# INTERNET OF THINGS FOR MOTION-IMPAIRED PEOPLE

Modular, flexible, interoperable IoT and 5G technologies for Smart Home.
The keys of your Smart Home are the keys to equality.

# 1.3

# 1.3

**billion people, or 16% of global population worldwide experience a significant disability today according to WHO**

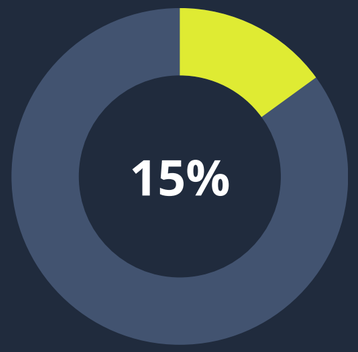
# DISABILITIES BRING INEQUALITY

# INFOGRAPHIC **MOTION IMPAIRMENTS**

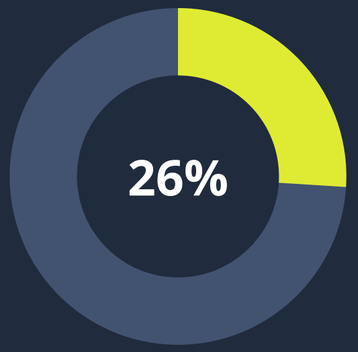
**Disabled people often have difficulty performing activities of daily living (ADLs).**

**Mobility disabilities can preclude from carrying out Instrumental Activities of Daily Living (IADLs) : housekeeping, accessing informations, cooking.**

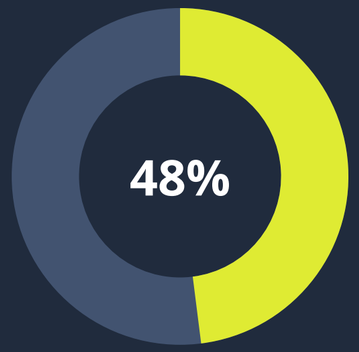
**They are necessary to maintain independence for living and avoiding mental health problems.**




Adults aged 65-74




Adults aged 75-85




Adults aged 85+

# Article 19

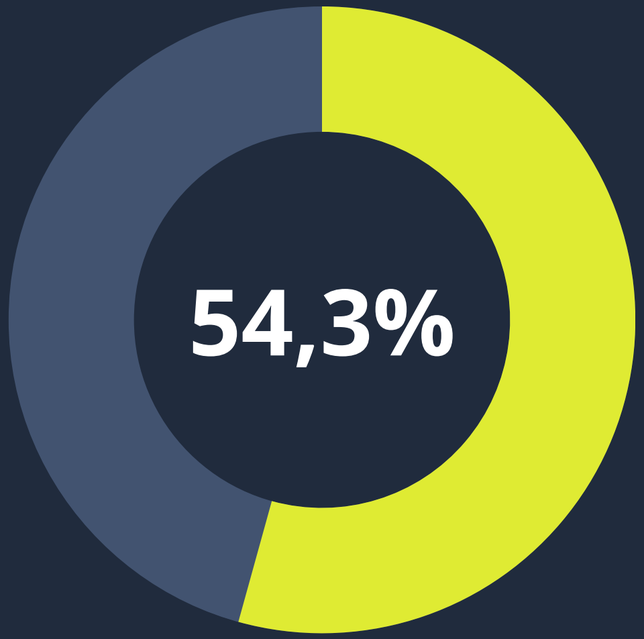
## Living independently and being included in the community

# Conceptualization:

**Assitive Technologies (ATs) promotes an equal and effective enjoyment of the right to live independently and participate actively in the community by promoting inclusion and reducing solation.**

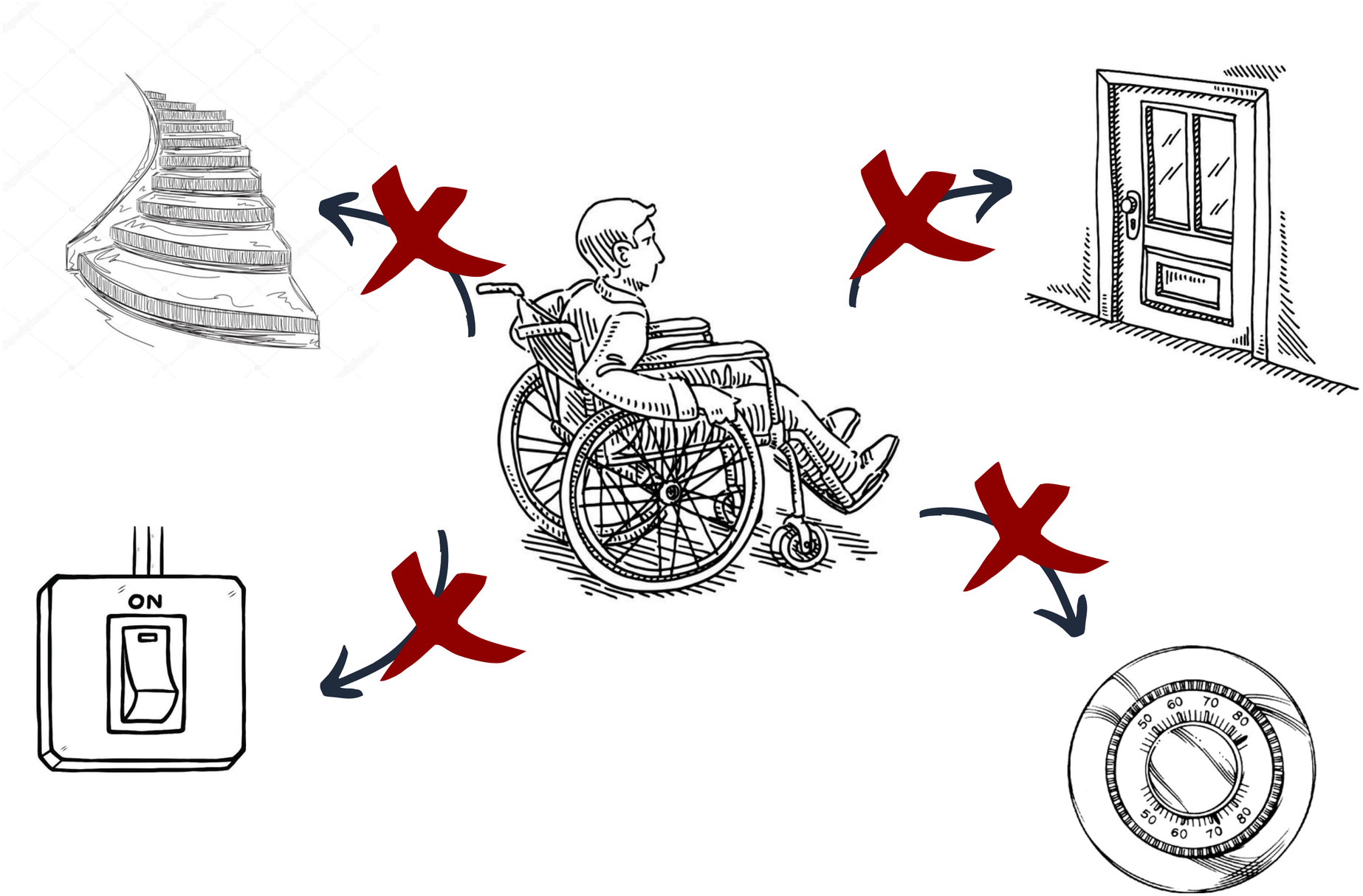
# Indicative Example

**ATs for independent living includes products which, among others, assist in daily living, communication, computer access, and environmental control systems.**

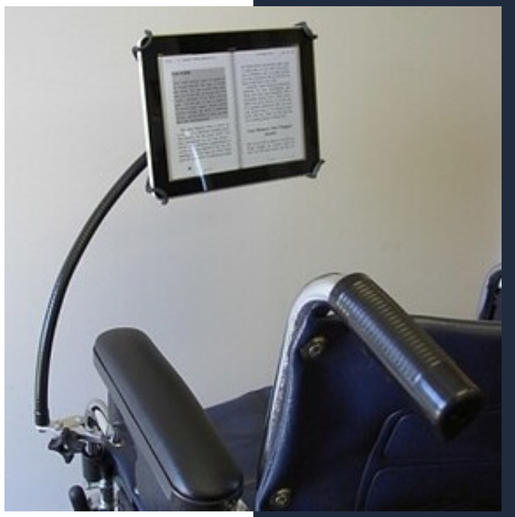



**of under 18 years old people affected by disabilities**
**consider a difficulty the only fact of participating in daily tasks at home**

# Physical environment’s barriers



# CASE STUDY JDROBERTS



One) **The front door lock.** Man, I can't even begin to list the problems I had with this before we got a smart lock. I had problems myself opening the door. I have levers on most of the interior doors, and a service dog to help me, but I didn't want the dog to be able to open the front door by himself. And I didn't feel hundred percent certain that housemates and their friends would remember to lock it every time. I also have home health care workers that come and go, many of whom do not have smart phones. Nor did I necessarily want to give a sensor device to all of them.

Two) I created a **pathway of lights from the living room to my bedroom.** Since I'm in a wheelchair, I can't easily feel my way over to a switch on the wall in the dark even if I can do the switch when I get there. And I can't send my dog back three rooms from where we are to start turning off switches. He can do the ones in the room that I'm in, but I really got interested in the pathway concept where I could turn on a specific set of lights through multiple rooms with one request, than turn them all off again once I got in bed. Before that, I used to leave the livingroom and hallway lights on all night and hope my housemate remembered to turn them off later.

Three) the next thing I hadn't really thought I would do during phase 1, but it turned out that there was a way to get **voice control to turn my television on and off** using SmartThings, Harmony, and IFTTT.

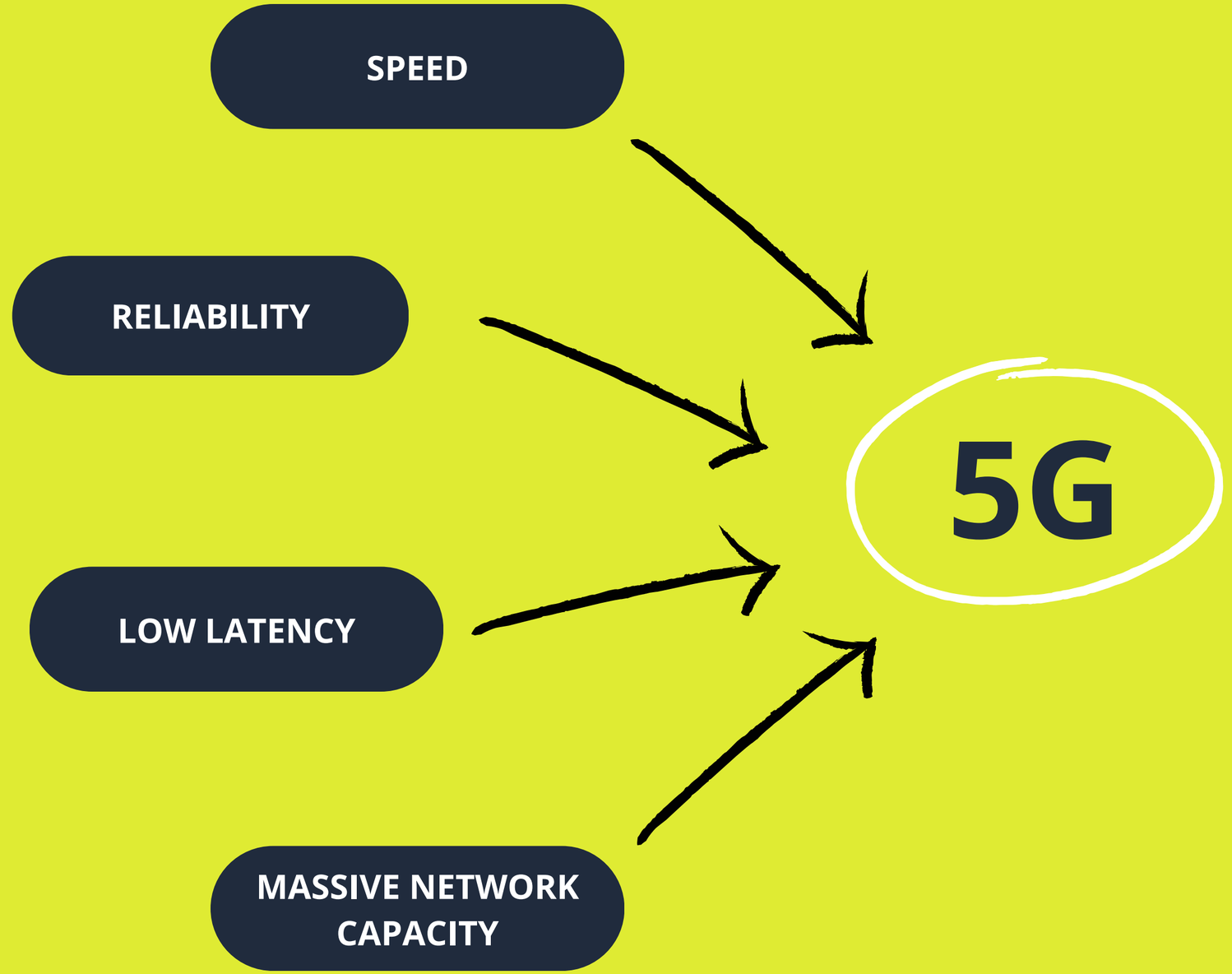
# KEYS TO EQUALITY

MODULARITY

FLEXIBILITY

INTEROPERABILITY

# TECHNOLOGIES



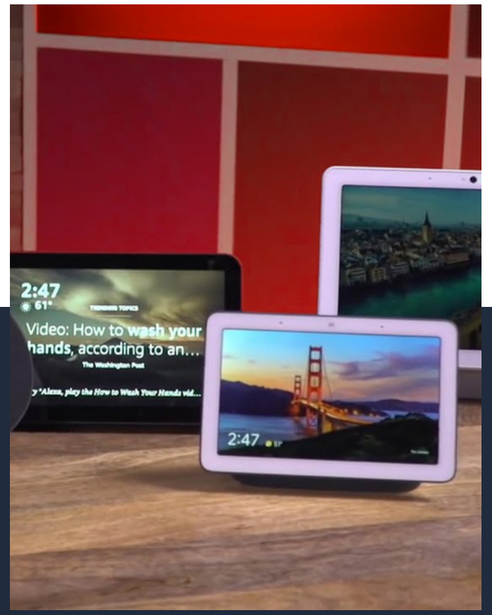

# 4G vs. 5G

| | 4G | 5G |
|---|---|---|
| LATENCY | 10-100 ms | 1 ms |
| THROUGHPUT | 2 Gbps | 20 Gbps |
| DENSITY | 100k connections/$km^2$ | 1M connections/$km^2$ |
| TRAFFIC CAPACITY | 10 $Mbps/m^2$ | 1000 $Mbps/m^2$ |

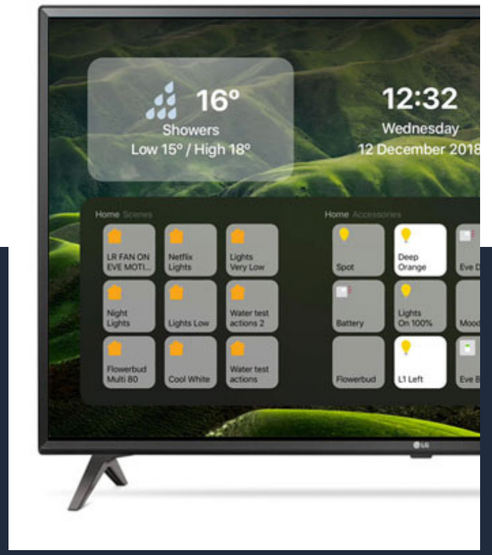
# VOICE ASSISTANT

- Integration of voice in IoT
- Enable Hands-free operations
- Common IPAs: Alexa, Google Assistant, Siri, Cortana
- IRON

# VISUAL ASSISTANT








Visual assistants are a new way to control and interact with smart homes.
They can provide information about calendar events, weather updates, visual feedback from voice commands and can visualize the sicurity camera system.
They can also be life changers for people with voice and motion disorders.

# IOT PROTOCOLS

Wi-Fi

ZigBee

BLE

# WI-FI

The most famous communication protocol

Widely adopted

High Bandwidht

Easy to setup

Capable devices

# ZigBee


Popular choice for IoT devices

Low power consumption

Quick response time

Mesh networking

Battery-powered devices

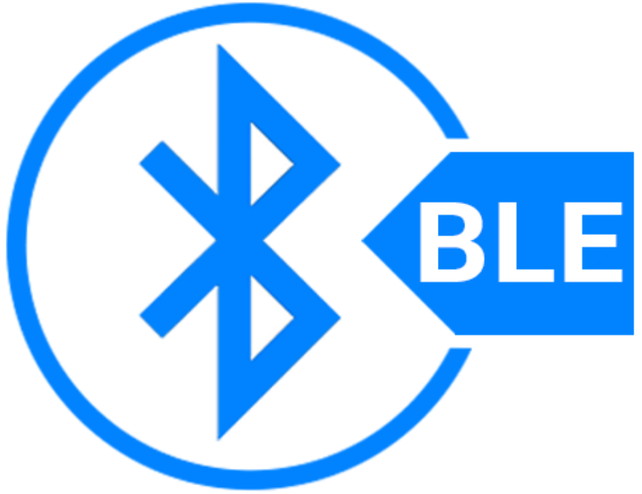
# Bluetooth Low Energy (BLE)

Same communication range as standard Bluetooth but with low energy consuption

Low data rate

Good for personal devices

Battery-powered devices




AMAZON
SMART PLUG
UNRESPONSIVE
smart plug
amazon
WORKS WITH
alexa


Smart Dimming
Fade On/Off
Apple Home
Google Home
amazon alexa
SmartThings


Hey Google
alexa
SmartThings
MAX 13A

matter

# matter

- Emerging open-source smart home connectivity standard
- Improves interoperability among smart home devices
- It builds upon existing technologies
- Interoperability and flexibility

# IoT DEVICES

### LIVING

Lights, fan, thermostat, smart plugs, sensors (flood, temperature, ...), doorbell

### SECURITY

Internal and external cameras, motion, door and smoke sensors, siren

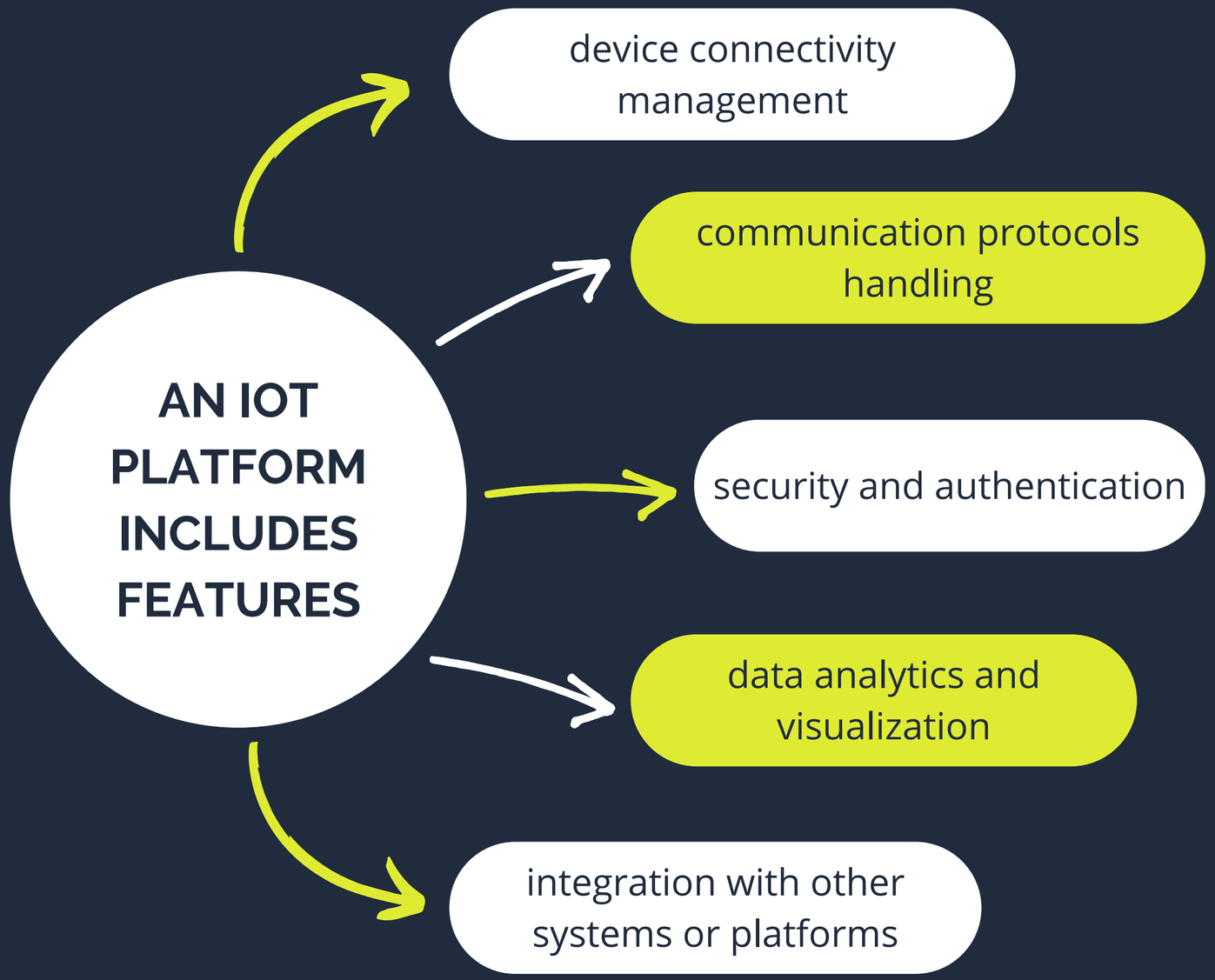
### MOTION IMPARED

Smart wheelchair, stairlift

### OTHERS

Smart lock, smart shutters/blinds, cleaning robots

# IOT PLATFORM



# KEY CONSIDERATIONS TO CHOOSE
# THE RIGHT IOT PLATFORM

- Device Compatibility
- Ease of Use, Support and Community
- Scalability
- Integration Capabilities
- Security
- Analytics and Insights

# HOME ASSISTANT ADVANTAGES

## 01 Local control

By minimizing reliance on cloud services,  it enables greater control, speed, reliability, longevity and privacy

## 02 Integrations

Almost 2000 integrations listed on the Home Assistant website

## 03 Community

It benefits from a large and active community of developers  and users continuously contributing to its advancement

## 04 Options and flexibility

Wide range of options and flexibility available in terms of software and hardware

## 05 Centralization

All devices and sensors can be centralized under one roof

## 06 Automations

Possibility to create customized rules and workflows to automate various actions and responses

## 07 Open source

It allows anyone to view, audit and contribute to the code ; functions are developed at a much faster pace

## 08 Privacy and security

Being local control means: no personal information is sold to third parties and potential attacks are minimized

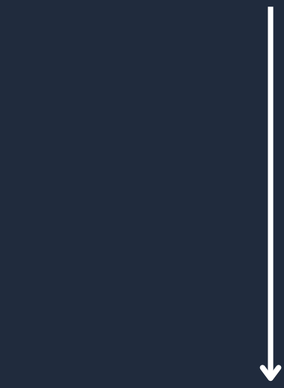
## 09 Customizable

Allows users to customize and tailor their smart home automation setup according to their specific needs and preference

HOME ASSISTANT MAY REQUIRE

# TECHNICAL KNOWLEDGE

to set up, configure and fully leverage its capabilities



matter

# MATTER

**simplifies**
the integration process

**allows**
devices to work offline

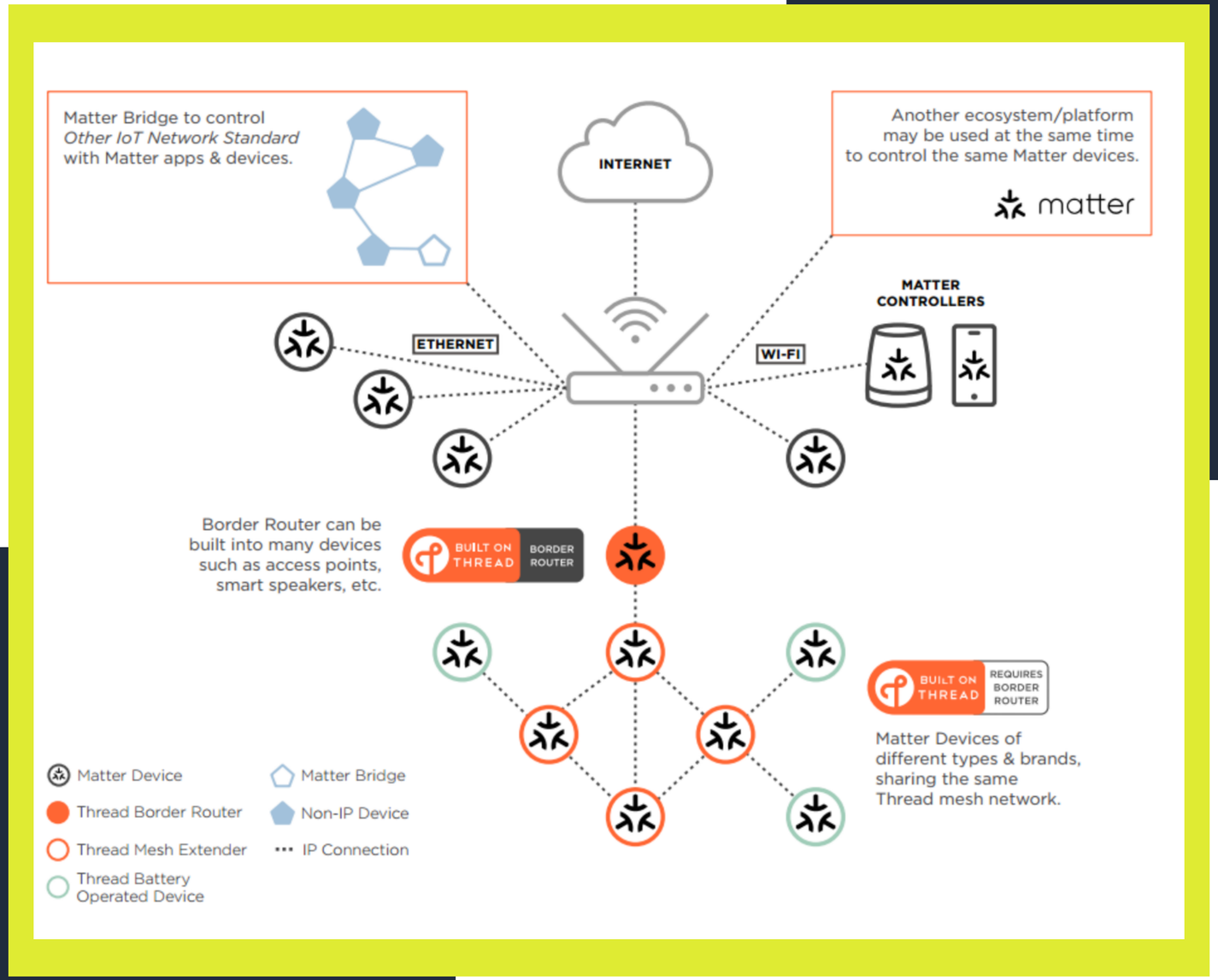
**improves**
compatibility between devices

**ensures**
higher level of protection and security measures

# ESSENTIAL TO MENTION THREAD

network protocol:

- Realiable
- Secure
- Energy saving



# EVOLVING LANDSCAPE

WITH

matter

becoming the future solution

HOME ASSISTANT

ensuring a seamless transition

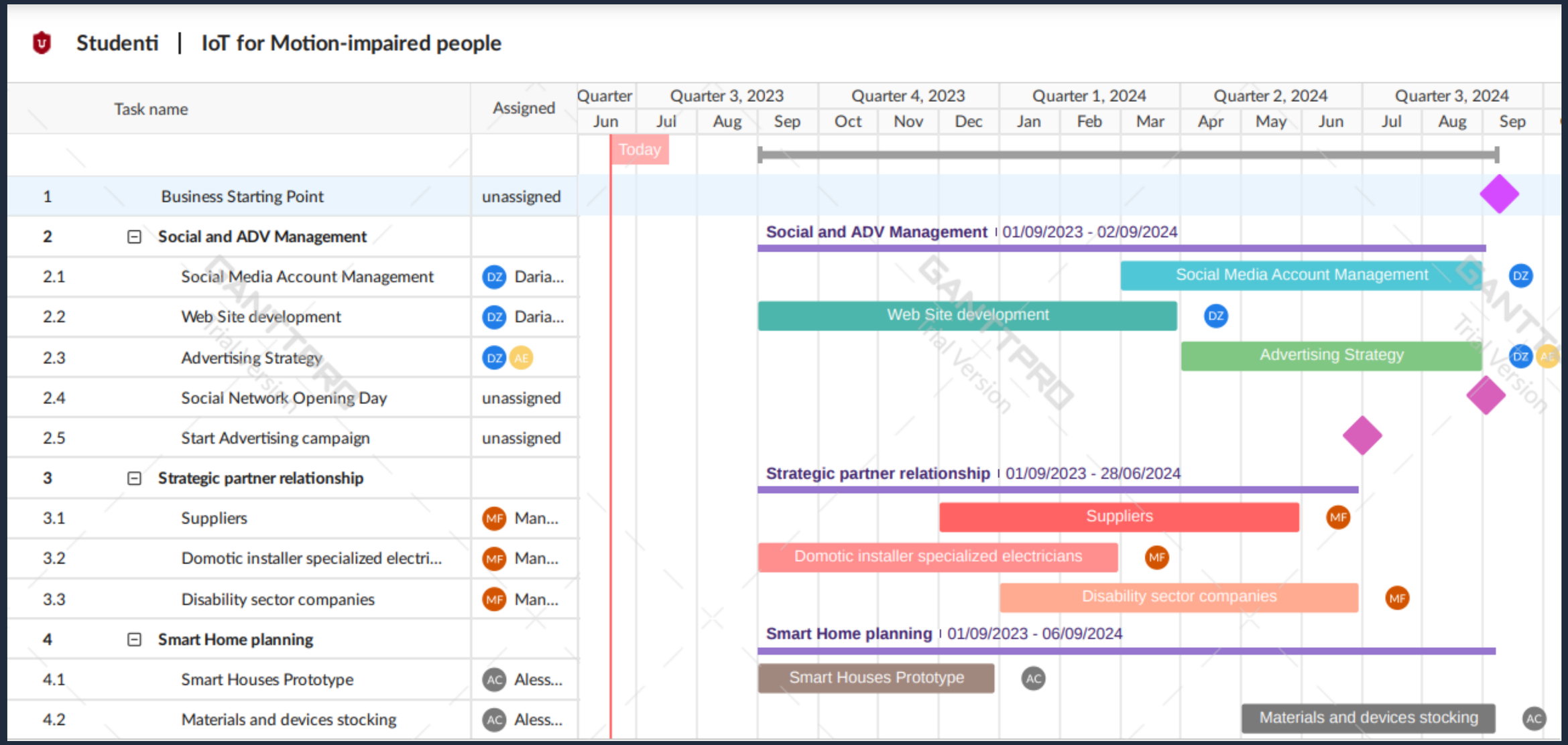
**And now, what all of you are waiting for...**

# And now, what all of you are waiting for...

# but first...

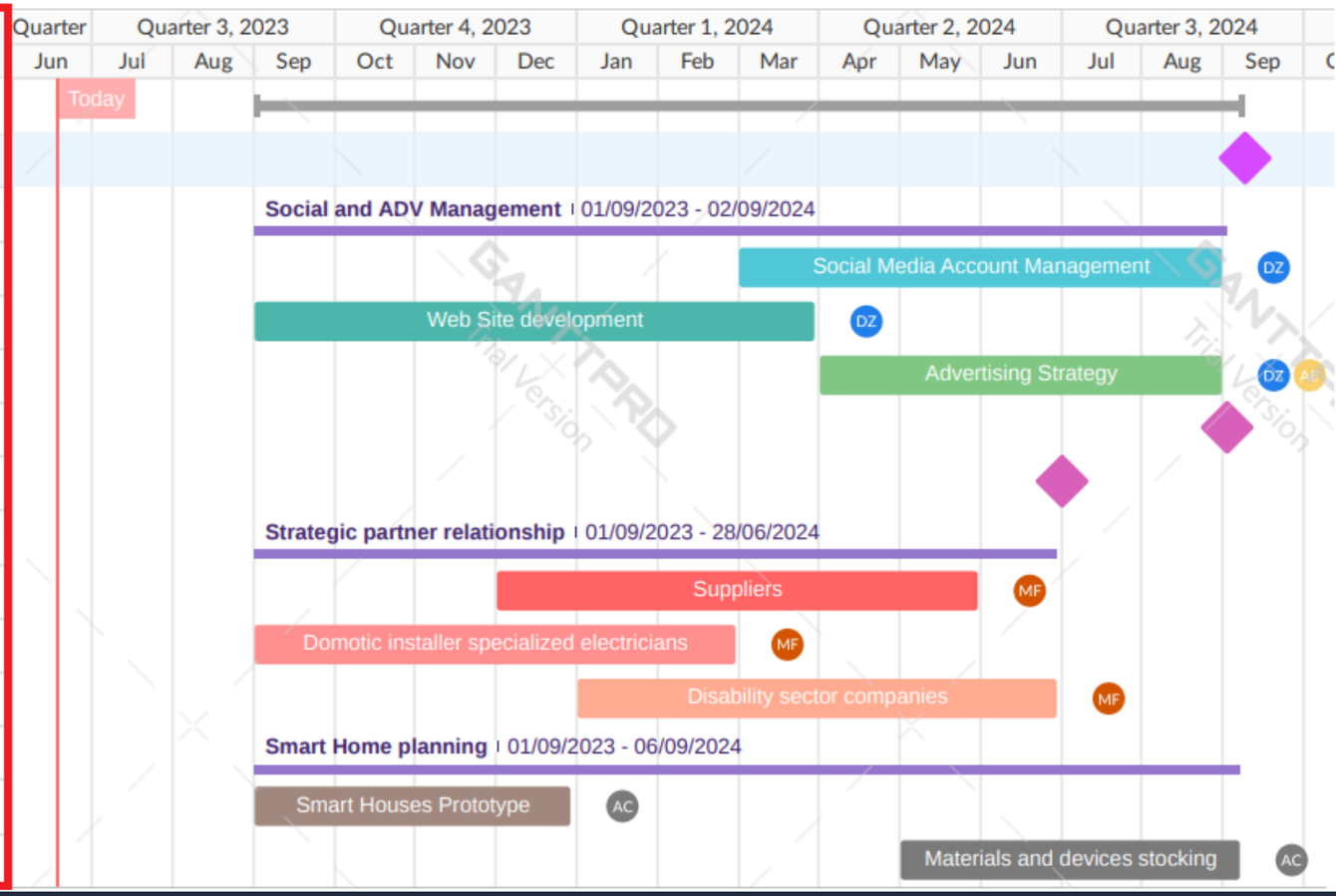
# tentative of timeline with a Gantt chart

# Tentative of timeline



## Studenti | IoT for Motion-impaired people

| | Task name | Assigned | Cost | Material Cost | Logistic Cost |
|---|---|---|---|---|---|
| | | | **1,920** | **6,000.00** | **2,900.00** |
| 1 | Business Starting Point | unassigned | 0 | 0.00 | 0.00 |
| **2** | **Social and ADV Management** | | **1,920** | **3,000.00** | **1,500.00** |
| 2.1 | Social Media Account Management | DZ Daria... | 0 | 0.00 | 0.00 |
| 2.2 | Web Site development | DZ Daria... | 0 | 0.00 | 0.00 |
| 2.3 | Advertising Strategy | DZ AE | 1,920 | 3,000.00 | 1,500.00 |
| 2.4 | Social Network Opening Day | unassigned | 0 | 0.00 | 0.00 |
| 2.5 | Start Advertising campaign | unassigned | 0 | 0.00 | 0.00 |
| **3** | **Strategic partner relationship** | | **0** | **0.00** | **1,400.00** |
| 3.1 | Suppliers | MF Man... | 0 | 0.00 | 1,000.00 |
| 3.2 | Domotic installer specialized electri... | MF Man... | 0 | 0.00 | 200.00 |
| 3.3 | Disability sector companies | MF Man... | 0 | 0.00 | 200.00 |
| **4** | **Smart Home planning** | | **0** | **3,000.00** | **0.00** |
| 4.1 | Smart Houses Prototype | AC Aless... | 0 | 500.00 | 0.00 |
| 4.2 | Materials and devices stocking | AC Aless... | 0 | 2,500.00 | 0.00 |



# CAPEX & OPEX

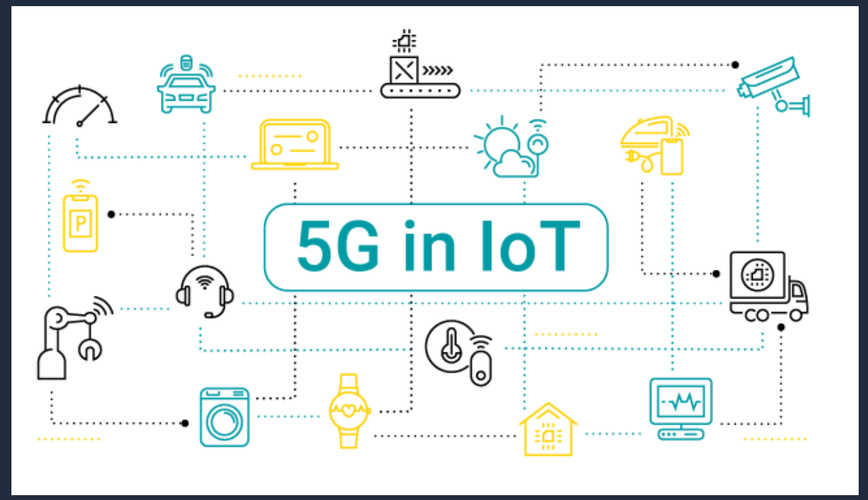
**Capital Expenditure**

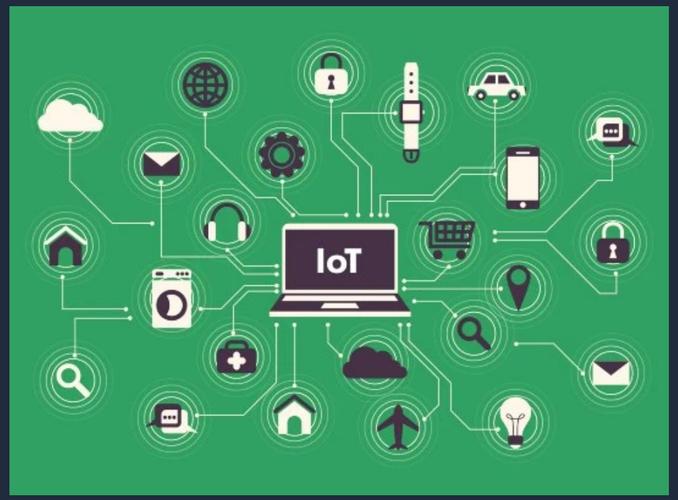
- Advertising stratregy (cost of online advertising, participation in industry events) **[about 4500€]**
- Expenses to find strategic partners (business travel costs) **[about 1400€]**
- Smart home planning (cost of devices and material for prototype design and stocking) **[about 3000€]**

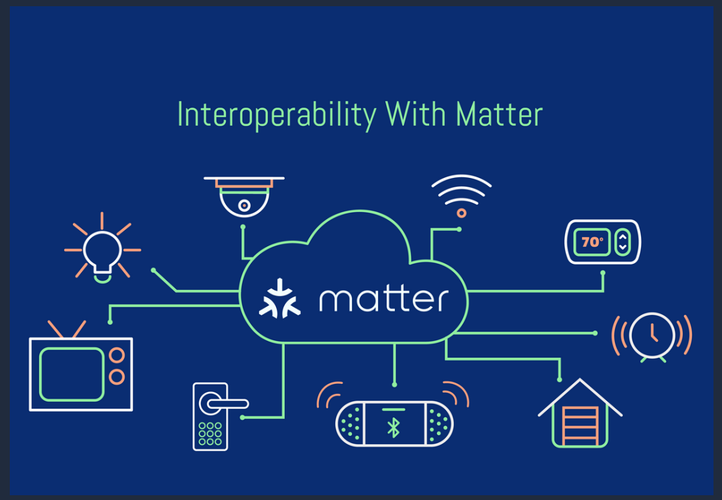
**Operational Expenditure**

- Marketing and advertising costs **[about 1920€ of Advertising Expert Advice and continuative social advertising cost to be defined]**
- Rent and utilities for office space and warehouse (after the first year) **[to be defined]**
- Domotic installation services **[depending on different services]**

**Tot.: about 10820€ for starting business in the first year**




# POTENTIAL MARKET

## 01

Sector concerning the IoT for motion-impaired people is not yet very developed in Italy. Most of the companies that offer a home automation design service don't focus enough on disabled people sector

## 02

Often high-priced or out-of-date proposals . We want to offer wide range prices in order to best meet different economic conditions

## 03

Customer care has a very important role in a modern business. Recurring and close contact with customers is very useful to satisfy any needs, in particular in the first days/weeks of use of the IoT system installation.

## 04

The system will be based on the Matter standard to guarantee a latest generation system with the possibility of adding new modules of different types and brands. Key words: modularity, flexibility and interoperability.

# THANK'S FOR WATCHING