LA PROSPETTIVA DI GENERE NELL'INGEGNERIA, NELL'ARCHITETTURA E NEGLI STUDI SULL'AMBIENTE

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DIPARTIMENTO DI INGEGNERIA DELL'ENERGIA , DEI SISTEMI , DEL TERRITORIO E DELLE COSTRUZIONI

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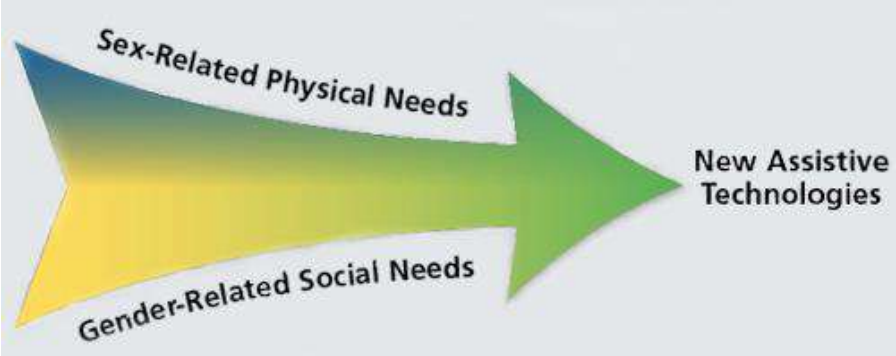
Exploring Markets for Assistive Technologies for the Elderly

The Challenge

The world **population will age dramatically** by 2050. The **increasing need for home health services** places a growing strain on caregivers, insurance companies, and social systems. New technologies are needed to support **independent living for the elderly**.



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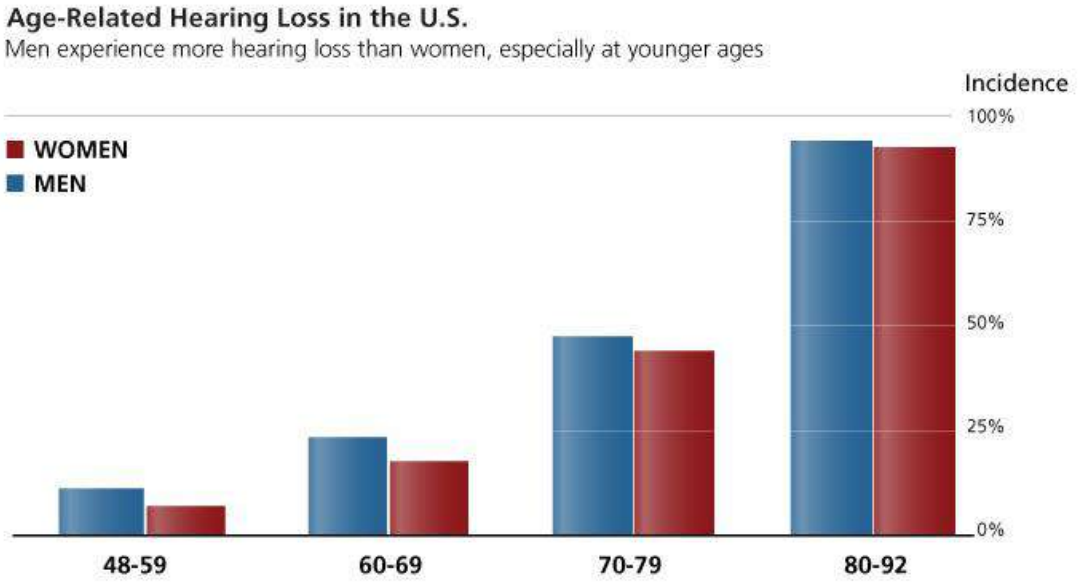
Exploring Markets for Assistive Technologies for the Elderly



Method: Engineering checklist

Analyzing data related to elder care, using **sex and gender analysis**, understanding different **needs of women and men** as they age, **collaborating with the elderly and their caregivers**, provide engineers **key insights for designing** and developing assistive products that are useful to a broad user base.

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Pregnant Crash Test Dummies: Rethinking Standards and Reference Models

The Challenge

Conventional seatbelts do not fit pregnant women properly, and motor vehicle crashes are the **leading cause of fetal death** related to maternal trauma (Weiss et al., 2001).

With over 13 million women pregnant across the European Union and United States each year, the use of seatbelts during pregnancy is a **major safety concern** (Eurostat, 2011; Finer et al., 2011).

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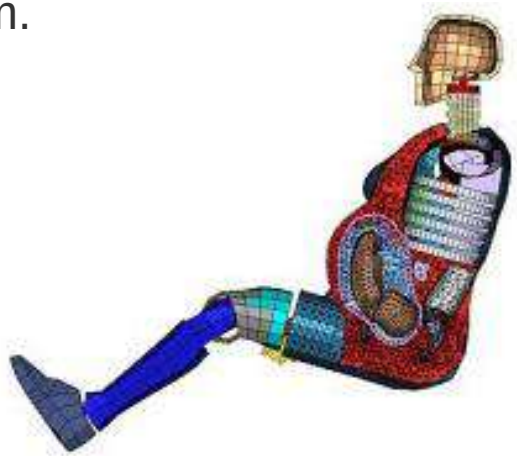
Pregnant Crash Test Dummies: Rethinking Standards and Reference Models

"Sierra Sam," developed for the U.S. Air Force in 1949 to test ejection seats, represented the median height and weight of the 95th percentile adult male U.S. population.

Method: Rethinking Standards and Reference Models

The **male body** is often defined as the norm and serves as the **primary object of study.** Inattention to humans of different sizes and shapes may result in unintended harm.

1980s: Test dummies modeled children (3 and 6 years of age).
1996: A pregnant crash test dummy was created by researchers at the University of Michigan Medical Center, in conjunction with General Motors.
2002: Volvo also developed a virtual pregnant crash dummy "Linda" in her 36th week of pregnancy



"Linda" by Volvo, a virtual pregnant crash-test dummy designed in 2002 by engineer Laura Thackray. "Linda" models the effects of high-speed impact on the womb, placenta, and fetus.

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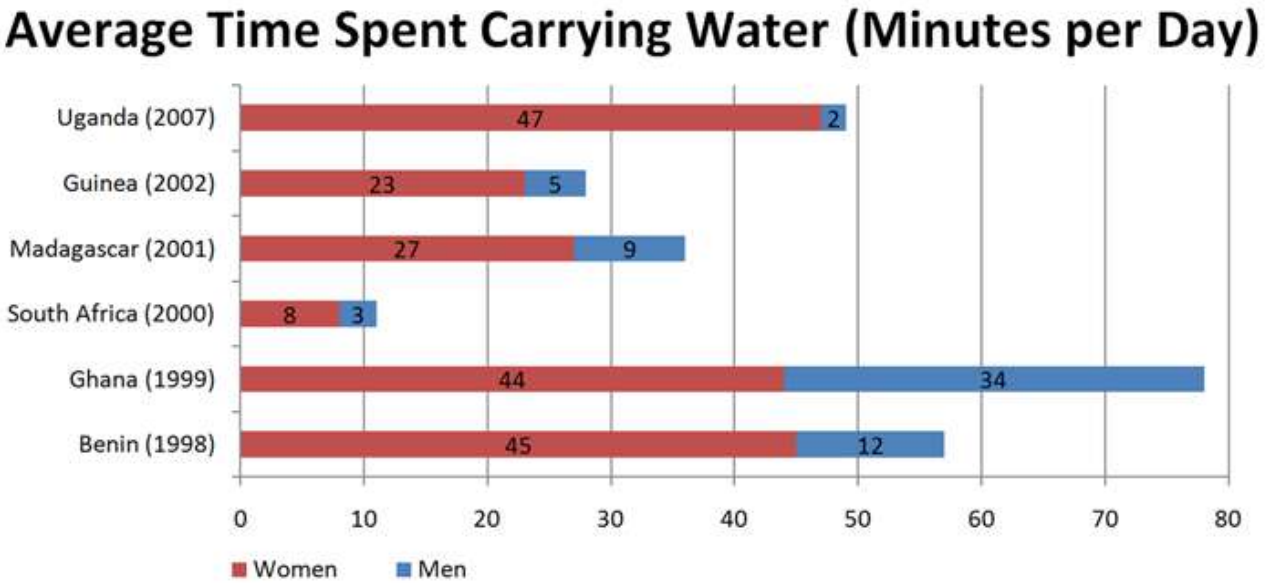
Water Infrastructure: Participatory Research and Design



The Challenge

Nearly one billion people worldwide lack **reliable access to water** (Hunter et al., 2010). In sub-Saharan Africa, water-fetching is women's work, and when villages lack water infrastructure, **women and girls spend some 40 billion hours annually procuring water** (Hutton et al., 2007).

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Water Infrastructure: Participatory Research and Design

Method: Participatory Research and Design

Because water procurement is women's work, many women have **detailed knowledge of soils** and **their water yields**. This knowledge is vital to civil engineering and development projects—for instance, in determining **where to place wells**.

A woman in the Volta region of Southeast Ghana mapping well sites. Image courtesy of the Afram Plains Development Organisation (APDO) and water.org.

Here we see a woman in Ghana mapping well sites. Such community participation vastly improves water services.

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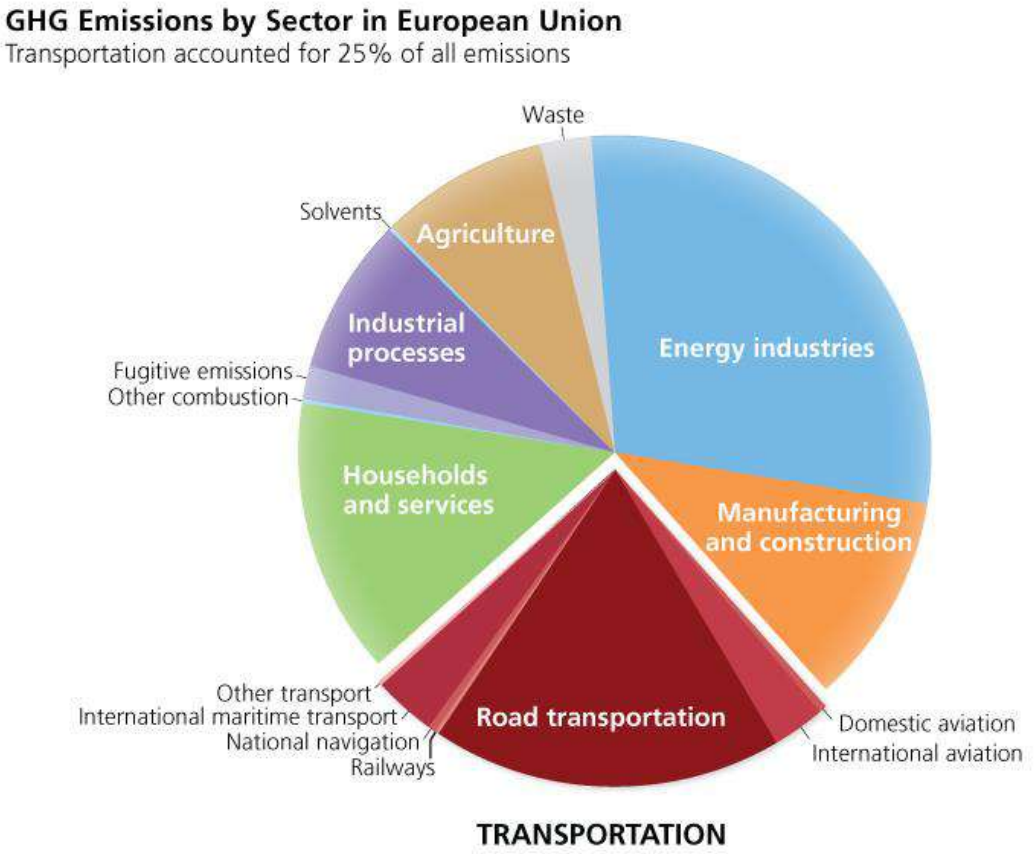
Climate Change: Analyzing Gender, and Factors Intersecting with Gender

The Challenge

EU has the ambitious goal of reducing its **greenhouse gas emissions** by 2020

U.S. supports emissions reduction through funding for alternative energy research.

Both EU and U.S. also have far-reaching goals for gender equality, but how these two important challenges—**climate change and gender equality—might be related** is rarely considered



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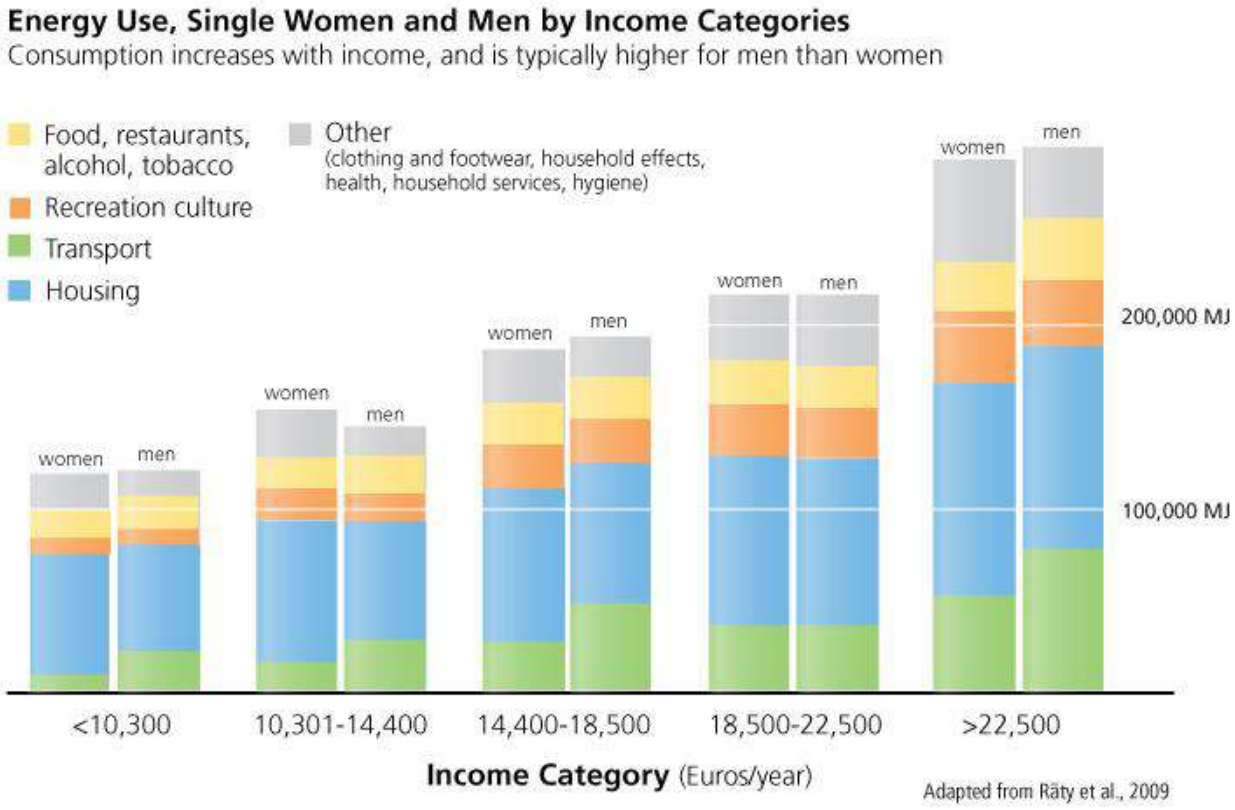
Climate Change: Analyzing Gender, and Factors Intersecting with Gender



Method: Analyzing Factors Intersecting with Gender

Analyzing gender means comparing **women's and men's behaviors and attitudes** in relation to climate change. Researchers should compare groups of women and men based on **social factors -** such as income, education and geographic location **-** that also predict **climate footprint**.

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Public Transportation: Rethinking Concepts and Theories

The Challenge

Categories used in transportation surveys may not properly **account for caring work**—that is unpaid labor performed **by adults for children** or other dependents, including labor **related to housekeeping**.

Public transport systems are typically designed around the **needs of commuters** (people traveling between their homes and places of paid employment). The **mobility associated with caring work, including childcare and elder care, has typically not figured into transportation design.**

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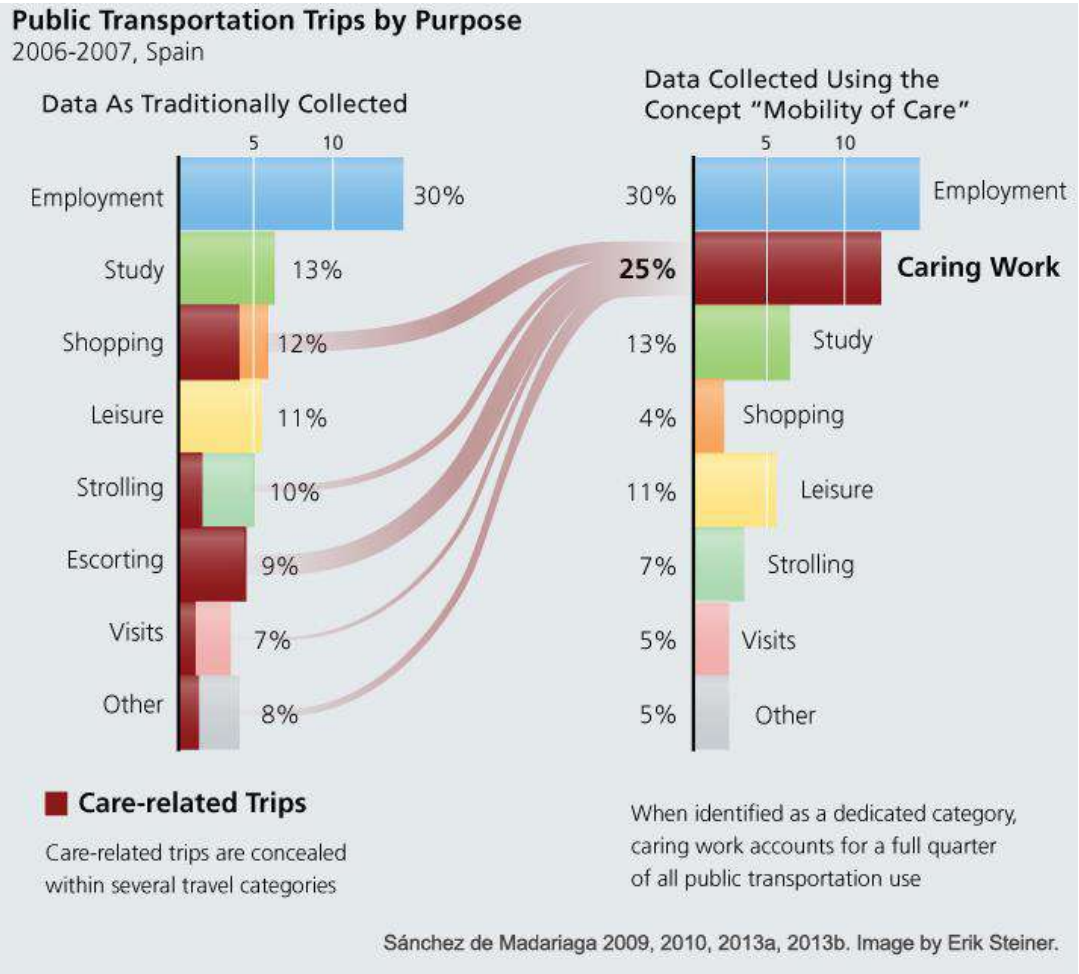
Public Transportation: Rethinking Concepts and Theories

Method: Rethinking Concepts and Theories

Incorporating **"caring work" into user surveys** helps to identify the significant number of trips that women and men make for this purpose.

Gathering data disaggregated by sex and other social factors - such as income, family status, etc. - improves **transportation research and policy**.



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Housing and Neighborhood Design: Analyzing Gender

The Challenge

Buildings and cities should serve well the **needs of all inhabitants**: **women and men** of different ages, with different family configurations, employment patterns, socioeconomic status and burdens of caring labor (Sánchez de Madariaga et al., 2013).

Method: Analyzing Gender

Integrating gender analysis into architectural design and urban planning processes can contribute to constructing housing and neighborhoods that better address **people's everyday needs**, by fully integrating caring issues—caring for children, the elderly, and disabled— and also improving pedestrian mobility and use of space for women and men of different ages, care duties, and physical abilities.

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Housing and Neighborhood Design: Analyzing Gender

Project in Vienna considers **urban design across generations:**
The housing complex is designed to contain **different types of apartments**—some for the very young, others for families, and others for the elderly. By incorporating different apartments at different cost in a single complex, families can have **elderly parents living in the same building,** but not in their own apartments.

URBAN PLANNING AND ARCHITECTURE

TRIA International Journal of Urban Planning
Special Issue: Engendering Habitat III. Facing the Global Challenges in Cities.
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- ✓ ***Evaluating quality of life perceived*** *with a gender perspective: the case of Bilbao City.* M.A. Casaus

- ✓ ***Architecture for maternity services****: recover our spaces, create those who empower.* A.Müller, M. Parra

- ✓ ***Housing designed thinking about women*** *between academy and gender mainstreaming.* M. S. Bernal

- ✓ ***Local Planning of the territory as a peace action*** *from the gender dimension in Colombian peripheries.* D. Burbano Gonzalez

- ✓ ***Participation of women in post-tsunami reconstruction processes*** *in the Chilean Biobio Region coastal area.* I.Tumini , I. Cartes Siade, C. Arriagada Sickinger

URBAN PLANNING AND ARCHITECTURE

TRIA International Journal of Urban Planning
Special Issue: Engendering Habitat III. Facing the Global Challenges in Cities.
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- ✓ ***Gender equality and the City: a methodological approach to mobility*** *in space-time,* M. Queirós*, et. al.*

- ✓ ***Women, technology and the spatiality of fear****: the challenge of participatory mapping and perceptions of safety in urban spaces*, F. Savoldi

- ✓ *Some notes on* ***how to introduce the gender perspective in urban policies****. The case of the* ***Valencian community*** *(Spain),* C. Mateo Cecilia , A. Rubio Garrido, B. Serrano Lanzarote

- ✓ *Integrating the* ***gender perspective in the Urban Agenda for the European Union****. State of the art and upcoming challenges,* S. De Gregorio Hurtado

HEALTH, GENDER AND HEALTHCARE SPACES

A GENDER-SENSITIVE APPROACH FOR IMPROVING ENVIRONMENTAL QUALITY IN EXISTING HOSPITALS

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Introduction

healthcare environment ↔ **health and wellbeing**

light, colors,
natural and artistic elements

↓

design criteria for the realization
or renovation of hospitals
humanization of hospitals

Theory of Supportive Design
Ulrich (1990s)

Reduction of
stress levels ↔ *perceptions of control*
positive distraction
social support

Introduction

how does the relationship between health-care environments and people change depending on gender?

medicine and sociology > **health and gender**

medicine and architecture > **health and healthcare environment**

sociology and architecture > **gender and built environment**

Medicine + Sociology + Architecture

↓

Health, gender and health-care spaces

focus on existing facilities

1. Territorial accessibility

subjects

→ users
→ healthcare staff
→ emergency vehicles
→ healthcare materials suppliers

major component > female component

→ among the **users**
Data: Ministero della Salute
→ among the **healthcare staff**
Data: Ministero della Salute
female component: 65% of the total staff

↙

gender influences **urban mobility dynamics** → **hospitals accessibility** should be read in a gender-sensitive perspective

2. Healthcare built environments

awareness about the **influence of environmental elements** + interest towards **needs of users**

↓

Scientific methods for assessing environmental quality and rating hospital settings

Perceived Hospital Environment Quality Indicators

→ Fornara, Bonaiuto and Bonnes (2006) - 3 Ortophedic Units in 3 Italian hospitals
Andrade (2012) - 4 Ortophedic Units in 4 Portuguese hospitals

Image technique for measuring the Perceived Environmental Quality

→ Montacchini and Tedesco (2015) - Unit of Oncologic Surgery in Le Molinette Hospital, Turin

2. Healthcare built environments

Image technique for measuring the Perceived Environmental Quality - Montacchini and Tedesco (2015) patients were asked to rank images of different spatial configurations for a day hospital department, each one characterized by different levels of privacy and control on the surrounding space, and different possibility to look at the outside landscape.

3. Specific spaces in hospitals

Entrance hall → **filter space** that allows the user to enter in contact with the facility in a gradual manner

Entrance hall + hallways → **signage system** that allow the users to move independently through the facility, avoiding the feeling of **disorientation**

↙

gender influences **spatial orientation strategies** → **design of Entrance hall + hallways** should consider differences in orientation strategies

3. Specific spaces in hospitals

Patient rooms
⌂ private sphere

→ acquisition of the own space is a favorable factor in the healing process (Capolongo, 2006)

↙

gender influences **dynamics of personalization of private space**

→ **Design of private rooms** should consider how the process of acquisition and personalization of the own space take place

distribution, dimensions and flexibility of spaces and furniture

Objects of analysis

assessment of **healthcare enviromental quality**

(1) availability and quality **of private spaces** for patients

(2) presence of appropriate **guidance systems**

(3) territorial **accessibility**

influence of gender in the interaction with **built environment**

(1) dynamics of **appropriation and personalization** of the own spaces (Dinç, 2009)

(2) spatial **orientation strategies** (Coluccia, *et al.* 2001)

(3) urban **mobility** dynamics

↓

aspects to be investigated in a gender perspective

Objectives

1. to adapt and extend the Perceived Hospital Environmental Quality **Indicators in a gender-sensitive perspective**, and test them on specific case studies;

2. to define gender-sensitive criteria for improving the **territorial accessibility** of healthcare facilities, according to the gender-dependent issues in urban mobility

3. to define gender-sensitive design criteria for the **humanization** of existing facilities

Case studies

case studies
selection criteria → **hospitals** from **different historical periods**
↓
strenghts and **weaknesses**

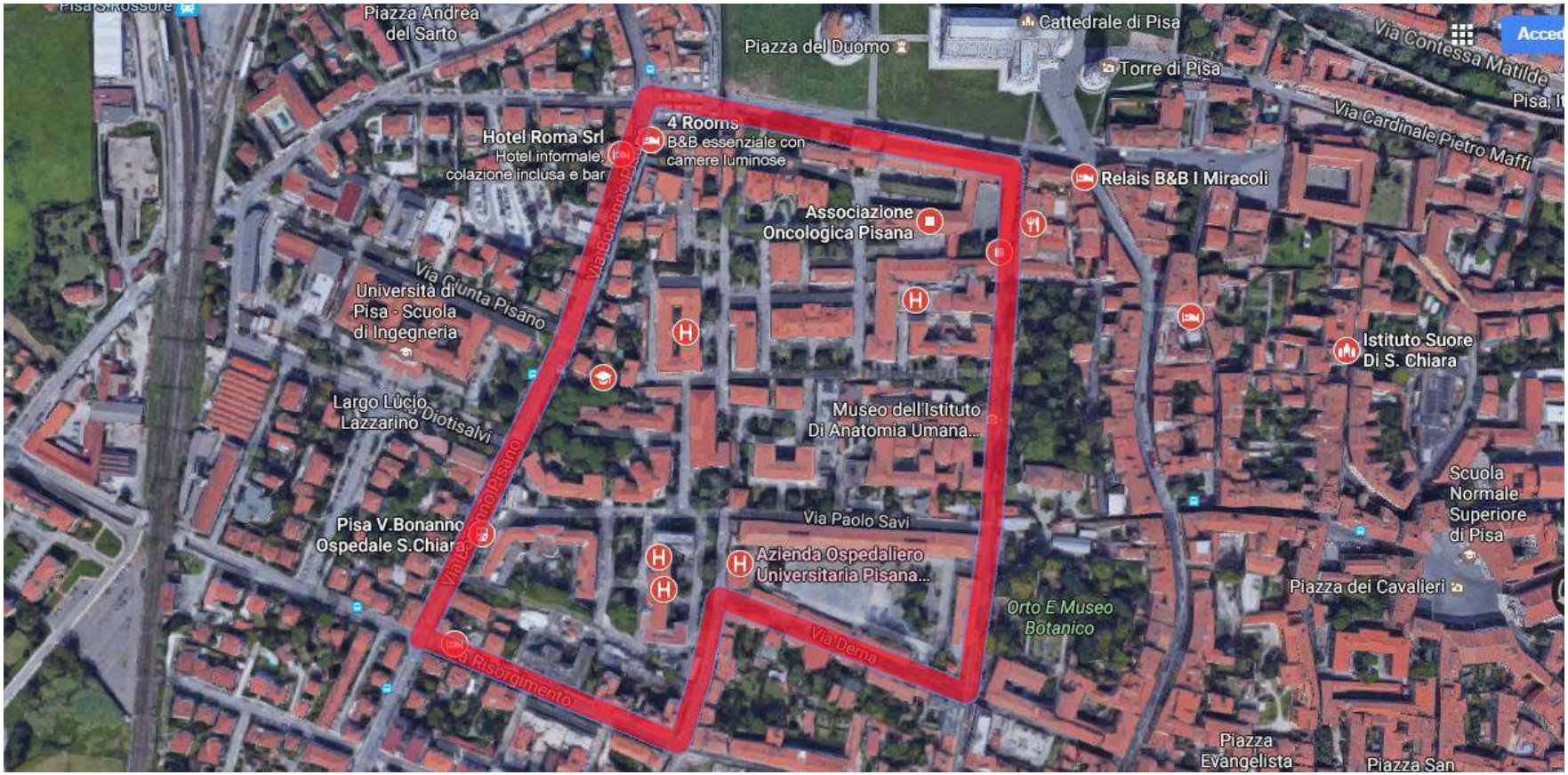
A. 19th Century hospitals (or older)

B. First half of 20th Century hospitals

C. Second half of 20th Century hospitals

Case studies

A. 19th Century hospitals (and older): Santa Chiara Hospital, Pisa



Many pavilions

Pavilions with very complex layout

Case studies

A. 19th Century hospitals (or older): Santa Chiara Hospital, Pisa

Many pavilions
Pavilions with very complex layout

Case studies

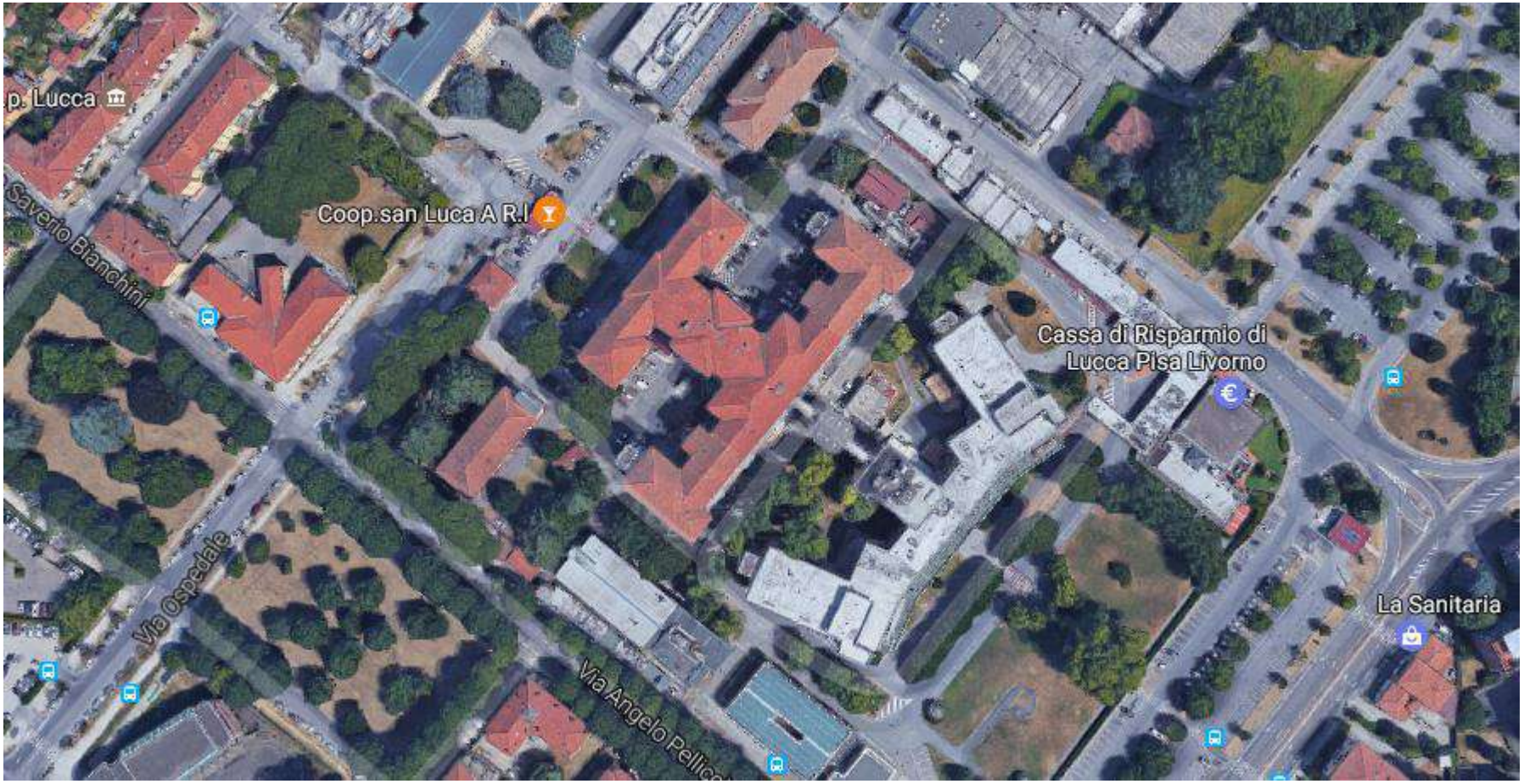
A. 19th Century hospitals (or older): Santa Chiara Hospital, Pisa

Many pavilions > problems to analyze:
- ✓ outdoor signage system
- ✓ quality of outdoor spaces

Pavilions with most complex layout > problems to analyze:
- ✓ indoor signage system
- ✓ functionality of layout

Case studies

B. First half of 20th Century hospitals: Campo di Marte Hospital, Lucca



Presence of many different outpatient departments

Case studies

B. First half of 20th Century hospitals: Campo di Marte Hospital, Lucca

Presence of many different outpatient departments

Case studies

B. First half of 20th Century hospitals: Campo di Marte Hospital, Lucca

Presence of many outpatient departments > problems to analyze:

- ✓ indoor signage system
- ✓ comfort/privacy of indoor common spaces

Case studies

C. Second half of 20th Century hospitals: San Bartolomeo Hospital, Sarzana.

Limited outdoor spaces + availability of free space

Innovative conception by Giovanni Michelucci

Case studies

C. Second half of 20th Century hospitals: San Bartolomeo Hospital, Sarzana.

Limited outdoor spaces + availability of free space
Innovati ve conception by Giovanni Michelucci

Case studies

C. Second half of 20th Century hospitals: San Bartolomeo Hospital, Sarzana.

Limited outdoor spaces + availability of free space:
- ✓ quality of outdoor spaces
- ✓ rehabilitation of free spaces to meet potential needs

Designed by Giovanni Michelucci:
- ✓ functionality of layout
- ✓ comfort/privacy of indoor common spaces and private rooms

Subjects and tools

Subjects involved

1. Patients
2. Visitors
3. Staff (both the medical and the nursing staff)

Investigation instruments

1. Questionnaires
2. Focus groups

3 groups of indicators

1. Indicators based on the 3 elements of Ulrich Theory Perception of control, Social support, Positive distractions)
2. Indicators related to spatial orientation
3. Indicators related to privacy

Indicators

Indicators based on the 3 elements of Ulrich Theory

Perception of control

1. possibility of **regulating light, ventilation, temperature** in private rooms
2. possibility of **personalizing private rooms** with personal items

Social support

1. availability of space and furniture in private rooms to **host family and friends**
2. availability of common areas to spend time with family and friends

Positive distractions

1. **"unusual" spaces** i.e. library, media room, etc.
2. presence of **art objects, decorative items, plants** in private rooms and common areas
3. **connection with the urban context** through green spaces, shops, dining activities

Subjects and tools

Indicators related to spatial orientation

1. presence of **landmarks** in hallways , as artistic elements, or furniture, enough particular to be easily remembered
2. intuitive and functional **localization of key areas**, i.e. entrance hall, coffe-bar, pharmacy, emergency unit, etc;
3. intuitive and functional **signage system**
4. intuitiveness and **functionality of the hospital layout** as a whole

Indicators related to privacy

1. **Availability of private rooms** (with no fee)
2. **Privacy** perceived in private rooms
3. Privacy perceived in outpatient departments
4. Privacy perceived in operating rooms

Expected results

user's judgment on case studies → data aggregated according to gender belonging

↙

understand **sensitivity** and different **importance** given to spatial characteristics according to gender belonging

↓

Define design **criteria**
Rank **priorities** of intervention

Thanks for your attention!