Analysis and UX Design of a Search User Interface for the next Enterprise Europe Network modules

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Version 1.6

Useless product by Katerina Kamprani

Introduction

This document is composed of two main sections:

1. A brief introduction to the User Experience design elements and goals.
2. The analysis of the five planes in which the design of the user experience can be broken into: Strategy, Scope, Structure, Skeleton, and Surface.
   In the Skeleton section, I present a proposal for a modular Search User Interface solution for mobile devices and desktop PC using wireframes that, based on the previous UX analysis, uses UI Heuristics, and Responsive Design principles, aims to improve the User Experience of the system.

1. Introduction to User Experience Design

1.1. The definition of user experience

The exact definition, as outlined by the International Organization for Standardization, is a "person's perceptions and responses resulting from the use and or anticipated use of a product, system or service."

There are many facets of our experience, none of which can stand on their own. For example, it is a common mistake to equate usability to user experience. Usability addresses whether or not we are able to achieve a task or goals with a product or service. However, simply being able to achieve a task does not give us the whole picture of how we felt about our experience.

Example: a great experience browsing an e-commerce website with a bad checkout process.

1.2. Morville's Honeycomb

There is a lot to consider if we want to understand the full UX, and Peter Morville breaks it down beautifully with his UX honeycomb:

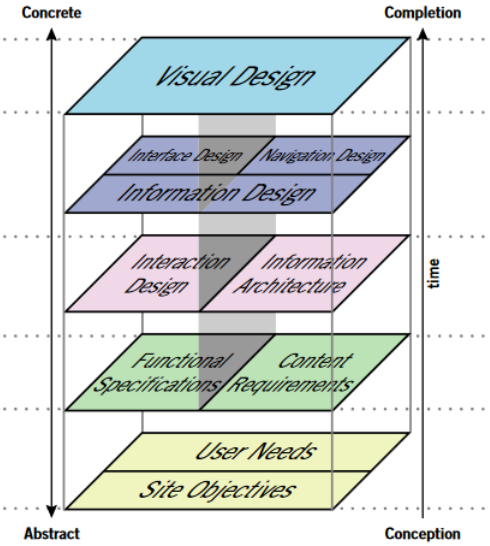
User Experience Honeycomb by Peter Morville

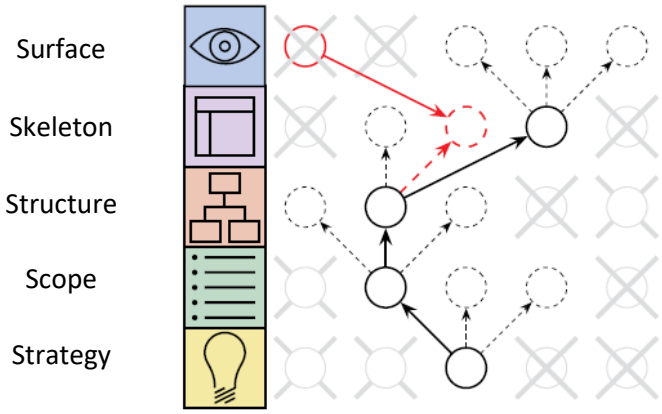
Creating a great user experience requires a user to answer these questions:

- **Usable**: Can you use it?
- **Findable**: Can you find it?
- **Useful**: Does it serve a need that you have?
- **Desirable**: Do you want to use it?
- **Valuable**: Do you find it valuable?
- **Credible**: Do you trust it?
- **Accessible**: Is it accessible to you?

1.3. The Elements of User Experience Design

This conceptual model of User Experience Design comes from Jessy James Garret, an American Information Architect and UX Designer, who among many other things, coined term AJAX.





Elements of User Experience Design by Jesse James Garret

The choices we make on each plane affect the choices available to us on the next plane above it. This ripple effect means that choosing an "out of bounds" option on an upper plane will require rethinking decisions on lower planes.

1.3.1. The Planes

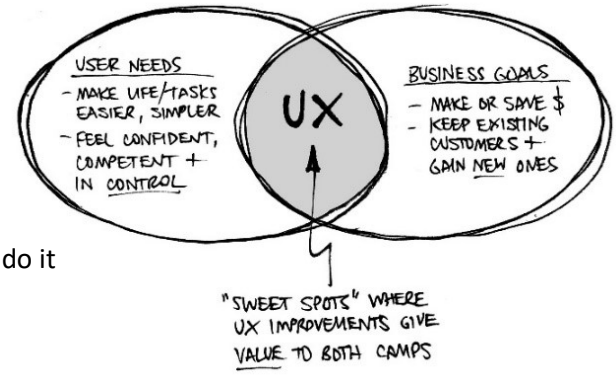
From bottom to top, conception to completion, abstract to concrete – in Design order:

The Strategy Plane:

- User Needs (Research) & Product (Business) Objectives

User Research to understand:

1. What users are trying to get done
   - **Gather context**
2. How do they currently do it
   - **Analyze workflow**
3. What could be better about how they do it
   - **Find opportunities**



UX: Intersection of User Needs and Business Goals by Joe Natoli

User Needs: goals for the system that come from the people who will use it. We must understand what our users wants from us and how that fits in with other goals they have. The activity dedicated to discover them is User Research.

Business/Product Objectives:

- Business Goals: Internal strategic objectives (i.e. increase competitiveness, innovation, sustainability of European SMEs, or to facilitate the meeting of supply and demand).
- Brand Identity: a set of conceptual associations or emotional reactions - an impression about the organization created by users' interactions with the product.
- Success Metrics or KPI: indicators we can use to track, after the product launch, to see whether it is meeting our own objectives and our users' needs.
  For example, how much time does the average user spend on the site during each visit, the number of times each day a search result is served to a user, the number of phone calls coming into our customer support lines, etc..

The Scope Plane:

- Functional Specification: detailed description of the "feature set" of the product (its Requirements)
- Content Requirements: description of the various content elements that will be required (rough estimates of the size of each feature: word count for text features, pixel dimensions for images or video, and file sizes for downloadable, stand-alone content elements like audio files or PDF documents)

The Structure Plane

- Interaction Design: how the system behaves in response to the user (options involved in performing and completing tasks);
- Information Architecture: the arrangement of content elements to facilitate human understanding (options involved in conveying information to a user);

The Skeleton Plane

- Interface Design: arrangement of interface elements to enable users to interact with the functionality of the system (providing users with the ability to do things);
- Navigation Design: set of screen elements that allow the user to move through the information architecture (interface design specific to presenting information spaces);
- Information Design: making decisions about how to present information so that people can use it or understand it more easily.

The Surface Plane

- Visual Design: the sensory experience created by the finished product. Content, functionality, and aesthetics come together to produce a finished design that pleases the senses while fulfilling all the goals of the other four planes.

Standard and OXO measurment cups - Source: UI & us

2. UX Design

In this chapter, I am using the UX Design concept briefly introduced before, and applying them to the analysis and design of a modular Search user interface.

2.1. Strategy: Business and User Needs

2.1.1. Business Needs

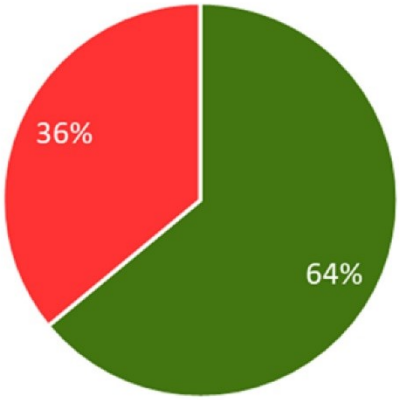
- IT team shared the inconsistency of the usability of the different search forms in various modules.

- With the exclusion of one instance, all the various search forms disseminated in the different modules are not responsive, and not usable with a mobile device.

- IT requested a modular approach to the design of the Search form, such that different instances of the same core object, with different components depending on the context of use, would be used in different modules or pages.

- The latest 2018 Satisfaction Index, regarding di European Commission web presence, shows the positive and negative votes given by users to different aspects.

Factors		Positive	Negative
Content	Up-to-date	9.2%	1.6%
	Accurate	8.5%	0.8%
	Complete	6.5%	2.3%
	Language	4.6%	2.7%
Social	Contact	1.4%	3.5%
	Feedback	1.8%	1.9%
	Transparency	6.9%	1.3%
	Ratings	1.0%	1.3%
Ease-of-use	Search	7.6%	4.5%
	Menus & Links	4.5%	7.1%
	Layout	5.5%	3.6%
	Look & Feel	3.0%	3.0%
	Speed	3.2%	2.6%
Satisfaction Index		64%	36%



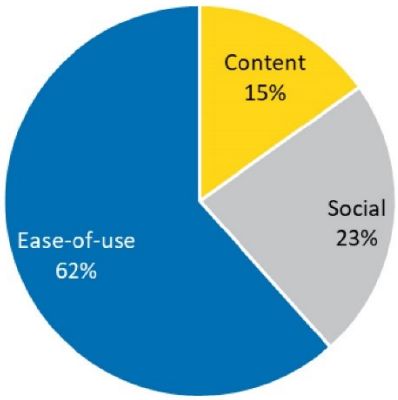
The Satisfaction Index

- 64% of the votes were for positive aspects such as ‘plain language’, ’accurate information’, ‘gives me the facts/transparent’, etc.
- 36% of the votes were for negative aspects such as ‘confusing menus and links’, ‘**poor search results**’, ‘hard to contact a person’, etc.

In the same report, a chapter indicates the areas where we should focus to increase the overall Satisfaction Index.

Where customers want us to take action

The Take Action score gives a clear roadmap to improve the customer experience of the Commission web presence. The two charts below summarise how customers would allocate resources to improve their online experience. The red shading in the "Take Action" column indicates the order of priority.



Factors	Take Action
Up-to-date	2%
Accurate	0%
Complete	6%
Language	7%
Contact	11%
Feedback	6%
Transparency	2%
Ratings	4%
Search	12%
Menus & Links	22%
Layout	10%
Look & Feel	9%
Speed	8%
Total	**100%**

The Take Action score

As you can see, **Search is second** with 12 percent after Menu & links. This demonstrate how important is to improve the Search user Experience, and how this is perceived as a business need by the European Commission.

- The Rules of the **Europa Search**, defined in the Europa Web Guide, must be taken into consideration. Europa Search is a corporate service managed by DG Communication with DG Informatics support.
  Europa Search is mandatory for harmonised sites as long as:
  - they host public information (no web information systems protected with login)
  - the information is of public interest
  - Europa Search can be integrated into the site
  - in any of the above cases, platform-specific search engines can be authorised

2.1.2. User Needs

2.1.2.1. Feedback from IT Champions

- The last IT Champion workshop report (beginning of October 2019), lists a "powerful search engine is in the centre of the new tool" as the first technical requirement.
- During the exercise "Workflow of advisory services", in 8 of 12 workflows, the search field is the initial step of the solution.
  Some additional notes from the participants:
  - Finding relevant partner with expertise is more important than finding information
  - One powerful search engine would be the best. If not possible, there may be several search engines for specific parts of the portal
  - Searching the database is first step for many services
  - People using search to identify organizations or other people that can help solving needs

- Search first at the host organization level, if the expertise is not there, then I'm going into the IT Tool and search there
- Everyone's in need of a powerful Search Engine

2.1.2.2. Search-Log analysis

Our EEN website's search engine can tell us what our users want, how they look for it, and how well our Information Architecture and Content Strategy meets their needs.

Search engines can produce a log (text file) containing a list of all the questions and terms that users type into the search tool. Logs also have useful information about each search query, such as the user's IP address or other identifier and the time of the request, which means we can look at a sequence of searches in one person's session if we sort the list by user identifier and time. An example of a log from Google Search Appliance.

2.1.2.3. Why we may want to analyze Search-Log data

Search-log analysis can help us empathize with visitors, because the data shows people struggling to find what they need. This information can help gain support for improving the website, because it usually illuminates problems that are frequently encountered and difficult to fix without doing significant work. Search data, on top of helping search engine design improvements, can impact:

- Content strategy
- Incoming traffic flows
- Information architecture (IA)
- Localization strategy
- Navigation design
- New target audiences
- Usability of search-results pages
- Website vocabulary

2.1.3. Findability and Discoverability for Improved User Experience

Findability and discoverability are important because they address two distinct needs of end users searching for the content they need. A user's informational needs are not satisfied solely through finding content that they know exists, or exclusively through discovering information that they hadn't known about previously. A user's goals constantly change between finding specific information and discovering new information, and any well-thought-out Knowledge Management strategy needs to accommodate both.

The findability/discoverability challenge is even more critical when users may need to go through thousands of documents to find what they're seeking.

2.2. Scope: Functional Specification and Content Requirements

2.2.1. Requirements

Based on business and users' needs, the Search feature should be **consistent** across various modules, it should be **modular** to adapt to different context and variables/filters, depending on the page/section where it resides, and it should be **responsive** (the most important features should be available on mobile devices).

The search feature should also be **efficient** (produce results which are valuable) and it should be able to work **globally** and **locally**.

Example of **valuable**:

- Search on a country - selecting some countries will lead to no result. The list of countries should propose only the list of countries that will lead to a result.

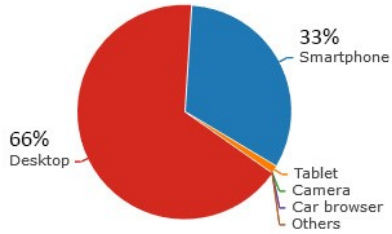
Example of **trustable**:

- Autosuggest should not suggest results not related to the word/s that has been typed (i.e. "Luggage on sale" should not result in just all items that can be used to travel). Do not exaggerate the scope of the search only for the sake of producing a search result.

Example of **usable**:

- The user should not be requested to use the CTRL button of the keyboard to select multiple filters.

Visits to **een.ec.europa.eu** in the last month



Source: webanalytics.ec.europa.eu

Enterprise European Network analytics
webanalytics.ec.europa.eu

2.2.2. Context

Here is the assignment I was given, with the effort of unifying the layout, look, and functionality offered by the Search feature in different contexts:

> *Here is the list of the 3 different places we can search for profiles. As you can see the layout is different for all 3… The idea would be to find a way to design one to be used in all three places based on the different search options they propose*

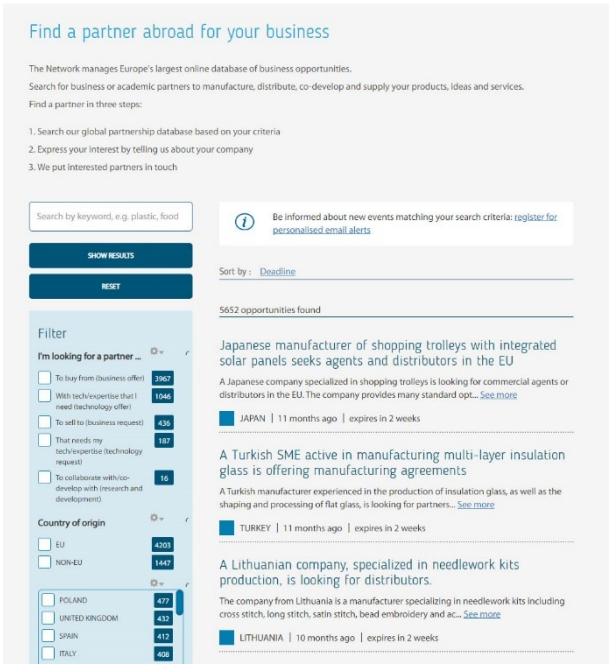
Public website
https://int.een.ec.europa.eu/partners

Partnering website
https://int.een.ec.europa.eu/tools/PartneringSearchCenter/PartneringSearch/ProfileSimpleSearch

Clients' website
https://int.een.ec.europa.eu/tools/services/SearchCenter/Search/ProfileSimpleSearch

Public website

Hyperlink



Partnering website

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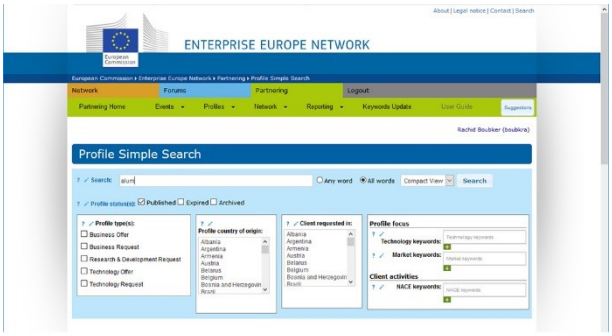

Clients' website

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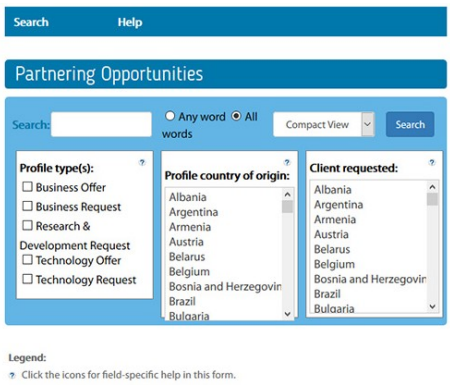
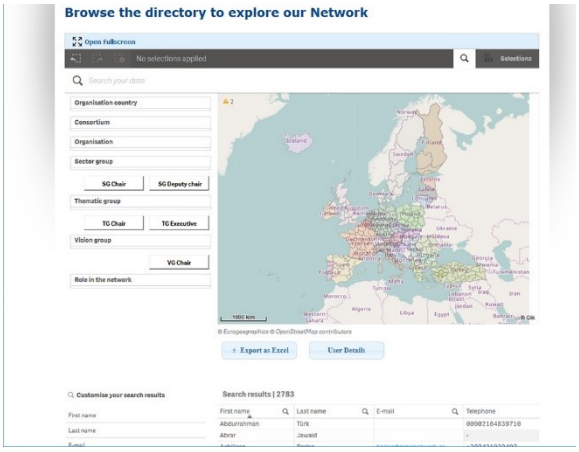


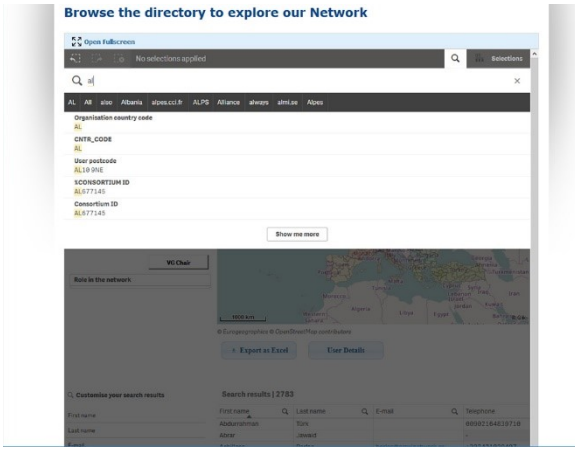
2.2.3. Existing instances of the Search pattern used in various modules

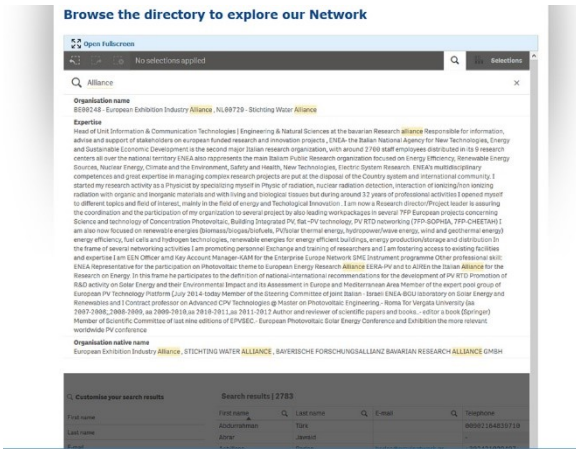
While there, I looked at other instances of the Search feature used in other pages/modules.

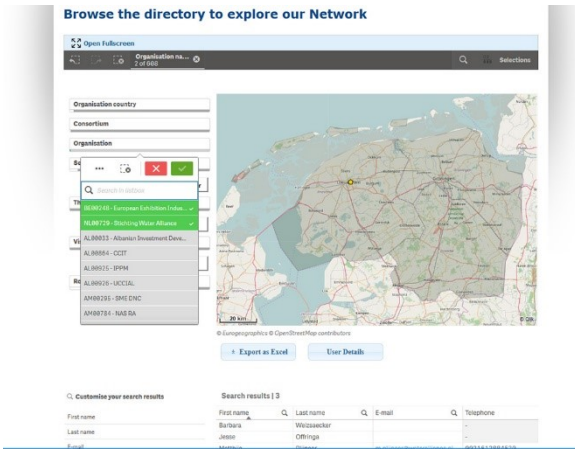
Partnering Home

Hyperlink



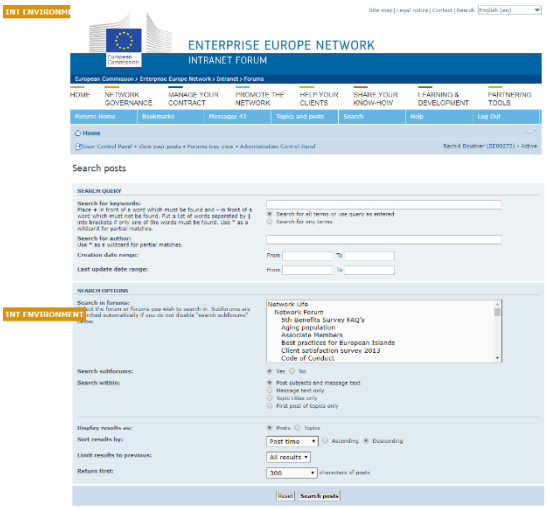






Forum

Hyperlink



Collaborative Space

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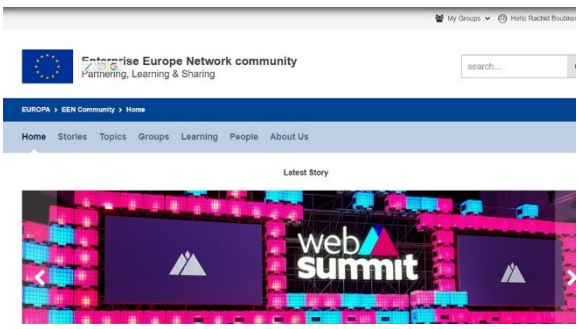
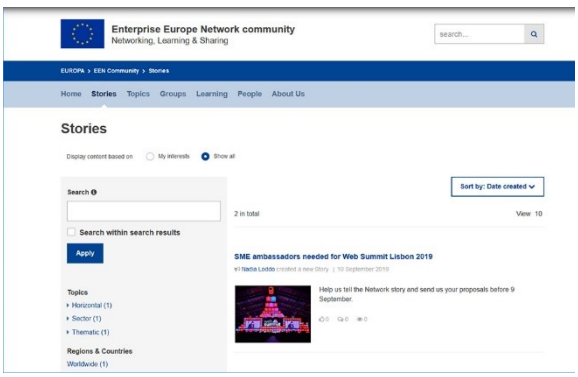
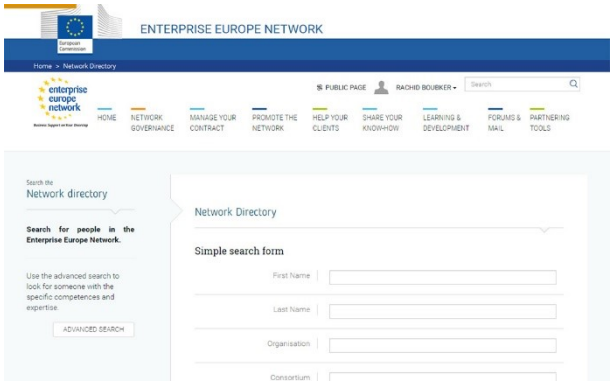


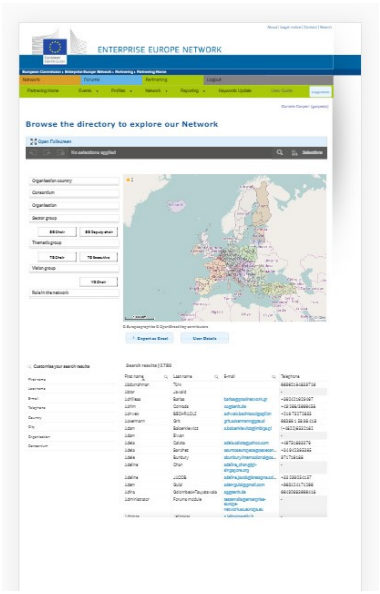


Network Directory

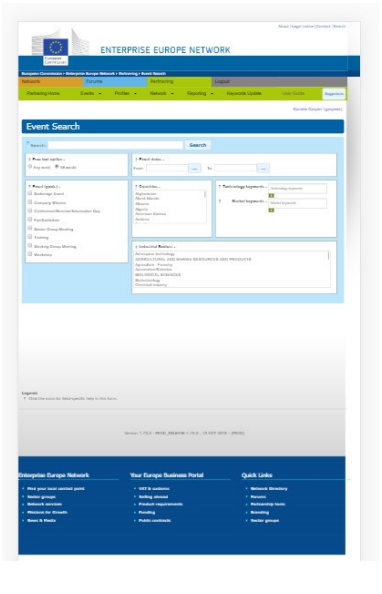
Hyperlink

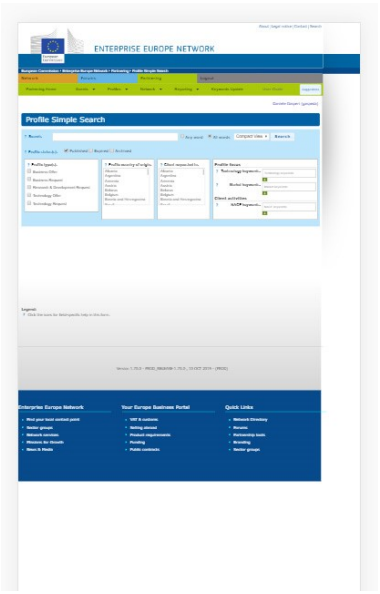


Mobile versions

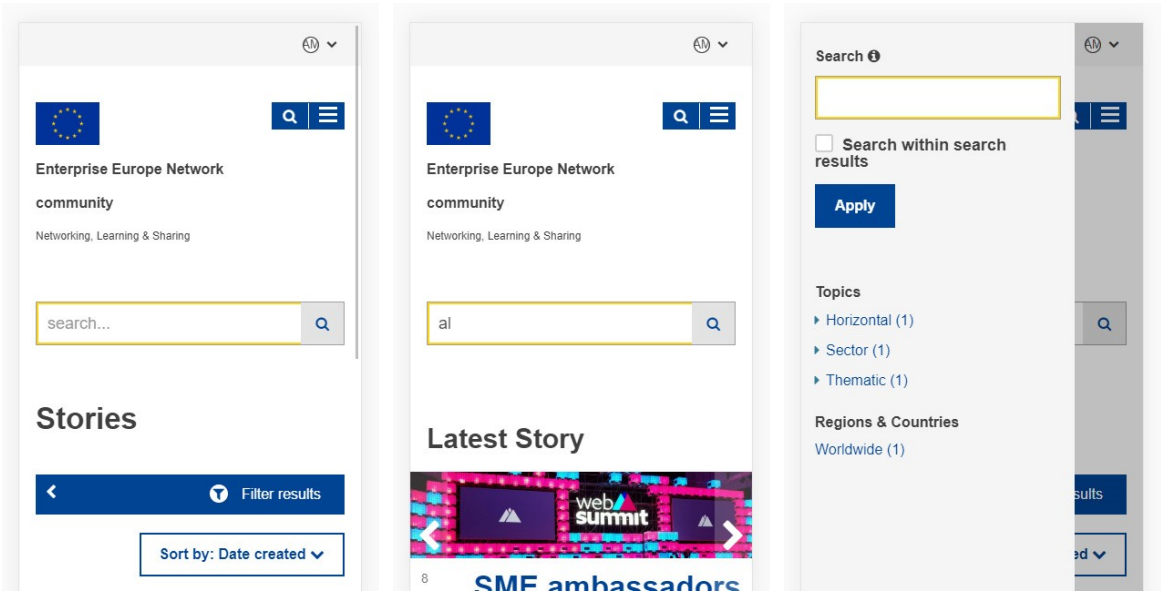


Network Directory

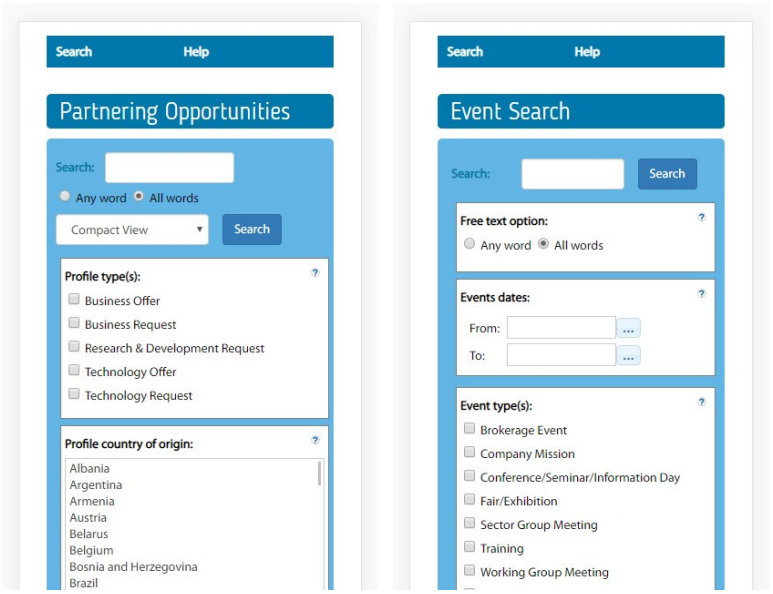




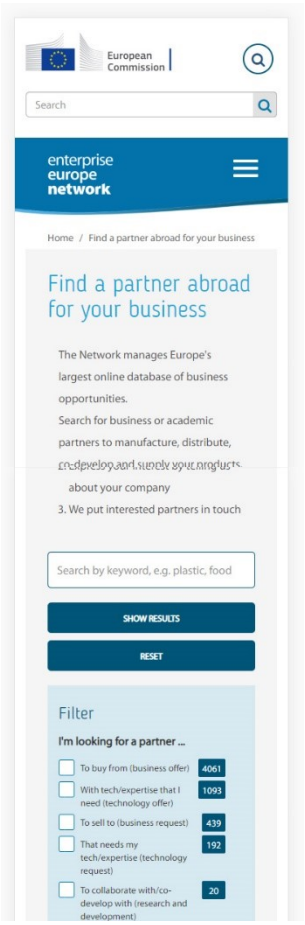
Partnering website



Collaborative Space



Clients' website



Public website

2.2.4. Personas and Job To Be Done

Personas

Following are the **Personas** that would benefit from an improved Search user interface:

- **Floor**, 38 - Account manager (Chamber of commerce, NL)
  - Needs: Efficient tools
- **Igor**, 28 - Advisor (University, PL)
  - Background: He feels it is very difficult to know who is who in the network; he gets frustrated with keywords.
- **Siegfrieda**, 57 - Consortium Coordinator (Chamber of commerce, DE)
  - Needs: Easy access to information
- **Dolores**, 52 - Account Manager (Regional development agency, BE)
  - Needs: Good, efficient resources (tools, people and mindset) that work for the client; Effectiveness and efficiency

Job To Be Done

- Feature — what is one of the key features of your product?
- Benefit — how will this benefit the user?
- Context — in what context will this be most useful?

JTBD — **what does that feature/benefit enable the upgraded you to do in a given context?**

- An effective and efficient Simple Search - Allows EEN Partners to find relevant partner with expertise - When trying to match partnering offers/requests
- An effective and efficient Simple Search - Allows EEN Partners to identify organizations or other people - That can help solving needs
- An effective and efficient Simple Search - Allows EEN Partners and SMEs to find only the right Brokerage Events – Within a specific area
- A responsive Simple search – Allows EEN Partners and SMEs to find relevant contacts – while participating to an event using their mobile phone

The list of Job To Be Done for the Search UI can be compiled by the Business Owners of each module

Personas developed by Namahn [EEN Partner Personas]

2.3. Structure: Interaction Design and Information Architecture

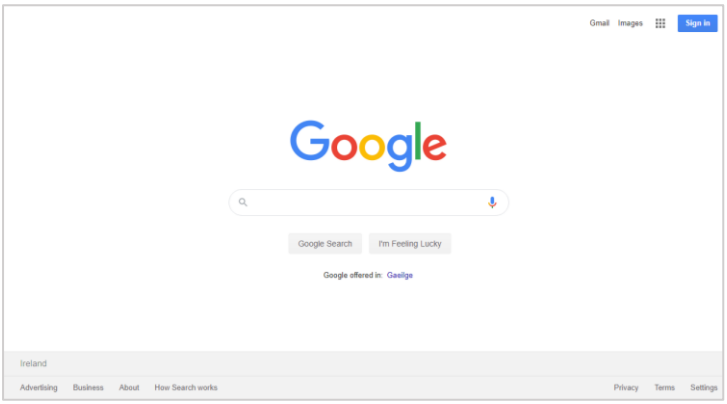
This is the next level up from scope: developing a conceptual structure for the system/elements.

Interaction Design - how the system behaves in response to the user (options for performing and completing tasks), and **Information Architecture** - the arrangement of content elements to facilitate human understanding (options for conveying information to a user), are analyzed together here.

2.3.1. Search history

Keep it simple.
After 20 years from the first Google search home page, its design has not changed much. The most efficient search design pattern is composed by a simple search field, followed by a submit button.

2019 - google.com



1999 – google.com

In the past two decades, Google has outperformed every competitor through a fierce dedication to its ambitious goal: “Organize the world’s information and make it universally **accessible** and **useful**.”

At the time Google Search was first designed, finding relevant pages was not an easy task, and its competitors (Yahoo and AOL) were relying on curated and aggregated content in the form of portals. The quality of content on the web was generally poor, and the quantity low; it was easy for a small number of human curators to deliver the best the internet had to offer in hand-picked doses.

By focusing exclusively and transparently on search — “unbundling” it from the aggregation-based approach of its competitors — Google bet big on the importance of search.

As the internet has grown exponentially in size and standards, that bet has paid off.

2.3.2. The Search Box Design Pattern

The Enterprise Europe Network IT Solution contains large amounts of information, text, options, and general contents that would simply take users too long to scan through when they want to locate a specific item, file, option, etc. Therefore, a search box **design pattern** (a general, reusable solution to commonly occurring problems) is an important timesaving design element that should always be provided when the user is dealing with such a complex information system with many different sections, pages, categories, options, or groups of content.

Without the search option, users would be forced to go through a list of categories, guessing as to what category their problem would belong (a difficult and frustrating activity).

2.3.2.1. Search Patterns to increase findability and discoverability.

Search patterns are website design patterns (solutions) for user behavior that facilitate **findability** (the ease with which information can be found) and **discoverability** (making sure that new content or information can be found, even if the users don't know that it exists yet).

Deciding which search pattern to implement into our information architecture should be guided by the expected user behavior (user research, search logs analysis), and how we intend to lead our users throughout our website (business requirements).

2.3.2.2. Exact Search

The most basic search pattern is "exact search" which forms the basis of many more advanced search patterns. It involves basic keyword matching along with stemming algorithm support reducing the results to a base or stemmed form. The search engine is able to index variants (such as plurals, prefixes, and suffixes) of the word and retrieve them, rather than the user needing to enter all variants themselves.

2.3.2.3. Autocomplete / Autosuggest

Autocomplete will help the user by filling a partial query providing instant page results, while Autosuggest offers related terms for a user. These auto-filled results typically appear after the user has typed an initial amount of characters into a search bar. Implementing one or more of these search patterns can help the users find what they are looking for quickly and easily, providing a more enjoyable experience. The value added is time saved for the user where users will tend to return to a site or app where information is easy to find.

2.3.2.4. Parametric Search

Parametric search presents multiple options - checkboxes, drop-downs and sliders - to the user at the beginning of their search allowing them to construct the aspects of their query up front. While this does enable the user to get very granular quickly, it can yield very few or no results due to the number and combination of parameters being searched. This can be frustrating to the user. With the high usage of faceted search (below), parametric search has started to lose ground.

2.3.2.5. Faceted Search

Faceted search allows users to navigate and refine a collection of information by using a number of attributes or facets, reducing the items with those facet values. Faceted search results are grouped using tags which are applied to the page index. The user can continue to narrow down the search results within what they have selected where previous facet values are retained and applied again. One key benefit from this pattern allows users to take a series of incremental steps down a logical pathway to reach what they are looking for.

2.3.2.6. Best First

This pattern is based on the assumption that the user wants to see the most relevant result first. Relevance operates on the principle of showing the user what's most useful to them first. Ranking based on relevance is constructed from a number of factors which produce a **relevance score** placing the result higher or lower in the list of search results. These factors usually include **frequency** (how often the user's search term appears in the records' metadata), **exact match** over **partial match**, and the weighting of **metadata** fields for relative importance. Fields can also be boosted or suppressed (adding points to the score) based on certain criteria that may be not be fully related to the search term.

2.3.2.7. Pagination

Pagination helps solve how to display a set of search results that do not fit on one page result. Some popular patterns include:

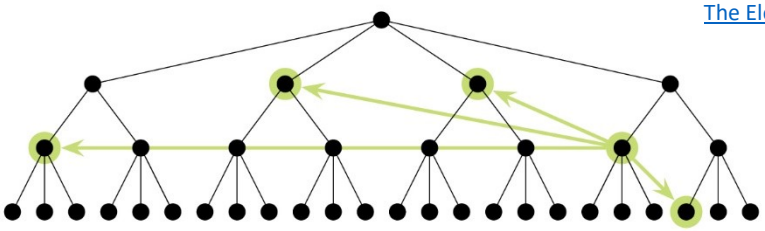
- **Linear**: the user moves from one page to another through a numerical sequence of pages.
- **Inline Paging**: the results reflow to the next set but the rest of the page remains stable.
- **Progressive Loading**: an initial amount of content is loaded and more loads as the user scrolls down the page.

The length of our search results, the extent and average volume of search queries, and the comfort level and dexterity of our users can steer us to one pattern over another.

2.3.2.8. Related Content

To further engage end users beyond their first click and **increase the discoverability** of content, by offering relevant links to content related to the original inquiry.

Supplementary navigation
The Elements of UX Design



Supplementary navigation provides shortcuts to related content that might not be readily accessible through the global or local navigation.

This type of navigation scheme offers some of the benefits of faceted classification (allowing users to shift the focus of their exploration of the content without starting over at the beginning), while still permitting the site to maintain a primarily hierarchical architecture.

Tips to consider:

- **Keep it simple**. It can be tempting to provide more to address all possibilities. This can easily overwhelm the end user, so cap the related links at **five to seven**.
- The level of **specificity** of related links **depends on where the user is** within the site. Offer a broader range of suggestions for nested content on **main pages**, because they act as a bridge to content that end users may not have considered yet. On a **topic-specific landing page**, offer only related links which are relevant to that topic.
- Be careful about **visual design**. Typically, websites reserve the right side of a webpage for less important information. As a result, it's **critical to avoid** any visual elements similar to

those less important info when designing related content, because content is more likely to be ignored in that format.

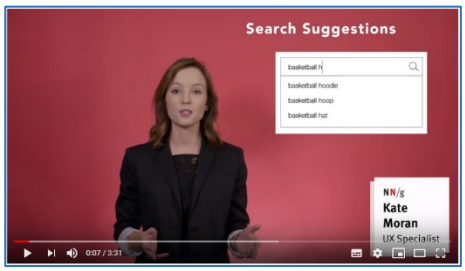
2.3.3. Simple Search

A simple **Search field** with **placeholder text**, followed by a **Submit button**, with **Search Suggestions,** and a well configured and performant search engine, is the most efficient solution (see 2.3.2.2. Exact Search pattern).

- The **Search field**: a large text input field to display long words/sentences (e.g. 30 to 50 chars). Its autofocus and placeholder text need to be defined (default local/global).

- The **Submit button**: a form button that submits the query placed next to the search input field. Its label (with or without the use of an icon) needs to be defined.

- **Search Suggestions** are recommended queries that appear in a dropdown as users type in a search box (designing search suggestions). These recommendations appear beneath the search box and change as users type each letter of their query.



Search Suggestions help users to:

1. Avoid typos
2. Decrease interaction cost
3. Decrease mental effort

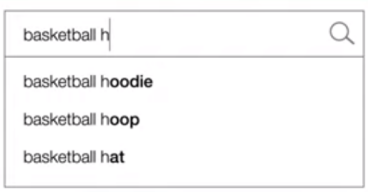
This design process for a better Search User Experience is aimed at creating something for people that is simple to use, easy to understand and does not get in the way of what their trying to do (see Scope section for functional and content requirements).
Things to evaluate (which might require user testing):

- Automatic search field focus on page load
- Length of the field
- Number of characters allowed
- Font style (size, family, dimension, weight)
- Autocomplete format
- Suggestions format

Recommendations:

Use different text styling to differentiate between **typed query text** and **suggested terms**.
There are 2 ways to accomplish this:

1. If adding characters to the end of user's text, highlight suggested characters



2. If the system suggests queries that contain the user's text anywhere in the phrase, highlight the user's typed text.

For NextEEN, a very large site with **different sections** of different types of content, we can use a 3rd component to visually differentiate the search results:

3. Use scopes (**Scoped search**) to limit searches to specific areas of the website

The key here is **helping users to quickly process the suggestions, and understand them**.

NOTE: It's **CRITICAL** for the Simple Search to be **fast, efficient and effective,** for the users not to miss the Advanced Search. It's **CRITICAL** that writers and editors **tag content effectively**, according to a controlled [centralised] vocabulary that helps users and machines [eg search engines] to find relevant content. See Search Engine Optimization on Europa Web Guide

2.3.4. Advanced Search

On top of the UI Controls offered by the Simple Search (text input field and submit button) using the Exact Search pattern, the Advanced Search (accessed by a link or a menu label - TBD), offers a group of UI components with multiple options (Parametric Search Pattern with checkboxes, drop-downs and sliders). This allows users to construct/refine the aspects of their query up front, before submitting it.

The type of controls that are part of the Parametric Search depend on the module where the Advanced Search is located. A matrix of all the UI controls and data fields required in each module should return the most common/used ones. A session of testing with the final users should give us the final word on which controls/fields are required to perform an advanced search in each module.

A UI switch control or link presented in the Advanced Search screen allow users to switch to the Expert Search mode.

2.3.5. Expert Search

On top of the UI Controls offered by the Simple Search (text input field and submit button) using the Exact Search pattern, and the Advanced Search UI controls, the Expert Search screen offers a group of additional UI components with multiple options (additional Parametric Search Pattern with

checkboxes, drop-downs and sliders). This allows users to construct/refine the aspects of their query up front even more before submitting it. A different approach to Expert Search is provided by Ted.

2.3.6. Search Results (SERP Search Engine Results Page)

This page should first show the same results offered by the Autocomplete/Autosuggest pattern, then the remaining results using the Best First pattern (based on the assumption that the user wants to see the most relevant result first). The Pagination pattern is adopted to navigate results. Display of the submitted query along with the total number of results, the customizable number of results per page, and the number of total pages.

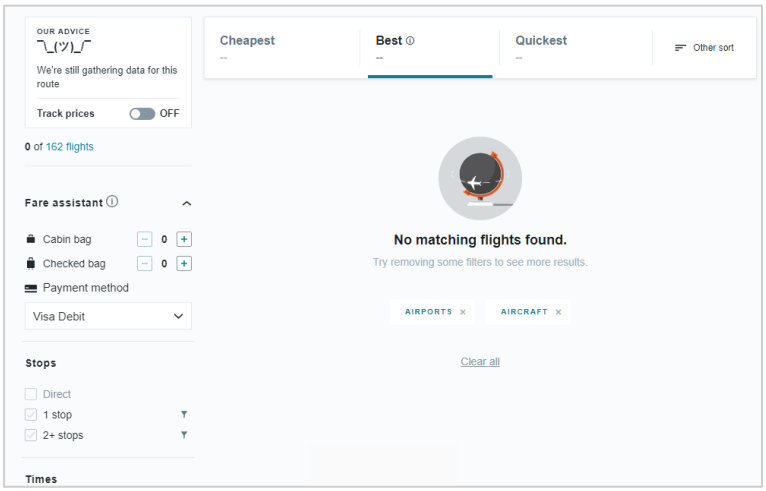
2.3.7. Facet search/filtering pattern

Recognition is better than recall (Usability **Heuristics #6**). The big difference between recognition and recall is the amount of cues that can help the memory retrieval; recall involves fewer cues than recognition. That's why the modular approach to Search presented here, proposes a powerful simple search in all pages (leaving the advanced search with Parametric Search pattern behind – available, but not immediately). After the results are presented, the Facet search pattern allows users to refine the search, instead of asking them to blindly build a complex query ahead, hoping to retrieve the right results on its submittal.

2.3.8. No Results page

If the search activity produced **no results**, we should use Usability **Heuristic 9**: Help Users Recognize, Diagnose and Recover from Errors:

1. **Inform users** of the error that occurred
2. Tell users what went wrong with plain language
3. Offer users a **solution**: e.g. provide instructions on how to fix it, or even better, **show a shortcut** in the error messaging, something that can be **clicked** or **tapped** to solve the problem.



Kayak no matching flights found
kayak.com

We could implement this solution in case of less-than-X results too.

2.3.9. Usability Heuristics for User Interface Design

1. Visibility of system status
   The system should always keep users informed about what is going on, through appropriate feedback within reasonable time.

2. Match between system and the real world
   The system should speak the users' language, with words, phrases and concepts familiar to the user, rather than system-oriented terms. Follow real-world conventions, making information appear in a natural and logical order.

3. User control and freedom
   Users often choose system functions by mistake and will need a clearly marked "emergency exit" to leave the unwanted state without having to go through an extended dialogue. Support undo and redo.

4. Consistency and standards
   Users should not have to wonder whether different words, situations, or actions mean the same thing. Follow platform conventions.

5. Error prevention
   Even better than good error messages is a careful design which prevents a problem from occurring in the first place. Either eliminate error-prone conditions or check for them and present users with a confirmation option before they commit to the action.

6. Recognition rather than recall
   Minimize the user's memory load by making objects, actions, and options visible. The user should not have to remember information from one part of the dialogue to another. Instructions for use of the system should be visible or easily retrievable whenever appropriate.

7. Flexibility and efficiency of use
   Accelerators — unseen by the novice user — may often speed up the interaction for the expert user such that the system can cater to both inexperienced and experienced users. Allow users to tailor frequent actions.

8. Aesthetic and minimalist design
   Dialogues should not contain information which is irrelevant or rarely needed. Every extra unit of information in a dialogue competes with the relevant units of information and diminishes their relative visibility.

9. Help users recognize, diagnose, and recover from errors
   Error messages should be expressed in plain language (no codes), precisely indicate the problem, and constructively suggest a solution.

10. Help and documentation
    Even though it is better if the system can be used without documentation, it may be necessary to provide help and documentation. Any such information should be easy to search, focused on the user's task, list concrete steps to be carried out, and not be too large.

2.4. Skeleton: Interface, Navigation, and Information Design

Methodological approach and presentation of the wireframes resulting from the analysis of the previous layers. The choice of designing with a mobile-first approach is driven by several factors, not least statistical data that proves that **more than half of all accesses to the web is done with a portable device**.

As of August 2019, mobile devices accounted for 51 percent of web page views worldwide. Nearly three quarters of the world will use just their smartphones to access the internet by 2025.

2.4.1. Graceful Degradation vs. Progressive Enhancement

Graceful degradation

This is the answer to the need to have a design function on as many browsers and platforms as possible, a full, standard website would scale back and gradually remove content and features as the viewport became smaller and the system simpler.

Progressive Enhancement

It starts from the mobile platform, providing the users with minimal screen real estate, processing power and third party plugins an amazing experience that both looks great and functions perfectly. As the need arises, the system can gradually be "enhanced" and even completely rethought for larger platforms with fewer constraints.

Mobile-first for a better user experience

When we start with the desktop platform, we tend to want to take advantage of everything that the platform has to offer. We build an amazing product that leverages lots of great technology, only to realize that not all of it scales well down to mobile.

With progressive enhancement, there is no need of trimming down UI and content to its most vital elements. It's just a matter of scaling the design up to the desktop. Instead of facing the decision of what to cut and how to water down the solution, we just need to decide how to make it even more robust.

Moreover, how do we serve up the content? If we take the graceful degradation viewpoint, all of the content (text, images, video, audio, etc.) is served up at the same time to what is assumed to be the largest platform. From here, mobile versions should simply ignore or remove much of this content from the page. The problem though is that it was already loaded in, whether the given platform needed it or not. We find ourselves serving up more content than is necessary on the platform that is often associated with the slowest download speeds.

With a mobile-first approach, we start by loading the absolute bare essentials on the smaller platforms. This leads to a better user experience that avoids unnecessary lag. The additional resources are loaded strictly on an as-needed basis to platforms that can handle them well.

Responsive Web Design

Responsive design is a technique built around the concept of media queries that target specific devices and viewport sizes. With a mobile-first design approach we can code up our initial CSS for mobile, and then use media queries to selectively serve up additional styling as the viewport size increases.

2.4.2. Modular Search User Interface

Modular

The **modular concept of the Search UI** drafted here, proposes that, for each searchable type of content of the NextEEN, there should be a number of reusable UI components – modules – that would be used to compose, in different configurations, the Advanced Search, the Expert Search, and the Facets for the search and result pages UI of mobile and desktop devices.

There are two types of Search modular UI objects, one for the **results** (it can be a string, a card or a search result item), and one for the object **properties** (a group of different UI controls to modify each object properties – check boxes, radio button groups, text fields, date pickers, etc.).

Simple Search

With the Simple Search followed by Facets, we are offering the users with the option to start their search and refine the outcome. The rationale behind this choice is that a simple, yet powerful search engine that offers scoped and related suggestions, along with filters to refine results, should cover the majority of the user needs, without the necessity to propose a complex Advanced Search upfront.

The Simple Search, always available in the UI, should become the user ally for any kind of information retrieval, increasing its findability and discoverability. The possibility of saving and sharing queries by registered users would make this tool even more useful.

Advanced Search

With the Advanced Search, we are offering expert users, with the ability to tune their search query upfront. After the results are returned, expert users can still refine those using Facets. The UI components used in the Advanced Search page are the same used by the Facets UI pattern (there layered out on a modal window) because of the modularity concept expressed before.

The Advanced Search should not present all the filters available for each searchable category (profiles, events, groups, forums, etc.) to the end users, but a subset of them. The number, type of UI components, and properties of each searchable category should be determined by analyzing business and users' needs.

Expert Search

With the Expert Search, available only on Desktop, we are offering granular control in the Search feature, over all fields of each searchable object in the Database (profiles, events, companies, forums, groups, etc.).

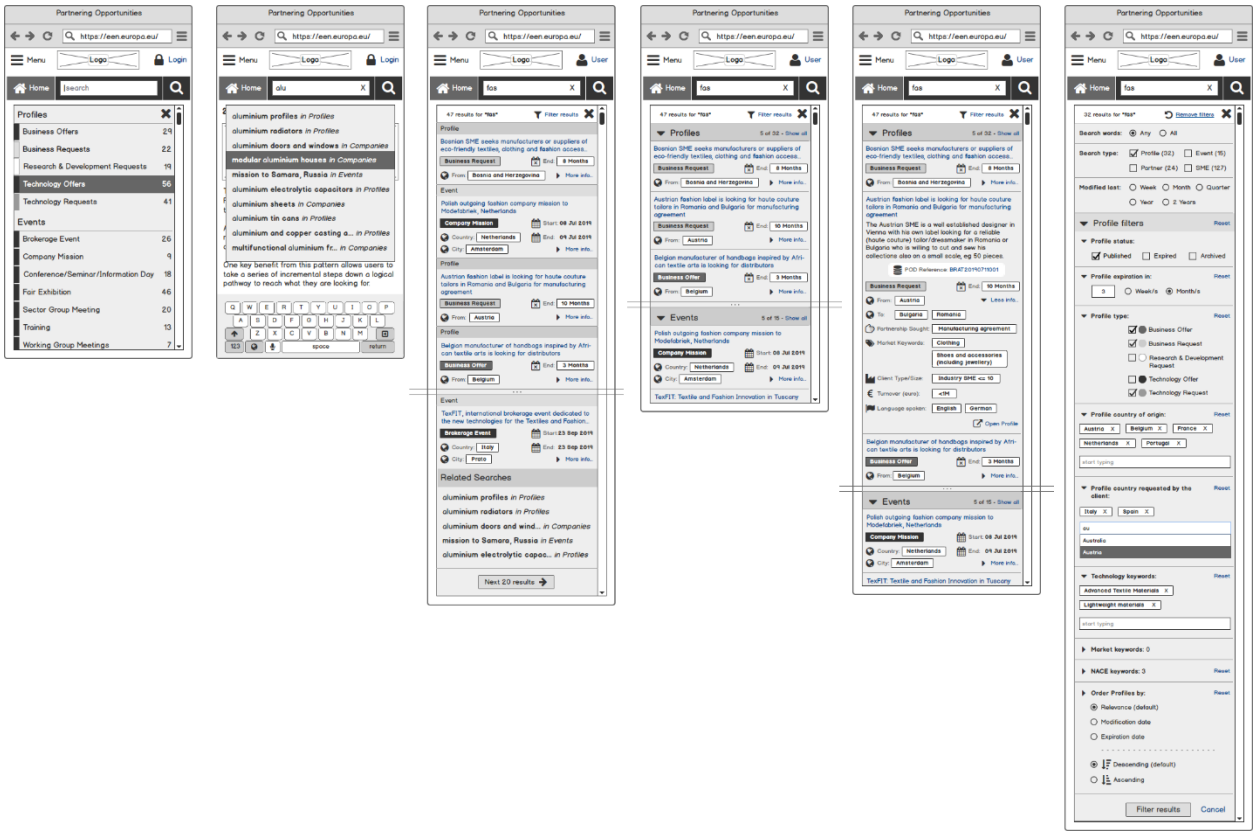
Facets are still available after an Expert Search, with the same level of granular control operated to generate the Expert Search query (the Expert Facets). This means that each Search module (search object property) needs to be flexible enough to display a more or less complex UI control, depending on the context in which it needs to be used (Simple-Advanced-Expert Search vs. Facet).

2.4.3. Simple Search

Mobile

I designed the mobile Search wireframes following the approach mobile-first (see previous chapter)

Focus | Autosuggest Autocomplete | Search Engine Result Page 1 | Search Engine Result Page 2 (grouped results) | Expanded Result | Facets

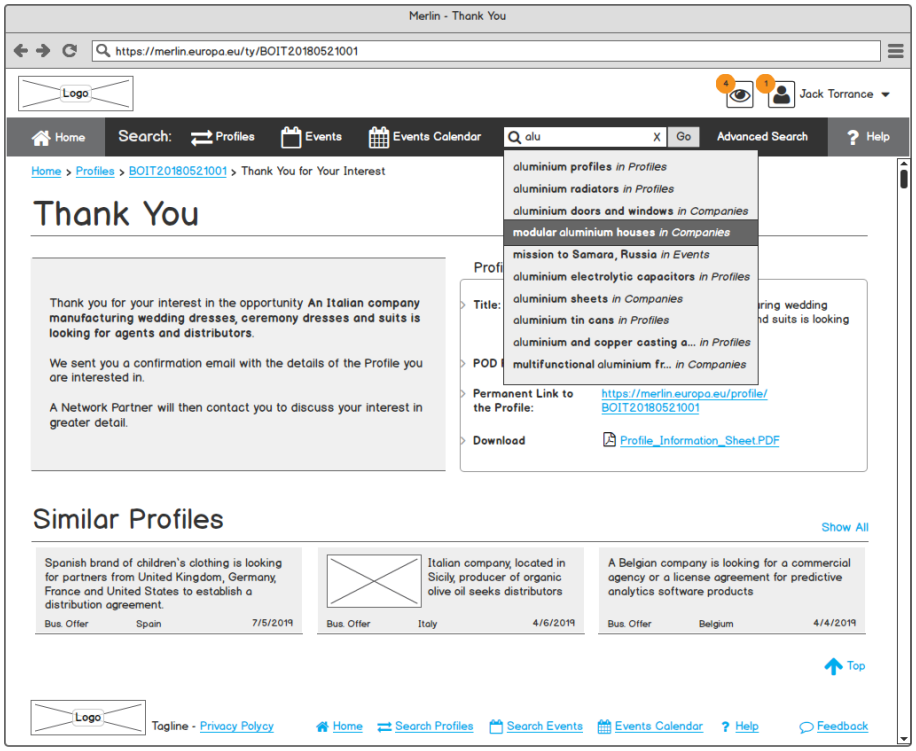


Some design questions to discuss with the Business and the IT Teams:

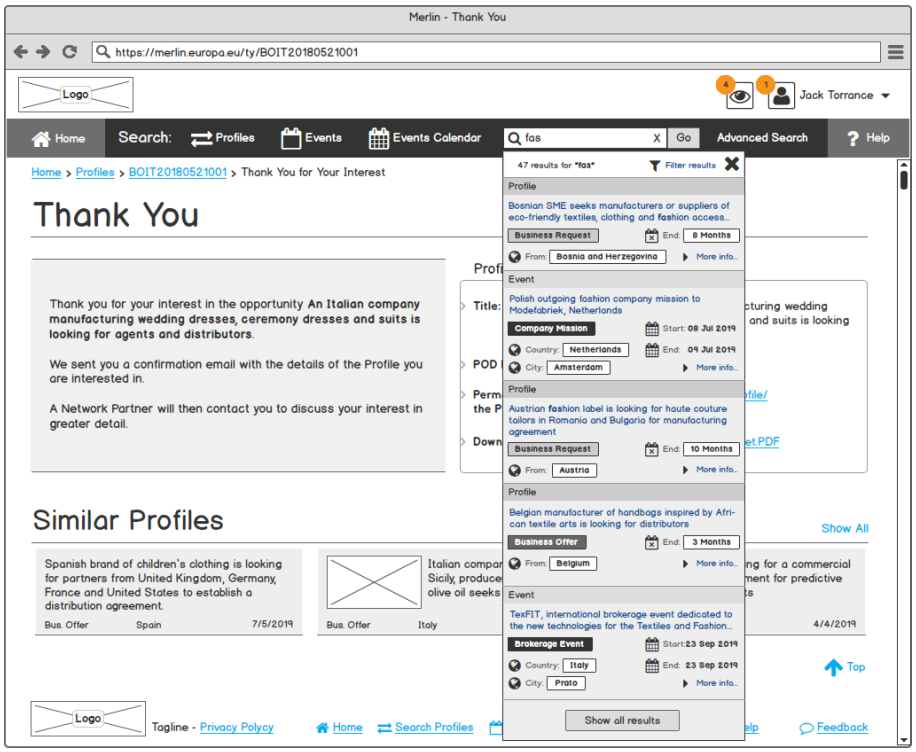
1. Is it feasible is to implement the autosuggestion and autocomplete as shown in the first picture?
2. How difficult is it to implement the Scoped Search (suggestions related to specific areas)?
3. How many suggestions can we display without affecting the search performance?
4. Can we suggest Card Results (e.g. SERP1 and SERP2 above) or should we stick to textual string?
5. How difficult would it be to allow logged-in users to save and/or share their search result?
6. Is it feasible to start showing suggestions after 3 characters have been typed in the search filed?
7. Is it possible to combine the Keywords to only one category (Market, Nace, and Technology)?
8. How much effort is required to display only the available properties in UI components (e.g. not just all the countries, but only the ones for which there is a record in the DB).
9. Is it feasible is to implement the Related Searches component?
10. Are there features on this solution that might affect SERP response time significantly?
11. How difficult would it be to implement a voice search?
12. What kind of media can we currently search (text, audio, video, images, pdf, etc.)?

Desktop

As for the mobile version of the **Simple Search**, we are offering the users with the option to start their search and refine the outcome. The **autosuggest/autocomplete** search pattern is proposed in two alternative ways, as **strings,** and as **cards**.

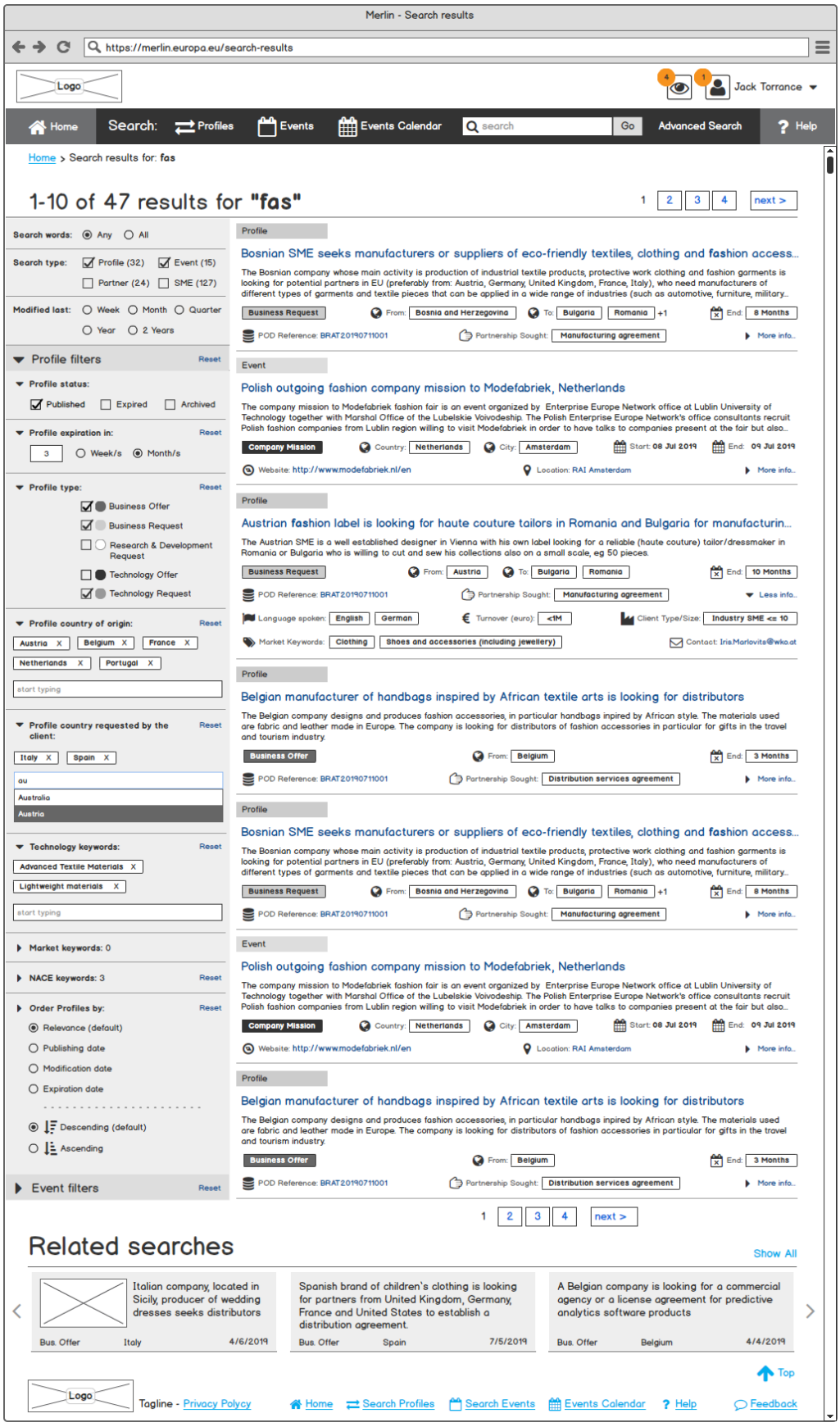


Autosuggest and Autocomplete as strings



Autosuggest and Autocomplete as cards

As for the mobile version, the **Facets** are offered in the **Search Results** page (SERP), as a tool to narrow down the results.

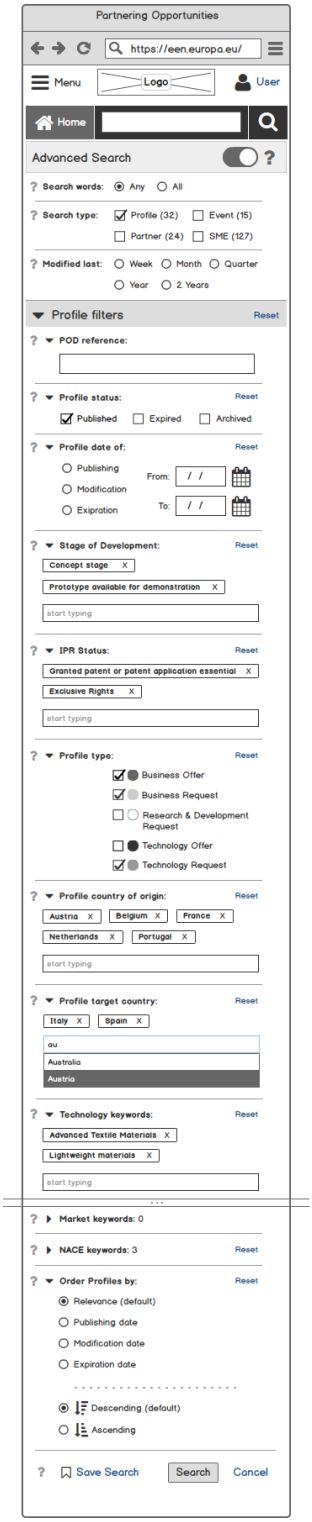


Desktop Search Results page with Facets

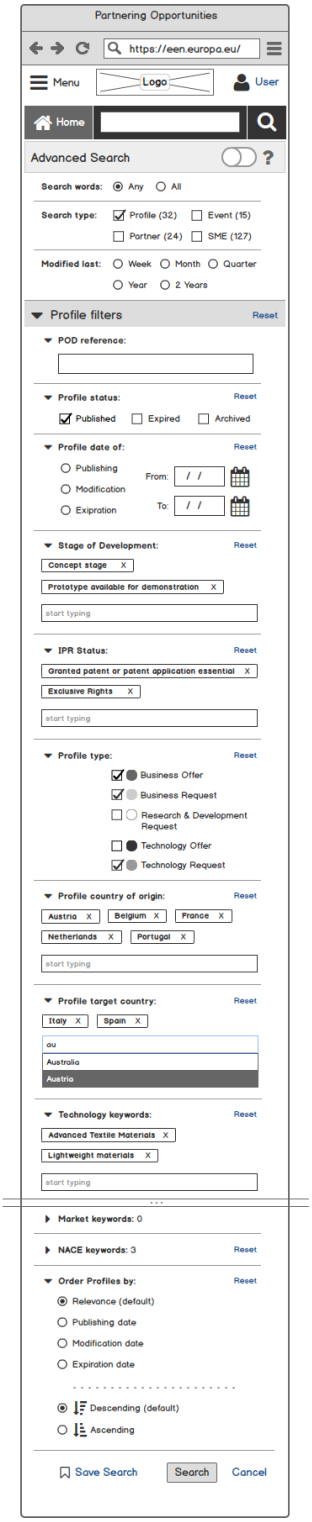
2.4.4. Advanced Search

Mobile

Advanced Search with Tooltips

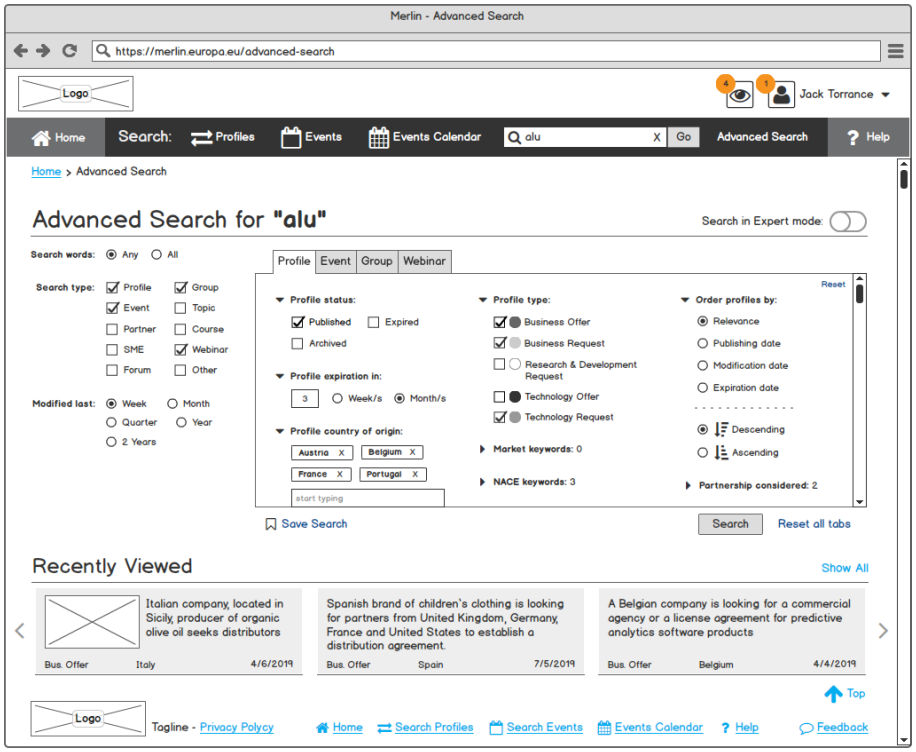


Advanced Search without Tooltips



The Mobile Advanced Search proposes the UI controls also used in the Facets (see previous chapter 2.4.2 Simple Search), but layered out in a page instead of a modal window. Basically they are been offered as an up-front filter to be used to create a query, instead of being a post-filter, after a first simple query is submitted.

Desktop



Desktop Advanced Search
(with Expert Search toggle control)

2.4.5. Expert Search

The proposal of the Expert Search feature, available only for Desktop devices, it's still under consideration.

It would be represented by a toggle that would switch the Advanced Search, and the Facets of the result page into the Expert Mode. The amount of controls to filter query or results would increase to offer a granular control of all properties of each content object (profile, event, partner, SMEs, etc.).

The main concern of its implementation is related to the amount of cognitive load requested for its use. The granular control it offers, providing UI controls for each Search object property available in the database, is thwarted by the difficulty of it use.

The lack of knowledge of current Search UI use by partners and SMEs, plus the current implementation of the Advanced Search, lead me to propose the Expert Mode as an option, but it could be left out (I'd like to discuss it with the IT Team).

An Advanced Search that would offer the right filters and facets resulting from user research should address all users' needs without compromising efficiency for ease of use.

2.5. Surface: Visual Design

At this level of the design process, a series of high-definition mockups would present the page/s or element/s, using the final layout, color palette, size and typography that summarize the choices made in the earlier stages.

Here design decisions are made about contrast, uniformity, dimensions, and consistency throughout various devices/viewport.

The documentation about the rules behind the functionality and aspect of the element or page are also set at this point of the design process.

3. Glossary

Accessibility

The design of products, devices, services, or environments to be usable by people with disabilities. The concept of accessible design and practice of accessible development ensures both "direct access" (i.e. unassisted) and "indirect access" meaning compatibility with a person's assistive technology (for example, computer screen readers).

Affordance

The quality or property of an object that defines its possible uses or makes clear how it can or should be used.

Credible

The quality of design and content that makes users trust and believe the organization and its products or services, which need to be trustworthy.

Ergonomics

Scientific discipline concerned with the understanding of interactions among human and other elements of a system, and the profession that applies theory, principles, data and methods to design in order to optimize human well-being and overall system performance. It is the process of designing or arranging workplaces, products and systems so that they fit the people who use them.

Findability

The ease with which information can be found. It means that users can easily find content or information they assume is present on a website. If the user has a problem they should be able to quickly find a solution. The navigational structure should also be set up in a way that makes sense.

Desirability

The design for the emotional level of the user experience. Design with the goal of offering a delightful and enjoyable experience. Because people emotional responses overpower their logical, or analytical, brain. The visual aesthetics of the product, service, or system need to be attractive and easy to translate. Design should be minimal and to the point.

Discoverability

The quality of an interface that enables a user to take full advantage of a feature without guidance or making sure that new content or information can be found, even if the users don’t know that it exists yet.
A feature has high discoverability if a user can quickly learn how to get the full benefit of using it.
A feature has low discoverability if an inexperienced user would fail to use or benefit from it.

Information Architecture

Design of the arrangement of content elements to facilitate human understanding (the options for conveying information to a user). Information architecture (IA) is **primarily about cognition**, how people process information and build relationships between different pieces of information.

Information Design

The design and communication of ideas to the users, deciding about how to present information so that people can use it or understand it more easily. Information design is **primarily about perception**, how people translate what they see and hear into knowledge.

Interaction Design

The Design of how the system behaves in response to the user (the options for performing and completing tasks)

JTBD – Job To Be Done

It is the process a consumer goes through whenever she aims to change her existing life-situation into a preferred one, but cannot because there are constraints that stop her. It's the answer to this question: What does that feature/benefit enable the upgraded you to do in a given context?

Persona

Personas are fictional characters, based upon research in order to represent the different user types that might use services, products, sites, or brands in a similar way. Creating personas helps to understand users' needs, experiences, behaviors and goals. Personas guide the ideation processes, and they can help to achieve the goal of creating a good user experience for the target user group/s.

Usability

The extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use.
The system in which the product or service is delivered needs to be simple and easy to use. Systems should be designed in a way that is familiar and easy to understand. The learning curve a user must go through should be as short and painless as possible.

Usefulness

The quality of a feature/content of being original and/or fulfill a need. If the product or service is not useful or fulfilling user's wants or needs then there is no real purpose for the product itself.

User Experience

The person's perceptions and responses resulting from the use and or anticipated use of a product, system or service.

User Interface

All components of an interactive system (software or hardware) that provide information and controls for the user to accomplish specific tasks with the interactive system.

Valuable

The system must deliver value to our users, which must be able to accomplish their goals increasing their satisfaction.

Plain fork