on care, a responsibility generally assumed by women under the traditional division of labor within households. However, the traditionally central role of women in the provision of care for the elderly becomes impractical in post-industrial systems where the number of households in which two adults work has increased dramatically.

In these sections we will review the impact of these transformations over key dimensions of the WS structure and function.

2. KEY DIMENSIONS OF THE CHALLENGE

The design of economic policies that maintain growth and respond to the challenges of climate change must also guarantee the best living conditions, a high level of wellbeing, and adequate social protection for citizens to achieve the objective of building competitive, cohesive, and sustainable societies. European countries need to address these challenges based on their specific social, economic, and political characteristics. Individuals' wellbeing is challenged in Spain by high unemployment and precarious jobs, low levels of social capital, inequality increases, and the need to reinforce equal opportunities.

2.1. The European Social Model And Its Future

The basic characteristics of each welfare regime continue to differentiate the institutional balances of the different European countries, but it is possible to highlight the existence of a clear trend toward convergence between the different regimes, both in relation to the levels of social expenditure and in the consolidation of shared features that support social cohesion within the EU. In this

sense, the European Social Model (ESM) would appear as a political project articulated around values of social equality, collective solidarity, and productive efficiency. Despite the diversity between countries within Europe, the contours of the ESM are well defined through three dimensions: a relatively large social spending; the existence of a social protection system that includes education, health, and public pension systems, as well as a regulated labor market with collective bargaining institutions. The level of social protection however varies across countries. This model promotes social citizenship as the aspiration to a dignified life and individuals' wellbeing through access to paid and dignifying work and social provision in situations of risk based on standards of living legitimized by society. As an overall strategic objective, the ESM promotes sustained and sustainable economic growth based on social cohesion. Likewise, this model influences the vision of economic and social policies shared by most European public opinion, and sharply contrasts with other socio-economic systems at the global level where mercantilist individualism (e.g., the United States), or social dumping as a mechanism for articulating growth (e.g., China and other Asian countries) prevail.

In the decades before the recession of 2008, EU recommendations focused mostly on economic issues, whereas social protection initiatives were mainly regulated at the national level. Since then, however, the EU's role in promoting praise on social, labor, and welfare issues has increased significantly, to the extent that the ESM now refers mainly to a set of policies articulated at European level with the aim of promoting the harmonious development of the territory and combating social exclusion more effectively.

The EU's recommendations are essentially inspired by two main paradigms: "flexi-security" (reducing the protection of people with a good position in the labor market and extending rights for those in temporary or low-quality jobs to achieve more balanced protection for these two groups of workers), and "social investment" (preventing rather than addressing situations of need, essentially through human capital formation throughout the life cycle and priority intervention in children). At a regulatory level, these European policies are embodied in the establishment of the European Pillar of Social Rights, which aims to guarantee equal opportunities and access to the labor market, fair working conditions, and social protection and inclusion for the most vulnerable groups. These principles are implemented through investment in active labor market policies, promoting vocational training and developing the Youth Guarantee program to tackle unemployment among younger, less educated cohorts.

The process of Europeanization of social policies and the ESM implies a confluence of resources, social representations, and actions between EU countries. They result from the dissemination of common ideas, processes of economic structural harmonization, constructing trans-national political institutions, and a system of shared values regarding social protection. The growing visibility of the NSR has, however, occurred in a context where the ESM is under pressure. The recession initiated in 2008 deepened tensions between “market Europe,” primarily concerned with economic competition and fiscal austerity, and “market-correcting Europe,” advocating for the strengthening of social protection. This tension places this model of social, economic, and political organization in a particularly complex situation. These tensions emerged once again with the Covid-19 crisis, as Spain has not yet fully recovered from the last crisis.

2.2. Evolution Of The Mediterranean Welfare Regime

The countries of the Mediterranean welfare regime, including Spain, share several defining features, including their relatively late economic development, their family-oriented character combined with relatively weak state support for families, their relatively low taxation, lower levels of social spending. Moreover, there is the coexistence of universal benefit systems (health, education, non-contributory pensions, etc.), with other social protection schemes contributory (pensions, unemployment benefits, etc.), and with other disparate and poorly coordinated non-contributory programs that serve specific groups considered deserving beneficiaries (orphans, widows, the disabled). However, they often fail to adequately respond to the needs of all vulnerable groups (new entrants to the labor market, workers in the underground economy, the long-term unemployed, inactive persons providing informal care for dependents, irregular immigrants, young people, high school dropouts, etc.).

Because of this specific configuration, this welfare regime has been criticized for its tendency to reproduce gender and socio-economic inequalities, its weak redistributive capacity, its poor performance in terms of employment (and the quality of the jobs), and its high levels of inequality and poverty resulting from the marked duality between relatively well-protected groups (“insiders,” including permanent workers with seniority in companies, public employees, highly qualified individuals, etc.) and the many precarious groups (“outsiders,” including young people, immigrants, lower educated,

single-parent families, etc.), whose level of social protection is significantly lower. To this, we need to add that Spain fails to offer equal educational opportunities to all individuals, perpetuating existing inequalities.

To understand the Spanish WS, it is essential to consider the historical circumstances in which it developed during the 1980s, whereas most European countries were trying to contain social spending and had begun processes of reconfiguration of their social protection systems cutting back on certain social rights. Modern welfare institutions and policies in Spain took shape in the context of the transition to democracy, after 40 years of dictatorship, and in a period of high social contestation, leading to developing a social protection system of an essentially palliative nature. For this reason, the resources allocated to social policies have generally been considered in Spain as an expense rather than an investment. Moreover, the political context in which this WS deployment took place gave rise to the articulation of a highly decentralized multilevel governance model in which the power to raise taxes remains to a large extent centralized (with the notable exception of the Basque Country and Navarra where fiscal autonomy is considerably higher).

The role of families as welfare providers to their members informally and acting as “buffers” against the most extreme forms of social exclusion is increasingly challenged by new lifestyles and the emerging social needs of young people. In this scenario, Southern Europe countries find themselves caught up in the dilemma between maintaining deep-seated sociocultural balances that have traditionally helped to respond to the social challenges faced by these societies or promoting restructuring their social protection systems to adapt to new social demands and aspirations, whereas satisfaction with family life and social capital is among the lowest in Europe.

The crisis initiated in 2008 revealed the weaknesses in the institutional balances of the Mediterranean welfare regime. The cuts in social rights, the deterioration in the quality of benefits resulting from cost containment measures, and introducing co-payments, weakened the protection capacity of social protection programs. The mechanisms of intergenerational solidarity on which this model is based could not function as effectively as in previous crises (when family ties and expectations were stronger and the adults—generally men—responsible for generating household income were protected by strict labor market regulations). In this new context, the future of the Mediterranean welfare model is openly questioned and it must adapt to a socio-economic environment profoundly different from the one in which it developed historically.

2.3. Gender Equality

Social reproduction, the creation of social bonds both between generations and through horizontal networks of solidarity between families and the community, has been routinely performed by women. As such, it is a prerequisite of life and of the economic activity. Unfortunately, the tasks of social reproduction have been taken for granted since the beginning of industrialization. Fraser (2016) has pointed out that the splitting of social reproduction and salaried work set the institutional basis for women subordination, which in the financial form of contemporary capitalism has only grown transnational, fostering phenomena like the one Arlie Hochschild (2000) refers to the “global care chain,” understood as personal links between people across the globe based on paid and/or unpaid work of caring, ultimately leading to a neoliberal view of the fact of providing care.

Only recently, countries within the Mediterranean model of WS have implemented work/life balance policies. In Spain these policies, such as maternal/paternal/parental leaves, have usually signaled legitimate exits from the job market (Lombardo & San Giuliano, 2008), leading to the construction on a “non-employed” subject that replicates the gender bias between labor or task, related to the social reproduction, usually non-remunerated, and those associated with the labor market. These policies transferred some responsibility of work/life balance to the employers, who were expected to provide day care centers for children and other services, and to governments, who would allocate funding for these services nationwide.

The confinement because of the COVID-19 sanitary crisis has taken back this responsibility to the families. This privatization of the work/life balance, when families had no school to turn to care for their children and teenagers, has placed an undue burden on women.

The role of women has traditionally been crucial in the provision of care within households in the Mediterranean welfare regime. Women have taken care of children or older relatives at the expense of erratic professional careers, or total withdrawal from the labor market, especially after the birth of the first child. The ever-growing number of women participating in the formal labor market were also expected to take on domestic and care responsibilities, even if seeking help from their mother or other female relatives. The male assumption of the “breadwinner” model discouraged them from more intensely engaging in domestic and caring activities, so working mothers have often been

driven to hyperactivity. These “superwomen” could only undertake demanding professional activities in the labor market if they would combine them with full unpaid care work in the household.

In Central and Northern European countries, the intensity of family ties is much weaker, and the ability of the family to function as a buffer against different social risks is considerably more limited (and much less necessary). The dividing line between strong and weak family systems is reinforced by the religious divide between the more “individualistic” Protestant ethos, and the more communitarian Catholic (or Orthodox) (Greeley 1989). Until relatively recently, churches traditionally influenced the structuring and functioning of social life in Southern European societies, in particular regarding family affairs, by emphasizing the importance of marriage, family ties, and responsibilities for the wellbeing of individuals and for social order. Cultural hegemony and the influence exerted by churches were mainly responsible for significant delays in developing legislative frameworks that already existed in other European countries for several decades such as the recognition of civil marriage, the rights of children outside marriage, divorce laws, or abortion. Religious traditions have also favored certain gendered patterns of care provision, with women assuming practically full responsibility in the domestic sphere.

The existence of strong family support networks, and the allocation of the burden of care, responsibilities to women has significant implications for the way social risks and needs are managed and therefore for the structure and functioning of WSs. The appeal to family responsibilities legitimized the provision of scarce social services, and to openly justify political inaction in these areas of social policy (Saraceno, 1994). The central role of the family allows governments to rely on it to meet the welfare needs of its members and to guarantee their basic economic security, which maintains the political claim for greater levels of public intervention at low levels. Expectations of solidarity and the pooling of resources within the household also defuse the demands of desegregation of labor markets, where women and young people have traditionally operated as “precarious,” occupying fewer desirable jobs than male “household heads,” either in the informal economy or in jobs with temporary contracts. An example of this is the 39/2006 Law on Personal Autonomy and dependent care, also known as the “Dependence Law.” Presented as the Fourth Pillar of Spanish WS, it relied on the work of women, either as familial caregivers who received paid €350 per month and their retirement pensions, or as personal assistants or home care providers, performed usually by

women with low qualifications or migrant women. In both cases this created a false divide between receivers of care and care givers (mostly females) whose vulnerabilities were dismissed and therefore deemed expendable population, as with the vast majority of familial caregivers who were middle aged to elderly women, or the women, migrant or national with low qualifications who were singled out be worn out and debilitated through exhausting working conditions, as it was the case of those who work as home care service providers or personal assistants under the 39/2006 Law.

Some distinctive features of the Mediterranean model are changing fast, driven by rapid transformations in families at the level of institutions, values, beliefs, and practices. Crucial to this development has been the emergence of new lifestyles and social risks for younger cohorts, and the emergence of policy innovations to deal with them. Spain is the country of Southern Europe where these transformations have affected, strongly, the capacity of families to respond to the needs of its members, forcing public administrations to intervene in different social policy areas.

However, social policies in Spain have yet to address the consequences of the dual system of caregiving, what Joan Tronto calls “privatization of care,” the social power divide between those who can delegate these caring tasks to other people, and those who cannot provide for their families because they are already taking care of other families.

2.4. Families and children

Family policies were a residual field of the Spanish WS before the 2000s, when a wide range of measures were introduced to meet the needs of families. These initiatives included measures to promote residential autonomy for young people, to promote female employment and work-life balance (through the expansion of childcare and long-term care services for the elderly), and to help young families with children (through a child-birth allowance). Because of the implementation of these measures social protection spending on families/children expanded well above the average increase in the rest of Europe between 2004 and 2010, marking a significant departure from the traditional welfare systems of Southern Europe.

However, this expansion of family policies did not last long enough to ensure institutional resilience. The budgetary austerity measures introduced after the fiscal crisis of 2008 resulted in a severe backlash of the gender and family policies. The dream of catching up on the generous family policies of

Central and Northern Europe never came true, as expansive welfare reforms were suddenly halted by the efforts to contain social expending.

Family policies seem inadequate to address some of the most persistent problems and pressing needs resulting from the profound sociodemographic transformations undergone by Spanish society in recent years. Thus, still problems arise from the lack of equality in the labor market (lower labor market participation rates and wages for women, many women withdraw from the labor market after giving birth, etc.), the lack of rationality in the working hours, and the abnormally high child poverty rates (with single-parent households being particularly vulnerable). The percentage of children aged 0 to 2 enrolled in formal pre-school education has increased significantly, however a significant gap in enrolment rates between children from high- and middle-income families (who are taking advantage of public commitment to such policies) and low-income families who seem more reluctant to use these services (either for policy and expectation, or because of financial and institutional barriers).

The future of gender and family policies is uncertain in a context of fiscal constraints considering that cost-free regulatory policies seem to be a poor strategy for achieving progress. Families are reacting to poorly developed supporting schemes by having fewer children and delaying the age of emancipation of young people, as it has been the case in Spain for the past two decades.

2.5. Youth Emancipation

Southern Europeans follow distinctive practices regarding their life course trajectories (late emancipation from their parents' home, co-residence with parents after marriage, or the spatial proximity between the homes of parents and their emancipated children). These practices have made it possible to maintain strong and lasting family ties, and to sustain intergenerational micro-solidarity. A child is supported and protected until they leave home for good, usually upon establishing their own household with a partner, even if this means sacrificing for the child. Adult children also receive parental support at different stages and times in the life cycle. They can rely on parents for financial support if they need to make major investments (e.g., buying a house, or setting up a business enterprise), or for childcare assistance. Families in Mediterranean European societies also try to protect their youngest members from economic and employment crises, absorbing part of the effect of high unemployment.

The NSR affect people particularly intensely in the early stages of life, as they are linked to problems of integration into the labor market and the establishment of a position within it, and to care responsibilities, mainly in the family-building stage (Taylor-Gooby, 2004). Besides the structural trends, the economic crisis of 2008 significantly affected youth unemployment in Spain. From 2007 to 2013, the youth employment rate (16 to 24 years old) went from 45.2% to 17.6%, a decrease of 27% (Dolado et al., 2013). However, this phenomenon is far from new, as youth unemployment rates have always been high in Spain compared to other European countries. In 2013, youth unemployment was one of the highest in Europe (55.5% of unemployed people aged 16-24) and only exceeded by Greece (58.3%) and far behind the European countries with the fewest unemployed young people, Norway and Germany (9.1% and 7.9%, respectively). In contrast to the Nordic countries, where the differences between youth unemployment rates and the rest of the population are relatively small, in the Southern European countries these differences have remained at the highest levels over the years.

High youth unemployment has had profound consequences at different levels. Besides the high instability and economic uncertainty and its implications on the life trajectory of those involved (delaying, or even truncating emancipation), people who suffer long periods in this situation or who enter the labor market in times of economic recession are more likely to have precarious and poorly paid jobs throughout their working lives. Therefore, they suffer worse social protection and very poor protection in periods of unemployment, as they have not achieved a sufficient contributory career to receive benefits. This may generate intergenerational conflicts, because protection of the youth in many welfare systems is considerably less developed than the schemes implemented to protect adults and the elderly.

2.6. Unemployment And Labor Market Precariousness

Deregulation policies adopted across Europe in recent decades led to the emergence of “dual labor markets” in some of those countries, and notably in Spain, with a clear divide between stable and precarious workers. This configuration grants relatively low unemployment risk and adequate social protection to workers with standard contracts (“insiders,” most adult males), while condemning workers with atypical contracts to high risks of unemployment and poor social protection (“outsiders,” most young workers, women, and immigrants).

In Spain about one-third of the working population is employed on an involuntary temporary contract, and approximately 9% of workers are employed in the

underground economy. These groups are very exposed to fluctuations of the economic cycle and have limited access to social protection schemes. With temporary workers (on fixed-term contracts, seasonal employment, free-lance activities, and/or internships), their short and intermittent work history implies reduced productivity because there is little or no investment in their job training, and it may limit their right to contributory unemployment benefits, and their low wages provide them (if they fulfill the eligibility criteria) ungenerous social assistance benefits. Nevertheless, workers in the informal economy can only access social assistance schemes in the event of a loss of employment.

The crisis significantly aggravated the employment situation, and the traditional problems of the unemployment protection system in Spain (poor protection of the unemployed, especially affected by long-term unemployment, increasing number of jobless workers at risk of poverty, youth unemployment—including youth Not in Employment, Education or Training known as NEETs—, etc.), moreover, the Covid-19 crisis is bound to worsen the labor market situation.

Unemployment protection systems seek to respond to the challenges presented by the lack of jobs through a combination of “passive policies” aimed at granting income to the unemployed, and “active employment policies” which seek to relocate the unemployed into the labor market as soon as possible. Although Spain is one of the OECD countries that devote more financial resources to unemployment protection, this is due not so much to the generosity of the benefits, as to the high number of unemployed workers who are protected with an average to low level of intensity. Different factors complicate the objective of protecting the unemployed and to help them return to the labor market in Spain: extremely high unemployment rates, large volume of long-term unemployed workers, high youth unemployment, lack of funding for active policies, complexity of the relationship between the central government and regional administrations, etc.

The fiscal consolidation measures introduced during the financial crisis implied reducing the generosity of the system, both by decreasing the benefits (often below the poverty line), and by tightening the requirements to access them, which implies that many jobless workers have no protection.

Besides those with no unemployment support, the problem of the “working poor” (workers with low salaries or precarious employment that do not allow them to go over the poverty threshold) is very common among low-skilled

workers. This problem has clearly worsened in recent years, as wage cuts have particularly affected those workers at the lower end of the pay distribution. The growing percentage of workers at risk of poverty are joined by young people without employment, notably, the NEETs, a particular challenge for the future of the country from an economic and social viewpoint.

2.7. Inequality And Poverty

The transition from industrial to so-called post-industrial societies that led to the emergence of NSR implied profound transformations in labor markets, the family and public protection structures, widening the gap between the most privileged, and the disadvantaged segments of the population, opening new spaces for social exclusion. New vulnerable groups have been affected by socio-economic developments over the past few decades. Subject to intense institutional inertias, states have neglected the emergence of NSR, concentrating political action on initiatives aimed at consolidating classical social protection structures (focused on “old social risks”). In this sense, new forms of social exclusion largely reflect political inaction against NSR. The result has been a growing trend toward social dualization with a clear political and institutional profile caused largely by the social segmentation of social rights, and the consequent differentiation in access to monetary benefits and public services.

Since the 1980s, income levels in the most favored population segments have grown above those of lower-income groups because of growing wage dispersion, labor market deregulation, and regressive taxation policies. Due to that polarization of the patterns of wealth distribution, poverty has increased across Europe, with groups not accustomed to occupying the lower echelons of the social structure transiently or permanently forced to do so. Thus, while in most European country’s poverty was concentrated in older groups at the end of the 20th century, child and youth poverty has taken center stage since the end of the first decade of the 21st century. The economic difficulties going through households with dependent children and young people in economic crisis contributed to concentrate vulnerability in the early stages of the life cycle.

In Western societies, being poor rarely poses risks to survival (because the most basic needs of people such as food, clothing, or shelter are not in question), but it creates significant difficulties to participate in the daily activities of society and, as a result, people in poverty cannot develop their

capacities and functionalities. In these societies opportunities to participate in society and achieve an adequate level of functionality depend on access to goods and services (housing, transport, education, health services, etc.), whose absence pushes individuals into difficult to escape marginalization spirals. The lack of adequate telephone or transport services may, for instance, condition participation in society if it prevents people from finding work (because they require them to be traceable) or to come to it on time each day. These deficiencies can push them into illegal activities, which increase the risk of problems with justice or stigmatization, by taking individuals into a cumulative spiral that chronicles their marginal situation. In addition, most individuals in Europe seem to prefer to leave in equal and socially cohesive societies and thus individual subjective wellbeing is negatively affected by increasing inequalities. Because of the financial and economic crisis of 2008, not all citizens could integrate into the circuits of “civic normality” through access to paid employment. Spain suffered intensely from the effects of that crisis becoming one of the countries with the highest levels of poverty and income inequality in Europe. However, macroeconomic imbalances affecting Spain were already present well before the crisis. Many of those problems are related to the configuration of its labor market, and to the relative weakness of the Spanish welfare system.

While a relatively vigorous economic growth took place between 2014 and the beginning of 2020, creating around half a million jobs per year, over 1 million people remained in long-term unemployment with enormous difficulties in returning to the labor market. Of these, 7 out of 10 are people over the age of 45, with low levels of education and who lost their jobs in the crisis. No other Western European country has almost half that number of long-term unemployed workers, and this is one determinant of the increasing income inequalities existing in Spain compared to our European partners. Therefore, the recent Covid-19 crisis might have worsened effects if Spain has not yet recovered from the 2008 crisis, with yet low levels of employment, job precariousness, income and education inequality, and low levels of social capital.

Another problem faced by Spanish society is the low levels of social mobility that implies, for households living in poverty have very significant difficulties in getting out of that situation. This is serious considering the evidence that shows how poverty levels are passed down from generation to generation. The opportunities of children living in poor households today are lower than for other children, which directly breaks any objective of establishing a society

with equal opportunities for all. Changes in the education system are fundamental and urgent. These changes should not only increase opportunities, but also social cohesion and growth.

Gaps in the social protection system had traditionally been covered by the family (especially women), which took care of children and the elderly. While the capacity of the family to protect its members is in decline in Spain, leaving many needs unattended (Moreno and Mari-Klose, 2013), social benefits do not reach a large part of the unemployed who either had work histories too short to meet eligibility criteria, or had been informally employed in the underground economy. While more experienced workers (and the elderly in general) became the main beneficiaries of social protection plans, younger workers and families remained largely out of the network provided by social policies, resulting in an inability greater than most European countries to fight poverty and inequality.

In a context of growing budgetary constraints, the idea of focusing resources on disadvantaged groups has gained adherents. The principle of selectivity takes hold in the face of the old values of universalism and solidarity that had originally driven the expansion of WS (Cox, 1998). In recent years, the European Commission has made several recommendations for individual states to generally commit to improve assistance policies, adapt them to the needs of people in adverse situations, and to promote the employability of recipients. The minimum income (*“Ingreso Mínimo Vital”*) just introduced in Spain goes in this direction.

2.8. Residential Exclusion

Housing is undoubtedly a key element in people’s lives, and one of the fundamental dimensions for the proper and full incorporation of an individual into society. Vulnerability in the field of housing is simultaneously the cause and consequence of social exclusion. Given its high degree of commodification, and the relatively limited development of public policies in this domain, the link between material deprivation and residential exclusion is clear in Spain.

The Spanish residential structure, characterized by the enormous weight of home ownership (the value of the houses represents around 2/3 of the total wealth of families, and 50% of the accumulated wealth of the country), which represents around 80% of the total housing stock in 2020 (far above the average of around 60% of the EU), assigns a relatively residual role to rental, one

of the lowest percentages in the EU. Particular attention deserves the extreme weakness of public social rent, which represents less than 3% of the total housing stock in Spain, compared to the European average of around 21%.

The precise characterization of the role of housing, or the difficulty of access to it, in developing social exclusion processes in Spain is largely defined by the evolution of real estate prices over the last decades. In an international comparison, Spain would be among the three OECD countries with the highest long-term growth in house prices, something which becomes even more flagrant when we consider gross wages to the average price of a home, thus measuring the effort that a family must make to acquire a home.

Those most affected by the increase in house prices have undoubtedly been those who did not own a home before the escalation of prices, and who have seen a need for considerable effort increases to be able to access this basic good. This includes those who bought a house at the highest price, while prices decreased in 2008, with the fiscal crisis. The accumulated growth of housing prices in Spain over the last two decades has helped to accumulate wealth in the upper tiers of the social structure, and has contributed to excessive indebtedness of domestic economies, limiting their capacity for consumption and investment in other goods and services.

With the ownership structure of housing, and the increase in prices, the third element of the problem of access to housing in Spain is determined by low intervention by public administrations in this domain (Spain devotes the lowest percentage of GDP to public spending on housing, around 1% compared to the average of 2% in the EU). Constructing publicly promoted housing is also virtually anecdotal. The tax breaks for home buyers, defended from the administration as a housing policy instrument with a low cost of management and a relative simplicity in its operation, have been criticized for having a regressive character and favoring those who buy against those who decide, or have no alternative but, to rent (while the benefits also increased with the price of the house).

High prices, both for buying and renting, constitute a very significant barrier for many citizens seeking access to housing, especially people with lower or unstable incomes, single-parent households, young people, or immigrants. Because of this situation, these groups often must rely on intergenerational residential or community forms of solidarity to address their potential residential exclusion. The social impact of the economic and

fiscal crisis was visible in the difficulties to access and maintain adequate housing. The crisis triggered the number of foreclosures for insolvency, and home evictions of defaulting tenants.

However, aspects related to habitability, the adequacy of housing to the specific needs of each moment of a person's life cycle (from physical barriers that prevent the normal development of daily activities in certain circumstances —old age, disability, etc.—, to problems arising from the inadequate surface area or distribution of the interior spaces of the house —overcrowding, etc.), constitute a significant problem in Spain. The social consequences of residential exclusion are multiple, from the obstruction of individuals' transition to adult life (emancipation of the paternal home and formation of new households), to the delay in the decision to have children (and the final number of children), and the inadequate housing solutions (precarious state of housing, insufficient dimensions, location, etc.) suffered by vulnerable groups. Moreover, the hazards to find housing in major cities may constitute an aggravating factor in gender violence. In the most extreme cases, this residential exclusion results in accommodation in sub-standard housing (horizontal or vertical), or directly in homelessness, phenomenon of extreme social exclusion in which the problems of lack of access to housing often appears accompanied by other aggravating circumstances (mental health problems, alcoholism, administrative irregularity with undocumented immigrants, etc.).

Social inequality is expressed geographically through the articulation of the territories and the location of social groups in them, so the processes of exclusion are often accompanied by processes of segregation that enhance the situation of social exclusion itself. Developing an urban policy that intervenes on the most disadvantaged neighborhoods to curb the processes that operate by increasing vulnerability and the risk of social exclusion (housing deterioration, inadequacy public transport networks, poor public and social services, low-quality schools, unemployment, destruction economic fabric, disappearance of proximity trade, and degradation public space), appears as a necessary and urgent policy tool.

2.9. Health And Healthcare

The relationship between health status and relative deprivation (in several key dimensions such as income level, education, living environment, etc.) is widely documented. As evidence on health inequalities shows, disadvantaged populations are vulnerable, and their health status (expressed both in

mortality and morbidity indicators) is substantially worse than the rest of the population. Although the complex interaction of factors (material, social, cultural, psychological, and attitudinal) that causes this health gradient has not yet been made explicit, it is clear that its existence is a serious limitation on the vital opportunities of the most disadvantaged social groups. Individuals in poor health have fewer opportunities to participate in the labor market and to earn income.

Analyzed from a diachronic perspective, the health status of the population of a given territory can improve as the aggregate wealth of the territory increases, although health inequalities may well not be reduced or may even increase. Over the past two decades, the available data points to a steady increase in social inequalities in most developed countries and particularly in Spain. Although the empirical evidence available on the existence of health inequalities within the Spanish population is relatively scarce (representing this indicates the low priority attached to this issue), the improvement of the main health indicators of the Spanish population, parallel to the increase in the aggregate socio-economic level of the country over the last decades, has not been evenly distributed and health inequalities within Spanish society increased.

A significant bilateral correlation between life expectancy and several variables such as income distribution, social capital, educational level, unemployment indicators, or developing the WS, has been empirically established. A clear northeast-southwest geographical gradient appears in Spain reflecting those inequalities. Differences in life expectancy at birth for males between different territorial areas could be up to 6 years, and the replication of ecological analyses of health inequalities at the most aggregated level (Autonomous Regions) reproduce similar patterns of premature mortality. The same applies to health status, because people in the most disadvantaged classes are in a worse state of health during their lifetimes (expressed in numerous health conditions such as respiratory disorders, high blood pressure, obesity, diabetes, or chronic diseases).

Beyond the absence of political interest in pursuing systematic research on health inequalities, the institutional arrangements of the “*Sistema Nacional de Salud*” (SNS) makes it particularly difficult to generate and analyze comparative health information (essential for assessing healthcare policies, and its equity outcomes in particular). The strongly decentralized nature of the SNS has clearly determined the range of the debate about the fairness

of health policies over the past decades. The legacy of the former social security health system, and the attribution of competences and responsibilities between the different levels of the state administration (national, regional, and even local) while the regional administration had no power to raise taxes, left little room for introducing health inequalities on the policy agenda.

In the economic crisis, the measures adopted in 2012 regarding the SNS altered the functioning of this system. The severe budget cuts (decrease of total public healthcare expenditure from 6.78% of the GDP in 2009, to 5.89% in 2017), the introductions of reforms (co-payments), and particularly the change in logic of the model (eligibility was returned to a social insurance logic, despite the universalistic ethos of the healthcare model since it was established in 1986) resulted in a deterioration of the functioning of the SNS, and in a relatively high visibility of this area of policy in the judiciary sphere, in the media, and in the public and political arenas. The process of fiscal consolidation seemed far from over before the Covid-19 pandemic emerged at the beginning of 2020 (the 2017-2020 Stability Plan presented by the Spanish government to the EU proposed to continue cutting down total public healthcare spending to 5.57% of the GDP in 2020), thus significantly questioning the capacity of the system to fulfill its mission.

Those reforms and budgetary constraints implied a deterioration of the quality of care provided because of the closure of hospital beds, the reduction of the ratio of health professionals per patient, and the general underfunding of healthcare centers. Recently analyzed empirical evidence points at the deterioration of physical and mental health among certain groups of the Spanish population, notably adult men affected by long-term unemployment, or among the most vulnerable groups of the population suffering from other negative side effects of the crisis such as foreclosures. Mental healthcare services cannot prevent the considerable increase of self-harm and suicide rates experienced by certain segments of the Spanish population since 2011.

The reduction of necessary medicine intake (due to introducing co-payments), and the death of patients because of an inadequate provision of healthcare linked to financial restrictions, have also been associated to the cuts and reforms of the public healthcare system. Some health indicators, strongly associated to lifestyle aspects (morbidity linked to asthma, labor related accidents, and hospitalizations), also show a negative trend. The economic crisis may also contribute to a higher prevalence of chronic illnesses, and to an increasing

presence of risk factors such as obesity among the most vulnerable groups of the population, and to a pro-rich bias in preventive screening programs.

Budget cuts resulted in a significant increase of waiting times to receive attention within the SNS. The average waiting time for a hospital non-urgent surgical intervention went up from 74 days in December 2007 (with 376,000 patients in the lists), to 89 days in December 2015 (550,000 patients in the lists), and it escalated to 115 days in December 2016 (614,000), to be reduced to 93 (584,018) in June 2018. Patients waiting for a neurosurgical intervention had to wait an average of 91 days in 2007, and this figure increased to 145 days in June 2018. With traumatology patients, the waiting time went from 86, to 111 days; and for pediatric surgery treatments it increased from 79, to 103 days in that same period.

Reflecting on some of the most extreme consequences of the crisis, some authors have pointed out at the death of patients because of an inadequate provision of healthcare in the SNS. Other authors claim that observed mortality seems to decrease at a slower rate than what would have been expected in the absence of the crisis, while an increase in winter mortality among elderly people can be perceived.

The de-motivation of health sector professionals, the deterioration of public perception on the functioning of the SNS, and the increasing move toward private health insurance schemes by wealthier segments of the population constitute additional threats to the sustainability of the public healthcare system. A stronger emphasis on primary care, and more articulation between the health dimension and the field of social services could prove fundamental to responding to the social challenges posed to contemporary advanced societies (population aging, increasing inequalities, immigration, etc.). Thus, one of the main objectives that the public health system should address is the reduction of obstacles to coordination between health and social services at the local and community levels, thus seeking greater integration with personal care services, in particular in relation to dependent groups (children, the elderly, chronic patients, physically disabled, etc.).

2.10. Long-Term Care

Attention to people in a situation of dependency, especially the elderly, has become a priority across the developed world, and particularly in Western Europe. However, various factors, notably the economic crisis initiated in 2008, meant that despite the increasing institutionalization of a public response to

the social risk of dependence, the responsibility for caring to those affected and their families has not been internalized by the state, especially in the countries belonging to the Mediterranean welfare regime. The role of caregivers traditionally attributed to women in this welfare regime has been accompanied with low government intervention to support families. When it has existed, public intervention has been characterized by its weak, fragmented, and residual nature, leaving most legal responsibilities in the hands of families.

In the domain of care for the elderly, the preferences of Spanish citizens openly clash with the reality of new family dynamics that question the basic assumptions of the familistic welfare regime. Despite the desire to be looked after by the family, and the good disposition of families to care for their close relatives, the impossibility of combining modern life (working, commuting, taking care of reproductive needs, taking care of the children) with the burden of caring for an elderly dependent relative is forcing citizens to turn toward the state for help.

Care policies for dependent people in Spain have traditionally been deficient in resources, based on relatively meager cash transfers, and only marginally in the public provision of services. Thus, the supply of public care homes and assisted living facilities for the elderly is remarkably limited. In addition, despite the large volume of highly dependent people living with their relatives, the system of home care has traditionally been poorly developed, both in terms of quantity (hours of assistance offered per week), and coverage (number of elderly persons attended).

A key policy measure adopted to respond to the growing demand of Spanish society was the drafting of the Law on the Promotion of Personal Autonomy and Protection of Dependent Persons, popularly known as the “Dependency Law,” passed in 2006 after 8 years of public and political debate. The new regulation defines the individual right to receive care when a person is in a situation of dependency and establishes a common normative basis for the benefits and services that must be provided by the Autonomous Communities. This Law involved the creation of new institutions, and the strengthening of existing ones (especially in social services at the local and regional levels). Originally intended to fulfill the commitments of Spain after the ratification of the Protocol of Convention on the rights of persons with disabilities in 2007, the 39/2006 Law application resulted in funding familial caregivers, most women, and nursing homes for the elderly and severely disabled people. As the COVID-19 crisis has revealed, the residential care home sector for the elderly and the dependent has been vulnerable

to the pandemic in Spain. The fiscal austerity measures implemented since the 2008 crisis threatened the implementation of this legislation and encouraged public administrations to reorient the system toward schemes that may contribute to reduce the total costs of the program. This combination of factors displaced the provision of care toward an unregulated informal market capable of providing flexibility and lower costs. This niche of the (mostly underground) Spanish labor market has been filled largely by immigrant women.

In the second half of the 2010s the public schemes included under the umbrella of the “Dependency Law” showed signs of recovery, with an increase of the number of beneficiaries (between December 2015, and 2018 the increase was 32%, 258,000 additional people covered by these schemes), and of the intensity of the protection. Nevertheless, significant regional disparities regarding access, levels of coverage, and waiting lists persist. On average, each beneficiary receives 1.25 benefits, with the cash benefit for home care being the most common. It was estimated that in 2016, the percentage of the population aged 65 years and over receiving LTC in institutions was 1.9%, and 7.1% received attention at home. Regarding informal care, according to the OECD, Spain has one of the highest percentages of informal caregivers (15.3% of the population) and in terms of the quantity of hours dedicated by family caregivers it is among the highest in the OECD (over 20 hours per week). The intensity of care is also above EU average: 14.1% of women (8.4% of men) spent multiple days or every day of the week caring for their elderly or disabled relatives (11.3% and 7.5% respectively in the EU). This is intense among persons of lower income (15.1%; 10.5% in the EU) compared to those with higher income (8.2%; 8% in the EU).

Among the challenges to this system we can point out the persistence of waiting lists for access to benefits by persons whose right to social protection has been recognized; the deficient quality of certain employment positions within the care sector; the excessive differences in coverage among the Autonomous Communities; the decreasing financial commitment of the central administration; and the shortfalls in developing institutional coordination between social and health services in the field of dependency.

These pitfalls of the dependency system lay evidence to the challenges posed by the dual system of care (Tronto, 2015) in which a market of caregiving services thrives at the expense of wide strata of population unable to cater the needs of their own social networks, and people being cast out of social life in institutionalized settings because their families are too strained in the labor market.

As it has been already mentioned, the disaffiliation process caused by delocalization loses the community ties placing certain people, such as single mothers, at a greater risk of social exclusion. Loneliness is a major contributing factor to this exclusion. The negative impact of loneliness on the physical and mental health and on the quality of life of those who suffer from it has been widely proven. It causes cardiovascular problems, declines in the immune system, and even increases the risk of premature mortality in people who feel lonely (Gené-Badia et al., 2016). Nevertheless, loneliness is related to various psychological disorders, increasing anxiety-depressive symptoms, suicidal trends, and levels of aggression (Cacioppo et al., 2015). Moreover, loneliness has a negative impact on the quality of life through various risk behaviors such as sedentary lifestyle, smoking, alcohol consumption, inadequate nutrition, and worsening of sleep quality (Gené-Badia et al., 2016). Thus, loneliness is becoming one of the greatest threats to public health systems, even exceeding the risk of other problems such as obesity (Holt-Lunstad, 2017). According to Cacioppo (2017) it is a silent pandemic of the first world, affecting one in four people in industrialized countries.

2.11. Sustainability of the WS

The analysis of the future sustainability of the WS has traditionally been conceptualized around the issue of the financial viability of social protection programs. However, economic reductionism is, at the very least, incomplete as there are other relevant aspects to defining possible future scenarios for the BS. These complementary dimensions include those that concern the role played by the political discussion on the WS, the normative preferences of citizens (regarding what is considered the most desirable cohesion and solidarity within a given society), and ultimately the level of social support for redistribution. These elements are key in determining the context in which economic and financial considerations are framed and interpreted and therefore setting the limits for the degree of citizen's support for programs and schemes under the WS umbrella.

The debate on the economic sustainability of the WS is not new, as discussions about the extent to which social rights and labor legislation should be reduced in an increasingly global economy have been present in the European political arena at least since the mid-1970s. Many contributions to this debate predicted (and sometimes recommended) the dismantling of social protection programs in response to the internationalization of capital flows. A careful analysis of the realities of welfare policy reforms in Western Europe

over the past couple of decades, however, shows a wide variety of responses dictated, largely, by the different institutional arrangements governing the policy and economy of different countries, with some retrenchment in certain dimensions, but also with the expansion of certain social protection programs, and the implementation of a wide range of reforms aimed at implementing a ‘fine-tuning’ of the WS without questioning its continuity.

The crisis that began in 2008 placed the economic sustainability of welfare policies again at the center of the social and political debate. Thus, the discussion about reforms and the potential reduction of spending on this policy area returned to the front line of the political debate, especially in the countries of Southern Europe, particularly affected by the economic and fiscal crisis. The challenges for the transformation of the economic systems of these countries are undoubtedly very important (they cannot compete with developing countries on low wages, their multinational companies are scarce, it is difficult for them to generate high-value-added activities that may create skilled jobs, their populations have expectations and skills that do not match the jobs that can be created in the sectors where they remain relatively competitive –tourism, agriculture, etc.). At the same time, and although there seems to be a ‘window of opportunity’ for political actors advocating the dismantling of social protection systems, this option remains unlikely since, besides protecting the population from the main risks associated with the different stages of the life cycle and providing a basic level of protection for people at risk of falling below the poverty threshold, the WS plays a key role in promoting economic progress. By facilitating the creation of employment, regulating labor markets, wage stability and low labor conflict, and promoting adjustment of economic cycles, the WS has been a key player in ensuring the macroeconomic stability of Western European societies. There is, however, scope for a profound redefinition of the equilibriums in the roles played by the state, the market and civil society (including not only families but also TS social organizations) in the regulation, financing, and provision of different social protection programs and welfare policies in Europe. European WS have pursued a recalibration of their programs through cost containment measures and modification of the priorities assigned to each of the different social protection schemes (to varying degrees and according to their peculiar historical trajectories).

The conceptualization of what is “possible” in relation to the extension of social rights is related to the framework that defines future scenarios for the WS. Ideas about solidarity and redistribution among different political

forces will condition the nature and intensity of social and political support for the WS. However, beyond how debates on the WS take place in the political arena, citizens' attitudes toward social protection are largely based on the shared social values that constitute the axiological foundation of a society. Citizens' ideas and beliefs about social policies shape the evolution of welfare policies, especially conditioning the feasibility of reforms in already existing policies. The dimension of shared social values is crucially important as an interpretative guide to the (de-)institutionalization of social policies.

The widespread support of European taxpayers for the redistribution of wealth through the WS should be emphasized, which contrasts with the disparity implicit in the ethos of the neoliberal economic model of individual self-responsibility outside collective redistribution. The notion that public policies (and in particular social policies, responsible for approximately 50% of total public expenditure in European countries) should be financed through taxes without resorting to debt (which should be used primarily to finance "extraordinary" expansionary policies and programs) is generally accepted in Europe.

4. CONCLUSION

The NSR addressed in this document are strongly connected to the main sustainability challenges facing the WS in our country, constituting key challenges for our society that must be investigated by all scientific disciplines, notably the Social Sciences and Humanities.

The growing prominence of these NSR on the social and the political agenda stems essentially from their economic impact, their social relevance, and partly also from the electoral salience of those groups who experience them more directly. The need to address the NSR is primarily posed as part of a broader strategy aimed at economically mobilizing a greater proportion of the population and improving the country's competitiveness and wellbeing. As such, the answer to these challenges would be part of a strategy of "social investment" oriented toward the future of the whole of society. Transnational institutions such as the EU, or the OECD, are often at the forefront of the promotion of policies to "modernize" social policies trying to ensure individual wellbeing (better job prospects and quality of life), while improving the chances for collective success of societies. Irradiating from these institutions, this social policy paradigm has shaped national political debates across

Europe, introducing the need to “recalibrate” the WS, legitimizing new priorities for social spending that would allow addressing transformations that shall require the participation of the whole of society. The crisis of social reproduction, with the dual system of care, poses a specific threat to be addressed from the social sciences and the Humanities.

Among these “social investment” strategies we can highlight the improvement of the functioning of the “social escalator” by ensuring equal opportunities to all social groups, notably those starting from a most disadvantaged position. Inequality of opportunity, income inequality, poor economic growth (low productivity), job precariousness, and low social capital and wellbeing at an aggregated level operate as a vicious circle from which it is difficult to escape without the intervention of public policies. The factors that may turn that negative dynamic into a virtuous cycle producing a fairer and more prosperous society include effective family policies (parental leaves and access to quality childcare), equitable access to quality education systems that allow individuals to have access to quality jobs, equal access to quality healthcare, meritocratic processes for access to fair and decent employment opportunities, and social safety nets to protect households from temporary hardship. The study of the design, operation, implementation, and evaluation of these social protection schemes requires a strong involvement from researchers that accompany these processes and help in the learning dynamics for the maximization of the resources invested in them. Individuals’ wellbeing should move toward the center of policy making, which will have implications for social cohesion, social capital, education, and productivity.

As monetary policy is not in the hands of national authorities anymore within the Eurozone, fiscal policies targeting investments in infrastructure, education and social innovation may improve productivity, support employment, and expand aggregate demand, constituting key instruments within the macroeconomic toolbox of European state authorities. Within that approach, updating tax systems and tax policy is one more element of social protection. Thus, the establishment of a more equitable taxation system without endangering economic activity or productivity, improving corporate taxation considering the complexity of international taxation architecture, and using taxation policies as instruments for the creation of incentives (and disincentives) to fight against the NSR constitute policy measures that should provide the financial resources to implement “social investment” strategies, and they require much more attention from social scientists to evaluate their effects.

To maintain competitiveness, European countries have also introduced significant changes in the regulation that protects employment, requiring for more flexible dismissal, less bureaucratic, and cheaper for the employer. It has also lowered non-wage labor costs through tax exemptions or employer subsidies and wage moderation. The concept of “flexi-security” has had significant penetration, referring to the combination of those labor market de-regulation initiatives with the strengthening of social protection for those who lost their jobs, and the provision of greater security in the transitional stages between jobs, especially with workers with a relatively weak position in the labor market. The increase of the gig economy, accentuated with the outbreak of the Covid19 pandemic, poses an additional important challenge to workers wellbeing and will require specific policy regulations. The analysis of these policy instruments must constitute the focus of attention from the Social Sciences and Humanities.

Reforms introduced in the domain of social policies to redefine the division of tasks and responsibilities between the state, the market, and civil society organizations require a similar attention from the Social Sciences and Humanities. Over the last two decades, a pattern of reforms conducted in different sectors of social policy implied a redefinition of the role of public administrations, which shared increasing responsibilities with private or TS organizations, notably in the provision of services. This trend produced a “re-commodification” of social rights, often it did not necessarily involve less, but simply a different type of state intervention, in administrative controls and reinforced regulation. The role of the Social Sciences and Humanities regarding this transformation is to investigate state capacity to adjust to this new form of intervention, and the effects of these trends on the impact of those social policy schemes over different populations. These reforms often appeal to introducing freedom of choice, merit, or the activation of workers, and significant attention should be paid to analyzing them and their effects over the objectives of redistribution of wealth, equality of opportunities, and equity that had traditionally characterized the ESM.

WS reforms over the last decade often involved funding cuts or tightening of the conditions to qualify for benefits or services, but with such restrictive measures, the extension of certain social rights also affected specific groups that to date were worse protected, or sometimes not directly covered by the system before. Thus, European countries also launched new protection policies for specific groups such as families, children, women, the long-term

unemployed, the elderly, and the economically disadvantaged, often within the general epistemological framework of addressing the NSR. Studies to assess the effectiveness of these new social policies are fundamental to estimate their actual scope and impact.

Finally, the transformation of public administrations in the way they distribute responsibilities among themselves in more complex multilevel governance structures, with introducing new forms of horizontal re-alignment of tasks and duties, requires further analysis. Thus, the complexity of the vertical organization of the division of responsibilities between different levels of state administrations in decentralized countries like Spain constitutes a key dimension to understand the functioning of social policies and their effects on different sectors of the population. Similarly, the growing introduction of “single window” services to manage social protection programs (like the merging of services for the unemployed, with those responsible for the provision of social assistance —notably minimum income schemes-, facilitating the coupling between active and passive labor market policies) may have very significant effects on the way beneficiaries access subsidies, and how they transit from receiving benefits to joining the labor market.

Like this report points out, the role of the Social Sciences and Humanities in the understanding of the basic underlying logics, functioning, and effects of social policies is key for their more efficient design, implementation and final effects and consequences, and the research Institutes of the CSIC may play a significant role in fulfilling this mission.

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CHALLENGE K

ABSTRACT

Heritage is increasingly being recognized as a key element for social cohesion, sustainable socioeconomic development and people's welfare. Resources dedicated to heritage conservation have gone from being considered an expense to being regarded as an investment, with a high revenue. The heritage industry has been an active part of this transformations in recent decades, it has generated employment, contributed to the worldwide expansion of tourism and has become a coveted sign of identity for political communities. Today there is no social or political process that does not use heritage in some way. Hence the actuality of the subject, and the importance of an organization such as the CSIC having research capabilities in this field.

WHAT REMAINS OF THE FUTURE: SUSTAINABILITY THROUGH HERITAGE

Coordinators

Felipe Criado Boado
(INCIPIIT, CSIC)

Blanca Ramírez Barat
(CENIM, CSIC)

1. INTRODUCTION

“What is the future if there is nothing left of your past?” Do you remember?
Albert Pla, June 2020, post-COVID-19 anthem.

The past shapes our entire life environment, expressing itself in multiple ways. The material world that surrounds us, our practices, our language, thought, and ourselves, are part of becoming which is a continuous transformation and sometimes abrupt but almost always imperceptible. Everything changes, and we are part of a process that does not stop: what has been, the memory that is our environment, materialized in places, landscapes, architectures, artifacts, and remains, or idealized in values and symbols, conditions our life. What it is, what we do, will determine the life to come. We will be the memory of the future.

All societies have been related to their own past, but it was the European powers of the modern age, from the 18th century and especially in the 19th and 20th centuries, which, in different ways, came to be. Furthermore, there is a set of elements and practices we inherit from the past and that we want to preserve for their present use and their legacy to future generations. This set of elements was called heritage. As such an invention of the Western powers, it is a historical category pregnant with games of value and power, linked to our own historical experience and to the cultural domination of our civilization over others, which is the history of Western globalization. From very early on in cultural attitudes towards heritage it became clear (as Alois Riegl

perfectly exemplified in his precursor work “The Modern Cult of Monuments” of 1903) that there was no single criterion for selecting those assets that should be safeguarded, and that heritage was a process of negotiation involving scientific, aesthetic, political and economic criteria, among others, which changed over time, just like the assets to be preserved and protected.

There is no social or political process nowadays that does not use heritage in any way. Resources for heritage conservation have gone from being considered an expense to being considered an investment with a high return. The heritage industry has been an active part in the transformations of the last decades, it has generated employment, it has contributed to the global expansion of tourism and it has become a coveted identity emblem by political communities. The celebration in 2018 of the “European Year of Cultural Heritage” is an example of the fundamental importance being given to heritage in Europe, and the chosen slogan “Our heritage: where the past meets the future,” demonstrates the relevance given to it for the construction of future time.

As part of this magnification and expansion, heritage has been considered as an important asset not only for attracting visitors and, therefore, for generating income, but as an essential part of sustainable development, in which they intervene more values besides the economic, from the scientific to the educational. Various international organizations, such as ICCROM, ICOMOS, UNESCO, and Europa Nostra, have highlighted the fundamental role that heritage plays in achieving Sustainable Development Goals (Agenda 2030) and improving the future of people and the planet.

The Spanish heritage elements inscribed on the UNESCO World Heritage List are among the most varied worldwide, being the third country after Italy and China with the largest number of sites. The World Heritage Convention establishes the obligation of countries to “identify, protect, conserve, rehabilitate, and transmit to future generations the cultural and natural heritage, to the maximum of the resources available to them, and if necessary, through international assistance and cooperation from which it may benefit, especially in financial, artistic, scientific and technical aspects” (1972). Among the means to do so, countries undertake “develop scientific and technical studies and research and perfect the intervention methods that allow a state to face the dangers that threaten its cultural and natural heritage.” Likewise, the UNESCO Convention for the Safeguarding of the Intangible Cultural Heritage establishes “the identification, documentation, research, preservation, protection, promotion, valorization, transmission, and revitalization of this heritage” (2003) as its main objective.

Different strategic documents have highlighted the importance of scientific and technical research to achieve these objectives. Heritage is increasingly recognized as a key element in identities, social cohesion, sustainable socio-economic development, and the wellbeing of people, highlighting that the investments made in its study, dissemination, and conservation have a very high return—social and monetary—. The establishment in 2010 of the *Joint Programming Initiative on Cultural Heritage and Global Change* (JPI-CH), in which Spain has participated from the beginning, starts from the recognition that scientific and technical research is a fundamental element to preserve, know, and disseminate heritage and ensure its positive effects. In the European Commission Recommendation on the establishment of JPI-CH, it is noted that “joint programming of research on cultural heritage and global change would provide coordination to research in this area, which would contribute significantly to the construction of a fully operational European Research Area on the conservation of cultural heritage, while strengthening Europe’s leadership and competitiveness in research in this field” (2010/238/EU).

Within the future *European Horizon Europe program*, cultural heritage plays a much more relevant role than in previous programs (H2020 where it was a cross-cutting theme), as reflected in its strategic plan.

In the Spanish context, in 2011 the Heritage Council approved the National Plan for Research in Conservation of Cultural Heritage (PNIC), as a “management tool and conceptual framework in which research actions on heritage conservation are programmed and financed.” This document starts from the recognition of the importance of research in this field in our country, the potential of the agents of the national R & D & I system to address this issue, and the need to coordinate them and / with the institutions in charge of its execution and financing. It includes various priorities grouped into five programs: conservation and environment; materials and new technologies for study and analysis; study of the technology of cultural property; economy, social value, and sustainability, and improvement of conservation and restoration methodology and protocols.

The conservation, study, and documentation of cultural and natural heritage are, likewise, mentioned frequently in the current State Plan for Scientific and Technical Research and Innovation 2017-2020, and very specially in Challenge 6, where the interdisciplinarity of the field and the alignment with the principles in the PNIC is specifically recognized.

Although this is not alien to the genealogy and own history of the concept of heritage (attached, as indicated, to European modernity and globalization), Europe occupies a world leading position in the appreciation and use of heritage and, above all, in its study, research and, in the creation and development of a heritage science. In this regional context, Spain must play its part in advancing scientific research on heritage in line with the leadership that its heritage has on a global scale.

2. HERITAGE AS A RESEARCH PROBLEM

Heritage is a privileged area to study the interactions between the material and the symbolic in their generation and development, through social practices that interact with other areas of human reality and experience (be it cognition, communication, or economics). This means that an open and inclusive notion of heritage has no ceiling: it is all-encompassing, it is everything or, at least, it can be everything. This can constitute a practical problem because of its scope and therefore make it difficult to specify priorities, themes, and strategies. Nevertheless, it is also a field of possibilities that highlights the real power of “Heritage studies”: all human reality can be studied from heritage.

Like so many other categories generated by Western modernity and exported to the rest of the world (from the separation of powers to rock-and-roll), heritage has become widespread and has been adopted with remarkable success as it provides a basic notion for building games of identity and power and establish or negotiate the patterns of relationship between groups within them or with other societies. Heritage translates the intangible webs of social processes: intra- and inter-community relations, gender, perceptions, forms of appropriation of resources and goods, of spaces, or of power. Heritage is not alien to power, but a weapon of power, hence its conflictive nature. This process must be one axis of study of the challenge: the triumph of heritage as a social phenomenon and its own constitution as a process, in many cases, of dominance, colonialism, and expropriation of communities and cultures.

However, although this phenomenon is modern, what current societies consider heritage results from centuries, even millennia, of interactions between human communities and with their environment. These complex and diachronic processes generate a diverse register which requires an increasingly

specialized investigation, based on analytical approaches, capable of producing a solid corpus of solid interconnected data, from which rigorous explanations and interpretations in terms of social processes arise.

Because heritage is a research problem. The most inclusive and comprehensive way of considering this problem and linking it to the related social dimensions and processes is to focus on the value chain of cultural heritage, which is the study of the processes that create elements in the past and in the present. The certain processes of cultural valorization grant patrimonial character; which introduces these assets into social life and turns them into contributors to much community uses; which are related to tradition, customs, habits, language, and politics; its implementation as a resource for social movements as a weapon of conflict or agglutination, and even its economic profitability. Research generates innovative knowledge about the societies of the past and the present, and from it is possible to know and recognize their social value for today's society and that of the future.

Although formulated for a long time, the concept of value chain applied to heritage requires in-depth reflection to update it and position it as the conceptual framework of the research strategy for the future. Scientific proposals for safeguarding, conservation, protection, restoration, or dissemination should be born from the research, in which the research staff must be an active part with other social agents. However, research must also know how to recognize these proposals when they emanate from non-academic spheres and must be there to evaluate and help the emergence of bottom-up appreciation and patrimonialization processes.

3. HERITAGE SCIENCE: A GENERAL, INCLUSIVE, AND DEMANDING PROPOSAL

The scientific study of heritage, “heritage science,” has unique characteristics and a high interdisciplinary component. Heritage science is based on three key ideas: safeguarding / conservation, valorization, and analysis of closely related social processes. The concept of “safeguard” can be applied equally to intangible and natural heritage, besides tangible. For example, a language at risk of extinction or a specific ecosystem may be the object of measures that make the forms of life that produce them possible. The concept “valorization” refers to the social processes (in the broadest sense) that generated that materiality, or that immateriality, which we now recognize

as heritage; the processes of generation of social value that occur around heritage, so heritage does not have an intrinsic value, but that it, in its multiple dimensions (existential, cognitive, ethical, aesthetic, political, economic...) is socially constructed. Although value is generally linked preferentially to the economy and economic value, which is why its application to heritage is often censored, in the context in which it is used in this text we refer to the broad notion of value not to be confused with “price” but rather in the sense that Rullani (2009) gives to the process of meaning-creation: “Which is conducted in the networks and flows that connect various physical places and draws forth their recognized and sustainable differences of identity. In other words, it is an exercise of differentiation, rather an exercise in identification.”

The scientific questions that arise in the field of heritage are complex. The process of creation or execution, with the transformations suffered throughout their history, make heritage objects often unique, and this requires a particular approach to each problem that arises. In addition, because of the dual material and immaterial nature of cultural assets and the practices in which they are enrolled, it is necessary to address issues originating from the human sciences using scientific techniques and tools, in a framework that requires collaboration between professionals from very diverse disciplines.

Heritage science, when approached from the field of the humanities and social sciences, tries to solve questions related to the origin, history and meaning of cultural goods and practices, their influence on development, and their value and meaning for the companies that have generated, guarded, possessed, disputed, or dispossessed it.

When done from the field of experimental sciences, heritage science studies the material composition, construction systems and technology of cultural assets, the mechanisms of deterioration, and addresses the problems of conservation and developing new materials and new analysis techniques. Likewise, it also studies materials and technology diachronically.

Both in one case and the other, digitization involves the use of ICT as tools to access and understand our cultural assets, through the approach and verification of research hypotheses, the computerized management of data, 3D virtualization of heritage environments, the generation of whole new documents and files, which may be converted into digital heritage, and a wide range of possibilities to multiply the potential for safeguarding and enhancing the heritage.

Therefore, this challenge aims to strengthen the relevance of scientific research on heritage, always go further, transcend the social relevance it has today to be an active part of it. Contribute to the sustainable development of society through heritage, its diversity of values, its importance for the processes of creating social welfare and the analysis of its risks as a field of identity confrontation.

Heritage is part of the processes of social appreciation. This means it must be part of the community empowerment and articulation of the community at different spatial scales (from the local to the global) and temporal (from the remote past to the most recent memory), and a factor of equality, multiculturalism, miscegenation, and hybridization; in short, diversity. Moreover, it can and should also be an active part of landscape management and planning policies, a comprehensive concept that brings together the dual natural and cultural dimension of heritage and projects them toward a horizon of sustainability and lasting development, from the present moment, as a generator of employment opportunities and wealth generation, and as a didactic and educational means.

4. THE CHALLENGES OF THE PRESENT AS CHALLENGES OF THE FUTURE

Beyond its immediate effects, disrupting COVID-19 raises the need to think and resolve how the memory of the experiences that, as a society and as individuals, we are living will be built, which concerns heritage: how the heritage conditions and has effects on our lives, and how our lives change an environment that tomorrow will be memory and heritage. The strength of this idea is captured by the theme from which the introductory quote of this Challenge is extracted: the speaker is not capable of talking about the pandemic without thinking about memory, about memory and weaving a fold between past and future; heritage does this. We will see a specific heritage of the COVID era and soon we will witness processes of ritualization, memorialization, and patrimonialization.

However, and although it is not the first time this has happened in history, nor will it be the last, the current abatement of statues (May and June 2020) because of the awareness of the systemic social injustice that our civilization above all others, and its dependent sectors, returns us to old unresolved patrimonial doubts: what do we want and must protect from the wind of history?

They seem different things, because in the first case a destructive process requires the construction of the social imaginary that represents it for the future, and in the second a constructive process in the past is destroyed in the present to challenge the dominant memory. However, what is common to both is the processes that build memory from elements that represent social values and historical processes. We result from what we were, and we will be the product of what we are. Heritage cannot freeze becoming, but heritage science can help us understand, manage, and guide it.

There can be no better way to update the critical importance of heritage in our societies. Both recent phenomena (still underway and will be for a while) remind us of the complex, ever-present, and increasingly conflictive nature of cultural heritage. They allow us to show the relationship between heritage and society and life, with groups and individuals, remind us of its importance in constituting essential aspects of identities and historicity, and alert us to the relevance of studying heritage in all its scientific dimensions, for which it is necessary to start from the conditions that make it possible from the existence of something called heritage to the fact that everything can be considered as such.

Therefore, the challenge facing heritage research at this time is, from the outset, a return to the origin: What do we want, and should we select for safeguarding, and why? When and where? Who should do it for and who should participate? Having come this far, the memory we are, generates new questions in relation to the heritage of the future, to which we must respond: What role should experts play in a process that is no longer our exclusive competence? How do we jointly approach, from research, the materiality of our world and ourselves with the symbolic and imaginary dimension, social relations, culture, and language? What are the instances in which the need to safeguard certain entities is generated? How do we do it when these relationships take place increasingly widely in a digital space that is, by definition, more energy than matter?

They are universal questions that transcend borders: but, while working in international scientific frameworks, we must not neglect responsibility toward our closest environment, where we can act and interact, as scientists and citizens, with greater efficiency and intensity.

5. ANALYSIS OF THE SOCIAL ENVIRONMENT: OPPORTUNITIES AND THREATS

From the viewpoint of the social context, there are opportunities and threats for undertaking the challenge of creating a sustainability-oriented heritage science.

5.1. European collaboration

In the context of the creation of the European Research Area, there are numerous European initiatives for coordination in scientific policies, major projects and shared scientific infrastructures, also in the area of heritage science. In addition to the aforementioned JPI-CH, the Spanish participation in the future European Research Infrastructure for Heritage Science (E-RIHS) is an opportunity to promote the development of research in heritage science and align ourselves with research of excellence in this field at a European and global level.

The threat is any movement against these joint European initiatives, and the isolation of the research strategies of the different member states. The current political moment implies a certain risk of regression in this sense.

5.2. Valuation of heritage

Heritage is usually perceived by people and social groups as their own. This supposes, in a certain sense, an opportunity, given the positive valuation, the prestige and the social interest for the goods object of our study. However, it is also a threat because the daily life and proximity of cultural property sometimes makes it difficult to appreciate their fragility and the need to advance in their knowledge and safeguarding. In addition, associated with the heritage phenomenon a series of social risks have to do with its overexploitation, commercialization, and trivialization, but also with processes of domination. From an objective viewpoint, heritage would be a victim of these processes; but, from a more procedural viewpoint, heritage is part of these valorization processes, not always desired.

Possibly the economic sector where the presence of heritage is most evident is that of cultural tourism. In a country like ours, where tourism is one of the main economic sectors, heritage undoubtedly plays a key role. However, there is no awareness in this sector of the importance of field research, because its effects, both positive and negative, are indirect and difficult to perceive in the short term, as mentioned in the previous section. For this

reason, it is essential that heritage science incorporates as part of its scientific strategy aspects related to heritage valorization, and safeguarding.

5.3. Current context and anticipation

The crisis generated by COVID-19 has had a very negative impact on access to heritage, with the closure of museums, archives, and other cultural institutions, although it has promoted a notable impulse in developing new forms of access and dissemination (we return below on this). International institutions such as ICCROM and ICOM, or national institutions such as IPCE have generated and compiled information and advice for immediate action, but the subsequent impact is unknown. Changes that occur in aspects such as the decrease or change in tourism patterns, the availability of funds for the conservation and study of heritage, the social appreciation of heritage compared to other assets, or the role it can develop for the resilience of societies are, at this time, uncertain.

It is necessary to continue working to make research in heritage science socially visible and this offers an opportunity for rapprochement between science and society.

Nonetheless, it is necessary to delve into a line still incipient, but which is given by introducing the critical perspective of heritage studies worldwide of management: that is, applying the critical knowledge generated. Regarding work in the field of heritage enhancement, it is necessary to assume responsibility: faced with the generalization of problems associated with tourist overcrowding and the proliferation of tourist-cultural circuits (gentrification, tourismophobia, trivialization of the visit...), we need to investigate the long-term social effects that critical wealth management can also have.

Finally, also the crisis generated by COVID-19, amplified by the radical questioning it supposes of the normality assumed until now and legitimized by having evidenced everything that does not work, worked badly or required to be updated (also in heritage, at the as occurs in many other fields), it is an opportunity for reflection on which heritage management models may be more suitable to diversify, specialize, spatialize (territorialize), season, and scale the impact of tourist flows. However, it is also to contribute to an urgent territorial rebalancing that must look toward the past, toward sustainable forms of resource and territory management, and toward the future, trying to fill the spaces that late modernity emptied, but in an orderly and scientifically informed way. Heritage research must also be present and relevant: heritage

is not only an element of attraction for tourism, but an engine of other activities (for example, the primary sector), a factor of demographic stabilization in rural areas, active in land use planning or joint programs for preservation / access to the cultural and natural as part of the same processes.

The COVID-19 crisis has clearly affected heritage, which will also be persistent, as different international organizations have recognized in different declarations and actions (Europa Nostra, ICOMOS, Historic England, European Association of Archeologists...) and in the joint action of over two dozen organizations that on May 19, 2020 addressed to the Minister of Culture and Sports a joint letter on COVID-19 and how it compromises the viability of many museum institutions and heritage assets, companies, and cultural projects. The economic impact on the sector is dramatic and will require empirical and innovative studies to found new management models. Going beyond this impact will imply enabling new forms of enjoyment and access to heritage (visitation regime, etc.) that, from a positive perspective, they will be an opportunity for, while always complying with the health security measures in force, the demand for visits and use of heritage can be redistributed and deconcentrated among a vast universe of sites and not only limited to heritage “flagships.” Something that will in passing be synergistic with strategies in the face of rural emptying and the priority that puts on the public agenda the debate on Emptied Spain.

However, these two fields of action are, although urgent, only some possible ones. It will also be necessary to think about how, from the heritage, constructing the memory of this crisis is documented and valued and how it is reflected in future memorialization processes. Even from the heritage and from the expertise provided by the knowledge of the traditional forms of mourning and pain, it will be possible to better understand the social and psychological effects of the truncation of mourning, or the emergence of substitute forms of non-existent mourning.

The COVID-19 crisis does not come alone. By hitting the world when it had not yet recovered from the socio-economic and political-organizational effects of the Great Recession, by hitting a society stressed by the growing inequality in distributing income and its concentration in a reduced percentage privileged (one of the great effects of the Great R), and by hitting on social structures weakened by the previous processes, the post-COVID-19 situation is being characterized by the substantial increase in social tensions everywhere. The BlackLivesMatter movements, which denounce social injustice

as inherent and systemic in capitalist societies, are also reflected in heritage and in heritage construction-destruction processes (for example, the demolition of statues, etc.). Once again, examples of how heritage is linked to the construction of the memory of power and how its questioning is the testimony of the claims and struggles of alternative groups emerge here.

The foregoing converges with the pending issue that Spain has with its historical memory and its self-representation as a state. The policies of historical memory will (or were) going to be one priority of the coming years and particularly of this legislature, they are the object of a specific Challenge, but as far as they involve creation, use and acts of evaluation (positive or negative) of heritage elements, are also an urgent field of study for heritage science.

6. FUTURE CHALLENGES

Once the interdisciplinary domain and the generic challenges have been limited, and an analysis of the conditions of research in heritage and environmental science has been conducted, it is necessary to more clearly outline the challenge this strategy faces on the horizon of sustainability, its fundamental characteristics, which will allow us to specify the research challenges where it would be specified.

6.1. Strategic challenge

The main and immediate challenge is the strengthening of heritage science as a research strategy, which translates into the heritage value chain as its conceptual framework. This chain, which links the basic processes of generation and socialization of knowledge (registration, analysis, interpretation, intervention, management, circulation, and valorization) with the environment in all its phases (interaction between scientific agents and social agents in all its variety) is the condition of possibility for the future challenge: the emergence of an open and richer, plural, and relevant heritage. Therefore, makes it possible for heritage to be a means that contributes to the Sustainable Development Goals to a different extent.

For this, a main challenge is the need to *strengthen interdisciplinarity* and collaboration between disciplines, not only in the terms in which there is already a consolidated trajectory (projects and networks), but in the design of lines of research itself essentially interdisciplinary, with different but complementary projects, and with support for scientific careers of young researchers with

interdisciplinary training. This must also take place within an international framework. Although disciplinary variety is important, the main nexus to be worked on is the one that seeks to bridge the gap between the experimental sciences and the social and human sciences.

Another challenge is *reflective immersion in the digital environment*, in terms of production, management, and socialization of knowledge. Although this is already a reality, it is quite a challenge to make the digital humanities something more than a compendium of humanistic and social disciplines that manage software tools. The potential implied by the digital challenge in terms of research action goes beyond this: it opens a world of lines of work in which, in addition, the feasibility of the interdisciplinarity to which we alluded before multiplies. However, the capacity for handling and generating data provided by the digital environment requires a deep reflection on its conditions of use, and on its ethical implications. Finally, digitization greatly multiplies the possibilities of integrating into the field of heritage (in terms of registration and safeguarding) the intangible entities that have been hard to attract: social practices, oral and artistic expressions, or languages in their different modes of expression and in their evolution.

The digital dimension of the world to come does not cancel out the persistence of a physical reality that, to a large extent, is being modified by it. Applying advanced technologies for the *design of a new materiality* is another of the challenges that heritage science faces: from the field of experimental sciences, it contributes to the generation of more sustainable materials both in their production and in their use, something that is essential to manage and safeguard the materiality of a part of the set of cultural and heritage assets.

In the same way, experimental, social, and human sciences must converge in the *design of a new territoriality*: this implies working in the field of spatiality, which is again made possible, in part, by digitization. This new territoriality is also rooted in the need to reconfigure intra- and inter-community ties of sociability. The modern model that segregates the rural and the urban, and subordinates the first to the second, with such dramatic results in our country, is a model under review and heritage science has much to contribute, thus this requires reordering. Essentially from geography, sociology, and anthropology, but also from an archeology that can delay into the historicity of the modes of occupation of the territory and spatialization of social relations, research lays the foundation for a heritage designed in terms of sustainability: rethinking the concept of cultural tourism in terms of supply, demand, and mediation.

This scientific strategy points toward the need to contribute, in this horizon of sustainability, to the *emergence of a new citizenship*, in the sense of an alternative model of sociability, which tries to manage the real, local, and global problems of a world in which the conflicts derived from the periodic human and economic crises continue to grow. Heritage is not a neutral entity, much less intrinsically positive, in this world; it is part of it. Therefore, the challenge is that heritage can function to transform reality: this justifies a science of heritage in the last resort, its social relevance. Our role as scientists and scientists is not limited to studying and safeguarding heritage for its own sake, but because it is socially valuable. However, this social value is plural, and it is neither homogeneous nor stable. Heritage studies help to understand why heritage is a field of dispute and therefore provide us with critical insight into the processes of which we ourselves are part. The contribution of gender studies and the feminist approach is especially significant: de-patriarchalizing heritage as a means of de-patriarchalizing society. Heritage science must contribute to increase the critical awareness of citizens (not only through narratives but also through the experience of access to the entity or event), and to generate alternative forms of social relationship, based on equality, cooperation, solidarity, and sustainability, understood as respect for the memory of those who preceded us, which we ourselves embody, and as respect for the vital dignity of those who will succeed us.

6.2 Specific challenges (SC)

For example, here we reflect on some lines of work, understood as specific remains that should make up this challenge, in line with the global challenges we have expressed above. These lines, in which progress has been made, will undoubtedly continue to be relevant in the coming years, and will give rise to new ones. This section has been organized by first describing the more general specific challenges that concern the challenges related to changes in social processes, to the more specific ones on the conservation and forms of registration and documentation of heritage.

Challenges related to changes in social processes

SC.1. Territory, landscape, and heritage

Basic research on processes of social change and technological change, and the production of historical knowledge through various documentary sources is essential to generate the narratives and content that nourish heritage and its multiple signifiers with meaning. To transmit this knowledge, heritage is a vehicle imperative for providing today's society with the networks of meaning

necessary to understand the phenomena of accelerated change in which we find ourselves immersed, and to help manage the processes of change both at a symbolic (collective identities) and territorial level. Knowledge about the past is necessary to manage the present reality, to contextualize current time and space and to project them into a horizon of sustainability.

Archeological research on landscapes, and their heritage recognition, have been and are generators of community and lasting resources in rural areas. These are alternative resources both to aggressive activities on the environment (such as extractive or industrial) and to abandoning the rural world, because they directly affect the development of the service sector, but they can and should also be an incentive for development of the primary sector (see previous paragraph) stimulating its recovery. This leads us to actively converge with regional and local governments, responsible for asset management, and with local communities, associations, entrepreneurs, and other local members in which the viability resides of a living landscape.

Examples: Study of prehistoric and ancient mining as a field of research that allows understanding the effects of the Anthropization of the environment in different historical times, from the concrete event to the long duration (which includes the patrimonialization of prehistoric mining landscapes); on different territorial scales, from the most immediate area (extraction area) to long distance (different forms of contamination); and at different social levels, from the organization of work processes to the ideology of exploitation.

SC.2. Critical study of the patrimonialization processes

The objective of this challenge is to study the processes of formation and use of heritage in the present and the past. Until recently, and still shared by many social and academic sectors, a vision of heritage has been maintained as something intrinsically positive, and not as a social field in which values and interests are displayed, often conflicting, and whose effects are not always positive for the community, or for the most vulnerable sectors of it. To build sustainable and innovative heritage valorization strategies, it is necessary to start from critical research and analysis: that is, from the production of critical knowledge about how societies appropriate and use heritage.

Example: Decolonizing the Archive: Memory and identity this line rescues the whole range of semantic and instrumental potentialities of the colonial archive, recovering its critical genealogy and clearing its praxis of the theoretical and epistemic prejudices with which it has been taxed.

SC.3. Social innovation and cultural heritage

The objective is the development of actions for a social appreciation of the heritage which the communities own and the entire citizenry benefit, as an integrating element and part of the national and European identity. Within this line, a new dimension of valorization toward society is beginning: citizen science. Developing an optimized work methodology and establishing citizen science networks would allow this phenomenon to be exploited to the maximum, both to contribute to the creation of knowledge and to make visible and increase the value of both scientific research and heritage. It could also be considered involving society, from the premises of scientific knowledge in the definition of heritage research strategies and even in the study processes, for example, in the phases of data collection or monitoring.

Research is not justified without a social projection that contributes to the valuation and exploitation of heritage. However, given the conservation requirements for future generations of heritage, the landscape economic profitability must be screened by social profitability itself. This is a conflictive aspect which places heritage in an ambiguous situation in which a balance must be sought between its social value and its economic value. This balance is the basis of its condition as a community and lasting resource. Social innovation must be put at the service of generating resources, above all social (including patrimonial), that allow an increase in the quality of life.

Example: Conservation practices in the community: the objective is to design and implement management practices for heritage spaces based on the generation of collaborative knowledge and open science principles, to achieve an optimal involvement in preventive conservation strategies.

SC.4. Heritage, languages, and communication

The study of language and communication from the heritage viewpoint is a priority in most heritage regulations because languages are considered heritage assets. The great challenge for a horizon of sustainability is to articulate a strategy of investigation and safeguarding of languages and their variants that integrates the immanent dimension of the linguistic system with its different historical, geographical, social, or stylistic manifestations.

Example: Relationships between languages and linguistics: Investigating the relationships between languages and language varieties helps to understand what unifies languages and what differentiates them. In addition, a view from linguistics allows us to distinguish the ideological contents implicit in

certain discourses of society that uses languages as weapons for its identity interests.

Challenges related to changes in records, forms of documentation, and materials

SC.5. Development and application of non-destructive analysis techniques

The development and application of non-destructive or non-invasive techniques that provide information about the cultural property without damaging or modifying the object. It is especially relevant to emphasize in situ evaluation techniques, which allow studying objects that for different reasons cannot be transferred to the laboratory, and in developing *diagnostic techniques* that provide information on the state of conservation of the materials or the cultural goods. These techniques can be applied to all types of cultural objects in *remote sensing* mode from the scale of the object to that of the deposit or that of territorial units.

Examples: Technological advances underway make it possible to use compact and hybrid equipment in which complementary techniques are combined, and that allow undertaking multi-analytical campaigns with a single, sometimes portable instrument (for example, portable impedance spectroscopy equipment electrochemical or instrument that combines three modalities of laser spectroscopy). Another example is the development of spatial data infrastructures (SDI) and, especially, of IDEARQ (Spatial data infrastructure in archeological research), with which the investigation of archeological heritage from a spatial approach has a powerful tool.

SC.6. Advances in preventive conservation

Advances in preventive conservation, including monitoring systems and developing mathematical prediction models and dose-response equations from long-term data. One problem of current science is the temporary limitation of projects (usually 3 years) that prevents the development of long-term ambitious projects, which because of the nature of the assets studied are very important for heritage. For this reason, it is necessary to resort to accelerated tests, whose results are not always well interpreted. The identification and prediction of problems derived from climate change, the appearance of new pollutants, development of knowledge of their interactions with the materials of the cultural assets, etc. is important. Regarding developing monitoring and analysis systems, using digital tools, artificial intelligence, mobile applications, etc. must be considered for monitoring and diagnosis.

On another scale, the maintenance of land uses, and traditional activities is an excellent form of preventive conservation of heritage often, especially in rural areas.

Example: New techniques to study in situ deterioration of the underwater heritage caused by new agents of deterioration: i.e., fuels, plastics. The emergence of new pollutants in the seas requires the use of new techniques to study the deterioration of underwater heritage.

SC.7. Development of new materials

Developing new materials for conservation and restoration, compatible with existing ones and that do not accelerate their deterioration, with special attention to using non-toxic products and sustainable and durable materials or even nanomaterials. In this challenge, one of the most important aspects is the study of the interaction between new and old material, with special attention to its long-term evolution. This development is fundamental to contribute to a sustainable conservation of the cultural heritage objects and to their greater accessibility to the public.

Example: Design of new sustainable lime-based repair mortars. Use of waste as a source of pozzolanic material and design of lime mortars. Obtaining the lime involves CO₂ emissions; one way of reducing this is to use waste without carbonates, thus it is necessary to study the behavior of these “new materials.”

SC.8. Standardization and data management

The standardization in both methodological and data, which favors the access and dissemination of knowledge and the exchange of information on cultural heritage, in line with the open science approaches, complying with the FAIR criteria. The standardization and interoperability of data is a challenge with different aspects. We must consider methodological standardization in conducting laboratory measurements and tests, defining protocols, etc. that allow obtaining comparable data between different groups and techniques, considering that often the instrumentation and methodology used are not standard, but have been developed specifically for heritage. Nonetheless, are the standardization and data management in the field of digital humanities. The heterogeneity of the scientific and documentary data managed in this field poses a challenge for its definition and efficient management. Finally, the possibility of collecting the tests and methodologies applied in European regulations should be facilitated.

Example: Semantic technologies for cultural heritage: The objective is to create, select, develop, analyze, validate, demonstrate, and disseminate the technologies for the construction of meaning around the information generated and managed during research and management of the cultural heritage.

SC.9. Protocols for the management of heritage material

Heritage—both in Spain and in other countries—is kept in the hands of public and private institutions, including CSIC itself. Usually, these institutions need and seek to value their material, which often requires a methodology of intervention, management and conservation of heritage that goes hand in hand with multidisciplinary scientific research. It is necessary that CSIC be able to offer a holistic analysis of the heritage of these institutions, forming, maintaining, and consolidating a management protocol that institutionalizes the trust and prestige of scientific research. The existence of this protocol, in addition, could launch, in a tutored way, the processes of conservation and restoration of heritage, no longer in the hands of researchers, but in the hands and funding of the Autonomous Communities interested in its preservation. Finally, this protocol must include a wide space for the effort and dynamization of transferring knowledge that must also be conducted by the proprietary institutions, taking as a basis and main source the results of research on heritage.

Example: Written Arab heritage management protocol. The objective is to propose and review a protocolized management model between the institutions that keep the documents and the researchers, for the characterization and material restoration of the collections, and a historical-cultural study of them.

7. SUMMARY / EXECUTIVE REPORT

Heritage is increasingly recognized as a key element for social cohesion, sustainable socio-economic development, and the wellbeing of people in different national and international strategic documents. For this reason, scientific and technical research is essential; especially in a country like ours, which has one of the richest and most diverse heritages worldwide.

The scientific study of heritage, or heritage science, is a complex field that requires collaboration between professionals from diverse disciplines, often interacting with each other: Archival, Archeology, Architecture, Anthropology, Astrophysics, Library Science, Materials Science, Soil Science, Philology, Physics, Geochemistry, Geology, Art History, History, Engineering,

Linguistics, Literature, Museology, Chemistry, and Sociology. This interdisciplinary characteristic is one of the greatest difficulties, both in its development and in its recognition. Given the traditional division between the human sciences and the experimental sciences for defining priorities, allocating resources, etc., people doing heritage science research are often at a disadvantage in either field. Fortunately, this aspect has improved in recent times and at the national level, heritage appears in research plans as a cross-cutting element in many instruments and calls.

However, the impact of heritage science research is not very visible to society. Although the volume of the heritage-related cultural industries sector is very large, its structure is very dispersed and lacks large companies. In this context, the economic impact of research is indirect, and difficult to quantify, which does not contribute to its visibility. Despite this, in recent years awareness of the value of cultural and natural heritage as a fundamental element of identity for people and different social groups has grown significantly, and an important asset for sustainable economic development.

Heritage science has recently turned toward several key issues, which will undoubtedly remain relevant in the near future and will give rise to new challenges:

- Advances in *territory, landscape, and heritage*, from historical knowledge to understanding and transmission of the spatial context of heritage.
- The *critical study of patrimonialization processes*, which allows us to understand what heritage is and how it has been used, and how it is necessary to manage complex social processes of which it is a part.
- Research in *social innovation linked to heritage*, which is the full appreciation of the research generated, including the approach of citizens to science and knowledge and new models of participation such as citizen science, as it is about implementing the model socially in which heritage and society are mutually conformed: heritage is, thus, a means for the transformation social toward a horizon of sustainability.
- Advances in *heritage, languages, and communication*, affecting both the communicative essence of the heritage phenomenon and the heritage nature of the communicative instrument par excellence: language.
- Advances in the *development and application of non-destructive or non-invasive techniques* that provide information on the BBCC and especially in situ evaluation techniques, which allow studying objects that for different reasons cannot be transferred to the laboratory.

- Advances in *preventive conservation*, including advanced materials analysis and remediation / restoration procedures, monitoring systems and development of long-term prediction mathematical models, with special attention to the identification and prediction of problems derived from climate change or the appearance of new pollutants.
- *Development of new materials* for conservation based on non-toxic products and sustainable materials; *management and standardization of methodologies, protocols, and data*, which favor the access and dissemination of knowledge and the exchange of information about heritage, in line with open science approaches, complying with the fair criteria (*findable accessible interoperable and reusable*).
- *Development of management protocols for heritage material*. For example, material written in Spanish archives and libraries, in its least studied aspect, such as material written in non-European languages (Arabic, Greek, Coptic, Hebrew, etc.).

CHALLENGE I

ABSTRACT

Memory processes —as selective displays of the past in the present— are an essential component of the configuration and development of all human societies and affect areas that range from everyday gestures to high-level politics. The unfolding of memory is especially important in the constitution of individual and collective identities, and its enormous potential for cohesion is only comparable to its great capacity to generate exclusion, difference, and dispute. It is impossible to understand historical or contemporary conflicts in depth without analyzing the memory processes in which they are or have been immersed. Hence the strategic importance of this challenge for an institution such as CSIC.

The approach to memory and memory processes is necessarily interdisciplinary, as it can be analyzed through the scientific fields of neurobiology, philosophy, sociology, political science, psychology, literary studies, religious studies, cultural studies, historiography, social anthropology, archeology, or cultural geography, among others. By reviewing the main historical, theoretical and thematic anchors of memory studies —with a special emphasis on CSIC-based research—, as well as their prospects for the future, this challenge proposes to proactively foster this interdisciplinarity to build a common analytical language substantially richer and more sophisticated than each of its individual parts.

MOBILIZED MEMORIES. DEPLOYMENTS OF THE PAST IN THE PRESENT AND THE FUTURE

CoordinatorsFrancisco Ferrándiz Martín
(ILLA, CSIC)Reyes Mate Rupérez
(IFS, CSIC)

1. INTRODUCTION

1.1 Executive summary

1.1.1.

Memory processes —as selective displays of the past in the present— are an essential component of the configuration and development of all human societies and affect areas that range from everyday gestures to high-level politics. The unfolding of memory is especially important in the constitution of individual and collective identities, and its enormous potential for cohesion is only comparable to its great capacity to generate exclusion, difference, and dispute. It is impossible to understand historical or contemporary conflicts in depth without analyzing the memory processes in which they are or have been immersed. Hence the strategic importance of this challenge.

1.1.2.

The great expansion of scientific studies on social memory in recent years responds to various factors. Although memory has always intervened in the understanding and construction of the individual and society, the great genocides of the twentieth century and the human rights violations that proliferate throughout the world have multiplied the groups of victims of various forms of violence that demand recognition of their suffering and pose the moral need

to remember the tragedies of the past so as not to repeat them. The Holocaust experience placed the need to drive memory at the center of the spotlight, making it a new categorical imperative. The Auschwitz concentration and extermination camp became a symbolic reference for State crime, as an archetype and metaphor for other past and present tragedies.

1.1.3.

Scientifically understanding memorial processes is an inescapably interdisciplinary task in total harmony with the objectives of the CSIC White Paper 2020-2040. Memory can be analyzed from the point of view of neurobiology, philosophy, sociology, political science, psychology, literary studies, religious studies, cultural studies, historiography, social anthropology, archeology, or cultural geography, among others. This challenge proposes to proactively foster this interdisciplinarity to build a common analytical language substantially richer and more sophisticated than each of its parts.

1.1.4.

In recent years, the analysis of memorial processes in Spain, in all its complexity, has become a very important conceptual laboratory within memory studies at a global level. This underscores the strategic importance of institutionally promoting this challenge.

1.1.5.

The challenge develops transversal themes that affect the research being conducted in the institution, in tune with the central themes of memory studies, grouped under these headings: neurological basis of memory; memory as a logos-with-time and central category of contemporary knowledge; memory and collective identities; memory policies; memory and conflict; diasporas and exiles; memories with a gender perspective; memories of science; materiality; and memories imprinted in landscapes.

1.1.6.

The challenge also lays the foundations for an anamnestic epistemic turn in both theoretical and practical issues, summarized in these sections: alternative epistemologies of memory and time, new horizons of digital memory, new memory technologies, studies of perpetrators, memories of utopia and hope, and dystopias related to climate change and major pandemics (COVID-19).

1.1.7.

The wide spectrum of topics reflected in the writing of the challenge shows that the scientific studies of memorial processes are an area of research of extraordinary social importance and with multiple future challenges. Far from being an area in extinction, the current boom in memory studies is testimony that the past is increasingly present, and that the study of the ways it affects the lives of individuals, groups and societies is a not only a scientific but also an ethical necessity when it comes to properly understanding both solidarity and social conflict.

1.2. Epistemological and ethical bases of memory

Memory is a fundamental category of knowledge because it is a temporal concept and, as we well know, time and space are both conditions of possibility of knowledge. However, memory is not just *any* time. It refers to the past. Moreover, the past is a rich fishing ground of meaning in which all disciplines cast their nets. History is interested in the past but also anthropology, literature, art, religion, science, psychoanalysis, philosophy, etc. This explains why memory has many definitions and why each discipline develops its own particular theory about what is or ceases to be memory. This challenge will be to address all this plurality, but also to order it so we can more easily speak across disciplines about memory.

Memory has acquired over time a semantic capital we have to consider. If for Aristotle, memory was a minor concept (typical of the “internal senses”) that only produced feelings (and therefore did not exceed the scope of the subjective and private), today it is presented to us as a category that, besides feeling, produces knowledge and that, besides being private is public or political, as aptly denoted by expressions such as “collective memory” or “historical memory.”

Memory belong to the order of knowledge and not only of feeling because it captures a part of reality that escapes the modalities of knowledge that focus on facts (such as history or science). What is memorable is the hidden part of reality. This makes memory an eminently hermeneutical faculty, because it not only refers to pastime, but also to the hidden part of reality, which means “the history of suffering” on which factual history is built.

In addition, memory is a duty or, as the philosopher Theodor Adorno would say, it is presented to us today as a “New Categorical Imperative.” This crucial aspect has become evident throughout the 20th century, when humanity faced the experience of a radical project of oblivion represented by the

Auschwitz extermination camp, a terrible event that was previously unthinkable. What is meant by that expression is that if we want to construct history differently, so barbarism does not repeat itself “never again,” we must rethink the pieces that history comprises (politics, ethics, aesthetics, law, education, etc.) considering what man did even if he could not think it. When the unthinkable happens, what happened becomes something to consider. Memory thus becomes the inspiring principle of a new theoretical and practical program, alternative to the one that ruled in the past and continues to govern, capable of novelty.

1.3. What does it mean to investigate memorial processes?

There is no doubt that memory processes are fundamental to understand how human groups selectively establish anchors with the past, and how these connections with yesteryear events and processes influence the formation and transformation of different modalities of communities of belonging. As memory is at the basis of feelings of belonging and community, it is also present in parallel or intertwined processes of exclusion, marginalization, and dispute. For this reason, understanding from the scientific viewpoint the unfolding of the past in identity processes has become a challenge of crucial importance in deciphering solidarity and conflict in contemporary societies. What is the reason why struggles of the past flood political discourses, permeate cultural production, or capture media attention so easily? Why are there characters or events from the past activated at a certain historical juncture, and others are marginalized or silenced? How is it possible that the past can be interpreted from the present in such different, even antagonistic ways, by different social groups? How do we recall episodes of extreme violence, but also of utopia and hope? What are the dialectical relationships established between hegemonic and subaltern memories? What forms did memorials take in the past and how are they taking shape in contemporary societies? What are the tensions and communicating vessels between memory and history? What social actors and institutions promote them and why? What are memory’s rhetorics, aesthetic keys, topographies, formats, and devices? How do monuments, memorial museums, anniversaries, or commemorations originate and evolve over time? How do we listen to and interpret witnesses? How do memorial processes interact with transnational discourses and practices of human rights? To what extent are the new forms of political organization and sociability, and the impact of the new ICT, transforming the modes of relationship with the past? Ultimately, what is the “past” and how is it unfolding and actualizing in the present, and how is it mobilized to anticipate futures?

To answer these questions, there has been an explosion of memory studies in the academic field in recent years, as memorial processes have become more complex and diversified in contemporary societies. Thus, there is a need for analysis in order to better understand the reasons why the supposed deficit of the past linked to the vertigo of globalizing processes may be transforming into a surplus or *memory saturation*. This need has propelled the emergence of a genuinely interdisciplinary research space in which, from different methodologies and theoretical frameworks, the relationships that different human groups establish with the past are studied, ranging from individual and family memory to the politics of memory cultivated by nationalist ideologies or that make up transnational spaces, such as the European Union, passing through all intermediate instances. Among the disciplines that contribute significantly to this field, we can highlight philosophy, sociology, political science, psychology, literary studies, religious studies, neurobiology, social anthropology, and cultural geography. A magnificent example of the wide spectrum of topics being worked on in this interdisciplinary field can be found in the program of the III International Congress of the Memory Studies Association, organized by a research team from ILLA-CCHS-CSIC and held in Madrid between 25 and June 28, 2019.

The most contemporary trends in this field of research increasingly conceive of social memory as a fluid, diversified and flexible process rather than as a static object, although not all memory processes are equally dynamic. In this logic, memory migrates, travels, mutates, and is exchanged in global processes, adopting transnational configurations and circulating through new digital technologies. Thus, specialists maintain that memory increasingly has cross-cultural, transgenerational, and transmedia qualities, and that makes interdisciplinary studies such as those presented in this challenge especially recommended. To apprehend the growing complexity, interconnection and fluidity of memorial processes, many contemporary authors have progressively created a new analytical vocabulary. To chronologically place examples of this *cross-cultural turn* —or *connective turn*, according to the authors interested in the intersection of memory with new technologies— of memory studies, we already have at our disposal a wide repertoire of concepts such as *collective memory*, *places of memory*, *communicative or cultural memory*, *cosmopolitan memory*, *multidirectional memory*, *traveling memory*, *post-memory*, *memorial mediation and remediation*, *palimpsestic memory*, *agonistic memory*, *ecomemory*, *memory without borders*, etc. For some leading authors in the field, what keeps seemingly disparate concepts coming from different disciplines

aligned are certain common elements: first, the close relationship of memory with the understanding of times present and the building of the future; second, the fact that commemorative programs are increasingly linked to global human rights regimes; third, the agreement that the comparative framework is key to understanding the intersections between global and local processes; and finally, the focus of analysis has shifted from static memory places to the dynamics and technologies through which memory is articulated in the contemporary world.

In this context, the challenge has the vocation to explore from the neurological bases of memory to its theoretical and philosophical foundations; its modes of representation; its relationship with collective identities in their different scales; its forms of political mobilization; its institutional models; its protocols and rituals; its literary and artistic expressions; its tensions and interfaces with public history, historiography and with other alternative memorial registers; its politics of oblivion; its modulation in diaspora and exile situations; its spatial and territorial dimensions; its connection with trauma but also with utopia and hope; its intersection with gender politics; its forms of materiality; its patrimonial connections; its global and transnational circulation; or their new digital expressions, to give a few examples.

2. BACKGROUND TO MEMORY STUDIES AT CSIC

Memory studies and the uses of the past are a clearly interdisciplinary field, and their processes call on a large number of approaches, some of which are well represented in the social and human sciences at CSIC. A large number of CSIC researchers analyse subject areas that deal with this challenge, either on an intensively or a more complementary basis. A key factor in the strength, solidity and future scope of this theme at CSIC is a result of the series of projects directed by Reyes Mate (IFS), including *Philosophy after the Holocaust*. This project, constructed around studying the reach of victims' memory, began in 1992 under the original title *El judaísmo, tradición olvidada de Occidente* [*Judaism, the West's Forgotten Tradition*], and still continues today. The resulting research has produced keys with which to interpret the significance of victims who have been used, both theoretically and in practice, in fields as diverse as terrorism, the Spanish Civil War, slavery and traffic accidents.

Also crucial, in the same research setting, is the memorial dimension of the project *Pensar en español* [*Thinking in Spanish*], which advocates a way of

thinking based on explicitly recording hidden experiences in the Spanish language as spoken by both the victorious and the defeated. This project led to *Enciclopedia Iberoamericana de Filosofía [Ibero-American Encyclopaedia of Philosophy]* (1978-2018), a 34-volume encyclopaedia involving 500 Spanish- and Portuguese-speaking authors. The development of this line of research turned CSIC into a national and international leader in thought on the memory derivation of the major tragedies of the modern age. Of particular relevance at IFS are the projects directed: by José Antonio Zamora on memory, social suffering, the victim's condition and the failure of memory in the face of new totalitarianisms; by José María González on political iconography and the image of angels of memory in Walter Benjamin; by Antolín Sánchez Cuervo on the relationships between memory and the experience of exile, with special attention to the exile of Spanish intellectuals in 1939; by Francisco Colom on memorial expression in the urban space, where cities are seen as palimpsests that have to be decoded by their inhabitants; and by María Jesús Santesmases on the gender perspective of memory studies.

Where CSIC's strengths are concerned, another relevant and consolidated line in the analysis of memory processes has been undertaken at Instituto de Lengua, Literatura y Antropología (ILLA), which ran a project on the memory activity generated around the Jihadist terror attacks in Spain on 11 March 2004, called *El archivo del duelo* [The bereavement archive], directed by Cristina Sánchez Carretero. A subsequent project on the Carabanchel prison as a site of memory was directed by Carmen Ortíz. Ortíz's latest project on the cultural heritage of the Canary Islands also intersects with the challenge of memory, in particular her research on the trade in and collecting of archaeological remains, including mummies and other Guanche human remains. Likewise, since 2007 a research group called *Subtiero* [Subterranean] has been studying the memory politics of the Spanish Civil War in a comparative interdisciplinary framework, coordinated by Francisco Ferrándiz. This project analyses the memorial cultures associated with the exhumation of mass graves in connection with transnational human rights processes, and the memorial impact of forensic technologies in the retrieval of the bodies of past conflict (*forensic turn*). Since 2010, this team has been organizing the permanent international seminar *Rastros y rostros de la violencia/Faces and Traces of Violence*, which has already held over 80 sessions and is available on the website (<https://politicadela memoria.org/en/>). In this context, a series of national research projects have been awarded and the team have participated in Marie Curie ITN actions (*Sustainable Peace Building*, SPBUILD), COST

(*In Search of Transcultural Memory in Europe*, ISTME) and H2020 (*Unsettling Remembering and Social Cohesion in Transnational Europe*, UNREST), demonstrating the huge appeal of this type of research for both national and international funding agencies. ILLA's organization (in conjunction with UNED and UCM) of the Third Annual Conference of the *Memory Studies Association* in 2019 is indicative of CSIC's leadership in this challenge and of its growth potential. In the 2008-2014 period, IFS and ILLA groups studying the memory of the Holocaust and the Spanish Civil War joined together in the interdisciplinary line of research *Justice, Memory, Narration and Culture* (JUS-MENACU), conducting debates, arranging international congresses and issuing joint publications. Particularly significant was the extensive investigation undertaken by Carlos Closa (IPP) in 2009 entitled *Study on how the memory of crimes committed by totalitarian regimes in Europe is dealt with in the Member States*, sponsored by the European Commission's Directorate-General for Justice, Freedom and Security, which provided the basis for a report published by the European Council in 2011.

Other researchers and research groups have made sizeable contributions to this field, although memory studies are not the sole purpose of their scientific programme. At ILLA's anthropological division, Juan José Villarías is undertaking comparative research on the political use of Tartessos in connection with Andalusian nationalism and, on the American continent, of revitalization movements and contemporary conflict between different origin myths in the State of Bolivia. Pedro Tomé and Luis Díaz de Viana, for their part, have conducted research into landscape, territory and nostalgia. At ILLA's Department of Literature, Judith Farré is carrying out a project on the transoceanic mobilization of colonial archives and objects, and the power relations generated on their margins, while Zeljko Jovenovic is studying Sephardic literary output in Judaeo-Spanish in the diaspora, after the expulsion of the Spanish Jews in 1492 and their settlement in the former Ottoman Empire and North Africa. This challenge has a particularly high profile at the Instituto de Historia (IH). In History of Science, authors like Leoncio López Ocón and Juan Pimentel have devoted considerable effort to analysing the conjunctural and political mobilization or neglect of certain scientists, institutions or scientific facts from the memory perspective, and their insertion in the collective imaginary. Pimentel also studies the relationships between memory and history, the *spectral turn* (the survival of images and their anachronism), and scientific heritage. Antonio Lafuente's work on the influence of new technologies in knowledge production connects with studies on the digital rollout of memory. In Medieval

Studies, Julio Escalona has researched space division methods (plot boundaries, jurisdictional preserves, municipal districts) to understand the role played by local memory as a landscape record and a gateway to land control in societies with no land registries (dense local knowledge). He has also studied the way documents are resignified when they change context in the hands of new actors, acquiring “new lives” and memory triggers, and serving different purposes from those for which they were initially designed. The emphasis here is on the “lie”, in other words on the production of false documents to support a particular discourse about the past which constructs a “desirable” present, and the disputes to appropriate such discourse where it has proved successful. In 2000, Eduardo Manzano was part of the editorial project *La gestión de la memoria: la historia de España al servicio del poder*, and in 2010, with Sisinio Pérez Garzón (UCLM), published *Memoria histórica*, a book that is part of CSIC and Catarsa collection “Debates Científicos”. In History of Art, researchers such as Miguel Cabañas, Idoia Murga and Wilfredo Rincón have studied the mobilization, pillaging, plunder and return of works of art and artistic heritage from ancient times to the present day – including baggage from the Spanish War of Independence, art and artists in exile, the commission and return of icons like Picasso’s *Guernica*, the mobility of art in dance tours, and the museumization of artistic memory. At Instituto de Análisis Económico (IAE) in Barcelona, Laura Mayoral, Hannes Mueller, Joan Esteban and Anastassia Obydenkova are conducting research on the impact of the uses of the past on contemporary mindsets and conflict, and are interested in the creation, persistence and transformation of cultural norms and their moorings in imagined pasts, the cultural and economic components of ethnic conflict, and the impact of historical legacies in migratory policies and attitudes towards immigrants.

Certain common elements of these studies are developed in greater detail as cross-cutting research areas. CSIC therefore possesses a substantial critical mass with huge potential to promote this challenge in a coordinated manner. At the same time, there are real opportunities to connect this challenge with others included in diverse thematic units in the CSIC white book, such as the challenges of digital humanities, digital citizenship, pain and suffering, demographic challenges in ageing societies, conservation and promotion of heritage and territorial development.

Overall, there is clearly a great opportunity to develop this challenge in view of the extensive interest in promoting this type of research in public institutions at both the national and international level. At the national level, research

projects geared to analysing memory cultures and processes fall under the challenges set out in the Spanish Science, Technology and Innovation Strategy 2013-2020. The fact that, in 2020, the State Government made the enhancement of “democratic memory” a key legislative concept, placing it at the highest institutional position (Office of the First Deputy Prime Minister), is proof of its political and social relevance. At the international level, in recent years, the European Union has funded major projects directly linked to this challenge in response to the need for a more in-depth understanding of the contemporary management of the memory of European wars and the underlying reasons for the resurgence of xenophobic and populist national movements on the continent in the post-Cold War era. FP H2020 and HERA have led to the funding of a significant number of research initiatives, including *Unsettling Remembering and Social Cohesion in Transnational Europe* (UNREST, which involved both ILLA and IFS researchers), *Transmitting Contentious Cultural Heritage with the Arts* (TRACES), and *Critical Heritages: Performing and Representing Identities in Europe* (COHERE). Similarly, in recent years, a large number of ERC projects fall within the area covered by this challenge, including *Bosnian Ghosts and Spanish Bones, Corpses of Genocide and Mass Violence, Digital Memories, Remembering Activism, and Greyzone*. In general, a very extensive network of international institutions and projects, in which CSIC groups have a significant presence, are dealing with these issues. Likewise, both a strength and an opportunity lie in the links which CSIC researchers have forged with the world’s main memory studies body, the *Memory Studies Association* (for which ILLA organized the Third International Conference MSA2019, with more than 1,500 participants, and on whose Executive Committee Francisco Ferrándiz sits), and the flagship journal in the field, *Memory Studies*. In this globalized context, high-impact research is being published, not only of an academic nature, but also of social and political relevance. It is important to emphasize that the strengths of this field include the social impact of studies which often analyse highly relevant social issues, such as management of the past and the conflicts of identity resulting from it. Some CSIC researchers work on memory processes with significant media national and international coverage, are engaged in transfer tasks and regularly work as advisors designing public memory policies at the institutional level.

Where weaknesses and threats are concerned, we should highlight the ageing workforce; a problem that exists right across the institution and which is hampering the consolidation of the challenge for the future. The lack of, and at times unsuitability of, technical and support staff is another of the problems endemic to the institution, which will naturally also affect the challenge. The

provision of human resources, particularly young researchers, is therefore crucial. Although CSIC researchers have shown a remarkable ability for interdisciplinary cooperation, this is an area that will require greater effort and stable coordination in the years to come. The articulation of this challenge is an opportunity to overcome another weakness, namely the current dispersion of research teams, especially after the JUSMENACU line ended in 2015.

In short, the challenge is built on very solid foundations at CSIC and has achieved international recognition, but its future viability requires the institution to make a firm commitment to the provision of resources in the years ahead. Its future also depends on establishing a stable coordination structure, bringing on board an international team of top-level advisors, and on drawing up a roadmap for future research. The main tasks in this coordination will include driving the growth of the critical mass of researchers involved in this challenge (both the existing workforce and new recruits), setting up a think tank, steering researchers towards funding opportunities from national and international calls, promoting top-level international publications and seminars, consolidating the incorporation of the challenge into international networks, generating autonomous teaching resources in coordination with academic institutions, promoting transfer activities, consolidating the public and media presence of its members and, where necessary, mobilizing rapid-response research capacity in the face of social issues where the memory dimension calls for scientific analysis.

3. LINES OF TRANSVERSAL RESEARCH

3.1. Neurobiological bases of memory

This challenge aims to incorporate the most contemporary research on memory processes at the neurobiological level. The contacts with Thematic Unit 5 have brought to the fore the many intersections and common interests between studies of a more biological nature and those of a more sociocultural nature, from memory diseases (which can be expressed both in the biological and in the social field) to the dynamics of active forgetting, as present in brain studies as in institutional memory policies.

The most innovative studies in memory neurobiology use state-of-the-art visualization technologies to detect the processes and patterns of brain activity at the base of memory, both in animals and in humans, and the functioning and limits of neuronal plasticity –the ability of neurons to

reorganize their synaptic connections and underlying biochemical processes. Among the challenges they face in their search for traces of memory in the brain or engrams [*engrams*]*—*which integrate at the neuronal level visions, smells, sounds, and a multitude of sensations and emotions that are mobilized by all regions of the brain*—*, neurobiologists try to understand the biological bases of learning, the morphology of storage and activation of the memory, the specific characteristics and interactions between short and long-term memory, the relationship between memory and sleep, spatial memory, memory loss (linked to aging, strokes or specific diseases), learned fear, specific circuits of declarative or semantic memories, implicit unconscious memories *—*linked to reflexes or emotional associations*—*, the interaction and overlap between memories, the capacity for recreation and their evolution over time, or the mechanisms that give rise to so-called false memories.

3.2. Memory, a logos-with-time, central category of contemporary knowledge

Memory, besides referring to a physical function, is also a meta-physical category. Our working hypothesis is that it has become the fundamental philosophical category of the way of knowing of our time. Our rationality is anamnestic or memorial because of an epochal trauma that humanity experienced in the last century and that we symbolize in the term “Auschwitz.” The unthinkable happened, and that fact forces us to think otherwise. This is meant by the formula “duty of memory”, or “new categorical imperative.” It breaks the enlightened trust in reason based on the certainty that the human mind could know everything and anticipate reality. From Galileo’s concipient mind to the ornate dictum “letting suffering speak is the condition of all truth.” The conviction emerges that the advent of the unthinkable, the fact that it actually took place, should give us something radical to consider. This anamnestic imperative should guide our work as it requires us to profoundly reexamine the pieces with which history is built in a new way. It would therefore be necessary to rethink politics (our understanding can no longer pivot on the concept of progress), ethics (moving from a discursive ethics to an interpellative one), law (doing justice should not consist so much in punishing the guilty as it is satisfying the victim), science, religion, aesthetics... Aesthetic representation must also deal with the hidden side of reality, with making present what is absent, which, in key “Auschwitz,” is a painful, failed or defeated past. Representing what is not, what is nothing, is a major challenge that artistic creation has to face, as exemplified in extraordinary pieces such as Claude Lanzmann’s *Shoah* film, Peter Weiss’s *The Indagation*, or Juan Mayorga’s *Himmelweg*.

3.3. Memory processes and collective identities

Renan said there was no nation worth its salt that did not invent its past. Benedict Anderson emphasized the importance of the dialectic between memory and forgetting in the constitution of *imagined communities*. The past is the one material with which collective identities are forged. The price normally paid is, on the one hand, that of arbitrariness when selecting and interpreting certain moments of the past and, on the other, the forging of individual-masses, willing to sacrifice their subjectivity in the interest of the public group where they feel more protected and where they can develop a sense of belonging.

These mechanisms may often times foster a type of authoritarian personality which is as submissive to the strong as it is oppressive to the weak. In recent years, as a response to a growing social problem, studies on the connection between memory and new forms of authoritarianism are of particular interest, like as those conducted by the CSIC research group coordinated by Reyes Mate and José Antonio Zamora. The insufficiency or failure of the critical memory of the authoritarian past is a condition of possibility, although not the only one, of the resurgence of authoritarianism today. Both the mainstream media and political discourses show surprise at the emergence of racism, xenophobia, nationalist chauvinism, the dehumanization and stigmatization of groups, the restrictive interpretation and application of rights, etc. They were considered already residual and marginal phenomena in “advanced” democracies and, suddenly, they are surprisingly increasingly accepted. There is also a correlation between these reemerging phenomena and the multi-crisis experienced by more developed societies. Nonetheless, social analysis shows that this is not enough. It is also the forgetfulness of populations that decisively contributes to making them more vulnerable to false responses to the deep social, economic and political crisis that Western civilization lives.

Both the events we are witnessing today and the astonishment about them are indebted to the same ignorance of yesteryear, now fed by active forgetfulness. This is confirmed by a trait that all neo-authoritarian movements share: trivializing and minimizing authoritarianisms and dictatorial forms of government of the past, and the rejection of historical memory, while constructing and disseminating antagonistic memory imaginaries. Critical historical memory is identified by these movements as an affront to national identity and national pride. Remembering that past enlarges the narcissistic wound opened by the crisis and becomes unbearable for those weakened by it. That authoritarianism identifies

historical memory as the priority enemy of its cultural and political conflict is a revealing index that it can only grow and impose itself on the silence and oblivion of the barbarism that authoritarian regimes have produced in the past. Thus, to understand neo-authoritarianism, it is necessary to conduct in-depth investigations on the limits and insufficiencies of historical and political memory, even in contexts where it has been officially made a political objective. It is necessary to understand the reasons, motives, and mechanisms of the social production of forgetting, and its cultural, social, and psychosocial roots.

3.4. Memory policies

In the academic field of memory studies, the analysis of memory politics has a privileged place. The politics of memory refer in a broad sense to the struggles that occur between various types of social actors —states, memorial associations, groups of victims, groups of power— to promote certain versions of the past. Some authors attribute this intensification of memorial policies to the traumas of World War II and the transnational unfolding of the Holocaust memory already referred to. These memory conflicts always exist, but they are exacerbated in certain historical moments —for example, in transitional moments from a dictatorial to a democratic regime, or in periods of generational questioning of the arrangements of their elders regarding a traumatic past, as has been the case with the mass graves of the Civil War in Spain and the complex memorial process they have triggered.

It is worth highlighting the importance that the analysis of the institutional modalities of managing the violent past has acquired, always considering that they do not operate in a vacuum but in very complex social and political fields, and that they are always the object of pressure, debate and controversy by part of other institutional and non-institutional social members. These policies can incorporate reparative measures, retroactive justice, opening of archives, construction of places of memory, museums and monuments, new commemorative cycles, formulation of new categories of victims, and so on. In the contemporary world, the globalizing processes of memory to which we have referred have a marked influence on the reconfiguration of institutional memories, easily framed within the concept of multidirectional memories —memories in continuous negotiation, and with constant references and reciprocal loans. Even though the framework of memorial policies is usually that of the nation-state, or even that of a specific region, they are necessarily globally oriented, and influenced —sometimes in unsuspected or not immediately detectable ways— by these transnational processes.

3.5. Memories of conflicts

The historical experience of the Holocaust is at the base of the contemporary boom of memory studies, just as its renewed strength is connected to the resurgence of national-populist movements and of identity-based conflicts that, it was mistakenly thought, certain ethical components and pedagogical memory, such as the duty to remember tragedies so they “never happen again”, had contributed to deactivating for good.

The relationship between memory and conflict is broad and complex. In a H2020 project in which researchers from ILLA and IFS have participated (UNREST, 2016-2019), a new theoretical approach was used to analyze the reappearance of memories of wars and past violence and the proliferation of aggressive and threatening notions of collective membership, which put at risk the basic principles that gave rise to the EU. In this context, UNREST proposed that three main models of memory can be defined in contemporary societies. First, the *antagonistic* memory model is very widespread, and is easy to digest in situations of potential social tension. It is monological and “intuitive”, and therefore it lacks any reflexivity. It works by building homogeneous communities based on myths of origin and confronted with others of the social and political environment, in binary terms of “good” and “bad.” Second, the memorial model derived from the effort to recall the horrors of the Holocaust is known as *cosmopolitan*. Memorial cosmopolitanism puts the figure of the victim at the center of the mediations with the traumatic past. This memorial mode is based on the testimony and experience of the survivors, a theme where the work of Primo Levi is central. It is a memorial mode that makes the past categorical and, in this process of abstraction and by focusing on human suffering and compassion for the victim, it risks decontextualizing and even depoliticizing the past. It is a dialogical and reflective model currently hegemonic in transnational discourses and practices of human rights and in many institutional and memorial activism spheres.

Finally, although the hegemony of cosmopolitanism seemed sufficient to stop the return of the opposing identities through the belief in the social and political efficacy of the lessons learned from the past, the resurgence of antagonism has called into question its efficacy in the medium and long-term. The most recent proposals advocate the promotion of a third model, called *agonistic*, which, although also reflective and dialogical like cosmopolitanism, also advocates multi-perspectivism and the acceptance of differentiated and even opposed memories of the traumatic past in complex democratic

environments. Proponents of agonism also emphasize the importance of memory not marginalizing the political aspects of the past and emphasizing the need to understand the unfolding of memory in its social, historical and political concrete contexts, including paying analytical attention to the perpetrators' viewpoint. Not to endorse or suspend the trial on perpetration, but to understand the complex causes that led to it.

3.6. Memories, diasporas, and exiles

Two levels can be distinguished when relating memory to exiles and diasporas. The first of them has a subjective scope, it articulates from the autobiographical experience (individual or collective), and is the most explored academically, thus being the source of most analytical common places. Due to the anxiety, discontinuity and rupture that this experience introduces in the life of the people who experienced these historical forms of disarray, it becomes an unavoidable source of reflection on subjectivity and its temporal dimensions, on identity and its narrative needs. There is a vast literature related to re-signifying the concepts of subject and identity in the memory of the exiles from different angles and nuances (sociological, anthropological, cultural, literary...). It refers to very diverse cases, always showing how these concepts are complex constructions and proving that memories (individual, collective, testimonial, generational, transmitted, or "historical" ...) play a fundamental role in them. In other words, exile (and the diaspora if applicable) is an experience that, because of its "traumatic" condition, forces memory to be (re)introduced into the life of the subject, sowing it with paradoxes and altering its narrative representations.

This descriptive memory with a subjective angle leads us to a second epistemological and moral level in the relationship between memory and exile, more ambitious and challenging, and more problematic. It is related to the impact that the memory of Auschwitz has generated in contemporary critical thought. It is no longer an epistemological and interdisciplinary turn, but a whole epochal change that forces analysts to unmask the violence inscribed in modern rationality (because of its vocation of oblivion) and to re-signify it in an anamnestic sense. In this context, the exiled memory would not only translate into an immanent descriptive narrative embodiment, but would also have a critical scope and would be the bearer of a new objectivity. It would have a self-reflective and challenging content, beyond the merely private or sentimental sphere.

The memory of the exiles recollects an absent past that questions the present successively built on it, thus noting its exclusionary and violent condition, opening

the possibility of other ways to reconstruct the past and transform the present. Very importantly, the exiled memory questions the narratives of the nation with which the state and modern communities legitimize exclusion, not to construct other narratives, more integrating but analogous and therefore doomed to reproduce this exclusionary logic, but to propose other ways of narrating, in accordance with new ways of understanding citizenship, more plural, democratic and with a transnational profile. This may be the main challenge of the exiled memory, playing against the grain of the current wave of national-populisms and the particularistic universalisms characteristic of many of the current global logics. The memory of the exiles and even more diaspora, is a great source of inspiration to unmask the nationalist matrix inscribed in modern nation stories and to illuminate new ways of narrating the latter, based on otherness, dislocation, and plurality, much more than identity, territory, and unity.

3.7. Memories with a gender perspective

The space that memory and oblivion receive in historiography, anthropology, and studies of the humanities and social sciences are adjusted to a large extent, like the societies and cultures they relate, to gender hierarchies, and collect the perspectives of the men to an extent much greater than women. Feminism has contributed to alleviating this circumstance and there are many published memoirs of women, included in studies, and collected in prominent bibliographies. Yet we are still far from granting women their social, cultural, and political authorship in constructing our time. It is mostly the memory of men that is deployed to analyze events and propose measures that contribute to preserving memory and avoiding forgetfulness. Incorporating women and the gender perspective means contributing to the recovery of an inclusive memory, in which agency is awarded not only to men, those who had power and especially those who lacked it, but rather to the work performed by women, the social and productive spaces that they contribute to create, their tasks inside and outside the home, and the domestic space as a generator of knowledge, practices, subversion and repression. Focusing on the role of women in the practice and study of historical memory, in terms of collection, archive and agency of historical memory, as well as in the fight to overcome gender stereotypes and prejudices, constitutes a great challenge. There are more and more collectives of scholars who have taken seriously the account of women about their lives, their aspirations, their jobs, and their activities as policy makers, who have taken the memories of pain and desire as a source to renew the historiographical account of culture, society and politics.

A memory with a gender perspective proposes to look for the women's sources and tasks, to include them in the spaces and narratives of historical memory and also in the analysis of practices of forgetting. There are many testimonies available from a gender perspective whose display and analysis would contribute to a more inclusive memory.

3.8. Memories of science

Mobilizing the memory of science may seem like a contradiction in terms. Science is often seen as advancing and unfolding by solving successive riddles and by discarding theories and interpretations from the past. Thus, once a problem is solved, new questions are generated that mobilize researchers and allow the sciences to evolve, enabling new interpretations of matter, life, and human societies.

However, it is not convenient to relegate to oblivion the set of ideas, knowledge, and practices that have shaped the global history of knowledge for various reasons. On the one hand, because in the production of knowledge that has shaped the science-world, multiple human and non-human actors have intervened and intervene. Their contributions over time deserve to be highlighted in order to contribute to combat the cognitive and socio-historical biases with which we interpret the world, at least on two fronts. First the memory of science needs to incorporate the knowledge of native populations of non-European continents, who have accumulated ancestral wisdom about their bodies and environments as revealed by ethnosciences. Similarly, it is crucial to avoid underestimating the contributions of those who are contemptuously considered profane, or lacking expert knowledge, but who may be carriers of an experience that deserves to be recovered, shared and valued.

Given the global nature of the challenges that humanity faces, it is necessary to recover and activate the memory of the initiatives accumulated by human societies to confront the challenges it has had to face over time to have a long-term perspective of the adventure of learning. This memory of knowledge has been activated by cultural initiatives such as *Memory of the World Program*, promoted and coordinated by UNESCO since 1992, to ensure the preservation and access to the documentary historical heritage of greatest relevance to the peoples of the world, in which scientific materials are strategic.

Secondly, this challenge should contribute to mobilize that memory of science stored in the very institution, CSIC –the most important research center in the country—, in its archives, libraries, depositories and museums as

exemplified in SIMURG, the platform hosting the digital heritage collections of the institution. This database provides witness and testimony of the transformations and changes in the patterns of scientific knowledge production, as well as in their avenues of transmission. Historians of science have to explore the tensions between memory and oblivion, particularly exploring the processes of forgetfulness and concealment of certain scientific traditions, left behind at the margins of the historical process.

3.9. Materiality of memory

Materiality is inseparable from memory. There are two main types of materiality. First there is a conscious or intentional materiality displayed in constructing collective memory (museums, memorials, monuments, counter-monuments, heritage elements, photographs, plastic arts). Second, we can define an unconscious or unintended materiality, represented by the ruins and the traces of past events, often associated with traumatic events. The first form of materiality has received the most attention from historians, art historians, anthropologists, and other social scientists. Unintentional materiality as a form of memory, which would fall within the field of archeology, forensic anthropology, and psychoanalysis, has only recently been the object of systematic study, both from the perspective of studies of political violence and from post-humanist paradigms. The tension between both types of memory materiality—voluntary and involuntary, conscious and repressed—is one of the most productive fields of analysis of collective memory and represents a methodological and epistemological challenge, because it requires the concurrence of very disparate disciplines.

Materiality has been one of the most debated elements in the struggles to establish hegemonic narratives about the recent past both in Spain and in other countries: consider the case of the statues of confederates in the United States or the Topography of Terror in Germany. In Spain, the controversies cannot be understood without the physical reality of the Valley of the Fallen, the documents from the Salamanca archive, or the human remains recovered in the mass graves. The question about materiality and the tension between its active and unintentional dimension is a central aspect that raises questions about the selections and criteria in the activation and mediatization of the sediments of the past. Some events lead to the recovery of the physical place and its inscription as a place of memory, whereas others do not. The materiality of memory invites to an interdisciplinary analysis that pays attention not only to the physical object itself but also the methods of recuperation

and archive, as well as to the social and political context that invest them with meaning, transforming them into memory.

3.10. Memories of natural spaces

The starting point to understand the relationship between memory and natural spaces and landscapes is that they both are and tell a story shared by those who have built them. In this sense the landscape is culture before nature. Therefore, participating, passing, or perceiving through a landscape implies a perceptual commitment to a socially constructed environment. It is not, however, that the culturally produced nature we observe is a mere “document” of the past. Rather, they are spaces of the present time in which material and immaterial, tangible, and intangible, public and private components are tied together, all loaded with personal experiences that can have different meanings depending on the cognitive maps of the environment produced by differences in gender, class, age, social position, etc.

Natural spaces not only tell us about who has inhabited them, but also about the cultural mediations that have operated in the past and in the present and, the relationships they have fostered and still foster with the “natural.” Therefore, the first characteristic of the landscape is that of being memory. A memory that can be appropriated—like nature—in multiple ways (destroying it, symbolically representing it, reproducing it in different places and formats, etc.). In this sense, any appropriation of the natural materialized in the landscape is susceptible to receiving ideological meanings. One privileged area in which this can be seen is by analyzing the role that landscape memory plays in constructing national or regional identities, in constructing “patriotic topographies” through literary and artistic productions, or otherwise. National memories cannot be understood without taking into account the production (reproduction, revitalization, reinvention) of symbolic landscapes on which / from which such memory is projected.

Linked to this, it is necessary to consider what is happening with the protected areas from which, on occasions, the population has been expelled, or some specific relationship between the natural and the human is prevented to favor an uncorrupted vision of nature outside the social construction. This long-standing perception can also be connected to the imperial-colonial production of landscapes, either through a radical economic transformation (extractive), or through symbolic changes derived from changes in toponymy, otherwise. If a large part of natural spaces is produced in the long term, they

exhibit certain values that are apparently aesthetic but that in a deeper reading reveal how ethical and political values have transformed the cultures of those who have inhabited them. This implies that each landscape, no matter how much they may resemble each other, is simultaneously unique and the product of multiple interactions in which there are not only varied ways of reasoning but also multiple sensory forms (*smellscapes, soundscapes, etc.*) when it comes to approach the natural and apprehend the historical.

Finally, it is necessary to address the re-spatialization processes inherent to globalization in three dimensions: urban relocations and dislocations; extension of urbanization processes that have transformed the (rural) landscapes arising from daily productive activities; and those derived from tourism. These processes, sometimes divergent and other convergent, have given landscapes new social, political, and economic values, mobilizing memorial processes.

4. FUTURE SCENARIOS

Some main future research scenarios that must be developed in the medium and long-term are summarized below.

4.1. Alternative epistemologies of memory and time

Social memory is determined by collective frameworks, but also by cultural paradigms. The concepts of the past and of time managed in the West that are at the base of the scientific investigation of the unfolding of the past in the present, are not universal. The studies of memorial processes must be open to other epistemologies of the past which differ from our forms of perception of the historical evolution of time and allow us to understand the richness of pasts that exist in human societies across the world. This is important beyond any scientific program because the lack of understanding between the different memory paradigms, and the hegemony of Western ones over others, is at the base of much of the current social conflict, and can produce serious interference in, for example, humanitarian actions or institutionalized processes of reconciliation or bereavement.

Therefore, one of the future horizons of this challenge is to understand not only these peripheral epistemologies of the past but also the different ways of constructing and transmitting stories, and the different specialists—from shamans to folk historians—and memorial actions—from healing rituals, to

initiations, to spiritualistic ceremonies or funeral arrangements— that are meaningful in local contexts, and that have remained off the radar of studies of relations with the past in the West. In a globalized world these epistemologies of time, which sometimes have circular references, or are related to the flow of the tides, or to ideas about the eternal return or the morphology of landscapes, are not isolated in closed worlds. They interact and feedback with Western hegemonic epistemologies and, despite their subaltern character, they operate in fields of reciprocal fertilization, as well as friction. Disciplines such as social anthropology have historically paid more attention to these indigenous or culturally alien ways of relating to times past, in an exercise of knowledge production whose objective is to get as close as possible to the native point of view. It can be considered that the large number of studies that anthropology has conducted on rituals, shamanism, spiritual possession, beliefs in spirits or phantasmagoria, can be considered antecedents of this new trend. These studies on the specific characteristics of the different regimes of historicity that coexist and contaminate each other in global society aim, on the one hand, to challenge the universality of concepts of time, chronology or progress. And, on the other, to contribute to generating more open and informed memory policies in places worldwide where situations of conflict or natural disasters are endemic and social memory operates with very different keys than those managed, for example, by humanitarian actors or transitional bureaucracies.

4.2. Digital memory

The analysis of how and with what depth new technologies, devices and digital platforms are affecting the production, circulation, and consumption of knowledge of the past, and how the images of the past in their different formats become part of virtual circuits, is a field of enormous potential. The intersection between social memory and digitization is transforming the relationship with the past. We are witnessing the emergence of new memory communities, new circuits of diffusion, new forms of experience, new modes of visibility, new expressive forms, and new repertoires of manipulation and falsification. The growing interest in this approach in memory studies is illustrated, for example, in the special section of the journal *Culture, Media and Society* entitled “Digital Media-Social Memory” in 2014. Let us take the example of the transformations that have occurred in memorial processes in Spain, especially those related to the exhumations of mass graves in the 21st century. In the last 15 years, the appearance and increase of access to digital technologies have changed and accelerated the process of rebuilding the

memory of the Civil War, projecting it on a global scale and profoundly transforming its media and broadcast networks. The wide availability of digital devices (especially smartphones) that can be used in the field and the growing preeminence of cyberspace in the transmission of memory also mean its profound reconfiguration as a social construct.

One of its most salient characteristics is the astonishing speed with which traditional black and white family photo albums and the associated social contexts of memory circulation have given way to a memory landscape dominated by digital technologies. Images and information related to the past in all its variants appeared and be frequently recycled in blogs, PowerPoint presentations, web pages and, as they were created and popularized, platforms and social networks such as Facebook, Twitter, Flickr, and YouTube. This new ecology of digital media is drastically transforming the temporality, spatiality and, without a doubt, the mobility of memories. This is the case, for example, of photos or videos taken with mobile phones at commemorative events quickly distributed to certain memory recovery networks via WhatsApp, Facebook or, at shorter distances, via Bluetooth. With the proliferation of digital devices and social media services, new equipment and platforms are paving the way for the production, circulation, and consumption of memory, and creating new genres, iconographies, and styles in general that represent, imagine, and recycle the past. The potentially instant accessibility of content and images in real-time digital cultures allow also creates new ways of witnessing, new subjectivities, new political identities, and new places for the configuration of multidimensional memories. Likewise, it places local memory processes closer to a cyberspace that is necessarily global. Thus, contemporary social memory is deeply imbricated in a technological drift, in which a dynamic coevolution of memory and technology takes place, effecting a radical transformation of memory processes whose analysis is unavoidable and necessarily transversal to any research on this topic.

4.3. New memory technologies: memory and the *forensic turn*

Contemporary memory processes, narratives and devices, in all their variants, are subjected to profound transformations as their expressive repertoires expand and the structures of sociability that frame them are modified. Some authors are developing research on the processes of bureaucratization or medicalization of memory, and on the colonization of social memory by various systems of expert knowledge that range from the biomedical

elaboration of memory pathologies —Alzheimer’s, amnesia, dementia, and so on— to developing technical procedures that deeply condition memory. In relation to the new configurations of traumatic memory, some authors call the *CSI effect* the new fascination for the corpse and bone and the gradual penetration of forensic logics and rhetoric in the transnational popular imaginary, and its great explanatory and analytical power to establish frames of reference to give meaning to violence, death, crime and all its derivatives. Television series with a forensic plot, such as *CSI* or *Bones*, or the contemporary crime novel itself, are not the only causes of this phenomenon —which is more profound, globalized, and extensive. Nonetheless, they indicate a new order of reality and evidence transforming our conception of the world, of life and death, of the human body, of the relationship between science and truth, of justice, of repairing damage, of funeral protocols, or even the criminal mind. Thus, television series and novels that trap us in their sophisticated technical plots are part of a broader and still under-understood process where scientific-forensic practices and discourses have inaugurated a new epistemology of memory in which the violent body, and its scientific-technical decipherment procedures, has been placed at the center of the stage and attracts all the focus.

This forensic turn in the understanding of memories of violence, largely framed in police plots, has reached strikingly the practices of human rights and the clarification of war crimes and crimes against humanity, by verifying the death of perpetrators, recovering and identifying victims, or amassing criminal evidence that, often, becomes part of criminal proceedings. This is a wide-ranging paradigm shift, which raises new kinds of questions. Why this growing need to get closer to the injured body? What are the reasons for the increasing predominance of forensic sciences in contemporary memorial recycling processes of the violent past? What are the historical roots and characteristics of the contemporary unfolding of this process? What consequences are they having on human rights discourses and practices in the 21st century? To what extent are they displacing methods of memorialization that seemed already consolidated since long ago? In what contexts, with what legal and institutional procedures and structures, and for what reasons are various forms of violence being excavated and exposed with forensic methodology in many parts of the world? What are the mechanisms for grief and reparation for the victims put in place and what are the potentials and limitations of this new *corpocentric* model of management of the traumatic past?

4.4. Perpetrator studies

For decades, memory studies linked to the reworking of past conflicts and traumas have focused mainly on analyzing the testimony and viewpoint of the victims, and their collection of facts. The Holocaust inaugurated the so-called “era of the witness,” which has given rise to heated debates and a very extensive bibliography. Although there are very important antecedents in this field, such as the work of the well-known writer and philosopher Hannah Arendt on the Nazi Adolf Eichmann and her elaboration of the thesis of the *banality of evil*, it has not been until recent years that many researchers are turning their focus toward the study of the viewpoint of the perpetrators, or how they reconstruct the memory of their acts, to understand more adequately and with greater density the social, cultural, political, economic and identity circumstances that give rise to certain types of perpetration, in a range that goes from selective small-scale violence to genocide. In this particular field, ethical positioning is especially important, because studying the conditions and processes of perpetration and how the perpetrators memorialize their acts cannot lead to their endorsement, but just the opposite, to the prevention and early detection of situations of possible violence.

The founding in 2017 of the international and interdisciplinary *Journal of Perpetrator Research* shows the strength of this new specialized field of memory studies. The end of the cold war led to the opening of numerous archives of totalitarian regimes previously very difficult to access. The consolidation of transnational discourses and practices of human rights, the establishment of international criminal tribunals (Yugoslavia, Rwanda) and the institutional mobilization of the legal figure of crimes against humanity also contributed to placing a new focus on the perpetrators, such as with the emergence of Truth Commissions. Likewise, new technologies and the trans-nationalization and transformation of conflicts have opened the way to new forms of perpetration whose keys it is crucial to decipher. Thus, both the novelty of the field and its permanent mutation make this subject a frontier research field in which disciplines such as history, sociology, anthropology, political science, gender studies, criminology, forensics science, philosophy, literary studies, cultural studies, psychology, ethnic studies, film and media studies, or education may converge.

4.5. Utopias: memories of activism and hope

A retrospective look at the studies of memory processes shows the predominance of traumatic memories and violent pasts. The influence of the Holocaust, genocide studies or the connection between memory and human rights

or transitional justice have deeply conditioned its exponential growth in recent decades. In recent years, a growing trend within this scientific field is trying to shake off the shadow of past tragedies in the constitution of individual and collective memories, focusing on memories of utopia and hope. This emphasis on rescuing utopias itself has a utopian twist, because its reason for being is to rescue forgotten or abandoned projects in the face of great tragedies, and thus inject optimism toward the future in a time marked by hopelessness. Especially, these memory studies try to denature a relationship of memory with the past that is conjunctural, avoiding frames of violence, atrocities, traumas, suffering, injustice, and victimization. The traumatic paradigm of hegemonic memory studies is considered as having several dangers. Research becomes repetitive and predictable, as catastrophic studies accumulate, and prevents the emergence or consolidation of other research registers or models. Also, the focus on violence in the study of memory processes may be contributing to feeding stories of victimization of a populist, nationalist or xenophobic nature in an epistemological loop in which critical scientific evaluation can be recycled as an apology for victimized identities.

Happiness and utopia also have representation problems, undoubtedly very different from those of the memories of violence. Precisely because of the hegemony of traumatic memory, there are few analytical tools to capture the memorial transmission of optimism and happiness. Neither their stories, nor their devices, nor their commemorative forms, nor their materiality, are well known. The authors promoting this new approach also try to differentiate positive memory from nostalgia, which is just one modality of a much broader spectrum of recreations of the past. This current trend in memory studies gravitates toward topics such as the memory of social movements and activism, the struggles for gender equality, the memories of the political processes that led to advances in social and human rights, the daily memories of “little happiness,” or the relationship between memory and humor. This approach allows revisiting past stained with tragedy with another look, rescuing other experiences and memories colonized by stories of trauma.

The uses of memory are multiple: there are abuses of memory and there are memories that are full of forgetfulness. Now, a substantial part of the semantic content of the concept of memory is the idea of “never again” and, therefore, the proposal of a strategy that prevents the repetition of barbarism. We associate the concept of memory with the creation of a time that is new and the overcoming of the traumatic past, with all that that entails.

4.6. Dystopias: ecotrauma, environmental memories, and pandemics

As shown, memory processes are in continuous transformation, and are extraordinarily sensitive to social, political, technological, and environmental changes. The latest trends in the studies of the connections between memories and spaces, landscapes, territories, and geographies point to the impact that the climate crisis is having on these processes. Authors such as Stef Craps have coined concepts such as *ecotrauma*, *pre-traumatic stress syndrome* (mirroring the clinically established *post-traumatic stress syndrome* (PTSD)), *so-lastalgia* (to miss the place where you still live), *preliminary* or *proleptic mourning*, or *climate anxiety* to analyze a type of memory based on nostalgia, for the past and present, in the face of an uncertain future of destruction or radical ecological transformation. Sometimes, memories of the present, or *anticipatory memories* lead to anxiety before presumably apocalyptic dystopian scenarios. Thus, the present is valued (and “remembered” in real time) in the face of an uncertain future. Memory goes from being fundamentally connected with the past to depending on and being conditioned by expectations for the future on a personal and global level. The classic parameters of memory studies are subverted in terms of scale and directionality.

These memory studies analyze, specially, the growing cultural production built around dystopias. They are also linked to the new epistemologies of the Anthropocene, to the growing awareness that the impact of humans on the planet is comparable to geological eras, implying that the human is the protagonist of a new planetary destructive era. In this paradigm, the clear boundaries between nature and culture, or even between human and non-human beings coexisting in the planet are blurred, unleashing new interdisciplinary challenges. From this viewpoint, the social memory that comes from the future can be activated to create a global awareness of the dangers that lie ahead and contribute to combat or mitigate climate change. The outbreak of the COVID-19 pandemic in writing this challenge and the dizzying construction of its chronicle and memory, especially in digital formats, is an example of the analytical potential of this perspective.

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This volume is focused on the axis “New foundations for a sustainable global society”, and refers to the important process of global change that affects all dimensions of society, disrupting the context in which scientific work has been developed in recent decades. It is a process of change not comparable to what happened decades ago, mainly due to its breadth, multidimensionality and interdependence, and also to the fact that this process manifests itself simultaneously in many areas, territories and social groups. Its analysis therefore requires carrying out a convergence exercise between areas and lines of research, betting on a multidisciplinary approach, since both “globalization” and “sustainability” are, concepts that affect society, as a whole.