

# CHALLENGES IN LARGE INTERNATIONAL PROJECTS – FINDINGS FROM ERAMIS AND PROMIS PROJECTS

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## Abstract

The completed ERAMIS and the ongoing PROMIS are European Union (EU) Tempus projects for setting up a new Master degree titled “Informatics as a Second Competence” taking as a model a similar existing degree of the University of Grenoble Alpes, France. Both projects can be considered big and having quite long implementation periods – more than three years each. There were seventeen partners from eight countries in the ERAMIS project, and there are now twenty one partners including three companies coming from ten countries in the PROMIS project. In both cases, EU partners collaborated with partners from regions that differ culturally, namely, Central Asia and Russia. Although those projects were not the biggest in the Tempus program, they could be classified as large in terms of their budget and the number of partners involved.

The core results of the statistical overview of parameters of the Tempus programme projects are presented in this paper. The analysis was performed in two dimensions: project budget and number of partner countries. It allowed classifying ERAMIS and PROMIS projects as large in comparison to other EU Tempus projects. To clarify the context, the short descriptions of both projects are given, followed by the summary of the evaluation of problems encountered by the EU partner project teams. Issues arose from different areas, such as project activities, scheduling, legal procedures, and so on. Some issues were due to the international nature of the project, for example, varying level of language skills, different culture, legislation and ways of handling tasks, work motivation, etc. Leverage came from the people: all teams consisted of academics in the same field. They had approximately the same level of knowledge and skills, used the similar reference works and similar technologies. We consider this is essential for the success of such projects.

By pointing out the various issues encountered in these two projects, we aim to raise awareness about the problems that need to be dealt with and planned for in this kind of large projects as to allow others to avoid them or address these issues smoothly.

Keywords: international projects, joint educational projects, large project, challenges of implementation.

## 1 INTRODUCTION

The completed ERAMIS (“Network Europe – Russia – Asia of Masters in Informatics as a Second Competence (ERAMIS)”, project number: 159025-TEMPUS-1-2009-1-FR-TEMPUS-JPCR, implementation period: 2010-2013) and ongoing PROMIS (“Professional Master’s Degree in Informatics as a Second Competence in Central Asia”, project number: 544319-TEMPUS-1-2013-1-FR-TEMPUS-JPCR, implementation period: 2014-2016) are EU Tempus projects for setting up a new Master degree titled “Informatics as a Second Competence” in Central Asia countries (ERAMIS, PROMIS) and Russia (ERAMIS). University of Grenoble Alpes, France, coordinated both projects. The idea of such Master comes from this university where a similar degree program is running successfully for more than 30 years.

ERAMIS and PROMIS projects are big in terms of budget, duration, and number of partners. There were seventeen partners from eight countries in the ERAMIS project and there are twenty one partners including three companies coming from ten countries in the PROMIS project. EU partners in both projects collaborated with partners from Central Asia and Russia. Due to regional diversities,

participants had to overcome numerous differences. The aim of this paper is to present difficulties encountered in the realisation of these two projects as well as levers that are essential for success. We think these findings can be applied to a wide array of large international projects and should be of use to those working on or planning for such initiatives.

The paper is organized as follows. First, size comparison of the PROMIS project with other EU Tempus projects is given. Then, both PROMIS and ERAMIS are overviewed. Difficulties and problems encountered are summarized in Section 4, followed by an overview of available levers. Finally, the last section concludes the paper.

## 2 STATISTICAL OVERVIEW OF TEMPUS PROJECTS

The PROMIS project was launched after successful participation in the call TEMPUS IV – Sixth Call for Proposals - EACEA/35/20112 (call closed on 26 March 2013) [1]. The final budget financed by Tempus programme was 1.238 million EUR. The PROMIS project budget was the 8<sup>th</sup> largest in this call, as shown in Fig. 1.

In addition to five universities from five European countries and three enterprises from three European countries, the PROMIS project involved 10 universities from five non-European partner countries. Only 2% of the projects funded during the aforementioned call involved the same or larger amount of non-European partner countries. Relative position of the PROMIS project is shown in Fig. 2.

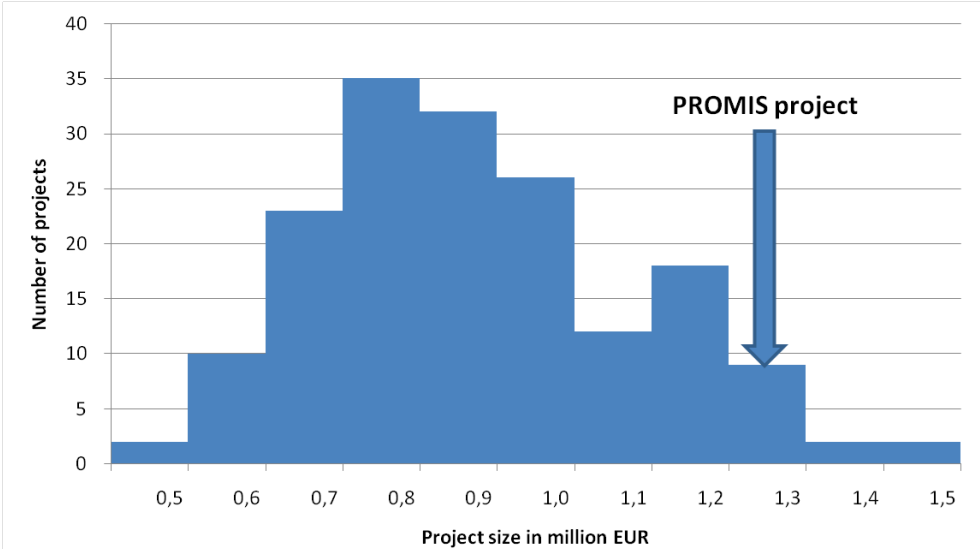


Figure 1. The PROMIS project budget with relation to all projects funded in the call (calculated based on [1]).

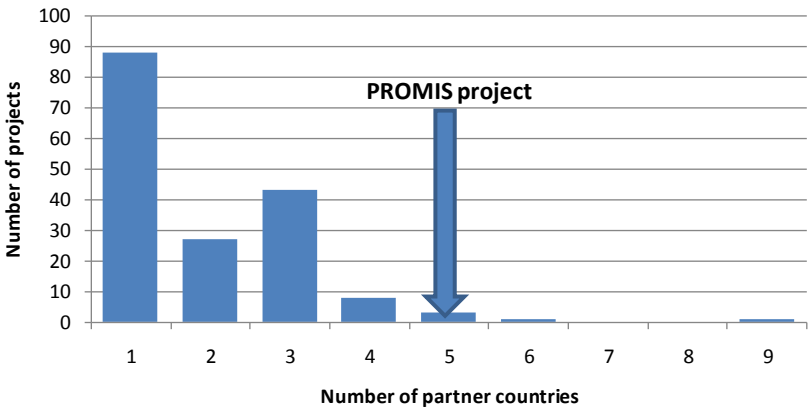


Figure 2. Number of non-European partner countries involved in the PROMIS project compared to other projects funded in the call (calculated based on [1]).

The ERAMIS project had a similar financial volume and involved ten universities from three non-European partner countries in addition to five universities from five European countries. Statistical positioning of the project is similar to that of PROMIS and thus not given here.

An analysis of all the projects gaining support during respective Tempus calls showed that both ERAMIS and PROMIS can be considered large Tempus projects in terms of their financial volumes and the number of partner countries involved.

### 3 ERAMIS AND PROMIS PROJECTS OVERVIEW

Our world does not work anymore without Information Technologies (IT). Almost every profession needs computers with adequate software. The production of this adequate software requires that the software developers understand the needs of the software users. Most of the time this understanding necessitates a person that understands both worlds: the world of the users and the world of the developers. This need was recognized as early as 1987 at the Pierre Mendès France University (now called University of Grenoble Alps) in Grenoble (France) where a Master “Informatics as a Second Competence” was created. This degree is intended for students having a Bachelor in social sciences and therefore who are non IT specialists. The Master's program objective is professional, as it aims to train versatile people who will combine good skills (acquired in a Bachelor's degree) in the first discipline with theoretical and technical skills in computer science, enabling them to create, develop and implement tomorrow's software tools in a better way.

Following the model of the Master of the University of Grenoble Alps, a similar Master was created in the Kyrgyz National University, Bishkek, Kyrgyzstan [2]. This model was extended in the European Tempus project ERAMIS. This project involved five European countries: Finland, France, Germany, Poland and Spain. The project was running from January 2010 to July 2013. It aimed to create a Master's degree “Informatics as a Second Competence” (ISC) in nine beneficiary universities located in Kazakhstan, Kyrgyzstan and Russia. This degree is intended for students having a Bachelor in social sciences, exact sciences or engineering but are not graduated in computer science and therefore are not Information Technology (IT) specialists. The detailed results of ERAMIS were presented in [3] [4]. The ERAMIS project ended with an operational network of 10 ISC Master's degrees: 4 in Russian Federation, 3 in Kazakhstan, 2 in Kirgizstan and 1 in France. All of the planned Master degrees were successfully created, accredited by the national ministries and launched in time. In addition to that, several more specific positive outcomes were obtained, including [5] [6]:

- Collaborative creation of a common curriculum for the master's programs, including syllabi for each of the 10 common core courses.
- Successful quality assurance process [7] [8] in the context of a large consortium of partners: a monitoring committee composed of one academic representative from each European university and our external expert was created; this committee visited all the partner universities, giving them help and advices to set up the new master's program and get the official accreditation from the Ministry of Education.
- Outstanding employability of the graduates: all graduates found employment immediately after graduation.

Other ERAMIS goals were not completely achieved, and it was clear these areas would benefit greatly from more improvements. Most important of those problems were as follows [4]:

- Almost all students in Central Asia were full-time workers outside of the university, whether they were in need of money because of the cost of the studies or they were involved in a life-long learning process. In the worst cases, this situation led some students to give up their studies. Possibly the best solution to this problem would be organizing classes late in the afternoon or in the evening. This problem is moreover relevant in the context of "second competence" as the programs are dense and the required personal investment of students is greater than for other studies.
- The number of educational material available in English, which is important for better internationalization and exchange between Europe and beneficiary universities, was limited to 20%.
- The ability to share elective courses on a regular basis in the network: during the project, only an experiment was carried out.

- The students' knowledge assessment: a pool of questions was created but not effectively used.
- The involvement of companies in the study process did not reach expected levels.
- The way courses were taught had to be improved. In many cases the approach was too theoretical and not as practical as in Europe. Participation of companies' representatives in the teaching activities (invited lectures or courses taught by professionals) was insufficient.
- Student mobility and double diploma were initiated but not fully achieved due to administrative problems among universities.

Based on our experience gained during the ERAMIS project, a new Tempus project, called PROMIS (PROfessional network of Master's degrees Informatics as a Second competence) was launched and got funded by the European Union (EU) [9] [10]. It aims to geographically extend the ERAMIS network in three other countries of Central Asia: Uzbekistan, Tajikistan, and Turkmenistan. PROMIS is encouraging local IT companies in the teaching process and studies organization. This will improve relationships between partner universities and local companies, and will give the companies the opportunity to express their real needs in terms of required skills for their future recruitments and thus improve the employability of graduates.

For the PROMIS project, we decided to give the status of partner to three European companies rather than to companies from the beneficiary countries. The idea is to give beneficiary universities the example of the quality of universities-companies relationships that usually exists in Europe: company fellows teaching some specific technical courses and providing information on their actual jobs to students, student internships, company fellows involved in the board of examiners and steering committees, etc. Dissemination tasks (one conference in each beneficiary country) have been planned in PROMIS for making the local Central Asia companies aware of the benefits of interacting with universities at each level of the teaching process and encourage them to establish closer relations with partner universities. On the university side, we suggest that each beneficiary university create (if not already present) a department in charge of Apprenticeship and Corporate Relations. This department will be also in charge of preparing students for internship and job search. Additionally, each beneficiary university would contact local companies and invite professionals to take charge of some courses (either as a whole or for a part of it), present professional perspectives in some of the classes, participate in the Masters' steering committees.

The PROMIS Project involves a large consortium of 18 partners and an external expert in the implementation of the Bologna process in Central Asia. The project is running from December 2013 to December 2016.

The European (EU) consortium is composed of five universities: University of Grenoble Alpes (Grenoble, France), Beuth Hochschule fuer Technik Berlin (Berlin, Germany), Savonia University of Applied Sciences (Kuopio, Finland), Kaunas University of Technology (Kaunas, Lithuania), and Lublin University of Technology (Lublin, Poland), and three private companies: SYMETRIX (Grenoble, France), eLeDia (Berlin, Germany), and Ilmi Solutions Oy (Kuopio, Finland).

The beneficiaries universities are: Kyrgyz State Technical University named after I. Razzakov (Bishkek, KG), Osh Technological University (Osh, KG), Al-Farabi Kazakh National University (Almaty, KZ), Eurasian National University (Astana, KZ), National University of Uzbekistan (Tashkent, UZ), Bukhara State University (Bukhara, UZ), Technological University of Tajikistan (Dushanbe, TJ), Khujand State University named after B.Gafurov (Khujand, TJ), Turkmen State Institute of Transport and Communication (Ashgabat, TM), and Turkmen State Institute of Economics and Management (Ashgabat, TM). The first and third universities in this list were also partners in ERAMIS and have already created an ISC Master's degree. Therefore their role within the PROMIS project is unique as they can set an example and help other beneficiary partners.

Because almost all students in Central Asia are full-time workers outside of the university, PROMIS proposes to adapt the teaching process relying on the "reverse teaching" [11] or "flipped classrooms" [12] during the first year of study. In case of reverse teaching, the teacher does not explain new concepts in front of a silent classroom that is only listening. On the contrary, students first study the topics by themselves, typically watching videos prepared by the teacher. When in class, students discuss difficult aspects and apply the newly acquired knowledge to solve problems. Time is allocated differently than in traditional teaching. Almost no time is spent in class for explaining new concepts. Instead, the classroom time is spent to deepen the understanding of critical aspects and put the knowledge into practice. One of the challenges of adopting reverse classroom or peer interaction is the availability of good teaching material for self-study. In particular the teaching material needs to

include simple exercises to support active reading or active watching of the students. Another challenge is the development of activities and case studies adequate for group discussion and group work during class time.

For the second year of study, PROMIS will develop apprenticeships: students will be able to earn both a living and their first professional experience by working part-time in an IT company and completing part-time their studies at the university.

## **4 DIFFICULTIES IN LARGE INTERNATIONAL PROJECTS – FINDINGS FROM ERAMIS AND PROMIS PROJECTS**

Large international projects are difficult to implement because of the size, diversity, multiculturalism, multinationalism, large distances, uncertainty, unpredictability of problems and so on. However, in order to be able to assess and manage these risks efficiently, one has to maintain a more structured picture of the issue. Therefore, after the analysis of the problems that have arisen in both of the discussed projects, we have defined 8 key problem groups that are overviewed below. Those are typical high risk areas that similar large project teams should anticipate and plan for in order to minimize efforts required to overcome those issues as they arise.

### **4.1 Administrative problems**

The size and the diversity of the consortium require administrative and accounting work, especially when organizing meetings. For each coordination meeting or a working seminar, visa, flights, hotels and stay expenses have to be arranged for about 30 people. The PROMIS project includes 5 coordination meetings and five workshops that all 18 partners have to attend, with 1-2 representatives per partner. In addition to that, unplanned meetings required to implement the master in the ten non-European universities are also taking place. This must be taken into account in advance when estimating the administrative workload for the project's budget.

Organization of project cash flows (for mobility, work, equipment purchasing, monitoring and other costs) also requires extensive administrative efforts. In some non-European countries, banking systems are not very favourable to international transactions. Possibly unfavourable inter-university regulations have to be considered as well.

### **4.2 Different standards in Higher Education**

While European universities operate under a harmonised framework thanks to the Bologna process, universities in non-European countries have to implement the rules of the local own ministry of education. In the case of the discussed projects, the salient points that differed and needed to be harmonized to create a common Master-degree were in: study credits and students' workload associated to a course, mandatory courses imposed by a ministry, student selection procedures.

Even such minor things as the duration in weeks of the academic year or semester, the length of an academic hour, or the number of required contact hours vary in different countries. Other important things, such as the minimum grade to pass a course, also differ from one country to another country. These differences are a major obstacle to the student mobility.

The more non EU-countries are involved in the project, the larger set of rules has to be understood and the more solutions need to be worked out. It has to be considered, that in some cases complete compatibility may be unachievable, and therefore they should be some common sense flexibility in how projects results are defined.

### **4.3 Communication between partners**

Different countries have different academic calendars; when colleagues are overloaded with teaching duties in some place, others have more flexibility, and vice versa. Furthermore, working habits, in particular speed on answering emails, are very likely to vary. Failing to consider this may lead to critical delays in communication.

Here, it has to be noted that in some non-European countries, access to the Internet is still fairly limited, and it is an issue that is easy to overlook. This creates additional communication problems. Long distances between partners also add to communication problems as meetings, seminars and workshops become more expensive and difficult to organize.

#### **4.4 Language barrier**

Insufficient level of English of teachers and students from the non-European partner universities was observed. As English is the official language of the consortium, insufficient knowledge of it of some non-EU partners meant that during coordination meetings or workshop a translation service had to be put in place. As a consequence, twice the amount of time was needed to discuss and clear a point. It also had financial implications.

Note that planning English (or other common language) teaching courses as part of the project activities is useful, but it will not solve communication problems immediately, therefore, having multi-lingual members on such project teams, at least in the central administration of the project, is highly recommended.

#### **4.5 Motivation and long-term activity**

Large projects in this case are also long-term projects. The schedule of activities in both discussed projects covered three years. For many members of the project team, most of the work carried within the project was an additional work. In such cases, it may be easy for individuals to lose motivation to produce high quality results on a timely basis and according to obligations.

One should also consider that different team members may have different personal reasons of why they take part in the project. Therefore, motivating factors may also differ. In the case of the discussed projects, we found that this motivation of non-European partners is not always rational and consistent with expectations of EU universities.

#### **4.6 Country specific professional knowledge and skill levels**

The master degree includes courses that are novel in some universities, and consequently local academics have first to learn the topics themselves. This lack of knowledge may be institution or even country wide, making additional learning a very laborious and difficult process. Furthermore, it may interfere with the project activities and lead to certain tasks being behind schedule.

Such situation is hard to predict, and therefore in the budget it is usually not position to fill this gap of knowledge or skills. However, when planning similar projects, risks concerning varying competence levels has to be assess and appropriate measures planned.

#### **4.7 Cultural differences**

Some cultural nuances of remote regions are very difficult to perceive by academics from Europe. Not recognizing them can cause violations of conventions and may have a negative impact on the project implementation process.

Some conceptions held by partners may cause surprise. Let's consider teacher training workshops in Europe as an example [6]. Some non-European partners may treat them as a reward "for someone's services", resulting in seemingly random selection of team members. In addition to that, training locations may be judged based on touristic attractiveness of the location, again, resulting in irrelevant people being sent to the workshops. If not monitored, such activities can compromise the project. Therefore, whenever possible, it is important to acknowledge these cultural differences and plan for them in advance.

#### **4.8 Political barriers**

Visa issuing policies and travelling restrictions in some countries may have a serious influence on the project progression, if not treated seriously. The severity of this risk increases as the amount of non-EU project partner countries grows. Also note that regulations in non-European partner states are often unstable and can change in the course of the project. Monitoring these changes is of most importance, so that each meeting can be organized in a timely manner.

Besides, the regulation of some countries does not allow the exemption from taxes on the purchase of equipment such as computers, even in the context of a cooperation project based on aid from other countries. This situation must be taken into account in the calculation of the project budget.

Administrative staff of the project must also embrace the fact that some partners will need more time to prepare for the trips and coordinate them accordingly. Our experience in ERAMIS and PROMIS

shows that in some cases partner representatives may have to travel abroad just to obtain a visa required for a project trip.

## 5 LEVERAGE IN LARGE INTERNATIONAL PROJECTS: PROJECTS CASE STUDIES

During the ERAMIS project, common curricula for the core courses of the master were worked out. It was understood that all partners offering the master should adopt these curricula, as to facilitate exchanges of students and teachers, and for quality assurance. An important task of the PROMIS project is to go one step further and to develop a common reference material while adopting a pedagogical approach inspired from peer instruction [11] or flipped classroom [13] for these ten core courses. In this paper, we call this pedagogical approach *reverse teaching*.

The reasons for developing a common reference material are basically the same as the ERAMIS aims mentioned above, namely, facilitation of student mobility and quality assurance. The aims behind adoption of reverse teaching, however, are to make students more active during lectures, have them to apply concepts solving tasks thus increasing their problem solving skills and their employability on the labour market. Therefore, developed common reference materials included lecture notes, slides, videos, quizzes and questions for reverse teaching, exercises for laboratory work, exams as well as questions and quizzes. Each teacher remains free in the way she organizes her lectures and her teaching. The common material can be taken as is, or adapted; when adapted it serves as a kind of standard reference.

To develop a common reference material, workshops focused on two courses each have been organized in the five different European universities gathering teachers in charge of those courses [9][1] from all 15 partners. During these workshops, participants reviewed the curricula, shared and discussed the digital materials they had already developed in their own courses, distributed the responsibilities to prepare common material according to the chapters of the course among themselves and began with the preparation itself. Despite the barriers, especially the language barriers as described above, consensus could usually be found rapidly. There were several reasons for that:

- Majority of participants were motivated, interested and wanted the project to progress.
- Participants were open minded and receptive to ideas of others.
- All participants of Central Asia spoke Russian; they could quickly exchange and reach an agreement among themselves in this language. This compensated to some extent the lack of fluency in English. Further, a number of teams, including those from the European side, had one member that was fluent both in English and Russian. This was crucial in reaching a good understanding as translators had no in-depth knowledge of the project, and therefore bi-lingual members could convey essential points in both directions.
- Due to the use of information technologies which belong to the area of computer science, most of them knew the same software and the same important books in their field. Thus they had common academic background knowledge. For example the core course *Programming* could be taught in Java or C++, both object oriented programming languages. One of the classical books in that field is "Object Oriented Software Construction" by Bertrand Meyer [14], which was known in Europe and Central Asia alike. The situation was similar for the core course *Algorithm and Data Structure* and the book "introduction to Algorithm" by Thomas H. Cormen et al. [15].

These factors are powerful leverages and are essential for the success of such an undertaking.

## 6 CONCLUSIONS

In this paper, we have overviewed ERAMIS and PROMIS, two international academic projects. Both can be classified as large, based on the statistical analysis of other projects financed by the Tempus (now Erasmus+) Programme.

Large international projects are a challenge for all participants due to a number of reasons which have to be understood well before undertaking large scale initiatives. Analysis of the issues encountered in the course of two aforementioned projects allowed us to define eight core problem groups. We believe that majority of the outlined problems are generalizable to other projects of a similar size, especially if

those are higher education oriented projects like the ones financed by the Tempus/Erasmus+ programme.

Teams working on large international projects or planning them would benefit from an additional risk assessment involving all of the potential problems listed here. As our experience indicates, management of the mentioned issues is crucial to the success of the project, even though some of them seem unlikely or are very difficult to foresee beforehand.

At the same time, a powerful leverage that is essential for success is the motivation of participants. Project leaders need to know how to detect such motivated participants, be able to delegate responsibilities to them and be ready to appreciate their work, so that their motivation does not vanish during the project.

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