Join Us to Optimize Health Through Cohort Research

Deliverable 3.1 Report on the technical requirement including tools to be used for webinars

Part II: Technical requirements

Version 1.0

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List of abbreviations

AkademieÖGW	Akademie für Öffentliches Gesundheitswesen in Düsseldorf, Germany
EUR	Erasmus University of Rotterdam, Netherlands
EMC	Erasmus Medical Centre, Rotterdam, Netherlands
GDPR	General Data Protection Regulation
MUB	Medical University of Bialystok, Poland
OH	One Health
P	Partner
RRI	Responsible Research and Innovation
SocLab	Foundation Laboratory of Research and Social Actions "SocLab", Bialystok University of Technology, Poland
UMG	University Medicine Greifswald, Germany
UwB	Social Science Department, University of Bialystok, Poland

1 Platform structure (PS)

We propose the platform to be **topic-oriented**. All steps of the concept are linked to a given topic. Depending on the step, the topic captures the central idea of the respective step and may thus comprise different contents. .For example,

- step 1: "Suggest" —> topic = description of the suggestion
- step 4a: "Facilitated teams: Plan, assign" —> topic = work plan and task allocation
- step 4c: "Facilitated teams: Present" —> topic = draft output of team

A facilitator or moderator has the right to make a given topic visible. Topics can be linked to users, teams, votes and so on.

A user can make suggestions (e.g. research questions, information needs, information offers, etc.) by generating a topic. Tasks and teams are linked with standardized information on design, outputs, review and dissemination, which in turn can be linked with topics. The challenge is to match topics, tasks and teams effectively to produce the optimum output for the overall beneficiary, society.

Users can take the following actions:

- passive vote = like;
- active vote = I am willing to contribute; optional: specification of time period and possible commitment;
- follow; and
- share via platform, email and social media.

These measures are used for reputation management and monitoring and evaluation purposes. Details on the platform structure will be added in due time. Here is a summary of core functionalities:

- multi-language support (PS1)
- as part of IT and content development: minimize barriers for individuals with visual, hearing or motor impairment; e.g. (PS2)
    - visual impairment: all images to include captions, avoid red / green combination (colour-blindness); follow the W3C's WCAG contrast-ratio recommendations
    - hearing impairment: add subtitles to videos
- facilitate social exchanges and management of sprints such as forums, chat and mailing functionalities (PS3)
- mail service and set-up of mailing lists, newsletters, …; automatic unsubscribe option; automatic password reset (PS4)
- calendars to share dates and organize events or activities (PS5)
- surveys to develop or evaluate the projects (internally or via external tool) (PS6)
- link to social media to support cooperation with our partner Whitebits (marketing company) (PS7)
- suitable dashboard for data analytics, monitoring and evaluation (PS7)

2 User management

2.1 Key requirements (KR)

The core idea of the proposed concept is to create a crowd-based and crowd-driven system with strategic oversight. Quality control and the creation of safe communication and engagement spaces are necessary to generate knowledge of value to society. No open dialogue is supported at low-level interactions.

Functions open certain tasks to users after a (generally) short training and certification. For instance, contributions, which are not coordinated by a user with a special role, need to undergo a review by at least one, ideally two selected reviewers. The reviewers submit their standardized assessment, which is checked by a user with a special role. Given the population-based focus, selection of reviewers should ideally be done at random from a pool of volunteers. A user with a special role or another randomly selected set of reviewers can review the contribution again in case of disagreements between previous reviewers.

Key features:

1. provide a safe environment regarding data security, privacy, intellectual property, tone of dialogue etc.
2. do not support open, unsupervised dialogues
3. a facilitator can volunteer to coordinate a team or task, thus allowing direct exchanges
4. (inter-)actions not supported by a facilitator undergo a review by two selected reviewers
5. ideally, the selection of reviewers is at random; if disagreement arises, two further reviewers are sought or a facilitator is engaged.

Technical requirements:

- user groups, roles and rights (KR1)
   - a user can be part of several user groups
   - a role describes which functionalities a user can use
   - rights describe, who can access which items
   - a user group assigned to a user can have a valid-until-date
- access to online training and certification exercise for users who want take on a new role (e.g. facilitator) or function (e.g. reviewer) (KR2)
- e-mail reminder when re-certification is needed or certain criteria are not met (KR3)

Resulting process requirements (see document describing the concept for details):

- clear decision-making structure within the platform (up to moderator) and beyond (consortium, Citizen Science Boards, Monitoring and Evaluation Groups, Scientific Committees of the cohort institutions)
- intellectual Property Rights agreement
- ethics approval
- approval by the data protection officer

2.2 Public and password protected area (PPA)

Systematic and effective communication and dissemination of outputs and access to educational materials shall be promoted to cover as wide a part of the population of the study regions of the three cohort projects as possible. A public area lowers the barrier to access public contents. Therefore, the platform needs to include both, a public and a password-protected area with internal contents. The open access area of the platform provides access to outputs, plans, education materials, guidelines, terms of use, evaluation reports etc., which a user with a special role made publicly

visible. Restricted access to a frontend to browse the hierarchical database (including search and filter functions) is also granted to non-registered users.

Technical requirements:
- Public and password-protected area (PPA1)
- Users with a special role have the right to make contents publicly visible (e.g. results, documents etc.) (PPA2)
  - items that can be made public include e.g. data (e.g. reviewed submission or comments), designated outputs (e.g. reports in open formats, videos, education materials etc.) or voting sessions

2.3 Registration (REG)

The crowdsourcing concept applied via JoinUs4Health bears the potential of targeting specific sub-communities such as representatives from certain RRI groups, societal strata or geographical units (e.g. district). Furthermore, the proposed random selection e.g. of reviewers from a pool of available reviewers should allow distinguishing users with a specific interest or experience. Finally, user information can be used to effectively match tasks and interests / experiences.

Table 1 shows the information proposed to be collected upon registration distinguishing whether
   a) the user has a choice to provide this information and
   b) information can be visible to other users.

—> For *successful registration, it is compulsory to accept the terms of conditions and data privacy agreement.*

Technical requirements:
- passwords need to match a minimum standard like using zxcvbn (free library, which assesses the strength of your password via score); some more rules regarding minimal length and blocklist for words (REG1)
- passwords to be saved hashed and salted (REG2)
- double Opt-In is needed for privacy and for checking e-mail-address (REG3)
  - if the registration is not completed within 24h, the users data must be deleted automatically
- saving personal information about the users (REG4)
  - every new user gets a unique ID on registration event
  - user IDs are unique and will also not be re-used if the user profile is deleted
  - all data from the users profile must be stored in a separate database, dedicated solely for that purpose
- references to the users from the "content"-database(s) must not contain any personal/user-related information beyond the user ID (REG5)
- captcha: Force user to solve a captcha to verify the user is a human (REG6) and avoid attacks via unencrypted emails

Table 1. Overview of key information proposed to be collected, whether it is required (yes: required, no: optional), and to define the visibility of information to other users

Id	Information	Required	Visible
1	user name (real or fictional)	yes	yes
2	password	yes	no
3	year of birth (other users only see age group)	optional	optional
4	gender (male, female, gender-neutral)	optional	optional
5	language(s) (DE, EN, PL, NL)	yes	optional
6	e-mail address	yes	no
7	country	yes	yes
8	consent with terms of conditions and data privacy agreement	yes	no
9	post code of residence	optional	no
10	which RRI group(s)	optional	optional
11	whether the user is a participant in one of the cohorts	optional	optional
12	whether the scientist / staff member works at a cohort institution	optional	optional
13	experience	optional	optional
14	specific interests	optional	optional
15	additional languages	optional	optional
16	how they became aware of the platform	optional	no
17	option to upload photograph	optional	optional

2.4 Roles (RO)

Roles result in specific rights, responsibilities and requirements. We envisage a distinction between five roles, i.e. moderator, facilitator, team/task associated user, JoinUs4Health associated users, reviewer (postings) and mentor (Table 3). For each of those roles, standard operating procedures will be developed and refined during the pilot test. Moderators will be limited in numbers to ensure an efficient communication flow from facilitators to moderators to citizen science boards and evaluation groups.

Besides this limitation, any user (e.g. citizen, researcher) can take on any of the roles based on the following conditions:

- good track record (few error alerts and complaints about the user);
- minimum number of active contributions;
- prior engagement in a certain number of different teams

Prior to assigning a role to a user, the user has to

1. sign a full (moderator, facilitator, mentor) or short (task/team and JoinUs4Health associated user) agreement covering aspects of confidentiality, privacy, ethics and data protection
2. read instructional guidelines / undergo short training and pass short assessment
3. undergo re-assessment every 12 months or in case of complaints or insufficient track records

Technical requirements:

- independent from the role, users must not have access to any personal data of other users (i.e. e-mail-address) other than the data provided by the user for the public (RO1)

2.5 User profile (UP)

The following possible actions are proposed:

- edit profile details, which can be provided upon registration
- turn on and off (Table 3)
  - availabilities for a given role and sprint; this determines the pool of non-assigned volunteers for a given sprint and
  - generic features, e.g. time measurement, gamification features
  - specific agreements, which may be offered only temporary, e.g. team shuffling.

Proposed details on gamification features

Acknowledgements of contributions / incentives: Ideally the platform allows for the inclusion of gamification features, e.g. measuring contributions by individual users and measuring their experience. Special consideration is given to supporting multicultural and interdisciplinary communities where people can develop research projects with the support of facilitators from different societal groups and backgrounds. RRI shall be integrated as part of evaluation criteria or other incentives (Wittrock et al., 2021).

Proposed details on time measurement

Three options of time assessment could be offered:

- A: facilitator estimates time (use as default value)
- B: user records manually (can be used to verify estimate by facilitator)
- C: automated recording via platform (to be further discussed)

Proposed details on team shuffling

If volunteers agree, then teams working on the same topic over subsequent sprint could be shuffled every now and then to enhance within-team diversity.

Table 2. Examples of features a user can turn on or off in the user profile section

Id	Information	default value	visible
1	availability for a given sprint	no	optional
2	time measurement (choice between options A to C - see above)	optional	no
3	gamification (earning badges, experience points)	yes	optional
4	team shuffling	no	no

Technical requirements:

- allow user to request a new password if the password has been forgotten (UP1)
- the user can choose to remove his/her profile, this results in deleting all of the personal data stored for that specific user (i.e. name, e-Mail, IP, externals IDs,…) (UP2)

Table 3. Overview of potential roles community members could fulfil as part of JoinUs4Health.

Roles	Description	Rights	Responsibilities
Moderator	• focusses on strategic oversight and linkages of activities • promotes diversity and identify linkages between teams / tasks	• administer users • communicate directly with any user • assign facilitator to a team or task and its linked set of volunteers (identified via active voting) • external communications related to a team or tasks • coordinate direct exchanges (e.g. virtual meetings or debates) • make topics visible to other users • any external communications	• monitoring and evaluation • report to the Citizen Science Board(s) and Monitoring and Evaluation Group(s) • adhere to the signed agreement
Facilitator	• avoids homogeneous knowledge creation in the community and manages associated processes accordingly • assigned to coordinate specific teams or tasks	• communicate directly with users assigned to a given team / task, moderators and other facilitators • assign volunteers to tasks and activities • coordinate direct exchanges (e.g. virtual meetings or debates) • make topics resulting from assigned teams or tasks visible to other users • external communications related to a team or tasks	• accountable for maximizing the value of team / task by planning, managing and summarizing interactions / outputs • report to an assigned moderator at the end of each sprint, during which facilitator is active, and (optional) to the Citizen Science Board(s) • ensure adequate tone and way of interaction amongst users assigned to a given team or task • adhere to the signed agreement

Team/task associated user	• works for a team or on a task during a given sprint; work can continue over multiple sprints (permanent or intermittent)	• following facilitator's approval:
		  o communicate directly with users assigned to the same team or task
		  o external communications related to a team or tasks
			• adhere to signed short agreement

JoinUs4Health associated user	• a user with a contractual agreement with either the cohorts (e.g. staff of cohort institution) or the JoinUs4Health project (staff of one of the project partners)	• post topics without requiring prior review / approval • following facilitator's approval: communicate directly with a circumscribed group of users • make own contributions visible to other users without prior review	• adhere to signed short agreement

Roles	Description	Rights	Responsibilities
Reviewer (postings)	• reviews submissions / contributions (topics) to verify and standardize contents and fill out standardized assessment	• following facilitator's approval: communicate directly with a user who submitted a topic or another reviewer assigned to this topic • edit metadata and contents of the topic	• ensure topic adheres to standards • fill out standard assessment • interact with assigned facilitator if required • adhere to the signed agreement

Mentor	• promotes topics, which have received considerable support/interest, but not yet attracted sufficient volunteers or diversity	• following facilitator's approval:
		  ○ post topics without requiring prior review / approval and make topics visible related to the assigned topic
		  ○ communicate directly with a user who submitted a topic or another reviewer assigned to this topic
			• adhere to the signed agreement

2.6 Prioritizations (PRIO)

In some cases, users may need to be prioritized, e.g. if the number of volunteers exceeds the requirement of a given task / team. Prioritizations may be based on three criteria:

1. the proximity to the cohorts (cohort participants > residents from one of the study regions > residents from outside the study region),
2. activity on the JoinUs4Health platform, and
3. experience measured via the JoinUs4Health platform or other (independent) sources (e.g. Researchgate).

Facilitators can choose to make exceptions for instance to enhance diversity of a team, but a justification needs to be provided and accepted by the associated moderator.

Activity level could distinguish between

- active (active contributions such as submission of research question),
- passive (accesses information, possibly contributes to voting) and
- archived (no activity for at least 6 months; can be reactivated) activities.

Certain actions could be limited to community members with a minimum level of JoinUs4Health engagement. Potential examples for such restrictions could be:

- governing voting may only be allowed if at least one hour has been contributed in two out of the previous three months (= also non-monetary incentive)
- teams applying for cohort results may need to provide evidence of successful team work.

Resulting technical requirements:
- measure activity level (details to be further discussed), highly privacy related (PRIO1)
- only make prioritization based on closeness to cohort an option if postcode and evidence of cohort participation has been provided (PRIO2)
- tasks, teams, votes etc. need to have the option to assign minimum entry criteria based on experience, activity, group association (PRIO3)

2.7 Reputation management (RM)

User experience (also see section part I – section "Community motivation") may be measured

- directly via the platform
    - quantitative measures, e.g. count of contributions, measured/estimated/reported time (total; for innovation, learning, engagement, dissemination, …)
    - qualitative measures: user feedback (likes, follow, share; possibly rating); assessment outcomes; consistency in outcomes for parallel assessments (e.g. review)
    - negative feedback: record of user complaints
- indirectly via other measures of trustworthiness (Wazny, 2018), e.g.
    - possibly make use of internal reputation system at cohort institutions (scientists) -> to be discussed with data protection officer
    - should not be done automatically (to be further discussed)
        - user opts in: I want to do this and provide consent (e.g. FIS system for UMG)
        - possibly only for internal scientists, which can be recognized via their email address (e.g. UMG —> ...@uni-greifswald.de or @med.uni-greifswald.de)
    - awards or other forms of documented, trustworthy acknowledgement

The number of complaints could be used as an early indicator of users not complying with principles and standards of JoinUs4Health. In some cases, additional training or personal communication may be needed to better understand the nature of a given complaint.

Technical requirements:

- the user must actively allow all of these measurements (opt-in!) (RM1)
- integrate quantitative and qualitative measures of user interactions / contribution directly on the platform (RM2)
- record number of likes, followers and recommendations per topic, which in turn can be linked to the author / facilitator / contributors (RM3)
- allow user to switch off the visibility of quantitative and qualitative measurements and the assessments of such (RM4)
- possibly offer fields for users to update biannually achievements recorded elsewhere; moderators / citizen science boards assess each specific achievement in terms of reliability and relevance for JoinUs4Health and how often a continuously recorded, external achievement should be updated (RM5)
- allows users to post a complaint using a standardized form including a free text field (RM6)
- only moderators or facilitators not affected by the complaint can view the complaint and decide on necessary actions (RM7)
- complaints / abuse reports can be linked to users, submissions, teams (RM8)
  - button is present (e.g. with unhappy smiley)

3 Low-level interactions (LLI)

3.1 Management of low-level interactions

Table 4 provides an overview of low-level interactions and proposed prioritizations (month of delivery) as part of development.

The frontend provides filtering as well as basic and advanced search functions. A user-friendly overview of newly submitted, active and archived contents, system needs and the number of users engaged with a given topic per sprint needs to be accessible to provide users with information to decide where to invest time.

Table 4. Overview of potential low-level (inter-)actions and priority (PT: prototype; FRL: full release; if later: envisaged year of release)

Action	Description	Priority
SUBMIT	submit (and categorize) research questions, suggestions, ideas	PT
CATEGORIZE	categorize research questions of their own or of others to higher level tables such as "Overall theme" (e.g. cardiology, environment) and "Topic" (e.g. effect of obesity on cardiovascular diseases"; this allows filtering and grouping submitted questions;	PT
ACTIVE VOTE	Indicate preparedness to contribute to addressing this suggestion / task	PT
PASSIVE VOTE	Indicate interest in this suggestion / task without following a topic	PT
FOLLOW	follow a topic (e.g. e-mail, social media, platform alerts)	PT
GOVERNING VOTE	Engage in decision-making	PT
REPORT	create error alerts and abuse reports related to low-level interactions (e.g. categorization, translation), comments, users or teams	PT
CROWDFUNDING	Indicate willingness to contribute money via crowd-funding (via link to third-party crowdfunding platform)	2022
TRANSLATE or indicate wish for translation	translate research questions and related fields to another language, thus opening it up to international partners	FRL
REPORT	create error alerts and abuse reports related to low-level interactions (e.g. categorization, translation), comments, users or teams; and ?	PT
COMMENT	comment on questions: initially only shown to facilitators, supervisors and moderators and only made visible to the public after revision by two community members (exception: cohort-associated users)	FRL

3.2 Special feature: Voting

The concept distinguished different types of votes: Active vote, passive vote and governing vote. Furthermore, in some instances the permission to vote may be linked to community-related criteria (e.g. only cohort participants), prior contributions (e.g. team members only, user having contributed at least two hours over last three months) and prior review of material (informed vote, e.g. linked to prior revision of related documents with comprehension test).

4 High-level interactions via facilitated teams (HLI)

4.1 Description

A suggestion (e.g. research question, offer to engage) enters high-level interactions if it has received sufficient support (votes, contributors, funds) and at least one facilitator has been identified. Teams are used to address the research questions by establishing working groups, which are coordinated and managed by a facilitator. Different methods and approaches can be applied such as reviewing available information, panel or focus group discussions etc.

Each team has at least one (ideally two) facilitator(s) who is responsible for planning the work and developing approaches and for facilitating the exchange amongst members. The facilitator is also responsible for a respectful and comprehensible group communication and for documenting results and communicating them to the moderator. Teams can be public and thus accessible by all registered users (i.e. anyone can subscribe) or private and thus only visible to their members (upon invitation).

4.2 Basic teams

Teams undergo a series of steps, which are documented in Part I (concept and process):

1. revise the research question to be in line with scientific standards (can be updated later);
2. design a preliminary plan of how to address this research question;
3. define preliminary tasks and assign users to these tasks, e.g. identify required information, review of peer-reviewed (white) and non-peer-reviewed (grey) literature, possibly identify additional contributors (e.g. from other groups of stakeholders);
4. generate and document outputs;
5. validate output quality;
6. communicate outputs and collate additional input by other platform users or external stakeholders; and
7. disseminate findings via interactions between teams, online exchanges, webinars, social media and other means (e.g. citizen science conference).

4.3 Advanced teams

If a proposal submitted by a team requests access to cohort results, a formal proposal has to be submitted and approved in two steps. In that case, at least one facilitator needs to have scientific background or gained sufficient scientific expertise to be able to mentor the team during the interpretation of the results. The following steps are required:

The team

1. prepares a proposal following pre-defined standards;
2. submits the proposal to the citizen science board, which provides feedback; and
3. submits the proposal to the scientific management board.

Once the proposal has been approved by both, the citizen science board and the scientific management committee of the respective cohort institution(s), descriptive results and, if sufficient scientific support is available, also advanced statistical analyses are provided. Such reports can be generated by individual researchers or possibly via an automated statistics pipeline (basic outputs e.g. histograms, scatterplots, loess plots, frequency table, missing overview, …).

5 Process (Pr)

5.1 Communication

Direct bidirectional communication between general users is not part of the low-level interactions. Moderators, facilitators, JoinUs4Health associated users and mentors can directly communicate with each other. Chat and messaging functionalities can facilitate this internal direct exchange. Other communications undergo a review process. A review may be required at different stages, e.g. review of comments or new suggestions, review of task-related outputs, review of someone else's review etc.

The review process works as follows:

- trained reviewers indicate their availability (e.g. online calendar);
- at the beginning of each sprint,
    - reviewers can pick topics of interest
    - remaining submissions requiring review will be randomly assigned and then proposed to the pool of remaining reviewers for the sprint
- to enhance voluntary input and choice of activities, each reviewer receives multiple choices and the same choices are offered to three reviewers (target: find two);
- once two reviewers have selected a submission, it is greyed out, indicating that no additional input is needed;
- if a reviewer wants to review the submission regardless, additional reviews are possible;
- a reviewer can also straight off reject an assigned review, which is then assigned to one of the other reviewers;
- the results of the review are entered into a standardized template
- moderators and authorized facilitators can access the full details of the assessment;
- for other users and for monitoring and evaluation purposes, only aggregated summaries are visible

Other features are mentioned in the box below.

> Technical requirements:
>
> - provide forum, chat and message functionalities (PR1)
> - allow authorization of users to communicate with a restricted circle of users only (PR2)
> - automatize the review process (see above) (PR3)
> - aggregated voting results (especially governing votes for decision-making) are permanently stored; it is possible to browse this archive via filter and search functions (PR4)

5.2 Scrum process framework (PrSc)

The scrum process framework defines a methodology based on a set of good practices for working collaboratively as a team. Work is broken down into tasks which can be managed within a given time period called sprint. Advantages of scrum methodology include flexibility and agility and focus on productivity and delivery.

Applied to the scrum concept, the facilitator takes on the role of the scrum master and the moderator the role of the Product Owner.

Technical requirements:

- incorporate aspects applied as part of the scrum process framework and agile project management (e.g. product and sprint backlog, …) (PrSc1)
- allow moderators and facilitators to break down planned activities into issues, tasks and subtask (PrSc2)
- allow linking issues, tasks and subtasks between teams (PrSc3)
- provide option to make scrum process visible to other teams or individual users (PrSc4)
- allow prioritization and assigning of tasks (PrSc5)
- allow joint editing of documents with the following functionalities (PrSc6)
    - version control
    - track changes
    - commenting
- allow users to protect sensitive documents via password to allow sharing it with non-users directly using link-sharing (PrSc7)

6   External tools and platforms (EXT)

6.1   General requirements regarding the use of external tools

External tools, if included / used, should ideally be open source tools and have to be GDPR compliant (see part I section "Data protection" in part I. External tools should ideally be hosted directly on the JoinUs4Health server. Otherwise, a legal contract is signed to ensure that the external partner complies with GDPR requirements and the privacy statement and consent procedures are approved by the data protection officer at least of the coordinating institution (UMG).

6.2   Requirements for tools to be used for webinars

An external tool will be used to hold virtual meeting. This tool needs to be either GDPR conform (e.g. BigBlueButton) or a contractual agreement needs to be signed with the provider.

Applications
Team exchanges, project management team meetings, virtual conferences etc.
Proposed requirements with high priority
- option to display key instructions in multi-languages (German, Polish, English, Dutch)   - video function (normally not needed, but for online conferences)   - raise hand   - password-protection of the room   - break out rooms   - shared notes   - facilitator actions: - choose whether participants can turn on video and microphone on or not   - mute an individual   - dismiss an individual from the meeting
Proposed requirements with lower priority
- show sequence of hands raised   - special rights for two facilitators

6.3   Potential link to commercial crowdsourcing / innovation management platform

Several commercially available platforms exist for crowdsourcing, innovation management and idea management. These platforms generally emphasize the innovation aspect and serve a single customer / business to leverage the creative potential of internal or external crowds. Innovation is also a major aspect of JoinUs4Health. Equally important is however simply the creation of safe spaces for exchanges and engagement, opportunities for any group of societal actors to find suitable team members for targeted exchanges, raise information needs or simply learn. From an RRI's and from the cohorts' perspective, the concept targets society as a whole, especially also underprivileged strata of society whose voices often remain unheard. Therefore, empowerment, democratization of science, providing access to science etc. are aspects, which appear to go beyond crowdsourcing approaches applied by commercial platforms.

Given those considerations and after obtaining feedback by the JoinUs4Health expert panel, it was confirmed that an own platform needs to be developed to keep control over the platform. Potential partnership scenarios can be further explored in the future.

Favoured scenarios from a JoinUs4Health perspective would be:

- establish intellectual partnership (e.g. company takes advisory role) or consider companies' input when evaluating the effectiveness of features, currently not applied as part of the commercial platform(s)
- create an interface to (an) external platform(s), which can be run on own servers
  - allows sharing of user information, contents, etc. between a free JoinUs4Health platform and an optional commercial platform
  - advantages:
    - makes use of years of developments
    - allows two-stage approach: stage 1 (general population), stage 2 (top solvers), thus also incentive for individuals to perform well
    - reduces costs for external platform as smaller community size

If an interface was considered as part of development, then the following criteria should be considered (all of which would need to be further discussed):

- the open-source JoinUs4Health platform can be used in full independent of the link to the external platform
- separate consent procedure for users to access external platform
- interface may need to be generic so not to give an individual company a competitive advantage
- potential sharing of user profiles, communications, projects, resources, key performance indicators etc.

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