SWITCH

Switching European food systems for a just, healthy and sustainable dietary transition through knowledge and innovation

Report on Hub Digital Experience specifications

D6.4

June 2023

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Document History

Deliverable Title	D6.4 – Report on Hub Digital Experience specifications
Description	This report documents the context of action for the Digital Hub Experience including a state of the art, literature review and inputs from other WPs and regional hubs. It takes this initial referential to define a first set of hypothesis, requirements and design direction for this digital platform, which will support three apps.
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Lead beneficiary	EPFL
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23 June 2023	Revised version 2	Revisions and suggestions provided by CMCC
27 June 2023	Final version	CMCC approved revisions and finalized the document

Partners

Abbreviations and acronyms

CMCC	Euro-Mediterranean Center on Climate Change
DHE	Digital Hub Experience
EPFL	École polytechnique fédérale de Lausanne
ICT	Information and Communications Technology
KPI	Key Performance Indicator
WP	Work package

Executive Summary

This deliverable presents the work leading to the generation of a first proposition for the requirements and hypotheses for the Digital Hub Experience. As part of Work Package 6 “Digital and technical innovation to facilitate food actors engagement”, it is the first deliverable of Task 6.3 which later includes the implementation and evaluation (D6.4, D6.5, D6.7, D6.8) of the Digital Hub Experience.

It includes a review of related work and projects, a summary of work done so far, and a first proposition for the design strategy for the Digital Hub Experience.

1. Introduction

This deliverable presents a report on the characteristics that the Hub Digital Experience digital platform must possess in order to reflect the specificities and local identities of each Hub. As part of Work Package 6 “Digital and technical innovation to facilitate food actors engagement”, it is the first deliverable of Task 6.3 which later includes the implementation and evaluation (D6.4, D6.5, D6.7, D6.8) of the Hub Digital Experience.

The central goal of the Digital Hub Experience is to engage with citizens, chefs and policy makers via a digital platform. These are expected to increase knowledge, facilitation and connectivity among actors, including citizens, enabling access to affordable, safe, traceable, healthful and sustainable food at all levels.

1.1. Purpose of the document

This deliverable gives the initial direction for the design of the Digital Hub Experience. This is based on an extensive literature review, state of the art and initial observations of the SWITCH project activities.

Many components of the SWITCH project are still in progress and being developed in parallel to this work. Therefore, it is important that the specifications outlined in this document remain flexible to accommodate new learnings from other work packages during the first year of the project.

1.2. Structure of the Deliverable

The deliverable begins in section 2 with a summary of related academic work and literature. Looking at more commercial projects on the market, section 3 analyzes projects that look to influence behavior change towards healthy and sustainable lifestyles. Section 4 summarizes interactions made between EPFL and the SWITCH regional Food Hubs, whilst section 5 highlights parallel activities and data coming from other work packages in the SWITCH project that could impact the Hub Digital Experience. Section

2. Related Work

This section looks at academic projects and literature linked to the objectives of the Hub Digital Experience around healthy and sustainable diets and behavioral change.

2.1. SU-EATABLE LIFE

The SU-EATABLE LIFE project was a three-year project financed by the EU LIFE program that looked to reduce the environmental impact related to food choices, by engaging EU citizens to adopt a healthier and more sustainable diet.

A series of engagement activities were carried out at university and company canteens in Italy and the UK, using a digital platform, named Green Apes, to involve people. The project was driven by social sciences expertise which identified four theoretical approaches to follow in the project. These are namely:

- The Salutogenic Model of Health [1], [2]. This approach focuses on promoting the positive impact of sustainable food choices, rather than the risks of unsustainable ones. It also regards engagement as a learning process over multiple moments of action.
- The Everyday Life Perspective on behavior change [3]. This promotes practical, quick and simple messages around healthy and sustainable food practices (from production to buying, to cooking, to eating, to sharing) towards citizens.
- Gamification [4]. This is the concept that a fun, playful, and challenge-based learning experience encourages engagement.
- Participation. The project involved participants throughout the process to inform decisions and directions.

2.2. Green Apes

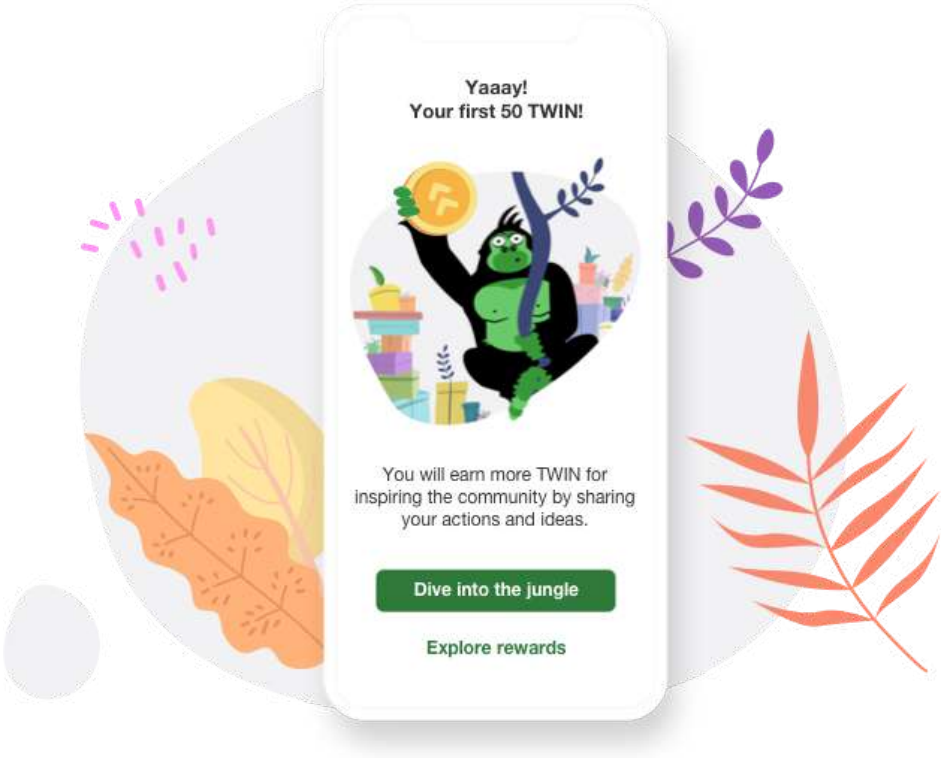

Figure 1. A screenshot from the Green Apes app

Green Apes is an app to promote healthy and sustainable lifestyles, through challenges, rewards, content and community sharing. For the SU-EATABLE LIFE project, a bespoke series of challenges was created and implemented on the Green Apes app. The aim was to track user input to tasks, challenges, interactions and content, and to equate changes in this to behavior changes. The app is available in English and Italian.

The app guides users through various practices around food (from production to eating and sharing), considering food as embedded in the everyday context.

However, the project saw low participation and engagement from participants. Around half of those who registered (n=244) scanned their first meal (n=111), and only a third of them (n=38) proceeded to complete the welcome challenge. Of these users, only 5 proceeded to complete the following challenge of which 4 of them claimed the reward after completing the challenge. This was mainly due to COVID measures that limited communication of the app during the project. However, these results still show the need for motivation and engagement to be continually supported as well as a potential reevaluation of the importance of challenges.

2.3. Engagement and behavior change towards healthy and sustainable diets

Digital experiences

Unsurprisingly, research suggests that digital experiences must be engaging for learning and behavior change [5], [6]. In the context of technologies for health behavior change, studies show that at an individual level, play increases cognitive engagement, motivation and emotional engagement and provides opportunities for motivating people who are unmotivated [7], [8].

Building on this, other recent work suggests that hedonic (perceived enjoyment), social (perceived social benefit), and utilitarian (technology as solution belief) approaches can drive adoption of carbon footprint tracking apps, although long-term studies were not carried out [9]. To address this, [10] propose that although other-oriented motives (e.g., pro-environmental concern, benevolence) can motivate consumers to start buying organic products, only self-oriented motives (hedonism) can ensure long-lasting maintenance.

A common approach to deliver a hedonic experience is through gamification, such as in the Green Apes app. However, there are mixed results around the effects of gamification over the long term. Some cite a complete oversight for long-term engagement to be studied [11], whilst others report a novelty effect with decreased engagement over time [12], [13]. Nonetheless, one study in the field of fitness showed that gamification and personalisation can increase engagement and motivation [14]. Indeed another propositision from the field of social sciences research for education suggests frameworks for long-term engagement based on Self Determination Theory (SDT) to improve intrinsic motivation and the Transtheoretical Model of change to consider criteria that support long-term behavior change [15].

Other digital strategies for engaging the unmotivated to change behavior include designing to increase awareness of current behavior, increased reflection, collaboration, giving praise and meaningful rewards and personalizing the experience to individual interests [8].

Beyond the individual

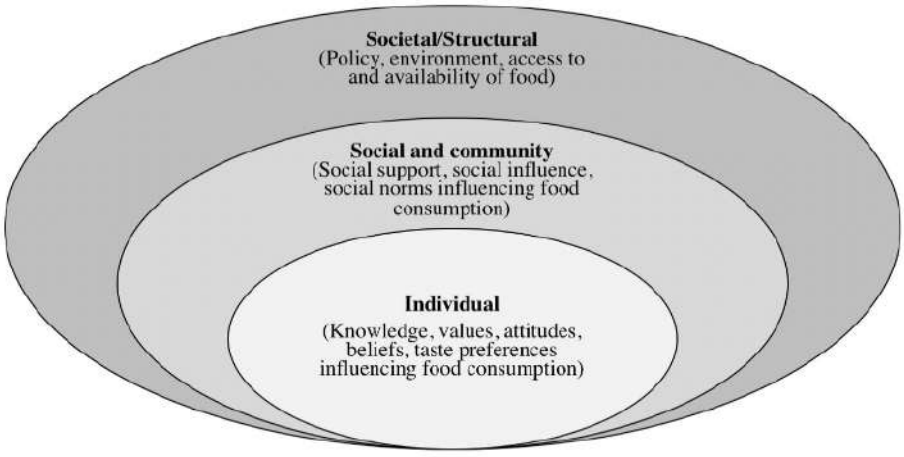

Figure 2. A simplified socio-ecological model adapted from [16] by [17]. This conceptual framework illustrates the concentric spheres of influence that have been known to impact dietary behaviors at the individual, community, and structural levels.

It is also important to look beyond individual motivation towards the effects of community and societal interventions. For example, work by [17] highlights the importance of social interactions, volunteer networks and stakeholder engagement to implement campaigns promoting sustainable diets. This is supported by other qualitative studies that observe that knowledge on sustainability is gained through personal networks [18].

Similarly, "Network interventions", from Social Network Theory, describes processes that use existing social networks (not necessarily digital ones) to drive behavior change [19]. One of the most frequently used interventions is to use individuals as opinion leaders or bridges between groups [19]. Interventions implemented by community-identified leaders are often more effective than those by non-leaders [20].

Therefore, digital experiences that promote the creation of community perspectives over personalisation could allow more actionable approaches to be developed [18].

2.4. Health and sustainability scoring apps

Few studies have investigated the effect of digital information tools on consumer choices for sustainable foods [21]. However, credibility is highlighted as an important driver of value for consumers regarding eco-scores of food and therefore positively affects green purchase intentions [22]. Indeed, some consumers are skeptical of sustainability information [23] which negatively affects their green purchase intentions [24]. In terms of healthy diets, including dietitians and nutritionists in the development of apps to increase perception of safety and legitimacy is recommended [25].

Currently, a common limitation of digital experiences that use sustainability data is that they use data in a universal manner and do not take into account the context of consumption [18].

Design recommendations

In a review of 80 apps for tracking food consumption the importance of visual appeal to distinguish from other apps was highlighted. Indeed the layout consistency and readability, content resolution, visual appeal, and group targeting was shown to be highly important [25].

Further work looks more specifically at the ways in which environmental information is presented to consumers. This shows that single indicator eco-scores significantly reduced decision uncertainty, compared with a more detailed break-down of information, with no effect on consumer confidence [26]. This is due to reduced cognitive load (choice and risk) and the ability to do direct comparisons [27]. What's more, color coding and traffic light labeling has a positive impact [28]–[30]. However, strategies that attempt to make comparisons between a food's impact with other relatable metrics (such as car miles) appear to have no additional benefit [29]. Nonetheless, conveying comparative perspectives on data by visualizing multiple localities of food data together could be an interesting approach to overcoming the universality of sustainability data [18].

2.5. Related Work Summary

- In order to engage individuals, research suggests that a positive approach is required.
- Considering all aspects of eating practices (from production to eating and sharing) around healthful and sustainable food is required.
- Gamification is commonly used as an engagement strategy, although little is understood about its long-term impact on behavior change.
- Nonetheless, long-term engagement is thought to rely on hedonic qualities rather than external or altruistic motivations.
- It is also important to look beyond the individual and promote approaches that facilitate network interventions between existing social networks. This is commonly achieved through identifying individuals who are opinion leaders in communities.
- Presenting environmental information should be kept simple with single indicators and traffic light color coding.
- Comparative data visualizations must be well considered to avoid confusion, but present the context-specific nature of sustainability data around food.

3. State of the Art

This section looks at current projects and products on the market that look to influence behavior change towards healthy and sustainable lifestyles.

3.1. Carbon counters

Kilmato is a web-app that aims to help restaurants and food service providers reduce their climate impact from food. It does so by providing a calculator, labeling solutions, reports and carbon offsetting options. Although data is not available on the adoption of this service, the start-up recently raised 4.2 million Euros to further its mission [31]. Although not specifically targeted at the food industry, Carbon Cloud is another similar web-app that looks to help larger businesses calculate, reduce and communicate their climate impact. Giki Zero is another carbon calculator aimed more at individuals and their lifestyles.

These three web-apps share similar aesthetics, promoting simple and light designs with approachable choices of font and illustrations.

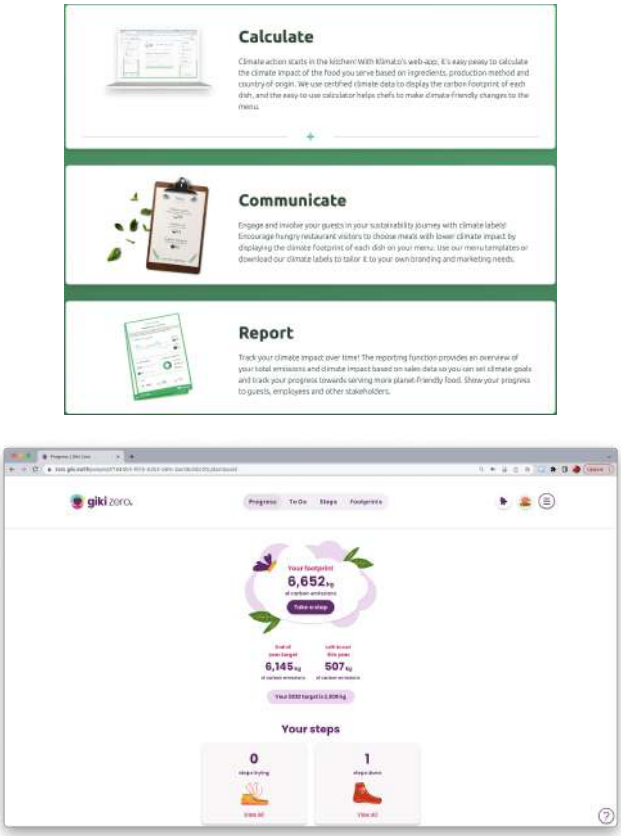

Figure 3. Klimato and Giki Zero

3.2. Food Scanning Apps

A common genre of application to promote healthy and sustainable diets are food scanning apps which use barcodes to give ecological and nutritional data around a food product.

In Europe, Yuka and Open Food Facts are prevalent, although many other smaller propositions exist including Code Check, MatChecken and Paradiset.

We have been unable to find data on the engagement of these apps, or an evaluation of their impact on behavior change. LIke carbon counters, we note that there is often a limited database for environmental information which can lead to disappointment and demotivation to reuse the application. The Open Food Facts database, which is also the database used by Yuka, takes an open source approach in an attempt to overcome these kinds of gaps [32].

These apps share many aesthetic traits with the carbon counter apps; namely sans serif fonts, approachable illustrations and green and white color schemes.

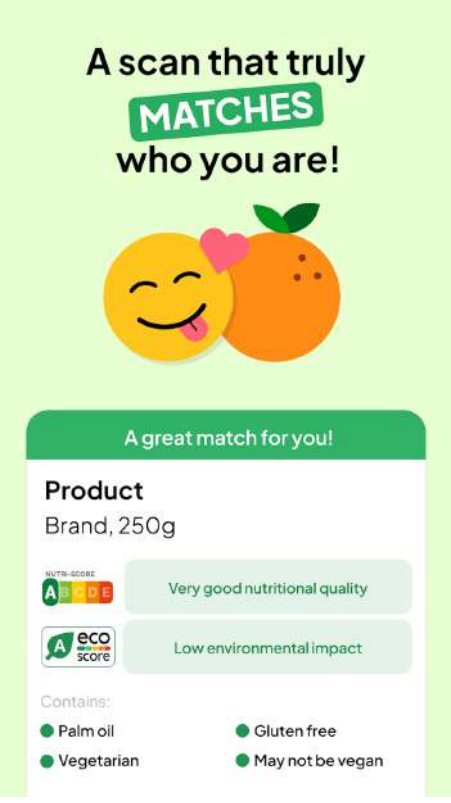

Figure 4. Yuka.

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3.3. Sustainable Recipe Apps for Citizens

Another approach to promoting healthy and / or sustainable diets is through recipe apps. Examples such as My Foodways show recipes with carbon footprint, land use and water use information alongside nutritional analyses.

Danish app Plant Jammer encourages you to select ingredients in your fridge and then suggests recipes based on this. Although this does not show data related to the food items, it promotes plant-based diets and the reduction of food waste. Plant Jammer can be integrated into other websites with an API in a variety of European languages and provides a dashboard with data on user behavior.

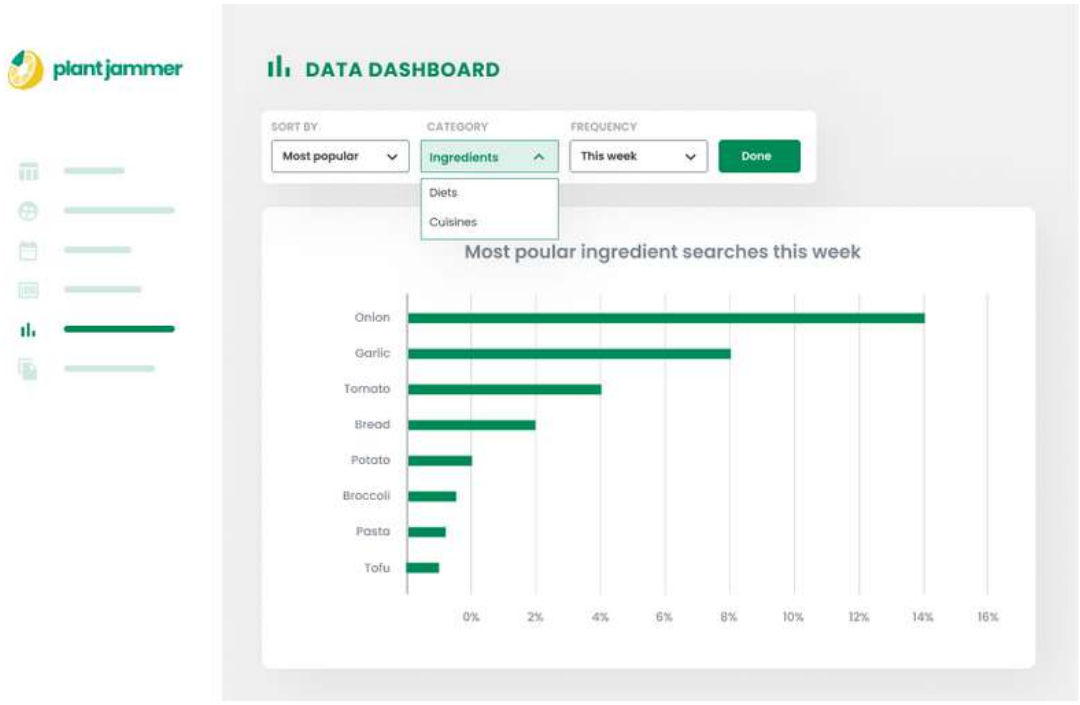

Figure 5. The Plant Jammer data dashboard.

3.4. Apps for chefs

Recipe apps targeted at professional chefs also exist. Most notably, Eaternity provides economic, nutritional, and environmental information on recipes inputted by the chef. It also gives reports and rewards for achieving certain goals.

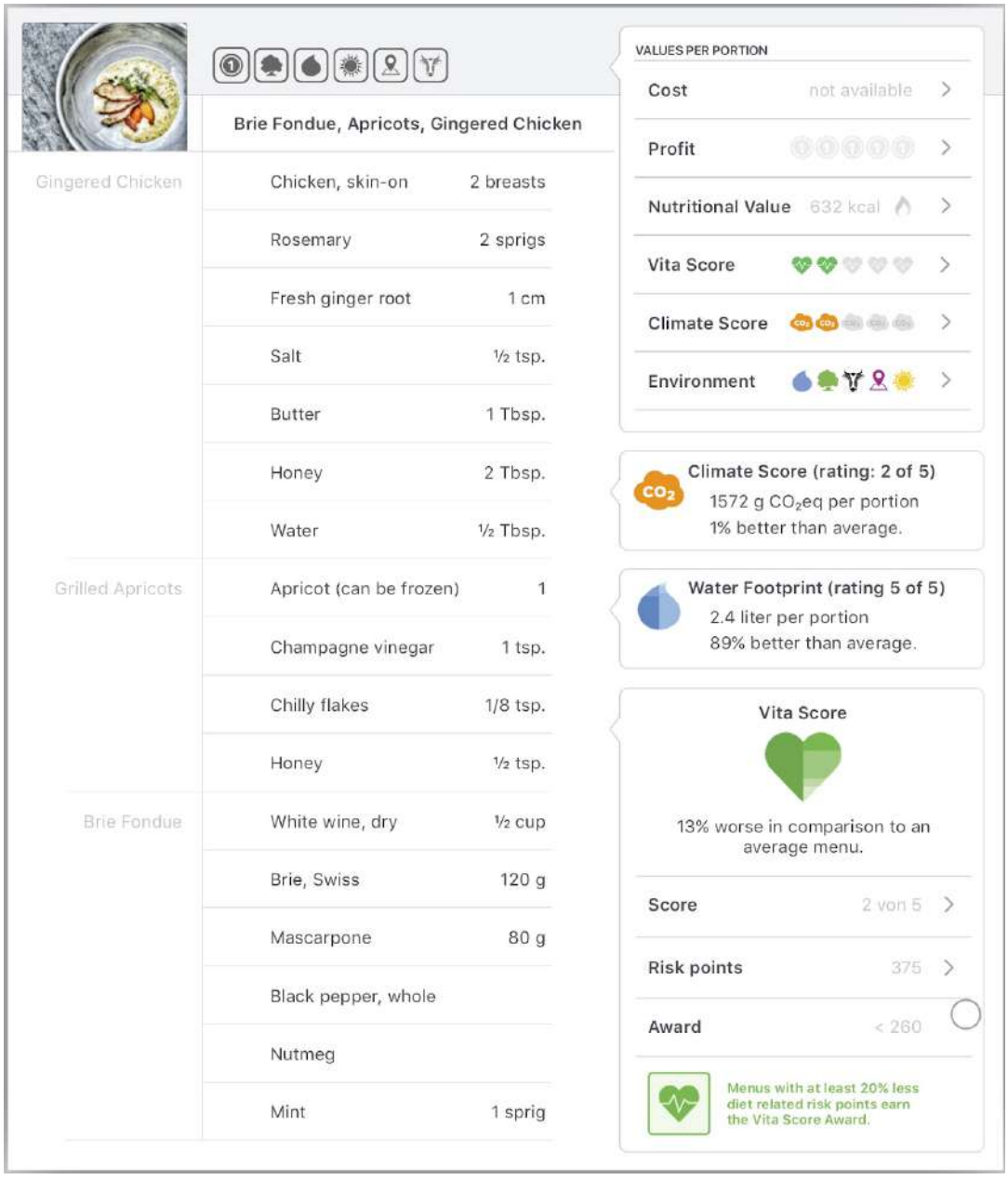

Figure 6. A recipe on Eaternity

Aside from healthy and sustainable diets, apps for chefs also include inventory checkers (e.g. BlueCart) , recipe managers (e.g. Paprika) and flavor pairing tools (e.g. Food Pairing).

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3.5. Other popular food apps

These applications seek to support people around daily issues related to food, without taking into account food delivery services such as Just Eat or restaurant booking services, such as TheFork.

Too Good To Go is an application that connects customers to restaurants and shops that have surplus unsold food. It has been steadily increasing in popularity since its launch, from 470,000 meals saved in 2016 to 52,500,000 in 2021 [33]. In addition to its social and emotional value to customers wanting to reduce food waste, Too Good to Go also has functional value in offering food at an affordable price [34]. This financial benefit was also seen as the main driver for the app's success in another case study in Italy [35].

Meal kit delivery services, such as HelloFresh, respond to another concern of consumers, namely deciding what to cook at home. They deliver the convenience of recipes and fresh, pre-portioned ingredients to the customer's home. The market is expanding for such services, helped in part by COVID19 which forced people to cook at home [36], but which also continues to grow well after the major effects of the pandemic [37]. In the case of HelloFresh, this is put down to convenience, availability and affordability, although concerns are raised about the company's employee and environmental standards [38].

3.6. Agricultural Productivity

Yearly reports exist on agricultural productivity, such as by Global Agricultural Productivity. In addition, there are many calendars of seasonality, which tend to be based at the country level (e.g. https://www.swiss-farmers.ch/seasonal-calendar/ , or https://www.eufic.org/en/explore-seasonal-fruit-and-vegetables-in-europe . However, these are not available in real time, or at a regional level.

3.7. Other projects

Here projects that are either speculative or more loosely linked, but still provide inspiration are covered.

Use less

This website promotes awareness around plastic waste through narrative and practical examples and resources. It gives a tool kit (called "survival kit") of practical things that can be used or bought to produce less waste and gives a list of sustainable shops and resources. It also takes a different aesthetic approach compared with other apps described above. It uses a strong graphic style which is recognisable and memorable.

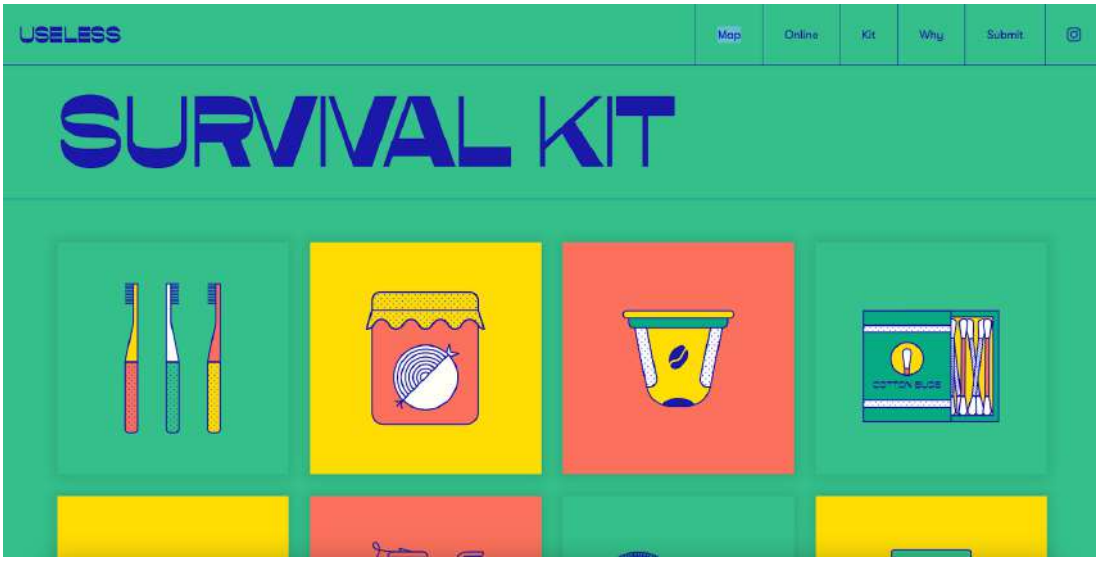

Figure 7. A screenshot of the Use Less survival kit

Waste Not

Waste Not is a web database of sustainable businesses around the world. Although currently small, it is based on an open source database so that it can grow over time.

Although using a familiar color palette using green and light colors, Waste Not uses a creative aesthetic with bespoke photography, illustrations and graphic design to communicate sustainability in a new way.

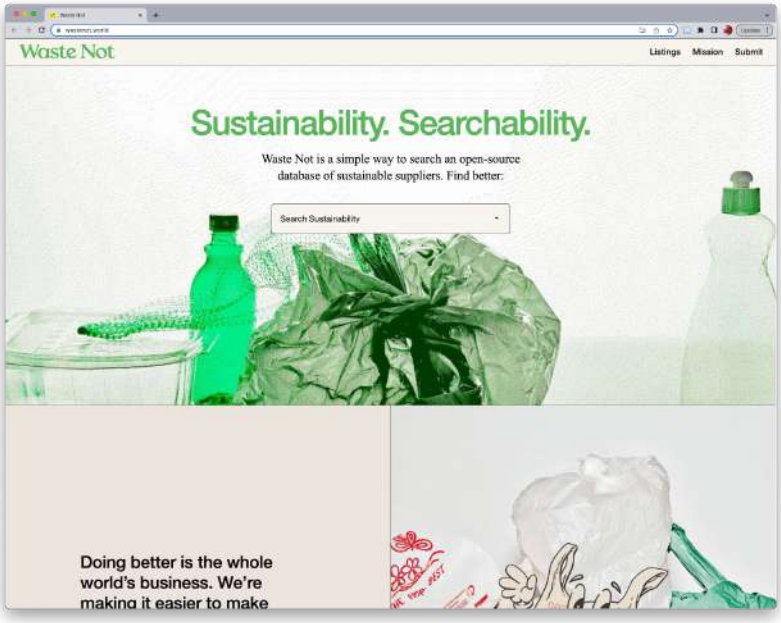

Figure 8. A screenshot from Waste Not

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Food Talks

This research project from the EPFL+ECAL Lab showed that using augmented reality (AR) to present environmental and nutritional information about food could increase engagement and learning. By scanning a single food project the application shows a single indicator eco-score,a single indicator health-score, the provenance and allergens in floating modules around the product.

The design approach seeks to optimize the collage effect of AR using modular paper cards that adapt in color palette according to the aesthetic of the scanned product.

Figure 9. Food Talks

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Preferable Future of Food

This project uses narrative, speculative design and case studies to explore food futures that balance health and sustainability. It proposes future scenarios through app visualizations and text and complements these with links to existing "pioneering" projects that share a similar motivation.

Aesthetically, the approach is very different to many existing health and sustainability apps with a more sober and serious proposition.

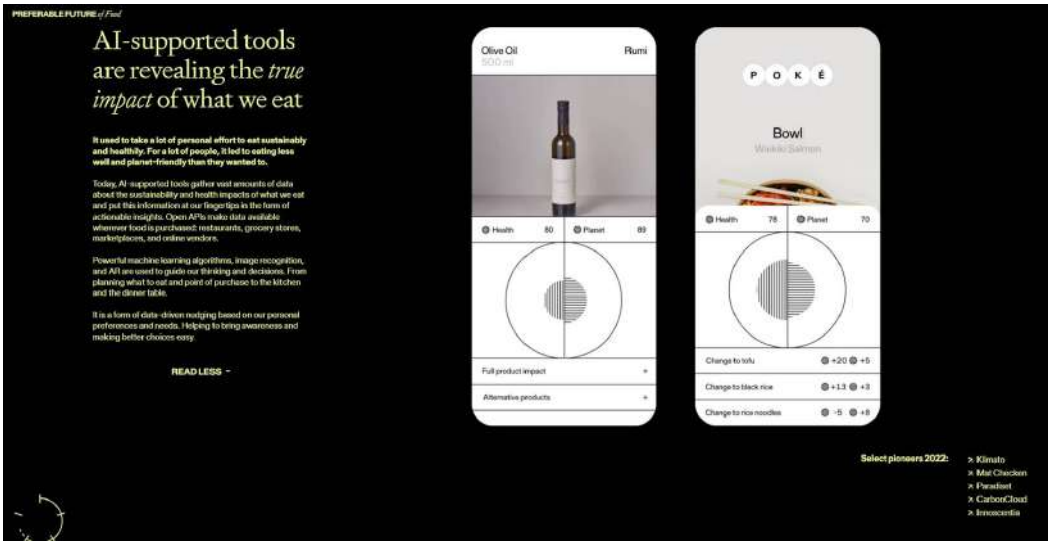


Figure 10. Preferable Future of Food

3.8. State of the Art Summary

- A common approach to digitally supporting healthy and sustainable diets is through apps that offer carbon counting, product scanning and recipe planning.
- Many examples of such apps exist that target businesses, individuals and chefs.
- A similar aesthetic is often used in these apps promoting light and bright colors (often whites and greens), sans serif typefaces and illustrations. This is a common practice although there is a lack of data about its effectiveness.
- Other popular food apps call to consumers' desire for affordability and convenience.
- Alternative approaches include gathering existing resources and promoting them through a strong graphic identity and narrative.

4. The regional dimension of SWITCH Food Hubs

4.1. Introduction

One of the major challenges for tasks 6.4-6.8 is to mutualise resources, exchange and knowledge in Europe, while addressing regional identity to enhance adoption and impact. The learnings from the work done to face this challenge should foster digital solutions for many other projects in Europe.

4.2. Interview outcomes

As a first step to address this challenge, we conducted semi-structured interviews with four out of the six SWITCH Food Hubs: San Sebastian & Basque Region, Rome and Lazio region, Västra Götaland County and Gothenburg area, and Berlin and Federal State of Brandenburg. The two other Food Hubs were not available to meet us. The goal of our discussions was twofold. Firstly, we wanted to gain insight into the activities of the Food Hubs, their data gathering methods, and the data they collect. Secondly, we aimed to understand the unique characteristics of their regions, their approaches to the project, and their desired outcomes or expectations.

Figure 11. Activities in Das Baumhaus in Berlin & Kutxa Fundazioa in the Basque region

Given the early stage of the project, we received varying levels of information and detail from the four Food Hubs. Nevertheless, we were able to draw some general conclusions and insights from our interviews:

- None of the Food Hubs collect data regularly. If they do collect data it is mainly project specific and qualitative.
- For digital data collection, they tend to use online surveys or existing tools such as Whatsapp (not specific apps).

- Some Food Hubs are already engaged in community activities and have specific desires, whilst others are creating them from scratch and are more unsure about what they want as an outcome.
- There is a need for simplicity and clearness to engage professional players like chefs and farmers.
- All the Food Hubs have links to local actors, although there will be a challenge to reach beyond those who are already willing and convinced by healthy and sustainable diets.
- They feel there are already many apps and tools regarding food, there's the danger to design something that already exists.

5. Project Data and Activities

This section highlights synergistic and parallel activities happening in other work packages in the SWITCH project that could impact the hub digital experience.

The following table shows the pipeline of data coming in from other work packages until month 18 (June 2024).

What	WP	When
Info on available statistics (D2.1)	WP2	31.06.2023
Results of hub questionnaire	WP5	31.07.2023
Consumption data for all food categories (D2.2)	WP2	31.12.2023
Data on the share of labeled/sustainable food consumption in the 5 Food Hubs (D2.3)	WP2	31.12.2023
Database of food fluxes of EU, National and local food systems (D2.4)	WP2	31.12.2023
Research protocol, and methods and tools for assessment of hub activities (D4.1)	WP4	31.12.2023
Report on factors influencing dietary behaviour in the hubs (D5.1)	WP5	31.12.2023
Reference information on regional diets (D3.3)	WP3	31.06.2024
Action plan for hub activities (D5.2)	WP5	31.06.2024
Data from SmartCounters use in Food Hubs (D6.5)	WP6	31.06.2024

Data Lake

The specifications for the Data Lake data repository IT infrastructure are being developed by CMCC in a parallel deliverable due at the same time as this report (D6.1).

SmartCounter

The SmartCounter is a technology being developed by POSTI. It consists of three elements:

- A digital cashpoint (using software and hardware from https://tilby.com/en/) to collect sales and customer data;
- A spectrometer (MyFreshFood) https://www.consumerphysics.com/technology/, to collect chemical data about food products;
- A platform (developed by POSTI) tracce.posti.world to assemble data from different sources and to create blockchain IDs.

The POSTI platform is a digital place for data to be uploaded about food products or dishes and then a blockchain certificate to be generated. It is currently aimed at producers and restaurants who would like to promote the validity of their products in a new way.

The SmartCounters will be sent out to the 6 regional Food Hubs for them to collect data from local actors. This data will be ready in June 2024.

EPFL's first analysis indicates that this tool has a high potential for large scale entities and quality control, but also requires a certain level of technical knowledge and economic investment. Because of this, we suggest that the citizen science aspect of the project, collecting daily inputs from small producers and farmers, should take a different and complementary channel.

Food Hubs Data

The initial questionnaire sent by the WP5 team to the Food Hbs showed a large diversity of strategy, context and level of development between the Food Hubs. However, this richness doesn't allow a standard compilation of data, strategies and tools at an early stage of the consortium. A second and more focused questionnaire is being produced that was sent at the end of spring 2023. The results will be integrated into the Digital Hub specifications by the end of August, an internal deadline set to concretise the advancement of the design of the Digital Hub Experience.

6. Design Strategy, Framework, and Initial specifications

This section lays out design directions based on the literature review, state of the art and primary research with the Food Hubs. At this stage, the specifications need to be flexible to accommodate incoming data and insights from the Food Hubs and other Work Packages.

6.1. Approach

- Many developed sustainability counters for chefs and recipes apps for citizens already exist. Our objective is to avoid redundancies and act as a catalyst and complementary platform.
- The final Digital Hub and related apps must be multilingual to be adopted in different European regions. SWITCH works will already consider content in 7 languages: the 6 languages covered by the Food Hubs (French, Spanish, Basque, Italian, German, Swedish) as well as English.
- Motivation beyond a desire to increase healthy and sustainable diets is required. This could be in the form of gamification, although there is doubt over its long-term effectiveness. Therefore an approach that highlights the financial and convenience benefits of such lifestyles should be explored. This is of particular importance for engaging with time-poor chefs, but also applies to citizens.
- Learning from social network theory, strategies should look to engage with both involved and not-yet-involved users. This could be done through the role of opinion leaders or community building resources.
- As well as providing users with information about healthy and sustainable diets, complementary context evolutions must be fostered to induce impact on subconscious choices, which are strong behavioral drivers. This needs to consider ties between specific design features of the Digital Hub Experience and activity implementations in the Food Hubs.
- Suggestions must be based on local data to make them as relevant and accurate as possible.
- Learning from the SU-EATABLE LIFE project, a focus should be made on the positive aspects of adopting healthy and sustainable diets, rather than the negative impact of not doing so. In addition, according to the Everyday Life Perspective cited in chapter 2.1, apps should facilitate all actions related to food choice, from selection to preparing and sharing food.

- Due to the problems of the contextual accuracy of environmental data, strategies should be explored that show macro-level data and heuristics instead of data around individual products.
- A new visual language should be introduced that fosters a new and strong impact on daily life of citizens, chefs and policy makers.
- The project must investigate the level of common functionalities and cultural dimensions versus what needs to be adapted to regional implementation to foster adoption.

6.2. App Descriptions

Here we quote the descriptions of the Digital Hub Experience and the three apps as given in the SWITCH proposal in Italics (Part B page 12, 13, 14). We also put in more detail and developments based on our early findings.

The Digital Hub Experience Platform

"A digital platform, designed to be an ecosystem of digital experiences in support of the multi-actor actions toward sustainable and healthy dietary shifts. The digital platform will be customizable according to the specifics and needs of each Hub. SWITCH aims to connect farmers, chefs, consumers, scientists, civil society, policymakers and many other people together, which have different cultural backgrounds, work environment, perceptions, behavior, age, technical competences, etc. Each actor will enter their specific Hub through the main platform. They will then be redirected to the page dedicated to their Hub and needs." - From the SWITCH Project Proposal

The Food Hub platforms and experiences are expected to increase knowledge and facilitation and connectivity among actors, including citizens, making it easier for consumers at all levels to access affordable, safe, traceable healthy and sustainable food (direct sales, restaurants, distribution, etc.).

Names of the different components are provisory. A final naming strategy will be proposed to the next annual consortium meeting, according to advanced specifications, available domain names, regional implementation strategy, etc.

The Digital Hub Experience will provide the common platform on which the three other apps are built, bringing together the specific services and data of the MySmartFork, The ChefsFork and the FrameFork apps. It will also provide links between hub activities, practices and methodologies.

The Digital Hub Experience aims to support research, experimentation and studies on the tension between common and adaptive features to ensure local adoption but also mutualisation of data and resources.

The Digital Hub will act as a global portal for the apps (European level), which will be complementary to MySmartfork and ChefsFork which entry points are meant to be anchored at a local level.

MySmartFork

"A digital tool to

- *Engage citizens in hub activities*
- *To inform citizens about healthy and sustainable diets*
- *To collect data about the citizens food choices and behavior (in response to the project action)"*

From the SWITCH Project Proposal.

A central part of MySmartFork will be around aggregating existing resources from around the world and from the individual Food Hubs. This will be a way to simultaneously engage citizens in Food Hub activities as well as informing them about healthy and sustainable diets.

How we will collect data from citizens is still dependent on developments from other tasks and work packages and will be developed for 2024. In parallel, we are considering existing resources to foster synergies, such as Plantjammer (referenced in Figure 5), as an engaging way to gather data from citizens.

We also consider adding an indicator of engagement for each hub as a central metric to track the activities of each Food Hub over time.

ChefsFork

"A digital tool for chefs and cuisine professionals to evaluate the sustainability and nutritional value of recipes. Includes a collection of recipes from important chefs." - From the SWITCH Project Proposal.

Several tools dedicated to chefs already exist, with a limited impact. Our effort is to provide more specific "chef-centered" service, providing a new value proposition. This includes internal benefits for the restaurant or companies, but also insights for the final clients. The work will investigate local relation between chefs and producers, but also global vision to foster exchange between regions according to seasonality evolution.

We also consider adding an indicator of engagement for each region as a central metric to track behavior over time.

FrameFork

"A digital tool for policy makers to aggregate and link dynamics and trends of food data and behavioral changes observed by SWITCH (and more generally from other databases) to identify factors that can transform the food agenda" - From the SWITCH Project Proposal.

This application will be based on data acquisition from the previous apps, observations of human perception monitoring, behavioral change monitoring, as well as data collection and processing from WP2, 3, and 4. Therefore, this app specification will be considered starting month 18.

6.3. Considerations

Ethical Considerations

The requirements of marginalized (vulnerable) people will be investigated and taken into account during the development and implementation of digital tools. We must ensure that the most marginalized are not excluded by technological tools. This will be developed in collaboration with WP4. We will use frameworks such as "Prioritarian principles for digital health in low resource settings" [39] to guide this work.

7. Design Proposal

To develop exchanges with other WP, with the regional Food Hubs and to start with final users, here we materialize strategies, frameworks and specifications in sketches of tangible forms. Accordingly, these propositions will evolve with specification refinements and the evolution of data flow.

7.1. Structure

The Digital Hub Experience is the landing point of the app ensemble. We propose it as an un-regionalised version of the citizen's MySmartFork App. Upon entering location data, the Digital Hub Experience becomes the MySmartFork app which will be specific to the Food Hub. Other links from the Digital Hub Experience will lead to the Chef'sFork app and the FrameFork app.

7.2. Digital Hub Experience

The Digital Hub Experience is aimed at a broad audience from around Europe. In order to be adopted across European regions, it should be available in English, and the 6 other languages of the SWITCH Food Hubs. The name and URL of the Digital Hub Experience and apps will be decided in the annual consortium meeting. This will allow learnings from deliverables produced in 2023 to be integrated and will ensure ongoing coherence.

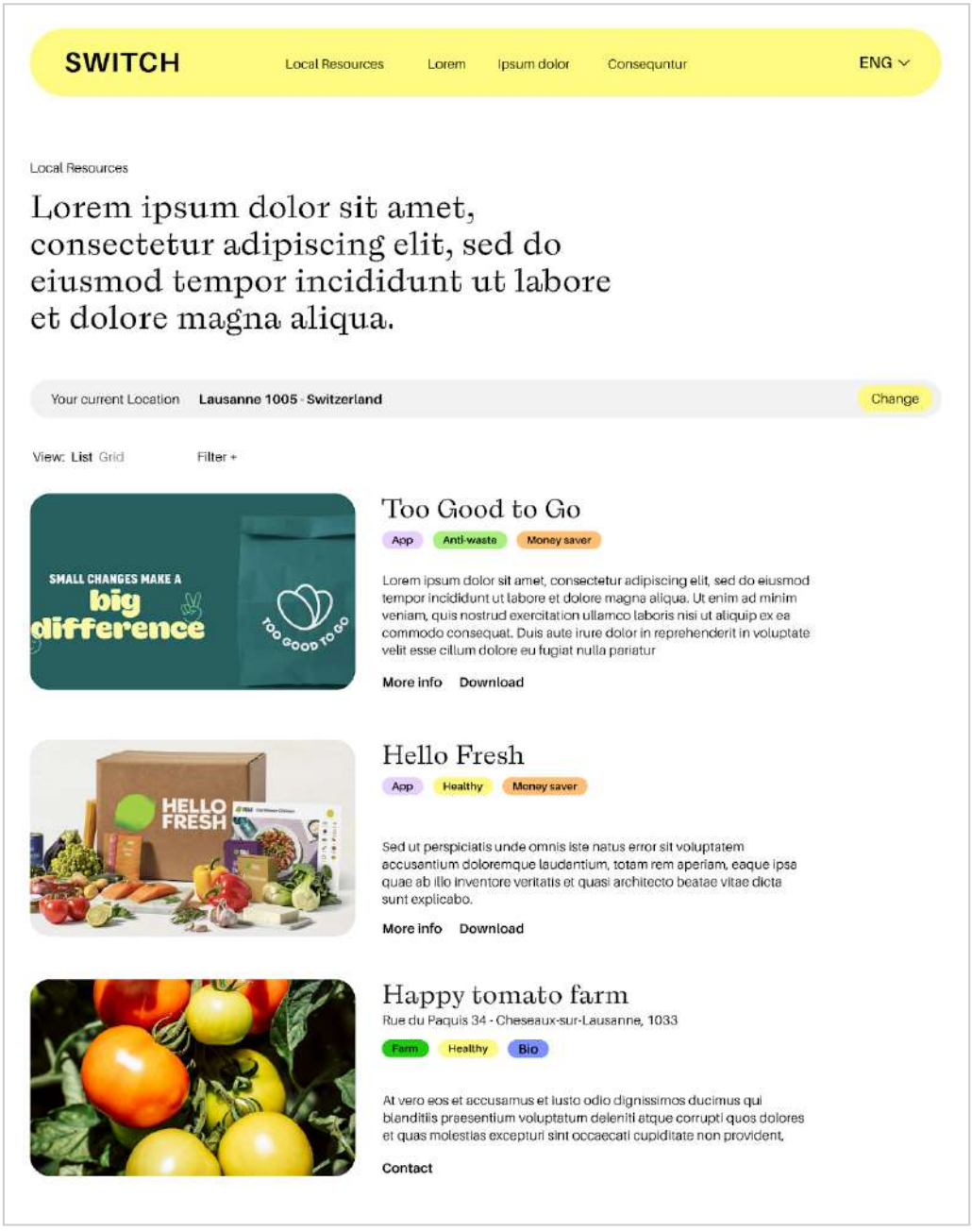
In order to accommodate the varied yet overlapping needs of the different apps that comprise the Digital Hub Experience, we propose a modular structure. These modules are described below and have been embodied via a visual representation. These do not represent any study of graphic identity, but instead aim to provide a pragmatic translation of current concepts.

Policy and Chef Module

These will be summarized versions of the ChefsFork and FrameFork apps, detailed below.

Resource Module

The Resource Module will give listings of suppliers, shops, products that support healthy and sustainable lifestyles. It can also include links or summaries of relevant articles from trusted sources on the same topic. As many resources have been developed around food and healthy diets, the list also includes existing websites, tools, apps, such as carbon calculators or recipe planners. It is important that this section highlights alternative benefits and motivations for engaging with these listings, such as low prices, convenience and low waste. This list can be filtered according to location or various tags.



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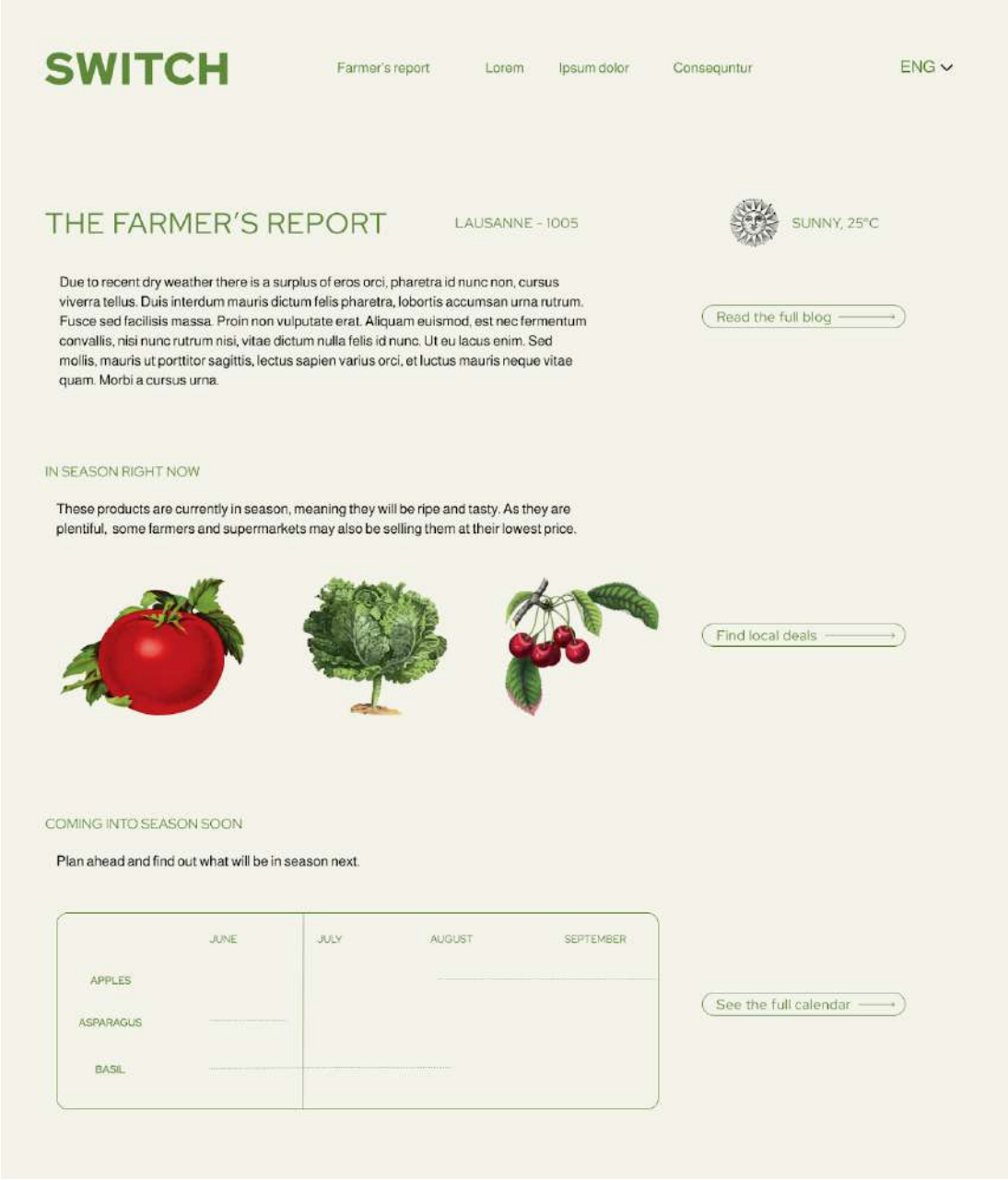
Report / Forecast Module

This section presents regularly updated information about current trends in food production. This can be related to overlapping parameters such as seasonality, ripeness, price and weather. The aim is to provide users with unique insights and new knowledge into what foods are currently in season or that will soon be coming into season based on data provided by farmers and weather predictions. It is important that this is regularly updated to keep users coming back to check it.



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Food Hub Module

This module gives an overview of the activities of each Food Hub, with some simple metrics to show their activity level. These metrics will be developed in collaboration with WP4 and WP5. They should be recorded over time with the possibility to look back in time The module could also include a call to action for future Food Hubs to join as well as a link for citizens to be redirected to their regional Food Hub page.

This is also the gateway to the different regional MySmartForks.

7.3. MySmartFork (Regional)

The Regional MySmartFork app shows local versions of the following modules from the Digital Hub Experience.

Resource Module

- This will look to promote and make visible local producers and actors and to link them with their local public.

Report / Forecast Module

- This will give users new knowledge of local food trends in price and quantity depending on season and economics.

Hub Module

- This will promote local Food Hub activities to the local public.
- We will also promote the role of “opinion leaders” by highlighting local individuals who carry local expertise on healthy and sustainable diets and allowing the local public to be in discussion with them.

7.4. ChefsFork (Regional)

This is based around aggregating indicators which are of specific interest to chefs such as production scalability, economic and consumer insights.

A key component is around the idea of an interactive tool for chefs and restaurants to find suppliers that fit their ingredients needs. By inputting certain parameters, a list of local suppliers and their contacts would be provided. This could also include indicators for blockchain certified suppliers (Posti's technologies).

The Chef's Fork app could also contain a local version of the Report / Forecast Module for chefs to plan ahead with seasonal menus.

7.5. FrameFork

The FrameFork app, aimed at policy makers, will also aim to provide a new perspective on data regarding healthy and sustainable diets. It will aggregate access to policy frameworks at the European, national and regional levels, and aggregate essential indicators for policy making, like production and consumption data, average diets evolution, etc.

As previously discussed, the full specifications will begin in month 18.

8. Following work

In the next semester, between June 2023 and January 2024, which we see as a pivotal point in the design process of the Digital Hub Experience, we will refine the propositions given in this document. We will also react to comments, suggestions and completed work provided by other work packages and tasks and integrate them into our work. We will conduct further stakeholder research, states of the art and literature reviews focusing on the targets of each of the three apps.

By January 2024, two months ahead of D6.5 “First version on Hub digital experience” we will:

- Present an advanced concept for the Digital Hub Experience including structure, data requirements and design elements to the consortium at the annual consortium meeting. This way we can get feedback before the deadline of D6.5.
- Use results provided by WP2, 3, 4 and 5 in December 2023 to propose a workshop on an advanced concept for the Digital Hub in January 2024, as an adjacent session to the annual consortium meeting with other members of the consortium. Work Package 2 and 3 will be able to provide further clarity on data regarding food systems and dietary behaviors. For WP4, this could be insights in how the design of ICT-mediated tools should consider ethical issues such as limited (digital) literacy. For WP5 this could be that the tools consider insight on types of actor connectivity..
- Give a strategic proposition and implementation plan for the design of the Chef’s Fork and MySmartFork apps.

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