



**ANALYSIS CHECKLIST FOR RESEARCH PROJECT MANAGEMENT:  
ASPECTS FROM EUROPEAN RESEARCH**

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**Abstract**

In the field of project management, research projects are atypical in many senses and possess special attributes. Whether it is the exhaustive process of obtaining funds for the project or the difficulty of measuring project progress and defining its impact and success criteria, the particularities of research projects require special attention in order to be fulfilled.

In Europe, this special attention is provided when it comes to dedicating funds for academic research and cooperative research between academia and the industry in order to ensure that Europe produces world-class science, removes barriers to innovation and makes it easier for the public and private sectors to work together in delivering innovation (European Commission, 2015; RWTH Aachen University, 2015; EU Research Funding and University of Oslo, 2015. EU Research Funding: Programmes and Opportunities). Nevertheless, project management methodology for academic research projects is hardly available and/or suffers deficits in handling certain aspects of the project (Lynn Meek, V. 2003, Powers, L., & Kerr, G., 2009 and Schützenmeister, F. (2010).

The aim of this paper is to propose a checklist that can be used by educational and research organisations (which include HEIs and pure research institutes) for managing academic research projects. Such a checklist should include a variety of projects and funding sources in order to cover the differences between projects in terms of size, complexity, internationality of consortium, degree of innovation and requirements of funding organization. For this purpose, this paper would consider two variations: interregional EU-funded research projects and German locally funded research projects.

**Key words:** *Research Project Management, European Research, Horizon 2020, Checklist*

**JEL code:** *I2, O3*

**Overview**

A research project has a defined goal, timeframe, cost and quality requirements, making it at the first glimpse similar to any other project. However, research projects are much more complex in the sense that there is no known path to achieve the research goal. The problem is known and over a period of time new methods will be applied to generate solutions, which makes the ability to commit to the desired timeframe and cost estimation very difficult (Mishra, N. (2013).

Research and development together with new methods of production are the basis of future technological developments. However, „high level research is complex, costly and interdisciplinary. Individual organizations often need partners to be able to respond to these challenges” (EC. 2015, Why European Research?).

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Research projects implemented within one country differ in terms of challenges to those extending to larger regions. An example country that ranks among the top in Europe in terms of scientific research, innovation and public funding allocated to academic research projects is Germany.

The German Federal Ministry of Education and Research (BMBF) developed a strategic instrument called “BMBF Foresight”, which provides technology foresight and the determination of future societal needs in terms of research and development (BMBF., 2016). Due to this strategy the BMBF supports innovative projects and ideas in the field of research and technology with selective support programs for academia and academic extra-faculty research institutes within the research funding. The purpose of this research funding is to fund the development of new ideas and technologies.

On behalf of the BMBF project executing organizations, which are also research institutes, e.g. the Research Centre Jülich or the KIT (Karlsruher Institute for Technology), have the task to support and provide consultation to the funded research organisation during the term of the project. Next to them there are more institutions, like the DAAD (German Academic Exchange Service) or the DFG (German Research Community), which are partly funded by the BMBF but which also function as a project executing organisation and support the research organisation with its research transactions.

Project proposals are evaluated based on specific criteria such as the degree of innovation, the prospects of success and exploitation of technological developments as well as lack of other sources of funding. The necessity and importance of research funding for academia and research institutes increased constantly in the past few years. In 2013 BMBF’s budget for research and development for academia amounted to €1.6 billion and for other academic research institutes €7.5 billion. In addition, the federal government raised the expenditure for research and development by 65% between 2005 and 2015 (BMBF, 2015. *Bildung und Forschung in Zahlen*).

The tight competition among institutes, the high requirements for writing the proposals, the thorough knowledge in the specific subject area and the expertise in project management together make obtaining the funding a great challenge. This challenge increases several-fold in cross-regional research projects in Europe. The largest funding for cross-regional research projects in Europe is the European Commission, which due to the many challenges of implementing research projects, has jointly worked with member states, the European Parliament, the scientific community and industry towards the creation of a "European Research Area" (ERA) (EC, 2015. *Why European Research?*).

According to the European Commission, European research is now high on the policy agenda in Europe. Conducting research policies and implementing its programs is a legal and political obligation (EC. 2015. *Why European Research?*). Between 2007 and 2013, the 7th EU Framework Program (FP7) provided more than 32 billion Euros in research funding. FP7 is now succeeded by the EU Research and Innovation program “Horizon 2020”, which has a funding budget of almost 80 billion Euros for the period between 2014 and 2020. It is the most recent research and innovation programme, where the EU emphasizes on excellent science, industrial leadership and tackling societal challenges (European Commission, 2015).

Project proposals are prepared in two phases: initial project proposal and full project proposal. There are certain criteria defined by the European Commission for grading the initial project proposal, which sum up to a total of 15 points. Initial proposals should not exceed 15



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pages. Only the proposals that receive 15 (or 14 at the least) out of 15 points have good chances to continue to the full project proposal phase and be considered for funding. The grades are divided as follows (Lynn Meek, V. 2003):

Table 1

### Structure of the Proposal for Research and Innovation Actions in Horizon 2020

1. Excellence	2. Impact	3. Implementation
1.1 Objectives	2.1 Expected impacts	3.1 Work plan
1.2 Relation to the work programme	2.2 Measures to maximize impact:	3.2 Management structure and procedures
1.3 Concept and approach	a) Dissemination and exploitation	3.3 Consortium as a whole
1.4 Ambition	b) Communication activities	3.4 Resources to be committed
<b>5 points</b>	<b>5 points</b>	<b>5 points</b>
<b>15 points</b>		

Source: Authors' construction adopted by (Villacorta, N. 2014)

In 2014, the first year of Horizon 2020, 14% of all submitted full proposals made to the first 100 calls were selected for funding (European Commission, 2015). In such multiregional projects, the challenges of managing a research project intensifies due to the more difficult requirements, the size of the project and the need to connect with partners across several countries. This will be discussed further in the next section.

### Challenges of academic research projects?

The challenges in a research project are faced before the project is started, e.g. to obtain funding and to build consortium. Further challenges appear throughout the different phases of project planning, implementation and closing. The most painful of them can be summarized in these points:

#### 1. Partners & Consortium Management

When a research project is done in a single country, it can be often the case as in Germany, that one organization itself or one host institution is initiating the project in cooperation with academic or industry partners; while most EU funding opportunities require some level of collaboration with partners in other EU countries. Often, finding these potential collaborators is the first hurdle which needs to be cleared in order to access funding (University of Leicester, 2015). This poses another challenge to the research organisation initiating the project which is its network base. Only well-established, well-connected organisations on a multi-regional level would in this case be eligible to apply for EU funding.

Joint funding proposal development in a cross border team is in itself a challenge that needs to be addressed (Wolff, C., 2012). European research projects are done by several independent partners, not by one monolithic organization. Managing such projects is rather managing a network of partners than a well-established team. Stakeholder management (Kerzner, H., 2009) has to be considered in a much more sophisticated way. In this case, cultural differences, virtual team meetings, the burden of mobility costs for major project events (especially unpleasant for institutes when the project is in the project proposal phase and has not yet received any funding) and the need for sophisticated strategies to conflict resolution add to the complication of partner management.



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However, when it comes to consortium agreements, most funding organisations offer tools, guidelines and templates in order to clarify the most important issues and decrease the emergence of conflicts as much as possible

### 2. Funding

National funding can solve a lot of open questions in scientific research, develop technologies and innovate in a particular field or discipline. However, to tackle major societal and global challenges, research implemented within national borders only cannot provide solutions. As already emphasized, “high level research is complex, costly and interdisciplinary” (EC, 2015). No research team or company or in some cases even country can reasonably claim to be able to respond to these challenges. Therefore, dedicated budget allocation for cross-border cooperation is inevitably needed (European Commission, 2012) - a role which the European Commission has well-played in Europe.

This creates a great challenge to obtain funding. The high competition among institutes and consortia coming from several countries in different scientific fields competing to the relatively limited funding obliges the EC to set high requirements, complicated pre-requisites and exhaustive procedures in order to obtain funding. During the phase of project proposal writing, the team should have already been built, major project events planned, budget plans written and roles described and justified. This usually happens under major time pressure and with high uncertainty to the probability of receiving the funding in order to proceed with the actual project.

### 3. Knowledge

Research cannot contribute to substantial economic, societal changes, innovation, development of new services and products and further research without the knowledge transfer between universities, public research organisations and industry.

Internet and electronic publishing has resulted in unprecedented possibilities for the dissemination and exchange of information. Unfortunately scientific information generated by public funding, in whole or in part, is not always available for free (European Commission, 2012). This creates a challenge to obtaining and re-using existing knowledge in the field without previous connections to leading research organisations. This has been addressed by requiring an elaboration on knowledge sharing as part of the dissemination strategy of a project proposal.

### 4. Innovation and Excellence

To be able to compete, projects have a high degree of innovation and uncertainty. A certain degree of (academic) freedom is needed, according to the technology readiness level (TRL) of the project (European Commission, 2015). The management of highly innovative projects is a challenge in itself. Funding applications should be excellent in terms of technical achievement, business impact and socio-economic change. Therefore, the funding application has to address a combination of technical excellence, business impact and execution excellence. Usually, scientists have difficulties to cover all three areas with the same expertise. Straight-forward tools (e.g. business model canvas (Osterwalder, A., 2004) can help achieve such results, but a research-project-specific project management methodology is needed. It should in this case be a combination of project management, technical innovation management, business development, and the management of the socio-economic change process. Again, this is a challenge for scientists.



### 5. Project Impact and Sustainability

After the project proposal phase is successful and actual funds are received to implement the research project, the largest challenge is achieving concrete and measurable results. It is often the case that projects revolve around research and over the course of time the aspired project result gradually sinks. It should be possible not only to create a usable outcome, but also to be able to bind this result to the dissemination and exploitation strategies of the project. To add to the complication, this all should take place within the relatively short time allowed for the research project and has to be planned already at the project funding application phase.

In the next section, the different phases of research projects will be dissected, in order to have a closer look at the tasks during each of them and attempt to simplify the management of each of these phases.

### Research Project Management Checklist

Universities and research institutions often have departments that are dedicated to analysing and offering consultation for research projects. However, applying for and receiving funding for a research project is not the sole responsibility of the consultants in the mentioned departments, it is largely dependent on the project proposal and the project team. Therefore, it becomes important to observe and assess the needed criteria to make a project proposal successful in its early phases and then continue to fulfil the expectations and requirements laid out by the funding organisation during its implementation phase until it eventually produces results that can be measured and developed into a concrete product that could be marketed for use.

The suggested solution would be in the form of a simplified project management method and a checklist that would consider the challenges faced in the application phase, the implementation phase and in the post-project phase. The checklist is a combination of the challenges and requirements tailored for the kinds of publicly funded research projects discussed in this paper; those responding to specific national or European-wide programmes and calls for proposals. The checklist goes beyond basic research and research aimed at gaining a doctoral degree.

The suggested method would incorporate a pre-project phase, a project phase and a post-project phase. The project phase here will be based on PMI's methodology of planning, executing and closing (PMI, 2008). However, here is no need for the initiation phase, as it would have already been covered in the pre-project phase.

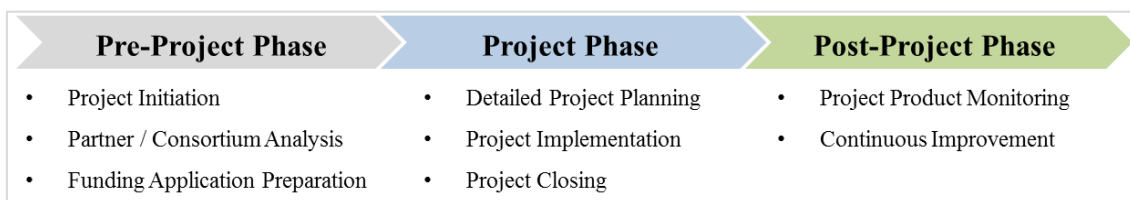


Fig. 2. Simplified Research Project Management Phases (own drawing)

In the suggested solution, the project management methodology would cover the following questions in the different phases:



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Table 2

Phase	Questions to be answered in the developed methodology for each phase
<p><b>Pre-project Phase</b></p>	<ul style="list-style-type: none"> <li>• What are the criteria for deciding whether to implement the project or not? Do they include criteria such as feasibility, excellence, sustainability, financial outcomes, etc.?</li> <li>• Does the host institution (in H2020 terms: the project coordinator) have the minimum maturity model and project management infrastructure? What improvements are needed?</li> <li>• Does the project proposal contain a problem statement? What is the problem? What are the research questions? What is already covered by the State-of-the-Art (SotA)? What innovations will be achieved compared to SotA?</li> <li>• Is the consortium/group of partners defined? Do they form a complete market value chain and technology value chain? Is there a template for the consortium agreement required by the funding organisation? Have the terms of agreement been discussed?</li> <li>• Have partnership agreements been signed?</li> <li>• Who is involved in the different local project teams, especially that of the host institution? Have the roles been clearly distributed and responsibilities clarified? Is the decision-making process clear?</li> <li>• Have the major project work packages and events been planned, described and justified? Is it clear which organisation would be responsible for each of the major work packages? Is it clear which organisations would be involved in each of the work packages?</li> <li>• Has the initial implementation plan been laid down? Are the initial costs estimated?</li> <li>• Have resource distribution been planned and agreed upon?</li> <li>• Have contingency plans and conflict resolution plans been taken into consideration?</li> <li>• Have country-specific risks, legal and institutional requirements, needs and constraints been taken into consideration?</li> <li>• How will project results be organised and managed? How will access rights, joint ownership and economic conditions be handled? Should experts be consulted? How is the management structure?</li> <li>• How will research results be disseminated on national and, if valid, regional level?</li> <li>• Project impact and exploitation opportunities: can the project outcome be used:               <ul style="list-style-type: none"> <li>○ as background of future collaborative research projects</li> <li>○ or in developing, creating and marketing a product/process</li> <li>○ or exploited by other organisations through out-licensing or transfer of ownership</li> <li>○ or used as background of a joint venture or spin-off</li> <li>○ or even for the image (especially in the civil service)</li> <li>○ or for the achievement of goals within internal strategic concepts</li> </ul> </li> <li>• How will the experiences in this phase be documented for future learning?</li> </ul> <p><b><i>Decision Point: Based on the questions above, can a successful project funding application be written? Is the project ready to move from the pre-project phase to the actual project phase, if funding is received?</i></b></p>
<p><b>Project Phase</b></p>	<ul style="list-style-type: none"> <li>• Is the needs analysis still valid?</li> <li>• Are proper project management tools being used?</li> <li>• Are the initial plans, e.g. budget planning, resource distribution, project work packages still valid or need adaptation? Have the detailed plans been made?</li> <li>• In the detailed phase of project planning, is the work split between partners clear? Have milestones and deliverables been identified?</li> </ul>





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	<ul style="list-style-type: none"> <li>• How will funds be allocated between partners and along the project phases? How is financial transparency ensured?</li> <li>• Have cost-cutting strategies been implemented, especially when it comes to meetings? Have electronic alternatives been used?</li> <li>• Have tendering procedures been planned? Do they consider country-specific conditions and legal requirements?</li> <li>• Is project organization clear? Are there clear communication and reporting lines? What tools are used to coordinate the work between national and international teams?</li> <li>• Are the reporting lines clear? Are informative reports submitted in due time?</li> <li>• Are continuous monitoring and controlling tools being used? What tools are being used for this purpose?</li> <li>• How is quality being ensured?</li> <li>• Have the indicators been monitored and deliverables reached?</li> <li>• Are milestones and project progress synchronized between partners?</li> <li>• Is risk management effective? Have any risks turned into issues?</li> <li>• Is conflict resolution strategy effective? How are conflicts being solved?</li> <li>• Are involved stakeholders satisfied with project progress and research content?</li> <li>• How are innovation and creativity ensured?</li> <li>• How innovative are the publications and academic contributions resulting from the research?</li> <li>• Are dissemination lines successful?</li> <li>• Is impact being assessed properly?</li> <li>• Which project management methodology would be used / methodologies would be combined in order to implement the project?</li> <li>• How will the intermediate deliverables, milestones and final results be delivered, assessed and reported among partners and to the funding organisation?</li> <li>• How will the experiences in this phase be documented for future learning?</li> </ul> <p><b><i>Decision Point: Based on the questions above, has research been implemented as planned and have the results been achieved? Is the research project ready to be closed? How to ensure smooth transfer to planned exploitation plan?</i></b></p>
<p><b>Post-project Phase</b></p>	<ul style="list-style-type: none"> <li>• Is further research in the area needed? Have further research streams been defined?</li> <li>• Which information from the research be further developed and further published?</li> <li>• Have the project succeeded in moving into the exploitation plan?</li> <li>• How will auditing and monitoring of the project outcome go on after project has been closed?</li> <li>• How will impact be assessed on the long-term?</li> <li>• How can impact be multiplied?</li> <li>• How is sustainability of the project results being ensured?</li> <li>• What would happen to the consortium? Would there be a follow-up project?</li> <li>• How will the experiences in this phase be documented for future learning?</li> </ul> <p><b><i>Decision point: Was the project successful? How can future research projects be improved?</i></b></p>

Source: Authors' construction.

### Conclusions

Technological advance, societal and economic change and solutions to global environmental and health issues can only be solved through research and innovation. The methodology, implementation and results of any research project differ depending on many



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considerations, such as type of project, the scientific research in which it is implemented, the major players in the project, its funding sources and the different aspects of the project players.

There is a need for a well-defined step-by-step project management methodology for publicly funded research projects. This methodology should be customized according to the field of research, the type of funding and the specific conditions of the project and consortium set-up. This contribution will help to pave the path towards such a methodology.

The proposed method and checklist are the result of preliminary research and are open for further research and improvements. It would be interesting to apply to different research projects that are being initiated in different fields or sizes to test its validity and how much guidance it offers to the project team.

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