



IF4TM

D3.5 Operational manual for Proof of Concept Programme

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Abstract

The Operational Manual for Proof-of-Concept Programme provides the set of recommendations and guidelines for researchers on how to validate their laboratory prototypes and make them more marketable. This will lead to the raise of Technology Readiness Level (TRL) and to improve commercialisation potential of their research. The Manual for PoC will be publically available so that researchers from other HEIs from Serbia and the region will be able to use it.



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LIST OF ABBREVIATIONS

EU	European Union
HEIs	Higher education institutions
IP	Intellectual Property
PoC	Proof of Concept Programme
TRL	Technology Readiness Level



EXECUTIVE SUMMARY

The Operational Manual for Proof of Concept Programme is developed as part of the WP Technology transfer and innovation dimension within Activity 3.5 Improving TRL level through implementation of proof-of-concept programme for selected research ideas.

The Operational Manual for Proof-of-Concept Programme provides the set of recommendations and guidelines for researchers on how to validate their laboratory prototypes and make them more marketable. This will lead to the raise of Technology Readiness Level (TRL) and to improve commercialization potential of their research.

Having this in mind the introductory part of the Manual explains the background of Proof of Concept (PoC) Programme and provides the definition of the Technology Readiness defining its 9 levels. It also gives a preview of activities supported by the PoC Programme:

- Market Research
- Business model development
- Commercialization strategy
- IP evaluation and protection
- Technology/concept validation.
- Development of prototype
- Technical feasibility study
- Fundraising or crowd-funding support.

The section Framework of the PoC Programme is focused on the more concrete objectives of the Programme and benefits that Serbian researchers can gain by participating in the Programme. It also provides some basic information on the planned duration of the Programme and some funding aspects.

Eligibility sections explains some terms and conditions for participation in the PoC Programme in terms of eligibility of institutions, researchers and scientific and research fields. It also includes the set of exclusion criteria for those researchers and research teams that do not qualify for the Programme.

Further on in the Manual, the basic principles of application and selection procedures are explained.

Separate section is dedicated to the progress reporting and follow-up procedures. With reference to the reporting, two types of reports are planned within the PoC programme: technical and financial.

The Manual is followed by the set of annexes that support the practical implementation of recommended actions within the PoC Programme:

- Annex 1 – Application Form
- Annex 2 – Selection Criteria
- Annex 3 – Technical Report on PoC programme realization
- Annex 4 – Financial Report on PoC programme realization



- Annex 5 – Model of Contract for PoC Programme
- Annex 6 – Contact persons for PoC Programme

1. Proof of Concept (PoC) Background and Objectives

Proof of Concept (PoC) is a procedure to realize an idea, technology or a method by testing and demonstrating its feasibility and practical potential. Realization of PoC provides an opportunity for researchers to identify potential technical and logistical issues of technology/product/service in order to reduce risks for its development and commercialization.

The main **objective** of the PoC programme is facilitate the transition from publically funded high-impact research to market-wise viable innovations by providing the set of instructions and guidelines for researchers on how to validate their laboratory prototypes and make them more marketable. This will practically lead to the increased capacity of a university to engage more in contracted research with industrial partners.

Additionally, it will contribute to the raise of Technology Readiness Level (TRL) and improve the ability of the research institution to understand the technology status as an important tool for determining the further activities and possible commercialization strategy.

Depending on the technology development stage, there are nine TRL levels:

- TRL 1 – basic principles observed
- TRL 2 – technology concept formulated
- TRL 3 – experimental proof of concept
- TRL 4 – technology validated in lab
- TRL 5 – technology validated in relevant environment (industrially relevant environment in the case of key enabling technologies)
- TRL 6 – technology demonstrated in relevant environment (industrially relevant environment in the case of key enabling technologies)
- TRL 7 – system prototype demonstration in operational environment
- TRL 8 – system complete and qualified
- TRL 9 – actual system proven in operational environment (competitive manufacturing in the case of key enabling technologies; or in space)

Source:

https://ec.europa.eu/research/participants/data/ref/h2020/wp/2014_2015/annexes/h2020-wp1415-annex-g-trl_en.pdf

The PoC Programme will provide the support to university research teams in the phase of pre-commercialization of research results (development projects, feasibility studies, working prototypes, etc.) that have high innovation potential and that are in the range from TRL 3 to TRL 7.

Proof of Concept programme covers following support activities:

- **Market Research** – assessment of the research result in terms of commercial value, intellectual property exploitation, competitive position and definition of commercialization requirements such as costs, time framework, scope of funding, etc.



- **Business model development** – validation of idea or research results using CANVAS method;
- **Commercialization strategy** – definition of the strategy and recommendations of the necessary steps in order to introduce a new product or production method on the market based on the scientific and research results
- **IP evaluation** and protection – identification of the potential for IP protection and most feasible exploitation model (sell, license, develop with partnership, establish spin-off or start-up), taking into account all legal, economic and financial aspects of the IP asset in question.
- **Technology/concept validation** – confirmation that the technology meets the expected requirements and produces expected results under realistic operating environment, i.e. to demonstrate that the technology works as intended.
- **Development of prototype** – supporting the projects in their pre-production phase in terms of development of prototypes, product design, testing the technology/product, in order to make it ready for acquiring the initial funding for its development or ready for commercialization depending on the type and stage of the project.
- **Technical feasibility study** – defining the strengths and weaknesses of proposed research results, opportunities and threats, as well as resources required to develop the product, process or service (human, financial, material, etc.).
- **Fundraising or crowdfunding support** – searching for and collecting the necessary financial resources to support the realization of research using various mechanisms such as EU grants, national grants, crowdfunding, etc.



2. Framework of the PoC Programme

Objectives

PoC Programme main objective is to provide the support to **university research teams to validate their research results, technologies, laboratory prototypes**, etc. in order to facilitate the process of their commercialization.

The Programme is designed to address the lack of support to the development of research concept into applicable and commercial products and services.

More specifically, it strives to:

- Improve the commercialization capacity of Serbian higher education institutions
- Build and upgrade capacities of Serbian researchers for applied research and development of commercialization strategies
- Encourage and support the process of generating, valuation and protecting of intellectual property resulting from research work
- Encourage researchers to engage in entrepreneurial ventures
- Support the commercialization of research results of high economic and social impact
- Strengthen the cooperation between the academic and business sector

Benefits

Besides the obvious financial and economic impact of the implementation of PoC Programme for the HEIs themselves and society at large, the main benefit is the raise of Technology Readiness Level (TRL) through:

- Consultations with EU and Serbian experts
- Assessment of the value of research results
- Market analysis and development of market strategies
- Support for IP management
- Building capacities for management of research projects
- Building research competences
- Mitigating the risks of failure



Duration and Funding

The duration of PoC Programme is 6 months.

There will be **one annual call** for applying to PoC programme. The call will be open until all financial resources allocated to the particular call are exploited. The costs that can be covered by the Programme can be:

- Consultancy services
- Training, coaching and mentoring costs
- Consumables for experiments, tests, etc.
- Subcontracting (development of prototypes, feasibility study, etc.)
- Travel costs (trainings, capacity building, etc.)
- etc.

In the period from September 2017 to June 2018, the PoC Programme will be piloted on seven Serbian HEIs (see the Section 3.1) within the IF4TM project.

For the calls within this period, PoC Programme will be based on non-financial support to the research teams, including:

- Mentoring and consultancy services (EU project partners)
- Support to IP valuation (Serbian Intellectual Property Office, EU partners)
- Elaboration of commercialization strategy (experts and EU partners)
- Production of rapid prototypes (Serbian HEIs)
- Access to the modern equipment for development / validation of technology/product
- Information on funding opportunities through national and EU funding schemes
- Support in writing winning project proposals from the side of experts in IF4TM Consortium



3. Eligibility criteria for applying to PoC Programme

3.1 Institution eligibility

Research teams from accredited Higher Education Institutions and Institutes in Serbia are eligible for participating in the PoC Programme.

During piloting phase (September 2017 – June 2018) researchers from seven higher education institutions (HEIs) in the Republic of Serbia are eligible to get support within IF4TM project for PoC programme:

- University of Kragujevac
- University of Belgrade
- University of Novi Sad
- University of Nis
- State University Novi Pazar
- Belgrade Metropolitan University
- Technical College of Applied Sciences Zrenjanin

All faculties, institutes and/or departments within these are also eligible.

3.2 Researcher eligibility

Researchers from any Serbian HEIs (seven abovementioned Serbian HEIs for pilot phase) listed above are eligible for application to PoC Programme. They can apply alone or as a team.

Teams made of researchers from different institutions can also apply in which case the team leader needs to be appointed and their home institutions have to provide their approval.

In such a case of multi-institutional research teams, aspects of intellectual property need to be regulated for both background (knowledge/IP supplied by the partners at the start of the project) and foreground IP (knowledge/IP produced within the project). These regulations need to be in line with the legal frameworks for IP management at those institutions.

3.3 Eligible fields

The researchers and research teams from any field of science is eligible to apply for receiving the support within the PoC programme.

3.4 Exclusion criteria

The researcher or research teams will not be taken into account during the application procedure in following cases:

- If researcher / research teams have already received financial support from any other source for the PoC project that is subject of the application.



- If researcher or research teams already have the result/s that has/have already been commercialized.
- If researcher or any member of research team are under any kind of contractual obligation outside the PoC programme that involves the commercialisation of proposed research results.
- If the research results are in contrast to provisions of Bylaws on the IP management at the home institution or provisions of related laws.

The researcher or research team need to state within the Application Form that none of the above exclusion criteria can be applied to the proposed research project.



4. Application and Selection Procedures

In order to collect the research projects that will be supported through the PoC Programme, an open call will be announced at the websites of all Serbian HEIs. The open call will contain:

- Short description of PoC Programme
- Who can apply? (eligibility of institutions and researchers/teams)
- What proposals are eligible? (eligible research projects, exclusion criteria)
- Type of support provided (financial, and non-financial for pilot period)
- How to apply? (deadline, application forms, application address)
- Deadline for application (until the funds are spent, or by the deadline for pilot phase)
- Selection criteria
- Terms and conditions (Manual for PoC Programme)
- Reporting obligations (deadlines, reporting forms, etc.)

4.1 Application procedure

The researcher or research team will apply for the support of PoC programme by submitting the **Application Form** (see Annex 1) as electronic version to the contact person at their home institution. List of contact persons with their email addresses is provided in the Annex 6.

Applications can be submitted from the date of publication of the call until all the provided funds are exploited, or until the deadline set in the call in case of pilot period.

All publications are to be electronically submitted by sending the Application Form to Contact person for PoC programme at each institution, defined in Annex 6.

4.2 Selection procedure

The evaluation of received Application Forms and selection of those to be supported through PoC will be carried out every six months (or within the 1 month from the deadline in pilot phase).

The Selection Committee will evaluate Applications based on the set of predefined selection criteria that include questions for evaluation, scores and weight factors for each criteria. It consists of seven members, one member per Serbian HEIs participating in the IF4TM project, during piloting phase of PoC implementation in IF4TM project. In other cases Selection Committee should form Financial body consisting at least five members



experienced in applied research, technology transfer, IP issues, business and funding risk ventures.

The selection criteria are provided as Annex 2 of this Manual.

The general aspects that will be assessed in selection criteria include:

- Innovation potential – Applications need to demonstrate that proposed research projects have potential to undertake pre-commercialization steps and that significant step forward can be achieved through implementation PoC Programme
- Market attractiveness – Potential for commercialization
- Intellectual property – the background intellectual property needs to be clearly defined in accordance with the institutional and national legal frameworks
- Implementation – Competences and skills of researcher/s to carry out and manage the research project through the PoC Programme.



5. Progress Report and Follow-up

During the realization of the PoC Programme, each researcher or research team who received the support is obligated to provide the short report on the activities.

The reporting includes both reports on technical and financial implementation.

Technical Report is a narrative report on the progress of research project within the PoC Programme. It needs to provide the following information:

- Short description of research project and research result
- Activities conducted during the PoC programme
- Results of PoC Programme (commercialization strategy, IP valuation, etc.)

The template for the Report is given here as the Annex 3.

Financial report is a statement on funds received and costs incurred for the implementation of the PoC Programme for proposed research project.

In order to be eligible for funding, the costs need to satisfy the following criteria:

- To be directly connected to the implementation of PoC Programme
- To be incurred during the PoC implementation
- To be supported by the relevant documentation (proof of payment, etc.)



Additional remarks (to be discussed)

It is necessary to agree on aspects of financial implementation in order to develop the model of financial reporting.

Having in mind that the Strategy for Innovation states that the PoC Programme will be implemented outside the project as well, the financial resources need to be provided in which case the following needs to be defined:

- *Who provides the financing and at what level (if the call is open until the available resources are spent, the amount of available resources need to be published within the call)*
- *What are the expected individual grants (how to determine the level of financial support to individual PoC Programme and by whom)*
- *What will be financially supported through PoC*
- *Will the individual grants be transferred to research teams (their home institutions) or PoC will directly cover the expenses*
- *If the grant is transferred, what is necessary for that process (approval of home institution, request for transfer, etc.)*
- *What is necessary to provide to justify the level of spending and eligibility of expenses made within PoC Programme*



ANNEXES

Annex 1 – Application Form

Proof of Concept Programme 2017 Application Form

Notes to the Applicant

This application should be completed in line with the provisions and explanations described. All information included are strictly confidential and will not be revealed without prior authorization of applicant/s.

1. Application Title

(Please provide a title for your application)

Max 20 words

2. Field of science (please choose the relevant fields, multiple choices possible)

National Sciences

- Mathematics
- Computer and information sciences
- Physical sciences
- Chemical sciences
- Earth and related environmental sciences
- Biological sciences
- Other natural sciences

Medical and health sciences

- Basic medicine
- Clinical medicine
- Health sciences
- Health biotechnology
- Other medical sciences

Agricultural sciences

- Agriculture, forestry, and fisheries
- Animal and dairy science
- Veterinary science
- Agricultural biotechnology
- Other agricultural sciences

Humanities

Engineering and technology

- Civil engineering
- Electrical engineering, electronic engineering, information engineering
- Mechanical engineering
- Chemical engineering
- Materials engineering
- Medical engineering
- Environmental engineering
- Environmental biotechnology
- Industrial Biotechnology
- Nano-technology
- Other engineering and technologies

Social sciences

- Psychology
- Economics and business
- Educational sciences
- Sociology
- Law
- Political Science
- Social and economic geography



- | | |
|--|---|
| <input type="checkbox"/> History and archaeology | <input type="checkbox"/> Media and communications |
| <input type="checkbox"/> Languages and literature | <input type="checkbox"/> Other social sciences |
| <input type="checkbox"/> Philosophy, ethics and religion | |
| <input type="checkbox"/> Art (arts, history of arts, performing arts, music) | |
| <input type="checkbox"/> Other humanities | |

3. Researchers / Research team members

Researcher 1 (team leader where applicable)

Name	
Position in the organization	
Institution	
Email	
Phone	

Researcher 2

Name	
Position in the organization	
Institution	
Email	
Phone	

Researcher 3

Name	
Position in the organization	
Institution	
Email	
Phone	

Researcher 4

Name	
Position in the organization	
Institution	
Email	
Phone	



4. Description of research project

*All fields are mandatory

4.1. Please describe the need or problem your technology / solution addresses*

Please provide a short description of the research/technology, including the phase of its development.

(Max 250 words)

4.2. Please detail the market potential of your research result/s*

Please provide a short description of the market, competitive advantage, target users and the scope of the market

(Max 250 words)

4.3. How innovative your research result is? Is the ownership of Intellectual Property (IP) regulated?*

Please describe the innovativeness of your research result.

Is the ownership of intellectual property regulated? Has IP regarding the research already been protected and if yes, how?

Have you already conducted a research to avoid infringing anybody else's IP?

(Max 250 words)

4.4. Have you received any other support (financial and non-financial) for the proposed research result? *

Have you received any other support (financial and non-financial) for the proposed research result?

(Max 250 words)



5. Capacity to implement the PoC Programme

**All fields are mandatory

5.1. Competences of the researchers / research team members**

Please describe your research competences and those of the team?

Please describe the “non-research” competences relevant for the implementation of PoC programme (entrepreneurship, IP management, commercialization, innovations, technology transfer, etc.)

(Max 250 words)

5.2. Competences of the home institution **

Are there available resources (equipment, software, etc.) at your home institution to support any further development of the proposed research project/result?

What resources are missing?

(Max 250 words)

6. Exclusion criteria

6.1. Please confirm that none of the criteria stated below applies to you or the research result proposed within this Application Form.

***Mandatory

Have you already received financial support from any other source for the research project that is subject of the application? *** Yes No

Have the proposed result/s has/have already been commercialized? *** Yes No

Are involved researchers under any kind of contractual obligation outside the PoC programme that involves the commercialisation of proposed research results? *** Yes No



To the best of your knowledge, are the proposed result/s in any way in contrast to provisions of Bylaws on the IP management at the home institution or provisions of related laws?*** Yes No

Note

By submitting this Application Form, I am confirming that the information provided within are complete and accurate to the best of my knowledge.

Signature of researcher/s****

Name and surname of leading researcher

Name and surname of researcher

Name and surname of researcher

Name and surname of researcher

****delete or add rows for signature if necessary



Annex 2 – Selection Criteria

Criteria	Relative weight factor	Score	Questions
Innovative character	20%		
Level of innovativeness	20%		What is the innovativeness level of proposed research results?
Market and commercialization opportunities	25%		
Market value	10%		What is the market value of research results/technology?
Competitive advantage	10%		Does the research result /technology have competitive advantage?
Size of the market	5%		
Intellectual property	15%		
Regulated ownership	10%		Are the background and foreground IP regulated?
Opportunity to protect IP	5%		Can the research result be protected in terms of IPR
Technical feasibility	25%		
Technology readiness level	10%		What is the level of technology readiness?
Technical feasibility	10%		Is the technology feasible?
Resources	5%		Are all necessary resources available (both human and material)
Competences the researcher / team	15%		
Researchers competences	5%		Are the research competences of researchers satisfying?
Other competences	5%		Do the researchers have other skills required for PoC (entrepreneurship, IP knowledge, commercialization knowledge, marketing skills, etc.)?
PoC management	5%		Are the management skills of researchers a satisfying level?



Annex 3 – Technical Report on PoC programme realization

Technical Report Proof of Concept Programme 2017

1. Title

(Please provide a title of your PoC project)

2. Short description of PoC project

(Please provide a short description of your PoC project)

3. List the activities conducted during the PoC programme

(Please provide a list of activities carried out with the short description, time framework, and major outcomes)

4. Please describe the results of PoC Programme

4.1. Commercialisation strategy

(Please describe the results of commercialization strategy developed within PoC Programme. What are the next steps?)

4.2. IP valuation

(Please describe the results of IP valuation developed within PoC Programme. What are the next steps?)



4.3. Market strategy

(Please describe the results of market strategy developed within PoC Programme. What are the next steps?)

4.4. Technology readiness level

(Please describe the change in Technology Readiness Level (TRL)? What was the estimated TRL prior to realization of PoC Programme? What is the TRL after the realization of PoC Programme?)

5. Conclusions

(Please describe how the results of PoC programme contribute to the further development of research result / technology? In which way and how much is time-to-market reduced? In which way will the commercialization opportunities be exploited?)

Signature of researcher/s****

Name and surname of leading researcher

Name and surname of researcher

Name and surname of researcher

Name and surname of researcher

****delete or add rows for signature if necessary



Annex 4 – Financial Report on PoC programme realization

Financial Report Proof of Concept Programme 2017

(to be added after the financial modalities are defined)
Excel table



Annex 5 – Model of Contract for PoC Programme

Suggested structure and contents

SECTION 1 – GENERAL TERMS AND CONDITIONS

- Article 1 — Subject of the Contract
- Article 2 — Programme to be implemented
- Article 3 — Duration and starting date of the Programme
- Article 4 — Estimated budget

SECTION 2 – SPECIFIC TERMS AND CONDITIONS

- Article 5 — Type of support and financial aspects
- Article 6 — Eligible and ineligible costs
- Article 7 — General obligation to properly implement the Programme
- Article 8 — Resources to implement the Programme
- Article 9 — Reporting obligations

SECTION 3 – RIGHTS AND OBLIGATIONS RELATED TO BACKGROUND AND RESULTS

- Article 10 — Management of intellectual property
- Article 11 — Agreement on background
- Article 12 — Access rights to background
- Article 13 — Ownership of results
- Article 14 — Protection of results
- Article 15 — Exploitation of results
- Article 16 — Dissemination of results

SECTION 4 – OTHER RIGHTS AND OBLIGATIONS

- Article 35 — Conflict of interests
- Article 36 — Confidentiality
- Article 37 — Termination of the agreement
- Article 38 — Communication between the parties
- Article 39 — Amendments to the Contract
- Article 40 — Applicable law and settlement of disputes



Annex 6 – Contact persons for PoC Programme

- University of Kragujevac, Prof. Dr. Vesna Mandic (mandic@kg.ac.rs)
- University of Belgrade, Dr. Jelena Filipovic (jfilipovic@ekof.bg.ac.rs)
- University of Novi Sad, Prof. Dr. Goran Stojanovic (sgoran@uns.ac.rs)
- University of Nis, Dr. Marko Milojkovic (marko.milojkovic@elfak.ni.ac.rs)
- State University Novi Pazar, Mr. Edis Mekic (emekic@np.ac.rs)
- Belgrade Metropolitan University, Prof. Dr. Dragan Domazet (dragan.domazet@metropolitan.ac.rs)
- Technical College of Applied Sciences Zrenjanin, Olga Deretic (olga.deretic@gmail.com)