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D1.2: User Scenario Definition

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This deliverable is about the detailed process from turning the user requirements into tangible design and concept ideas. The document describes the individual steps, intermediate results and connections to other work packages. It also includes a preliminary product roadmap and an updated version of the CPN user scenarios.

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EXECUTIVE SUMMARY

The purpose of this deliverable is twofold. By taking a look back, it aims to explain the development process over the last few months, documenting the steps that were undertaken by the user partners in collaboration with the technical partners to advance the development of a CPN service, by detailing user requirements, writing user stories and developing first drafts of a potential user interface. All steps will be described, connected and results shown, including a refined version of the User Scenarios, but also a set of more specific use cases for those scenarios.

Looking into the future, the deliverable also aims at taking all the work and the experience from these first steps into account to draft a first version of a product roadmap - the pilot plan - to cover and detail the elements of all three pilots, from the requirements and ideas to the evaluation. This plan is there to help all consortium members keeping a clear overview of where the focus lies in a particular phase of the project. This pilot plan is set up as a living document and will be further detailed and refined throughout the project lifetime.

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ABBREVIATIONS

CPN	Content Personalisation Network
GDPR	General Data Protection Regulation
PDR	Personal Data Receipt
v1	Version 1
API	Application programming interface

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1. INTRODUCTION

The initial project phase was defined by the research of existing personalisation technologies, comparison of applications and the gathering of user requirements for a CPN solution. Over the last six months, the project has used this information to formulate a better picture of how CPN should be set up and what is needed to do so. While the technical partners have documented the technical requirements and started to implement the first prototype, based on the initial requirement set, the user partners have refined those user requirements through user stories, first user interface scribbles and evaluations and finally a wireframe model of a possible CPN application.

In this deliverable, we will describe these efforts from the last six months and give more details on the different steps of the process and its outcomes. Guiding through the process, we explain how each single step was undertaken and how it is connected to the following ones, leading to an updated version of the user scenarios, a set of use cases for those scenarios and a set of wireframes, visualising a future CPN app. All of these results were shared with the technical partners, aiding and guiding them in their work.

To get a better picture of where the project is headed, we also take a look ahead towards the next steps the consortium will have to undertake to realize the CPN prototype and possible derivatives. For this, the deliverable contains the current version of the pilot plan, an overview over the different elements the project aims to develop and analyse on its way to create an innovative personalisation solution, with one focus a recommendation engine, for the news and publishing business.

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2. PILOT PLANNING: AIMS AND EXPECTED RESULTS

The development work in the last months was done following a lean startup design method, using two-week long sprints to discuss the next steps, implement them, evaluate them and discuss the next tasks. This gave both sides, the technical partners and the user partners, time to evaluate the first vision of the CPN solution as well as refine the aims and expected outcomes. All these thoughts went into the following pilot plan, an overview of the three foreseen development and evaluation milestones (pilot 1 to pilot 3).

To better plan and structure the coming work for the remaining 18 months of the project, and to give a better overview over the different elements of the CPN solution, the Pilot Plan was split into three streams:

- a CPN Service stream: Covering all technical modules necessary to build the CPN personalisation service, including the GDPR and licensing elements
- a CPN App stream: Covering all apps and interfaces building on top of the CPN Service
- a CPN Analytics Stream: Covering all the topics that the project wants to analyse in regards to personalising news, that are more complex from a media point of view

While the streams are aimed at giving a better overview for the different areas the consortium is and will be focusing on, the outcomes of the items in the different streams are connected and interlinked. Some of the results from the analytics stream are directly influencing the development of the recommender for example. So, the plan offers both a view of the individual tasks to focus on, but also gives a holistic view of the overall development process.

The plan was set up as a living document to be modified when new developments arise, or things need to be changed due to updates from the evaluations or other input from the design process. It is hosted online and accessible for all project members in order to see and discuss the project road map. In this deliverable it is included as an overview in an early stage, focusing strongly on the tasks of Pilot 1. The following pilots will be defined in more details over the coming months.

While this Pilot Plan combines the aims and expected results and will be working as a product roadmap, the User Scenarios and the Use Cases listed in the following chapters of this deliverable are a guideline for the developing process. They were an underlying element, when creating the pilot plan and will be kept as blueprints and visions of the ongoing development and evaluation process. They are going to help the consortium to keep in mind what we are aiming for.

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2.1. THE SERVICE STREAM

The service stream (see Figure 1) focuses on the main goal and outcome of the project: personalisation as a service infrastructure with an innovative recommendation engine, fully GDPR compliant and widely usable via API access.

All modules are assigned to the pilot version they are planned to be implemented into. Wherever a module is going to be refined in a later version, it is addressed respectively in a higher pilot version, e.g. the recommender module (Pilot: v1, Pilot 2: v2, Pilot 3: v3)

CPN	Pilot 1	Pilot 2	Pilot 3
Services Stream	Recommender v1	Recommender v2	Recommender v3
	- *Generic content based filtering* - *cold start fallback* - *Feedback loop (like/dislike)*	- Content & collaborative based filtering - Solution for overcoming cold start issue - Improved feedback loop, including feedback questions	- Improved version of v2 - Including results from Analysis stream
	Personal Data Receipts v1	Personal Data Receipts v2	Personal Data Receipts v3
	- Draft of Personal Data Receipts Layout & Details - Definition of necessary elements for CPN	- Integration of PDR into CPN App and API - UI Draft for CPN app - E-Mail version ready	- full integration of PDR into API, App - E-mailing of PDR feature integrated and fully operational
	DLT Licensing v1	DLT Licensing v2	DLT Licensing v3
	- First draft of DLT Use Cases - Draft of future implementation	- Integration of DLT module - Demonstration of functionality	- improved integration of DLT module - demonstration of functionality
	Rest API v1	Rest API v2	Rest API v3
	- First version of CPN Rest API - Allows to distribute results from recommender, PDR	- Updated version of CPN Rest API - Including new features regarding recommender, PDR and other new features	- Final version of the CPN Rest API - Allows for integration of CPN Services into other news outlets back- and frontends with full functionality of CPN Service
		Analytics on News Items v1	Analycits on News Items v2
		- Updated version of CPN Rest API - Including new features regarding recommender, PDR and other new features	- Updated version of CPN Rest API - Including new features regarding recommender, PDR and other new features
		Sentiment Extractor v1	Sentiment Extractor v2
		- Exploring the feasibility of extracting sentiment from news items for better filtering	- Updated version of sentiment extractor and inclusion in recommender

Figure 1: Overview of the Service Stream in the Pilot Plan

The main element of this stream is the recommender module and all its necessary side-modules (like entity extractor and others). It has been implemented in the first pilot in its basic version, but will be refined throughout the coming months based on

- ➔ user feedback from evaluation
- ➔ input from the different modules in the analytics stream (usage data)
- ➔ the basic user requirements

This stream also includes the modules for the Personal Data Receipts (PDR, to uphold the GDPR regulations) as well as the Distributed Ledger Technology for Licensing of content. The PDR has been drafted in Deliverable D1.5 in a first version, which will be evaluated and refined for the following pilots. It is furthermore planned to transform it from the draft version into an integrated module in the CPN service structure, so as to be available out of the box for CPN users.

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Going beyond the Pilot 1, this stream also contains further upcoming modules, that might become part of the CPN service, once they have been tested and refined through user feedback and are ready to be implemented. One of those modules is focusing on a possible sentiment extraction from the articles to be used for a different approach in personalisation. Other ideas might still be added following the evaluation of the first prototype.

2.2. THE APP STREAM

The application stream (see Figure 2) puts its focus on the different output modules, like the envisioned CPN app, which will be used for demonstrating the CPN recommendation algorithm and possibly to offer a multi-content-solution. It contains the clickable wireframe model of the envisioned CPN app, which will be a model for the second version of the app prototype.

The stream contains other output formats, that the CPN recommender service can connect to and which the consortium is planning to experiment with, either directly itself, or through other media companies that are going to engage with the CPN service. These formats range from a possible personalised newsletter format to a live web integration of the service.

Again, all modules are listed for the pilot they are envisioned to be realized in, or respectively with updated versions based on a previous pilot.

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CPN	Pilot 1	Pilot 2	Pilot 3
App Stream	**News App v1**	**News App v2**	**News App v3**
	- Basic CPN user interface - web-based - for demonstrating purposes mainly, first evaluation	- Evolved CPN User Interface - mobile application - demonstration purposes and evaluation	- Final CPN User Interface for multi-content app - mobile application - demonstration of CPN features, multi-content access and evaluation
	Clickable Wireframes	/ (integrated into app)	/ (integrated into app)
	- Design Draft of mobile CPN App - Showcasing future design including envisioned features - for evaluation purposes mainly - blueprint for News App v2		
		Personalised Newsletter v1	**Personalised Newsletter v2**
		- regular newsletter, based on news outlet content, using the recommender - first draft/design concept - demonstration purposed - proof of concept	- improved version and workflow of v1 - demonstration purposed
		Web Integration v1	**Web Integration v2**
		- Integration of recommender API into news outlet website - personalisation of specific elements - experimental integration - demonstration purposes	- improved version of v1 - demonstration purposed
			News Bot
			- Integration of recommender API into messenger bot - proof-of-concept - demonstration purposes
			Smart Speaker
			- Smart Speakers for news summary using the recommender API - proof-of-concept - demonstration purposed only

Figure 2: Overview of the App Stream in the Pilot Plan

2.3. THE ANALYTICS STREAM

Building a well working recommendation algorithm means connecting a lot of different dots and making them work well together. Making it perfect for the end users requires a lot of evaluation of the behaviour and the expectations of users. This means there are a lot of open questions to be answered in regards to fine-tuning the algorithm.

In order to have a better overview of what we still need to focus on or were we need to find a better solution, we set up the analytics stream (see Figure 3). This stream brings together all the open questions about personalisation that we want to test, evaluate and eventually incorporate into the CPN system.

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CPN	Pilot 1	Pilot 2	Pilot 3
Analysis Stream	General Acceptance	Alternative personalisation strategies	Including Seredipity
	Because of recent data scandals, critic of algorithmic news and uncertainty about personal data, CPN will also use its evaluations round to evaluted the general acceptance of a service like this. The aim will be to understand what people are afraid of, when it comes to personalisation and to overcom these issues	Based on the standard methods of Collaborative and Content-Based Filtering, CPN will explore different aproaches to personalisation during the project lifetime. This will mainly aim for different approaches to getting the necessary data baseline and network connections.	A particular method to overcome a very specific criticism of personalisation is to offer user something unexpected, that doesn't fit their profil, but is still of interest to them in a way. This method is the digital equivalent of the serendipity feeling users got from reading a newspaper making their own selections. CPN will evaluate possible methods and evaluate them with its users.
	Feedback Questions	Mapping Strategies (keywords vs. interests)	Best Practices for Personalisation
	When a user dislikes a news item, what does that mean for the personalisation profile in regards to the different entities in that item? We are exploring the use of frequent feedback questions with the users, to overcome ambiquity in user actions, also testing whether users like this kind of interaction with the system or not.	CPN will explore the best way to map users intersts to the data extracted from the articles: Are interests the best way to connect to entities in the articles? Or are other aspects like mood, sentiment, values more promising?	CPN aims to collect a set of best practices, both on an editorial and a technical level for media companies to implement personalisation in their products. This set will include recommendations regarding personalisation methods, categories, necessary adjustments in articles, internal worklows - and other results from the items in the analytics stream.
	Cold Start vs Categories	How to handle Breaking News	Editorial prerequisites for good personalisation
	Personalisation algorithms need data in order to make predictions. So the problem is how to get started when a user first uses the service. There are two main solutions to do so: Having the user deliberately use the app a few times without personalisation and learn from their behaviour. Or asking them for interest categories. We will be testing both ways, including different ways of categorisation, evaluating what users like more.	Breaking News, from an editorial point of view, are news, that users need to see, because they are an interruption of the daily routine (e.g. natural disasters, a political crisis, outbreak of violence). The question we are trying to answer is whether this also goes in a personalised news setting, especially if a news items doesn't fit any of a users personalisation settings.	As part of the overall best practices, CPN will collect best practices from an editorial side regarding personalisation. What do newsrooms have to take in to account, when wanting to offer a personalised news offer, what formats work best, what channels are the most popular etc?
	News Summaries vs Background Info	Breaking the Filter Bubble	
	With the news-cycle having become a 24/7 business, we are constantly getting hit with news. Its become more difficult to keep an overview of what is going on. On the other hand people sometimes miss the details, only getting the headlines, sometimes also confusing. We will experiment with users finding the right mix between news summaries and background info.	Algorithmic news offers based on the users preferences are prone to deliver the user only a specific point of view on the new, maybe even leaving out topics completely, if they don't fit the users preferences. We are experimenting with different methods to overcome this so called filter bubble and will test and evaluate them with users.	
	Location based news	Fighting FOMO	
	We will take a look into what it means to get location based news, especially when users are often changing their location e.g. due to business travels. How do you connect the location to the news decision process and how do you overcome the content availability and possibly language issues.	In the current flood of news, many users experience a feeling of missing out on information if they don't check the news every few minutes. CPN aims to analyse ways of giving the users the feeling they are always well informed, without feeling the urge to check the service all the time.	

Figure 3: Overview of the Analysis Stream in the Pilot Plan

The questions range from a general level to very specific research aspects, e.g.

- ➔ Finding best practices for personalisation from a media point of view (societal and business goals)
- ➔ How to best handle breaking news on a personalised level?
- ➔ How to fight effects like the filter bubble and FOMO (fear of missing out)
- ➔ What could be alternative recommendation strategies, other than interest categories?

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3. UPDATED USER-SCENARIOS

The following chapter presents the current CPN User-Scenarios. Based on the versions from the DoW and the deliverable D1.1, these scenarios have been revised and supplemented, reflecting the knowledge gained throughout the process of the last months.

In order to properly reflect on all aspects of the CPN project and to help guide the development in all areas, some scenarios have been split into two, adding more details to certain aspects. Furthermore, we've incorporated the innovative components that could provide additional benefits and USPs to the platform. For this task the consortium has evaluated some current technologies as well as emerging trends, a complete overview of these suggestions has been provided in D1.3. While those innovative components will be further evaluated as the project advances, we have already envisioned how some of them could be integrated into the current user-scenarios.

3.1. USER SCENARIO 1: THE POWER NEWS-USER

The first User-Scenario is based on the initial User-Scenario of a frequent and critical news consumer as described in the DoW. The initial assumptions of usage patterns and challenges of news consumption that should be addressed through the project and provided the basis of this initial user Scenario have been validated with the help of previous work as described in D1.1. Here we intend to address critical, high-volume news consumers, who are interested in a broad array of news content but feel a sense of frustration with the current situation. This Use-Case shall carefully address various aspects of online news consumption, which may have a negative impact on the overall news experience. These aspects include information overload, fear of missing out, as well as lack of control, transparency and real and perceived filter bubbles.

> *Maggy Krafft, 33, is a hard working business administrator and an avid and regular news consumer. Her job requires her to stay on top of the news from around the world.*
>
> *"It is important to me to already get an update on the news in the morning, at home and during my commute, followed by updates throughout the day and background information in the evening. Previously I was relying on my social media networks, but it got very confusing and overwhelming over time. CPN now gives me the overviews I need, through a personalised feed, while allowing me to keep an eye on everything else that's happening and popular in the news. What's most helpful for me, is that I can control when I receive updates, and that they are adjusted in length to my availabilities, enabling me to focus on my work in-between. This way I'm not wasting time by checking news sites over and over again. And instead of an endless feed, CPN provides me with a curated selection of relevant articles according to my interests.*

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The easy setup of the personalisation and the choices for the format of the update are another big plus of CPN. I now get a short, spoken news brief on my smart speakers in the morning before I leave for my commute. During my train ride to work, I check on more details and some learning content now and then. The CPN algorithm makes sure that I always have enough content during the commute or in the evening, when reading the background materials and saved articles from the day. It analyses my reading times and interests and adjusts its offerings accordingly. And the more I use it, the better my feed gets. But I don't feel like missing out, because CPN makes sure that I do get something outside my profile every now and then mixed in.

Plus, I know that I can change my settings at any time. CPN gives me an overview of the data it has collected on my usage and allows me to easily edit it. It also shows me why I was presented with certain news - so if I feel like I don't get the right news, I can always adjust it manually or even turn if off completely and go back to the full news overview. And when I'm really fed up with a topic, I just mute it for a while.

Possible Innovative Components from D1.3:

- Smart Speakers/Chatbots:
  While Maggy Krafft takes her morning coffee or prepares breakfast a smart speaker like Alexa could provide her with an overview of news or a short podcast that relates to her evening reading. This is made possible as the CPN platform could be integrated to Alexa via Alexa Skills. The implementation of a chatbot or newsbot into the system would provide an additional user-friendly and intuitive interface for CPN.

- Highly Contextualized Data:
  As a possible implementation the mobile application could detect that Maggy is moving at a specific pace which indicates that she is riding the subway the app provides a collection of short articles before switching into the offline modus.

- Multi-Layered Personalization
  Possible advanced features could be the analysis of text complexity, hence the knowledge a person has regarding a certain subject and the importance of a particular topic within the social context and current events. This would affect the news offering for Maggy in regards to other interesting content.

- Data from Social Media:
  Already existing data from the social media sites could be transferred via the Outh API into CPN for recommendations or skipping the slow process of building a new profile for useful recommendations, given the users' consent.

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3.2. USER SCENARIO 2: THE DATA-MINDED SCEPTIC

The Second User Scenario is also derived from the DoW and especially addresses the needs of a User-Group that might be overly skeptical about news personalisation and in particular of the usage of their data and watches closely in which way companies address the customers concerns and implement GDPR policies. To cater for this group transparency, control and data protection settings must be especially highlighted and so create a more trustful environment for this particular user group who might otherwise shun personalised news applications. At the other hand, this Use-Case also addresses the primal requirements of the platform, as of being compatible with the GDPR.

> *After all the recent data-scandals with leaked personal data from social networks, 25-year-old Phil Schofield is very sceptic towards giving out information about himself to any service. At the same time, he prefers getting news recommended to him instead of going through countless websites. A friend recommended the CPN app to him and Phil is intrigued by its functionality:*
>
> *"What really surprised me, was the level of control I had over the app's data collection right from the start. It let me decide whether I wanted notifications, I could agree on the use of my location, or whether the app should track the time I spend on it - every step of the profile set-up felt quite comfortable. And even if you decide not to share any of this information, the app still gives you a news overview and lets you set certain features, e.g. time frames for news updates, just without tracking your data.*
>
> *Once you've logged in to the app, it still feels like you're in control about what you want to share, for example when you change your mind. It's quite easy because everything is in one place, and I don't have to search for any hidden features in the settings of my phone or get help from a forum or a service hotline first.*
>
> *The tracking in CPN just feels different from other apps, because it is so open about it and because it is so easy to see the data and make changes to it or even delete it. It also shows me why I was given certain news items, making it simple to retrace my steps - not like in some networks, where you keep scratching your head over something shown to you.*
>
> *My particular favorite is the Personal Data Receipt (PDR) - a simple, concise and easy to understand summary of what personal data are used by CPN, and how and where they are stored. The feature is implemented in the profile in the app, easily accessible, just as it should according to GDPR. I feel like I'm really in control over my data with the PDR, giving me overview, access and the way to modify data. If I don't like what's happening with my data, I can immediately enforce my digital rights and delete it all, including the app.*

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This transparency increases my trust in CPN and makes me more comfortable sharing more of my information for a better service, in this case more fitting recommendations. I really feel that with CPN I have a news app that takes users concerns seriously.

Possible Innovative Components from D1.3:

- Personal Data Receipt
  A transparent and easy-to-understand way for the user to see what data is being stored about them. More details can be found in D1.5

- Highlighted Transparency:
  For skeptical users the Personal Data Receipt will provide an extra confirmation that media companies take their concerns serious. Transparency shall provide the user with the ability to see what data about them is stored and how it is used in an understandable way, ideally, the provided transparency shall go even beyond the requirements of the GDPR. The users will always be able to make changes to their data, e.g. withdraw their consent for its use, change it, those functions should be easy to find inside the application.

3.3. USER SCENARIO 3: LIGHT NEWS USER

The Third User-Scenario represents the needs of an infrequent news consumer and is a further development of the Light-News User described in D1.1. This User-Scenario caters to a user group with reduced news consumption routines who may prioritise content from a single trustful source like a public broadcaster or their favourite local or international private news organisation. The infrequent user still wants essential updates and may value innovative features that adjust content to their current situation and may use different data sources for wholesome personalisation.

Addressing their needs is an essential task for media providers who intend to enlarge their audience and revenues, and support the civic assignment of in case of public broadcasters.

"There is way too much chatter and disinformation on social networks for me," says 51-year old Annika Klein. She prefers the news from her one trusted source. "I've been reading the news from my outlet for years, and I've come to trust them. But I have to admit that in today's world, there is just so much going on, that I can't keep up - and I don't want to either. Just getting the local news and something relevant to me when I travel to my daughter or from Prague, where I studied, would be enough. So I decided to give CPN a try, when my news outlet presented it on their website.

Now I get updates on topic collections like local news, events happening nearby, traffic and weather information, but also some interesting articles about what's happening in the Czech Republic. I only check the news every now and then, but CPN makes sure I still don't miss any of the important

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stories. It presents me with news summaries of the days I've missed and offers me more in-depth articles for when I want to read more.

I don't feel overwhelmed by the news, I still get updates on the most important things, and I can use CPN for entertainment when I have some time to browse exciting content. CPN limits the content in contrasts to the continuous feeds other applications, but sometimes I do want more and CPN has it ready for me.

What's pretty helpful is also that CPN knows when I'm traveling to my daughter, who lives a few hours away. So, I can read about news on traffic in order to avoid any jams, but it also tells me what's going on at her place, and sometimes suggesting me a wonderful art exhibit or a new play that's currently being performed in town. I love to surprise my daughter with tickets to something like this and usually share the links with her via mail - and then we both go out having a good time, leaving my phone at home. I don't have to worry about missing something important, because CPN has it ready for me, when I come back.

Possible Innovative Components from D1.3:

- External Highly Contextualized Data/Multi-Layered Personalization/Sensor Data: Using environmental or geolocation data provided by an API to CPN detects that Anika is at the moment in a place with very warm weather and may add some health tips, or science reports on global warming to her personalised feed.

- Automated, personalised summarisation:
  The Automated Summarisation functions would provide the reader with a fast update customized to their preferences.

- News Bots and Smart Speakers
  Similar possibilities as in user scenario 1

3.4. USER SCENARIO 4: THE PRODUCT MANAGER'S VIEW

The fourth User-Scenario takes the perspective of the production side, the editors and product manager responsible for the deployments of new technologies at media enterprises into the equation. As stated in the DoW, the CPN platform must provide value to large and small news organisations alike and simplify the process of content personalisation.

Mark Smith is a 44-year old Product manager at a regional European media organisation. He uses the CPN platform to perform content personalisation for his audience.

"Personalisation is everywhere nowadays, but when we experimented with different approaches in the past, nothing was quite right. It seemed like a

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costly undertaking to get the right developers and figure it all out to work properly. Plus, with the GDPR, it has now all become much more complicated making sure you properly deal with user data.

Implementing CPN, however, was quite easy and allows us to provide personalised content to our audience a lot quicker and with less resources.

The integration took a little bit of time, but the overall set-up and the connection to our content management system via the API was quite easy. CPN works like an in-between personalisation layer connecting our CMS and the output-channel we choose. What is even more valuable, is that CPN was designed with the GDPR in mind, which again saved us much guesswork and time. Our audience can easily see what kind of data we gather in the system and why to give permission or revoke it instantly when something feels not right or is not needed anymore.

CPN helps us a lot to stay competitive and to oblige to the new regulations at the same time. We decided to focus on the CPN service to offer a personalised service on our own app, but there is also the CPN multi-sourced content app, where we also participate as a content contributor next to other CPN users. We hope to win new audience groups, that are not familiar with our content yet and wouldn't find our content otherwise. The personalisation of CPN brings our content to the right audience.

A major help is the analytics we get from both the CPN service and the CPN app. Our editors can much better see which of their content is read by many people. They also get a better impression of when most of their content is being consumed. This information helps our editorial departments to produce better content, by identifying new trends on the content items and the style of articles readers like to read. While this does mean extra work in the beginning, the added information and the more specific focus of our content help bring in new readers and users.

We can also now source more information from freelance journalists using CPN because the Distribution Framework on the platform has given them an easy way to show and explain the licensing and payment terms to use content they have produced, and a way to recognise their work. If I think an article is likely to get a lot of reads, I can now choose to use a photograph or video from someone who uses 'per-read' payment terms and allows re-editing. I can also see the duration of exclusivity on content like political news, or economic reports, which I couldn't do before without lengthy paper-based negotiations.

Possible Innovative Components from D1.3:

➔ External Highly Contextualized Data/Multi-Layered Personalization: Information from Social Media API, Sensor API, Crowd-Sourced Data, Sentiment Analysis etc. and advanced textual analysis should provide insights on user preferences. Potentially the system could playback information on performance

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for images, visual elements and writing style or the users' knowledge about a particular subject helping Mark Smith plan more engaging content.

➔ Personal Data Receipts
A transparent and easy-to-understand way for the user to see what data is being stored about them. More details can be found in D1.5

3.5. USER SCENARIO 5: THE FREELANCER'S VIEW

The fifth User-Scenario will address individual editors and content creators and add innovative and useful aspects to content licensing.

Mark Wall is a 29-year-old freelance journalist whose work has been used and distributed by editors that are using the CPN platform.

"It used to be difficult for me to find the right outlet for my work because I'd have to be committed to a single content distributor who gave me fixed licensing terms and payment options. But now with CPN it's really easy for me to choose from among a set of existing licenses, which are easy for me to understand without the assistance of legal experts. I can also choose from a number of payment options for my content, all of which is recorded transparently. Any editor can now find my work on the platform and use my content with the click of a single button, and I get paid really easily."

Not only does CPN improve my connections to editors and distributors, it also lets me gather transparent feedback on how my articles are consumed and allows me to identify new trends on the content items and styles of articles readers like to read. This means I need to think about including different media types in my articles, including pictures, videos and infographics. I can choose to work alone as a single content producer, or work with others, in order to generate content tailored to what the market is asking for.

Registering with the platform and getting my content in front of distributors was straightforward and has led to more work than before. Editors at various large content distribution agencies also like the way that they know an article was produced by an established freelance journalist, with transparent pricing. I hope this new approach to single or multi-source journalism can cut down on all the 'fake news' out there.

Possible Innovative Components from D1.3:

➔ Distribution Framework
This is a blockchain-based framework for content distribution, including transparent license management and tracking. The framework is described in more detail in D1.5

➔ External Highly Contextualized Data/Multi-Layered Personalization
As described in Scenaerios 3 and 4

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4. FROM USER REQUIREMENTS TO FIRST VISUAL DESIGNS

With the user scenarios in mind, the user partners created a set of scribbles to visualise the requirements and to create a first version of a user interface as a basis for further discussion and further user feedback. The scribbles were also created in order to make the user requirements more tangible for technical partners and to better understand their meaning in terms of actual development (of code).

4.1. WHY CREATE SCRIBBLES?

Scribbles are a good and easy way to discuss and better understand user requirements, as they give everyone around the table a better idea of what a requirement means in terms of a feature or a user interface. They are usually just simple pen and paper drawings to get a point across, but because of their simplicity they can be easily improved, updated or renewed.

There are also a number of digital tools available that help people create scribbles, by providing basic shapes and elements. While this already goes into the direction of wireframes, it holds the advantage of being more easily shared across the web, which is most helpful in decentralised teams, such as the CPN consortium.

4.2. HOW DID WE CREATE THE SCRIBBLES?

In CPN, we decided to do several sessions of scribbles, before combining them into a single draft version to use for further evaluations. The user partners discussed the requirements during several sessions, to ensure a similar understanding of all of them. Part of this process was the creation of user stories for each requirement in the form of a short description of how a user would use/benefit from a specific requirement (see example in Figure 4).

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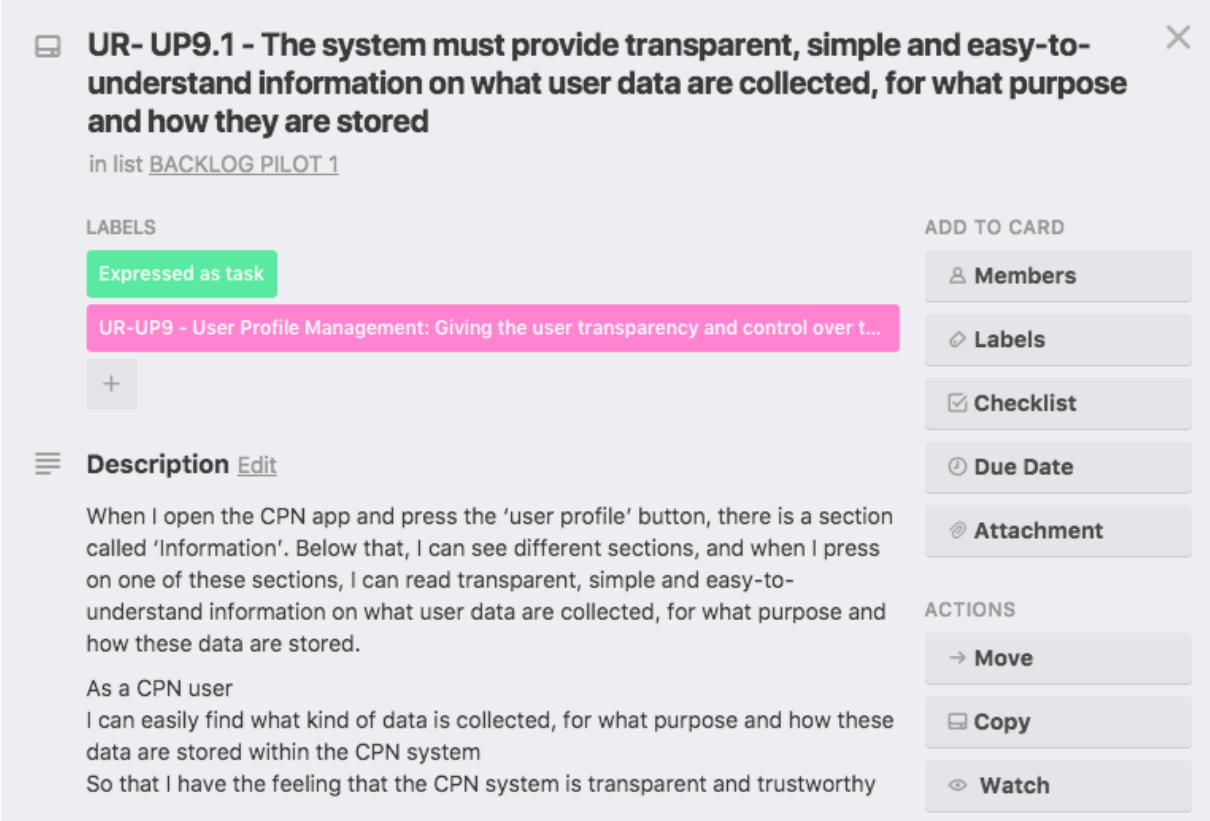

Figure 4: Example of a user story, connected to a specific requirement on trello

Based on the outcome of those discussions, all user partners started creating their own set of scribbles for a first version of a CPN mobile application. As can be seen in Figure 5, the outcomes were quite similar - showing that there was similar understanding of all user partners about the requirements. In another round of calls, VRT, DIAS, IMEC and DW discussed the scribbles and the differences, creating both a list of final decisions as well as open questions that needed to be validated with real users.

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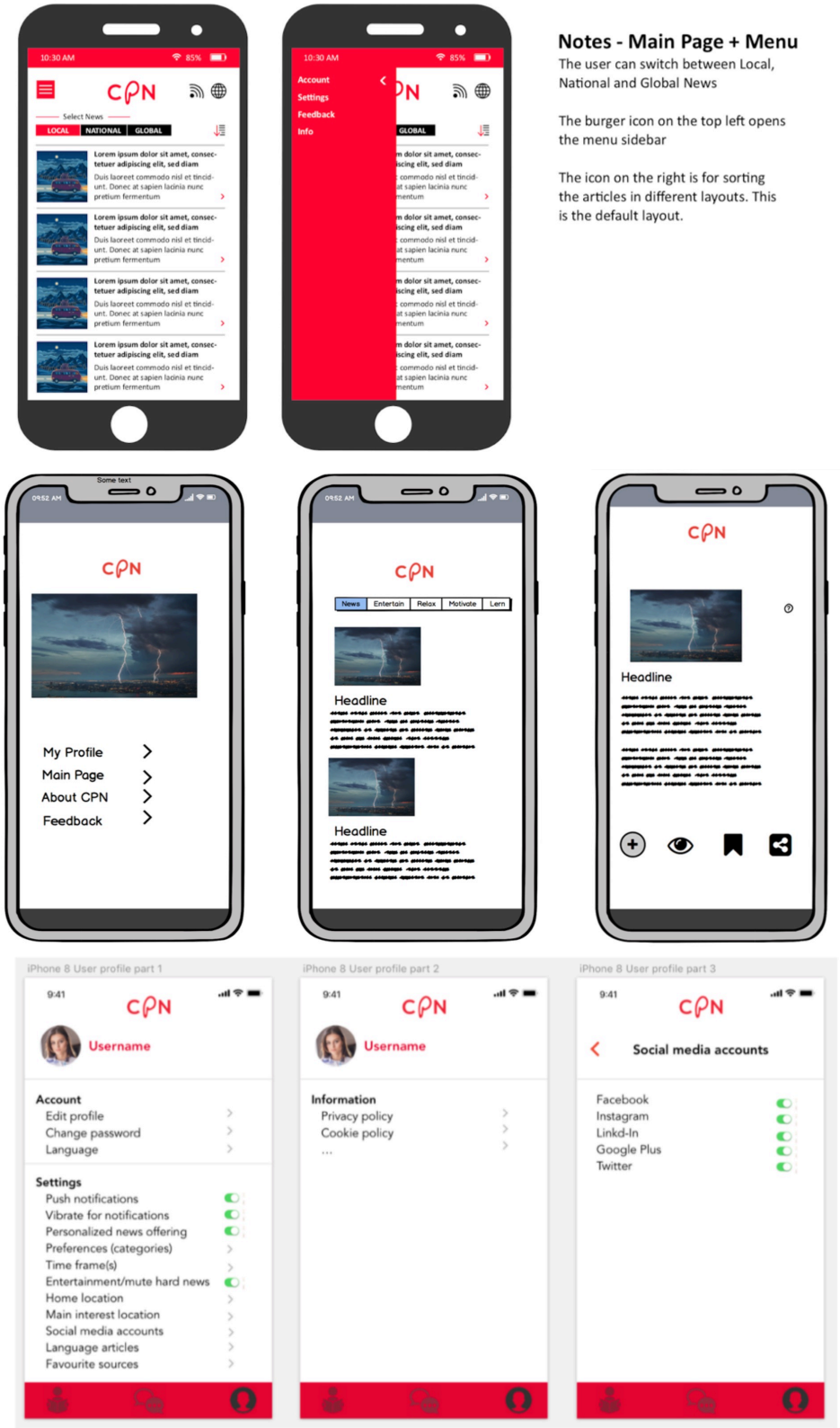

Figure 5: Scribbles of the user profile during the first round of discussions

The output of those discussions was for one a single set of scribbles, combining all

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ideas from the previous process into one design, as well as a list of features with different ideas among partners that needed to be validated by real users.

Using its livinglab, imec did a small evaluation to validate whether people would understand the general concept of the envisioned design, but also to gather opinions on such open questions like the number of registration screens, feedback questions or transparency elements in the user profile.

4.3. THE RESULTS

Even though we had several rounds of discussion, making sure that we had a similar understanding of the user requirements, the individual scribbles showed that there was still room for interpretation, leading to different designs in the first round of scribbles.

In order to come up with one single, testable version of scribbles, the user partners quickly agreed on most issues, keeping some open for discussion and evaluation. The final set of scribbles (see Figure 6) hence contained several open questions, with different design solutions to them.

These open questions touched the following topics:

- Registration process and data access
  When would users be more willing to agree to notifications, location tracking, etc.?
- Transparency on personalised news offers
  Why was this offered to a user?
- Feedback for improving the algorithm
  Are people willing to give direct feedback for better recommendations?
- Transparency in personal data usage
  How would people prefer to see what's being stored about them?

Some of these questions were presented in two alternative ways in the scribbles, so users could state their preference, in other cases the users could state their approval with a solution at hand but would also be asked about the satisfaction of the displayed way and its limits.

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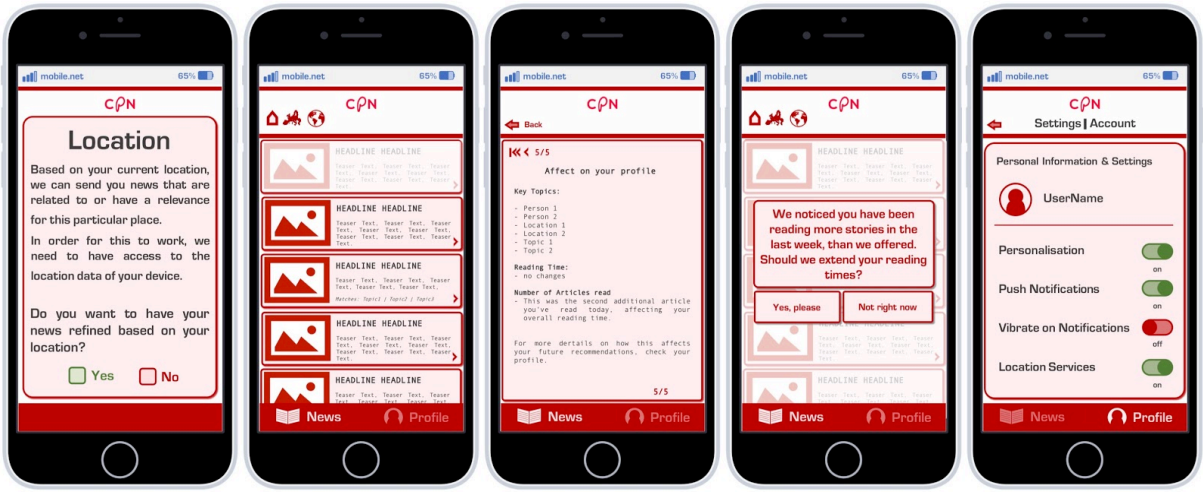

Figure 6: Examples of the final set of scribbles used for evaluation with users

The final version of the UX-scribbles has been evaluated with test-users in five evaluation sessions conducted by imec in Belgium. The test users were asked to answer detailed questions regarding their impressions and expectations of the various functionalities represented in the scribbles.

The evaluation showed that we are on the right track of setting up the CPN service, but also the necessity for both a more elaborate prototype/interface and more in-depth analysis steps regarding some envisioned features in the app. On the one hand the users valued the transparent setup of the onboarding process as well as the design of the profile inside the app, allowing them to clearly understand what permissions they are giving to the app and how to revoke them. They also liked the general setup of the app, as it was based on familiar app-designs, including some of the possible interactions, like swiping left or right to delete or open an item.

On the other hand, some users rather felt overwhelmed by the information about how the algorithm works, e.g. when showing them how reading an article would change their profile. A similar skeptical reaction was notable when evaluating the feedback questions. Some users considered them as unnecessary, others would only accept them if they wouldn't show up too often (max once a week), and the majority considered them too intrusive the way they were scribbled. This clearly calls for more analysis into this aspect, as it concerns the proper function of the recommendation at the core of the CPN service.

This aspect will have to be evaluated in more details during the actual pilot test phases, using the refined wireframes, as it also became clear, that people thought the scribbles were already a near-final version of the user interface. More detailed results about this evaluation will be available in the deliverable D4.2

The results from the scribble exercise and the evaluation were integrated in the design process of the CPN Wireframes.

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5. DETAILING THE USER SCENARIOS

The user scenarios from chapter 2 give a good idea of how CPN is going to make consuming news easier for users, how it will help media companies implement their own personalisation service and how it will allow freelancers to better target their audiences wishes and track the usage of their stories. Still, the stories leave a lot of room for interpretation when it comes to developing the technological components and the user interface.

In order to narrow this gap, we created a set of so-called use cases based on the scenarios and the development in the project so far. Use cases are short descriptions of typical user behaviour patterns and processes (e.g. the registration or checking the user data profile) within the CPN system. Mapping them to the user scenarios gives a more detailed picture of how the users interact with the system. The use cases are created with the idea of news consumers using a news app on their mobile device as their main tool to consume news, on the go, at home or at work.

While most of these use cases overlap for several scenarios, there are some use cases that only apply to one specific use case. These use cases are not final in their current state. Depending on user feedback during the evaluations but also due to natural changes throughout the development process, the Use Cases will be adjusted, refined, or complemented with new ones in the following months. Also, the thresholds and exact numbers (e.g. of articles to be taken into account for a first personalisation profile) will be filled during the following evaluation and development stages.

5.1. USE CASES FOR SCENARIOS 1 - 3 USER PERSPECTIVE

For the news consumer focused scenarios, we look at the usage process from registration and set-up to using the CPN system in different ways. We differentiate between users who use the system a lot (which has quite an impact on the quality of the personalisation based on the larger number of data available) and user who check the system more on an occasional basis. We also take a look at users not willing to give access to all data-points (like reading time or location) and how that changes the process.

5.1.1. Registration Use Case

1. User opens app for the first time
2. The welcome Screen with the respective logo and slogan is shown
3. A short intro text appears, explaining the purpose of CPN and in brief its basic functionality with a register button
4. Clicking the Register-button, the user is taken through the process starting with an e-mail and a password entry (as unique identifiers)

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5. This is followed by requests of permissions for notifications, location, tracking of reading behaviour, including clear explanations
6. All requests are shown one after another, users can maneuver back and forth to make and change their choices.
   (this step will be evaluated versus a one-page solution)
7. The registration process finishes with one last overview of all permissions (and the possibility to make last changes) before entering the news section.
8. Clicking on finish opens the news overview, with the "Your News" active

5.1.2. First Time Usage (no personalisation data available yet)

The approach described here is a first option to overcome the cold-start. It will be evaluated and challenged by other options in Y2.

1. Upon opening the app, the user automatically sees the personalised news tab.
2. The user gets shown the most recent 10 articles of the day, which are not personalized
3. A welcome message is shown, explaining the three different tabs (personalised, headlines, popular) and why this first news offer is not personalised yet and how/when it will change
4. The user can get an overview of the articles, open the ones he/she's interested in
5. Swiping the articles to the left (in the overview) and confirming the dislike or disliking them (in the detail view of the article), marks them as something the user is not interested in
6. Swiping the articles to the right (in the overview) or liking them (in the detail view) allows users to mark an article as particularly interesting.
7. Articles the user opens and reads are internally marked as interesting and displayed as greyed-out in the overview.
8. After having gone through all 10 articles, and having reached the end of the list, the user is shown the "you're all caught up" message at the bottom.
9. If the user swipes up several times after having reached the bottom (with message) the user, a "Do you want to read more?" message is shown.
   a. If the user clicks yes, the next 10 most recent articles are loaded and displayed
   b. If the user clicks no, the "all caught up message" and the greyed-out articles from before keep showing.

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5.1.3. Returning Use Case

This is going to vary depending on the User Scenario

1. User receives a notification that a new set of news is available based on their set/identified reading times
2. User opens the app via the notification
3. App opens on the "your news" tab
4. Shows the number of articles that (roughly) fit in length and number to the tracked/pre-set users time-frame, taking the ranking in the personalisation profile into account
5. User reads through news, swipes away what they don't like, read the rest
6. All actions by the user get tracked by the algorithm (depending on what the users allowed) and taken into account for the personalised offering.
7. At the end of an article user decides that the topic wasn't interesting and shouldn't be kept, marks this
8. After reading another article the user decides, that this topic is important and swipes right on the article in the overview to mark it as important
9. Once the user has read through all articles, he/she gets the "you're all caught up for now" message
10. User swipes up again, and gets "Do you want to read more" message?
11. Says yes, the app loads another 5 articles, next in line according to the personalisation profile
12. The algorithm notes the number and length of additional articles and (after this was one several times, threshold tbd), changes the time-frame in the user's settings accordingly.

5.1.4. Interaction with feedback questions

Example: disinterest in topics

1. The user opens the app and goes to the personalised news tab
2. After going through the list of personalised articles, the user swipes an article to the left, because the topic doesn't seem interesting to him/her
3. Since this article is concerning a topic the user has disliked a couple of times in the last days, this triggers a feedback-question

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4. The user is told what the algorithm has detected (a growing disinterest in this topic) and asks what the algorithm should do?
   a. Show less concerning this topic
   b. Don't take this topic into account
   c. Don't do anything
5. Depending on the answer of the user, the algorithm takes the user's wish into account and changes the profile accordingly.

5.1.5. Personalisation with partial permissions (location)

1. User denies access to location either in the beginning or later from the profile
2. The user opens the news tab and gets an overview of personalised information based on their previous usage, but not on their current location
3. The location in the articles (extracted from text, as well as location mentioned as location of the event, as well as location of news outlet) is not taken into account for further personalisation
4. Location based on previous consumption of articles is taken in to account.
5. User is presented with personalised articles based on his/her behaviour only.

5.1.6. Personalisation with partial permissions (time-frames)

1. User doesn't allow the tracking of his times spent on the app
2. The User receives notifications whenever there is a new story fitting his/her profile to a certain percentage
3. The user opens the news tab through a notification or directly
   a. Through the notification the user is lead directly to the article view
   b. By opening the app directly, the personalised information is shown
4. The user consumes the new article/s, which is taken into account by the algorithm
5. If the user clicks the like button at the end of the article or swipes it right in the overview, the articles topics/entities get a special boost in the algorithm
6. If the user dismisses the article as uninteresting, the algorithm takes not of it.
7. Going back to the overview, the user is shown other articles that have a fitting rate below the threshold but are still personalised.

5.1.7. Personalisation deactivated

1. The user has decided to use the app without a login or disabled the personalisation in the settings of the app
2. No information is tracked about the user, no personalisation is offered

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3. When the user opens the app, it opens on the "Headlines" tab with all available news, not personalised
4. When clicking on the personalised news tab, the user gets an empty tab with a message explaining why there is not news and what to do do activate it with a direct link to the settings

5.1.8. Maneuvering the User Profile

1. Inside the app, the user switches to the profile page
2. The user checks the permissions he/she gave at the beginning
3. The user checks the "my interests" page with an overview of what the algorithm has tracked so far.
4. The user takes some of the interests and rearranges the priority of some of them by dragging them higher or lower on the list
5. The user mutes a topic for a specific time-frame, that he doesn't want to hear about
6. The user deletes some of the interests that don't fit the profile in his/her view
7. The user then checks on the read articles and deletes the ones that are not interesting, thereby taking out some of the entities from the interest list and lowering the priority on others.
8. Switching to the location overview, the user marks two places in his location list as especially interesting to him/her, including the definition of the location (as a city, region, state or other location of interest)
9. Finally the user checks the tracked reading time windows and adjusts them according to his/her personal taste.
10. The user then saves the changes he/she made and closes the profile
11. Getting back to the personalisation news overview, the user gets a new suggestion taking his/her changes into account

5.1.9. Changing priorities in personalisation attributes

1. User opens the settings and goes to the overview of data in his profile
2. User chooses the tracked topics overview
3. User moves two topics higher up in the ranking by long-touch and dragging them
4. User mutes one topic for 1 week by choosing the option and length directly for the topic
5. User closes settings and goes to personalised news overview
6. The system shows a new selection of articles (if available) based on the changed settings in the personalisation attributes

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5.2. USE CASES FOR SCENARIO 4 – PRODUCTION SIDE

The production side has so far not gotten as much attention in the design process as the user's side, which has to do with the fact, that personalisation changes more for the users. This was also apparent in the interview sessions CPN user partners had with their respective production departments. In the second year, CPN will have a closer look at this scenario though and highlight the aspects that are important for the production side and also detailing the following use cases.

5.2.1. Implementation of CPN

1. A media company wants to use CPN to offer their audience a personalised news offer in their mobile app
2. The company connects to the CPN Service via the CPN API
3. Both the companies CMS and their app are adjusted as necessary to interact with the CPN service
4. The company makes a decision (out of the package that CPN offers) on which type of personalisation they want to use for their app
5. Developers define the user parameters, they need to include in their setup and create the necessary tracking functionalities for their client application
6. The connections between the CMS, the app and the CPN service are set and tested
7. The Personal Data Receipt is adjusted to the data the company tracks about their users
8. The app goes live and delivers users a personalised news offer, fully GDPR compliant

5.2.2. Distribution of content via CPN

1. The media company decides whether it wants to only implement the CPN service or also play out their content to the CPN app
2. Once implemented, the company distributes its content both to its own app, as well as to the CPN app at the same time.
3. In the CPN app, the content is offered next to content from other media companies, that are participating in this process.
4. The users of the CPN app now get offered a larger number of articles and sources, with content being applied to their profile depending on their language settings
5. The user data for the CPN app is stored with CPN and available to the users as per GDPR

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5.2.3. Analytics

1. A media company is distributing its content in a personalised form based on the CPN service through its own app
2. The CPN service tracks the news items that have been opened and read, when they've been opened, by how many users and for how long users have spent on an item.
3. The CPN service also tracks those data points based on the keywords/topics related to a news item
4. The CPN platform makes available these services to allow to display a graphic overview of those numbers in the CMS of the media company
5. The editors can now see which articles and which topics were most interesting to people and when those items were consumed
6. The system also shows possible trends and connections, by showing analytics of what people read after that, what they saved or maybe shared via social networks.
7. The editors can now add new content targeting specific topics that user where most interested in, but also plan it better timewise in order to reach people with it.

5.2.4. License Management

1. A producer wants to include a news item from a freelance journalist
2. She sends the freelancer a request for a specific article, that the freelancer has produced through CPN
3. The freelancer replies with their settings and conditions to publish the article
4. The producer reads through the clear overview of conditions shown to her by CPN
5. She accepts the conditions with a simple click and receives the freelancer's article through CPN
6. She now passes the article on into the companies CMS and prepares it for publication.
7. Via the CMS the article is now available for the editorial department including all licensing information and possible publication restrictions
8. An editor can integrate the article in the company's publication.

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5.3. USE CASES FOR SCENARIO 5 – FREELANCER

The freelancer scenario focuses on the idea of incorporating a distributed ledger technology for licensing media content. This would allow freelancers to better track their work and help them to get adequate payment in return. The details of this are described in full in the deliverable D1.5 Content Licensing and Distribution framework, which also contains a long version of the use cases, foreseen for this scenario. To be consistent within this document, we repeat those use cases here in short form.

5.3.1. Single creator/single publisher

1. A freelancer creates a new article and wants to distribute it to a publisher
2. An interested publisher acquires the the exclusive rights to the content
3. He pays a one-time payment for the content
4. The freelancer uses the licensing tools, attaching a suitable exclusive license to his content
5. The freelancer connects an appropriate price to his content
6. The Publisher accepts both with a few simple clicks

5.3.2. Single creator/multiple publishers

1. A freelancer creates a new article and wants to distribute it to multiple publishers
2. Two Publisher are interested, but want to pay different prices for the content, because of different expectations regarding readers-responses
3. The freelancer creates a separate license for his content, including a payment-per-read price for one of the publishers
4. The publishers both accept their licenses with a few simple clicks

5.3.3. Multiple creators/single publisher

1. A photographer and a writer, both freelancers, want to distribute a jointly produced article together through one publisher
2. They agreed to own 30% (photos) and 70% (writing) of the content respectively, hence would share the rewards in proportion to their respective ownership.
3. The publisher wants a clear understanding of how the article can be shared and/or adapted to best fit her/his needs.
4. The freelancers attach a payment model based on their partial contributions
5. The publisher gets a plain-language version of the license including possible restrictions for publications (e.g. regional), as well as rights to adapt or amend the content.

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5.3.4. Multiple creators/multiple publisher

1. A photographer and a writer, both freelancers, want to distribute a jointly produced article together through multiple publishers
2. They agreed to own 30% (photos) and 70% (writing) of the content respectively, hence would share the rewards in proportion to their respective ownership.
3. Publisher 1 wants to publish the article, and arrange payments per number of times it is read
4. Publisher 2 wants to arrange a one-time payment with rights to adapt the article.
5. The freelancers produce two different license agreements attached to the content to match what the publishers want
6. Both licenses include plain language explaining regionality, and rights to re-use or adapt.

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6. FROM SCRIBBLES TO ACTUAL WIREFRAMES

The following chapter describes how the wireframes were created, taking into account the previous steps. This includes the scribbles as baseline and the results from the evaluation, as described in chapter 4, and the telephone conferences/ discussions on the design of the wireframes.

6.1. WHY USE WIREFRAMES?

The first visualisations (scribbles) made the user requirements more tangible, but for communication and testing purposes, it soon became clear that we needed a higher-fidelity solution.

We chose to consolidate the existing scribbles into one group of wireframes (see Figure 7). This brought us one step closer to a possible finished product, but it also had the advantage of a unified basic design and it gave us more flexibility to try out different interfaces and scenarios.

On top of that, linking the screens in customary app flows, laid bare some of the gaps in the user experience that are hard to solve with scribbles alone.

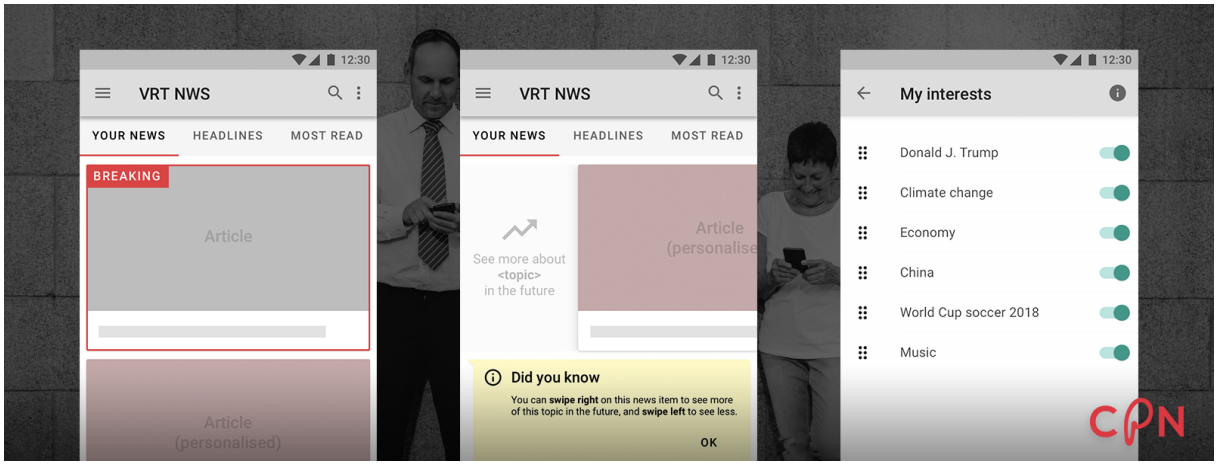

Figure 7: Examples of the wireframe interfaces

6.2. HOW WE CREATED THE WIREFRAMES

Over several discussions and telephone-conferences, the involved consortium partners agreed on a first set of UI concepts that best visualised the user requirements.

We then collected the existing scribbles and made new versions of the UIs in Sketch, the leading UI design and prototyping tool. We used the Google Material Design library to speed up and facilitate this process. The screens may seem as if they are

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designed for Android phones, but this is only the temporary result of our decision to use Material Design. In reality the screens and UI will be design agnostic.

We filled any gaps that might appear in the UI flows and cross-referenced each element with the user requirements in D1.1 (User Requirements Model) for pilot 1, plus some additional requirements foreseen for later stages. This was to ensure all of the UI concepts in the wireframes could be referenced back to the relevant requirements and, vice versa, to check there was a visualisation for each requirement.

We split up the wireframes in separate flows to keep them as simple as possible. While wireframes are excellent for communicating features and testing UI concepts, they are much less suited for complex interactions. Keeping functionalities limited to their own, dumb flows allows for greater flexibility. These flows also informed some of the user scenarios described above.

6.3. THE RESULTS

The result of our wireframing efforts is a living, regularly updated collection of UI screens and user flows (see Figure 8). The prototype can be seen in practice here:

https://sketch.cloud/s/4g1gm/p/cpn-screens/launcher/play

We decided the best form factor for the prototype would be a mobile app. This solution will most closely resemble future products that will use the CPN services. It also allows for easier testing and it will inform the development of the next version of the products in Pilot 2.

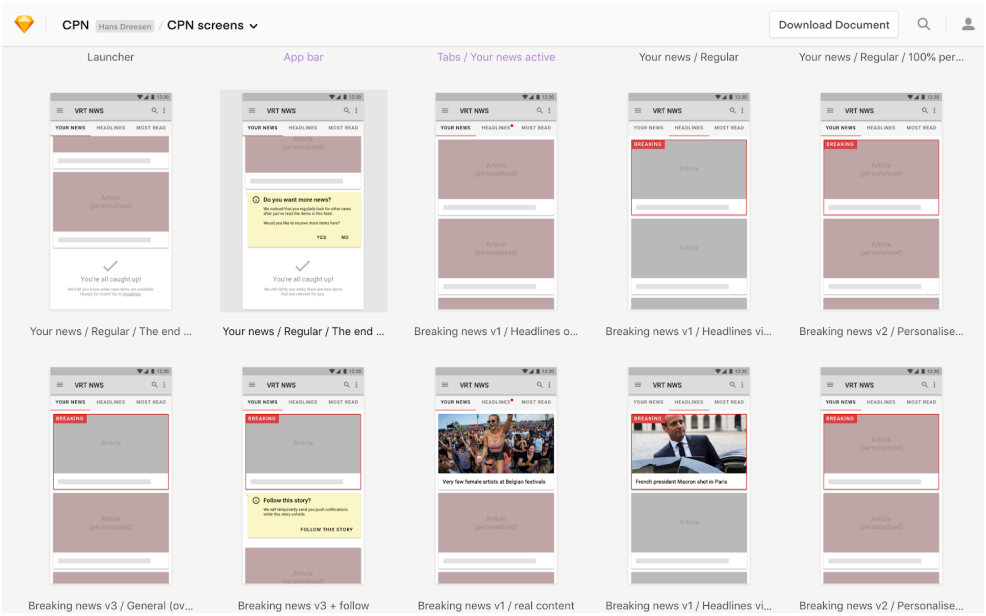

Figure 8: An overview of several different pages in the wireframe model

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The prototype is fully clickable. For some functionalities we made several versions to be used in further discussions and to test with users.

On each separate screen there are links to the relevant user requirements and further comments as a means of improving the design (see Figure 9).

E.g. https://sketch.cloud/s/4g1gm/p/cpn-screens/your-news-regular.

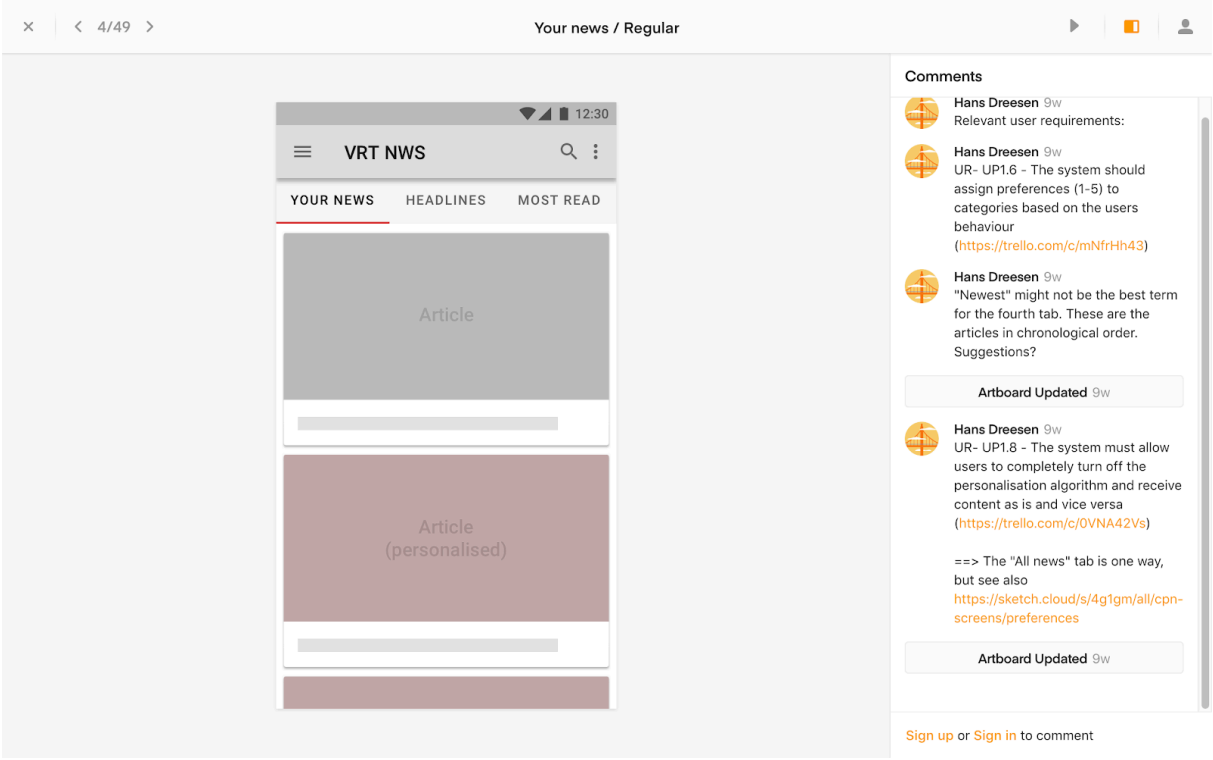

Figure 9: Example of how the wireframes are connected to the requirements and user stories

The final version of the wireframes model will be put to the test during the pilot 1 evaluation phase in M13/M14. Using the wireframe, users will be able to get a better picture of how a personalised news offer based on CPN services could look like. The wireframes then allow us to better evaluate the flow and the user experience regarding certain elements, such as the feedback questions, or the user profile with the overview of tracked data. While not using real media content and profile data, it will still be a good way to get a feel for what users like and where they see room for improvement.

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7. CONNECTING TO D1.4 TECHNICAL REQUIREMENTS

As mentioned before, this deliverable and all the results described therein, give more details to the development process. The refined user scenarios give everyone a better understanding of how the CPN system could be applied in the real world and how users will be interacting with it. The mapping of the innovative components to the scenarios shows how these components might be integrated into those models and where they might add additional value to users. Both the use cases as well as the wireframes give a deeper understanding of individual processes as well as the overall workflow of a CPN system from a user's point of view.

This is the connection to D1.4 Technical Requirements - while having been included in the process of developing those Scenarios, Use Cases, Scribbles and Wireframes, the technical partners used this information to better understand the underlying technical requirements stemming from these ideas. D1.4 now describes the process of how this information was used on a technical level to prepare the infrastructure for the CPN system. It details how the integration and fine-tuning of the modules already available was planned and realized.

While this deliverable gives an overview of the process from the user partner's side, there were a lot of discussions about details that had direct influence on the technical design and requirements. Those discussions are not included word for word, but the decisions made are incorporated in both the technical deliverable D1.4 and this deliverable D1.2

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8. CONCLUSION

As stated already in the introduction of the deliverable, the user partners have worked in close collaboration with the technical partners while developing the different elements described here. This way we ensured that the technical development always included the most current ideas and closely followed the users input.

Based on the included pilot plan, which will be further refined and adjusted, the project now has a central document to guide further development. It is central to the project's progress, that this document will now be extended by all partners, to include a clear connection between the individual requirements, the technical modules and elements of the CPN service, the interface design for possible apps and other output channels, as well as further analysis and evaluation of the different aspects of the CPN personalisation solution.

Adding all this information, step by step, will ensure, that no details are left out and that all partners see the connection between the user requirements, the current development and future work in the project.

The evaluation of the wireframes during the first pilot evaluation phase will give important insights from users' perspective for further development. The next steps will be to integrate the design ideas and the feedback from users into the second pilot prototype and move beyond the mere presentation of the recommender in the first pilot prototype. Combining both the wireframes and the first technical setup will lead to a usable CPN application, that can then be tested and improved further.

Last but not least, the CPN consortium will focus on the topics identified as to be analysed further (in the analysis stream). The user partners will create different models and apply different evaluation methods to get a better understanding of what works well for users and for the application to further improve the CPN system. The first steps will be to analyse the outcome of the prototype evaluation and see where users are most critical and find adequate solutions for these issues. What's most important is to set out and define the boundaries, thresholds and general settings of the personalisation algorithm. These questions will encompass things like:

- ➔ How to deal with several entities in one article, that the user dislikes, while they might also appear in an article the user likes
- ➔ After how many dislikes should we take an entity completely out of the list?
- ➔ How to make sure that there is still a certain amount of serendipity in the suggestions, allowing for the users to find something they weren't expecting?

Overall the progress made in the last year is a good basis to kick-off the second level of analysis on the way to an innovative recommendation engine. The cooperation with technical partners will have to be increased further and the user partners still

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have a lot of open questions to answer, when it comes to details. But the results of this first year show, that we are on a good way.

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