RESILIENCE

Grant 871127, RESILIENCE

RESILIENCE Database

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1 Introduction

The RESILIENCE Experts and Resources Database (afterwards called Experts Database) is the result of the user-oriented approach and several meetings between WP2 members, the core RESILIENCE team (WP leaders, project coordinator's team) and possible stakeholders and users through the field of religious studies. The objective of the database is to define an entrance point for the academic community to find persons, projects and resources.

1.1 Requirements Analysis

During the requirements analysis the aspect of improving and uncovering the links among researchers themselves and also between the religious scientific community and the public became the dominant motivation to create the RESILIENCE Database, under the title "RESILIENCE Experts Database".

The RESILIENCE team decided over several meetings to firstly list all available resources spread over different universities and libraries, their means of access and the access restrictions. It became evident in the first feedback round, that such a list would be helpful but would not meet the expectations of possible users. Rather than just listing resources, a link between institutions, persons and their work was felt as a need and gave birth to the idea of the RESILIENCE Experts Database.

The RESILIENCE Experts Database is designed to be the first step stone towards a complete digital ecosystem platform of religious studies. While it still lacks features as conference integration and inter-platform communication. It is designed to create a digital representation of both RESILIENCE experts and user's CV and history as also of a resources' timeline.

1.2 Challenges and design strategies

During the first couple meetings, many core features were agreed on, but the feedback session showed a need for extension, therefore bringing the developer to a loose and extended database design able to offer this feature. Moreover, the team agreed on the fact that the whole project should use publicly open common technologies, since adding features should not rely on one developer only.

The architectural design uses a common database-backend-frontend pattern. The database is only designed to store the predefined datasets while the backend itself can be extended to use multiple and different databases and data sources, presenting all data at one domain. Unable to predict in advance all the frontend needs, the user interface can connect to the backend via a documented API. The downside, as front and backend cannot be created completely in sync but the frontend can be exchanged quite easily.

Figure 1 shows a separation into 4 main entities: *resources*, *institutions*, *persons* and *publications*. Those entities represent organizational units of the database, they are interlinked and have their own attributes. To map the expertise of a person, the person entity turned out to be the most sophisticated one and represents a person's CV.

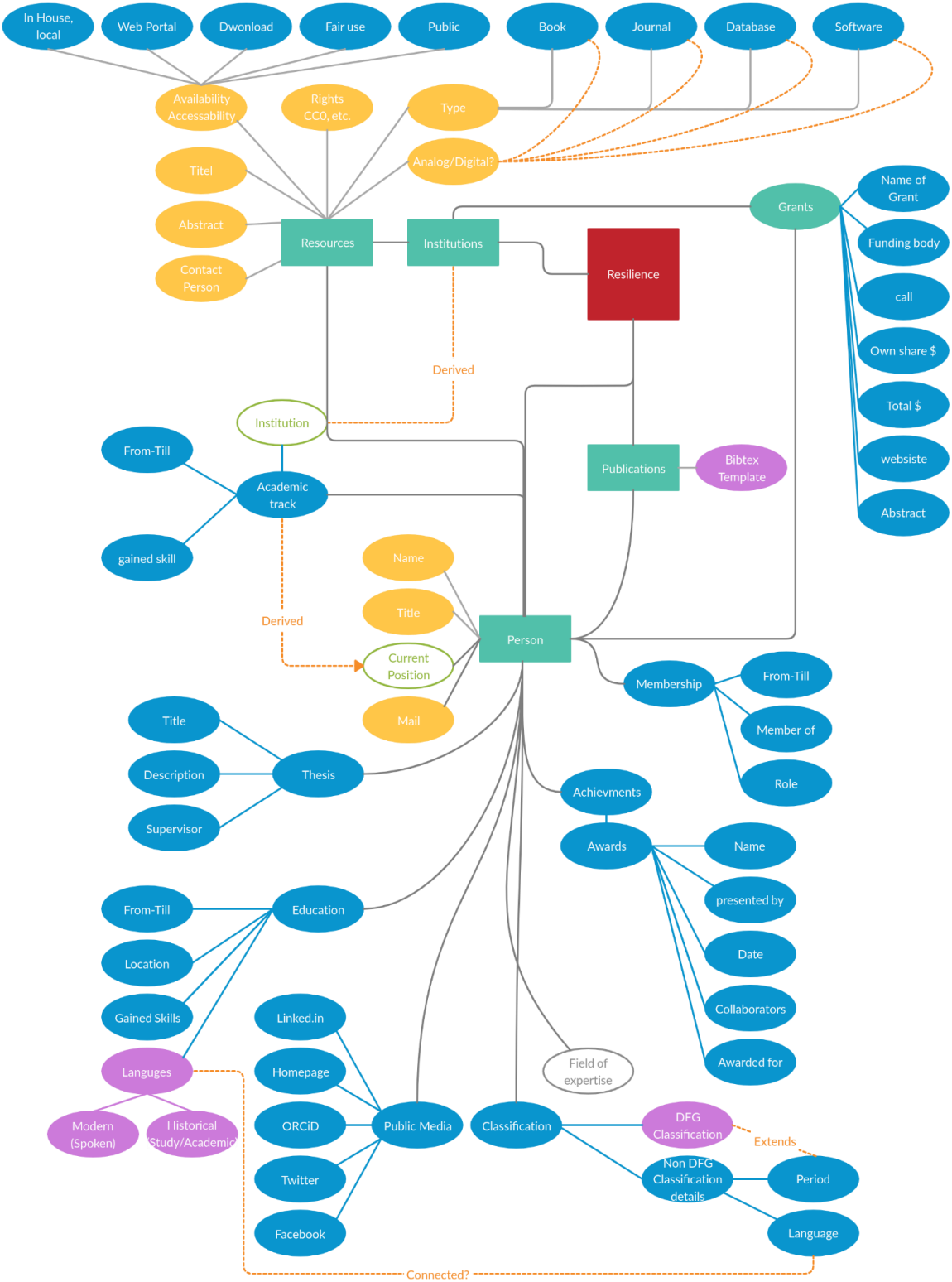

Figure 1 Mindmap of relevant information developed by Resilience team members

1.3 Implementation

1.3.1 Frameworks and software utilized

Except for the database, the whole project is developed with JavaScript. JavaScript is the most used programming language for web applications and one of the foundations of the modern web.

1.3.1.1 Database

PostgreSQL 12.1:

PostgreSQL is one of the few databases that come with a built-in support for arrays and objects. Given the nature of multiple values per field (for example academic track), multivalued fields or objects can be stored easily. Also, the built-in geometrical module enables simple comparison and searches on geographical data. PostgreSQL is open source, was developed for 30+ years and is therefore reliable long-term solution. It also comes with a command-line interface as well as a web-interface.

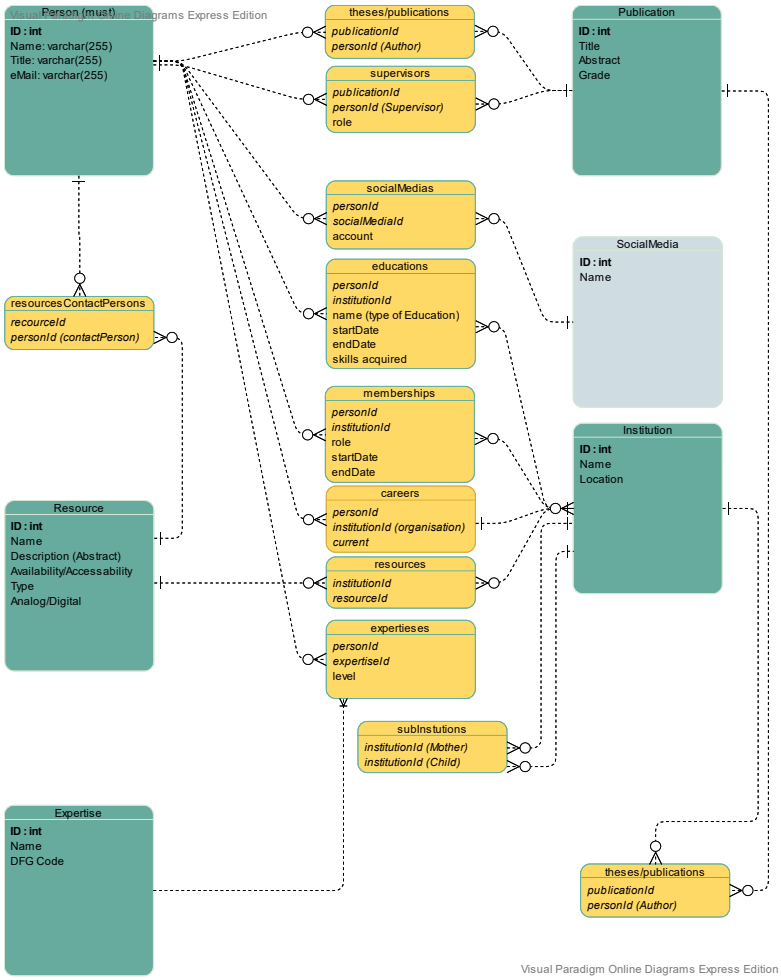

Figure 2 Database schema of the relational database

1.3.1.2 Backend

Given the wide popularity of JavaScript and its frontend utilization the backend was developed on the same language. *Node* serves as a browser free JavaScript interpreter, while the *Express.js* framework is used to process the incoming requests and serves the API-Endpoints.

1.3.1.3 Frontend

The frontend uses the modern *Vue.js* framework to create a reactive interface with dynamic loading and modularity. The main aspect to choose *Vue.js* came from with the modularity, while future frontend can still reuse the forms while replacing the menus and vice versa. Although the design is provided by *Bulma.css*. Other CSS libraries can be used to change the look and feel of the interface.

1.3.1.4 Deployment

The whole project is deployed on a virtual machine hosted by the GWDG under the IP address 134.76.18.175 and is also reachable under the RESILIENCE subdomain experts.resilience-ri.org. For future optimizations the front and backend can be hosted on different machines and load can be balanced to accommodate more users.

1.3.2 List of source code repositories

All source code and database schemas are openly available in INFAI's versioning repository. The following list gives precise links to the several subprojects related to the Experts Database:

1. Gitlab group: https://vcs.etrap.eu/resilience
2. Issue 'tracker: https://vcs.etrap.eu/groups/resilience/-/issues
3. Frontend: https://vcs.etrap.eu/resilience/frontend-vue
4. Backend: https://vcs.etrap.eu/resilience/backend-node-express-rest-api
5. Database: https://vcs.etrap.eu/resilience/database-postgresql

1.4 Documentation

1.4.1 Workflows

1.4.1.1 Search

The landing page of the Experts Database presents the search field. Searching for persons, institutions, publications and resources can be done from this point. All searches are performed over the main textual database entries. Custom searches are not available via the user interface but can be added utilizing the API.

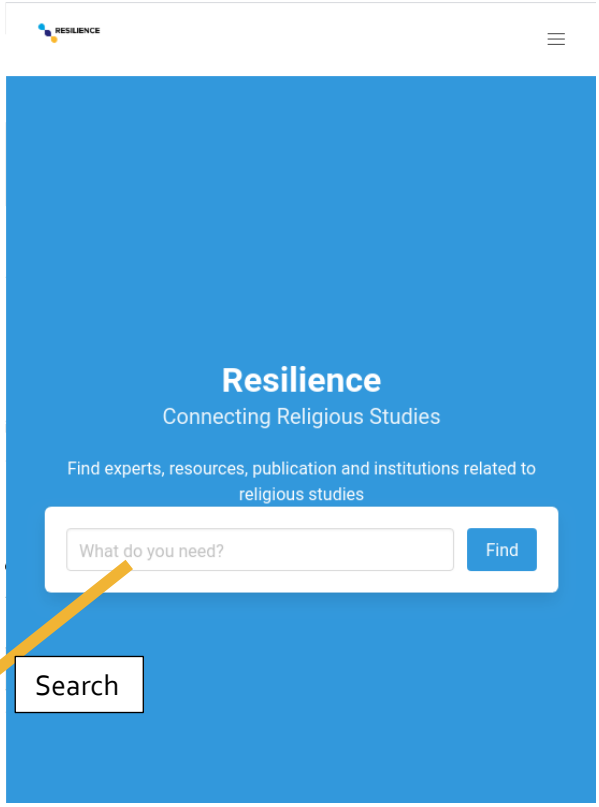

Figure 3 Landing page of the experts database

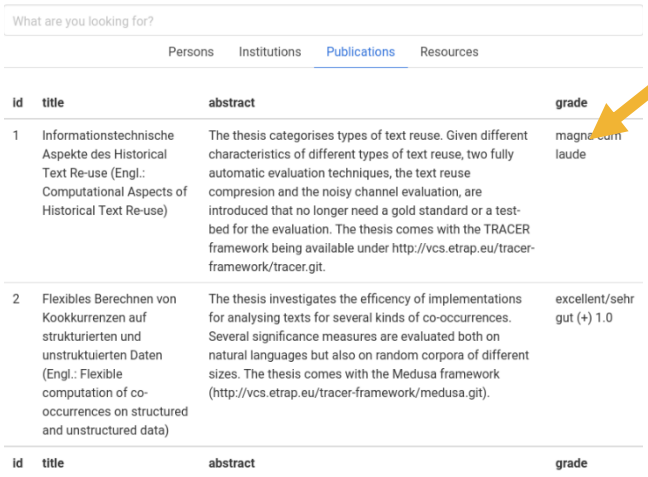

Figure 4 Result-set of a search

1.4.1.2 Create Account

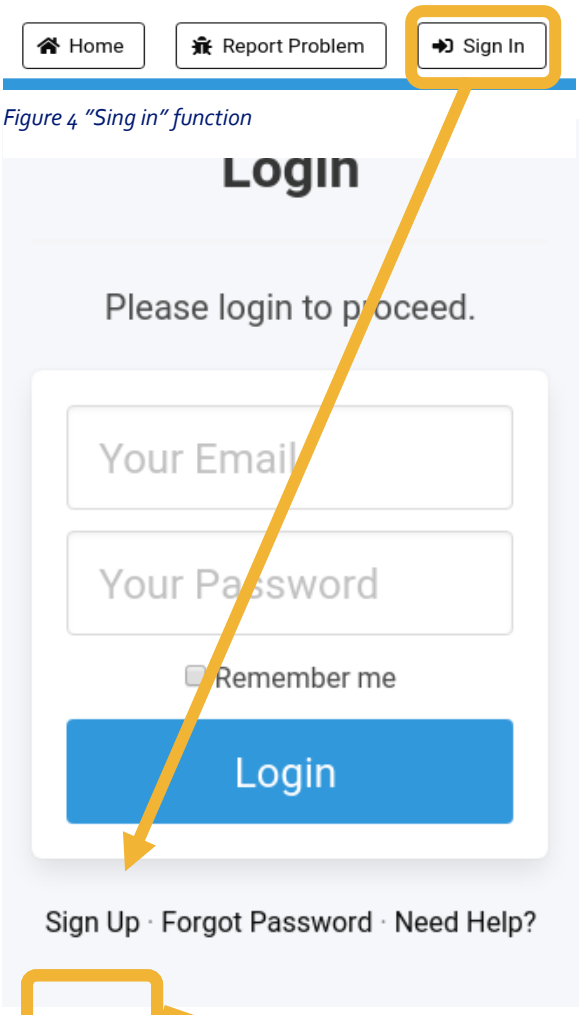

Figure 4 "Sing in" function

Figure 3 Sign up process

New users who want to be listed by the database should start by creating an account. A new user account can be created with the *Sign In*-button at the top. Following the *Sign In*-button a user can choose the *Sign Up*-option at the bottom giving you the *Sign Up* page.

On the final page the user can create a new account with his/her email and name. The email will be used for future logins and only one account can be created per mail address. The email, the passwords hash-sum and all data are stored in the same database as the data on RESILIENCE experts.

Once an account is created the user profile page is displayed.

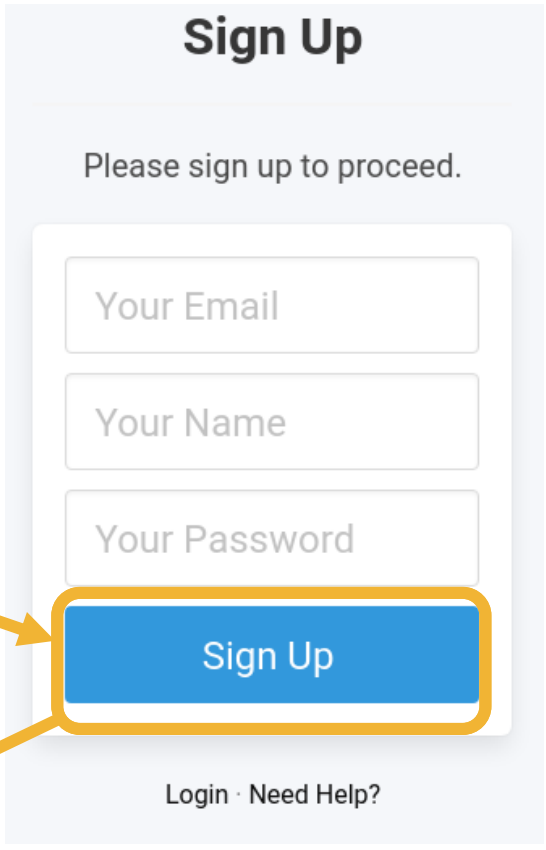

Figure 5 Creating an account

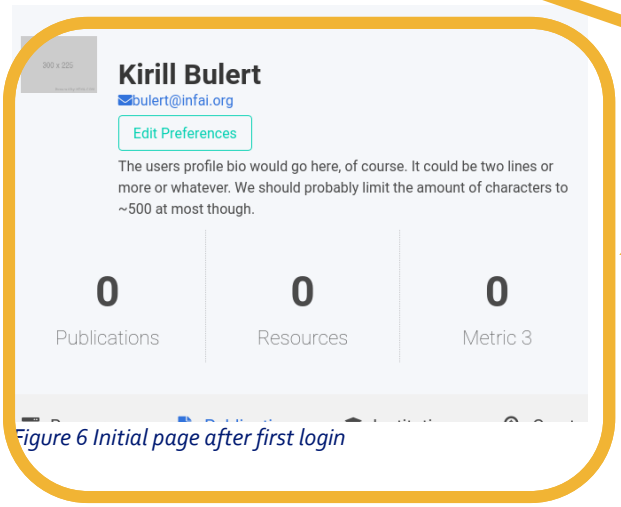

Figure 6 Initial page after first login

1.4.1.3 Edit User Data

Once logged-in, the user's personal details can be edited via the edit form and further details can be reached over the navigational menu on the left side.

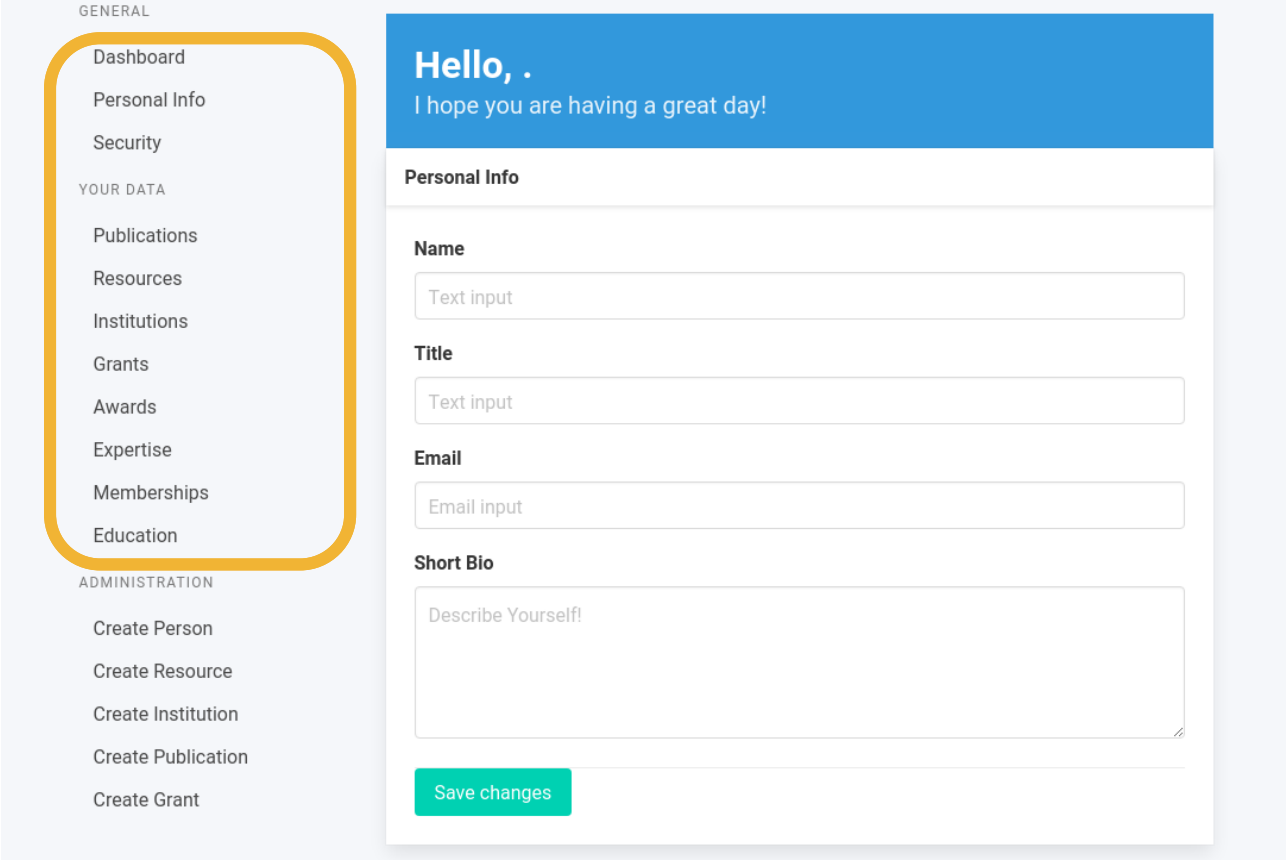

Figure 7 Editing mode of the database

1.4.1.4 Create Entity

Users with elevated rights are able to create persons, resources, institutions, publications and grants. This feature enables for example institutions to add multiple associated persons. The elevated options can be found in the bottom part of the edit menu.

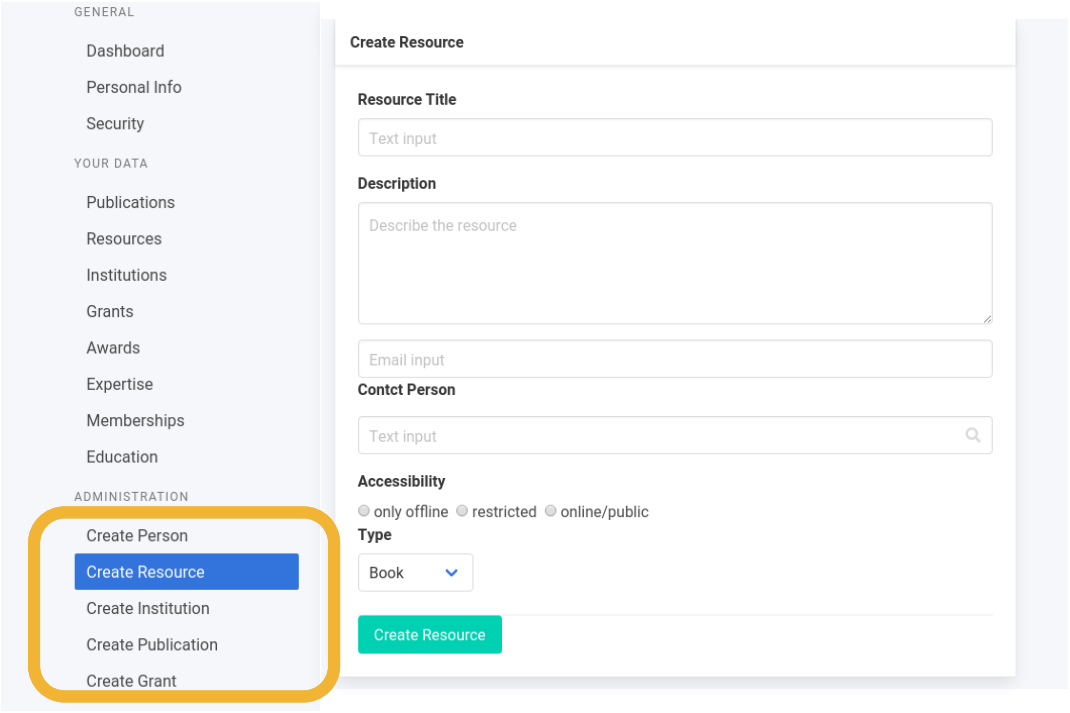

Figure 8Adding further professional information

1.4.2 API Documentation

The information stored in the database can also be retrieved via partially publicly available API.

For access use the domain + the API endpoint. For example:

https://experts.resilience-ri.eu/api/person/search?query="Kirill Bulert"

1.4.2.1 Query database

Endpoints:

- */api/person/search?query="<query>"*
- */api/institution/search?query="<query>"*
- */api/resource/search?query="<query>"*
- */api/publication/search?query="<query>"*
- */api/grants/search?query="<query>"*

This API returns a list formatted as JSON. The list contains all found corresponding entities and, if available, data.

The last query performs a search over all endpoints.

1.4.2.2 Get data

Direct data access can also be obtained via ID endpoints. Those are static results and won't change with new data added in comparison to the queries.

- /api/person/:id
- /api/institution/:id
- /api/resource/:id
- /api/publication/:id

The result will be a JSON with the corresponding entity id.

2 Applicable Documents

Applicable documents are documents from which all requirements must be fulfilled in the context of the Grant Agreement, although they are not repeated in the present document.

ID	Date	Title/Reference
[A1]	[DD/MM/YYYY]	
[A2]		
[A3]		

3 Reference Documents

Reference documents are intended to provide background and supplementary information.

ID	Date	Title/Reference
[R1]	[DD/MM/YYYY]	
[R2]		
[R3]		

4 Revision Log

ID	Date	Nature of Revision	Approved by
[R1]	[DD/MM/YYYY]		
[R2]			
[R3]			

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