

Introduce Impact-Pathways in a CRIS – support societal impact orientation in research projects and funding processes

Birge Wolf, University of Kassel, birge.wolf@uni-kassel.de; Doris Lange, University of Kassel, doris.lange@uni-kassel.de; Thorsten Michaelis, University of Kassel, thorsten.michaelis@uni-kassel.de; Andrea Moser, University of Kassel, andrea.moser@uni-kassel.de; Stefanie John, University of Kassel, stefanie.john@uni-kassel.de; Andreas Abecker, Disy, andreas.abecker@disy.net; Lucia Hahne, Disy, lucia.hahne@disy.net; Stefan Lossow, Disy, stefan.lossow@disy.net; Andrea Bollini, 4Science, andrea.bollini@4science.it; Giuseppe Digilio, 4Science, giuseppe.digilio@4science.it; Susanna Mornati, 4Science, susanna.mornati@4science.it

Abstract

Societal challenges require research contributions to solve them. Accordingly, societal impact assessment is an object of increasing interest in publicly funded research. Some countries have build elaborated national systems, applied on the level of research institutions. The approach of the SynSICRIS project (Synergies for Societal Impact in Current Research Information Systems) focuses on societal impact creation and assessment in research projects. Therefore, a repository/CRIS system is being built with additional entities related to societal impact and functionalities to record the information during funding processes.

Our system is built upon the open source software DSpace-CRIS. The additional entities include process-oriented indicators that represent an increase in the likelihood of societal impact. The additional functionalities, allow planning, documenting and structuring contributions of a project to societal impact via interfaces to build impact pathways and working plans. The development built on a synthesis of existing approaches, participatory requirements analysis and agile software development.

Using such a system at the funding body enables to assess information related to societal impact without additional documentation burden for researchers, allows to manage sensitive project information and supports the dissemination, reusing and sharing of outputs and information tailored to actors in practice and society.

Keywords

Contributions to societal impact, impact pathway, recording data during funding processes

Audience

This presentation addresses funding bodies, CRIS and repository managers as well as evaluators and knowledge transfer services that search for integrated approaches to record contributions of research to societal impact and support projects in increasing those contributions. Furthermore, developers will benefit from the openly available code.

Proposal

Introduction

Supporting the process of creating societal impacts and evaluating the contributions of research to it is becoming increasingly important in publicly funded research [1]. Decisive

tasks are being undertaken e.g. national evaluation programmes that focus on institutional units such as those in the United Kingdom, the Netherlands or Australia. In Germany, there is certainly a strong interest in federal research funding to achieve societal impacts through mission-oriented programmes and to assess them adequately. Meanwhile, institutional assessment of societal impact is quite uncommon.

In this context, the SynSICRIS project works on the question of how Current Research Information Systems (CRIS) can be extended to meet the data requirements required to assess societal impact in mission-oriented research funding (exemplarily in the field of agricultural research).

Using repository/CRIS technology in research funding processes have the advantage to build on technologically advanced, widely established and interoperable tools for collecting and exploiting research information. If CRIS are used in funding processes in a way that allows replacing parts of proposals and reports, documentation processes for researchers are changed but the effort stays the same. In this way, data related to societal impact is made available for multiple use as project management, analysis and evaluation. Within the SynSICRIS project DSpace-CRIS [2] was chosen as platform to build upon and contribute to the open source and open data approach.

However, this use case requires working environments that allow to start with the planning of contributions to societal impact and to structure the information in a way that fits the requirements of funders for proposals and reports. To meet this demands, we developed user interfaces to create impact pathways and working plans.

The impact pathway (IPW) approach was chosen, because it is an instrument for impact-oriented project planning and analysing the contributions of research to societal impact. It visualises and structures the interrelationships of inputs, outputs and outcomes as well as intended impacts of a project utilising a sequence of text fields (items) connected by arrows. Creating IPW should involve relevant stakeholders to make the IPW plausible, feasible, to build consent and commitment and to provide transparency on who should be involved in what action for which intended effect. [3], [4], [5], [6].

The entity development focused on process-oriented indicators that represent an increase in the likelihood of impact. Firstly, this is required to meet the documentation period during the research projects lifecycle and the early data need of funders for management and evaluation. Secondly, this is to properly take into account the time and attribution gap in societal impact assessment as well as the aspect of fairness regarding research's limited influence on impact evolvement in complex innovation systems [6].

The approach presented here is currently in a testing period with external users. The purpose of the conference contribution is to give an overview to the extended repository/CRIS approach and to highlight the impact pathway user interface.

Material and methods

The development is based on an in-depth synopsis of relevant approaches, (e.g. impact oriented planning, societal impact assessment, productive interactions, transfer, transdisciplinarity, responsible research and innovation). The general concept for the extension of DSpace-CRIS was developed and visualised (e.g. via mock-ups) and then reflected in expert consultations and workshops with user groups in the research and innovation value chain. Based on the provided feedback the approach was adapted and implemented iterative in the software, including some testing by the project team according to the agile approach of the project.

Results

The following results present the approach of integrating the impact pathway instrument and additional entities related to societal impact in a CRIS for the use in funding processes. Therefore, four specific requirements were met: (A) The IPW steps need to be adapted to be appropriate for project planning processes and to incorporate the information required in funding processes. (B) The system integration has to work with an entity model, for the IPW

itself and the text fields usually used in the classical IPW-approaches. (C) The entity development needs to cover all documentation needs of funding processes and societal impact assessment, and needs to be connected to specific IPW steps. (D) High flexibility and configurability in the system integration is required to allow future adoption.

A) Adoption of IPW steps

Adoption of the IPW-steps include some contextualisation and additions:

“Input” is replaced by “Background”, that accommodates the “intellectual input” to the project as starting point of the IPW. The resource planning as a classical “input” is excluded, as it is usually already recorded in detail in the funders’ own templates/systems, and repeated reporting for users is aimed to be avoided.

“Output” is divided into the two steps „Research and Development objectives“ and „Interactions with stakeholders and partners. Outputs for dissemination“. This change enables to represent adequately the central work of a project and to highlight interaction processes as indicators for the development of impact.

“Outcome” has been renamed to “Application (opportunities) and covers the developed solution, change or innovation respectively all steps to bring them into application and recording of use.

“Impact” is focused on “Expected impact” at the end of the project and includes the sustainability implications that are related to the solution, change or innovation.

The step “Contribution to Funding Policy Objectives” was added, as this is a mandatory requirement in German federal research. It allows users to select funding policy objectives and relate them to the contributions of the project.

B) System integration and functionality of the Impact Pathway approach

The integration of the IPW approach in the entity based CRIS approach was achieved in the following way: Specific high-level entities were introduced to represent the concepts behind the Impact Pathway, such as steps. Within these steps, the lower-level entities were used directly instead of text fields: Each item can be created with a title and the selection of the entity type, in order to allow a quick and user-friendly planning in the IPW. Detailed information for an item can be added by opening it. During the project the content of the items can be edited and completed.

In order to allow a detailed planning and reporting of the project but also keep the IPW well structured, for the steps „Research and Development objectives“ and „Interactions with stakeholders and partners. Outputs for dissemination“ a sub-level was introduced to add more detailed entity-types. The entries made in the sub-level are reused in the work planning. This allows to add a time structure, visualised as a bar chart and to assign the responsible partners.

C) Additional entities and their connections to IPW steps

Here we will briefly introduce some specific extensions of entities.

To accommodate the intellectual input in the step “Background” the entity “State of the art /problem description” serves to describe the most important key messages from the state of the art chapter of a proposal. “Framework conditions” allow to record several types of conditions for impact development, and “Ethics” and “Gender” cover reflections, that make research and innovation more responsible. To describe the research process in IPW and working plan, “Objectives”, “Work packages”, “Tasks” and “Milestones” are used. To highlight interaction processes as indicators for the development of impact, entities like “Events” were extended with attributes and the entity “Processes for collaboration and participation” was newly developed, to record continuous interactions with the same stakeholder, groups or partners. “Solution / Change / Innovation” record detailed the central intended outcome of the project. Furthermore new entities allow to record “Ideas for further use”, “Next steps” and “Unexpected results / risks” as well as the “Application” when solutions change or innovations are really used. The steps “Expected societal impact” and “Contribution to

funding policy” accommodate one entity each, with the same name. In order to relate most of the aforementioned entities to a stakeholder group that is involved or uses results, the entity “Stakeholder groups” was introduced.

(D) Technical basis for high flexibility and configurability

Using the standard DSpace-CRIS REST API [8] to introduce the IPW concept and the working plan allows an easy maintenance of this extra module. Moreover, the high configurability and the use of standard features such as the form definition and the authority framework will allow an easy adaption of such module by other CRIS systems with a different or simplified data model. The implementation of the user interfaces has greatly benefited from the new frontend technologies used in DSpace-CRIS 7, most prominently Angular Materials [9] and Flex Layout [10]. Besides the technical efforts regarding IPW and working plan, it is noteworthy that the DSpace-CRIS structure has been adapted to allow a project-centred model with the corresponding rights-and-role management.

Conclusion

In conclusion, the presented approach offers a significant future development potential of CRIS triggered by the integration of functions and content relevant for mission-oriented research funding processes. In this way, CRIS can operate as an “information hub” for more transfer and societal impact in the entire research and innovation value chain. By using an open source CRIS, [1] with a repository at its heart, there is a great potential to adapt the approach to different contexts and to develop it further with the community.

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