

# SPECIFIC ISSUES IN MANAGEMENT OF LARGE INTERNATIONAL RESEARCH PROJECTS IN THE FIELD OF SECURITY AND DEFENCE

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## Abstract:

*This article presents specific characteristics of large international research projects in the area of security and defence. It is based on the experience of the authors gathered while managing international research projects realised within 7<sup>th</sup> EU Framework Programme, European Defence Agency (EDA) programmes etc. The issues of project size, international and research character are described in the article. Specific elements that characterise projects in security and defence field are also identified and discussed. Finally selected key factors determining the success of such projects are mentioned.*

**Keywords:** management, defence, security research project

## 1. Introduction

International research projects are extremely interesting to work on and to manage. Their participants are at the same time co-creators and observers of the birth of new knowledge, new technology and new quality. Companies that normally compete with each other, here decide to cooperate in creation of new knowledge, new technologies and in result, new products and services. One of the reasons laying behind the decision to cooperate is synergy that is created between partners having different knowledge and background. The synergies are created between organisations having competences in different research and technology areas. The other reasons are connected with risks occurring in every research and development activity. Doing R&D together with other companies, research centres and academia leads to sharing and thus reducing the risk of a project. Cooperation in research projects also help in establishing business links with partners operating in other countries and on other markets.

The authors of the article analysed a number of international technological research projects from security and defence area carried out by Polish institutions (research institutes, technical universities, enterprises). The aim of this article is to highlight and discuss the characteristics of such research projects.

## 2. Specific issues of large international research projects

The four main characteristics of such projects (large, international, research, and security) are described in this section. It is followed by description of the consequences resulting from the project's size, international nature and scientific character. Above mentioned aspects cannot be described separately as the merge with, and influence

each other. Therefore the division shown on Figure 1 is only a simplified display to make the presentation of the topic easier.

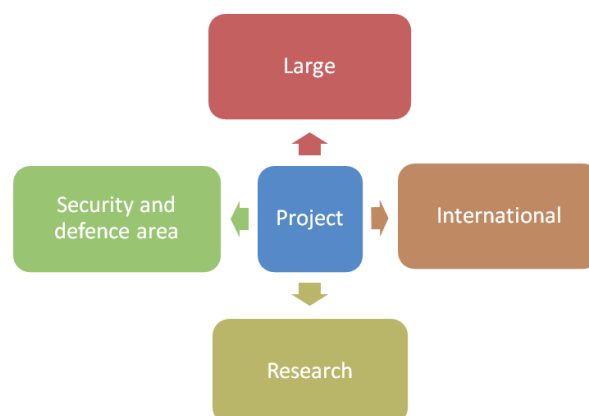


Figure 1. The characteristic of large international security and defence research projects.

### 2.1. Large

In the „Security” priority of the 7<sup>th</sup> Framework Programme (FP7), projects defined as large are so called Integrating or Demonstration Projects which have received a grant higher than 3,5 million Euro from the European Commission and are being realised in a consortium comprised of at least 3 entities from at least 3 member or associate countries<sup>1</sup>. In practice however, these projects have budgets of above 9 million Euro and are developed by at least 10 different partners.

### 2.2. Preparation phase

The first characteristic of large projects is the long development process, especially in its first stage, which is the preparation phase. In research projects developing a project concept, analysing current state of the art in key technologies and identifying technological gaps are especially important to minimise the risks with which the research nature of the project is bound. The planning process of such an undertaking is also a challenge. The schedule and budget of the research project must be flexible enough to reflect dynamic character of research yet must enable coordination of efforts of many different project stakeholders.

<sup>1</sup> Work Programme 2011, Cooperation, Theme 10, Security, European Commission C(2010)4900 of 19<sup>th</sup> July 2010.

The second element influencing the duration of the preparation phase of the project is composing the consortium. International nature as well as the necessity of the participation of various entities with vastly different competences and research experience forces the creation of large consortiums. The process of creating a consortium begins by creating a “competence map” necessary for the proper development of the research project. Creating such a map is possible after analysing the current state of the art in the technologies related to the project, identifying the key technologies and determining technological gaps. This analysis enables identification of competences that are needed for the successful execution of the project. Partners may come from previous joint research projects and other actions, may be contacted on conferences, fairs, and thematically related workshops or by dedicated services (eg. FP7 Partner Search portal etc.). After choosing the partners and making the initial agreements the next phase is dedicated to further development of the project concept based on the experiences and competences of the members of consortium, as well as negotiations related to the resources committed by each of the partners and creating the project’s budget.

When building a consortium in research projects it is important to clearly define the issue of ownership of the knowledge (Intellectual Property Rights) created during the project as well as access to already existing knowledge owned by the partners. Usually these issues are regulated by the consortium agreement. In security related projects, it is also important to set the framework for information protection, identification of sensitive information, rules for information disclosure etc. Non-disclosure agreement signed at the very beginning of cooperation is usually the first step in this process.

One must take into account that preparation phase that is long and resources consuming is being funded entirely from the future consortium’s own assets. This means that each idea goes through a form of natural selection within the partner’s organisations, which need to determine the importance of the project scope and their future tasks in relation to overall institution strategy. In result of this process partners who decide to enter the project are naturally motivated to ensure its success.

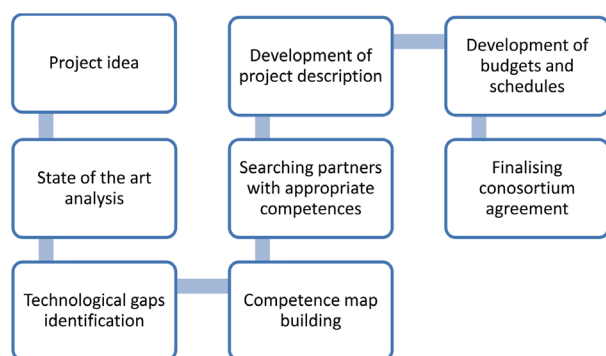


Figure 2. Stages of the preparation phase in an international research project.

The progress of each of the stages in the preparation phase is illustrated in Figure 2.

### 2.3. Development phase

The development phase is bound with the creation of management plan, which includes planning at least for:

- Communication;
- Risk management;
- Change management;
- Quality management.

Each of above mentioned plans should be based on chosen project management methodology, which should be adopted to the particular project’s needs. All management plans must be agreed by the representatives of all the partners in the consortium.

Conducting large projects requires clearly defined goals in the preparation phase and an appropriately detailed division of tasks in the development phase. Clear assignment of responsibilities between the members of the consortium is crucial for successful management of the project. It also help partners to present clear message within their organisations what is their role in the project. On the other hand sharing responsibility may lead to blurring responsibility. Sharing tasks may lead to doubling the work or causing problems with interfaces. That is why it is very important to appoint technical integrator whose main responsibility is to turn all partners in the same direction. Such person should be well oriented in systems engineering methodologies and his/her most important responsibility at the very beginning of the project is to agree with all partners system engineering approach and tools to be used on the next steps of the project.

Since there are many partners working on many issues at the same time within large projects another important issue is to develop tools for monitoring the state of the project as well as the use of resources in order to be able to early identify risks and issues caused by delays getting behind the schedule or exceeding the budget.

It is also important to identify the key partners early, the ones responsible for supplying the most important components, technologies, deliverables to the project. A consortium with many partners from several countries is very difficult to coordinate. Inertia of such structure influences significantly time it takes to reach decisions. This creates a dangerous paradox, in which on one hand we have many independent project executors responsible for different parts, elements of the project and on the other hand efficient coordination and management are crucial to reach successfully expected goals. Through identi-

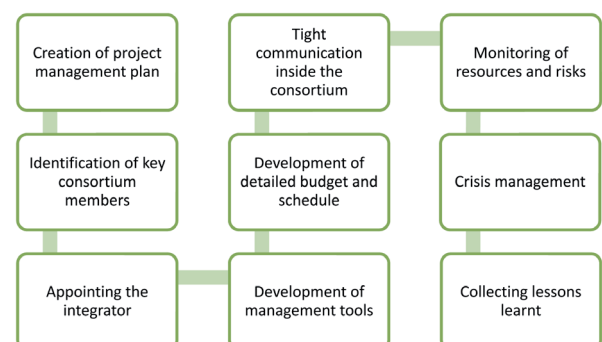


Figure 3. Selected phases in the development phase of an international research project.

fication of key performers in the consortium it is possible to establish decision making bodies of smaller size where coordination is much easier and consensus decisions can be reached more easily. Identification of roles inside the consortium also helps in managing the project. Project management bodies as well as roles and responsibilities are defined in consortium agreement mentioned earlier.

Above described stages of the development phase of an international research projects are presented in Figure 3.

#### 2.4. International

The international nature of the project requires a specific approach in its management. At first, one must take into account the cultural variety of partners coming from different countries and even continents. It is not only about the differences in mentality, different behaviour patterns and way of seeing and understanding the world. Cultural variety influences project management on many levels – for example different dates of public holidays and religious events, sometimes different weekend days (eg. Friday in Israel) and differences in working hours coming also from time zones influences significantly project schedule. When planning meetings, conferences, management sessions and other events Project Coordinator must take all these factors into account in order to avoid putting the partners into situations having strong impact on their usual private time.

The international nature of the project also means a variety of languages used within the consortium. English is usually used as the “working” language of the project. However, as most of the consortium partners are not English natives, misunderstandings and misinterpretations are likely to occur. It is important to use simple and precise terminology in the project documentation. Creating common dictionaries and writing down clear project management procedures also help to avoid communication problems. The role of face to face contacts is very important in international research projects, which is understood by the European Commission, which requires regular F2F meetings in EU programmes. This way of communication strongly supports the exchange of views and ideas and significantly increases the level of understanding among the consortium partners. Regular teleconferences usually support meetings, however the entire consortium should not meet less than once in every 4-6 months. Key partners that manage consortium on executive level should have meetings at least once in every 2-3 months.

#### 2.5. Research

Main problem of a research project mentioned earlier is that it takes much time and effort to come to practical results. Return on investments in research may come in years or not come at all if the idea is not as promising as it looked at the very beginning. Working on the edge of technology is always a bit risky. There are many ways to reduce risks in research. One of them is cooperation. While composing the consortium to run international project we must have it in mind. Another very important thing is careful analysis of the current state of the art in relevant technologies, identification of key technologies and technological gaps. Finally created consortium must

have appropriate competences, especially in relation to technological gaps.

Another characteristic of research projects run in international consortiums of independent partners is that usually that partners are motivated to join if the project itself and their role in it is in-line with their internal development strategies. This has two important consequences. First is connected with protection of sensitive information. Companies usually are reluctant to disclose to wider audience (and especially their competitors) the technologies that they are developing. That is why trust and confidence is very important in international projects. Additional issue is that partners are also reluctant to share some of their discoveries even within the consortium. Access rights to knowledge developed during the project are usually addressed in detail in grant agreements and consortium agreements. The second consequence occurs when development strategy of the partners change as a result of internal factors like changes in management or external as for example crisis. In such cases motivation for working in the project may drop significantly leading even to leaving the consortium.

#### 2.6. Characteristics of security projects

Security research projects, apart from the characteristics mentioned above, also have additional aspects which must be taken into account in the management process.

First and foremost security is a very sensitive field. That is why a greater degree of trust amongst the partners as well as between the consortium and the users of the end product is required. Such trust cannot be built in a day. That is why it is very difficult for new players in this sector to enter into closer cooperation. Also people involved in such projects should be reliable, trustworthy and discrete. As a rule, all personnel involved with the project must have appropriate certifications.

While working on projects in this field it is also important to develop procedures for identifying and handling sensitive information. Authors experience show that cooperation with end users on that field is crucial. These are people who can best identify areas where sensitive information may appear.

In security research projects, especially the ones where hardware results are foreseen, there is a problem of dual use and military equipment purchase and production. While purchasing of such equipment is put under specific national and international regulations, the management procedures of the project must address the issue of producing such equipment within the project. Appropriate procedures must be created to ensure identification and handling of dual use and military equipment developed during the project lifetime.

Next aspect of security related projects is ethical issues. Technologies developed within research projects may affect ethical standards and their use can be subject to legal restrictions. Authors experience show that it is reasonable to gather a group of specialists in the field of ethics and human rights acting as advisory body, especially to address legal aspects of technologies and systems developed in research projects.

Figure 4 presents dependencies between the main characteristics of the mentioned projects and their attributes, which influence each other.

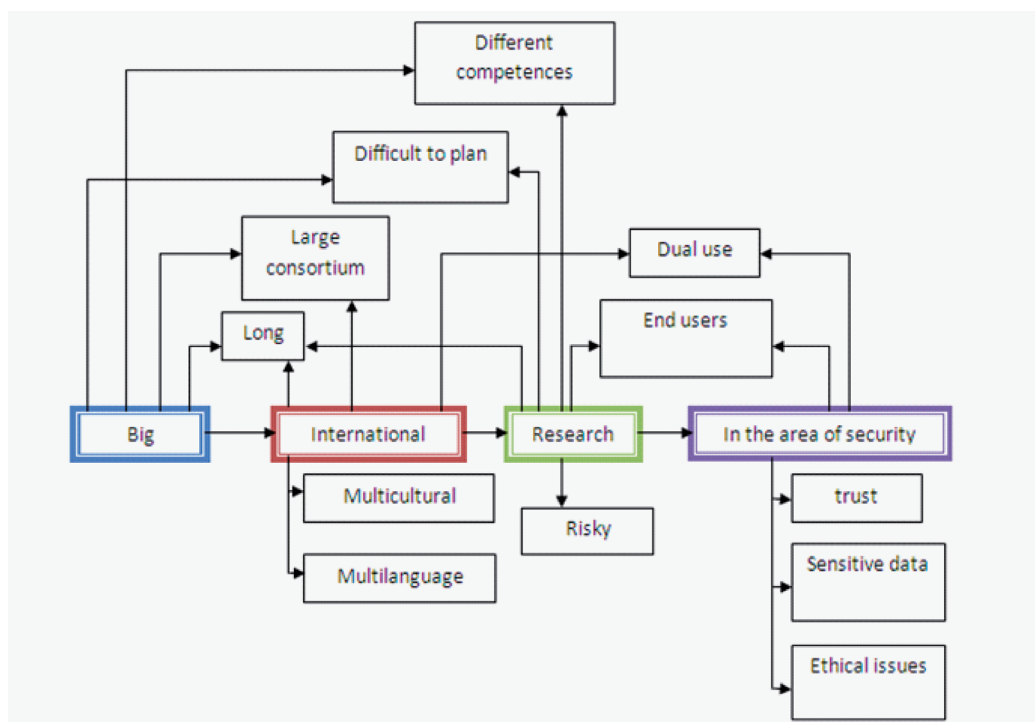


Fig. 4. A schematic of the dependencies between the characteristics of a research project.

### 2.7. Key factors for success in international security research projects

Of course it is impossible to create a universal recipe for success of a research project in any field, including security. In this section authors would like to highlight some factors, without which success is very difficult, if not impossible, to achieve.

The most important factor is to have an interesting idea. The successful research projects are usually built on innovative connection of different technologies offering new or improved functionalities for end users or clients. This needs both deep competences in technological areas developed within the projects and constant, close and good relations with customers.

This leads us to the second key factor for successful project, which is the technological competences of the partners involved with the project. This seems obvious for any research activity but here it means that it is very important to carefully build the consortium based on competence map or matrix to ensure that the necessary knowledge is on board of the project when needed.

The last factor influencing success of the project, worth to mention in this short article, is the project team and its spirit. It is a challenge in projects developed by independent entities from different countries and cultures, when people have chance to meet only for couple of days two, three times a year.

### 3. Summary

The article presents the specific aspects of preparing and running large international research projects. It describes specific elements influencing the management process related to the international and research nature of the project and its scope. It describes additional issues related to field of security and highlights selected key success factors of such projects.

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