The WE-Bench

Smart Seating for a Change

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ABSTRACT

Our WE-Bench project seeks to address the issue of the digital gap in our society by creating a hub of connectivity in Paris by giving a large number of people internet access. The Internet plays an irreplaceable role in most of our lives and those who do not have access to it are deprived of a wealth of information and opportunities.

Our idea consists of benches with added and securely attached tablets giving access to basic online services. We chose to use the bench because it is a symbol of people-friendly communities, a physical bond that connects people to each other and to their cities, and a hub for creating a network of accessibility. Furthermore, it is easily accessible for anyone and non stigmatizing.

Though numerous approaches have been taken to add utility to smart furniture and provide easy Internet access, our hope is to go further. This project would start from a retrofitted prototype but could then be extended, judging on the frequency of use and popularity of the pilot program. Feedback would be gathered via short surveys, number of usage hours, and individual impact analyses through data gathered using a subscription service. Expansion to different neighborhoods and additions to the basic functionality of the bench can be explored. The first implementation of the bench, however, would go a long way in bridging the digital gap.

Issue and Background

The Digital Gap

"It is difficult, if not impossible in some places, to participate fully in today's world without an open, available Internet"

David Rothkopf, CEO of the Foreign Policy group, 2015

The emergence of the Internet offered countless new possibilities to obtain and to cross-reference information, to participate in public debates, and to bring people together to enjoy broad and diverse opportunities. The importance of the role it plays in our lives is undeniable. According to the latest 'We Are Social' study, French people spend, on average, 3.9 hours a day on the Internet if they access it through a laptop or desktop, and 1.9 hours if they access it through a mobile device (2015).

Because of the essential role the internet plays in our lives, many people view Internet access as a human right. The work of NGOs such a A Human Right, for instance, focuses on making basic Internet access a reality for entire populations. They argue that inefficient Internet access leads to missed economic opportunities and missed information, such as information about natural disaster relief for example (A Human Right, 2016).

The Digital Gap

Percentage of Population Without Internet Access
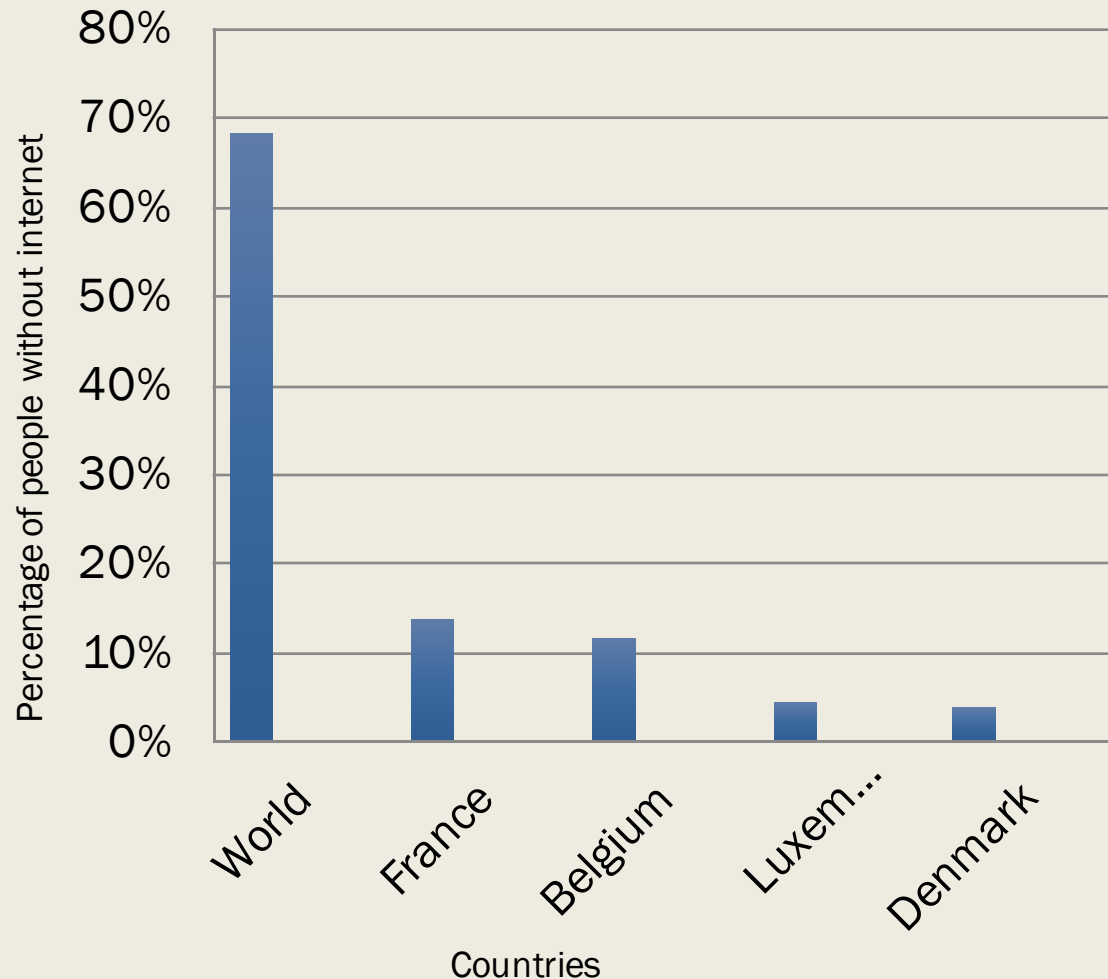
Graph comparing percentage of population in different countries without regular internet access

Even in the most developed countries, equal access to the Internet is not yet realized. In France, 13.6% of the population (about 9 million individuals) do not have access to the Internet (Emmaüs Connect, 2016). This puts France ahead of certain countries like Brazil and Turkey, but behind many other european countries, such as Luxemburg (4.5%), Denmark (3.7%) or Belgium (11.5%) (EU Cyber Security Report, 2015). The digital gap, a concept referring to increasing differences between persons caused by unequal access to the Internet, particularly affects those from underprivileged socio-economic backgrounds, including, in our cities, the elderly, the homeless and the refugees, in addition to the millions of tourists who travel abroad every year.

Our Proposal

To try to minimize the consequences of this digital gap in our societies, we came up with the idea of the WE-Bench, a new design of the Parisian bench with securely attached tablets capable of accessing the Internet and some of its most important features. Accessible to all, this bench would benefit most those with no regular access to the Internet, such as the homeless population, as well as tourists travelling abroad. We believe these individuals could find in the WE-Bench an easy access to essential services they often have trouble accessing. The WE-Bench would act as a hub for connectivity and accessibility, strengthen social bonds between people of different backgrounds and social strata, and create opportunities for those who do not have regular access to the internet, thus reducing inequalities.

Meeting the Sustainable Development Goals

The WE-Bench project was devised to tackle one of the Sustainable Development Goals identified by the United Nations : reducing inequalities. By providing different groups of people with non-discriminatory and open-access to essential online services, this project gives new parts of the population the possibility to enjoy economic opportunities, like real estate openings, and other features so far taken for granted by most of the population. This not only begins to close the digital gap in Paris, but also creates a more level-playing field for those currently without access to the Internet. It reduces inequalities and prevents new ones from emerging.

Biological Inspiration: Synapses
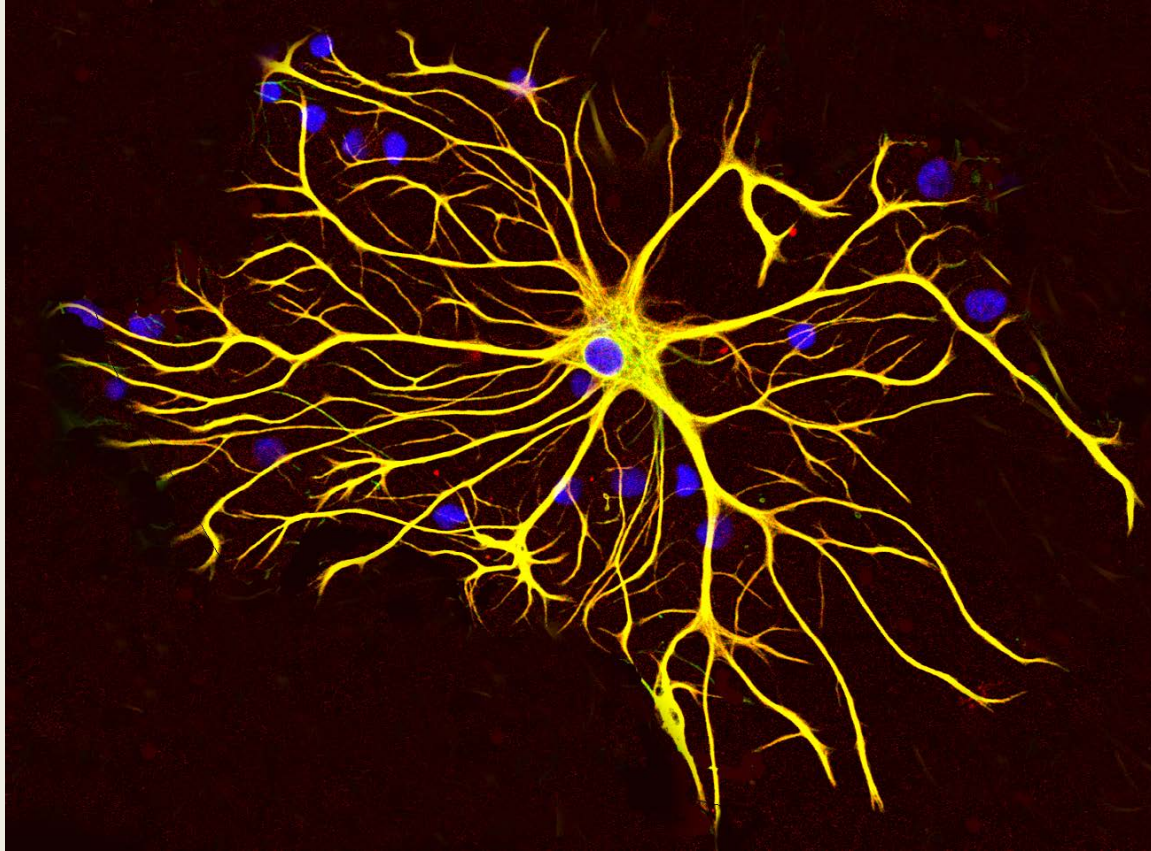
The Internet connects people through transfer of information much like synapses transfer electric signals in the brain (Sheng, 2012). Certain diseases, such as Alzheimer's, cause a decrease in the number of synapses able to be produced; more generally, synaptic fatigue is the temporary (short-term) loss of input signal transmission from neurons which results in synapses not being created in parts of the brain (Kilpatrick, 2010). It can be argued that in societies, inequality is this disease which causes the halting of information transfer to certain parts of the society. Consequently, certain parts of the population do not have equal access to resources and equal access to information. Hence, their connections to others and to the outside world weakens and diminishes over time.

Biological Inspiration: Synapses

By facilitating the distribution of information via the Internet to those currently starved of it, the WE-Benches contribute to the collective intelligence of a city much like how the accumulation of synapses create the collective intelligence of the brain. Just as the brain is defined by connections and circuitry, benches strengthen the connectivity of the city and hence make Paris a more intelligent and powerful hub for creation, innovation, and production.

Just as synapses facilitate the transfer of information, the WE-Benches make information accessible to people from all parts of the city via the Internet. Additionally, similar to how neurons both send out and bring back information within the brain, the WE-Bench also not only transmits out information, but also gathers outside data in order to improve itself for subsequent implementation steps.
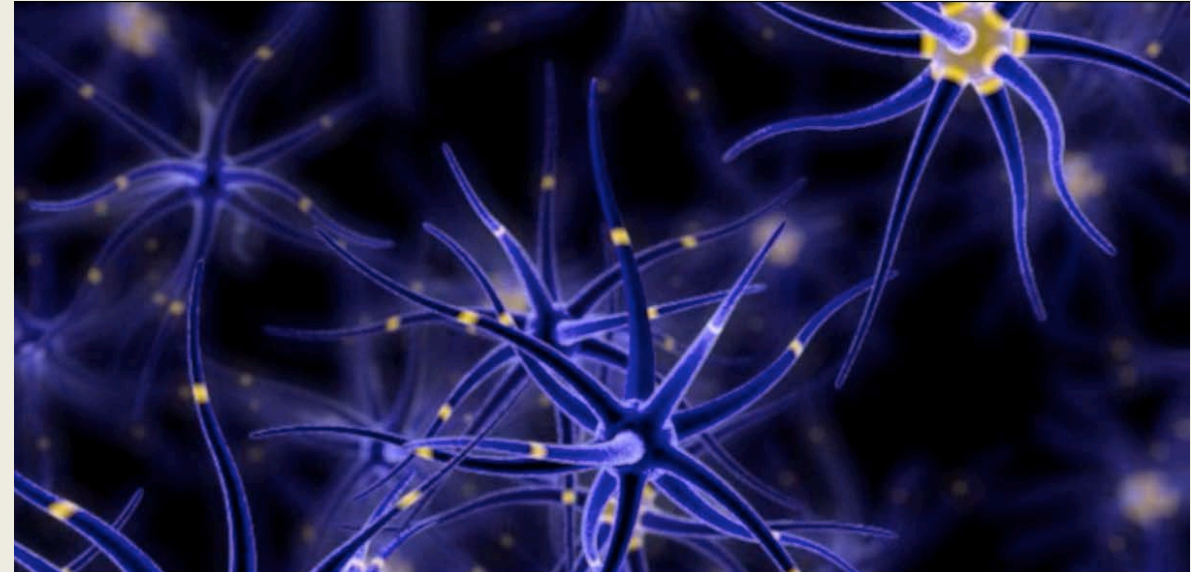
Why The Bench?

*"Your cellphone doesn't just make phone calls,
why should our benches just be seats?"*

Marty Walsh, Boston Mayor, 2014

Benches, free and open piece of street furniture, serve as ways to integrate and connect people from different backgrounds, income levels, and neighborhoods. It acts as a bridge between individual and social activities.

Paris' iconic bench even goes further; designed in the 1860s (Lenoir, 2016) as part of a larger urban planning vision, it has ever since held a particular spot in Parisians' hearts, as seen from the many references to it by writers or singers, and from the recurrent initiatives led to rethink the location, usage and utility and the some-11 000 benches in Paris (Paris Open Data, 2016).

The bench is indeed for more than; it is a symbol of people-friendly communities, a physical bond that connects people to each other and to their cities. It can thus be a tool and an agent for social change. It has the potential to affect the lives of all who live around it.

Paris — Place du Château Rouge - Rue Poulet

Why The Bench?

The necessity to rethink public seating in Paris is made even more urgent from the evident lack of street furniture. This is a problem for Paris and those living or passing through, as evidenced by anecdotes from travelers, and maps displaying how unevenly distributed and scarce street furniture is in Paris. This runs in contrast to Paris' goal of becoming more pedestrian-friendly.

As one example among many, la Butte aux Cailles, a hilltop neighborhood that requires some effort to walk through and hosts a very small number of seating options, scattered all around the area.
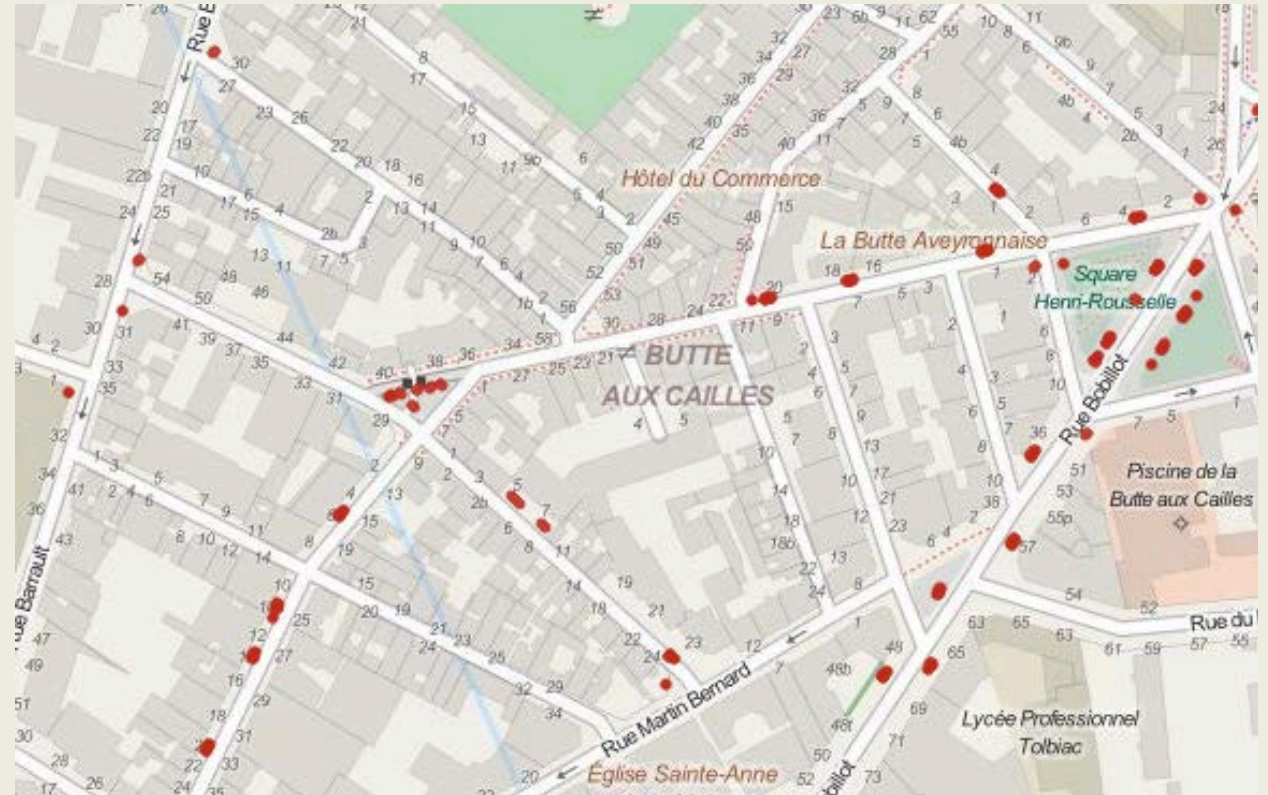
Screen shot of bench distribution in La butte aux Cailles.

Current Challenges

Aging population

- Paris hosts approximately 3.45% of the French population. In 2050, with a national population of about 70 million, Paris could host 1.6 million residents aged 60+ (INSEE, 2016).

Making cities pedestrian friendly

- Current City Hall officials plan to turn Paris into an increasingly more pedestrian-friendly city. This will require more public seating with the aging population.

Implementing new technology to meet new needs

- New technologies are more pertinent than ever in our lives, it seems only natural that they are implemented in the city.

Shying away from those challenges would limit the social utility of cities' public equipment.

Updating Public Seating

Talking to designer Flore Lenoir, who worked on new models of Parisian benches, it appeared to us that our first concern would be to put the bench back at the center of its environment -the city-, and to make it more socially inclusive.

This concern is shared by many : local governments show the importance of public seating by sharing data about it and, in Paris, by making it possible to present initiatives to the public at the time of the vote on the city's budget. This leads to several private initiatives on the subject.

Context and Audience

Urban Context
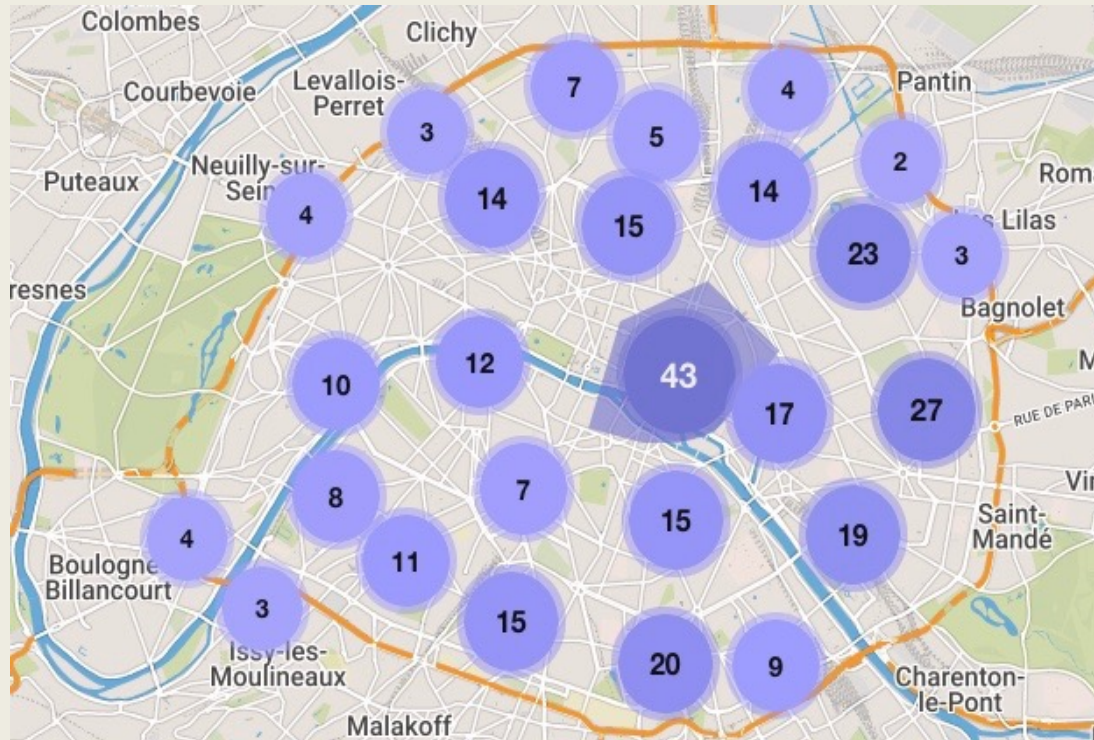
During her 2014 campaign to be elected mayor of Paris, Anne Hidalgo declared that she wanted to extend the Wi-Fi access so that you never have to walk more than five minutes to find an Internet hotspot.

Free Wi-Fi is available in several public gardens, libraries, "mairies" and other public buildings. Private Wi-Fi, from restaurants or shopping malls, is also easily accessible. This leads to Paris being ranked as the fourth best connected city in the world (biannual Networked Society City Index/Ericsson, 2016).

However, marginalized populations, mainly the homeless population, can not benefit from this easily accessible Internet, for they lack the devices to do so. Though many homeless people have mobile phones, smartphones, tablets or computers are much more uncommon. Despite growing efforts, shelters also seldom offer accessible computers (Emmaüs Connect, 2015). Paris' challenge therefore lays less on the Internet itself than the devices to access it.

Biological Inspiration: Sympatric Speciation

Our project focuses on addressing the issue of unequal access to information in Paris, caused by the increasing digital gap. This gap tends to create two groups of people : those with easy access to essential information, and those with no access to such information. This is similar to the phenomenon of species' evolutionary diverging because of sympatric speciation -- when populations originally of the same species become isolated from each other because of behavioral differences and grow up and reproduce independent of the other group and eventually split into 2 different species groups.

The people who do not have access to online information are isolated, albeit not always physically, and the population of the city will slowly diverge into two different groups of people who will have difficulties communicating and interacting with each other. Just as a species that diverges into two different species and can no longer mate with each other, the group without access to information will have great difficulties integrating back into society.
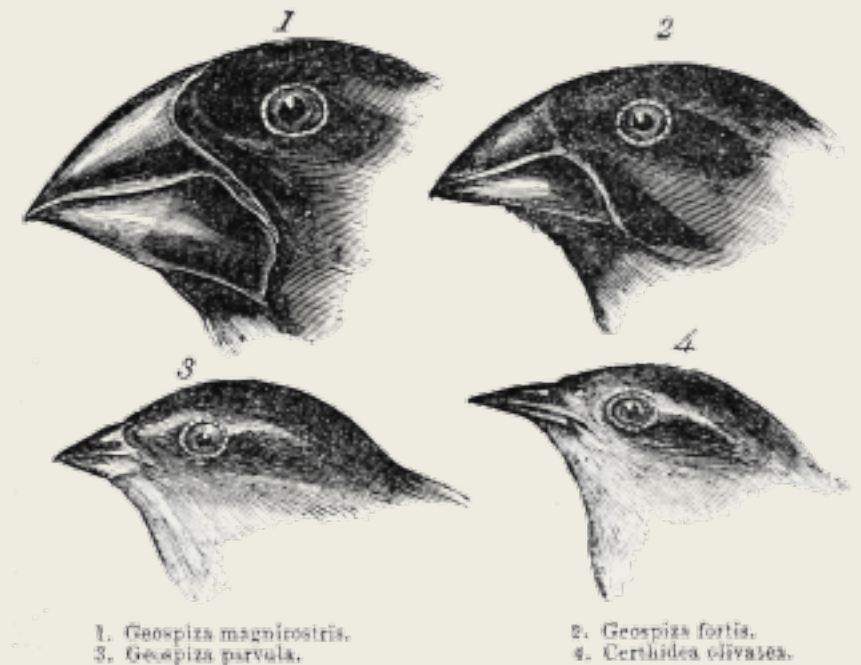
Darwin's finches exemplify the results of (allopatric) speciation

Audience

Our enhanced bench targets mainly two types of people. However, despite this targeting, the bench would benefit to everyone; its general utility is a way of avoiding stigma for the populations who would use it the most.

Since our goal is to reduce the digital gap and give Internet access to those who can't easily benefit from it, one main targeted audience is the indigent population of Paris, particularly the homeless, estimated at 28 000 (APUR, 2014).

Additionally, this equipment would also benefit particularly the 47 million tourists who visit Paris every year (Les Echos, 2014), since they generally lack data roaming while traveling, and the bench is accessible to everyone.

Previous Approaches

Smart Benches: The Soofa Bench

There have been many initiatives done in the past to add utility to street furniture but none that has tried to directly address the problem of the digital gap as we are trying to do. One of the most prominent ideas is the Soofa Bench in Boston and LA. It is solar powered and allows the user to charge his/her phone or check the weather. Though they deliver internet services to the public, these benches do not reduce inequality and bridge the digital gap, as the WE-Benches intend to. Also, the Soofa Benches are expensive and thus tend to be built in neighborhoods that are well resourced.

We intend to go beyond what the Soofa Bench offers with the intention of the WE-Bench-decreasing inequalities by bridging the digital gap. We want our infrastructure to empower people and create more opportunities for them.

The Soofa Bench in Boston

Efforts on Connectivity & Information

NYC's new pay phone booths above and internet.org logo on bottom

Efforts are being conducted all around the world to bridge the information gap in our societies. Public and private initiatives focus on ways to make valuable information accessible to all.

New York City has begun replacing thousands of pay phones with free Wi-Fi hot spots, hoping it would help reducing the digital gap. The hot spots are also equipped with Android tablets with Internet access (Knutson, 2016).

Internet.org is an initiative led by Facebook whose goal is to offer Internet access to the world's population who don't usually have access (Internet.org, 2016). It has been criticized for going against basic Internet regulation of equal access because of its biased restrictions on accessible websites.

Our Commitment

Our objective is to reduce inequality, empower people by creating opportunities for everyone and creating a network of connectivity between people of different backgrounds. We drew inspiration from initiatives such as the one of Emmaüs Connect, a French NGO which focuses both on accessibility and equality for the homeless and the disadvantaged (Emmaüs Connect 2016).

To present an original approach that would address the identified challenges and aim at responding to them, we commit to:
- Drawing inspiration from previous approaches in terms of accessibility, connectivity, and innovation;
- Identifying the flaws in the projects we research, and avoid these mistakes in the implementation of our proposal;
- Getting in contact with forward-thinking designers, researchers and local officials that got involved on the subject;
- Relying on and pursuing the SDG of reducing inequality.

For example, our software would give regulated access to the Internet but does not promote a specific service/company/website. We chose to do so to prevent the WE-Bench being used for accessing websites that do not contribute positively to our mission such as those dedicated to gambling or pornography. We also wanted to prevent monopoly of the bench by those who have access to Internet at home.

Execution Plan

Software

The OS will be a simple user interface with preset apps and will be closely developed with City Hall to ensure that their services are well represented. Estimated time for development is 1 year to be undertaken after the hardware is built.

Hardware

Prototypes will be built so that we can experiment with the design of the bench and try adding solar power and other features. The estimated time for development is 1-2 years (see how input prices change).

Financing

Public funding, especially from the State, will surely be the main source of funding but we also want to try to reach agreements with tech companies as well as explore possible targeted advertising that the bench could provide.

Distribution

We would start with the pilot neighborhood of Square Leon for 3 months and then expand to Le Marais for another 3 month trial to gather data from users and implement necessary changes before the next implementation phase.

# Software: Operating System and Subscription Service

The potential Operating System for the bench's tablet would be based on a popular platform like Android since it is free and easily customizable. We would implement a simple but strict firewall that would only allow access to pre-defined websites and their sub-domains. We would also require people to sign up, similarly to a subscription service, to fully benefit from the services offered by the WE-Bench. If the user doesn't sign up, he/she would have access to only a limited number of apps including maps, metro, weather, city hall, emergency services.

At the end of the user session, every subscribed user would take a short survey about their experiences using the WE-Bench and suggestions for improvement. We will collaborate with different organizations, such as Red Cross, who will assist in signing up people they work with who will benefit from using the WE-Benches. This subscription service would allow us to track individual users and the impact the WE-Bench has on them. Like the synapses, the WE-Bench -- with the subscription service in place – would not only emit information but also effectively gather information from its environment.

WE-Bench
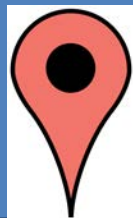
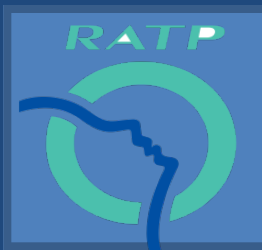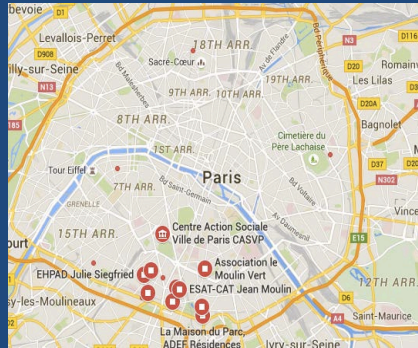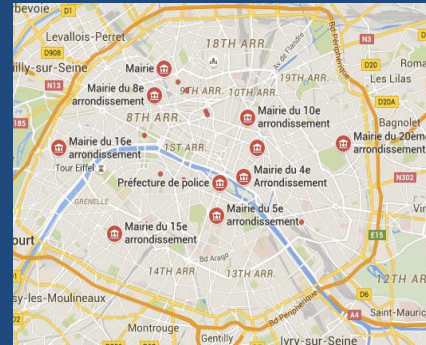|			
Location Services	News and E-Books	E-Mail	Web Calling
City Hall	Transportation	Emergency Services	Weather

Example of the design of the welcome screen

Location Services

Social Services
City Hall &
Emergency
Services
Shopping & Food
Points of Interest
Home

Location Services

Social Services
City Hall &
Emergency
Services
Shopping & Food
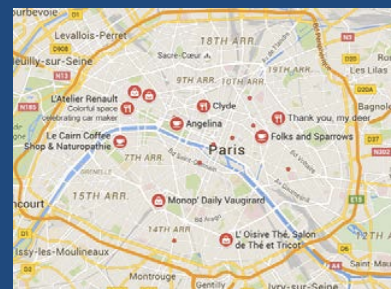Points of Interest
Home

Location Services

Social Services
City Hall &
Emergency
Services
Shopping & Food
Points of Interest
Home

Location Services

Social Services
City Hall &
Emergency
Services
Shopping & Food
Points of Interest
Home

Location Services

The map interface would be based on Google Maps API. It would show the reputable/well known service in each category.

It directs people to some services to work with qualified people (such as social workers) to get the necessary help.

A clear "You are here" marker would also be provided so that people will be able to get turn-by-turn directions to these places.

This would be specially useful to homeless and tourists:

- The homeless or those without regular access to the Internet can clearly note where social services are located and their opening hours.
- Tourists without data will be able to pinpoint directions more easily.

News & Books

Periodicals
Newspapers
Novels
Home

Adding the possibility to consult news and books is a way to help those who want to help themselves help themselves. This feature could help spread out information. We would partner with a municipal library to publish public domain books and would solicit sponsorship from newspaper to supply daily news which aids civic engagement.

Consulting Email is often necessary to respond to job notices. We would give access to this to people who normally can't communicate this way.
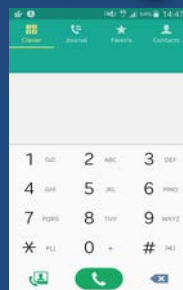They would have the option to access and create email accounts from major suppliers in the "Email Selection" page.

Email
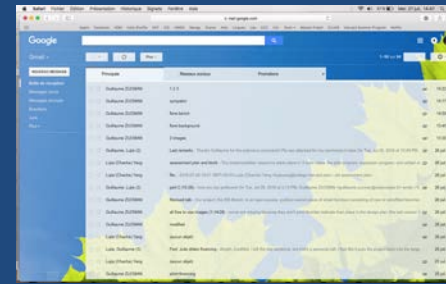
Email Selection
Home

Calling

Emergency Calls
Personal Calls
Home

We would implement web based calling sponsored by a telecommunications company like Vonage or its French equivalent.
Emergency contacts are saved to the bench. Otherwise, it would support personal calls that are maximum 15 min long.

City Hall

Services
Information
Register Complaints
- Arrondisments
- City-Wide
- Message Reps
Home

Transports

Metro
SNCF
RER
Home

The official Paris City Hall website would be integrated. It would provide information and offer services available only online to anyone.

It could have a feature where people could read up on their rights or on the benefits that they are entitled to. One would also be able to register complaints. This gives the opportunity to any citizen to report problems that they notice around the city. The system would be divided by Arrondissement (can report to specific city hall) or you could also report city-wide problems.

Also, one could write messages to specific representatives.

The system would have detailed maps of the Metro, SNCF, and RER lines. Anyone can thus have the option to access detailed direction between places.

It would give tourist the chance to check train times from anywhere.

Also, homeless benefit from it by being able to find out ways to shelters that are often far outside the city of Paris.

Emergency Services

Police
Fire
Ambulance
Sanitary Risks
Broadcast
• Report an Alert
• Missing Persons
Home

Weather

Weather Today
7 Day Forecast
Air Quality
Home

This website would display and link to various emergency response departments. One can call services needed via the calling app.
We would have an Emergency Broadcast System thanks to the alarms the benches would be equipped with and which would sound when danger is imminent. Otherwise, it will also display faces of missing persons like those often seen in local magazines.

This weather app would give information about the current temperature and air quality. It would give detailed forecast for the day and for the week ahead. It would be useful to anyone who needs to plan for the day or the week ahead.

Hardware: Implementation Sequence

1. Retrofitting existing benches

The implementation would begin with a pilot program in Square Leon which would retrofit existing benches. This is the cheapest and easiest option to have a first wave of feedback and correct things.

This part entails connecting the bench to the electrical grid and installing the tablets and their folding arms.

2. Upgrading benches

The next step is the expansionary program in Le Marais. Instead of just adding the folding arm and screen to an existing bench, we would create benches that "incorporate" our idea because more seating is needed in Paris. The benches could be redesigned to promote more social interactions and be aesthetically upgraded.

3. Adding features

Depending on money/interest, the "final" step is about adding features. Indeed, the bench itself could emit Wi-Fi, it could run on solar power, give off LED lighting or implement a sound system.

Hardware: Retrofitting existing benches

Firstly, we would add tablets to existing benches, which entails hooking them up to the electrical grid.
The point of contact with the grid can be made through a metal box that also secures the arm to which the tablet attaches.
The arm folds out from under the seat (see drawing below and to left) so that people can choose whether to use the screen or not.

Drawing of attached arm with tablet to benches
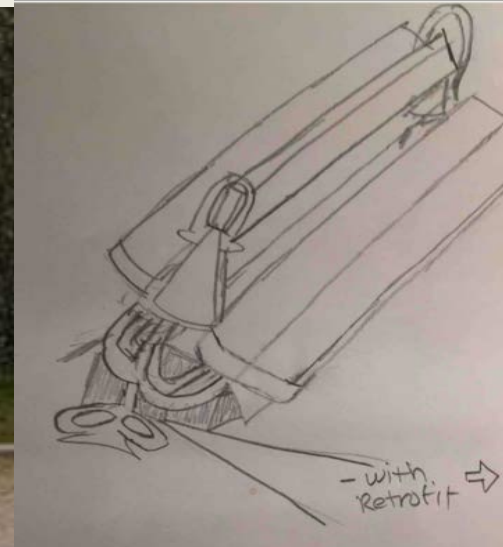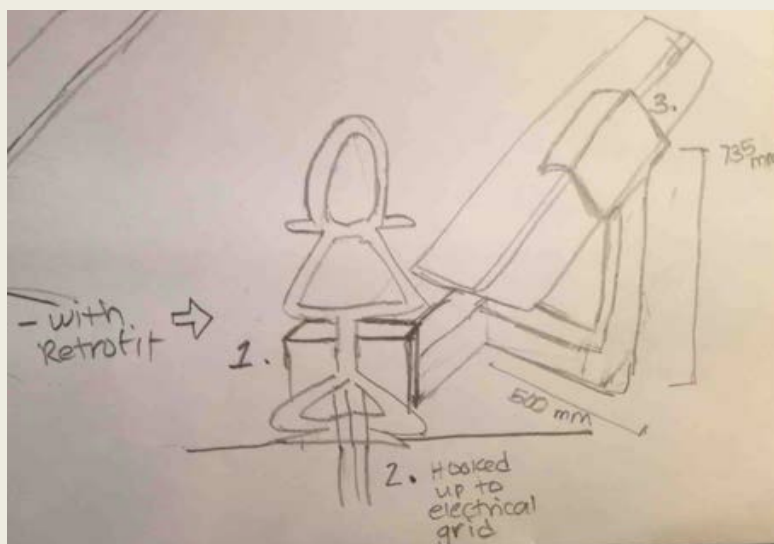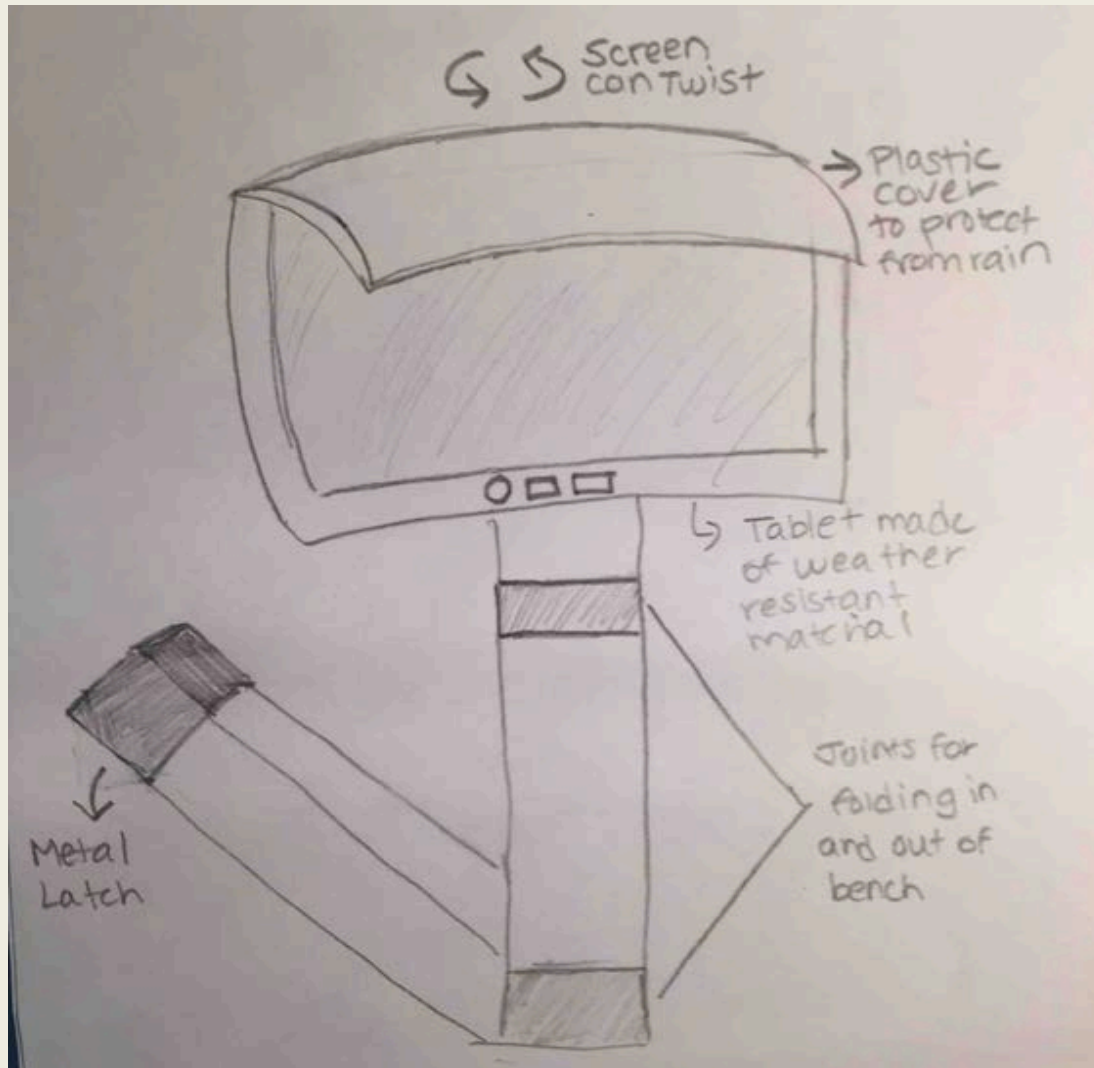
The tablet would be "rugged" with a plastic case and plastic covering to shield it from the elements.

Since it is powered through grid connection, there would be no battery and camera (saving on cost).

Hardware: The Arm
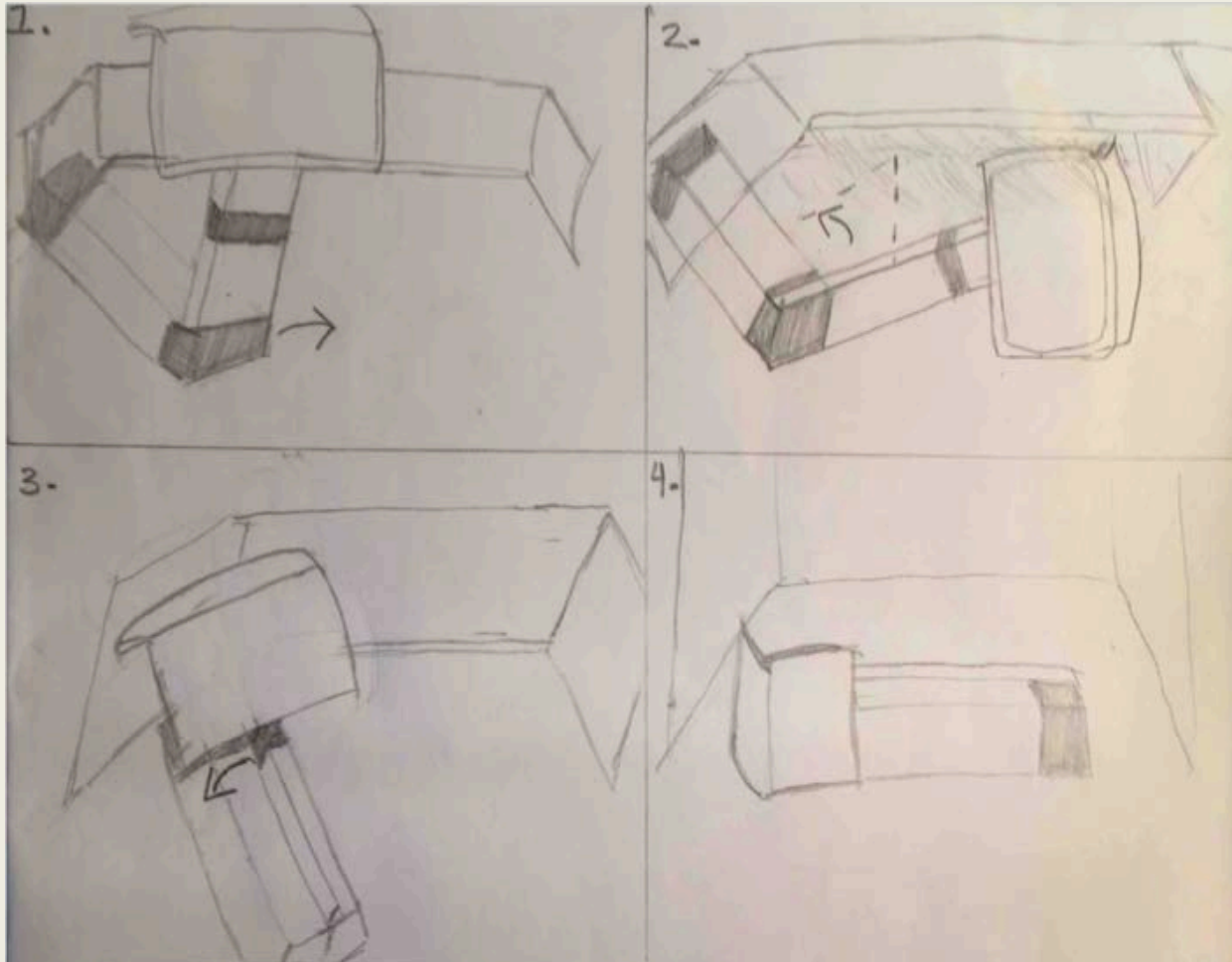
Drawings of different stages of the arm folding in and out

1. Arm in locked position and ready to use. Trapezoidal structure below arm is plastic awning meant to protect screen when stowed away.
2. Folds down and to the right via middle joint
3. Next folds in and to the left, also from the middle joint.
4. The screen then folds to be tucked away along the side of the plastic awning via the joint nearest the tablet (side view shown).

Hardware: Upgrading Benches
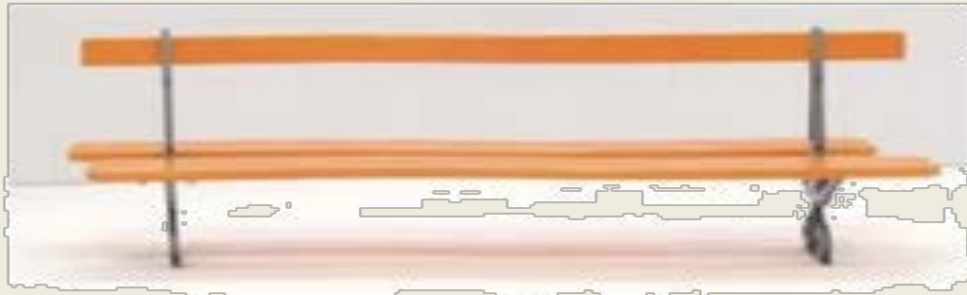
le bavard

The benches by designer Flore Lenoir would be good basis for the new benches in the second stage of implementation. These benches' design promote social interaction by using s-shape to group two people close together on each side.
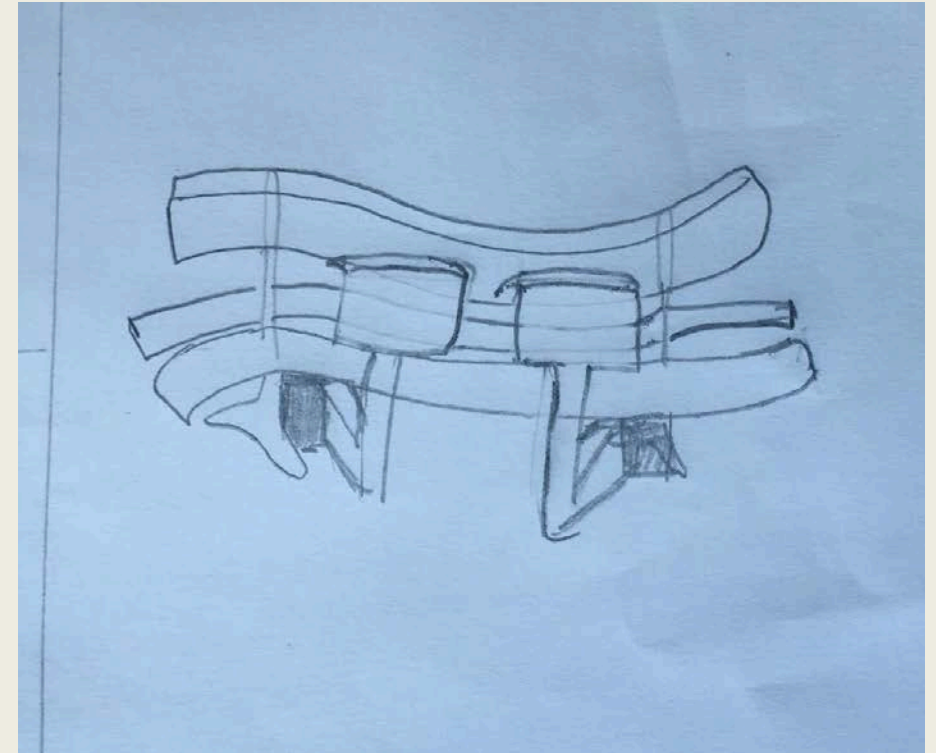
The tablet and arm structure would be added to the bench with little adaptation necessary.

Hardware: Adding Features

The WE-Bench is highly adaptable according to what you want users to get out of it.

Wi-Fi
- The benches could themselves provide Wi-Fi (would involve installing routers in some kind of protective contact point).
- The arm mechanism could originate from this contact point.

Green Tech
- The benches could be solar powered and in the long run this could be cheaper (Four Peaks Technologies, n.d.) .
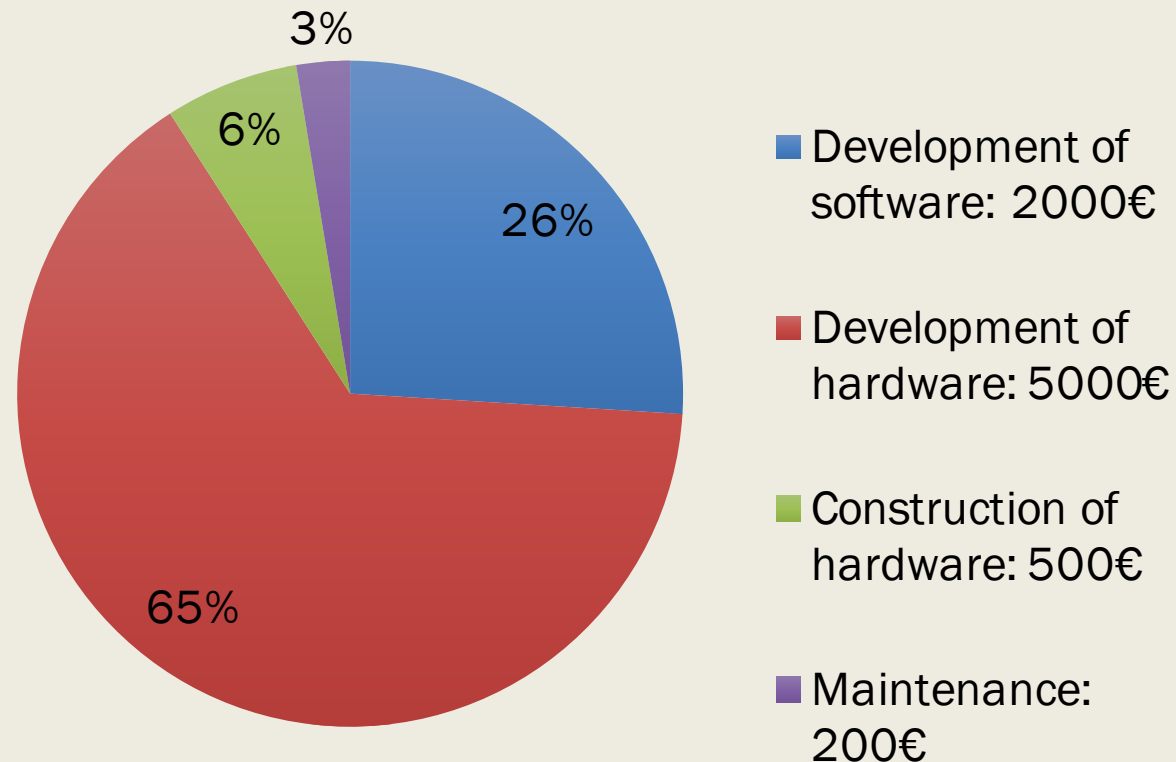- LED lighting could be added to the benches as an alternative to lamps.

Miscellaneous
- Charging stations could easily be added to the benches.
- An audio system that gives information about the area that surrounds the bench is also a possible feature.

Financing: Cost Distribution

The estimate cost for our project is as following for a total of $10 000 per bench, but with economies of scale possible that would reduce this per unit cost if enough benches are made:

- ■ Development of software: 2000€
- ■ Development of hardware: 5000€
- ■ Construction of hardware: 500€
- ■ Maintenance: 200€

Software and hardware development are both one-time costs.

The construction and implementation costs of the WE-Benches follow a simple linear function with potential scale economies.

Maintenance is a regular cost, the estimate of which would depend on the organism in charge of maintaining the infrastructure. This mainly depends on the level of approval from City Hall. Relying on public infrastructure, this project would best be managed by civil servants having received the adequate training. But in a context of budgetary restrictions, other leads need to be studied, such as partnerships with tech-companies (in exchange for brand-visibility).

Breakdown of proportion of costs in implementing project

Financing: the Different Leads

Public funding is the first thing one can think of when trying to finance a general interest project. This option, however, implies higher taxes for local residents, a difficult political decision to make. For the WE-Benches, public funding would be more of a starting grant.

While advertising is usually a good source of revenue for this type of project, we believe it would be poorly suited for our initiative, whose targeted audience (the less-privileged) is one for which advertisers have limited interest. Especially well targeted advertisement could still, however, be a viable option, as could be in the long-run partnerships with surrounding shops, which could use the WE-Bench as a way to advertise for periodic sales or promotions.

Financing: the Different Leads

A new way of getting projects financed nowadays is crowd-funding. This source of revenue usually comes with original forms of retribution, which in the case of this project could be naming the benches after the donators.

We think our project could raise the interest of many "investors" since it combines technology and social issues, both challenges people can relate to.
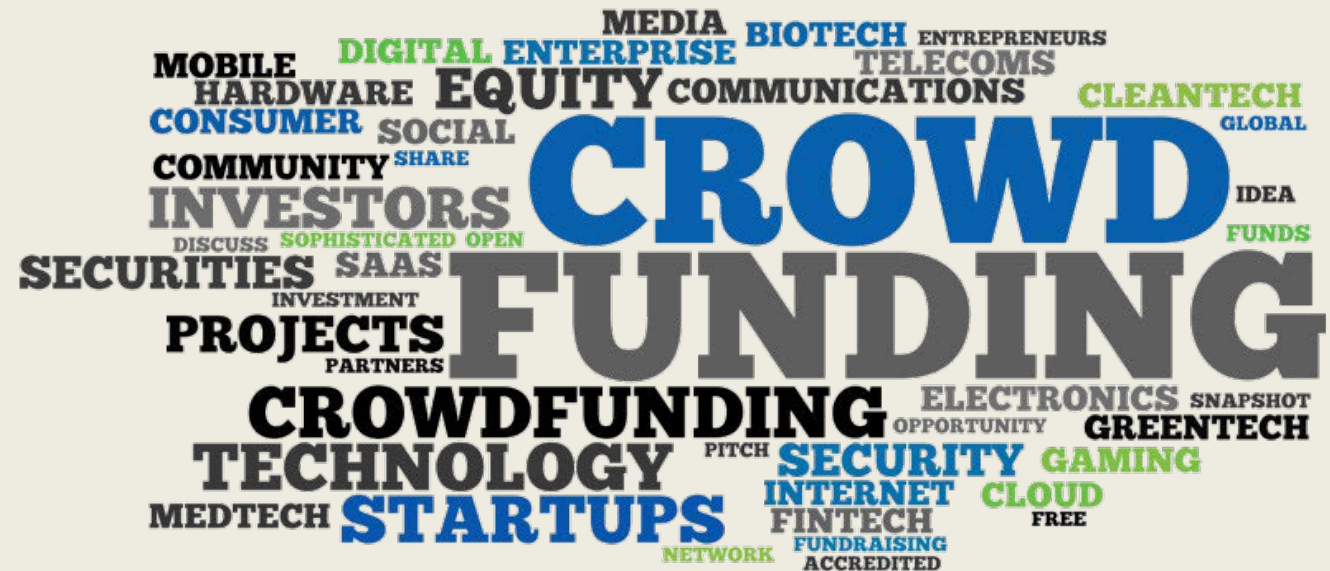
Financing: the Different Leads

Many initiatives in the field of technology are now financed by private grants from the largest tech-companies.

Firms like Google, Facebook or Cisco have these last few years dedicated large sums to help innovative projects flourish.

Many French companies, such as EDF, also have foundations to locate and finance projects with the aim of social improvement.

Soliciting partnerships (which could take the form of sponsoring contracts) with these companies, would require this project to present in-depth business and assessment plans.

Funds from this type of source could also be secured by participating in some of these companies' open challenges, like the Google Impact Challenge that, as the company puts it, "seeks big non-profit ideas for a better world."

Distribution Strategy

Retrofitting existing benches

Installing the tablets with their folding arms to currently existing benches and then connecting the benches to the city's electrical grid. Easiest and cheapest way to test out this project.

Installing new benches with screens

Installing newly designed benches with tablets after feedback and improvements after Stage 1. Also increases amount of public seating in Paris. Bench designs inspired by Fleur Lenoir with hopes of increasing social interaction.

Adding features to Stage 2 Bench and further expansion

Depending on money/interest/success in first two stages of implementation, additional features could be implemented such as solar panels, LED lighting, Wi-Fi hotspot, and sound system. Benches would be implemented all across the city.

Stage 1: Pilot Neighborhood Choice Criteria

Wi-Fi Hotspots Available

Connections to electrical grid

Target Audience Present

Existing Benches in Area

Square Leon is a park in la Goutte d'Or, one of the poorest neighborhoods in Paris. It is known for hosting an important homeless population, but is also located near Montmartre, a very touristic area.
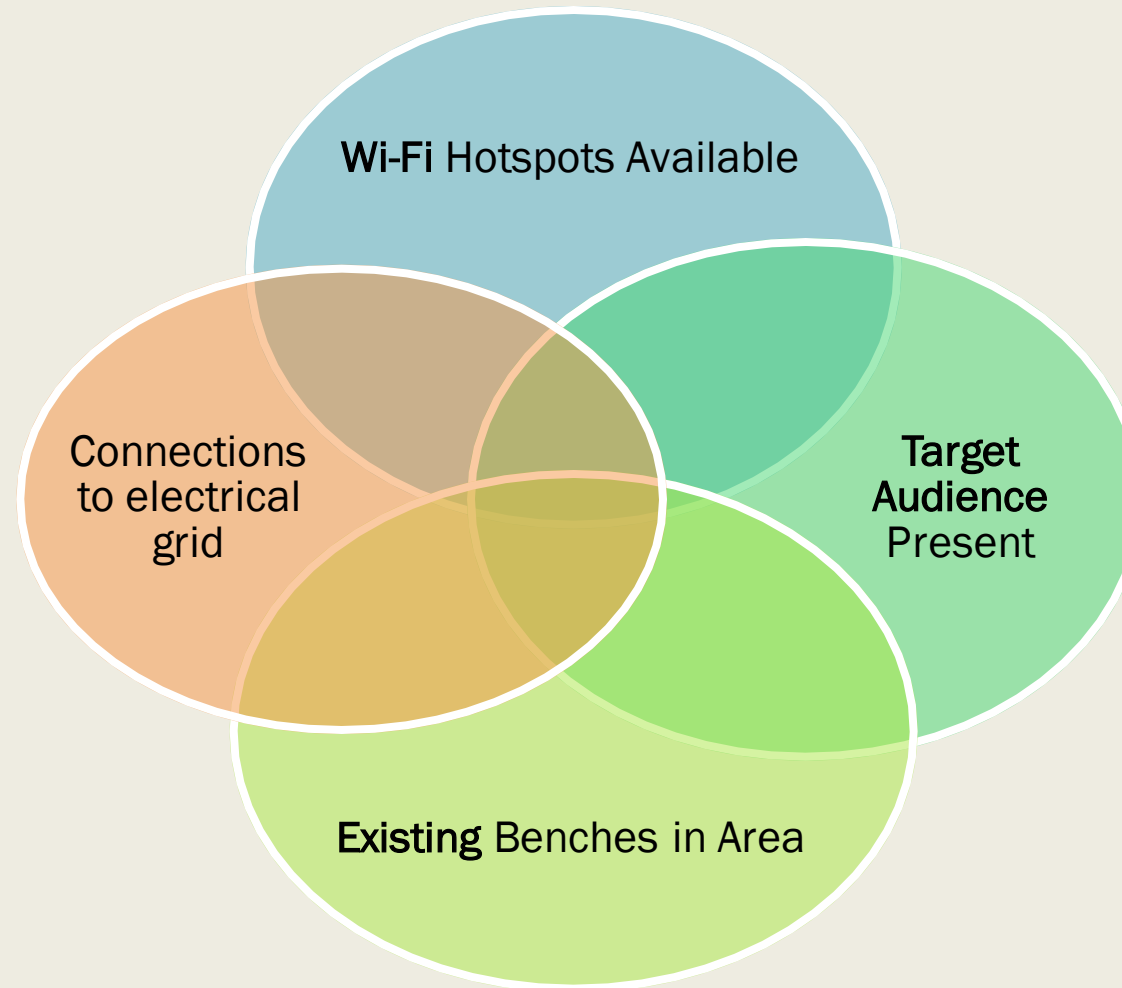
A well-known part of the neighborhood, square Leon would make a good canvas for this experimentation. Publicity could come from City Hall's or newspapers' advertising.

The park has several benches, as well as a Wi-Fi hotspot, which, in the case of retrofitting, would allow the installed tablets to connect to the Internet. The tablets would power on the city's electric grid, accessible from the numerous public lights.
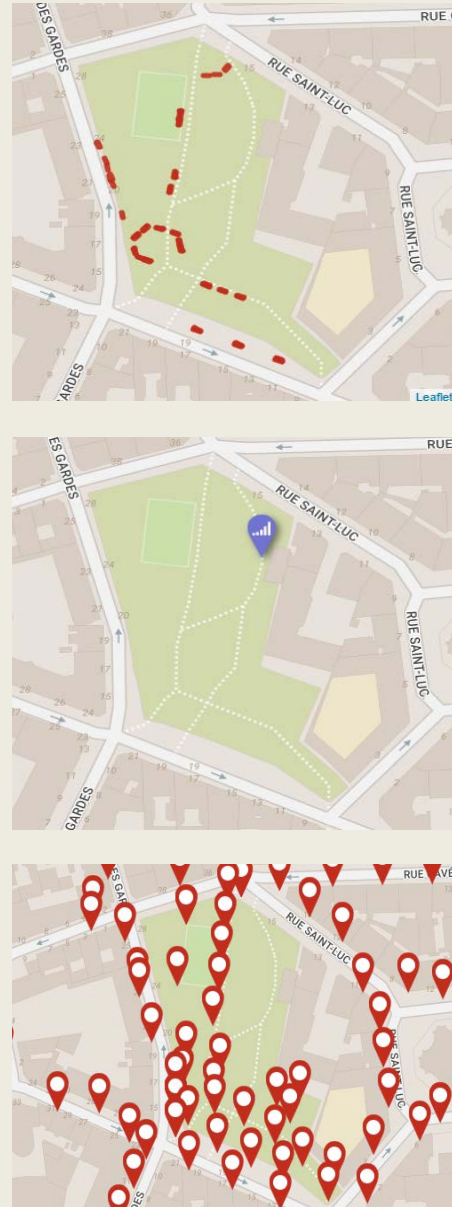
Pictures on the left show, from top to bottom, the location in the park of benches, Wi-Fi and public lights.

Picture above shows that screens would be retrofitted onto half of the benches, in the purple circled area.

Stage 2: Expansion Neighborhood Choice Criteria
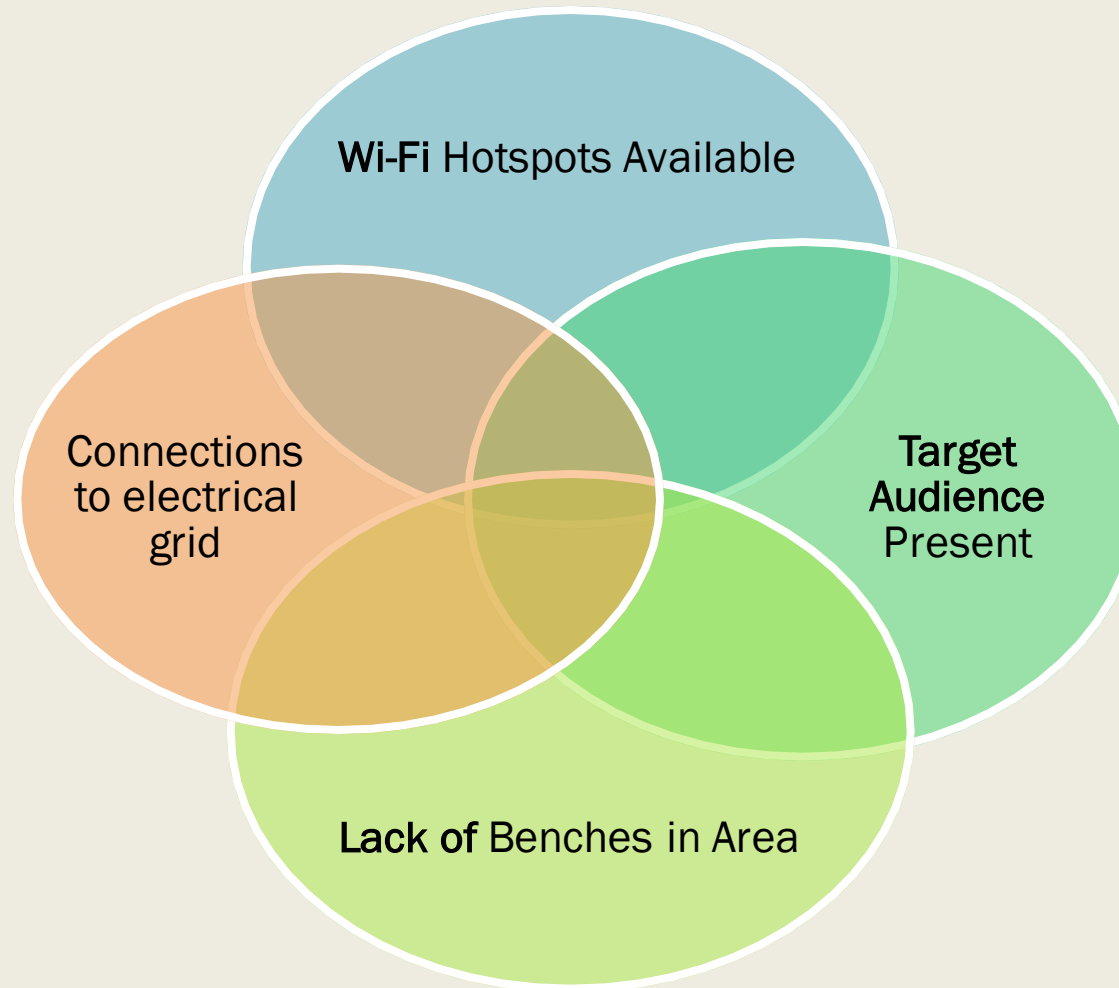
Expansion Neighborhood: Le Marais

Pictures on the left show, from top to bottom, the location in the park of benches and Wi-Fi hotspots.

Picture directly to right shows where new WE-benches will be installed (blocked off in purple).

Steps can then be taken to expand the project by installing more screens in a second neighborhood which would similarly need to have numerous Wi-Fi hotspots to allow the tablet to connect in addition to high fre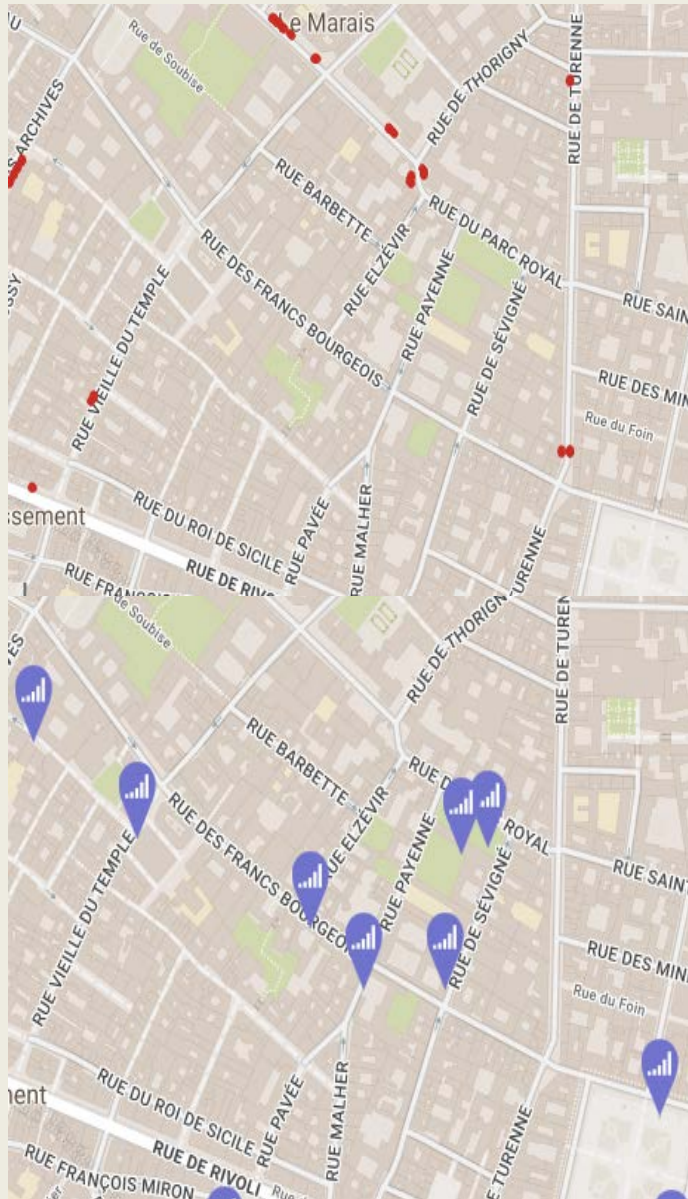quentation; we chose le Marais, which satisfies these criteria. Le Marais is a dense neighborhood with many tourists and some homeless people who come to ask for money from the wealthier inhabitants there. Le Marais has street lights along its streets making it possible for benches to be connected to the city's electrical grid. We would install new screens attached to new benches in the areas blocked off in purple. The benches would have a new design proposed by Parisian architect Flore Lenoir that promotes more social interactions.

Execution Timeline
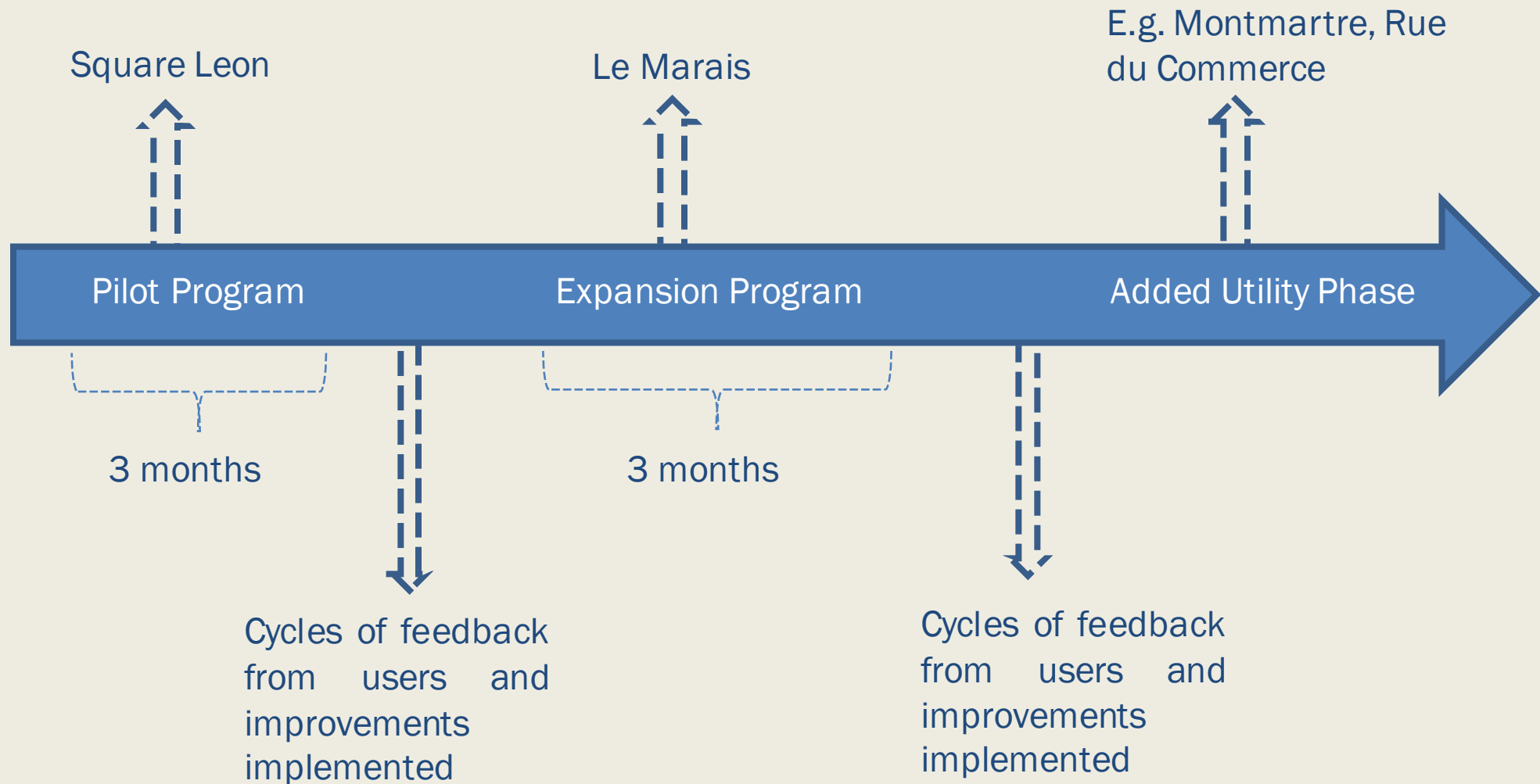
Square Leon

Le Marais

E.g. Montmartre, Rue du Commerce

Pilot Program

Expansion Program

Added Utility Phase

3 months

3 months

Cycles of feedback from users and improvements implemented

Cycles of feedback from users and improvements implemented

Assessment Plan

Assessment Plan

This subscription service system would not only allow us to track the usage of the WE-Bench on users overall, but also allow us to track the impact of the bench on individuals. This system would allow us to gather data about the popularity of the apps, the length of use for the tablet, and how frequently users use the bench.

The implementation sequence takes place in 3 main steps: the pilot program, expansion program, and added utility phase. In between these steps, there are cycles of feedback generated from usage data which will be used to improve the WE-Bench for the next implementation stage. Information collected includes number of hours the tablets are used per day, the most popular apps, and when the tablets are used in the day. Data will also be collected from users via pop-up short surveys for information, such as, what services users want included. Additionally, through use of the subscription service, we will be able to track the usage of individuals and measure the impact that the WE-Bench has on their lives over a longer period of time. Impact can also be measured if the WE-Bench is listed as an option at the end of job applications or housing applications to questions such as "how did you hear about this job?" or "how did you hear about this apartment opening?"

Feedback Loops

Public Usage

Changes to bench implemented

Feedback from usage data + survey answers

Pilot Program → Expansion Program → Added Utility Phase
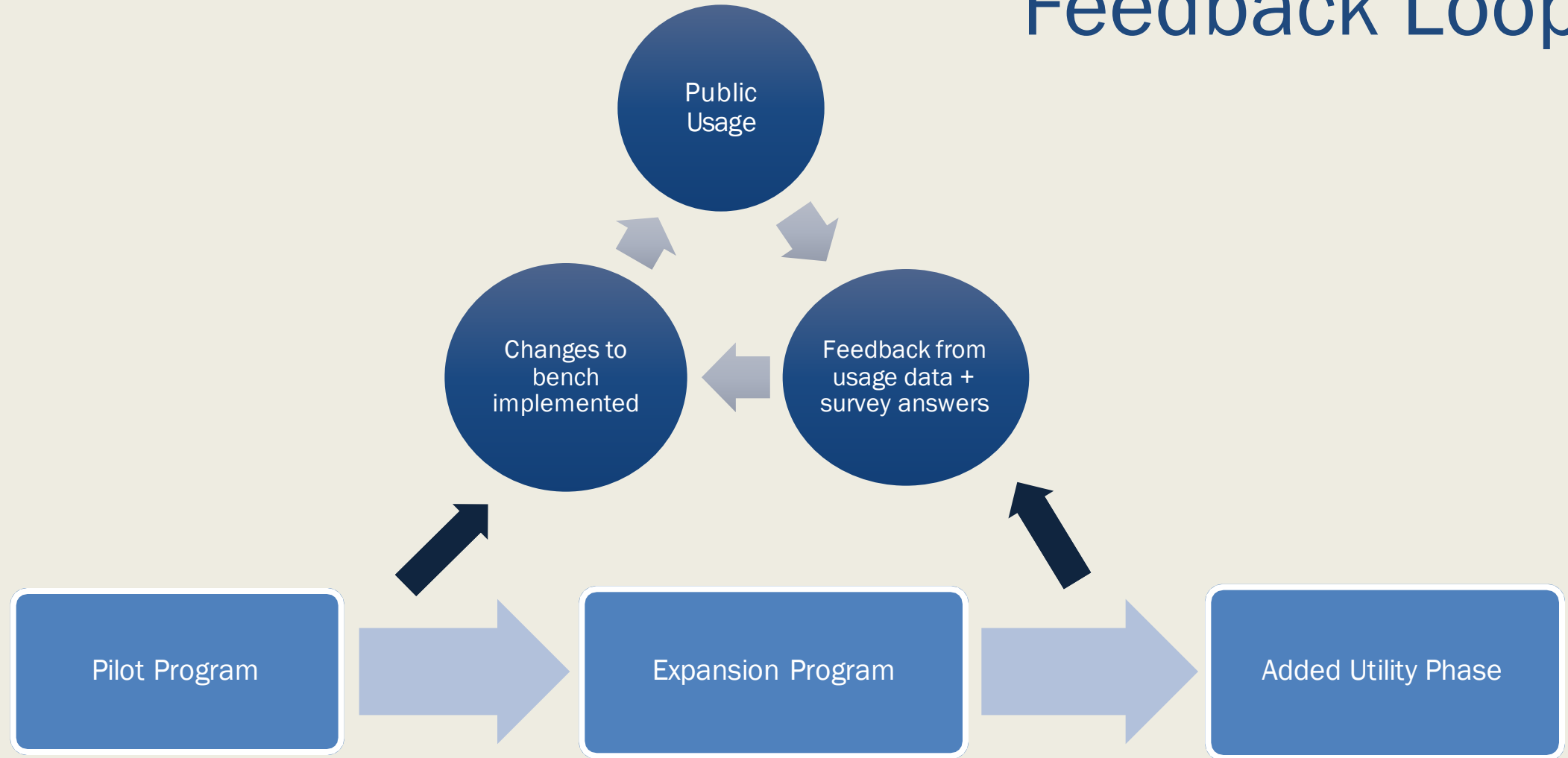
Short and Long Term Goals

- Optimized usage of different apps
- Important turn-over (aiming for 1 hour usage periods)
- Positive feedback from the arrondissements' offices based on inhabitants' perception of the project

- Daily usage of 5 to 7 hours
- No physical degradation of screen
- Positive feedback within the area regarding software performance

Long Term Goals

Short Term Goals
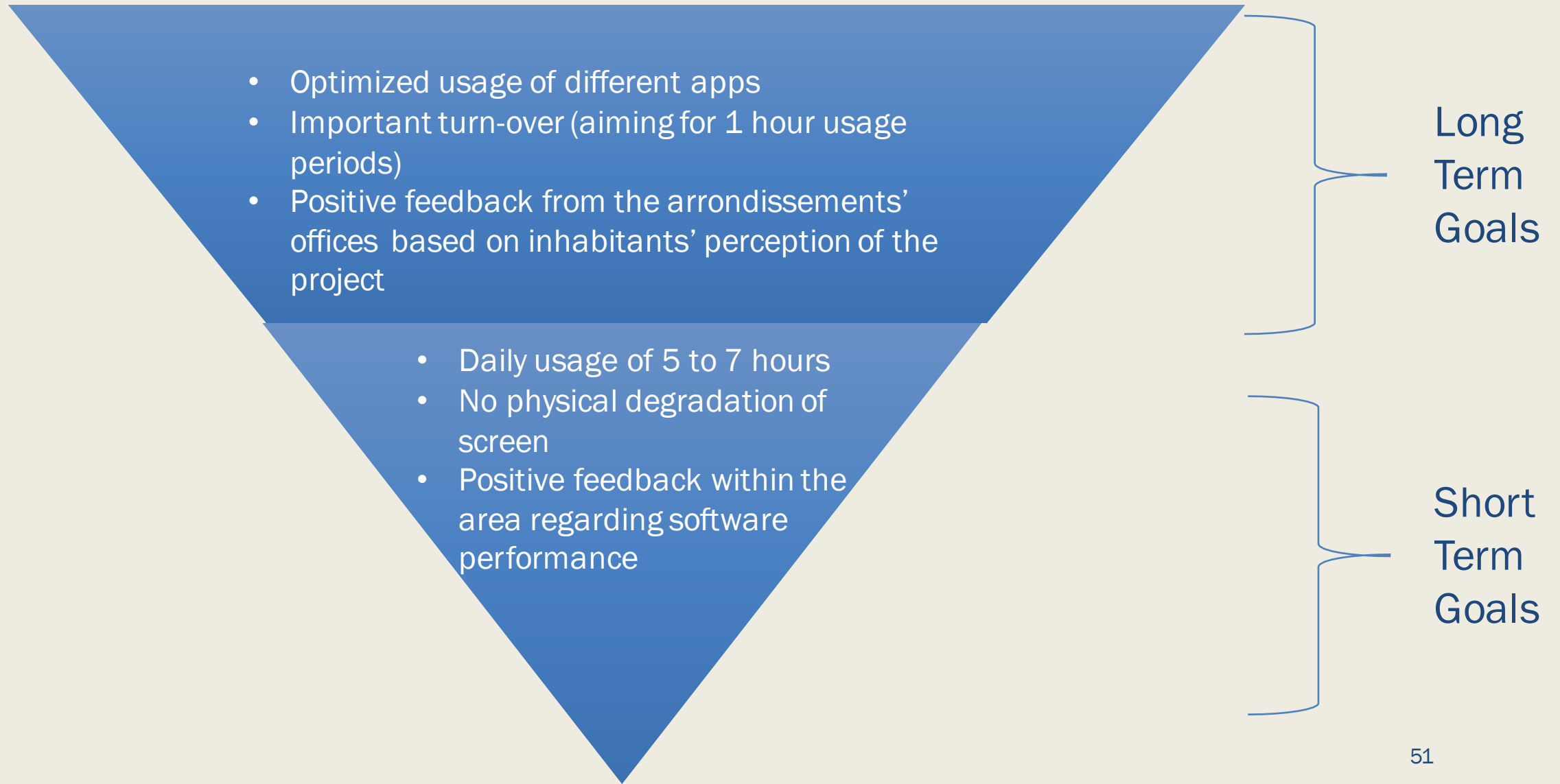
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Abstract :
https://pixabay.com/static/uploads/photo/2014/11/29/12/15/couple-549824_960_720.jpg

Issue and Background :
https://static.pexels.com/photos/164/man-person-apple-iphone.jpg

Sustainable Development Goals :
https://upload.wikimedia.org/wikipedia/commons/2/21/Sustainable_Development_Goals_Logo.jpg

Biological Inspiration :
https://upload.wikimedia.org/wikipedia/commons/6/63/Astrocyte5.jpg

Current Challenges :
https://upload.wikimedia.org/wikipedia/commons/3/36/A_street_bench_on_the_Avenue_Foch,_Paris_8_May_2011.jpg
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https://upload.wikimedia.org/wikipedia/commons/7/7f/Dolores_Park_Bench.jpg

Context and Audience :
https://c1.staticflickr.com/8/7264/7418726440_a3df792b2a_b.jpg

Urban Context :
http://opendata.paris.fr/explore/dataset/liste_des_sites_des_hotspots_paris_wifi/map/?location=12,48.85905,2.35623

Sympatric Speciation :
https://upload.wikimedia.org/wikipedia/commons/a/ae/Darwin's_finches_by_Gould.jpg

Audience :
https://upload.wikimedia.org/wikipedia/commons/a/a9/Apparently_homeless_man_doing_crossword.jpg
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Soofa Bench :
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Efforts on Connectivity :
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Our Commitment :
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Execution Plan :
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Software :
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WE-Bench App :
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