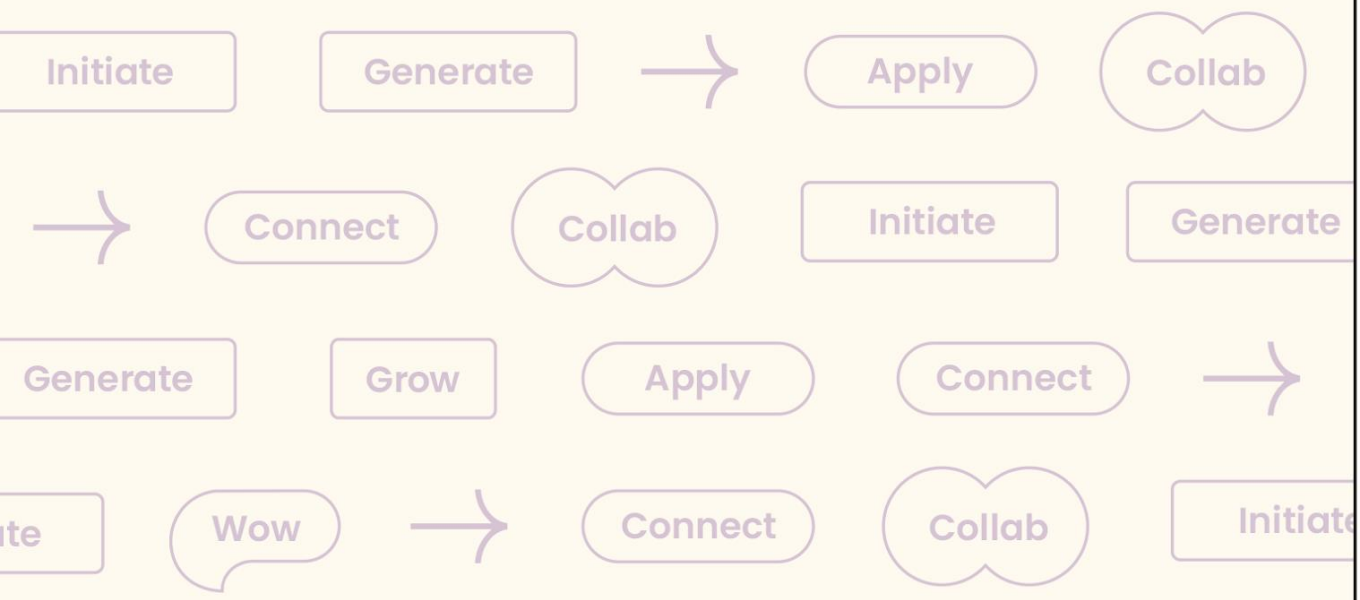
AccelerAction
Connecting European DeepTech Innovators

D3.1 AccelerAction Virtual Ecosystem

PROJECT Nº 101072073



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D3.1 AccelerAction Virtual Ecosystem

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DESCRIPTION	The deliverable explores the realisation and implementation of the DeepTech ACT platform. The platform will allow business entities (accelerators, start-ups, innovation agencies, business networks) and experts (mentors, evaluators, investors, educational institutions and regional authorities) to share good practices, to easily access business support solutions, to find the most suitable potential investor/s and to discover networking opportunities.

VERSION	DATE	DESCRIPTION
1.	12/04/2024	First Draft for review
2.	24/04/2024	Final version

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EXECUTIVE SUMMARY

This report provides a comprehensive overview of the development of the AccelerAction Virtual Ecosystem called DeepTech Act Platform, which is one of the key deliverables of the AccelerAction project to contribute to a more balanced and connected European innovation landscape in the DeepTech sector.

Its aim is to facilitate interaction between entities such as accelerators, startups, innovation agencies and business networks, as well as experts including mentors, evaluators, investors, educational institutions, and regional authorities across Europe. The platform acts as a catalyst for the exchange of knowledge, access to shared resources and the creation of synergies that can lead to the realisation of innovative projects on a European scale. It serves as a hub for accessing business support solutions, finding potential investors, and discovering networking opportunities.

This document delves into the methodology employed in designing and structuring the website and the platform. It discusses the architecture, including the utilisation of AWS services, Cloudflare, Docker, PHP, React, Node, and Nginx. The development of the DeepTech ACT platform and its various sections, such as the Initiate section, Training section, Profile section, Events section, and Matchmaking Map, are also explored. The testing phase of the platform is highlighted, with details provided on the Alpha and Beta tests conducted to assess its reliability and usability. Feedback from the testing phase was incorporated into the platform's implementation.

Lastly, the document discusses the potential impact of the DeepTech ACT platform on the innovation ecosystem. By providing equitable access to opportunities and resources, the platform aims to make small and moderate emerging innovative businesses more attractive to international companies. It enables the exchange of knowledge, fosters collaboration, and facilitates the realisation of innovative projects on a European scale.

1. INTRODUCTION

1.1 INTRODUCTION TO ACCELERACTION PROJECT

The European innovation landscape is currently characterised by a clear geographical inequality that negatively affects the most disadvantaged entrepreneurial ecosystems, resulting in lower entrepreneurial activity, limited investment and scarce job opportunities in less connected regions. Faced with this reality, the AccelerAction project was created with the aim of reversing this trend, rebalancing the European innovation landscape and making moderate and emerging innovation ecosystems more attractive by stimulating more balanced entrepreneurial activity across Europe.

The challenge that AccelerAction aims to address is the disparity between European innovation ecosystems, where some highly connected and developed areas, defined in the project as 'strong innovators' and 'innovation leaders', enjoy more opportunities for entrepreneurial acceleration, investment and skilled business support than less connected areas, classified as 'moderate' and 'emerging'. This gap results in considerable advantages for start-ups located in well-established innovation centres, to the detriment of those located in less favoured contexts.

AccelerAction aims to bring about this change by creating more connected and efficient innovation ecosystems in the advanced technology sector. The project intends to support the scalability of enterprises, promote innovation and stimulate cooperation between innovation actors at all levels - national, regional and local - through a Pan-European Networked Acceleration Programme.

1.2 BACKGROUND AND SCOPE OF THE DELIVERABLE 3.1

Deliverable 3.1 – AccelerAction Virtual Ecosystem is conceived with a distinctly technical connotation as describing the objectives and implementations carried out within the DeepTech Act Platform, realised by JO Consulting, with the support of F6S.

The aim of this document is to carry out an accurate examination of the development of the Virtual Ecosystem named DeepTech ACT platform, providing a frame of reference for the more technical details. The methodological section aims to emphasise the systematic approach that was adopted for the design of the platform, specifically the use of colours and layouts, and their evolution closely linked to the visual identity.

Deliverable 3.1 also undertakes to explore the development of the content of the DeepTech ACT platform and the technical aspects related to the architecture of the platform and the technologies implemented within it. The objective is to describe how the different sections of the platform were designed and integrated within the ecosystem to facilitate user interaction and engagement.

This is followed by a section dedicated to the results of the testing of the platform, a fundamental step that serves to assess the reliability and usability of the system. The deliverable aims to provide a detailed account of the Alpha and Beta tests performed on the platform, the feedback received and the subsequent implementation of these.

Finally, the document concludes with a section on the potential impact generated by the platform, and how it can influence the innovation ecosystem.

1.3 SCOPE OF DEEPTECH ACT PLATFORM

The European innovation landscape is extremely diversified, with capabilities and performance differing significantly between regions. The northern and western parts of the continent, recognised as 'innovation leaders' according to the European Innovation Scoreboard, boast dynamic and well-integrated ecosystems. These regions benefit from broad access to investor networks, a high density of hi-tech companies, leading academic institutions and effective collaboration between the public and private sectors.

In contrast, southern and eastern European regions often face significant obstacles: lower research and development (R&D) investment, poor technology infrastructure and a lower presence of innovative companies. This unevenness creates an unbalanced geography of innovation that not only holds back growth in Europe as a whole but also widens regional economic disparities.

Specific Challenges of Less Connected Ecosystems:

- Limited Access to Finance

Start-ups and small and medium-sized enterprises (SMEs) in less developed regions face considerable difficulties in accessing the capital needed for growth and expansion. The lack of local investors and the difficulty in reaching wider networks of financiers limit their opportunities for development.

- Talent and Skills Resources

Advanced skills, crucial for fuelling innovation, are often scarce in these regions. Experts may be reluctant to relocate away from established ecosystems, leaving these areas short of the technical and management skills needed to compete on a global scale.

- Collaboration and Networking

The lack of a robust network facilitating connections between start-ups, investors, universities and other entities is a further obstacle. Without an established network, opportunities for synergy and collaborative innovation remain limited, preventing innovative ideas from getting the support they need to turn into successful solutions.

In the context described, there is a clear need for a supporting mechanism to increase collaboration and equitable access to opportunities for economic and technological growth.

The goal of the DeepTech ACT platform, as part of AccelerAction's mission, is to contribute to reverse this trend by making small and emerging innovative businesses more attractive to international companies. By leveraging technology, the DeepTech ACT platform allows to overcome physical barriers and facilitate interaction between entities such as accelerators, startups, innovation agencies and business networks, as well as experts including mentors, evaluators, investors, educational institutions and regional authorities. The platform acts as a catalyst for the exchange of knowledge, access to shared resources and the creation of synergies that can lead to the realisation of innovative projects on a European scale.

To implement these synergies, the platform includes a Match-making area which fosters connections through a matching algorithm between target users, experts and regional policy makers, with a virtual map of stakeholders at local and EU level. Through DeepTech ACT, you can share ideas and best practices, easily access business support solutions, find potential investors and discover networking opportunities. The platform aims to create contacts between different stakeholders, improving mutual visibility and stimulating collaboration.

For small up-and-coming entities, such as start-ups, the platform offers the possibility to share positive experiences but also to access business support solutions, including training and mentoring, as well as the possibility to find potentially interested investors.

Investors can use the platform to discover start-ups and companies in need of financial support and to identify the most suitable entities within the ecosystem with which they may be interested in interacting.

For experts, the platform is a resource to discover networking opportunities and to connect with the various players involved in the innovation ecosystem.

In addition, the DeepTech ACT platform provides a resource library containing 39 high-quality materials, including in-depth case studies, best practices, practical frameworks and insightful articles which were developed by experts as part of Work Package 2 - Strategic Discovery Process. These resources are meticulously curated and developed as valuable reference tools for learning, research and information sharing. This library is an interactive tool, accessible to anyone with a special focus on gender equality acceleration, which encourages peer-to-peer learning and is instrumental in building networks and relationships among the diverse participants of the EU-NAP. In addition, the platform is instrumental in delivering the AcclerAction Abroad Exchange Programme (Work Package 4 – AccelerAction Exchange Programme to leverage scale-up acceleration ecosystems) as it hosts the information and training materials and allows the start-ups to connect with players from other innovation ecosystems during and after the exchange programme.

In conclusion, the DeepTech ACT platform aims to:

- **Improve the quality and dissemination of business acceleration services in developing innovation areas** to make them more competitive and able to attract investment and talent;
- **Co-design business programmes** that are the result of collaboration between business acceleration institutions located in less connected ecosystems and innovation hubs, to ensure a holistic and integrated approach;
- **Strengthen less connected ecosystems** to increase their competitiveness and connectivity, and to ensure a balance of entrepreneurial activity on a European scale, thus fostering territorial equity;

2. METHODOLOGY

2.1 DESIGN OF THE WEBSITE AND THE PLATFORM

This section of the document provides an overview of the chosen graphic design for a web platform.

2.1.1 INITIAL DESIGN AND LAYOUT

The initial design of the website and platform was developed based on discussions with project managers and designers, with the goal of dividing the platform into four sections according to the services it needed to provide. The overall style aimed for simplicity and attractiveness.

The mockup was structured around the AccelerAction logo, which also influenced the colour palette chosen for the design.

Following various feedback and suggestions, both regarding the dynamic nature of the page and the decision to remove the community section, there was a need to graphically restructure the homepage and adapt it to the new project name, "DeepTech ACT."

Additionally, based on partner advice, the Initiate section was also redesigned (see corresponding section).

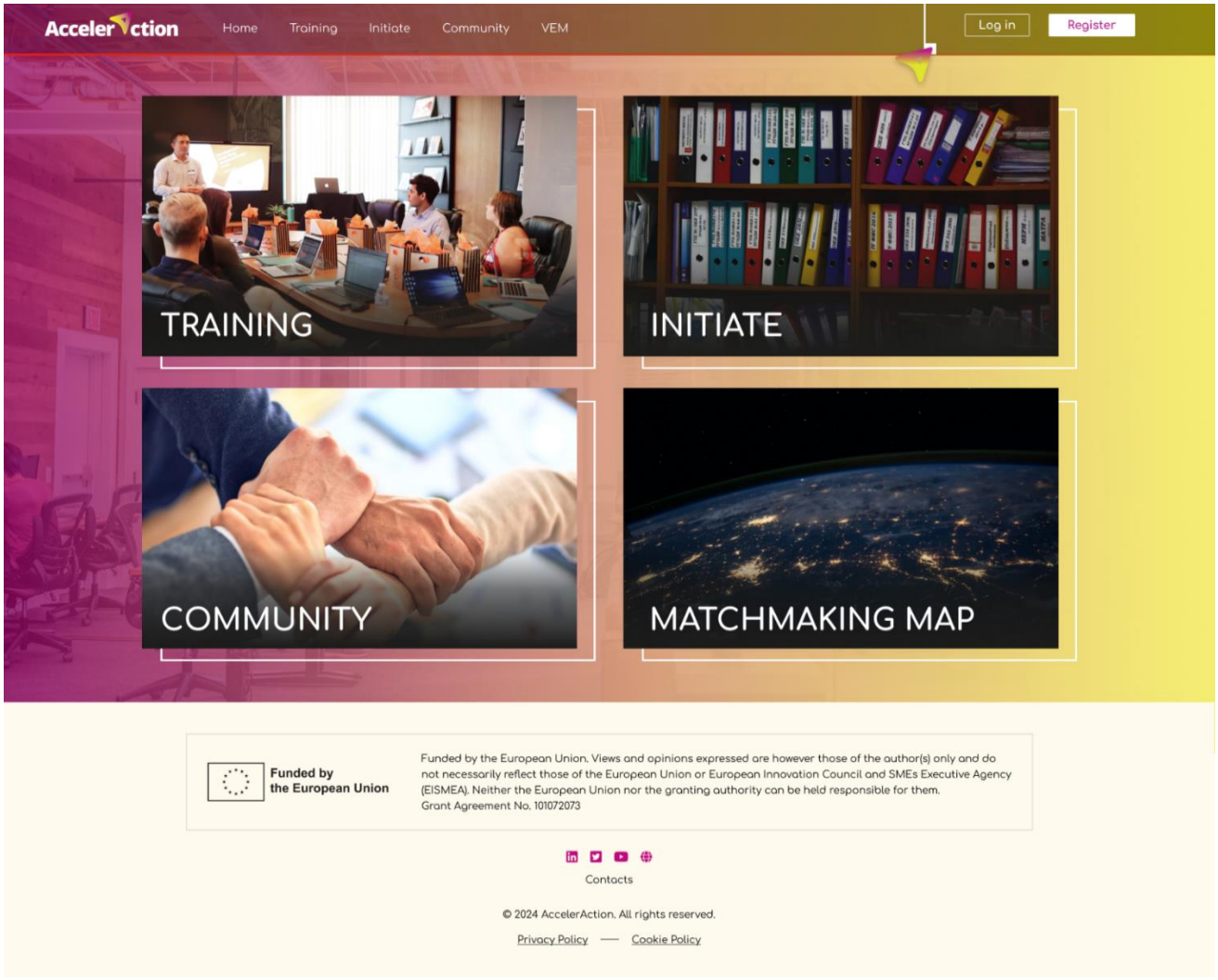

Figure 1: The 1st version of mock-up of the home page

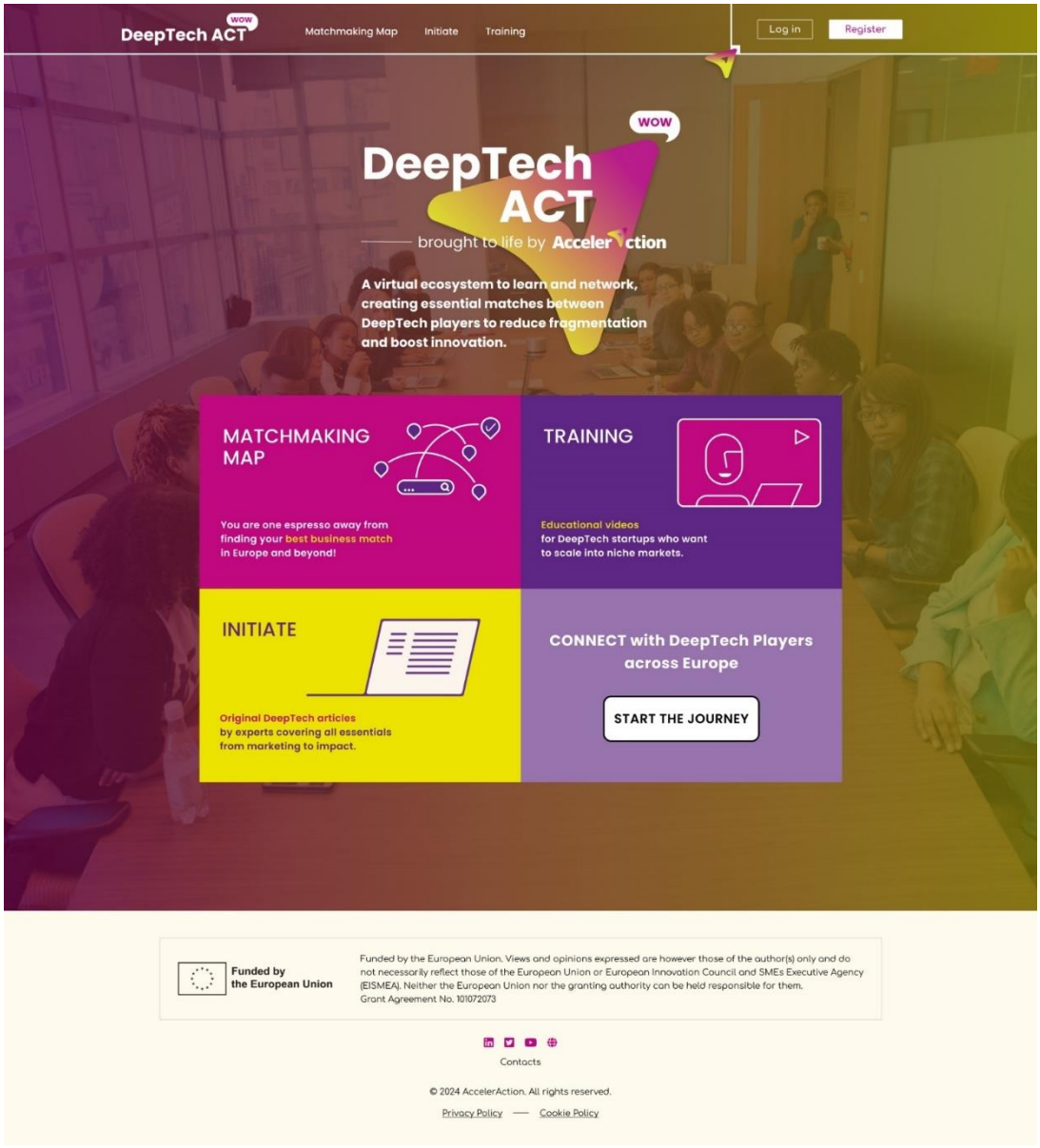

Figure 2: The last version of the mock-up of the homepage

Sections details:

The four planned sections were as follows:

- **Training**: an e-learning section offering courses.
- **Resource Library** (later renamed **Initiate**): a repository of articles and useful materials.

- **Matchmaking Map**: the core function of the platform, facilitating matching between users based on their interests.
- **Community**: a mini-discussion forum for users.

The layout idea focused on providing the available services to users **without excessive navigation steps**, resulting in the placement of the navigation menu at the top of the page and **better user experience overall**.

Colour scheme:

The chosen **colour scheme** was made more distinct to **highlight the colours of the logo** and create a less formal atmosphere for the platform. Inspired by the AccelerAction logo, the colour palette utilised **bold and contrasting colours**. This approach aimed to make the platform **visually engaging** and prevent it from appearing overly formal. By employing a more pronounced and **vibrant colour scheme**, elements such as buttons, icons, and highlights stood out, effectively **drawing attention and enhancing user engagement**.

Font selection:

The initial font selection initially focused on Comfortaa, a font widely used on the project's website. However, after receiving the brand manual and following partner advice, it was decided to give more prominence to the primary font, Poppins.

Therefore, the font selection followed the brand manual, combining these two typefaces: Poppins and Comfortaa (both Google Fonts). **Poppins**, with its clean and modern appearance, was predominantly used for paragraph texts, ensuring readability and a cohesive visual experience. On the other hand, Comfortaa, with its slightly more decorative and playful style, was employed to a lesser extent for titles, subtitles, and other prominent textual elements. This combination created a harmonious balance between professionalism and creativity, enhancing the overall aesthetic appeal of the platform.

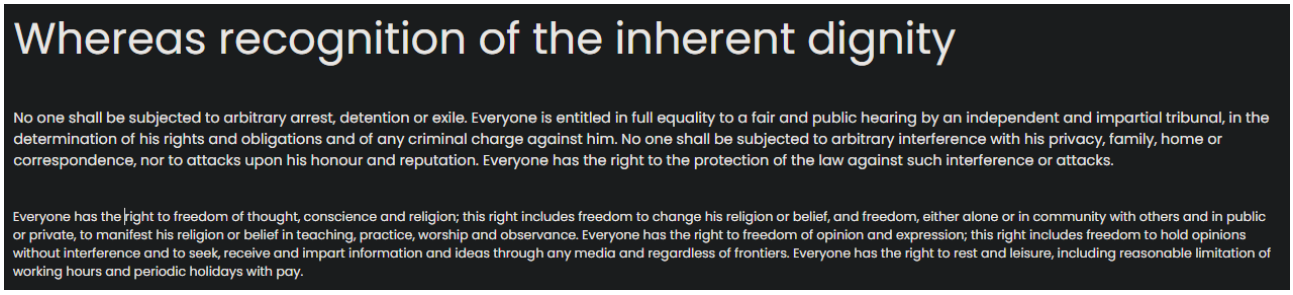

Figure 3: Poppins font - type test

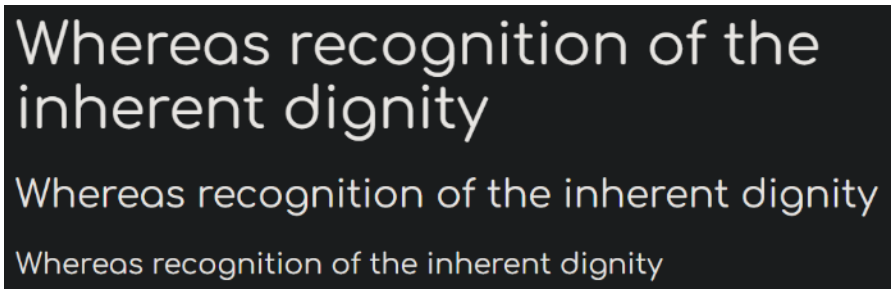

Figure 4: Comfortaa font - type test

Images:

Evocative images were employed to convey themes of **inclusion, solidarity, engagement and professionalism**, creating a diverse yet not overly formal environment. Examples of such images include offices, entrepreneurs and educators.

Registration form:

A registration form was implemented to **gather initial user profiling information**, enabling immediate access to the matching feature upon registration. The form was divided into **three main sections** visually in **white blocks over a coloured background**; a design choice that is used throughout all the platform.
The sections are:

- **Create an Account**: basic account information;
- **Specify Your Profile**: Initial profiling information about the user;
- **Let's Match!**: The user's preferences and desired matches.

Many times, these registration details have been streamlined and reworked to **simplify the registration process**, aiming to limit them to the **necessary information for basic matching**.

Therefore, the optional data could be provided in a later stage through the "**Additional Informations**" section on the user's profile page, offering supplementary data for the matching process.

Additionally, the feature to **fill in the basic information** of the first section **via social platforms** such as **Google, Facebook,** or **LinkedIn** has been added.

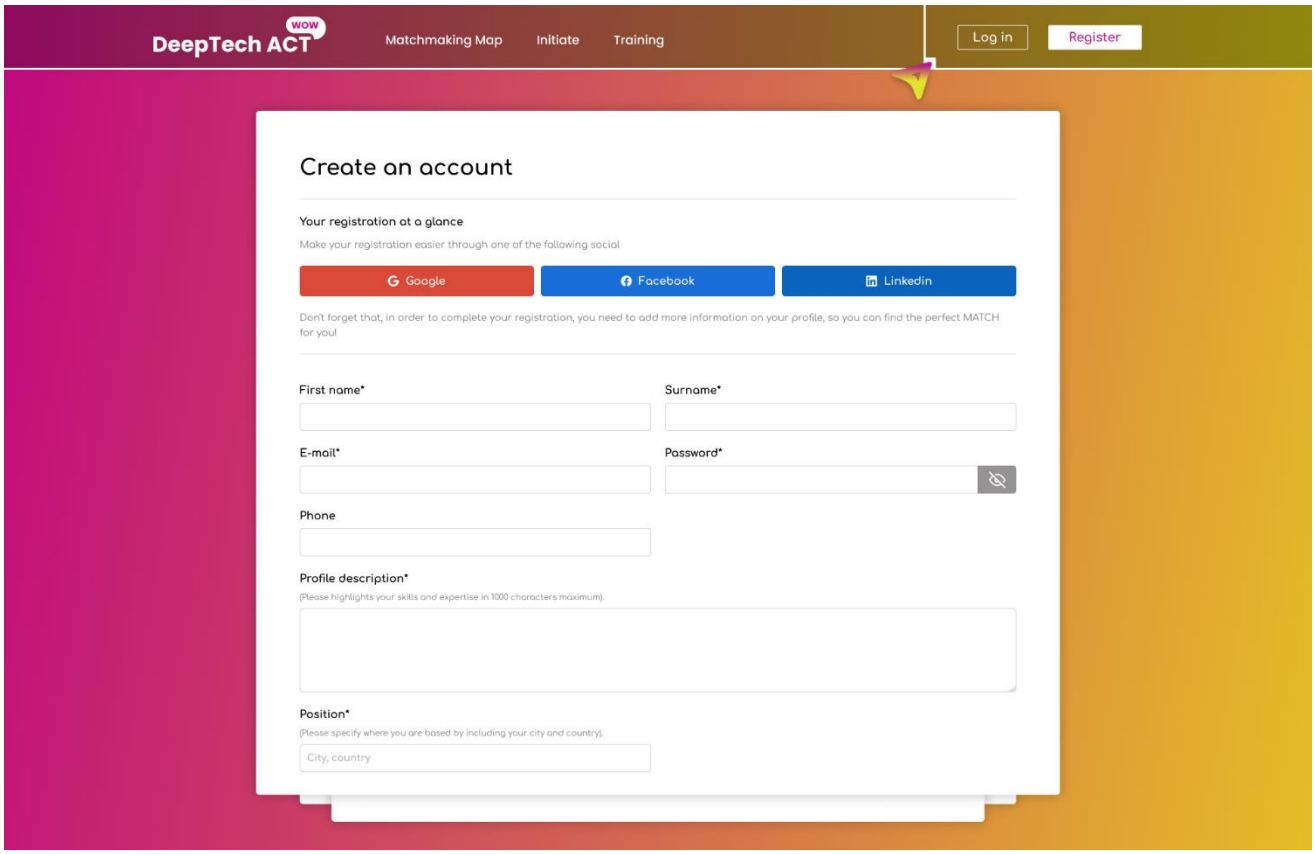

Figure 5: Registration form design

2.1.2 SECTION DESIGN DETAILS

Training:

The **Training** section include a series of courses accessible to platform users. Visually, the courses are **arranged vertically in blocks with a title and a featured image** following the design of the white block forms used previously. It gives us the essential course information about the user. Once one clicks on the chosen course there will be a **detailed preview of the contents** from which one can access the resources contained therein.

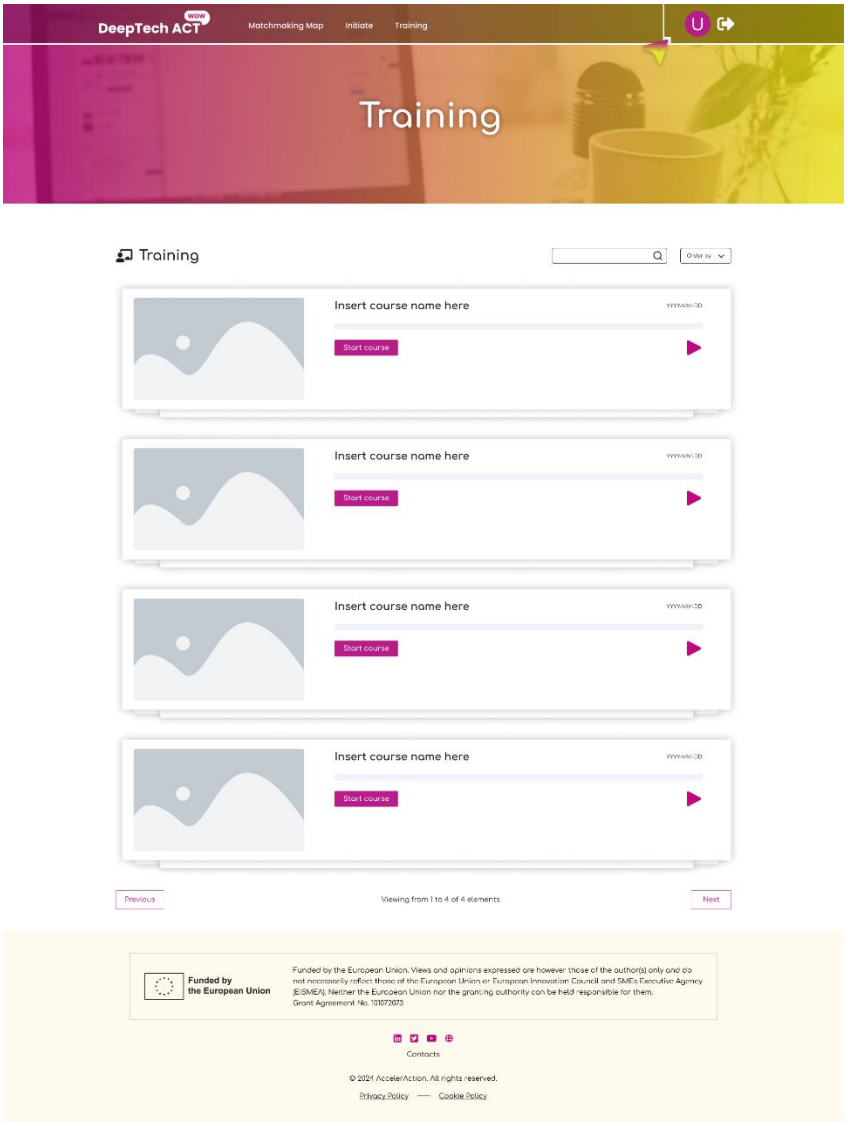

Figure 6: Mockup of the Training section

Initiate:

The **Initiate** section features a collection of articles categorised into **five sections**: Entrepreneur, Accelerator Programme Manager, Investor, Policy Maker & Transversal. The layout resembled a **blog format**, with a **search bar and archived categorisation**. This section is also accessible without an account.

Initially, the layout included a section of trend articles and previews for each category, using the graphics of these "**colourful books**" to differentiate them **by category**. However, due to the **articles being static** rather than dynamic, the presence of **redundant information**, and the **graphics not reflecting** the professionalism of the **content** effectively, it was decided to **redesign the section** and simplify it significantly.

As part of the redesign, the "colourful book" graphics were removed even from the secondary pages, and the section was simplified to serve as a **user-friendly gateway to the categories of interest**.

Figure 7: First version of the mockup of Initiate section

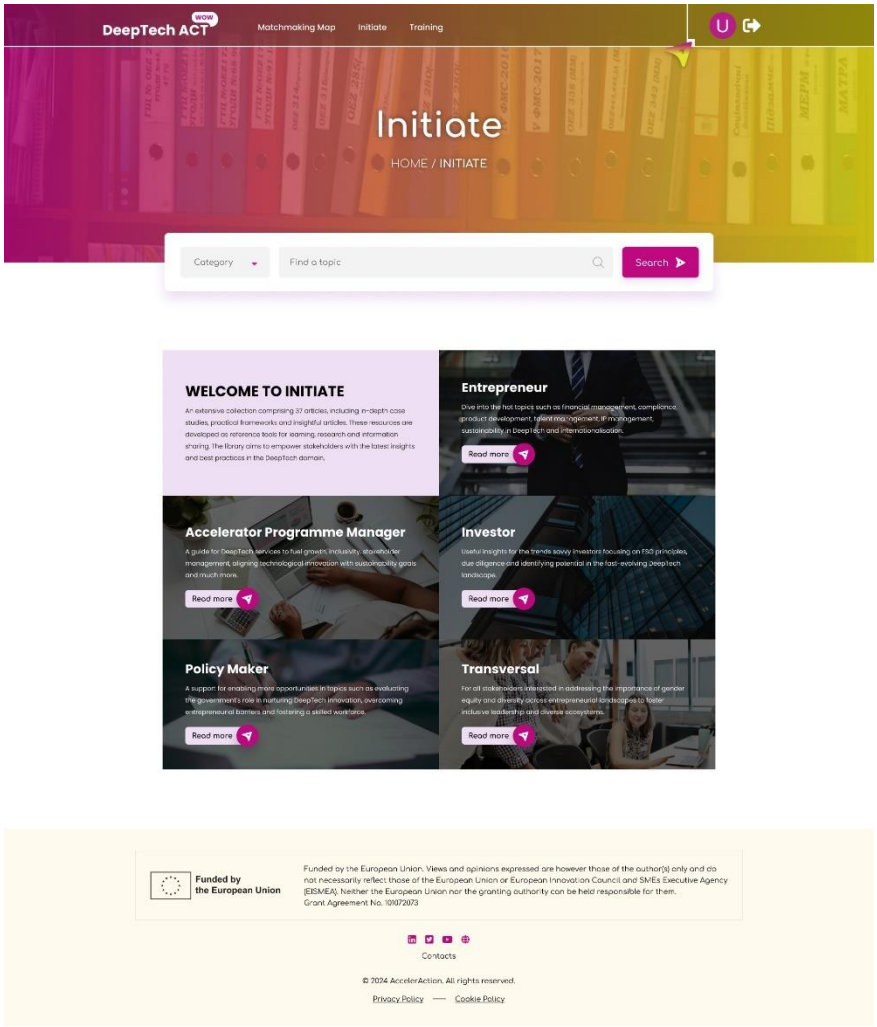

Figure 8: Last version of the mockup of Initiate section

Community (removed):

The initial plan for the **Community** section involved a forum-like feature, but it was later **eliminated due to lack of use**.

Matchmaking map (core function):

The Matchmaking Map section initially had **a simple layout with the map as the central focus** and a **sidebar on the left** displaying **users in matching** order based on their matching scores with the user.

- However, based on user and partner feedback, **several changes were implemented**, including:
- Addition of a **top toolbar** with useful matching functions;
- Inclusion of a **sidebar with additional features**, such as adding users to favourites;
- Incorporation of a **tutorial** on how to use the tool;
- Implementation of a **different colour scheme for users with a matching score above a certain threshold**, allowing for differentiation of better matches;
- And such more minor design changes.

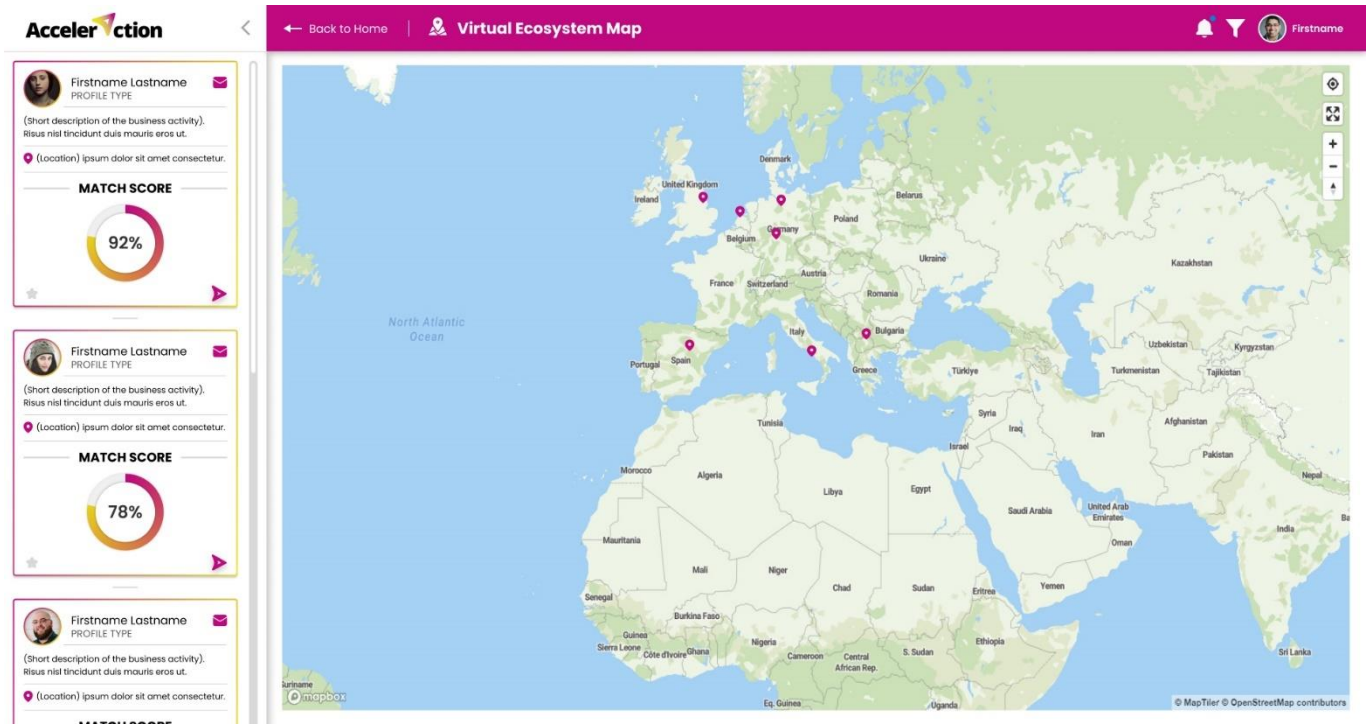

Figure 9: First mockup version of the matchmaking map

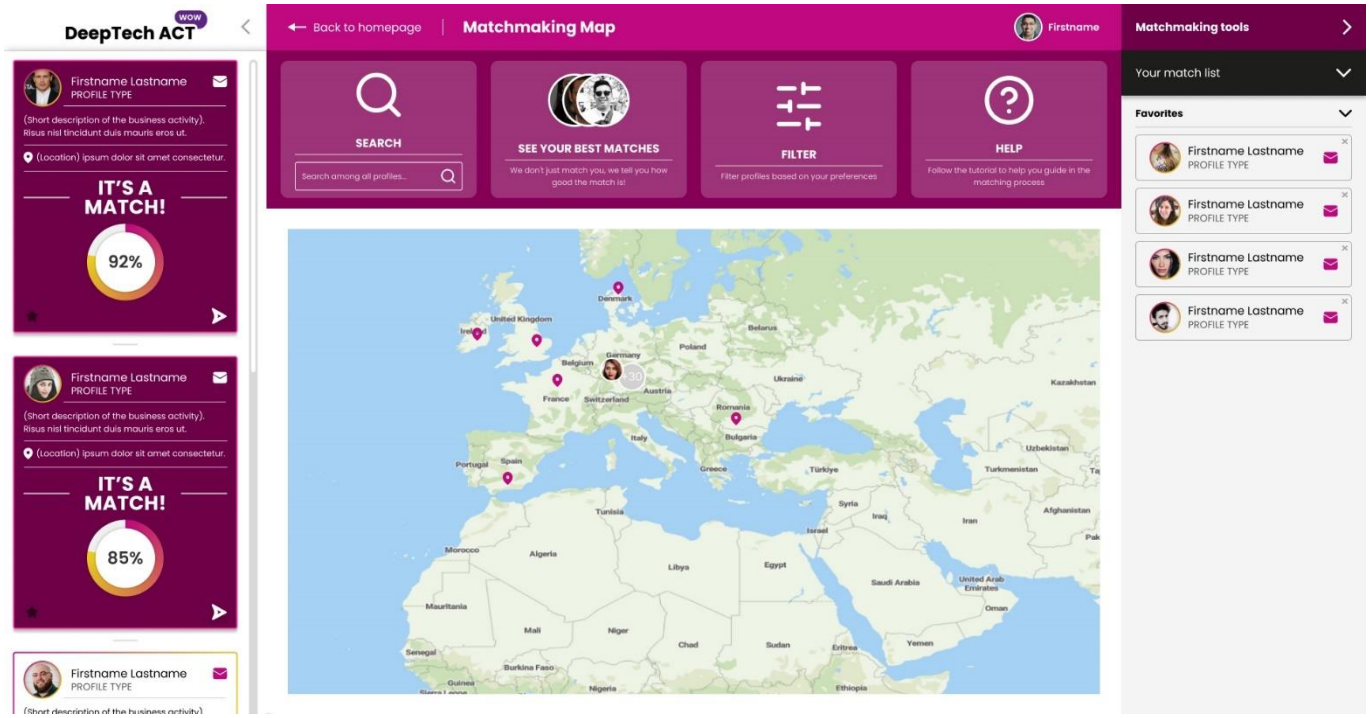

Figure 10: last Mockup version of the matchmaking map

Mail templates design

During the development of the platform, three e-mail templates were created to communicate with users. All three templates have a similar layout, with headers and footers, but the content is different.

There is a **registration confirmation e-mail**, a **password reset** e-mail and a **newsletter** e-mail. Each of these also has a mobile version to ensure readability and responsiveness on smartphones and tablets.

In terms of visual identity, the same principles applied to the platform are also applied to the email templates.

The three templates will be described in detail below:

Registration confirmation: this email confirms the user's registration to the platform and provides a record of it. It includes both text and an image representing the platform. This template also has a variant stating that the user has confirmed their registration.

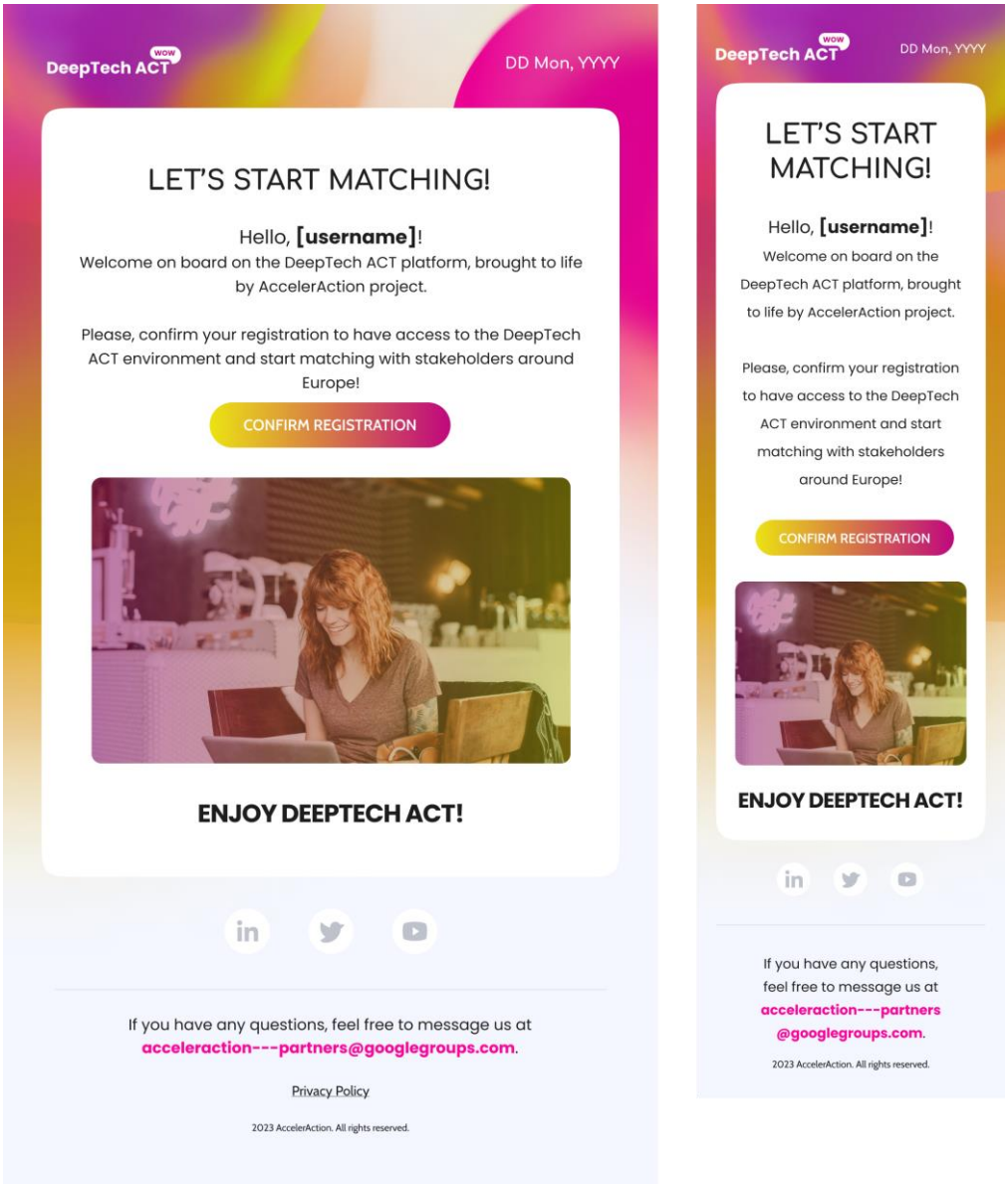

Figure 11: Mockup of the registration confirmation mail in desktop and mobile version

Password recovery: This email has the same layout as the registration confirmation, but it includes a button or direct link for the user to reset their password.

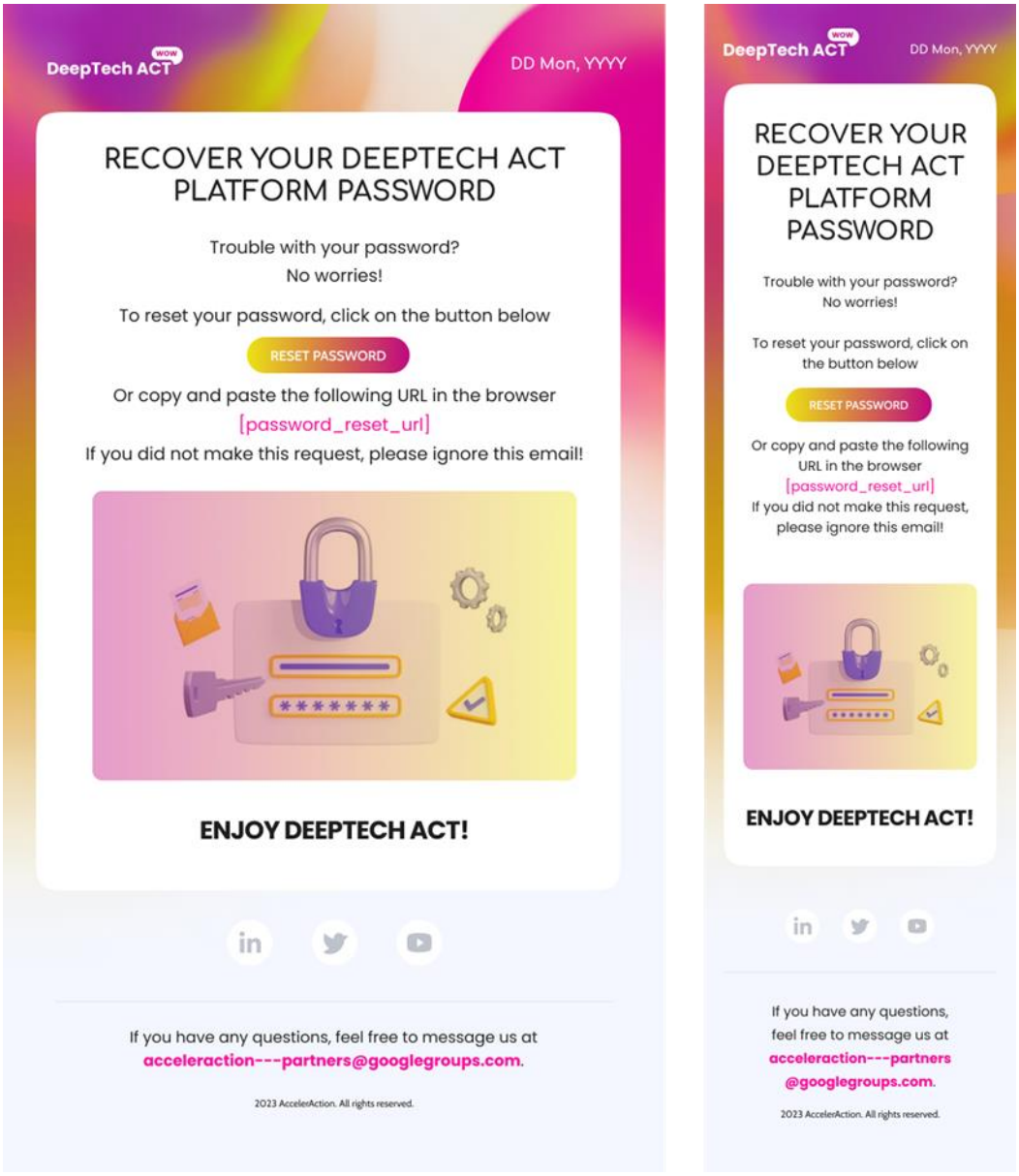

Figure 12: Mockup of the password reset mail in desktop and mobile version

Newsletter: This email notifies the user of potential matches related to their account on the platform. The top three matches are listed directly in the email, along with some details for each match.

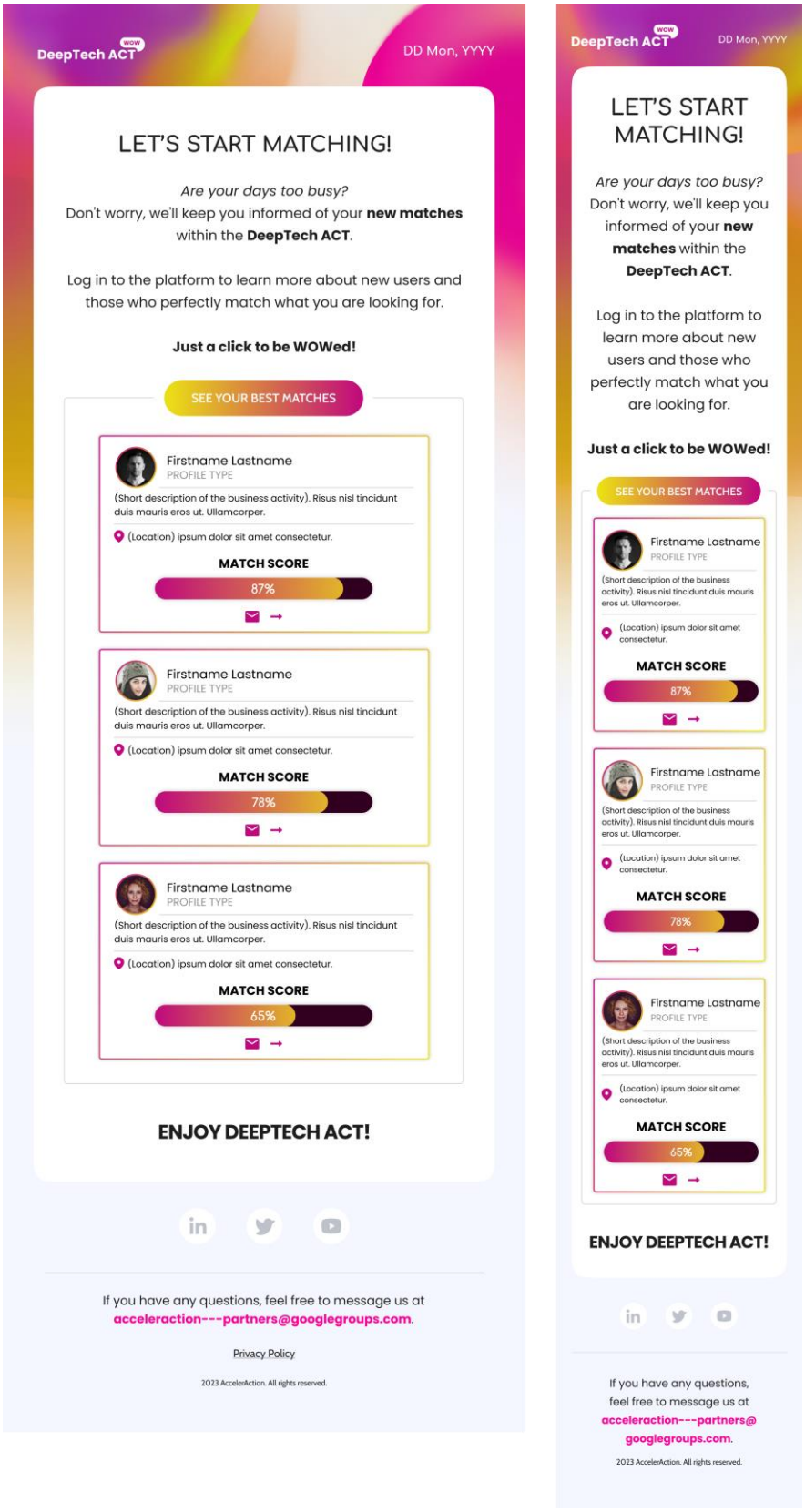

Figure 13: Mockup of newsletter mail in desktop and mobile version

Additional notes:

Throughout the development process, various modifications were made based on suggestions and feedback from partners and users, resulting in the current platform design. It should be noted that **these changes may have caused deviations from the initial mockup design.**

2.2 STRUCTURE OF THE WEBSITE AND THE PLATFORM

The design of the website and the platform was created starting from a simple basic layout previously discussed between project managers and designers, which highlighted the basic required functions that needed to be present on it and how to arrange them within the site. A clean and user-friendly approach was adopted. Before delving into the details of the AccelerAction platform frameworks, we will outline its design and architecture. Giving the context of the technologies used, why they were used and what the implementation advantages obtained are.

Below is a very quick and non-exhaustive overview of the IT ecosystem created: the platform has two front-end applications that are perfectly integrated with each other, but which have different purposes. JO Consulting servers are hosted by AWS, Amazon Web Services and one of the web applications is developed in PHP 8.2 and the other one, that is the more innovative section, is in React. RDS Amazon Relational Database Service, was used for the database with Aurora (mysql 5.7). Front-end and database communication thanks to APIs in node, have been implemented via Docker and the server reverse proxy is nginx and out of AWS it is possible to find proxy Cloudflare.

The following image is a simplified diagram for a better understanding:

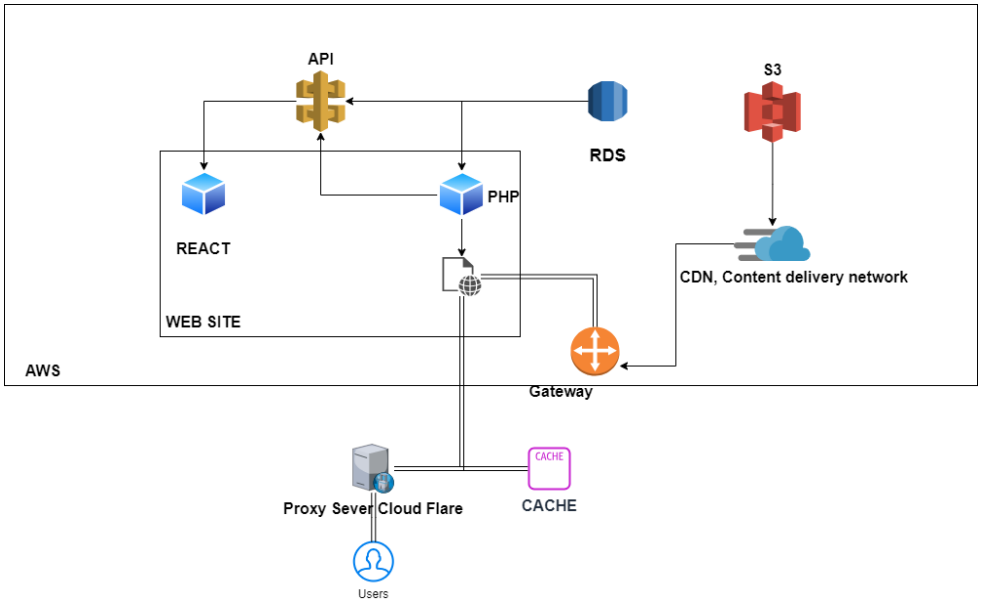

Figure 14: Server Architecture

The ecosystem is hosted in **AWS CLOUD**.

2.2.1. ARCHITECTURE: AWS SERVICES

Amazon Web Services (AWS) is a comprehensive cloud computing platform provided by Amazon.com, offering a wide range of services to help organisations to build and to scale applications. AWS delivers cloud services in various categories, including compute, storage, database, networking, machine learning, and more. These services are designed to provide flexibility, scalability, and cost-effectiveness to businesses of all sizes, enabling them to innovate and grow without the overhead of managing physical infrastructure. AWS allows us to quickly provision of resources and scale the infrastructure up or down based on demand. This elasticity enables organisations to handle spikes in traffic, reduce operational costs, and optimise resource utilisation.

The choice of Amazon AWS relies on AWS Availability Zones that are designed to provide high availability and fault tolerance, allowing organisations to deploy resilient and scalable applications in the cloud. They are physically separated from each other to minimise the risk of simultaneous failures. Applications deployed across multiple Availability Zones can withstand failures and disruptions, ensuring continuous operation and business continuity.

AWS offers a robust and feature-rich cloud infrastructure, including global regions and Availability Zones, that provides organisations with the flexibility, scalability, and reliability they need to innovate and grow their business in the cloud.

Below is an overview of the services implemented on AWS:

2.2.1.1. RDS

Amazon RDS (Relational Database Service) was selected as the database management system for AccelerAction project for several key reasons. Firstly, scalability offered by Amazon RDS was paramount to project's needs. As the workload can vary significantly over time, it was needed a solution that can be dynamically adapted to demand. Amazon RDS provides the ability to easily scale database resources, allowing to increase or decrease compute and storage capacities based on real-time requirements. Moreover, the management of day-to-day database operations is simplified through Amazon RDS's automated backup, patching, and database repair management. This allows the technical team to focus more on developing the initial project idea rather than base it on database maintenance tasks. High availability is another crucial feature that drove us towards Amazon RDS. With the ability to create database replicas across different availability zones, we can ensure a high level of availability and minimise the risk of service interruptions due to hardware failures or human errors. Lastly, the integration of Amazon RDS with other AWS services was another key point in the final decision. The ability to seamlessly integrate the database with AWS Backup service allowed the team to build a highly scalable and performant application ecosystem.

In summary, the use of Amazon RDS in AccelerAction project provides us with scalability, ease of management, high availability, and excellent integration with other AWS services, supplying a solid foundation for the success of final output.

2.2.1.2. S3

Amazon S3 (Simple Storage Service) is an object storage service offered by Amazon Web Services (AWS). It is designed to provide software developers with scalable, secure, and reliable infrastructure for storing and retrieving data over Internet. It has been implanted Amazon S3 buckets as a reliable and scalable solution for storing large volumes of data,

ranging from multimedia files to documents. These S3 buckets provide durable and cost-effective storage, ensuring that data remains highly available and resilient to failures. To complement this storage solution, it was leveraged Amazon CloudFront, a Content Delivery Network (CDN) service.

2.2.1.3. CLOUDFRONT

CloudFront optimises content delivery by distributing cached content across a network of edge locations strategically positioned around the globe. This network of edge locations reduces latency and ensures rapid access to the content for users worldwide. Additionally, CloudFront's integration with S3 enables seamless content replication and distribution, enabling us to deliver a consistently high-quality experience to final users regardless of their geographic location.

In summary, the combined use of Cloudflare, Amazon S3, and CloudFront provides a robust, secure, and efficient infrastructure for delivering services to users globally. These services work in tandem to enhance security, optimise content delivery, and ensure a seamless user experience, reinforcing the commitment for providing reliable and high-performance services to customers.

2.2.1.4. EC2

Once the infrastructure with which contents have been delivered, is clear, it is important to focus on the servers used which is Amazon EC2 (Elastic Compute Cloud). It stands as a cornerstone service within Amazon Web Services (AWS), offering a dynamic solution for computing needs in the cloud. At its core, EC2 provides users with the ability to rent virtual servers, known as instances, enabling them to run applications without the overhead of physical hardware. This service is built on robust virtualisation technology, allowing multiple instances to operate on a single physical server.

In essence, Amazon EC2 revolutionises computing by providing on-demand access to virtual servers, offering unparalleled flexibility, scalability, and performance in the cloud computing landscape.

2.2.2. CLOUDFLARE

Cloudflare is a cloud-based service provider that offers a wide range of tools and services aimed at improving the security, performance, and reliability of websites and online applications. The integration of Cloudflare into our infrastructure offers a comprehensive suite of benefits. Notably, it serves as a robust shield against Distributed Denial of Service (DDoS) attacks, bolstering used server's resilience against malicious threats. Additionally, Cloudflare provides insightful access statistics, offering valuable insights into traffic patterns and user behavior. This data empowers us to make informed decisions regarding our infrastructure and optimise our services for improved performance and user experience.

Moreover, Cloudflare's regional firewalls add an extra layer of security by allowing to enforce access controls based on geographic regions. This granular control helps mitigate potential threats originating from specific regions while ensuring legitimate users can access services seamlessly. Furthermore, Cloudflare's caching capabilities significantly enhance content delivery speed and efficiency. By caching frequently accessed content at various points across its global network, Cloudflare minimises latency and accelerates content delivery to end-users, resulting in a faster and more responsive browsing experience.

2.2.3. DOCKER

Docker played a pivotal role in the implementation of AccelerAction project, providing a lightweight and efficient containerisation solution that streamlined the development, testing, and deployment processes. F Docker allowed us to containerise our application components, including the backend services and it was achieved consistency and portability across different environments, ensuring that the application behaves reliably regardless of the underlying infrastructure. Docker revolutionised the development and deployment workflows

by providing a consistent and efficient containerisation solution that improved portability, scalability, and reliability of the proper application.

2.2.4. PHP

It was chosen to use PHP: Hypertext Preprocessor, server-side scripting language primarily used for web development. It is renowned for its simplicity and ease of learning, making it accessible to beginners while offering advanced features for seasoned developers. This extensive community has contributed to a plethora of libraries, frameworks, and resources, making it easier to find solutions to various development challenges. Over the years, PHP has undergone significant performance improvements. With the release of PHP 7 and subsequent updates, it has become faster and more efficient, rivaling other scripting languages in terms of speed. PHP powers a significant portion of the web, including popular content management systems (CMS) like WordPress, Drupal, and Joomla.

Its compatibility with various operating systems and web servers makes it a versatile choice for web development projects. Recent versions have prioritised security enhancements.

The PHP development team actively addresses vulnerabilities and releases security patches promptly. Additionally, the PHP community provides best practices and guidelines for writing secure code, helping developers build robust and secure applications.

The security of user session management, the versatility and compatibility of the language with cloud services like AWS through SDKs, the speed, and as mentioned earlier, the robustness offered by the community and a language that originated in 1994, used in the courses of the most authoritative universities in Computer Science and Computer Engineering, now in its eighth version and continuously updated, has made the choice for develop in PHP 8.2.

2.2.5. REACT

To implement the most innovative solutions, different languages were taken into consideration: Vue.js, Angular JS and React. After a careful analysis of the pros and cons, also considering the experience cultivated over the years of web application development, has been chosen React as the library to develop part of the project.

React is a framework front-end that help to develop component-based architecture that allows for the creation of highly interactive and dynamic user interfaces, providing a seamless and engaging experience for users. Applications can deliver cutting-edge experiences that rival native desktop or mobile applications. React's declarative syntax and modular approach streamline development workflows, enabling developers to build and maintain complex applications more efficiently. Unlike PHP, which is a server-side scripting language, React is purely front-end and requires a web server to function.

Component-Based: React is based on a component-based architecture, where UIs are split into independent and reusable components.

- Virtual DOM: React uses a virtual DOM to improve performance by updating only the necessary parts of the actual DOM.
- JSX: JSX is a syntax extension for JavaScript that allows mixing HTML-like code within JavaScript.
- One-Way Data Binding: React implements one-way data binding, which means that the data flows in one direction, making the code more predictable.
- React Native: React Native allows for building native mobile applications using React.
- Angular, developed by Google, was released in the year 2010, It is a TypeScript-based framework that uses a regular DOM. Angular provides a set of tools using which a complex, reactive UI can be built.
- Full-Featured Framework: Angular is a full-featured framework with a comprehensive set of tools and libraries for building complex web applications.
- Two-Way Data Binding: Angular uses two-way data binding, where changes to the model are reflected in the view and vice versa.
- MVC Architecture: Angular follows the Model-View-Controller (MVC) architecture, which helps in organizing and managing code.
- Dependency Injection: Angular has a built-in dependency injection system that helps in managing dependencies and promoting modular code.
- CLI: Angular provides a Command Line Interface (CLI) for scaffolding and managing Angular projects.

Vue was developed by a former Google employee and was released in the year 2014. It was developed to make the best version of Angular and make a custom tool. It is used for developing single-page engaging and high-quality web applications. It lets you extend directives (HTML with HTML attributes), and also provides built-in directives and user-defined directive

Features of Vue

- Approachability: Vue is known for its simplicity and approachability, making it easy for beginners to understand and use.
- Flexibility: Vue is flexible and allows developers to use it as a library for specific features or as a full-fledged framework for complex applications.
- Reactivity: Vue provides a reactivity system that automatically updates the DOM when data changes, similar to React's virtual DOM.
- Single File Components: Vue allows for defining components in a single file, which includes the template, script, and styles, making it easier to manage components.
- Vue Router and Vuex: Vue comes with official libraries for routing (Vue Router) and state management (Vuex), making it a comprehensive solution for building SPAs.

Here are some key strengths of React.js compared to other languages as Angular JS and Vue.js:

Component-Based Architecture: React's component-based architecture promotes code reusability, maintainability, and scalability. This modular approach allows for more straightforward management of complex applications, making it easier to develop and maintain large codebases compared to Angular's MVC and Vue's MVVM architecture. React does not follow any specific pattern, developers have the freedom to choose any design pattern. It begins with a single root component. Each can be nested with another component. It can also include third-party components such as state management routing, animation, etc for specific purposes. Here, the components are the large building block that defines reusable items used through the application.

Flexibility and Integration: React's flexibility allows developers to choose the best libraries and tools for their specific needs. Its seamless integration with various backend technologies, including Node.js, makes it a versatile choice for building full-stack applications compared to Vue.js

Industry Adoption and Stability: React's broader industry adoption and proven track record in powering large-scale, high-performance applications make it a reliable and trusted choice

for building modern web applications. Its maturity and stability compared to newer frameworks like Vue.js and ensure long-term support and compatibility.

Efficient Virtual DOM: The Virtual DOM (Document Object Model) is a lightweight, virtual representation of the actual DOM of a web page.React's Virtual DOM ensures efficient updates and rendering of components, leading to improved performance and a smoother user experience. When elements in a React application are updated, React compares the Virtual DOM with the real DOM to identify differences (diffing). Subsequently, React updates only the parts of the DOM that have actually changed, minimizing the number of manipulations performed on the actual DOM, which can be costly in terms of performance. This feature offers a significant advantage over Angular in terms of handling dynamic UI updates with minimal performance overhead. Angular utilizes two-way data binding to automatically synchronize the model and the view. While this can simplify development, it can also lead to performance issues, especially with complex applications, as every change trigger updates in both directions.

In conclusion, React is known for its fast performance due to its virtual DOM implementation. Vue also offers excellent performance, while Angular's performance can vary depending on the complexity of the application and how it's implemented. React.js combines performance, flexibility, and a strong community to offer a compelling solution for building modern web applications. Its component-based architecture, efficient Virtual DOM, and extensive ecosystem of libraries and tools make it a preferred choice for developers looking to create scalable and maintainable front-end solutions.

2.2.6. NODE.JS

In the project, it was opted for Node.js as the server-side technology to ensure seamless integration across multiple services database APIs, and APIs from other partners. The choice of Node.js was driven by several factors. Firstly, Node.js is renowned for its ability to handle asynchronous operations efficiently, making it well-suited for building scalable and high-performance web applications. This is particularly advantageous in scenarios where the

application needs to handle concurrent requests from multiple clients while maintaining responsiveness.

Node.js offers a vast ecosystem of modules and packages through npm (Node Package Manager), which provides developers with access to a wide range of tools and libraries to streamline development tasks. This rich ecosystem enhances the ability to integrate with various APIs and third-party services seamlessly. Furthermore, Node.js's event-driven, non-blocking I/O model aligns well with the requirements of modern web applications, allowing us to efficiently handle real-time data processing and communication between the front-end and back-end components of the application.

In summary, the decision to use Node.js as the server-side technology for this project was motivated by its performance, scalability, rich ecosystem, consistency, and suitability for building modern, high-performance web applications that integrate seamlessly with diverse backend services and APIs.

2.2.7. NGINX

Nginx was selected as the web server and reverse proxy for the project due to its exceptional performance, flexibility, and robust feature set. First and foremost, Nginx is renowned for its high-performance capabilities, particularly in handling concurrent connections and serving static content efficiently. This is crucial for the project, which anticipates a large volume of incoming requests and demands optimal response times. Nginx's versatility makes it an ideal choice for various deployment scenarios. Whether serving as a web server, reverse proxy, load balancer, or caching server, Nginx provides the flexibility to adapt to the project's evolving needs. Its lightweight architecture and efficient resource utilisation ensure that it can effectively handle the workload without unnecessary overhead. Nginx offers advanced features for managing and optimising web traffic, such as URL rewriting, SSL termination, and content caching. These features enhance the project's security, performance, and scalability, while also simplifying the implementation of complex routing and deployment strategies. Furthermore, Nginx's extensive ecosystem of third-party modules and plugins extends its functionality and customisation options. This allows us to tailor Nginx to specific requirements and integrate it seamlessly with other components of the project architecture as for React.

As regards the backend, in addition to Nginx, Apache was taken into consideration as a web server.

Apache:

Apache, one of the most widely used web servers globally, has a long-standing reputation for reliability and versatility. It employs a multi-process, multi-threaded architecture, which has been the standard for traditional web servers.

Maturity and Stability:

Apache's maturity and extensive documentation make it a trusted choice for hosting a wide range of applications and websites. Its proven track record and broad community support ensure long-term stability and reliability for mission-critical environments.

Flexibility:

Apache offers a rich set of features and modules, allowing developers to tailor their server configurations to meet specific needs. Its extensive ecosystem of plugins and extensions provides flexibility and adaptability, making it suitable for various hosting scenarios and integration with different technologies.

Comparison:

Performance vs. Versatility:

Nginx's superior performance in handling concurrent connections and serving static content makes it an excellent choice for high-traffic websites and applications where speed and efficiency are paramount. On the other hand, Apache's flexibility and wide-ranging features make it a preferred option for diverse hosting environments and complex configurations. But Unlike Apache, NGINX doesn't support directory-level configuration. While this results in limited flexibility, it helps increase site performance. Since NGINX is designed to be efficient, it doesn't need to search for .htaccess files and interpret them, allowing it to serve a request faster than Apache.

Resource Utilization:

Nginx's lightweight design and efficient resource utilization can lead to reduced memory usage and improved scalability compared to Apache's multi-process model. This can be particularly beneficial for optimizing server costs and ensuring smooth performance under heavy loads.

In conclusion, during the evaluation process, Nginx emerged as the clear frontrunner for web server infrastructure. Its event-driven architecture demonstrated superior performance capabilities, effectively managing high volumes of concurrent connections while efficiently

serving static content. This efficiency translates to faster response times and improved user experiences for our audience. Additionally, Nginx's robust security features and flexibility in configuration provide a solid foundation for ensuring a secure and scalable environment. Its lightweight design minimizes resource utilization, optimizing server costs and allowing for seamless scalability as our platform grows. Overall, Nginx's combination of performance, security, and flexibility aligns perfectly with project's needs, making it the ideal choice for powering our web applications and delivering exceptional performance to our users.

2.3 DEVELOPMENT OF DEEPTECH ACT AND ITS CONTENT

Once identified the technologies employed in the project, it is needed to delve into how they've been leveraged and which peculiarities of each technology have been particularly significant.

For the AccelerAction project a microservice solution was adopted. This means that the application is divided into three main components that work together to provide the complete functionality:

- The component **Initiate**;
- The **training section**;
- The **community** (which is no longer available)[1];
- **DeepTech ACT** main functions as *user register*, *user login*, *events* and *profiles* which have been developed in MVC architectural pattern, using the PHP language with the CodeIgniter framework and totally complementary to it.
- The **Match-making area,** which was developed in React;

[1] The decision to remove the community section was taken, as it was considered superfluous for the purposes of the project. The forum is a web construct that is extremely outdated and clashes with the innovative nature of the project we aim to present. Therefore, we chose to forego a marginal feature to preserve the innovative and practical aspect of the entire platform. Not to mention, forum platforms require constant maintenance due to their susceptibility, owing to the possibility of anonymity, to hate speech and vulgarity, and not least, constant supervision, organization, and administration of forums, comments, and sections.

2.3.1 TOOLS FOR DEVELOPING

2.3.1.1 CODELGNITER

CodeIgniter is a web framework written in the PHP language that boasts of being able to confer efficiency and speed to web application development due to its particularly compact software design. The performance-oriented design of CodeIgniter is enhanced by the sleek layout of the PHP framework. This, in fact, is oriented on the Model-View- software architecture model.

Controller (MVC). The principle behind MVC is the strict separation between code programming and presentation, achieved through a modular software setup and the transfer of PHP code. Three main components are differentiated: the model (Model), the view (View) and the controller (Controller).

The model (Model) represents the data structure of a web application developed on the basis of CodeIgniter. For this purpose, the so-called model classes are defined ("model classes") in the source code. Through access to a database, these contain specific functions with which information can be opened, saved or updated.

The view (View) is that aspect of an application that is presented to the end user. Normally this is an HTML document into which content is integrated via PHP in a dynamic manner (server side). The view is thus a kind of template.

The controller (Controller) acts as a mediating entity between the model, view, and any other resource needed to process an HTTP request or to create a dynamic Web site. This component accepts incoming requests, searches for the desired view, and forwards the contents to the model, which has loaded them from a database.

CodeIgniter advantages of the application are the following:

- Simple setup: the first approach with CodeIgniter is straightforward. Users do not have to take a long time to configure the framework but can start practically right away with the development of the application they have planned. The difficulty is basically limited to the settings in config.php in the application/config/ path.
- High performance: such a lightweight base system which means that CodeIgniter, compared to other PHP frameworks, can take advantage of very high speed.

- Clean URLs: CodeIgniter automatically generates user-friendly URLs that are optimised for search engine. Instead of realising access to dynamic web content via Query Strings like other PHP frameworks, CodeIgniter relies on an approach based on the segments.
- Detailed documentation and community support.

CodeIgniter is based on a URL concept: this means that the controller becomes the central monitoring unit between view and model by entering a URL in the browser's search bar. For this purpose, developers create so-called controller classes (classes). In this case, these are PHP files, which contain various functions to load libraries (libraries), extensions (plugins) or helper classes (helpers), to make links to databases, to integrate a model or to search for a specific view.

The application flow of CodeIgniter is therefore based on the following basic URL pattern:

example.com/class/function/parameter

The domain (example.com) is followed by a controller class to be involved, as well as a specific controller function. The conclusion is optional parameters (Parameter): these are used to pass IDs or variables to the chosen controller.

Controller Classes:

CodeIgniter gives developers the opportunity to programme individual controllers as user-defined classes. For this purpose, web developers provide a separate PHP file for each controller within the application/controllers/ path. Controllers contain the programme logic of a web application developed with CodeIgniter and are created as subclasses of the CI_Controller class element. Within the source code, programmers do the same thanks to the “extends” keyword.

```
class Course extends CI_Controller {
	function __construct(){
		parent::__construct();
		$this->Customer_model->is_logged_in('checkout');

		$this->load->model('Member_model');
		$this->load->model('Customer_model');
		$this->load->model('Frequency_model');
		$this->load->model('Settings_model');
		$this->load->model('Product_model');
		$this->load->model('Log_model');

		$this->load->model('Activity_model');
	}
}
```

Figure 15: PHP code, class CI_Controller.

The example shows the Course class as a subclass of CI_Controller. The __construct() constructor function combines the various models.

The programme logic will appear in the form of controller functions that let the views be called. For the controller to be able to load a view, the underlying HTML document must be placed in the application/views/ path in the form of a PHP file.

To load a view into the controller, you need a user-defined function. In the following code example, the index() function comes into play to load the header.php view.

```
public function index() {
	$data['user_id'] = $user['id'];
	$this->view('front/' . 'header', $vars, true);
}
```

Figure 16: PHP code, load of a view.

Models Classes:

Models are used in CodeIgniter to make available functions with specific database-related operations. Just like controller classes, model classes can also be programmed with the PHP framework so that they are defined by the user.

To activate a model class, firstly a name is assigned to the class: in this case Course_model. Similarly to controller classes, all user-defined model classes are subclasses of the parent

class CI_Model. Inheritance is accomplished through the extends keyword. Model classes also connect databases and other resources through the constructor function.

```
class Frequency_model extends CI_Model {
  public function __construct() {
    parent::__construct();
    $this->load->database();
  }
}
```

Figure 17: PHP code, Class Frequency_model.

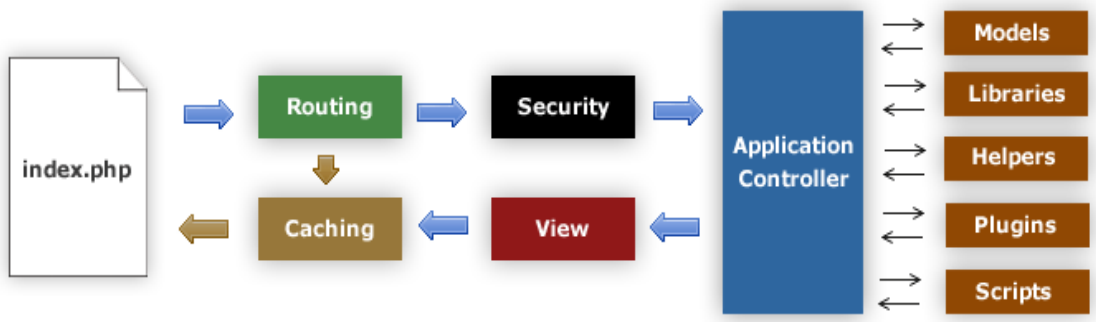

Figure 18: CodeIgniter workflow

1. The index.php serves CodeIgniter as the front controller for incoming HTTP requests. All the basic resources that are needed to use the application are initialised here.
2. At the routing level, CodeIgniter checks which action needs to be implemented. For this purpose, the application aligns the URL in the request with the routing rules defined in routes.php.
3. Subsequent to routing, caching takes place. If a suitable response to the request is found within the application's cache, then it will be forwarded directly to the browser that sent the request. Otherwise, the controller examined during routing is activated with the pre-inserted filter function.
4. The CodeIgniter framework contains a built-in filter that intercepts malicious requests. Each HTTP request undergoes a security check before the application loads a controller appropriate to the request.
5. If the request manages to pass the filter check, then the controller is activated: this chooses a suitable view and loads the model and also all the libraries, helper classes, extensions, and scripts that are needed to respond to the request.

6. As soon as all relevant data is transmitted to the view, the view can forward it to the browser.
7. If caching is active, CodeIgniter temporarily stops outgoing data in order to respond directly to recurring requests.

2.3.1.2 DATABASE SCHEME

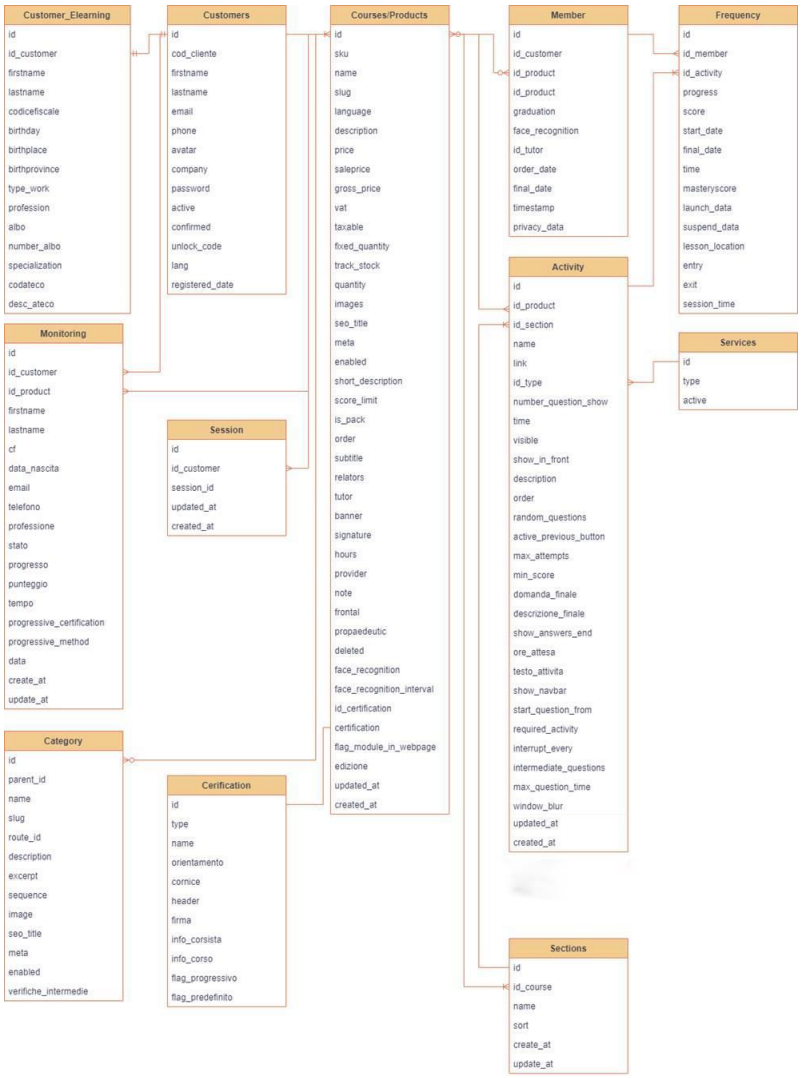

Figure 19: Databases Scheme

The "Customers" table constitutes a comprehensive register of end users who have registered on DeepTech ACT platform. Once users have activated their accounts, they can access the system and access the Training, Matchmaking Map, and Initiate sections.

Courses are stored in the "Courses" table, each course consists of one or more sections, allowing thematic categorisation of various activities within the course. Sections are stored in the "Sections" table, while activities are collected in the "Activities" table. Activities represent the actual educational content and can be, for example, SCORM, video, document, quiz, with each activity's specific type identified by the associated ID, known as "id_type."

The table collecting various types of activities managed by the system is called "Services."

To summarise the nesting steps, activities are grouped into sections, sections into courses, and courses into categories.

The "Members" table keeps track of the correlation between various courses and users, creating a new record in this table each time a user purchases a course or obtains free access to it.

Regarding the monitoring of various activities, relevant information is stored in the "Frequency" table, collecting data on scores, progress, start and end dates, and other fields allowing the resumption of each individual activity from where it was interrupted. The "Monitoring" table also supports tracking but concerns the entire course rather than individual activities. This approach enables comprehensive capture and analysis of user learning dynamics within the overall course context.

2.3.1.3 VISUAL STUDIO CODE

It was used visual studio code as development IDE. Visual Studio Code (VS Code) is a lightweight, cross-platform source code editor developed by Microsoft. It provides developers with a powerful yet streamlined environment for coding, debugging, and collaborating on projects. This document outlines the features, functionality, and best practices associated with using Visual Studio Code for software development.

2.3.1.4 GIT

Git enables developers to track changes to their codebase over time, providing a detailed history of revisions and modifications. This history serves as a valuable resource for understanding the evolution of the project, diagnosing issues, and reverting to previous states if necessary.

One of Git's most significant features is its distributed nature, which means that every developer has a complete copy of the project's repository on their local machine. This decentralisation fosters independence and flexibility, as developers can work on their changes independently without disrupting others. They can experiment with new features, fix bugs, or refactor code without fear of affecting the main codebase.

Git's branching and merging capabilities are instrumental in facilitating parallel development and collaboration. Developers can create branches to work on specific features or fixes in isolation, allowing them to iterate and test their changes without interference from other team members. Once a feature is complete, it can be seamlessly integrated back into the main codebase through the process of merging. Git's sophisticated merge algorithms ensure that changes from different branches are reconciled intelligently, minimising conflicts and preserving the integrity of the codebase.

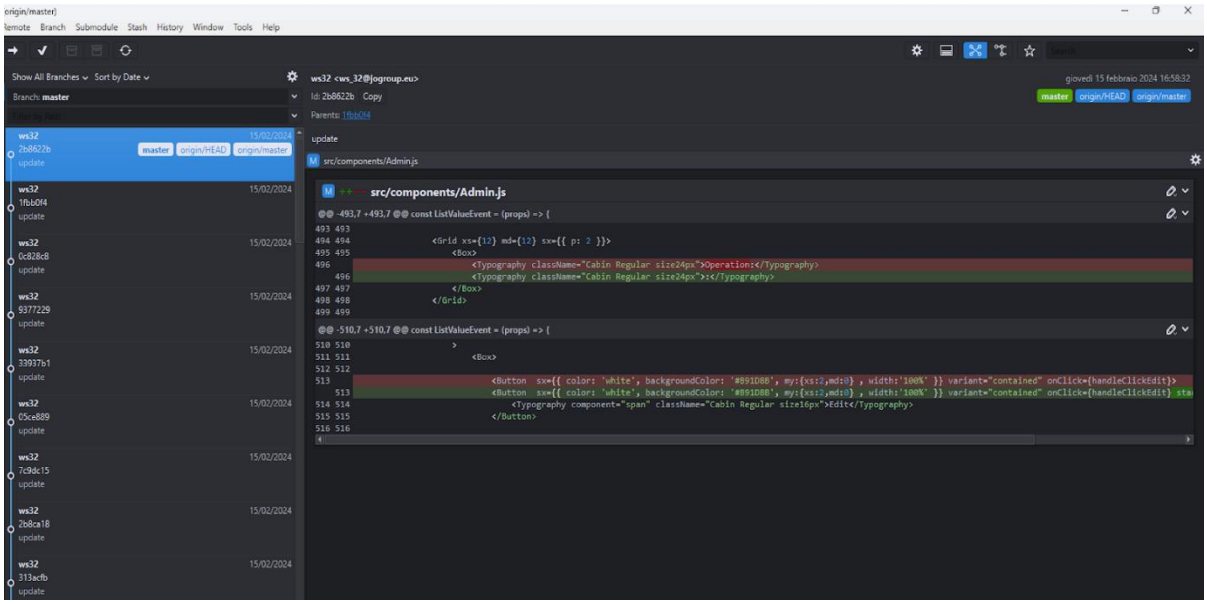

Figure 20: GitAHead tools to manage git project

GIT was indispensable for several aspects: parallel development of the code, revision of the code before being implemented (commit), recovery of less non - current code.

2.3.2 DEEPTECH ACT: INITIATE SECTION

As already described previously, these sections were developed in PHP with the help of codeIgniter. Following, technical details of the section Initiate.

```php
class Resource_library extends Front_Controller
{
    var $data;
    public function __construct()
    {
        parent::__construct();
        $this->load->model('Page_model');
        $this->data['carousel'] = $this->Carousel_model->get_carousel(6);
        $this->data['categories'] = $this->Page_model->get_pages();
    }

    function index(){
        $this->data['title'] = lang('resource_library');
        $this->data['tops'] = [ ];
      foreach ($this->data['categories'] as $category) {
        for ($i=0; $i < 3; $i++) {
                $chose_index = rand(0, count($category->children)-1);
         if ( !in_array($category->children[$chose_index], $this->data['tops'] ) ){
                    $tmp = $category->children[$chose_index];;
                    $tmp->parent_title = $category->title;
                    $this->data['tops'][] = $tmp;
                }
            }
        }
        shuffle($this->data['tops']);
        $this->view('resource_library',  $this->data);
    }
```

Figure 21: PHP code, class Resource_library

This PHP code defines a class Resource_library that extends the Front_Controller class. The index function is called when the path https://deeptechact.acceleraction.eu/resource_library is navigated, at the end of the operations, the data is passed to the view, which following the MVC paradigm is responsible for returning the web page to the client with:

"$this->view('resource_library', $this->data);"

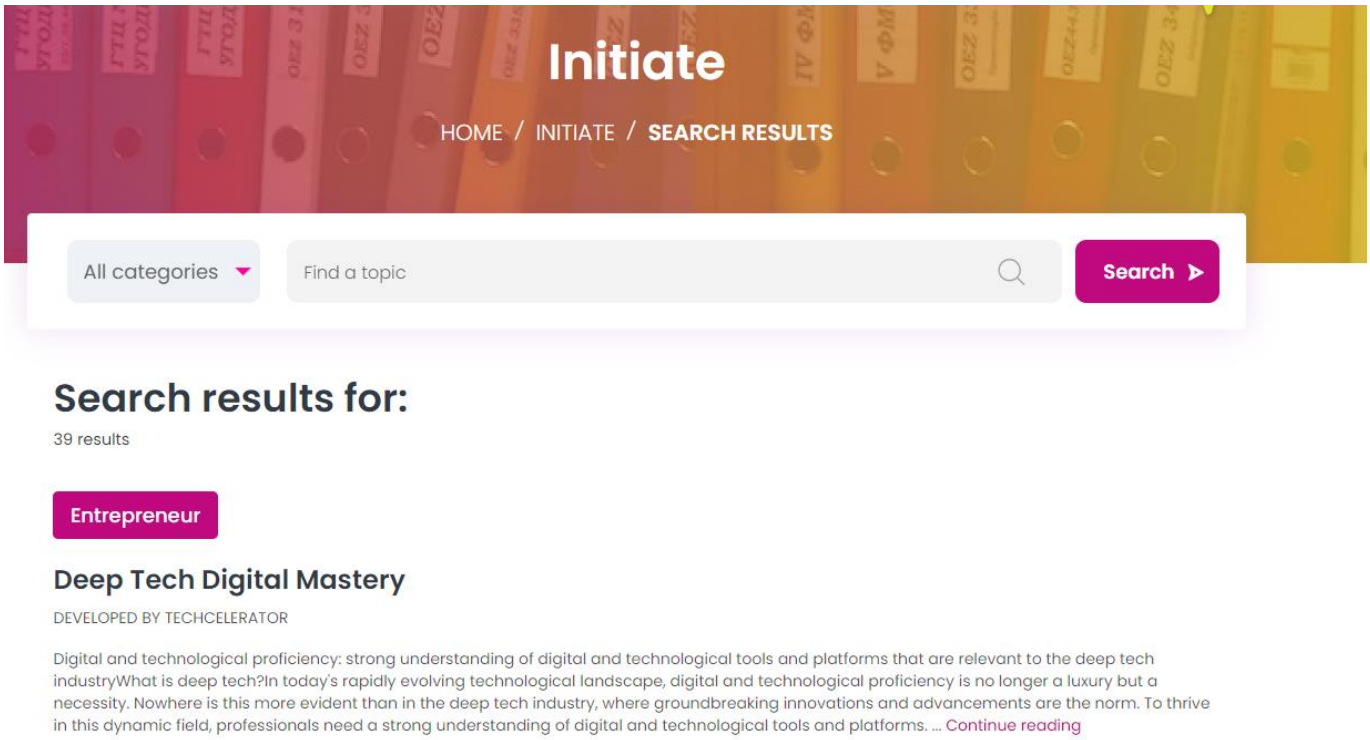

Figure 22: Initiate page

The main functionality of the Initiate page for final users in the front-end area is search, which also features a category filter. This section contains 39 articles, including in-depth case studies, practical frameworks and insightful articles. The library aims to empower stakeholders with the latest insights and best practices in the DeepTech domain.

For administrator users there is a back-end area, in order to edit the contents of these articles.

Figure 23: Back-end for articles

2.3.3 DEEPTECH ACT: TRAINING SECTION

As already described previously, these sections were developed in PHP with the help of codeigniter. Following, technical details of the Training section.

This PHP code defines a class Mycourses that extends the Front_Controller class.

The index function is invoked via the url https://deeptechact.acceleraction.eu/mycourses .

In the constructor, the parent constructor is called first. Then, the CodeIgniter instance is retrieved and stored in $this->CI, which allows you to reuse code through inheritance and encapsulation.

At the end of the operations, the data is passed to the view, which following the MVC paradigm is responsible for returning the web page to the client with:

```php
class Mycourses extends Front_Controller {
    private $locked = false;
    private $user = null;
    function __construct(){
        parent::__construct();
        $this->CI = &get_instance();
        $this->load->library(['facerecognition', 'zoom', 'LogFrequency']);
        $this->load->model('Member_model');
        […]
        $this->locked = false;
        $this->user = (object)$this->session->userdata('user');
        if (empty($this->user->id)){
            redirect('/');
        }
    }
    function index(){
        if ($this->Learner_model->is_logged_in()) {
            $data['carousel'] = $this->Carousel_model->get_carousel(5);
            $this->view('mycourses', $data);
        }
    }
```

Figure 24: PHP code, class Mycourses.

"$this->view('mycourses', $this->data);"

The statement *$this->load->model('Member_model')* is used to load the model functions, used to execute calls to the databases as described by MVC pattern.

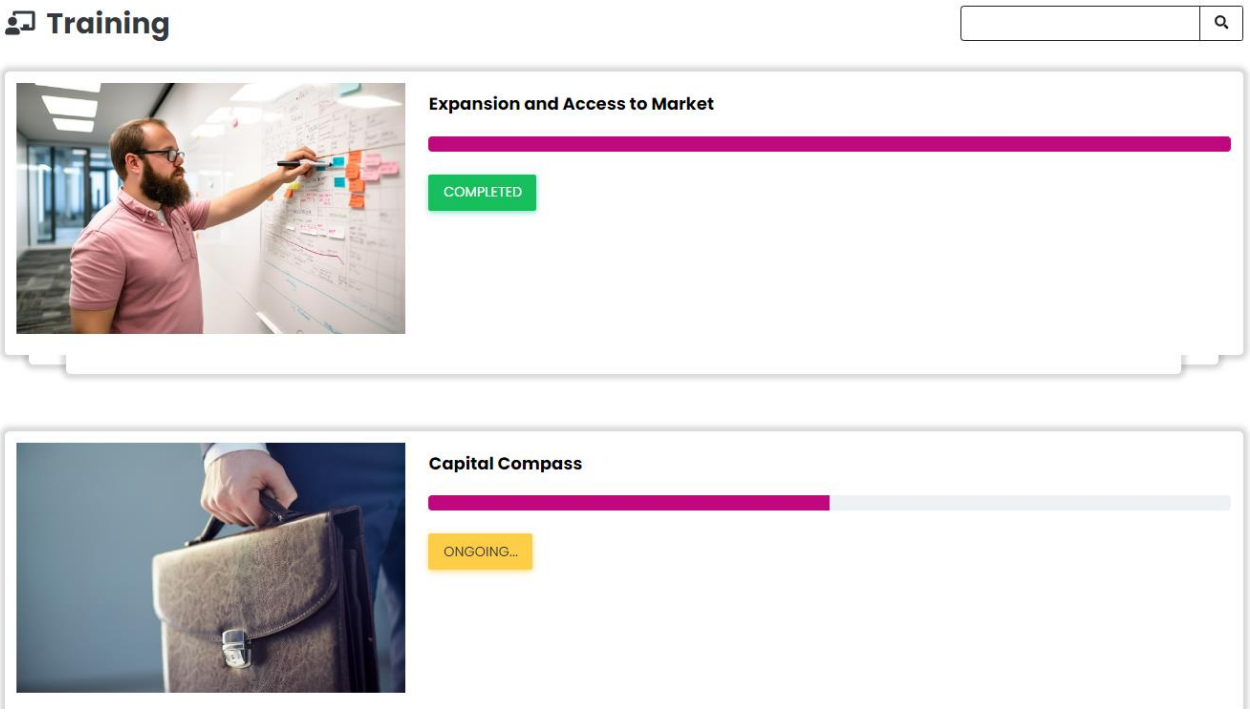

Figure 25: Training page

This page allows the use of the courses, giving users information on the progress of the course through the progress bar and the text in the button. There is also a filter for searching courses.

Each course is structured in modules, which can be videos, documents, SCORM, quizzes, etc.

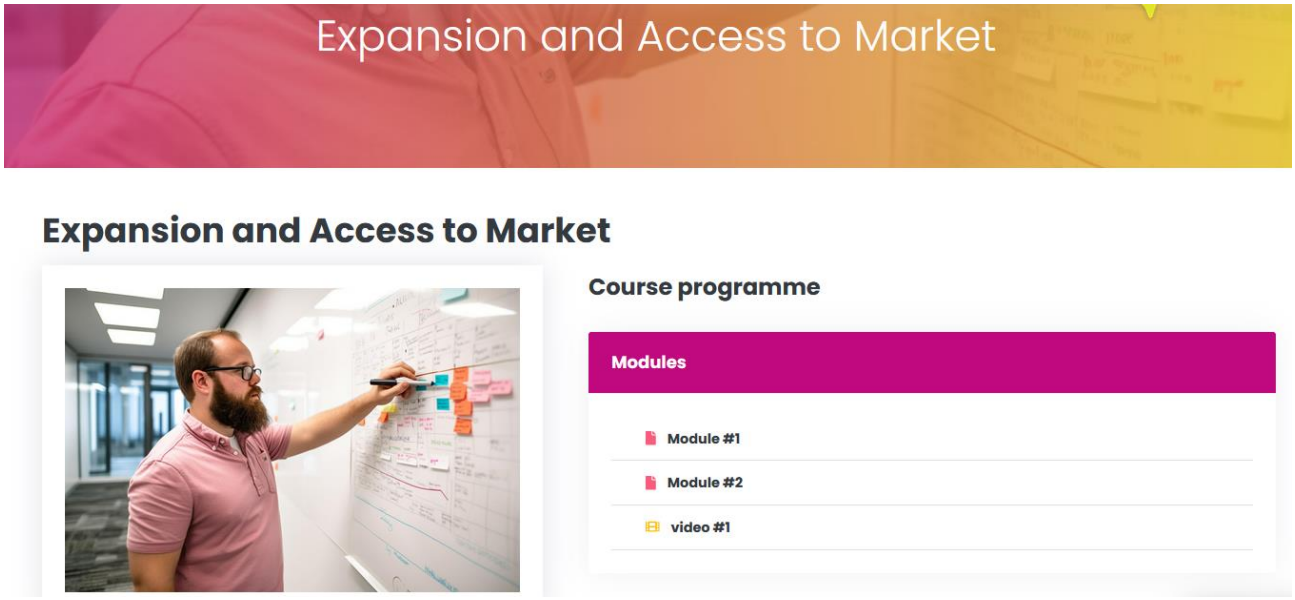

Figure 26: Training page - detail

2.3.4 PROFILE SECTION

The profile section allows users to profile themselves through ad-hoc questions. Additionally, they can indicate their interests to refine their search in the matchmaking map section.

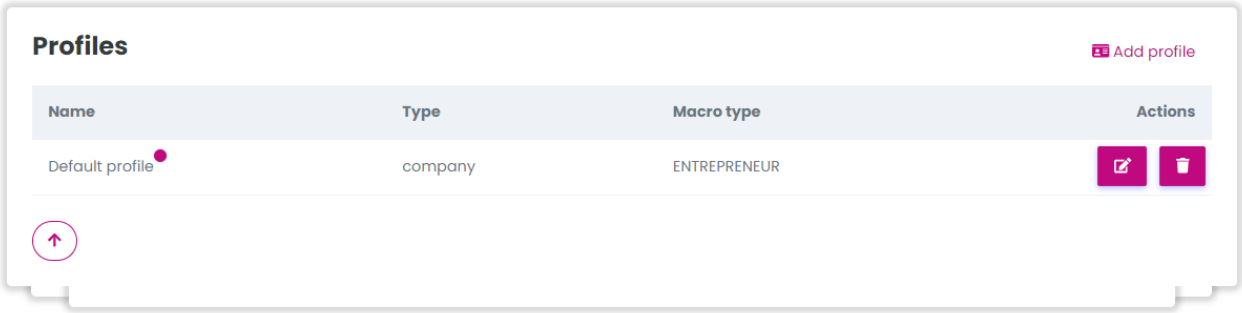

Figure 27: Profile section

The profile creation process begins with user registration on the platform, at third stage the account is registered but deactivated. An email is sent to the user with a button to activate the account.

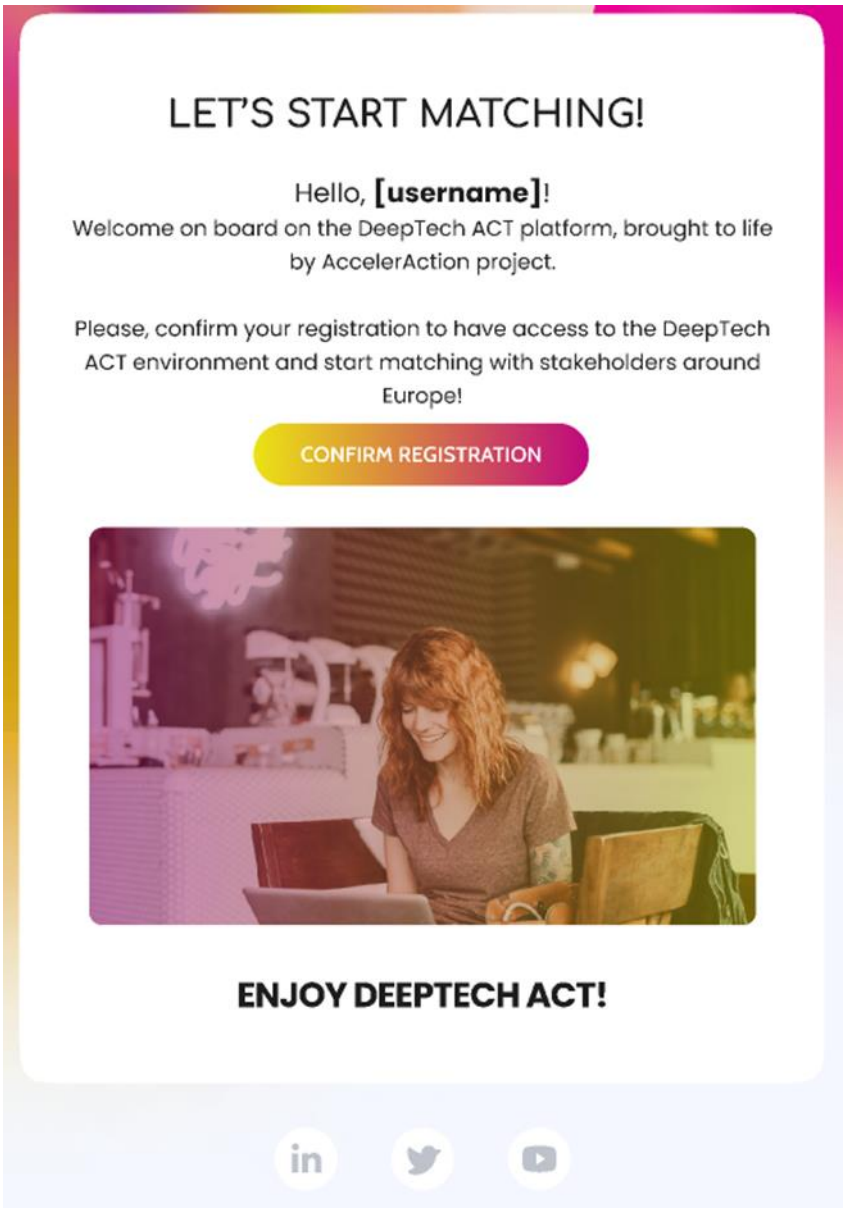

Figure 28: Confirmation email

When registering on the platform, the user will receive the following email:

Figure 29: Facsimile of Confirmation email

If a user forgets his password, an e-mail will be sent through which the password can be changed.

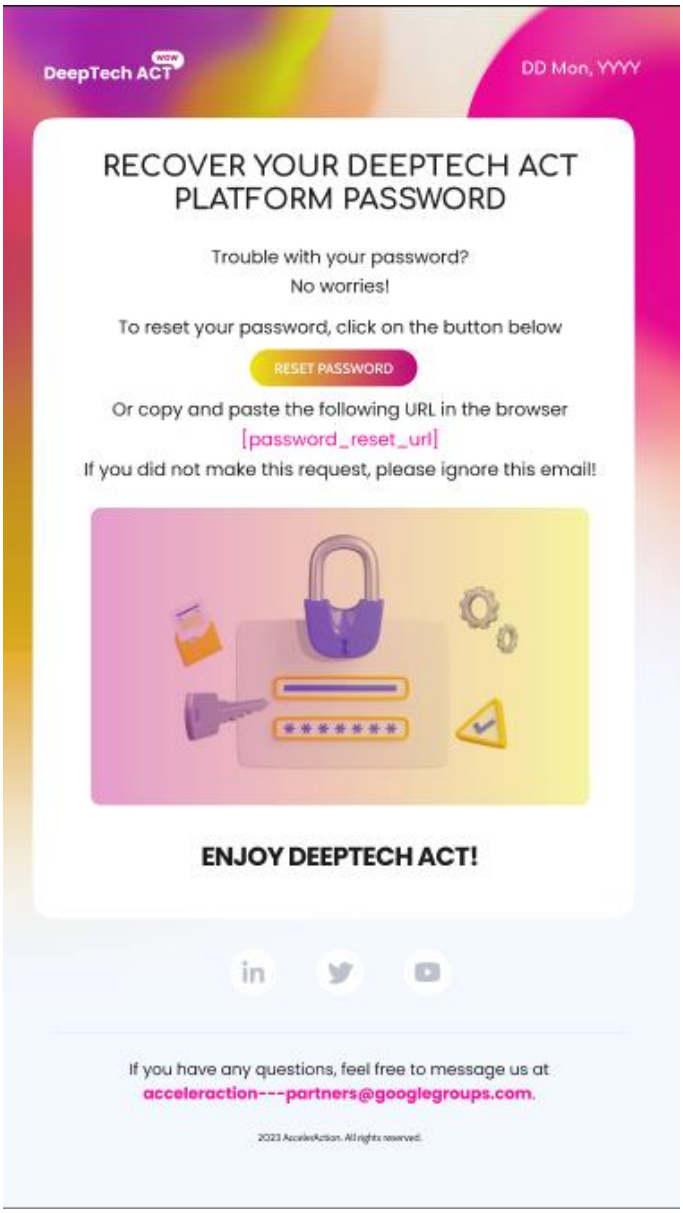

Figure 30: Facsimile of the email allowing the password reset

In the case where a user makes a match with another user, he or she is notified by an e-mail with a summary of all matches.

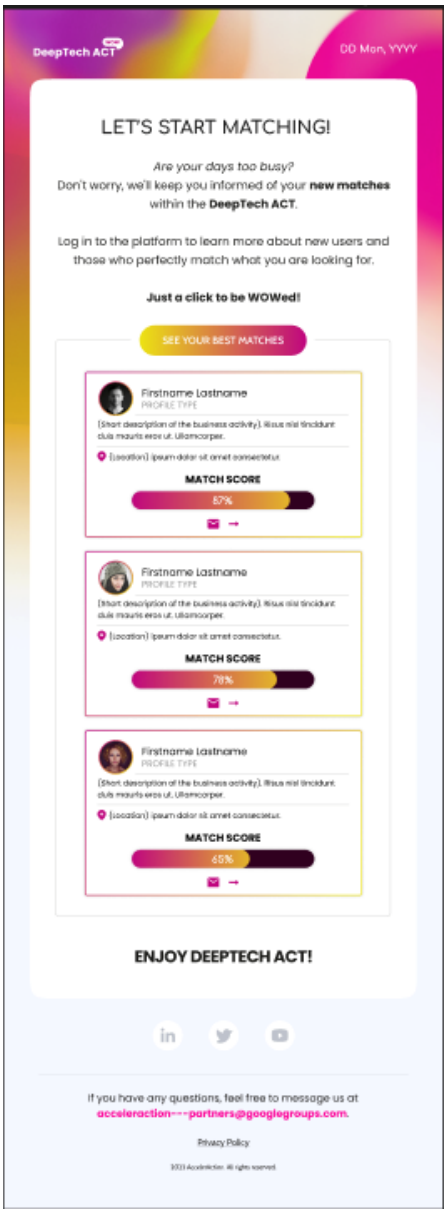

Figure 31: Facsimile of the email with matches

Each user can create more profiles, in order to be recognised as different roles covered in the company. There are 6 steps to complete a profile, some info are mandatory and will be used for the match-making activity.

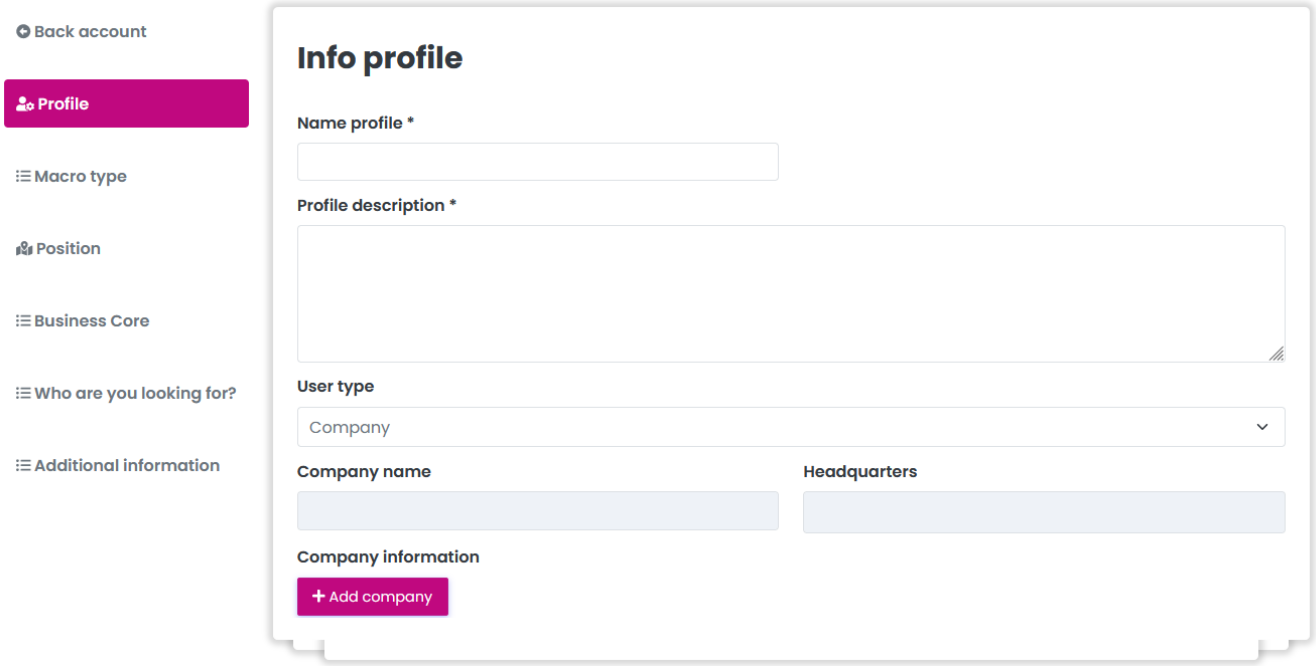

Figure 32: Profile section - detail

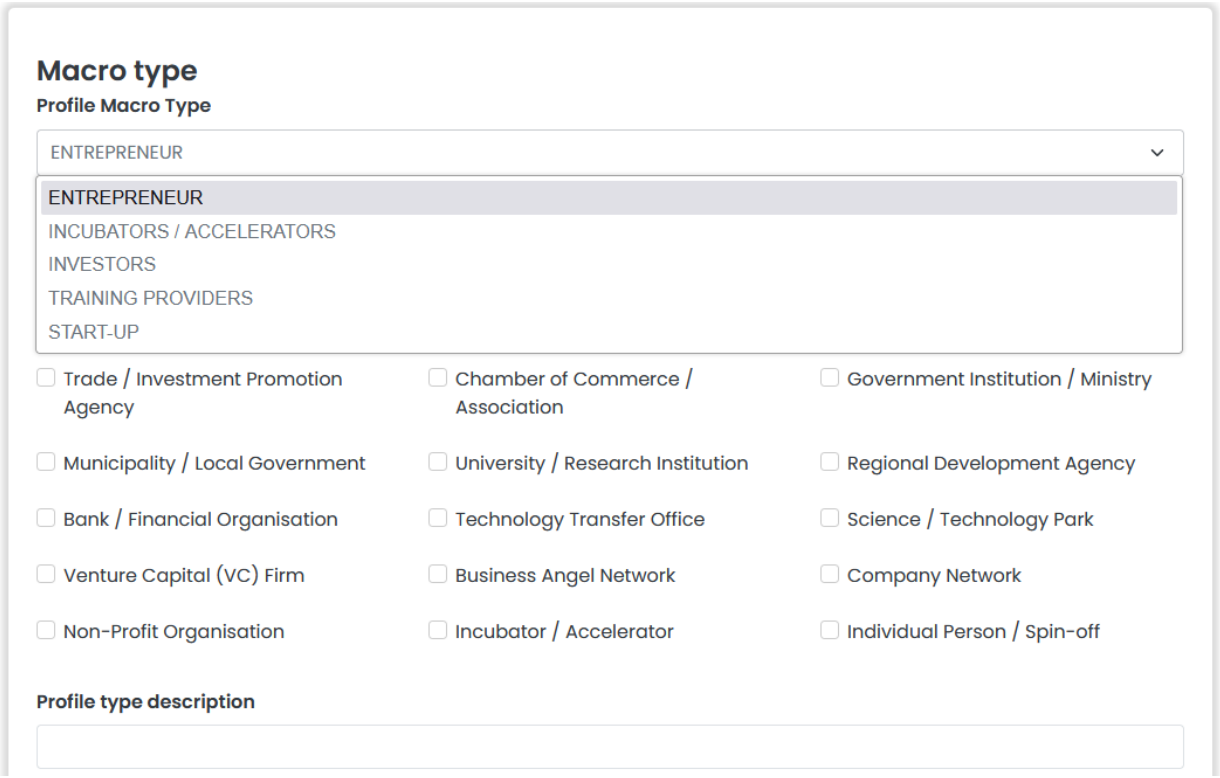

Figure 33: Profile section – detail (2)

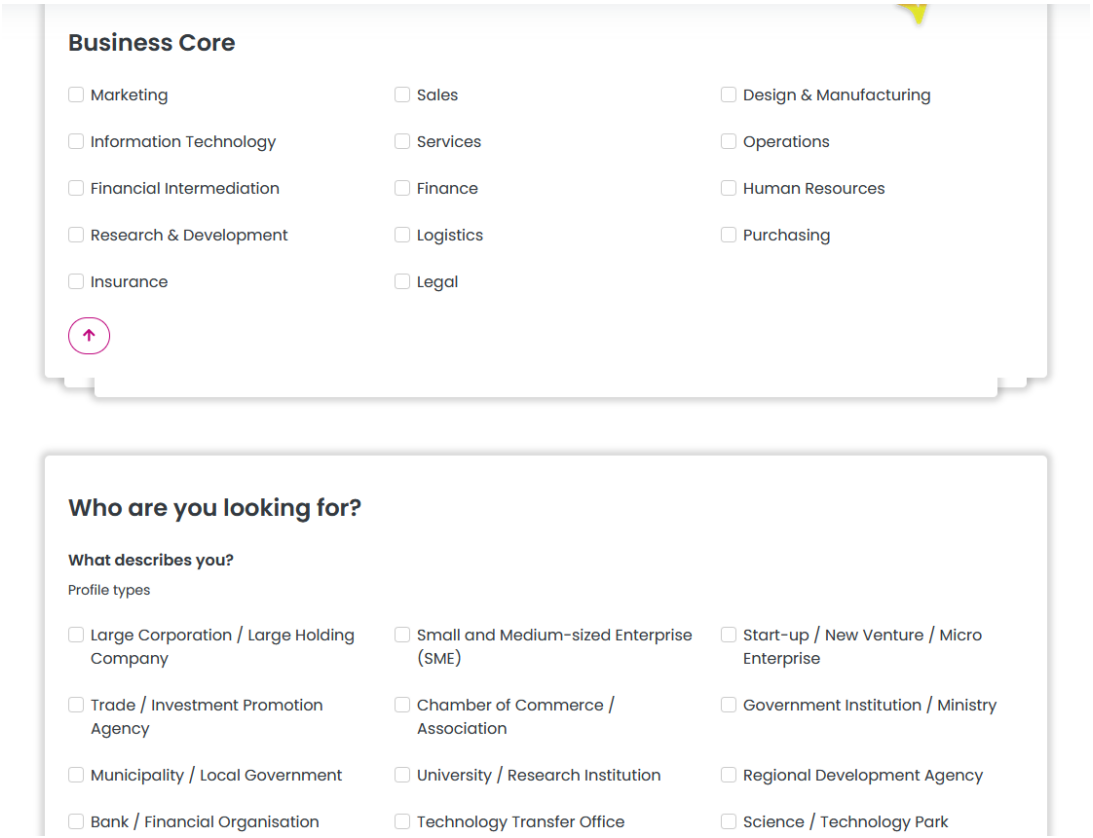

Figure 34: Profile section – detail (3)

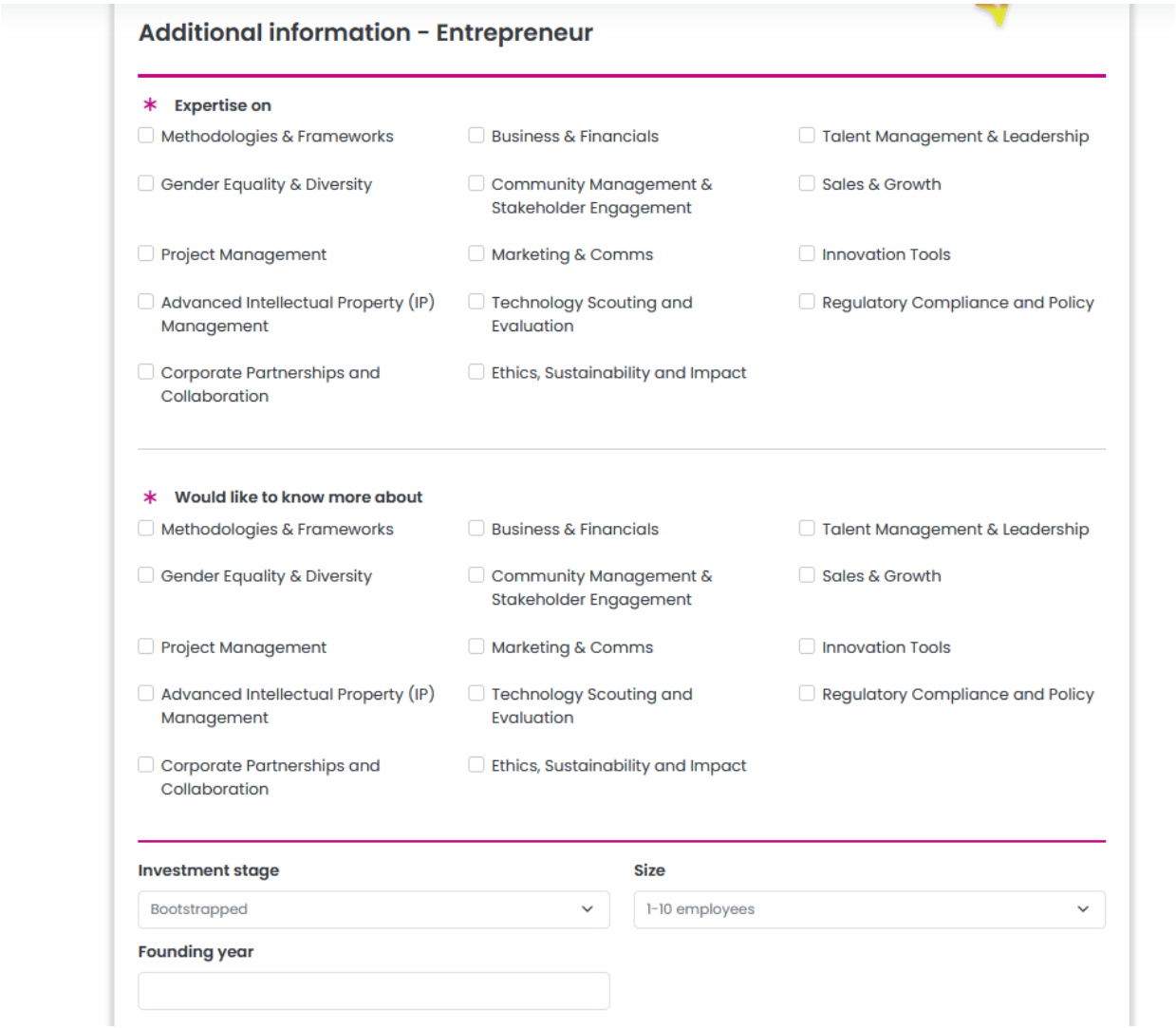

Figure 35: Profile section – detail (4)

2.3.5 THE EVENTS SECTION

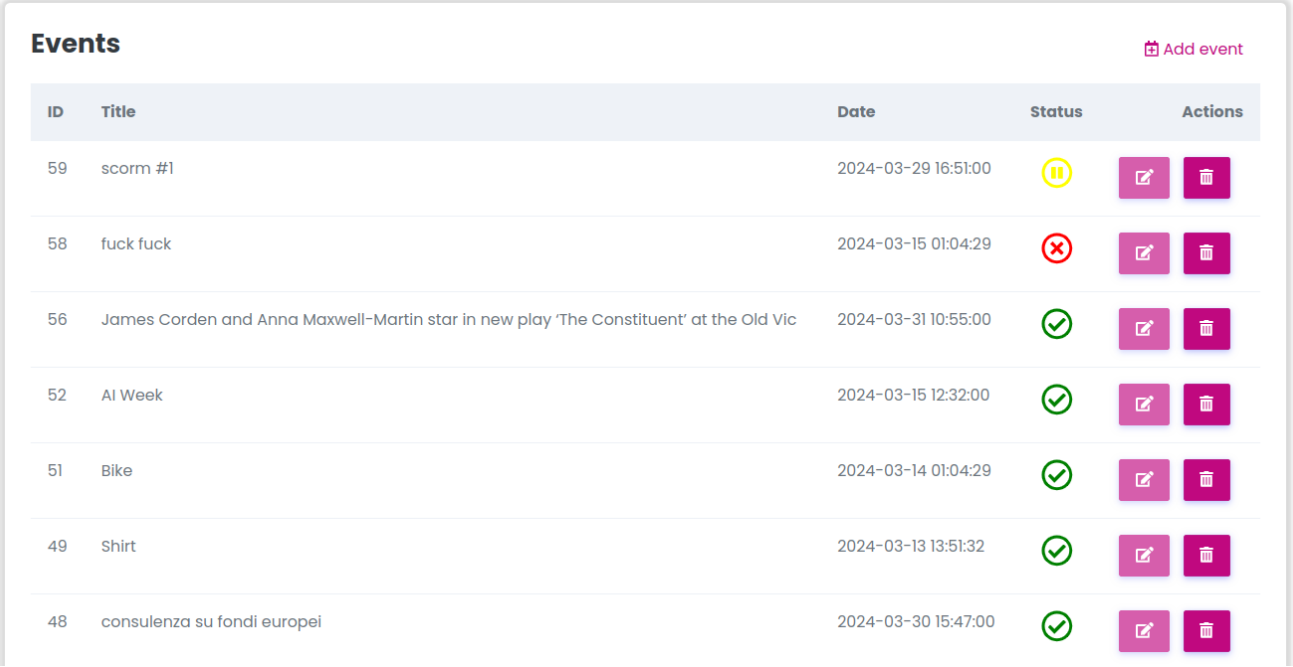

Figure 36: Section page – detail

The events section allows you to add events that are organised by users by geolocalising them. Users can complete a short form to add one event, but there will be an AI algorithm (see Figure 24) that checks it before making it public in the DeepTech ACT platform.

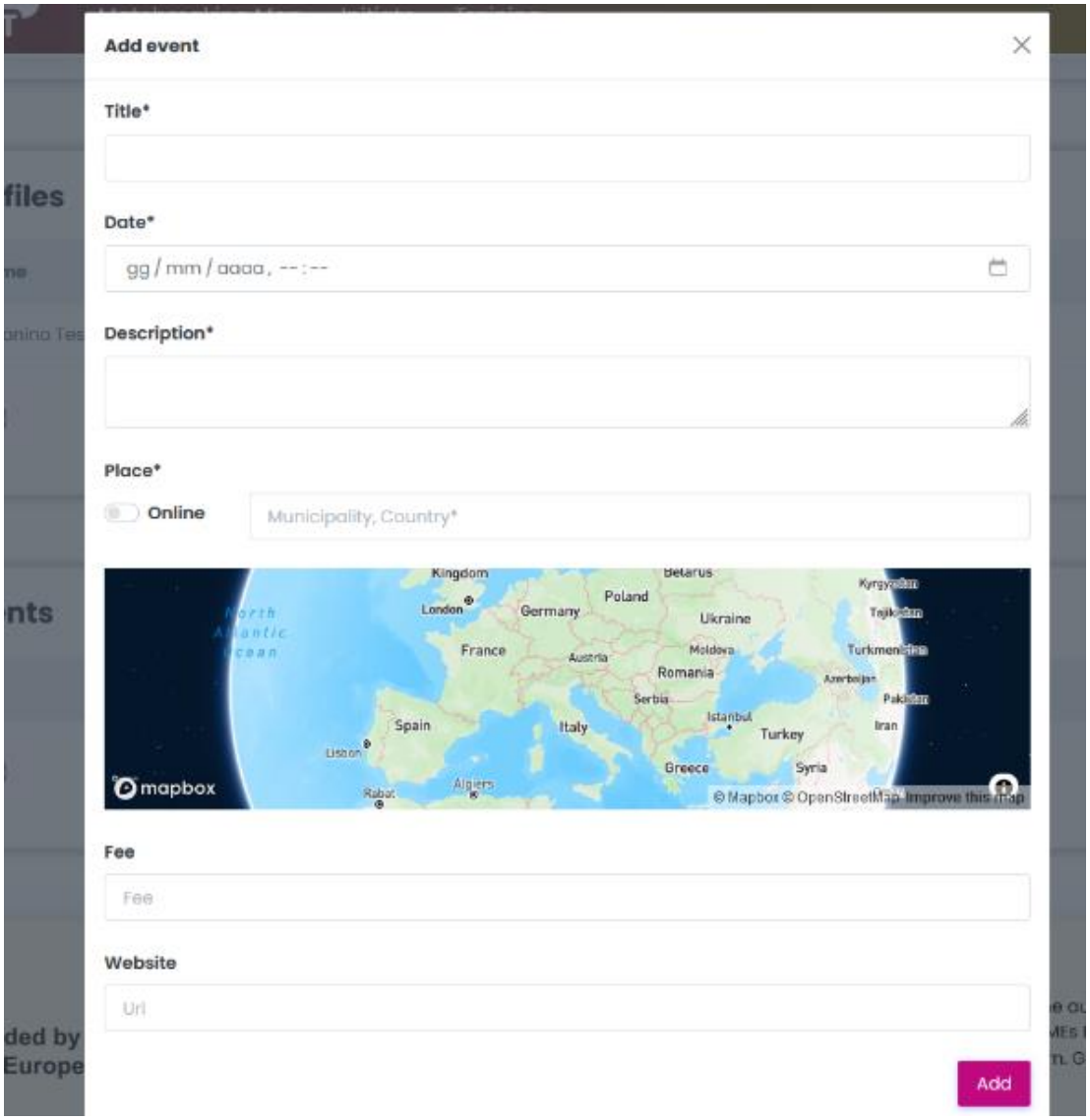

Figure 37: Events page – detail

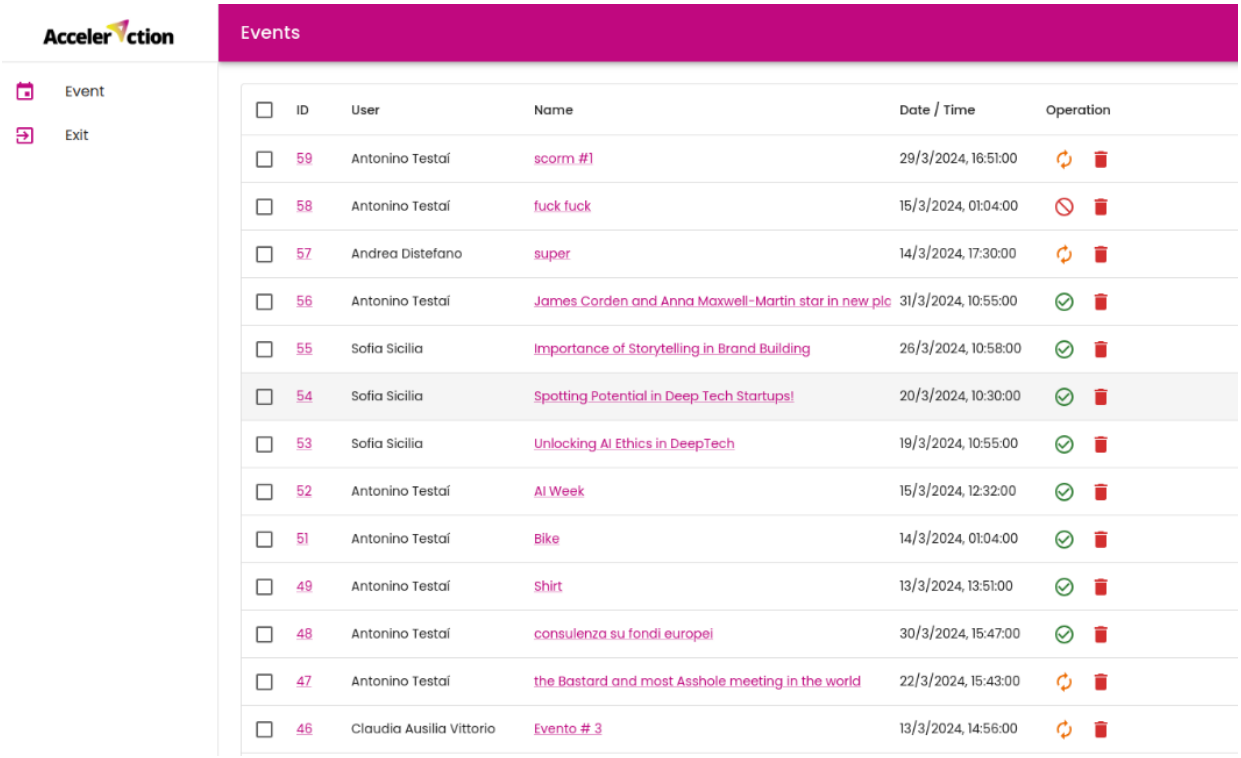

Figure 38: Events page - detail with bad words

There is a section, dedicated to the administrators, in which all events can be manually managed, approved or rejected.

As you can see, in figure number 26, the id 58 is blocked for using of bad words.

2.3.5.1 AI ALGORITHM

An artificial intelligence algorithm has been implemented to check user input, ensuring it is free of offensive language and relevant to an event before insertion. The algorithm, written in Python, utilises the `analyse_offensive_language` function to analyse user input. It was developed using the `better_profanity` library.

```
def computate_row(row, conn, model, tokenizer, summary_model, threshold):

    row["describe"] = clean_values(row["describe"])
    row["business_core"] = clean_values(row["business_core"])
    row["Global Profile"] = list(pd.Series(row["describe"] + row["business_core"] + row["expertise"]).unique())

    try:
        new_profile = []
        for string in row["Global Profile"]:
            if "/" in string:
                new_profile.extend(string.split(" / "))
            else:
                new_profile.append(string)
        row["Global Profile"] = new_profile
    except TypeError:
        row["Global Profile"] = row["Global Profile"]


    row["Description Offensive language"] = analyze_offensive_language(row["description"])
    row["Title Offensive language"] = analyze_offensive_language(row["title"])
    url_offensive_lang, result_text = analyze_url(row["url"])

    row["URL Offensive language"] =  ''.join(url_offensive_lang)

    result_text_without_newline_tab = [stringa.replace("\n", "").replace("\t", "") for stringa in result_text]
    result_text_without_newline_tab = ''.join(result_text_without_newline_tab)

    row["URL text"] = result_text_without_newline_tab


    summaries = ""
    if row["URL text"] in ("URL can't be verified (>=400)", "URL can't be verified") or row["URL text"].startswith("We're checking to see if you're a bot"):
        summaries = "URL can't be verified"
    elif row["URL text"] == "URL not found":
        summaries = "URL not found"
    else:
        summaries = generate_summary(row["URL text"], tokenizer, summary_model, row["event_id"])


    row["URL summary"] = summaries


    global_event = ""
```

Figure 39: Ai-tool details

2.3.6 DEEPTECH ACT: MATCHMAKING MAP

For the matchmaking app was used React Framework. The decision to utilise the React framework for the matchmaking app stemmed from the innovative and dynamic requirements of the map feature. Given the need for a cutting-edge and responsive map interface, React emerged as the natural choice in terms of technical paradigm.

The application is structured around a component-based architecture, with each UI element encapsulated within reusable React components. This modular approach facilitates code organisation and promotes reusability, allowing us to efficiently compose complex user interfaces from smaller, self-contained building blocks.

Moreover, React's virtual DOM is utilised to optimise rendering performance. By maintaining a lightweight representation of the actual DOM in memory, React minimises unnecessary re-renders and DOM manipulations, resulting in faster page loads and smoother user

interactions. This is particularly beneficial for the application, which features dynamic content and frequent updates. State management is handled effectively using React's built-in state management capabilities and, where necessary, complemented by libraries such as Redux. By maintaining a single source of truth for application state and enabling unidirectional data flow, React ensures predictable behavior and simplifies debugging and maintenance.

Additionally, the application utilises React Router for client-side routing, enabling seamless navigation between different views and ensuring a smooth user experience without refresh's page. The application takes advantage of React's ecosystem of third-party libraries and tools to enhance functionality and streamline development. For instance, libraries like Material-UI provide pre-designed components and styles, facilitating rapid prototyping and consistent UI design.

In summary, React's component-based architecture, virtual DOM, state management, declarative syntax, and rich ecosystem make it an ideal choice for implementing innovative map visualisation with dynamic rendering of components. By leveraging React's strengths, we could create highly interactive and responsive map interfaces that meet the demands of modern web applications.

```
return (
    <>
     {(user && profile && filters && data) ? (
        <Box sx={{ display: 'flex', justifyContent: 'stretch', height:  '100%' }}>
          <DialogFilter open={openDialogFilter} handleClose={onCloseFilter} filters=
{filters} setFilters={setFilters} profile={profile} />
          <CssBaseline />

         <AppBar position="fixed" open={open}>
       <Toolbar>
    <Box sx={{ display: 'flex', justifyContent: 'space-between', width: '100%' }} >
      <Box sx={{ display: 'flex', justifyContent: 'flex-start'}} >
          <IconButton
                color="inherit"
                aria-label="open drawer"
                onClick={handleDrawerOpen}
                edge="start"
                sx={{ mr: 2, ...(open && { display: 'none' }) }}
          >
          <ChevronRight />
          </IconButton>
          <SettingsBackupRestore sx={{ display: { xs: 'none', md: 'flex' }} />
     <Typography variant="h6" noWrap component="div" sx={{ flexGrow: 1 }>
        <TitleLink component={LinkRouter} to={`/home`}>
          {appTitle}
        </TitleLink>
       </Typography>
      </Box>
```

Figure 40: Javascript code, structure of a React component

This JavaScript code snippet is a part of a React component, specifically using Material-UI library for the UI components. Here's a breakdown of the structure:

- The <DialogFilter> component is a dialog box that handles the application filters. It receives several props including open, filters, profile. The props are used to manage the data inside the function's component. Instead setFilters, and handleClose are functions passed as props, let the component use externals functions;
- <CssBaseline /> is a Material-UI component that provides a consistent baseline to align with other UI components;
- Inside the <AppBar>, there's a <Toolbar> component which contains a <Box> with two nested <Box> components. These boxes are used to structure and align the toolbar content.

As mentioned before, the React structure allows the encapsulation of components, making the code readable, creating interactive and well-structured applications, creating independent components that receive specific data via props and manage updates via states.

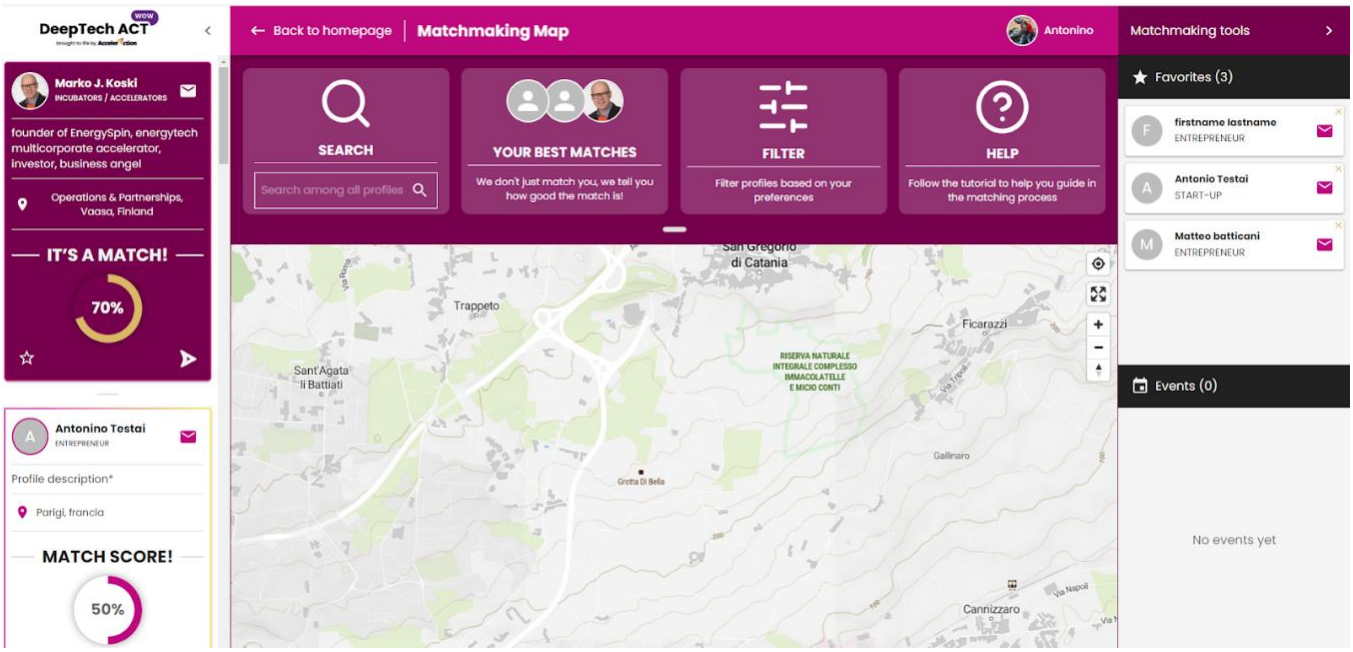

Figure 41: Matchmaking Map page

The features on this page are many, the search allows you to search for profiles that correspond to your interests, setting different and multiple filters. Favorites show people you saved.

Figure 42: Matchmaking Map page - Map detail

The map, placed at the center of the screen, shows where the profiles that match my search are located.

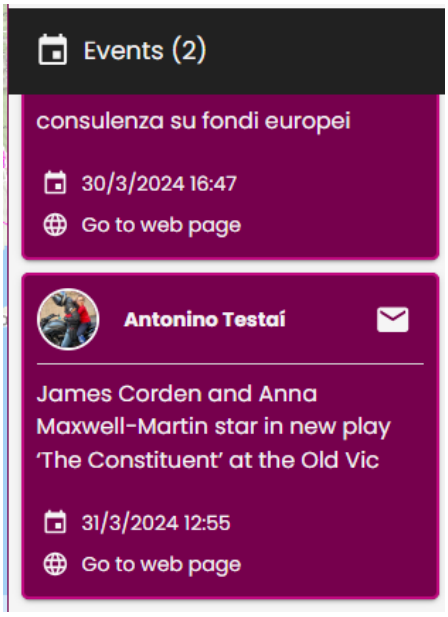

Figure 43: Matchmaking Map page - events detail

At the right of the page there is a section in which the user can see a list of events related to the profile preferences, with info about data and a link to the web page.

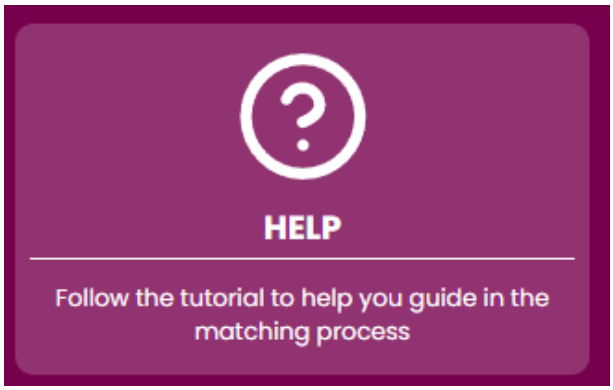

Figure 44: Matchmaking Map page - help section detail

By clicking the HELP button, the user will be guided through a virtual tour of this section, the page will be covered by a light dark layer and every section will be highlighted step-by-step with a pop up that explains the functionality. Users can decide to skip or follow this tutorial.

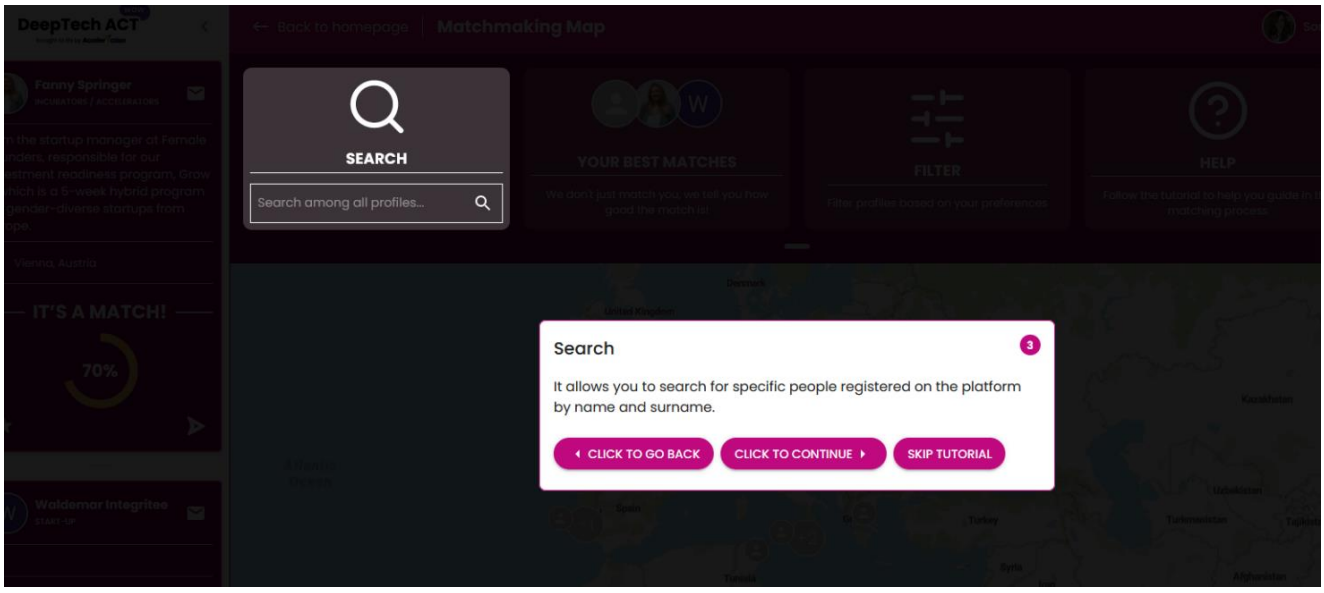

Figure 45: Matchmaking Map page – Tutorial

Some aspects that have been implemented for the matchmaking system are listed below.

```
export function calcolaDistanza(lat1, lon1, lat2, lon2) {

    const R = 6371;

    const dLat = toRad(lat2 - lat1);
    const dLon = toRad(lon2 - lon1);

    const a =
        Math.sin(dLat / 2) * Math.sin(dLat / 2) +
        Math.cos(toRad(lat1)) * Math.cos(toRad(lat2)) * Math.sin(dLon / 2) * Math.sin(dLon / 2);

    const c = 2 * Math.atan2(Math.sqrt(a), Math.sqrt(1 - a));

    const distance = R * c;

    return distance;
}
```

Figure 46: JavaScript function, calcolaDistanza

This JavaScript function, calcolaDistanza, calculates the distance between two points on the Earth's surface, given their latitudes and longitudes. It uses the Haversine formula, which is especially accurate for long distances. The function takes four arguments: the latitudes and longitudes of the two points. It returns the calculated distance in kilometers. The toRad function, used to convert latitudes and longitudes to radians, is not shown in this code.

The Haversine formula is an equation important in navigation for calculating the distance between two points on a sphere given their longitudes and latitudes. It is especially useful when it comes to calculating distances between points on Earth, which can be considered a large sphere for the purposes of such calculations.

The formula is as follows:

$$a = \sin^2\left(\frac{\Delta \text{lat}}{2}\right) + \cos(\text{lat}_1) \cdot \cos(\text{lat}_2) \cdot \sin^2\left(\frac{\Delta \text{lon}}{2}\right)$$

$$c = 2 \cdot \text{atan2}\left(\sqrt{a}, \sqrt{1-a}\right)$$

$$d = R \cdot c$$

Figure 47: Haversine Formula

where:

- lat1, lat2 are the latitudes of the two points (in radians),
- Δlat is the difference in latitudes,
- Δlon is the difference in longitudes,
- R is the Earth's mean radius (approximately 6371km),
- a is the square of half the chord length between the points,
- c is the angular distance in radians, and
- d is the distance between the points.

The difference from the simple formula of the Euclidean distance between two points in the plane, which does not take into account the curvature of the Earth's surface.

To ensure that Matchmaking Map is able to create valuable connections between players and thus encourage innovation, a multi-level matchmaking algorithm has been implemented.

Scoring System

The core of the algorithm lies in its scoring system. Each user is assigned a score that reflects their compatibility with other users. This score is calculated based on several criteria:

```
const relations = {
    user: include.includes('user'),
    company: include.includes('company'),
    profileMacroType: include.includes('profileMacroType'),
    profileTypes: include.includes('profileTypes'),
    positions: include.includes('positions') ? { region: true } : false,
    businessCores: include.includes('businessCores'),
    lookingFor: include.includes('lookingFor'),
    hashtags: include.includes('hashtags')
}

const {data, total, pages } = await Profile.getMatch(req.dataSource, idProfile, regions, lookingFor, expertise, relations, limit, page, sort);
```

Figure 48: JavaScript function, getMatch function and relations object

Profile Macro Type: What describes Users, there are macro type ENTREPRENEUR,INCUBATORS / ACCELERATORS, INVESTORS, TRAINING PROVIDERS, START-UP and detailed sections:

- Large Corporation / Large Holding Company
- Small and Medium-sized Enterprise (SME)
- Start-up / New Venture / Micro Enterprise
- Trade / Investment Promotion Agency
- Chamber of Commerce / Association

- Government Institution / Ministry
- Municipality / Local Government
- University / Research Institution
- Regional Development Agency
- Bank / Financial Organisation
- Technology Transfer Office
- Science / Technology Park
- Venture Capital (VC) Firm
- Business Angel Network
- Company Network
- Non-Profit Organisation
- Incubator / Accelerator
- Individual Person / Spin-off

Position: where the user is located.

Expertise on: Academic and professional qualifications also play a role in determining the score.

Matching Algorithm

Once the scores are assigned to each user, the matching algorithm comes into play. This algorithm sorts the users based on their total score, presenting the most compatible matches to the users. By doing so, it ensures that users are connected with others who share similar interests and have complementary skills and expertise.

Implementation Details

Due to the length and complexity of the code, below is the pseudo code, where the functioning of the algorithm is explained:

*Function **getMatch** takes dataSource, idProfile, regions, lookingFor, expertise, relations, limit, page, sort as parameters*
Import user's data as repository;
Define profiles as an object, with for region, type, and expertiseOn with default values as null;
Query the repository to get IDs of profiles in specified regions, not deleted, and not the current profile;
Assign the result to data;

Assign 20 points to profiles.region.value;
Assign the mapped IDs from data to profiles.region.data;
Query the repository to get IDs of profiles of specified types, not deleted, and not the current profile;
Assign the result to data;
Assign 50 points to profiles.type.value;
Assign the mapped IDs from data to profiles.type.data;
Construct a SQL query part for expertiseOn based on the expertise array;
Query the repository with the constructed query to get profile IDs and user IDs, not deleted, and not the current profile;
Assign the result to data;
Assign 30 points to profiles.expertiseOn.value;
Assign the mapped profile IDs from data to profiles.expertiseOn.data;
Define the sql query as an array with a single object that includes profiles not deleted and IDs in any of the profiles' data arrays;

Try the following operations:
Count the total number of profiles that match the SQL condition;
Calculate the number of pages and the offset for the current page;
Find all profiles that match the SQL parameters;
Map the found profiles, calculating a match score;
Return an object with the sorted profiles (score based), total number of profiles, and number of pages;
MatchMask is added with a binary-like system to map to map which section contributed to the score
If an error occurs during the above operations, log the error and return null;

```
async getMatch(dataSource, idProfile, regions, lookingFor, expertise, relations, limit, page, sort) {

    const repository = dataSource.getRepository(repositoryName)

    const profiles = {
        region : {},
        type : {},
        expertiseOn : {}
    }
```

Figure 49: JavaScript function, getMatch

2.3.6.1 NODE.JS

The use of the API in node allowed the PHP module to communicate with the React module. And let the React module communicate with functionalities implemented by our partners and with database.

In the context of software development, REST APIs are a common approach for enabling communication between different components of an application. They allow for the exchange of data between client and server in a standardised manner, typically using HTTP requests and responses.

By leveraging Node.js to implement REST APIs, our partners were able to seamlessly integrate various functionalities into our applications. The use of RESTful principles ensured that these APIs were well-structured, easily understood, and interoperable with other systems. Additionally, as already mentioned Node.js provided a fast and efficient runtime environment, enabling our partners to deliver responsive and reliable API services to their users.

routes.js

routes.js > ...

```
// CompanyFocus
router.get('/:version/companyFocus', authorize, CompanyFocus.getAll);
router.get('/:version/companyFocus/:id', authorize, CompanyFocus.getOne);


// InvestmentStage
router.get('/:version/investmentStage', authorize, InvestmentStage.getAll);
router.get('/:version/investmentStage/:id', authorize, InvestmentStage.getOne);


// IncubatorsType
router.get('/:version/incubatorsType', authorize, IncubatorsType.getAll);
router.get('/:version/incubatorsType/:id', authorize, IncubatorsType.getOne);


//InvestorType
router.get('/:version/investorType', authorize, InvestorType.getAll);
router.get('/:version/investorType/:id', authorize, InvestorType.getOne);


// ProgrammeDuration
router.get('/:version/programmeDuration', authorize, ProgrammeDuration.getAll);
router.get('/:version/programmeDuration/:id', authorize, ProgrammeDuration.getOne);


// Expertise
router.get('/:version/expertise', authorize, Expertise.getAll);
router.get('/:version/expertise/:id', authorize, Expertise.getOne);


// Service
router.get('/:version/service', authorize, Service.getAll);
router.get('/:version/service/:id', authorize, Service.getOne);


// ServiceDeliveryType
router.get('/:version/serviceDeliveryType', authorize, ServiceDeliveryType.getAll);
router.get('/:version/serviceDeliveryType/:id', authorize, ServiceDeliveryType.getOne);


// Solution
router.get('/:version/solution', authorize, Solution.getAll);
router.get('/:version/solution/:id', authorize, Solution.getOne);



// // SupportOrganization
// router.get('/:version/supportOrganization', authorize, SupportOrganization.getAll);
// router.get('/:version/supportOrganization/:id', authorize, SupportOrganization.getOne);


// ActivityLevel
router.get('/:version/activityLevel', authorize, ActivityLevel.getAll);
router.get('/:version/activityLevel/:id', authorize, ActivityLevel.getOne);

```

Figure 50: Node.js route api

```
AppDataSource.initialize().then(async () => {
    const port = 5050;
    const app = express();
    app.use(cors());
    app.use(express.json());
    app.use(express.static('assets'));
    app.use(fileUpload({ createParentPath: true }));
     app.use("/api", (req, res, next) => {
        req.dataSource = AppDataSource;
        next();
    }, routes);
    app.use((req, res) => res.status(404).send());
    app.listen(port, () => {
        console.log("Server has started on port: " + port)
    })
});
```

Figure 51: Javascript code, Node function

As mentioned before, Node.js allows the using of libraries to implement the server. In this portion of code, it was analysed the use of the express library which initializes the server listening on port 5050

- AppDataSource.initialize().then(async () => {…}): this line initialises the AppDataSource and then starts the server once the initialisation is complete;
- const port = 5050; this line sets the port number on which the server will listen;
- const app = express(); this line creates an instance of an Express application;
- app.use(cors()); app.use(express.json());: these lines add middleware to the application to handle Cross-Origin Resource Sharing (CORS) and to parse incoming requests with JSON payloads;
- app.use(express.static('assets')); this line serves static files from the 'assets' directory;
- app.use(fileUpload({ createParentPath: true })); This line adds a middleware to handle file uploads;
- app.use('/api/ping', (req, res) => {…});: this line defines a route handler for GET requests to '/api/ping'. It logs the environment variables to the console and sends them back as a JSON response;
- app.use("/api", (req, res, next) => {…}, routes); this line adds a middleware function that attaches the AppDataSource to every request object, and then passes control to the next middleware function in the stack (in this case, routes);
- app.use((req, res) => res.status(404).send());: this line adds a middleware function that sends a 404 status code for any request that doesn't match a route;

- app.listen(port, () => {...});: this line starts the server on the specified port and logs a message to the console once the server has started.

2.3.6.2 SECURITY AND FIREWALLS

Below is a brief overview of the security measures implemented.

- **Fail2Ban:**

As an additional layer of security, we also have Fail2ban that is an open-source software designed to protect servers from intrusions, particularly unauthorised access attempts via brute force.

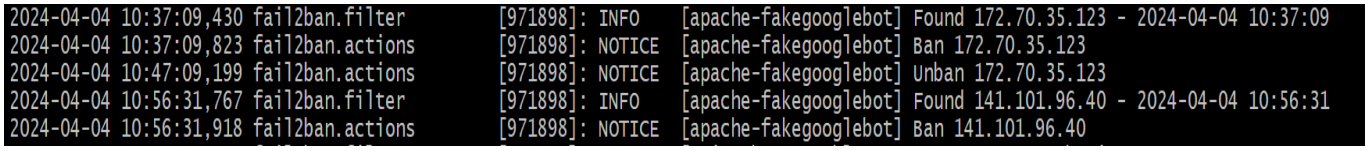

Figure 52: Fail2Ban logs

Figure 34 shows some records of Fail2Ban activity, which finds a threat and bans it.

- **CloudFlare**

As a DNS manager, we use CloudFlare which allows us to have threat mitigation even before reaching the firewall on server Fail2Ban. Cloudflare is utilised as a security measure to enhance the protection of our infrastructure against various online threats. By leveraging Cloudflare's robust security features, including DDoS mitigation, Web Application Firewall (WAF), and bot management, we can effectively defend against malicious attacks targeting our servers.

Integration with Cloudflare involves routing all incoming traffic through their globally distributed network, which acts as a shield between our servers and the public internet. This allows Cloudflare to inspect incoming requests in real-time, identifying and blocking potentially harmful traffic before it reaches our origin servers.

3 RESULTS OF THE TESTING OF THE DEEPTECH ACT PLATFORM

3.1 ALFA TEST

The alpha test serves as an essential phase in the software development lifecycle, where the internal team responsible for developing the platform thoroughly tests its available functionalities. During this phase, the team meticulously documents any bugs or issues encountered while interacting with the platform. Moreover, they assess whether the expected output aligns with the actual output obtained from the platform. This process allows the development team to identify and rectify any discrepancies or malfunctions before the platform is released to external users. The alpha test acts as a crucial quality assurance measure, ensuring that the platform meets the desired standards of functionality and performance.

The alpha test on the platform was carried out by JO Consulting's technical team on February 26th, 2024.

The complete report on the conduct of the alpha test and the results obtained is available in the Appendix section (Appendix A). The following is a list of the most important results achieved from the testing of the backend functionalities on the platform.

The initial test concerns the process of accessing the platform. The test cases covered include the entry of correct and incorrect credentials, with the expected results being access granted or denied, respectively. The system was found to behave as expected; users were redirected appropriately and incorrect attempts resulted in an 'Authentication Failed' error message. With regard to the password reset functionality, the test reported a problem with the e-mail template as containing errors. A similar problem occurred with the autonomous password reset option, which allows users to reset their password if forgotten. In this case, an error was again detected in the e-mail template, despite the system working correctly to send e-mails. A further function tested during the alpha test was the addition of a new power user to the platform. The process involved entering user data, such as first name, last name, username, e-mail, and assigning a role and password. The system behaved as expected, with successful user creation and error requests when the necessary information was missing.

The test also covered the modification of generic platform parameters, such as updating the site logo, backend language, contact e-mail and company information in the footer. All changes were applied correctly without any problems.
Course management, a critical aspect of the platform, included editing and adding new courses and course modules. For courses, attributes such as name, description, SEO optimisation fields, SKUs, visibility options and pricing details were made editable. The expected results included the display of the course edit screen with the entered data and error messages for missing information, fully corresponding to the results obtained. Similarly, for the course modules, the entry and editing of different types of modules such as resources, SCORM, videos and quizzes were tested, with positive results and error messages for incomplete entries.
Finally, the test addressed the course monitoring functions, allowing administrators to view course enrolment details, participant progress and the ability to delete a participant's progress. The platform functioned as expected, providing detailed participant tables, progress sub-tables, cancellation confirmation pop-ups and lists of courses taken by learners. Overall, the platform test generally met the expected results, recurring issues with e-mail templates were noted as needing revision.

3.2 BETA TEST

The beta test marks the next stage in the evaluation of the platform, wherein a separate group of users, distinct from the internal development team, conducts testing. These users may vary in technical expertise, as well as affiliations with different organisational, social, or demographic groups. Unlike the alpha test, which focuses on internal testing by the development team, the beta test involves real-world testing scenarios by external users. This diverse pool of beta testers provides valuable feedback on the platform's usability, performance, and overall user experience. Their input helps uncover issues that may not have been detected during the alpha test phase and allows for further refinement of the platform before its official release to the wider audience.

Beta testing on the DeepTech ACT platform was carried out through the administration of an evaluation questionnaire to all consortium partners, with the primary objective of assessing the functionality of the platform, identifying any bugs, improving overall usability and gathering feedback to improve the user experience.

Testers were asked to navigate through the various sections of the platform, interacting with its functionality and providing feedback and evaluations based on user experience. The beta test included all the main sections of the DeepTech ACT platform, such as Homepage, Login/Registration, Account, Security and Privacy, initiate, Training and Matchmaking map.

The main results of the partners' analysis of the sections will be briefly listed below. More information on the beta test, feedback obtained and implemented can be found in Appendix B.

Homepage section:

The interviewees confirmed the clarity of the section, however some critical points and suggestions were highlighted, specifically concerning the improvement of the visibility of the logo. Most of the participants praised the organisation and structure of the homepage, noting in particular the graphic layout of the buttons and confirming the clarity of the texts and descriptions. The images were described as relevant and of high quality.

Registration section

The section was described by the test participants as well organised and easy to navigate. The content was considered informative, clear and well written. Suggestions were received to standardise the fonts and colours of the registration e-mail with the visual identity of the platform.

The password recovery process was rated as generally simple, with the suggestion received to make the password recovery e-mail responsive for mobile devices. The ease of use of the login/registration section was rated very high, with scores of 9 and 10 out of 10.

Account section

In the Account section, most users confirmed the accuracy and timeliness of the information displayed, although problems were encountered in saving the LinkedIn URL. The ease of finding information and the editing process were rated positively, some users found it difficult to add the phone number in the international format.

Security and privacy section

In terms of security and privacy, the section was found to be clear and understandable, with users expressing satisfaction with the use of data and the security of personal information on the platform. No specific concerns were expressed, nor suggestions for improvements.

Initiate section

The Initiate section was found to be well organised and easy to navigate, with functional search filters, but with some problems highlighted when searching for articles by category without entering a keyword.

Training section

The Training section was described as easy and intuitive to navigate. Some users reported access problems, but no specific bugs or anomalies were reported by those who accessed the content.

Matchmaking map section

In their analysis of the map and its functionality, users noted the efficiency of the links, the user-friendliness of the search function and the clarity of the tutorial function. Requests for improvement include a review of the relevance of the search results and changes to the overall user experience on the platform, such as a reduction in the number of buttons on the map to make it visually less overloaded.

The feedback from the test participants was overall positive. No significant changes were requested to the information presented on the map.

4 IMPACT OF THE PLATFORM

4.1 POTENTIAL IMPACT

The AccelerAction project, through the realisation of the DeepTech ACT platform, has the ambition to create a virtual reality that connects and improves the efficiency of innovation ecosystems in the field of advanced technologies, with a focus on business growth, fostering innovation and stimulating cooperation between national, regional and local innovation actors. The expected potential impact of the platform can be explored in several dimensions:

Connection and Integration

The platform is intended to act as a connective tissue between DeepTech innovation ecosystems across the 27 EU Member States and potentially beyond and enhance their collaboration. More than 10.000 actors are estimated to be involved in the AccelerAction's activities and at least 1000 are estimated to be included in the DeepTechAct platform. Through its implementation, it is expected to reduce the existing gap between so-called 'strong innovators' and 'emerging innovators' and increase the coordination between innovation stakeholders by 30% on average. This should lead to increased opportunities for start-ups and SMEs located outside established innovation centres, giving them access to resources, skills and networks previously out of their reach.

Creation of Communities

The DeepTech ACT platform is intended to be a rallying point for innovators, entrepreneurs and innovation facilitators. By offering a virtual place for collaboration, the platform promotes the building of a community of practice. This community could benefit from knowledge exchange, joint learning and the creation of strategic alliances, which in turn could translate into a systemic and concrete impact on the European innovation ecosystem as a whole.

Improving Competitiveness

By leveraging the platform, less developed innovation ecosystems should be able to improve their attractiveness and competitiveness. This is achieved through the implementation of a match-making mechanism, sharing of best practices, cross-border cooperation and access to joint accelerator programmes. The platform could also encourage the adoption of new business models and advanced technologies, pushing innovation beyond traditional boundaries.

Supporting Scalability

The DeepTech ACT platform is designed to accelerate the scalability of enterprises by providing them with knowledge, tools and services that can help overcome common challenges to business expansion. This includes access to wider networks of investors, talent and potential partners, concrete business advice for each target group, as well as the ability to participate in collaborative acceleration initiatives.

In conclusion, the DeepTech ACT platform represents a key element in AccelerAction's ambitious goal of balancing and enhancing the technological innovation landscape in Europe. Its impact is expected to be multiple and transformative, influencing not only economic opportunities and business expansion, but also innovation culture, international cooperation and inclusiveness in the Deep Tech sector.

5 CONCLUSION

The AccelerAction project represents a revolutionary initiative of great impact and relevance for the rebalancing of the European innovation ecosystem. Through the implementation of the DeepTech ACT platform, the project aims to reduce the regional disparities that currently characterise the innovation landscape in Europe by promoting a more balanced entrepreneurial activity and transversal cooperation between different innovation actors.

The DeepTech ACT platform was developed precisely to facilitate interaction and collaboration between start-ups, accelerators, innovation agencies, business networks, experts, investors, educational institutions and regional authorities. This multifaceted approach not only increases mutual visibility between the various stakeholders, but also stimulates the creation of synergies that are crucial for the advancement of innovative projects on a European scale.

From a strictly technical point of view, the implementation of DeepTech ACT required the integration of advanced technologies and scalable solutions. The platform architecture uses AWS services such as EC2 for elastic computing and S3 for storage management, ensuring high performance and reliability. The use of CloudFront and Cloudflare improved content distribution and security, while Docker offered an effective solution for containerisation, facilitating software deployment and portability.

The user interface, developed with technologies such as React and Node.js, is intuitive and responsive, providing a smooth and accessible experience. This aspect is crucial for engaging a diverse audience, transforming technology from an obstacle to a bridge to innovation. Advanced matchmaking capabilities, based on AI algorithms, allow users to efficiently connect with stakeholders and resources that best match their needs and interests.

The long-term impact of DeepTech ACT is expected to be substantial. By facilitating more equitable access to resources, the platform empowers less developed regions, stimulates innovation and promotes inclusive economic growth. Looking ahead, DeepTech ACT's success will depend on its ability to remain agile and expand its network of users and collaborators. With this in mind, the platform is well positioned to be a key player in the transformation of innovation ecosystems in Europe and beyond.

6 APPENDIX

6.1 APPENDIX A: ALPHA TEST

Platform login

By accessing the link https://virtualecosystem.acceleraction.eu/admin the user will be redirected to the administrative side of the platform where the login interface will be displayed.

PREREQUISITES:

Be in possession of an account with a Copywriter or admin role.

INPUT:

a) Fill in the mandatory Username and Password fields correctly and click on the login button;

b) Fill in at least one of the mandatory fields Wrong Username and Password and click on the login button;

OUTPUT EXPECTED:

a) Access to the system with all functions reserved for the Copywriter or Admin;

b) Access denied if credentials are incorrect;

OUTPUT OBTAINED:

a) Redirecting to platform content

b) Access denied with an 'Authentication failed' error message;

Password reset by Admin

This functionality allows the password to be reset while being aware of the username.

PREREQUISITES:

Log in as admin and know the username of the Copywriter to whom you wish to reset the password. Then go to Administration - Power Users, select the desired user and press the edit button.

INPUT:

Press the 'Reset Password' button.

EXPECTED OUTPUT:

Receipt of an e-mail with the new password.

OUTPUT OBTAINED:

Consistent with the expected ouput.

Password reset - autonomous

This functionality allows the password to be reset in case the admin or power user has forgotten it.

PREREQUISITES:

Knowing the verification e-mail, press the 'Forgot password' button. INPUT:

a) Fill in the e-mail field correctly and press the 'reset password' button and tick the reCAPTCHA.

b) Do one of the following steps incorrectly: fill in the e-mail field and press the 'Reset Password' button and tick the reCAPTCHA.

EXPECTED OUTPUT:

a) Receipt of an e-mail with a link to reset the new password, password updated after entry in the password input field.

b) Error message.

OUTPUT OBTAINED:

a) Receipt of an e-mail with a link to reset the new password, password updated after entry in the password input field.

b) Error message concerning incorrect passage.

Edit Social Auth Parameters

This functionality allows API keys to be entered to log into the platform with Google, Facebook, Linkedin socials accounts.

PREREQUISITES:

Be in possession of an account with Admin role. INPUT:

a) Edit the API key and API password fields for the chosen social.

b) Leave a field blank.

EXPECTED OUTPUT:

a) Modification of fields performed with redirection to the tabular screen of all settings. b) Error message.

OUTPUT OBTAINED:

a) Redirection to the tabular screen with all fields, the information entered in the previous step updated.

b) Error message 'fill in this field'.

Modifying API parameters

This functionality makes it possible to obtain API keys to make the modules communicate correctly in the platform.

PREREQUISITES:

be in possession of an account with an Admin role.

INPUT:

a) Press the Generate button to obtain a new API password.

EXPECTED OUTPUT:

a) Changing the API password field.

OUTPUT OBTAINED:

a) Consistent with the output obtained.

Inserting a new Power User in the platform

This functionality allows a new power user to be added to the platform.

PREREQUISITES:

a) Be in possession of an account with an Admin role, go to the Administration section, and click on the Power Users submenu and finally press the button to add a new power user " New power user ".

INPUT:

a) Please enter the required fields:

a. first name: name of the user,

b. surname: surname of the user,

c. username: nickname of the user that will be used to log in,

d. e-mail: e-mail that the user will use to access the platform and where he/she will receive communications.

e. profile type: Manager or copywriter, these are the roles available, the manager will have platform management permissions while the copywriter is in charge of content management;

f. password: password which, together with the username, allows the user to access the back-end of the platform.

EXPECTED OUTPUT:

a) The user is logged in and active on the platform.

b) Error message if fields are missing.

OUTPUT OBTAINED:

a) Consistent with the output obtained.

b) Error message 'fill in this field'.

Changing generic parameters in the platform

These features allow the management of various options on the platform, such as the site logo, the language of the back-end, specifying an e-mail to receive communications, and entering company information.

PREREQUISITES:

Be in possession of an account with Admin role, go to the Administration section, and click on the General settings submenu.

INPUT:

Please fill in all required fields properly for the relevant section.

a) Logo: choose the image from your PC.

b) Language: choose the language from the drop-down menu.

c) E-mail: choose the e-mail where you wish to receive all communications relating to the platform.

d) Footer: section where you can enter company information.

e) BUSINESS DETAILS: Enter generic platform information

EXPECTED OUTPUT:

a) Changes applied in the platform, display of the new logo.

b) The texts in the platform correspond to the chosen language.

c) Communications from the platform received in the chosen e-mail.

d) Updating of footer information with inserted information.

e) Updating of company information with those entered.

OUTPUT OBTAINED:

a) Consistent with the output obtained.

b) Consistent with the output obtained.

c) Consistent with the output obtained.

d) Consistent with the output obtained.

e) Consistent with the output obtained.

Editing and adding courses to the platform

This functionality allows a new course to be added to the platform and existing courses to be modified.

PREREQUISITES:

Have successfully logged into the system as an administrator. Go to the course list. Click

on the button for editing/inserting a new course.

INPUT:

a) Enhancement of fields of a new/existing course

a) Name: name of the course.

b) Description: course description.

c) Slug,Meta title, Meta description: insert fields to optimise SEO.

d) SKU: enter the course identification code.

e) Show modules on course page: to be enabled or disabled; option to allow courses in the platform to be hidden or shown.

f) Disable multiple sale: to be enabled or disabled, enables the multiple sale of the same course.

g) Price and VAT included: enter the selling price of the product.

b) Incorrect field valorisation of a new course / of an existing course

EXPECTED OUTPUT:

a) Display of the course editing screen, with the data previously entered/inserting a course with empty fields to be filled in.

b) An error message in the case of missing information or lack of communication between client and server and unmodified data.

OUTPUT OBTAINED:

a) Automatic refreshing of the page and display of the course edit screen with the data previously entered.

b) An error message in the case of missing information or lack of communication between client and server and unmodified data.

Editing and Insertion of Course Modules

This functionality allows new modules to be inserted into courses on the platform and modules already present in the course to be modified.

PREREQUISITES:

a) Be in possession of an account with an Admin role, go to the Courses section, Courses submenu, and click on the New Course button, or choose the course where you would like to add or edit modules.

INPUT:

a) Select a module: choose the type of module desired:

a. Resource

b. SCORM

c. Video

d. Multiple-choice quizzes

e. Name: enter a name for the course.

f. Section: if created, choose a section in which to insert the form.

g. Time: Hours and Minutes, enter the hours and minutes available to complete the course.

b) Incorrect field valorisation of a new course / of an existing course.

EXPECTED OUTPUT:

a) Displaying the screen for editing/inserting a module.

b) An error message in the case of missing information or lack of communication between client and server and unmodified data.

OUTPUT OBTAINED:

a) Automatic page refresh and display of the edit screen with previously entered data.

b) Error message 'fill in this field'.

Displaying course monitoring details

This feature allows you to view course details, all those enrolled in a respective course, the answers given in the various training modules, and reports on the progress of the modules per trainee. It also allows you to delete the progress made by the trainee.

PREREQUISITES:

Being logged in as admin in the platform.

INPUT:

a) Go to the list of users or courses.

EXPECTED OUTPUT:

a) To view the list of course participants, press the monitoring button in the course section.

b) To monitor a learner's score and progress in detail, press the expand button in the 'Details' column of the table in the course section.

c) To delete a learner's progress, press the Delete button in the row for the relevant trainee in the course section.

d) To check the courses in which a learner is enrolled, go to Enrolment - Learners and press the monitor button.

OUTPUT OBTAINED:

a) Table containing course participants.

b) A sub-table containing the trainee's progress.

c) Deletion confirmation pop-up, if confirmed successful deletion.

d) Table containing the list of courses a learner is taking.

Editing Resources

This functionality allows resources in the 'Resource Library' section to be viewed and edited from the back-end of the platform;

PREREQUISITES:

Be in possession of a Copywriter account

INPUT:

a) Edit the Title field and using the text-area tools edit the body of the page and then click on the 'Save' button

EXPECTED OUTPUT:

a) Change of page made with redirection to the tabular screen of all resources

OUTPUT OBTAINED:

a) Redirection to the tabular screen of all updated resources.

USER SIDE:

Registering a user

This functionality allows the user to register on the platform.

PREREQUISITES:

Have a valid e-mail address to receive the registration confirmation link;

INPUT:

a) Please complete all mandatory fields in the registration form;

b) Failure to comply with the mandatory requirements in the registration form; EXPECTED **OUTPUT:**

a) Screen display of successful creation, with receipt of the e-mail entered during registration with the account activation link inside;

b) Notification of the field that did not fulfil the requirements of the registration form; **OUTPUT OBTAINED:**

a) Display of the successful creation interface, with notification to check the e-mail entered during registration. Receipt of e-mail with activation link and redirection via button to the login screen;

b) Label message to the field that did not fulfil the requirements of the registration form;

User login

This functionality allows the user to log in to the platform.

PREREQUISITES:

Have an already registered account or log in via social networks (Google, Facebook, Linkedin);

INPUT:

a) Fill in the E-mail and Password fields and click on the login button or use the social network login buttons;

b) Enter in the fields E-mail and Password credentials not registered in the platform;

EXPECTED OUTPUT:

a) Access to the platform and main functionalities;

b) Authentication failed message;

OUTPUT OBTAINED:

a) Redirection to the screen of your account with its editing functionalities;

b) Redirection to the homepage with failure message of user authentication;

Password Reset

This feature allows you to reset your password while being aware of your e-mail.

PREREQUISITES:

be in possession of an account with a user role and click “Forgot password?” in the login box.

INPUT:

a) Fill in the E-mail field correctly, flag the reCAPTCHA and press the reset password button;

b) Incorrectly fill in the E-mail field or do not flag the reCAPTCHA and press the forward button;

EXPECTED OUTUP:

a) Receipt of e-mail containing the link to redirect to the interface to enter the new password.

b) Error message indicating that entered e-mail is not present in the database or error message of reCAPTCHA not solved.

OUTUP OBTAINED:

a) Receipt of the e-mail containing the link to redirect to the interface, insertion of the new password and display of the screen warning that the password has been reset;

b) Redirected to Password reset page with "The email field must contain a valid email address." error message or "reCAPTCHA expired";

Edit account

This feature allows you to edit your account and add additional information to it.

PREREQUISITES:

have a registered user account on the platform and logged in correctly.

INPUT:

a) Edit or fill in the fields of interest respecting the constraints of the form;

b) Do not respect the constraints required by the form;

EXPECTED OUTPUT:

a) Message of successful modification;

b) Reporting the field that does not meet the requirements;

OUTPUT OBTAINED:

a) Redirection to the screen of your account with its editing functionalities;

b) Notification by means of a field label which does not fulfil the requirements of the form;

CRUD of profiles

This functionality allows to perform various operations such as:

- Creation;
- Visualisation;
- Update;
- Cancellation;

In the tabular view, either the default profile or the profile to be deleted can be selected using the button.

PREREQUISITES:

be in possession of an account with a user role

INPUT:

a) Fill in the fields of interest correctly and press the confirmation button for editing or creation;

b) Incorrectly fill in the fields of interest and press the confirmation button for editing or creation;

EXPECTED OUTPUT:

a) Creation/Editing success message with redirection to profile;

b) Reporting of the field that generated the Creation/Editing block;

CRUD of events

This functionality allows you perform various operations such as:

- Creation;
- Visualisation;
- Update;
- Cancellation;

PREREQUISITES:

be in possession of an account with a user role

INPUT:

a) Fill in the relevant fields correctly and press the confirmation button on editing or creation;

b) Incorrectly fill in the fields of interest and press the confirmation button for editing or creation;

EXPECTED OUTPUT:

a) Creation/Editing success message with redirection to the account;

b) Reporting errors of the field that generated the Creation/Editing block;

OUTPUT OBTAINED:

a) Redirection to your account with the changes you have made;

b) Reporting errors of the field that generated the Creation/Editing block;

Initiate

This functionality enables tools for learning, research and information sharing.

PREREQUISITES:

Be in possession of an account with user role, go to the Initiate section.

INPUT:

a) Click on the desired resource;

EXPECTED OUTPUT:

a) Displaying the contents of the chosen resource.

OUTPUT OBTAINED:

a) Viewing the contents of the chosen resource.

Community

This functionality allows the creation of posts and comments to posts in the community section.

PREREQUISITES:

Be in possession of an account with user role, go to the Community section.

INPUT:

a) The user clicks on the 'Start a Discussion' button, enters a title for the 'Discussion', enters a content for the 'Discussion' and finally presses the 'Post Discussion' button.

b) The user selects a Discussion and writes a comment.

c) Performs a search by Topic.

d) Delete one of his posts

EXPECTED OUTPUT:

a) The discussion is created correctly with title and contents inserted.

b) The comment is correctly entered and is displayed at the bottom of the discussion.

c) The list of topics is filtered according to the chosen search topic.

d) The post is hidden from others but still available for who made it.

OUTPUT OBTAINED:

a) The discussion is correctly entered in the platform .

b) Comment entered correctly, the name of the person who commented on the discussion is displayed.

c) The page is refreshed and only the chosen topics are displayed.

Test Matchmaking Map

This feature allows to find profiles that match your interests and display them on the map.

PREREQUISITES:

Be in possession of an account, go to the Matchmaking Map section.

INPUT:

a) The user looks for profiles or sectors of interest using search box.

b) The user clicks 'Filter' button.

c) The user clicks favourite button.

d) The user clicks help button.

EXPECTED OUTPUT:

a) The list is updated according to the topics of interest entered and results are displayed even in the map.

b) You can choose your interests via interface.

c) The chosen user is added to the list of favorites.

d) An information box opens with an interactive tutorial.

OUTPUT OBTAINED:

a) Consistent output.

b) Consistent output.

c) The chosen user is added to the list of favorites, the list on the right is updated

d) An information box opens with an interactive tutorial.

Test Training

This module allows to take platform courses

PREREQUISITES:

be in possession of an account with a user role and be logged into the platform.

INPUT:

a) select the module you want to follow

EXPECTED OUTPUT:

a) starting the video, displaying the chosen resource

OUTPUT OBTAINED:

a) fruition of the chosen resource, course completion icon

Test Logout

This functionality allows logging out of the web platform.

PREREQUISITES:

be in possession of an account with a user role and be logged into the platform.

INPUT:

a) Press the button to logout.

EXPECTED OUTPUT:

a) Return to the homepage and delete user session.

OUTPUT OBTAINED:

a) Return to the platform homepage, login button available again

6.2 APPENDIX B: BETA TEST

This report constitutes a comprehensive analysis of the DeepTech ACT platform, conducted through a beta testing protocol.

The test was carried out by administering an evaluation questionnaire to all consortium partners.

The main objective of the questionnaire is to evaluate the functionality of the platform, to identify potential bugs, to improve the overall usability and to collect feedback from the consortium in order to improve the overall user experience.

This activity is part of WP3 - **Establishment of the AccelerAction Virtual Ecosystem.**

Methodology

The test protocol included a series of questions aimed at evaluating different aspects of the DeepTech Act platform.

In order to carry out the activity, testers were asked to navigate through the various sections of the platform, interacting with its functionalities and providing feedback and evaluations based on the user's experience.

The beta test covered all the main sections of the DeepTech ACT platform, including:

1. Homepage
2. Log in/Register
3. Account
4. Security and Privacy
5. Initiate
6. Training
7. Matchmaking Map

Results

Homepage Section:

Is it clear and easy to understand?

Feedback Summary**:** Most respondents confirmed that the section is clear and easy to understand.

Critical Points and Suggestions:

- One participant indicated a difficulty in reading the text under "DeepTech ACT" in the left corner, suggesting an improvement in visibility.
- Another participant expressed appreciation for the logo created specifically for the platform but suggested enlarging the logo slightly.
- One suggestion was to add all four main sections (also the connect part) to the menu bar for greater accessibility.

Is the background image appropriate and captivating?

Feedback Summary: All respondents agree that the background image is appropriate and captivating.

Is it well organised and structured?

Feedback Summary: Most participants praised the organisation and structure of the homepage, noting in particular the graphic layout of the buttons. Most respondents also confirmed that the titles and descriptions were clear and concise and that the images were relevant and of high quality.

Critical Points and Suggestions:

- One participant expressed doubts about the title 'initiate', suggesting that it might not fit perfectly with the content.

- It was suggested that it would be good to have more diversity in the images to make them more inclusive.

Are the links functional and correctly linked?

Feedback Summary: The answers indicate that most of the connections work correctly.

Critical Points and Suggestions:

- The links from "Matchmaking Map" and "Start the Journey" are the same, the "Contacts" button doesn't have a link. It is also noted that when you click on the matchmaking map there appears a small window on the bottom right saying "complete your profile now" & when you click you are directed to the homepage and not to your profile.
- Some links lead to 'work in progress' pages.

Are the buttons easy to click and identify?

Feedback Summary: The evaluation of the user-friendliness of the homepage received high scores, with most participants rating the experience between 8 and 10 out of 10.

Critical Points and Suggestions:

- The four squares might not seem clickable to an external user.

Do you have any suggestion for improving the homepage? Is it enough user-friendly, functional, and engaging?

Feedback Summary: Overall, the homepage is described as functional and user-friendly, suggestions for improvement include a request for a more dynamic, less static homepage and a greater emphasis on easy identification of buttons.

Registration/log in Section

Is the form to be filled out well organised and easy to navigate?

Feedback Summary: Overall, respondents find the form well organised and easy to navigate.

Critical Points and Suggestions:

- Suggestion to change phrasing to "What describes you BEST"
- Highlight the need to fill out the form for matchmaking purposes even when using social network registration

Is the content informative, clear, and well-written?

Feedback Summary: The majority of users agreed that the content is informative, clear, and well-written.

Critical Points and Suggestions:

- Text under the logo was reported as blurred and could be improved

Once you registered, have you received in your registration email, the confirmation of it?

Feedback Summary: Most users have received the email without problems, but some improvements are suggested.

Critical Points and Suggestions:

- Make sure font and color in the email are consistent with branding
- Modify the email template to be more platform-specific and remove unnecessary lines
- Correct the platform name in the email to match the actual platform

To proceed with password recovery, click on the "Forgot password?"

Feedback Summary: Password recovery process is generally found to be straightforward.

Critical Points and Suggestions:

- Ensure the email for password recovery is mobile-responsive
- Change the button text from "confirm registration" to "set new password" for clarity

On a scale from 1 to 10, how easy is the Log in/Register section to use?

Feedback Summary: High usability with scores of 9 and 10 out of 10 from respondents.

Critical Points and Suggestions: No specific suggestions provided as the feedback is positive.

Did you encounter any bugs or anomalies while using the Log in/Register section?

Feedback Summary: No major bugs reported, but a minor issue was mentioned.

Critical Points and Suggestions:

Improve the form to save already entered information when a mandatory field is skipped by mistake

Do you have any suggestions for improving the Log in/Register section?

Feedback Summary: Users find the section user-friendly and enjoyable, yet some improvements are suggested.

Critical Points and Suggestions:

- Adapt the color of the "Log OUT" button to match branding
- Ensure consistency in naming the platform across different emails and sections (in the Reset password email, the title refers to Virtual Ecosystem Platform not to DeepTech Act Platform.)
- Improve the structure of the reset password confirmation email (the template is not well structured, but this could be a bug or anomaly of my email.)

Account Section

Is the information displayed accurate and up-to-date?

Feedback Summary: Users generally confirm the accuracy and currency of the information.

Critical Points and Suggestions:

- Issue with LinkedIn URL not being saved after clicking save

- Confusion about the meaning of "Default profile" and whether it should be changed

Is it easy to find the information you are looking for?

Feedback Summary: Users find it easy to locate information.

Critical Points and Suggestions:

- Users are unclear about the purpose of adding profiles and when this should be done

Is the editing process easy and intuitive?

Feedback Summary: Users agree that the editing process is straightforward.

Critical Points and Suggestions: No specific criticisms or suggestions were reported.

Is it possible to edit all the information you want?

Feedback Summary: Most users are content with the editability of their information, but some face issues.

Critical Points and Suggestions:

- Problems with editing and saving the LinkedIn URL
- Users are unable to add their phone number with the "+" sign, suggesting an issue with international format recognition

Is the recovery password process secure and easy to follow?

Feedback Summary: The process is deemed secure and easy, with an exception.

Critical Points and Suggestions:

- One user did not test the feature due to using a Google profile for login

On a scale from 1 to 10, how easy is the "Account" page to use?

Feedback Summary: The page scores range from 7 to 10, indicating a generally positive user experience.

Critical Points and Suggestions: No specific suggestions provided based on the scores.

How satisfied are you with the control you have over your account information?

Feedback Summary: Satisfaction levels range from 4 to 5 on a 5-point scale, suggesting high user satisfaction.

Critical Points and Suggestions: No specific criticisms or suggestions were reported based on satisfaction levels.

Did you encounter any bugs or anomalies while using the "Account" page?

Feedback Summary: Some users did not encounter issues, while others reported specific bugs.

Critical Points and Suggestions:

- Persistent issue with saving LinkedIn URL
- LinkedIn information not being retained after saving

Do you have any suggestions for improving the "Account" page?

Feedback Summary: Some users are satisfied, but others have provided improvement suggestions.

Critical Points and Suggestions:

- Auto-fill name and surname from the registration information to avoid redundancy
- Suggestion to add a save button for each section for clarity

Are there any features you would like to add or modify?

Feedback Summary: Users have varying opinions on potential features to add or change.

Critical Points and Suggestions:

- Add the ability to include website URLs in the profile

- Change button colors for consistency, particularly regarding photo upload
- Implement a notification email for password changes made directly from the user's account

Security and Privacy Section:

Are they easy to understand and provide sufficient information about how your data is processed?

Feedback Summary: The consensus is that the information provided is clear and comprehensible.

Critical Points and Suggestions:

- Suggestion to explain the role of "Jo Consulting" and the reason for using their Privacy Policy.

Are you satisfied with the way your data is used?

Feedback Summary: Users express satisfaction with the data usage on the platform.

Critical Points and Suggestions: No specific criticisms or suggestions were offered.

How confident do you feel that your personal data is safe on the DeepTech ACT platform?

Feedback Summary: Users generally feel confident about the safety of their personal data, rating it with a 4 or 5.

Critical Points and Suggestions: No specific suggestions provided, but the ratings indicate good confidence levels with room for some improvement.

Do you have any doubts or concerns about the security or privacy of your data?

Feedback Summary: Users reported no doubts or concerns regarding data security or privacy.

Critical Points and Suggestions: Absence of concerns suggests satisfaction with current measures, but continuous monitoring is implied.

Do you have any suggestions for improving the security or privacy of the DeepTech ACT platform?

Feedback Summary: No suggestions were made for improvement, indicating contentment with the current state of security and privacy.

Critical Points and Suggestions: While no improvements were suggested, maintaining up-to-date security measures is always recommended.

Initiate Section:

Are the categories well organised and easy to navigate?

Feedback Summary: Users find the categories well organised and easy to navigate.

Critical Points and Suggestions: No criticisms or suggestions were made.

Are the search filters functional and allow you to easily find the desired resources?

Feedback Summary: Users generally find the search filters functional.

Critical Points and Suggestions:

- A reported issue when filtering articles by category without entering a keyword.
- Suggestion to fix the search functionality to display resources from the selected category properly.

Is the document format appropriate?

Feedback Summary: Most respondents find the format appropriate.

Critical Points and Suggestions:

- Inconsistencies in formatting across articles, such as titles, spacing, and subtitles.

- Suggestion to standardise the formatting for consistency.

Is the search function easy to use and provides relevant results?

Feedback Summary: The search function is easy to use and mostly provides relevant results.

Critical Points and Suggestions:

- The inability to filter by author is noted.

Are the search filters easy to use and understandable?

Feedback Summary: Search filters are considered easy to use and understandable.

Critical Points and Suggestions: No specific criticisms or suggestions were provided.

On a scale from 1 to 10, how easy is the Initiate section to use?

Feedback Summary: The Initiate section is rated highly, with scores of 8, 9, and 10.

Critical Points and Suggestions: No specific criticisms or suggestions were reported

Is it easy to find the resources you want?

Feedback Summary: Ratings vary from 3 to 5, suggesting room for improvement in resource discoverability.

Critical Points and Suggestions: No specific criticisms or suggestions were reported.

Did you encounter any bugs or anomalies while using the Initiate section? If so, please, describe them in detail.

Feedback Summary: Users report few issues, with one noting no results when using the 'find a topic' bar.

Critical Points and Suggestions: The 'find a topic' search issue should be investigated.

Do you have any suggestions for improving the Initiate section? Is it enough user-friendly and comprehensive?

Feedback Summary: No significant suggestions for improvement were provided, indicating overall satisfaction.

Critical Points and Suggestions: Continuing to monitor user feedback for potential enhancements is recommended.

Are there any categories of resources you would like to add?

Feedback Summary: Users are satisfied with the current categories, with one suggestion for increased interaction.

Critical Points and Suggestions:

- Consider adding a form for topic suggestions or a way for visitors to contribute content.

Do you have any suggestions for improving the search function?

Feedback Summary: Users have few suggestions, with some referencing previous points made in Question 4.

Critical Points and Suggestions: Addressing the previously noted issues with the search function remains a priority.

Section 2: Resource Detail Pages - Articles

Do links, inside articles, related to other resources work?

Feedback Summary: All tested links within articles are reported to work properly.

Critical Points and Suggestions: No suggestions made; functionality meets user expectations.

Did you encounter any bugs or anomalies while using the resource detail pages? If so, please, describe them in detail.

Feedback Summary: Users did not report any bugs or anomalies.

Critical Points and Suggestions: Continual testing and user feedback collection are advised to maintain quality.

Do you have any suggestions for improving the resource detail pages?

Feedback Summary: Users suggest minor improvements for consistency and readability.

Critical Points and Suggestions:

- Ensure consistent branding, such as the consistent use of "DeepTech."
- Address duplicate titles and standardise subtitles and paragraph spacing.

Training Section:

Is the navigation easy and intuitive?

Feedback Summary: The feedback indicates that users who could access the training found the navigation easy and intuitive.

Critical Points and Suggestions:

- There are no specific criticisms or suggestions indicating that users are content with the current navigation setup.

Are the different sections of the course well-organised?

Feedback Summary: Responses suggest that users are divided on the organisation of the course sections.

Critical Points and Suggestions:

- Some users are unable to access the site due to a "work in progress" message, indicating a possible site outage or restricted access issue.
- Users who have accessed the content agree that the sections are well-organised.

On a scale of 1 to 10, how easy is the "Training" section to use?

Feedback Summary: The usability of the Training section varies among users, with scores ranging from 5 to 10.

Critical Points and Suggestions:

- The variance in scores suggests that while some users find the section very easy to use, others encounter difficulties, perhaps related to the accessibility issues mentioned.

Did you encounter any bugs or anomalies while using the "Training" section?

Feedback Summary: Users report mixed experiences with bugs or access issues.

Critical Points and Suggestions:

- Continued issues with site access are reported, reinforcing the need to address the "work in progress" situation.
- Users who could access the content did not report any specific bugs or anomalies.

Do you have any suggestions for improving the "Training" section? Is it enough user-friendly and engaging?

Feedback Summary: Most users did not provide additional suggestions for improvement, indicating satisfaction with the current state of the Training section.

Critical Points and Suggestions:

- Accessibility issues need to be resolved for a complete assessment of user-friendliness and engagement.
- One user mentioned the clarity and ease of access to videos, suggesting that the multimedia content is a strong point.

Are there any features you would like to add or modify?

Feedback Summary: Most users did not suggest new features or modifications.

Critical Points and Suggestions:

- One user alluded to previous recommendations that are documented in the "VES Grammar Check & Design Feedback" document, implying there may be outstanding suggestions that need to be revisited.

Matchmaking Map Section:

What kind of information does it present?

Feedback Summary: The map displays a variety of information including matches, favorites, events, and a navigation bar.

Critical Points and Suggestions:

- The tutorial was mentioned as useful, indicating that the first impression of the platform might be overwhelming.

Is it clear and easy to understand?

Feedback Summary: Opinions are mixed; some find the platform confusing and visually crowded, while others appreciate the clarity provided by the tutorial.

Critical Points and Suggestions:

- Consider simplifying the interface to reduce visual clutter.

Is it well organised and structured?

Feedback Summary: Responses suggest that the organisation is generally good, but the interface may be too crowded.

Critical Points and Suggestions:

- Streamline content for easier viewing.
- Suggestion to make events and favorites into expandable icons to declutter the interface and give more space to the map.

Are the links functional and correctly linked?

Feedback Summary: Users report functional links, but some filtering issues are present.

Critical Points and Suggestions:

- Address filtering inaccuracies like mismatches between selected regions and displayed results.
- Improve tag spacing and overlap in profile views.

Are the search filters functional and allow you to narrow down your search?

Feedback Summary: Search filters seem to be functional, but some are not precise or relevant.

Critical Points and Suggestions:

- Enhance search filters for precision, especially country filters.
- Allow for more diverse search criteria, such as city of origin.

Is the search function easy to use and provides relevant results?

Feedback Summary: The search function is easy to use, but relevance of results is questioned.

Critical Points and Suggestions:

- Improve the search algorithm to yield more relevant results.

Is the tutorial easy to follow?

Feedback Summary: Unanimous positive feedback on the tutorial's ease of use.

Critical Points and Suggestions:

- No specific suggestions.

Are the features easy to use and understand?

Feedback Summary: Features are easy to use, but some discrepancies in information presentation were noted.

Critical Points and Suggestions:

- Ensure consistency in profile information presentation, such as accurate location mapping.

Is the information presented on the map clear and concise?

Feedback Summary: Information on the map is clear, but icon visibility can be improved.

Critical Points and Suggestions:

- Change the color of icons without pictures for better visibility.

Are the different layers of the map well-organised and easy to navigate?

Feedback Summary: The map layers are well-organised and navigable.

Critical Points and Suggestions:

- No specific suggestions, indicating general satisfaction.

On a scale of 1 to 10, how easy is Matchmaking Map to use?

Feedback Summary: The Matchmaking Map is rated highly for ease of use, with scores of 8 and 9.

Is the Matchmaking Map intuitive and allows you to easily find the desired information?

Feedback Summary: The Map's intuitiveness is rated positively, with scores of 4 and 5 on a 5-point scale.

Did you encounter any bugs or anomalies while using the Matchmaking Map?

Feedback Summary: No new bugs were reported outside of previous mentions.

Critical Points and Suggestions:

- Review previous responses for detailed descriptions of encountered issues.

Do you have any suggestions for improving the Matchmaking Map?

Feedback Summary: Users suggest minor improvements for user-friendliness and engagement.

Critical Points and Suggestions:

- Add an "x" button to close pop-up profiles for clarity.
- Consider making the left banner smaller to optimise space.

Is there any information you would like to add or remove from the Matchmaking Map?

Feedback Summary: No significant requests for adding or removing information.

Critical Points and Suggestions:

- Events and favorites could be optional windows to reduce initial information overload.

Implementation of the feedback

Following the collection of feedback from partners after the Beta test had been carried out, JO Consulting proceeded to implement the proposed improvements and to correct the critical issues found.

The major changes made to the DeepTech Act platform are listed below:

- In the Homepage section, a change was made to the background image, which is now more inclusive as it portrays men and women.

- The platform logo was enlarged, the subtitle was relocated to the centre of the homepage
- The four squares in the homepage section, indicating the 4 sections accessible on the site, have been modified in order to make their clickability comprehensible to users
- The text in the log-in section was changed from "what describes you" to "what describes you best".
- The platform registration email was modified and adapted graphically and stylistically to the project's brand manual. Corrections were also made in the text of the password reset email. Minor bugs in the display of the email in the mobile version were corrected.
- Button colours that did not comply with the brand manual were corrected.
- In the Account section, the wording 'Default profile' was changed to include the user's name.
- The issue concerning the impossibility of entering the telephone number in the Account section has been corrected.
- The issue concerning the inability to filter articles in the initiate section has been corrected.
- The bug whereby it was not possible to enter the reference in the personal profile to one's LinkedIn account has been corrected.