

Large Scale Program Risk Analysis Using a Risk Breakdown Structure

O. Zacharias

*School of Electrical & Computer Engineering, National Technical University of Athens
9 Iroon Politechniou Str., Gr 15773 Zografou Athens, Greece
Tel: +30-2107723555; Fax: +30-2107723550
E-mail: ozach@epu.ntua.gr*

D. Panopoulos

*School of Electrical & Computer Engineering, National Technical University of Athens
9 Iroon Politechniou Str., Gr 15773 Zografou Athens, Greece*

D. Th. Askounis

*School of Electrical & Computer Engineering, National Technical University of Athens
9 Iroon Politechniou Str., Gr 15773 Zografou Athens, Greece*

Abstract

This paper explores the challenges of risk analysis in large scale programs and presents a case study in a Greek Operational Program of the Community Support Framework (CSF) III, co-funded by EU. A Risk Breakdown Structure for large scale program risk analysis is proposed and developed, which is fairly general and could have been applied to any program with similar organizational structure, regardless of the including projects. Moreover, a team risk management framework is proposed, with occasional team reviews between the involved parties.

Keywords: Large Scale Programs, Program Risk Identification, Risk Analysis, Risk Breakdown Structure, Team Risk Management

1. Introduction

The primary emphasis of this paper examination is the large scale programs of Governments or Intergovernmental Unions, such as European Union (EU), or International Financial Institutions (IFIs), such as World Bank (WB) and European Bank for Reconstruction and Development (EBRD). As defined in the PMI (2006) standard, 'a program is a group of related projects managed in a coordinated way to obtain benefits and control not available from managing them individually. A large scale program is defined in this paper as a program, that is constituted of a large number of projects (more than 100), which projects even though they differ considerably (on the objectives, the included activities, the complexity, the technology used, the available resources, etc), nevertheless, they serve the same strategic goals in a specific sector or geographical region. These programs are usually implemented by a plethora of different organizations in different program levels, e.g. the funding institution differs than the program managing authority, which also differs than the projects implementing bodies. The management structures used for such large scale programs are quite complex, governed in a large extent by national bureaucracies.

Large scale programs are widely recognized to play key role in international policy making, as their objectives include development, reconstruction, poverty reduction, employment, competitiveness, etc. More and more national economies worldwide depend on that kind of programs in order to improve their status and provide a better life quality to their citizens. However, despite the importance of such programs, there has not been yet a commonly accepted program management methodology, which would provide a firm framework for program implementation, promoting efficiency, transparency and accountability. Most program managers, refer to program risk from a project risk management perspective. This approach may be satisfactory for one single organization's program of 3-10 projects, but it can't work in the case of a large scale program, especially when most of the involved parties belong, regarding risk maturity, in the 2 last categories of the Institute of Internal Auditors – UK and Ireland (2003) classification, i.e. involved organizations belong either in the risk naïve category, so there is no formal approach developed for risk management, or they belong to risk aware category and consequently there is only a scattered silo based approach to risk management. Very recently, PMI (2006) has just published the first Program Management Standard, recognizing the need for program managers to access to the same wealth of information that is already available to project managers. Although this standard offers very valuable information about good practice in program management processes, including benefits management, stakeholder management, program governance and organizational planning, its main focus is in managing programs within an organization and not managing large scale programs, involving different organizations.

Large scale programs face a very wide range of risks, something that renders them particularly interesting for research in the field of risk management. Risk is hindering program's objectives in a very different way amongst the different program levels. Project risks hinder project's objectives and consequently affect the related program's objectives. Risks however hinder both the cooperation between the different organizations / stakeholders, the program governance and the program's objectives achievable. The set objectives of large scale programs are mainly non-material, since their subject is not related so much with the achievement of certain economic criteria, but rather with a wider reform of the structures of a country, the development of the infrastructure, the strengthening of democracy and the rise of the living standards. Consequently the success of the objectives and hence the possible risk consequences are moving in gray areas rather than being black or white. From this perspective, in many cases EU and other IFIs lean towards interventions with a higher risk than the one accepted in the private sector and therefore the need for solid risk management becomes even greater.

The most typical examples of large scale programs in Greece and in EU in general are undeniably the Operational Programs which are co-funded by the European Structural Funds (Programs of Community Support Framework – CSF III), since they include a big number of projects and face a very wide range of risks. Just like all other large scale programs, it is worth mentioning that despite their size and importance for the national economies, as well for the European one, still no commonly accepted risk management practices and techniques have been established. More particularly, despite the rapid development of the art of risk management during the last years and its boost with a sound scientific background, program risk management for EU, and other IFIs even today, is still considered as an additional process. Consequently, it is applied either fragmentarily or frequently is exhausted in the evaluations level (ex-ante/ intermediate/ ex-post evaluation), where the margin of intervention is limited.

Therefore, this paper attempts to contribute to a particularly contemporary, but also major issue in the field of large scale program management. This paper proposes a large scale program risk analysis, using a risk breakdown structure, and a team risk management framework. The proposed risk analysis approach has been developed and used in action for managing risks of a Greek CSF III Operational Program. However, the methodology described can be applied with minor adjustments in almost all programs governed by similar management structures.

2. Previous Research

Lately, important effort has been carried out towards the standardization of the risk management processes. This effort, however, is focused mainly on project risk management or in generic risk management, so there are very few reports dedicated in program risk management.

The first standards in the field of risk management were national, presented in 1995 in Australia and New Zealand and then in 1997 in Canada, followed by BS 6079-3:2000 in United Kingdom. The most recent and up-to-date standards are the AIRMIC, ALARM and IRM (2002) standard, which proposes a risk management process of seven iterative stages (organization's objectives, risk assessment, risk reporting, decision, risk treatment, residual risk reporting, monitoring) and the Standards Australia/ Standards New Zealand (2004), which also proposes a seven stages process (establish the context, identify risks, analyze risks, evaluate risks, treat risks, communicate and consult, monitor and review). ISO members are also working towards standardization of the risk management process and it is expected that the respective model will be ready until the end of 2008, which corresponds to a three-year period of work and consultation from the part of the team.

Additionally, several other approaches to risk management have been proposed. The PMI (2004) guide contains a separate chapter for risk management, proposing six stages in the risk management process (planning, risk identification, qualitative risk analysis, quantitative risk analysis, risk response planning, monitoring and control). The HM TREASURY (2004) Orange Book, which refers mainly to governmental organizations, described a six stages model for risk management (risk environment/context, risk identification, risk assessment, risk addressing, risk reviewing and reporting, communication and learning). The Committee of Sponsoring Organizations (2004) went a step forward, proposing the COSO Enterprise Risk Management, which incorporated their previous internal control framework and provided a more robust and extensive focus on the broader subject of enterprise risk management. The COSO model is depicted by a cube identifying four objectives categories (strategic, operations, reporting and compliance) in the first dimension and eight risk management components (internal environment, objective setting, event identification, risk assessment, risk response, control activities, information & communication, monitoring) in the second dimension. In the third dimension of the cube, the entity and its units are depicted. The IRGC (2005) white paper proposed a risk governance framework, consisting of 5 components (pre-assessment, risk appraisal, tolerability and acceptability judgment, risk management, communication).

As it becomes apparent from the above mentioned models, and as also noted by Raz and Hillson (2005), the risk management processes presented have a great deal in common, suggesting that there is a universal consensus regarding what the risk management process should cover. Where there are apparent differences in processes, these are largely attributable to variations in terminology. This divergence in terminology as a matter of fact is one of the biggest problems towards standardization. The ISO/IEC (British Standards Institute, 2002) definition guide was intended to create a common language for all risk standards documents, but this has not yet been reflected in currently available standards and methodologies.

However, despite this important unevenness, all the above mentioned risk models and standards suggest a very similar process for risk management, with the following stages:

- Initialization – Defining the Context,
- Risk Identification,
- Risk Analysis,
- Risk Response,
- Monitoring and Control,
- Communication.

The above-mentioned stages constitute the minimum common resultant of stages that are suggested in the risk management standards and models, since in some standards or models some additional elements beyond the central risk management process are included or a different scope of coverage is followed; certain standards cover mainly the risk management process itself, and ignore the aspects involved in establishing the organisational infrastructure needed to apply the process, or in

some other cases, such as the COSO standard, they provide an integrated framework with other disciplines, e.g. internal control.

The focus of this paper will however be primarily on the three first stages, i.e. initialization, risk identification and risk analysis.

Considering program risk management and particularly large scale program risk management, as used in this paper, all presented standards / models tend to be quite general, without any particular specialization, leaving thus space for completely different approaches. Besides, it is interesting to note that none of these standards are currently used for certification purposes, though in some cases this has been proposed and is being actively pursued. Rather, they all provide guidance and advice, and encourage the adopting organisations to adapt them to their own needs.

Regarding risk management of EU programs, Bramshill Consultancy (2001) in a recent EU funded study has proposed methodologies of typical risk analysis and high-level risk analysis, whereas the latter is actually a more simplified version of the former. According to these methodologies, the risk analysis is constituted of 3 stages, risk identification, risk estimate and risk assessment. The analysis is based on qualitative terms, where the probabilities of risk appearance and risk consequences are distinguished to low, medium and high, so that all risks are classified in a 3x3 risk analysis matrix. Regarding projects auditing in EU programs, the RASM methodology (Zacharias et. al, 2007) has been proposed, suggesting projects risk ranking, based on risk factors identification and evaluation.

However, EU Structural Funds have not adopted so far an official risk analysis methodology. As a result, most efforts that are undertaken are elementary and fragmented and, regarding the program level, they are exhausted almost in the framework of ex-ante or intermediate evaluations. In project level, the situation is different, since it depends, to a large extent, on the culture, the structure and infrastructure of the implementing institution, but even there, risk analysis is held in the minority of projects. According to the final report of a research in Wales for good practice in Structural Fund project management (Old Bell 3, Economic Development and European services, 2005), in the majority of the examined cases it was declared that indeed there was no official risk analysis held, while only the 42.5% declared that certain risks had been recorded somehow.

However, even in the cases that an official risk analysis was held, there has not been any team risk analysis, despite the fact that team risk management acquires an exceptional importance in the framework of large scale program risk management, since the failure of these programs is often due to lack of co-ordination and collaboration of the involved parties. Things are even more complicated, given that the involved parties are indeed very different, so much regarding their structure and management, as well as their objectives and the means through which they attempt to realize their objectives. As a result, although team risk management should be obvious in the case of large projects and programs, however, it is often something almost hostile, since different organizations are completely unwilling to exchange information even when they try to realize a common goal.

Team risk management usually is covered by risk management models and methodologies. Higuera et al (1994) attempted to emphasize on their work the exceptional importance of team risk management when many and different parties are involved. According to Higuera, 'team risk management defines the organizational structure and operational activities for collectively managing risks throughout all phases of a program life cycle'. Team risk management practices bring together individuals within an organization and between organizations to form working teams.

By recognizing the importance of team risk management, the OGC HM Treasury (2004) published a guide for managing risks with delivery partners. According to that guide, a risk management approach for partnerships includes (a) risk identification and assessment phase, in which supposedly a joint risk register should be created, (b) allocation of risk ownership, (c) monitoring risk, (d) reviewing risks, with possible joint reviews as part of joint meetings, (e) managing risks, and (f) risk communication.

3. Large Scale Program Risk Analysis Using a Risk Breakdown Structure – A Greek CSF III Operational Program Case Study

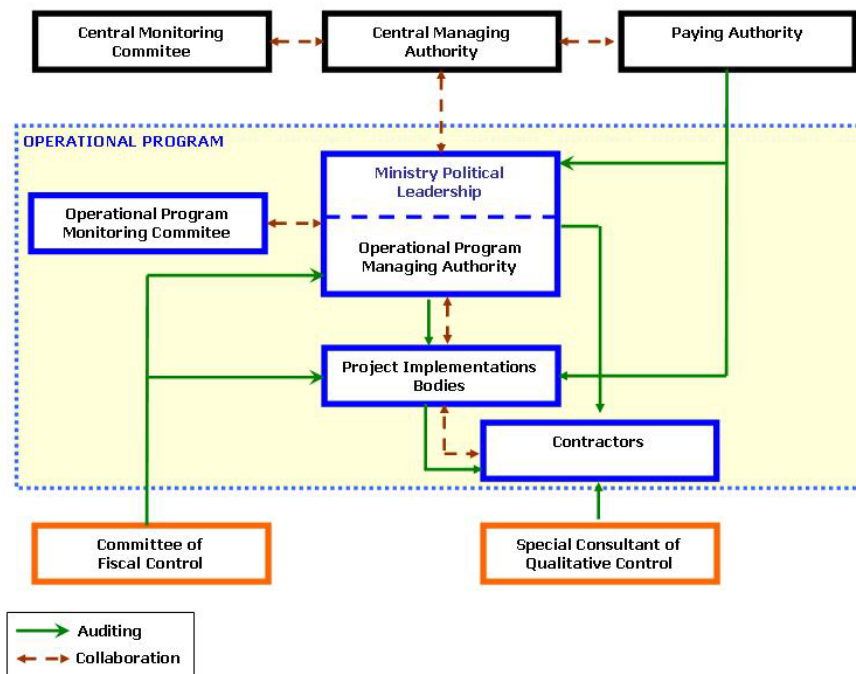
3.1. Defining the Context

According to the risk management procedure described in Section 2 of this paper, the first step for program risk management should be the initialization of risk management process. In this step, risk management practitioners should define (i) the context in which risk management procedure will be applied, (ii) the organization's strategic objectives and (iii) the specific objectives of risk management procedure.

The framework in which the process of large scale program risk management has to contribute is characterized, in most of the cases, by great complexity and bureaucracy. In Greek Operational Programs for instance, a large number of multi-level management structures have been developed, often with overlapping responsibilities, which are altogether administrated by the Greek public authorities.

Given that for the 2000-2008 period, 11 sectoral and 13 regional programs are in the process of implementation in Greece, the developed management structure includes the establishment of many new bodies in framework, program and project level. All these bodies form a multi-level structure with many interdependencies (Zacharias and Askounis, 2007), as presented in the following figure:

Figure 1: Structures of management and control of the CSF III



Although contracts are the mechanism to allocate liabilities and responsibilities of project participants, contract language alone is insufficient to specify and appoint all the risks (ACEC/AGC, 1992, Rahman and Kumaraswamy 2002). In large scale programs, things are even more complicated, since the owner is not a single organization. In our case study of Greek Operational Programs, Project Implementing Bodies are responsible for tendering procedures, awarding the contract, supervising and certifying the implementation. Project Implementing Bodies may be the Operating Entities of the projects after their termination, but not necessarily. Managing Authority, an entity belonging to a ministry, depending on the program sector, approves the projects funding and is responsible for assuring both that their implementation is compatible with national and community policies and that all funds are used efficiency. Operational Program Monitoring Committee is supervising Managing

Authority and is responsible for Program's objectives and directions. Central Managing Authority coordinates all Managing Authorities of the 25 Operational Programs, providing instructions and directions for the management, appraisal and control. Finally, for the projects and programs audit, some additional bodies have been created or used per case, such as the Committee of Fiscal Control, the Special Consultant of Qualitative Control and the Paying Authority, one more new body, which holds control and is being charged with the transaction of Payment Demands to EU. Given the enormous importance of Operational Programs in country development, political decisions play also a significant role in problem solving, very often at a high level.

Based on all the above mentioned matters, it is clear that the main authorities for the effective management of Operational Programs are Managing Authorities, which they should collaborate with all other organizations, in a quite complicated and competitive framework. One major problem in this complicated management structure is the "horizontal" and "vertical" coordination and interfaces between all these departments and agencies.

Managing Authorities are responsible for the efficient and correct implementation and management of Operational Programs. In short, their major responsibilities include:

- Drawing up and implementing program planning
- Approving projects funding
- Assuring regularity and compatibility of projects and actions throughout the program with national and community law and policies,
- Preparing and organizing the mid-term reviews,
- Management of the program,
- Monitoring the implementation progress of the program and the incorporated projects, drawing, where necessary, proposals for program revisions which are submitted to the Operational Program Monitoring Committee,
- Auditing of the executed projects,
- Supporting Project Implementing Bodies during project implementation,
- Assuring information and publicity of program and its incorporated projects.

3.2. Risk Analysis

Since few tools have been proposed for program risk analysis, Risk Breakdown Structure (RBS) is proposed in the case of large scale program risk management as the main tool to structure the information and aid comprehension. The RBS can assist in understanding the distribution of risks in a program or project, aiding effective risk management. RBS in this paper has been adopted in a wider framework than that described by Hillson (2003), so that in level 0 instead of project risk, program risk is assigned henceforth.

RBS was adopted as the major risk analysis tool, since it offers a structured and comprehensive list of all risks in all program levels. Additionally, RBS covers successfully all three broad management themes that are keys to the success of a program, as recognized by PMI (2006):

- Benefits management,
- Program stakeholder management,
- Program governance.

RBS was developed in this case study for a program of large infrastructure projects. Towards risk identification Chapman (2001) and Miller and Lessard (2001) provided a valuable framework. However, considering that analysis was conducted in program level, in which specific projects risks tend to be more abstract, resulting RBS is quite general, as depicted in table 1. Actually, as it can be concluded, the developed RBS could fit any program regardless of its incorporated projects type. For risk identification and classification purposes, the conclusions of Hall and Hulett (2002) in risk analysis of a generic project (Universal Project Risk) have been very useful.

Table 1: Greek CSF III Operational Program Risk Breakdown Structure

Level 0	Level 1		Level 2		Level 3						
PROGRAM RISKS	A	Management	I	Operational Program Managing Authority	1	Organizational Structure & Culture					
					2	Experience					
						3	Procedures Knowledge & Observance				
						4	Projects Approval				
						5	Projects Monitoring				
						6	Projects Auditing				
						7	Internal Control & Quality Assurance				
						8	Equipment & Resources				
						9	Support Environment				
			II	Project Implementing Bodies – Final Beneficiaries	1	Organizational Structure & Culture					
					2	Experience					
						3	Procedures Knowledge & Observance				
						5	Projects Monitoring				
						6	Projects Auditing				
						7	Internal Control & Quality Assurance				
						8	Equipment & Resources				
						9	Support Environment				
		B	Projects Implementation	I	Planning	1	Public Consultation				
										2	Goals – Benefits
										3	Stakeholders
									4	Maturity – Studies	
									5	Operability	
									6	Project Type	
							7	Complexity			
							8	Technology			
							9	Environmental Impact			
							10	Licensing			
							11	Project Site – Ownership			
							12	Sub-Projects			
							13	Consistency & Complementarities with other Projects			
		II	Contract	1	Clarity and Completeness of Tender Documents						
						2	Tendering Procedure				
						3	Time – Schedule				
						4	Penalties				
		III	Construction / Implementation	1	Employees						
						2	Logistics				
						3	Sub-Contracting				
						4	Insurance				
				5	Health & Safety						
				6	Quality Assurance						
		IV	Operation	1	Maintenance						
						2	Consistency & Complementarities with other Projects				
	C	External	I	Unforeseen Circumstances	1	Natural Disasters					
								2	Terrorism – Vandalism		
				II	Political	1	Legal & Regulatory Framework				
								2	Management Framework		
								3	Elections – Governmental Change		
						4	International Relationships				
				III	Economic	1	Fiscal Policies				
								2	Inflation		
				3	Government Fiscal Framework						
		IV	Social	1	Labor Market						
						2	Traditions & Biases				
	D	Operational Program Planning	I	Goals	1	Overestimate of Goals					
								2	Goals Ranking and Evaluation		
								3	Timetable		
				II	Budget	1	Fund Raising of Private Capitals				
								2	Sufficiency of Resources		
				III	StakeHolders	1	Clashing Interests				
						2	Coordination of Involved Parties				
						3	Insufficient Information Flow & Identification of Issues				

Modeling risk in distributed, large-scale systems, such as the large scales programs under examination, presents its own challenges. First, because the systems are distributed, risk in the system can migrate, making risk identification and mitigation difficult. Risk migrates when the introduction of a risk mitigation measure to address one problem in the system introduces other, unintended consequences in another part of the system. Furthermore, modeling risk in distributed large scale systems is also difficult because incidents in the system can have long incubation periods due to poor information flow between distributed sub-systems, making risk analysis and identification of leading error chains difficult.

As a result, effective program risk management is dependent on a plethora of different organizations, with different corporate cultures and with different interests, which are required to collaborate. The above RBS is created for the highest level of program management, i.e. for Managing Authority. Similar RBS should be drawn by the rest of the involved organizations. The above-mentioned structure should be developed further, in one more level of analysis, where all specific risks are recorded.

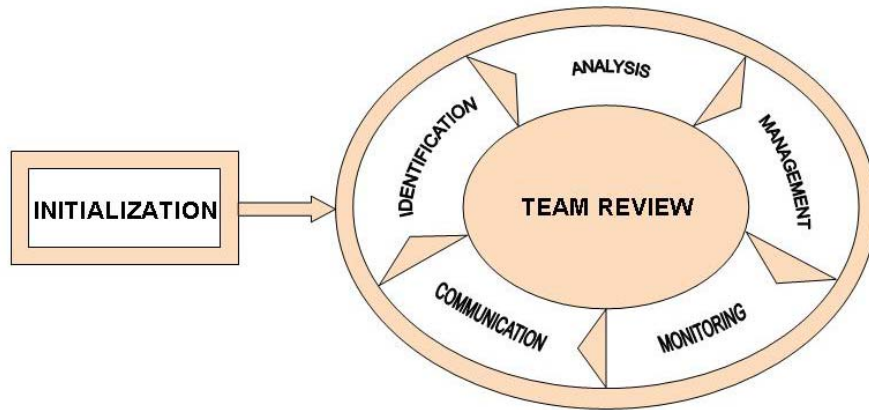
For magnitude estimation of the above-mentioned risks, a qualitative approach was followed, where the probability of appearance of each risk and its consequences were estimated with qualitative terms on a scale from 1-5. For an easy and fast risk categorization ranging from trivial to important risks, a probability-impact grid was used. Recording to risk registers was held according to the fields suggested by Ward (1999).

For the risk analysis process proposed in this paper, a qualitative approach was preferred against a quantitative one. The extent of the examined Operational Programs, the exceptional lack of data and historical documents and the fact that risk maturity is missing in most of the examined organizations, lead to the conclusion that in fact a quantitative analysis cannot be held. Besides that, taking into account the type and the structure of risks that were identified, it becomes obvious that a quantitative analysis could not easily give such results that would justify the collection effort of all required additional data. On the contrary, the qualitative analysis that was used in this paper, offered a fairly good and full base for a complete risk analysis of the examined program. Moreover, as it is mentioned for instance by Walsh (2002), a qualitative risk analysis is preferred in program level, even in smaller private sector programs.

3.3. Team Risk Management Framework

Team risk management is absolutely essential for the achievement of the required effectiveness in this multi-level management framework. However, current program management practices are still quite disappointing, regarding this issue. The necessary communication channels for team risk management do not exist in most cases, or, in cases that they exist, a solid risk management structure has not yet been established. Moreover, although EU stresses out the importance of risk management, still, there is no relative directive issued to Managing Authorities about what at least a risk management methodology would be supposed to include, when it has to be applied and by whom.

By recognizing this important void in management of large scale programs, this paper suggests a team risk management framework, as depicted in figure 2.

Figure 2: Team Risk Management Procedure

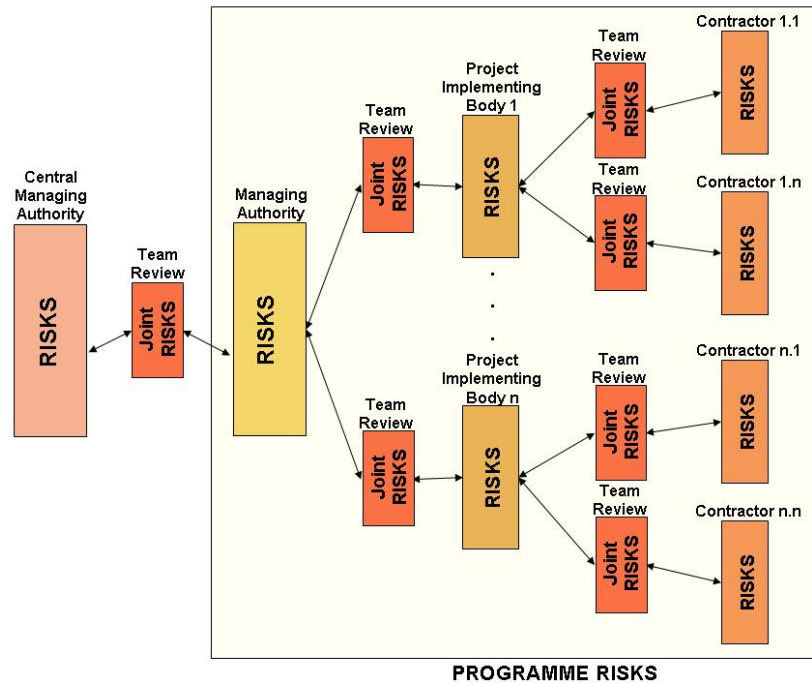
Risk management is not retracted in each organization separately, but on the opposite, it constitutes a precondition for team risk management. Risk analysis is suggested to be held in each organization, based on RBS. RBS that was presented in this paper concerns the higher level of management, the program level, and it was developed with the perspective of the Managing Authority. Corresponding RBSs should be developed so much by the Project Implementing Bodies for the number of projects that they implement, as well as by the contractors for each project separately. A corresponding RBS should also be created by the Central Managing Authority, in a higher level than that of the Operational Program, in the context of the whole CSF.

After initial risk identification and analysis for each organization separately, team reviews should begin, to clarify what kind of risks should be faced jointly and what kind of responsibilities each organization undertakes separately. For this purpose, permanent working teams need to be formed, aiming at the free flow of information between the different levels of the program. These working teams should meet in regular time basis. Through these meetings 2 very important goals are achieved:

- the dissemination of specific problems and risks that the different levels face, and
- the fact that all parties comprehend that they belong to a common system, with a common objective, the effective program implementation.

Since in the examined case of large scale program management, many and different organizations are involved, there is no point that team reviews should happen among all, but they should be held in smaller groups, related directly.

It is proposed that these groups should be three, based on their hierarchic structure (Central Managing Authority – Operational Program Managing Authority, Operational Program Managing Authority – Project Implementing Bodies, Project Implementing Bodies – Contractors), as it is depicted in figure 3. Operational Program Managing Authority acquires determinant coordinative role in the proposed framework, since on one hand it has the program management responsibility, and on the other hand it lies in the intermediate level, between the political leadership, the Central Managing Authority and the Project Implementing Bodies. From each group a common list of risks will emerge, which will be also monitored with further team reviews, according to the procedure that is depicted in figure 2. It is obvious though, that in the framework of the common risk list, specific responsibilities and competences will be undertaken by each organization separately. These responsibilities and competences will be evaluated in the next meeting.

Figure 3: Team Risk Management in a Greek CSF III Operational Program

Team reviews should be a continuous activity, with regular meetings and a standard agenda. These reviews should cover all management themes, which are key issues to program risk management efficiency, such as:

- Risk identification,
- Risk management plans,
- Monitoring and evaluation of risk management plans,
- Monitoring of interactions that certain risk management policies might have in a program level with risks created in some other one.

4. Summary and Concluding Remarks

Despite the existence of many models and methodologies about risk management in general, as well as about project risk management more specifically, program risk management is seen in most cases fragmentarily, as an extension of risk management of different projects, rather than an autonomous process. This can be satisfactory in the case of small programs, which include 2-5 projects, similar one to another; it is exceptionally insufficient however in the case of the management of large scale programs. The result of such an attitude is undoubtedly the high percentage of failure of such programs (for example very low budget absorption ability in CSF III programs in Greece).

Towards program risk management standardization, this paper suggests the application of Risk Breakdown Structure (RBS) in program level. Such a structure has been created for the case of a Greek Operational Program. From the examination of this structure, we conclude that (i) it offers a valuable help to structure the information and aid comprehension of risks throughout the program under examination, (ii) it serves as a good basis for the initiation of team risk management process, (iii) it covers successfully all three broad management themes, which are key to the success of a program, as recognized by PMI (2006), and (iv) it is general enough, therefore it can be applied in any program with similar structures of administration and organization.

Finally, this paper suggests a team risk management framework, involving a team risk management procedure, the formation of permanent working teams and the structured information flow between the various levels of programs. The developed RBS is adopted as the basis for all team

reviews and team risk management practices. The proposed framework was initiated for Greek CSF III Operational Programs and as a result many parts of this discussion are unavoidably related to the specific application domain. Nevertheless, it is our strong belief that the proposed framework could be easily adapted to other large scale programs, with similar management structures.

5. Acknowledgment

This work is financially supported by the research project "Herakleitos" of the Operational Program EPEAEK II. The project "Herakleitos" is co-funded by the European Union - European Social Fund (75%) and Greek National Resources (25%).

References

- 1] ACEC/AGC (1992). Owners Guide to Saving Money by Risk Allocation. American Consulting Engineers Council and Associated General Contractors of America.
- 2] AIRMIC (Association of Insurance and Risk Managers), ALARM (National Forum for Risk Management in the Public Sector) and IRM (Institute of Risk Management) (2002) A Risk Management Standard, London: AIRMIC, ALARM, IRM
- 3] Bramshill Consultancy Limited, (2001) Guidance on the analysis of risk in the context of EU expenditure programmes, Report prepared under contract to the European Commission, (Bramshill Consultancy Limited, Hampshire)
- 4] British Standards Institute (2002) ISO/IEC Guide 73:2002: Risk Management Vocabulary. Guidelines for Use in Standards. London: BSI.
- 5] Chapman R. J. (2001). The controlling influences on effective risk identification and assessment for construction design management. *International Journal of Project Management*, Vol 19 (3), pp 147-160
- 6] COSO (The Committee of Sponsoring Organizations of the Treadway Commission) (2004) Enterprise Risk Management — Integrated Framework, Jersey City: AICPA
- 7] Hall D. and Hulett, D. (2002) Universal Risk Project – Final Report. INCOSE/PMI, available at <https://acc.dau.mil/CommunityBrowser.aspx?id=19175>
- 8] Higuera, P.R., Gluch, P.D., Dorofee, J. A., Murphy, L. R., Walker A.J., and Ray C. W., (1994) An Introduction to Team Risk Management, Pittsburgh: Software engineering Institute, Carnegie Mellon University
- 9] Hillson, D. (2003) Using a Risk Breakdown Structure in Project Management. *Journal of Facilities Management*, Volume 2 Number 1, pp 85-97
- 10] HM TREASURY (2004) Orange Book: Management of Risk - Principles and Concepts, London: HMSO publications
- 11] IRGC (International Risk Governance Council) (2005) White paper on Risk Governance: Towards an Integrative Approach. Geneva: International Risk Governance Council
- 12] Miller R. and Lessard D. (2001). Understanding and managing risks in large engineering projects. *International Journal of Project Management*, Vol 19 (8), pp 437-443
- 13] Office of Government Commerce, HM Treasury (2004) Managing Risks with Delivery Partners, a guide for those working together to deliver better public services. Available at <http://www.ogc.gov.uk/documents/cp0013.pdf>
- 14] Old Bell 3, Economic Development and European services (2005) Good practice in Structural Fund Project Management – Final Report, available at <http://www.wefo.wales.gov.uk/resource/GoodPractice-in-SF-ProjectMangement300.pdf>
- 15] PMI (2004) A Guide to the Project Management Body of Knowledge – Third Edition PMBOK, Pennsylvania: Project Management Institute, Inc.
- 16] PMI (2006) The Standard for Program Management, Pennsylvania: Project Management Institute, Inc.

- 181 *European Journal of Economics, Finance And Administrative Sciences - Issue 12 (2008)*
- 17] Raz T. and Hillson D. (2005) A Comparative Review of Risk Management Standards. *Risk Management: An International Journal*, 7 (4), pp 53-66
- 18] Rahman, M. and Kumaraswamy, M. (2002) Joint risk management through transactionally efficient relational contracting. *Construction Management and Economics*. E & FN Spon, Vol. 20, 4, pp 44 - 54.
- 19] Standards Australia/Standards New Zealand (2004) Australian/New Zealand Standard AS/NZS 4360:2004: Risk Management. Homebush, NSW: Standards Australia / Wellington: Standards New Zealand
- 20] The Institute of Internal Auditors – UK and Ireland (2003). Position Statement – Risk Based Internal Auditing, the Institute of Internal Auditors – UK and Ireland, London, available at <http://www.iaa.org.uk/cms/IIA/uploads/48dc2e62-f2a7bd939a--7cef/RiskBasedInternalAuditing.pdf>
- 21] Walsh, B. L. (2002) Risk diagnosis methodology in Unilever – a case study. Proc. 5th European Project Management Conference, Cannes France: PMI Europe 2002
- 22] Ward, S. C. (1999) Assessing and managing important risks. *International Journal of Project Management*, Vol 17, No 6, pp 331-336
- 23] Zacharias, O. and Askounis, Th. D. (2007). Managing risks in large scale programs: a team risk management framework, *Business Journal for Entrepreneurs*, Vol 2007 Issue 3, pp 115-129
- 24] Zacharias, O., Mylonakis, J., Askounis, Th. D. (2007). RASM: A Risk-Based Projects Auditing Selection Methodology for Large Scale Programs, *International Research Journal of Finance and Economics*, Issue 11, pp 179-193