
# Proposing A Structured Project Management Approach

- for Greek Companies of the area of GIS / Geoinformatics -

By:

Georgios Ch. Stavridis

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APPROVED:

*Chrysanthi Angeli, MSc, PhD* (Thesis/Project Advisor)

(Electronically Signed)

*Andrew Fox, MEng* (Thesis/Project Advisor)

(Electronically Signed)

_____ (Senior Faculty)

(Signature)

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# CURRICULUM VITAE

Georgios (George) Ch. Stavridis has been associated with project management for 3 years. He is a graduate of the Technological Educational Institution of Athens (Greece) with a Bachelor of Engineering Degree in Surveying Engineering; he also holds a Postgraduate Certificate in Project Management from University of Athens, and currently besides the MSc in Project Management, he attends a Business Administration Course (BSc) at Greek Open University. George has experience in Geoinformatics area of business through both governmental and private projects.

During most of his experience, George has involved in the development and utilization of project management methodologies for projects of every size and complexity. He currently holds the position of *Spatial Information Project Manager* in a group that consists of two companies (Geospatial Enabling Technologies ltd. & MaP ltd.). His main roles and responsibilities are: Business Development, Project Management, Systems and Solutions Development based on geospatial technologies.

Prior his professional involvement with projects and project management, George has also worked for three years in Bosch / Siemens organization in Quality Management and Total Quality Management Sectors.

Post graduation George plans to continue his education, and involvement with project management research.

# ABSTRACT

Georgios Ch. Stavridis
(Student ID: 20063515)

Proposing A Structured Project Management Approach
- for Greek Companies of the area of GIS / Geoinformatics -

The Study centers on the existing project management philosophy that Greek companies adopt in the business area of GIS and Geoinformatics. It identifies areas for potential improvement by proposing a structured – knowledge based – project management approach in order to aid such companies and organizations to undertake and successfully execute complex and demanding projects. As these companies are small they face constant change in every aspect of business and management. Through the proposed project management approach that it is being proposed (SPMA), the Author does not expect to narrow project management knowledge for Geoinformatics, but to offer to whom it might concern a) a useful interim tool that will aid a transition to professional wide project management methodologies or b) an easy and adoptable project management method. The proposed Structured Project Management Approach (SPMA) is a result of research through recognized related literature, and other sources combined with the Geoinformatics business area through conducts of interviews.

## Table of Contents

# 1 INTRODUCTION

## 1.1 Nature of Study

In Greece, the companies that are in the field of GIS (Geographical Information Systems) / Geoinformatics are small whether they undertake big projects or not. Globalization and competition push profit margins to constant reduction. On the other hand these companies very often have to change their working environment (outsourcing, consortium participation, non-permanent staff hiring, permanent-staff-hiring, procurement, international collaborations, and complicated contracting) according to the big projects' needs and requirements. As a result, the success criteria of time, cost, and performance are often unachievable.

Moreover, regardless of whether the project succeeds or fails, it is very complicated (due to the aforementioned dramatic changes and the difficulty in standardizing the processes) to produce the same outputs using the same processes. This fact is one of the main factors that influence both Quality and long-term Customer relationships.

The author used academic research, in-person interviews, and a review of relevant material as papers, and journals to illuminate these issues and develop recommendations for improvement.

## 1.2 Purpose of Study

The purpose of this study is to show how a standard Project Management Methodology will help companies acquire Project Management oriented thinking for solving the problems these companies usually have. The

ultimate purpose is to help a company directly (by the application of the recommendations of this thesis) or indirectly (by the partial application or just the understanding of the recommendations of this thesis) in order to:

- Increase their Return On Investment (ROI).
- Meet the existing success standards of Time, Cost, and Performance more easily.
- Define new success standards of Time, Cost, and Performance for similar projects in order to continuously improve.
- Create the ability (via the standardization of processes) for continuous improvement (the ability to improve a process exists only if there is a process).
- Make previous Customers know what to expect as a minimum from future projects that are similar to previous projects, or contain similar parts with previous projects.
- Improve specific early processes in order to avoid phenomena such as communications breakdowns, conflicts, and deviations from the initial vision without the approval and the commitment of the critical stakeholders.
- Build project teams capable of defining problems more easily and communicating them more effectively.
- Train new individuals more specifically and successfully.
- Make it easier for Project Managers to manage many projects simultaneously.

- Have better cost estimating and control. Furthermore, knowing exactly where to spend for what, and comparing it to costs of similar past projects, creates the opportunity to reduce cost.
- Develop and maintain efficient project control system(s).
- Have embedded quality management for every project.
- Minimize the losses of downsizing.

## 1.3 Needs Assessment

Stakeholders for this thesis include the management of small-sized Greek companies doing business in the GIS / Geoinformatics field and which undertake big projects. More specifically, the stakeholders are those who depend on the project. Usually they are: The Management Board, the Project Manager, the Project Team, the Customer, the End Users, the Suppliers, and the Collaborating Companies. All of these stakeholders will benefit from the results of this research. There will be more structured vision building. The system, due to the implementation of continuous improvement philosophy, indents to eliminate “waste” from the processes that do not add value to the Customer, and eliminate processes that are generated from lost lessons and experience. Through standardized processes and Structured Project Management Methodologies problems will be easier to forecast and to solve which will save resources and time. In conclusion, with a full application of a Project Management strategy or philosophy, the working environment can improve, becoming more innovative and less stress-generating.

## 1.4 Relation to the Program of Study

*PM 501 - Introduction to Project Management* represented at an introductory level many structured ways and concepts to approach a project and solve the root cause of a problem.

*PM 504 - Project Planning and Control* showed tools and techniques that are required for achieving the success criteria of the projects.

*PM 505 - Systems Concepts and Thinking in Project Management*, utilizes systems theory in the complex project management environment and helps individuals to understand the interrelations of systems and the root cause of problems. System thinking encourages critical approach and helps a greater understanding than limited information and time often allows.

*PM 511 - Project Quality Management* introduced the need to *embed* Quality in the project processes. Furthermore the standardization of the processes also involves Quality Management issues.

*PM 512 - The Customer into the Project Process* focused on the parts of Project Management that involve or need to involve the Customer. Moreover it provided structured techniques and methodologies (for the Customer involvement)

*PM 513 - Managing Project Change* represented processes and concepts that organizations and companies utilize to anticipate the contemporary meaning of Change in the global business environment, and manage the *phenomenon* as challenge for continuous improvement.

## 1.5 Definition of Terms

- Geoinformatics (Geo-Informatics): Combination of Informatics and geography

- Knowledge Management: *"management of organizational knowledge for creating business value and generating a competitive advantage"* [Tiwana, 1999]
- Project Management: *"… the application of knowledge, skills, tools and techniques to project activities to meet project requirements. Project management is accomplishmed through the application and integration of the project management processes of initiating, planning, executing, monitoring and controlling, and closing"* [PMI, 2004]
- System: *"… is a perceived whole whose elements "hang together" because they continually affect each other over time and operate toward a common purpose"* [Senge, 1994]
- Systems Thinking: *"… is a discipline for seeing wholes, recognizing patterns and interrelationships, and learning how to structure those interrelationships in more effective, efficient ways"* [Senge, 1991]

# 2 CONCEPT

## 2.1 Problem Statement

In Greece, the companies related to the field of GIS or generally Geoinformatics Applications, Products, Consulting and Services are small. Most of them have 5-40 personnel. On the other hand, these companies have to undertake big projects. This means that such companies very often deal with factors such as outsourcing, consortium participation, non-permanent staff hiring, permanent-staff-hiring, procurement, international collaborations, and complicated contracting. Due to a lack of process standardization at the end of each project there is a great loss of know-how, knowledge management, lessons learned, and the ability to improve processes. As a result when new projects are undertaken, experience is lost and much work must be re-planned and re-done.

## 2.2 Rationale

When small companies undertake big projects which involve outsourcing, consortium participation, non-permanent staff hiring, permanent-staff-hiring, procurement, international collaborations, and complicated contracting, a very different working environment is generated. This working environment is quite different to the one that exists during the execution of small or normal sized projects.

The companies operating in the field of Geoinformatics are fundamentally involved with projects; therefore, the application of project management

systems and tools in a knowledge based environment can improve the results and turn the constant change into challenge.

## 2.3 Hypothesis

A Project Management Methodology (in this study named Structured Project Management Approach or SPMA) that fits the needs of small Greek companies (such those executing GIS / Geoinformatics projects), will result in better performance and flexibility for today's demanding and constantly changing global business environment.

# 3 Review of Literature

## 3.1 Introduction

The study refers to the whole of project management, and the literature covers a wide spectrum of related topics to project management. The literature review is divided into parts. The parts are:

- Project Management
- Systems Theory and Thinking - Knowledge Management - Learning Organization

The course material of City University was central to this study as it provided the thesis with integrated and wide project management knowledge literature.

## 3.2 Analysis

### 3.2.1 Project Management

*A Systems Approach to Planning, Scheduling, and Control by Kerzner* (2001) outlines the 16 points to project management to ensure project success. These points serve to document a Project Management Methodology that will ensure that companies operating in the field of Geoinformatics achieve better results.

1. Adopt project management methodology and use it consistently
2. Implement a philosophy that drives the company toward project management maturity and communicate it to everyone
3. Commit to developing effective plans at the beginning of each project

4. Minimize scope changes by committing to realistic objectives
5. Recognize that cost and schedule management are inseparable
6. Select the right person as the project manager
7. Provide executives with project sponsor information, not project management information
8. Strengthen involvement and support of line management
9. Focus on deliverables rather than resources
10. Cultivate effective communication, cooperation, and trust to achieve rapid project management maturity
11. Share recognition for project success with the entire project team and line management
12. Eliminate non-productive meetings
13. Focus on identifying and solving problems early, quickly, and cost effectively
14. Measure progress periodically
15. Use project management software as a tool – not as a substitute for effective planning or interpersonal skills
16. Institute an all-employee training program with periodic updates based upon documented lessons learned

*Project Management Body of Knowledge* (PMBOK 2004) provides standards and guidelines for Project Management. The PMBOK is the main source for creating specialized processes and identifying project management

knowledge areas. Through these knowledge areas it is assured that the study will serve project management principles. These knowledge areas are:

- Project Integration Management
- Project Scope Management
- Project Time Management
- Project Cost Management
- Project Quality Management
- Project Human Resource Management
- Project Communications Management
- Project Risk Management
- Project Procurement Management

As this study intends to provide an interim tool for a transition to wider project management standards, it covers the PMI's knowledge areas through SPMA. This fact also ensures the SPMA's integrity as a basis for project management processes. The nine knowledge areas are covered through the proposed elements of the *proposed* project management plan as a part of SPMA.

*People Skills for Project Managers by Flannes* (2001) utilizes techniques to establish a more efficient human resources strategy, in order to select individuals that fit the company and the project. Furthermore, based on Flanne's directions for training policies are developed that are embedded into the system, thereby adding value to the project and to the whole stakeholders'

team. The existence of the project manager as a leader, manager, mentor, and facilitator in small business is a very valuable necessity, as change in such companies is rapid and constant. This study often refers to soft skills that are central to the project oriented environment.

*Customer-driven Project Management*: Building Quality into Project Processes by Barkley (2001) discusses how to put quality into the project processes according to the customer needs. Embedded quality is one of the recommended features of the recommended Project Management Methodology. Separate checking teams and functions are no longer needed, as individuals of a project team proactively embed the quality into the project.

Translating customer expectations to specifications is the second basic part of this book that is used for this study in order to give the ability to the organization to achieve "*expected outcomes*".

*Chasing Risks in Projects: Tools and Tips by* Leopoulos, Kirytopoulos, Malandrakis (2003) provide tools concerning risk management. This study adopted the RBS-WBS matrix concerning risk definition, in order to implement it on Geoinformation Projects.

*The Leader's Handbook; A Guide to Inspiring People & Managing the Daily Workflow* by Scholtes (1998) shows how the project manager can effect the transition to a standardized Project Management Methodology, as well as how leadership can result in effective team building. Besides, the problem of this study also includes the question of "process standardization". This literature element gives analytical directions in order to develop a standard. Scholtes

states: "*Repeatable tasks can be studied and improved. We can determine the most efficient, most reliable, easiest, safest, and most productive way we know to do this work*"

### 3.2.2 Systems Theory and Thinking - Knowledge Management - Learning Organization

*The fifth discipline field book: Strategies and tools for building a learning organization* by Senge (1994) "*is providing methods, tools and principles all oriented to looking at the interrelatedness of forces, and seeing them as part of a common process"*. The Systems Theory and the Learning Organizations Theory were utilized in order to develop the study. The principles and other tools of this book are embedded into the Proposed SPMA in order to help the companies to become Learning Organizations with people who can see beyond their roles and responsibilities and act proactively, creatively, and under limited supervision. System thinkers understand the interrelation of the processes, and they are problem solvers.

The fifth discipline field book provides the required education to people who develop systems, but is also a very good "mind-opener" to anyone who wants to understand that nothing is existing independent.

*Essentials of Knowledge Management by Bergeron (2003)*, introduces knowledge management in organizational environments, while it proposes processes that can exploit the benefits of managing the knowledge. This study proposes a Knowledge-Based Project Management System. Organizational knowledge is the "immune body" for the loss that the ever-changing business environment creates, and also is the key to continuous improvement. The road

map that is offered in the chapter “Getting There” is adopted by the Author of this study in order to develop processes and embed them into the results. Bergeron (2003) introduced a road map that consists of five major phases, and addresses practical Knowledge Management implementation from the perspective of senior management:

1. *Ad hoc experience*. Collect data about the company’s ongoing KM activities.
2. *Fact finding*. Determine if a corporate KM implementation is warranted and feasible.
3. *Formalize approach*. Define specific milestones and outcomes for success.
4. *Implement*. Take action.
5. *Evaluate*. Assess progress toward milestones and outcomes, and based on the results of the evaluation, follow **one** of the four following paths:
    a. *Modify*. If the current solution doesn’t suit the needs of the corporation, then modify the approach and implement a new KM solution. Since few implementations will work perfectly on the first attempt, this is the most likely initial outcome of the evaluation phase.
    b. *Extend*. If the KM solution suits the needs of the corporation, either from the initial attempt or as the result of a modified approach, then extend the solution through more of the corporation.
    c. *Maintain*. At some point, the corporation will reach a steady-state condition in which the current KM solution is

stable and satisfies the corporation's foreseeable needs. Maintenance of a KM system is a dynamic process that will require a continual stream of resources

d. *Disable*. If the current approach to Knowledge Management fails, at some point senior management has to decide whether to continue to invest resources in it or to disable the current implementation process and either reformulate the strategy or search for changes in technology or corporate culture.

# 4 METHODOLOGIES AND PROCEDURES

## 4.1 Introduction

This Thesis was developed by collecting data and utilizing a variety of scientific resources (books and articles) which deal with process standardization, quality management, project management, systems development, as well as with the methods and procedures that Greek Geoinformation companies use.

Furthermore, electronic resources of the web such as libraries, journals, and databases with papers, assisted the endeavor of the Author to represent accurate and in-depth information so as to reach the desired results.

Finally, the Author interviewed people who are involved with Project Management in the business area of interest.

The methodology that was developed consists of three parts. The first part fulfills the need for specialization of the SPMA for the business of Geoinformatics. The rationalization for the specialization derives from the factors (potential constraints, selection of specific directions, conditions and other) that make the results of the present study easily applicable for the specific business area of interest.

The second part contains the methodology and the principles that the Author uses as a basis to develop the SPMA. In other words in this part describes the Theories, Tools and Techniques implemented in order to realize the results. Figure 4.1 shows the Methodology adopted.

The Third part provides the SPMA with integrity and compatibility as it embeds elements concerning the organization and the generic project management documents. This part will not be analyzed in this chapter as it does not contain any developed components.

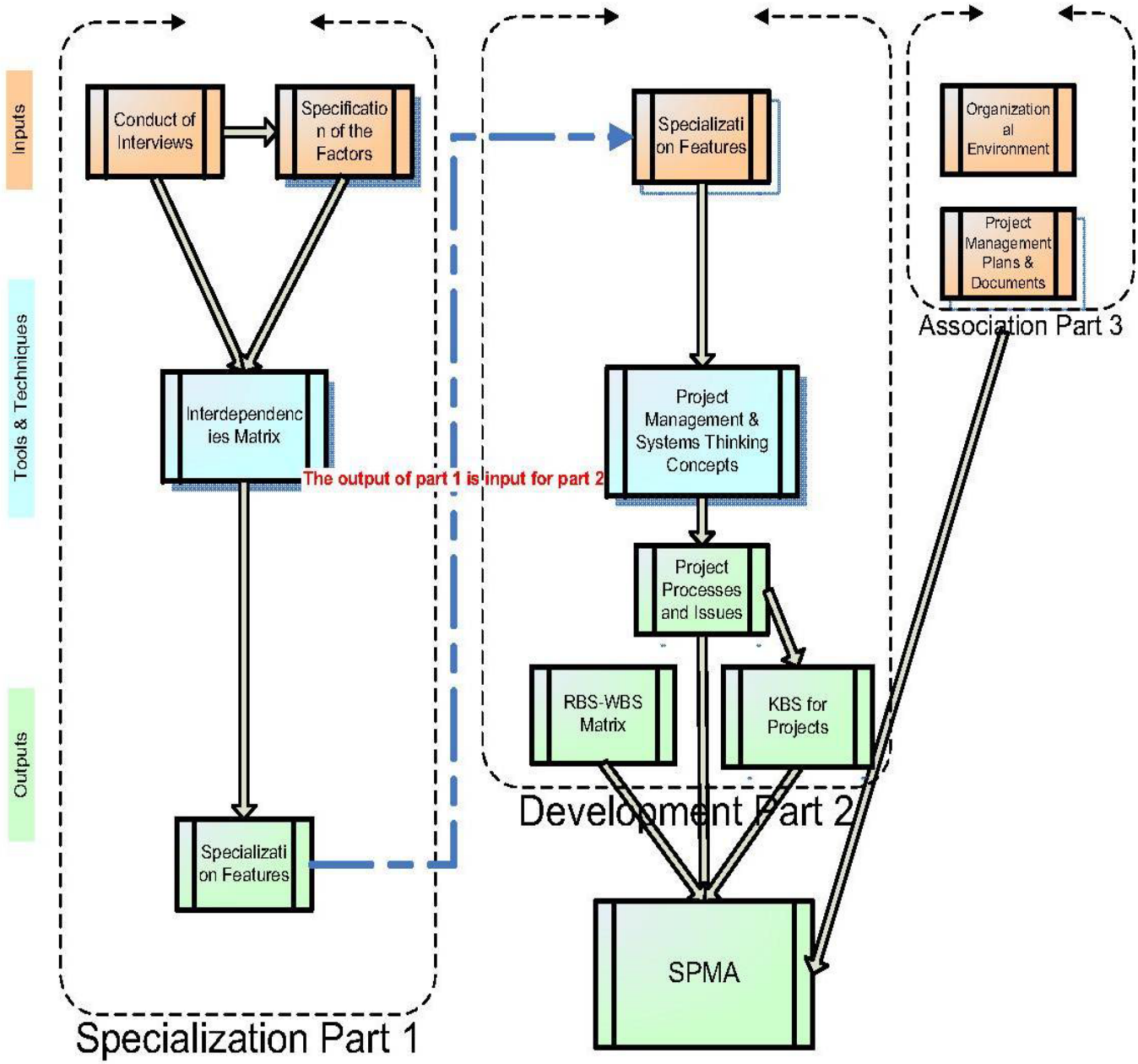


*Figure 4.1: The Methodology for the SPMA Development*

The methodology is also represented below in tabular format (Table 4.1), in order to provide explanations and information. The "SPMA" is the total output, so it is described in chapter 5 – "Results"

Table 4.1

**The Methodology for the SPMA Development**

| **Specialization Part** | |
|---|---|
| | *Conduct of interviews*: The Author interviewed people nvolved with project management in the business area of interest. Through the interviews the representatives of the companies had an opportunity to state some of the problems and particularities they face in order to carry out the projects, and to give valuable information to the Author. |
| Inputs | *Specification of the Factors*: These factors have a major influence to the business area of interest. These, are considered to be major factors, but it is probable that there are others. Consideration of these factors results in the Specialization Features, described below. The difference between the factors and the specialization features is that the Factors relate principally to the business environment while the Specialization Features are aspects that are processed according the philosophy and the methodology of PM knowledge. |

| | |
|---|---|
| Tools and Techniques | *Interdependencies Matrix:* The way the Factors interact with each other is defined and represented in this part |
| Outputs | *Specialization Features*: features that are processed according the philosophy and the methodology of PM knowledge. These Features are the ultimate combined material of this study that add “specialization” to the SPMA |
| **Development Part** | |
| Inputs | *Specialization Features*: features that are processed according the philosophy and the methodology of PM knowledge. These Features are the ultimate combined material of this study that add “specialization” to the SPMA |
| Tools and Techniques | *Project Management and Systems Thinking Concepts:* In order to result an intergraded output, the application of project management knowledge and systems thinking principles is required. There are included also interactions between project processes, organizational processes (embedded into the project), organizational factors, and business |

| | |
|---|---|
| Outputs | *Project Processes & Issues (PP&I)*: A combination of Geoinformatics area of business and project life cycle. PP&I is the component that gives the strongest focus on this area of business.<br><br>*RBS – WBS Matrix:* This is a tool that assigns main risks to a generic WBS that describes Geoinformation projects (Risk Breakdown Structure - Work Breakdown Structure)<br><br>PKBS: The Project Knowledge Breakdown Structure that shows the knowledge issues represented in the PP&I in more detail.<br><br>. |
| **Association Part** | |
| Inputs | *Organizational Environment*: organizational environment includes all the particularities that the organization could embed into the SPMA<br><br>*Project Management Plans & Documents*: This is a *recommended* set of project management plans and documents that could be developed in order to:<br><br>• manage and fulfill the project needs and objectives<br>• provide compatibility with wider or other existing project management methodologies and systems |

## 4.2 Analysis

### 4.2.1 Specialization Part

#### *4.2.1.1 INTERVIEWS*

The Author conducted interviews (in Greek language) that aided the factors definition process. The interviews have been conducted during the whole period of the Thesis development. Ten companies, including the two that the Author is working for, were selected. The interview topics covered:

- Business Factors (Used in §4.2.1.2)
- Project Management Methodology.
- Risk Management Approach
- Quality Management standards and certification
- Knowledge Management Issues

#### *4.2.1.2 SPECIFICATION OF THE FACTORS*

The specialization derives from the three features that the companies of the business area of interest have: Greek, Geoinformatics, Small (there are no big ones). The following chart will show these factors in a hierarchical structure.

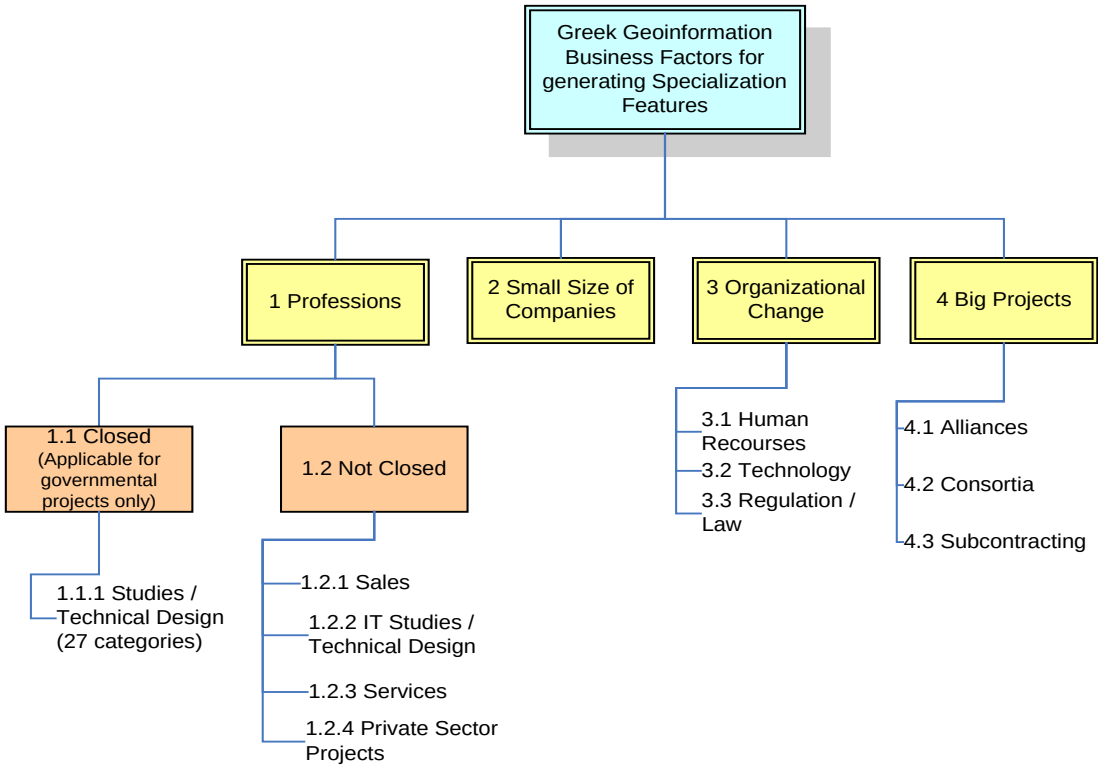


*Figure 4.2: Factors that generate Specialization Features*

The factors that were adopted, discussed and used for this study are considered to be important, but more can also be added. Moreover these factors are examined *from the perspective of their influence on project management*.

These factors are also described in the Table 4.2 showing how they relate to the study.

Table 4.2

**Greek Geoinformation Business Factors for generating Specialization Features**

| | |
|---|---|
| **Professions** | The professions that involve into the Geoinformation |

| | Business Area |
|---|---|
| Closed (Applicable for Governmental Projects ONLY) | In Greece, a register for the Engineers is held. Another register is held for Engineering Corporations and Companies. Academic requirements are mostly limited to specific undergraduate engineering degrees (Greek Public Higher Education or non-Greek official equivalent). Post graduate studies are NOT counted. The more experienced an Engineer is, the bigger the governmental projects he can bid. |
| *Studies / Technical Design* | Officially, there are twenty seven (27) categories assigned to the professions, depending on undergraduate studies. Not all the categories belong to the Geoinformatics business field. Furthermore a Project can *partially* involve Geoinformatics for a specific part. Registered engineers are assigned to the categories of their profession. These categories in combination with experience determine *what* project can be undertaken in *what* size (based on budget). An equivalent procedure exists for companies. |
| **Not Closed** | Professions that have no particular restrictions for their practice |
| *Services* | For the business area of study the main services are: |

| | |
|---|---|
| | consulting, training, maintenance, engineering |
| *IT Studies / Technical Design* | At the time this study this category is not a closed-profession |
| *Private Sector Projects* | (self explanatory) |
| *Sales* | Many Geoinformation companies involve sales as they are relevant software distributors, retailers, or developers. Furthermore, project results are often potential inputs for product development |
| **Small Size of Companies** | As mentioned in the Concept (ch. 2), these companies do not exceed 40 employees. |
| **Organizational Change** | The main factors that cause change in the companies |
| *Human Resources* | • Downsizing<br>• Permanent Staff hiring<br>• Non-Permanent Staff hiring<br>• Subcontracting<br>• Part time<br>• Consortium Participation. Many times Multicultural and Multidisciplinary project teams<br>• Career Path |

| | |
|---|---|
| | • Overtime Work |
| *Technology* | The business area of interest is strongly related with hi technology and innovation. |
| *Regulation / Law* | Greece, as a member of the European Union (EU), embeds or implements European laws and directives that may differ from the existing practices. On the other hand smaller changes in Greek law can also affect the companies. |
| **Big Projects** | (self explanatory) |
| *Consortia* | Two factors considered the most usual, result the need for consortium participation. A) Interdisciplinary professions through project team members and B) In order to bid for a big project, consortium participation is required. Often the participants do not have same (or any) systems and standards for Quality and Project Management. This creates stressful environment and challenge for the companies who are “forced” to follow different standards and system. Moreover, due to the small size of the companies, it is more difficult to implement simultaneously their systems (for the other projects) during these periods. |
| *Subcontracting* | Subcontracting in Geoinformatics is mainly for two reasons:<br>• The company does not have the know how for a work |

| | |
|---|---|
| *(covers also "outsourcing")* | package<br>• The company do not have the required resources |
| *Alliances* | Companies, who participate in consortia, widen their organizational relationships with other companies. It is usual that some relationships become more strategic and long term. |

### *4.2.1.3 INTERDEPENDENCIES MATRIX*

The following matrix, (table 4.3) shows the interdependencies between the factors. As for the factors, the interdependencies are also examined only from the project management perspective. The matrix **only** considers *major* interactions. The interdependencies may reveal a *topic* or *need*. Due to space economy the Factors are referred to only by their code (assigned in fig. 4.2). Furthermore, some of the stated interdependencies have little or no relation to project management, but as these generate tasks for project team members (due to the small size of the companies), the project based environment is affected. For this reason these interdependencies are analyzed only from this perspective.

Table 4.3

**Interdependencies Matrix**

| | Col. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Row | code | 1.1.1 | 1.2.1 | 1.2.2 | 1.2.3 | 1.2.4 | 2 | 3.1 | 3.2 | 3.3 | 4.1 | 4.2 |
| 1 | 1.2.1 | - | | | | | | | | | | |
| 2 | 1.2.2 | - | - | | | | | | | | | |
| 3 | 1.2.3 | - | PM philosophy for After sales | - | | | | | | | | |
| 4 | 1.2.4 | - | New markets | Add value, Change | Relationships | | | | | | | |
| 5 | 2 | Registered Founders | - | Know How, outsourcing | Minimize Know How Loss | | | | | | | |
| 6 | 3.1 | Organ. Str. Prj. Teams Pub Prj | Embed PM philosophy | Minimize Know How Loss | | | | | | | | |
| 7 | 3.2 | Innovation | - | Innovation | | | | Education | | | | |
| 8 | 3.3 | Tenders, Contracts | - | - | - | - | outsourcing | Complex Contracting | - | | | |
| 9 | 4.1 | - | Define copyrights | - | - | - | - | Know how transfer | | - | | |
| 10 | 4.2 | Experience, rights | - | Big Projects, Communication, Know how | | | | Know how transfer | | Contracting | - | |
| 11 | 4.3 | Know how / resources / Quality | | | | | Contracting | | | | | - |

### *4.2.1.4 SPECIALIZATION FEATURES*

In this paragraph, the outcomes (interdependencies) of the previous matrix will be analyzed from *the perspective of project management*. Every topic analysis generates specialization feature(s) for PP&I. Every “green box” of the previous matrix is referred to its coordinates (I, j) = (row, column).

**(3, 2) Services - Sales:** After sales in a projectized environment is strongly related with project management. As mentioned above, significant proportion of products are often developed using previous project results. After-sales are the common ways that lead to future projects, especially for commissions where there is no previous project with the particular customer. As project team members are involved with this part, there is a strong need for a co-existing customer oriented project management philosophy and technical expertise. The embedding of a project management philosophy into after-sales tasks can result in pre-sales and new needs for projects.

Specialization Features: (a) *expanding project manager's authority* concerning the project-related tasks and actions of after-sales and pre-sales.

**(4, 2) Private Sector Projects – Sales:** This interdependence is similar to the previous (3, 2) but the expected outcome is "new markets". Private Sector Projects (PrSP) are more easily customized in comparison with the Public Sector Projects (PuSP). For this reason there is room to explore new markets and apply organizational innovation in projects. In order to overcome their size constraint, small businesses can utilize new technology for distributing their proposals, or demonstrations (demos) of their work.

Specialization Features: The utilization of new technology in order to distribute new work (demos) and generate new projects requires small internal projects to create these demos. For this interdependence the feature that is derived is one more time the (a) need for salespersons who understand both project management philosophy and technical know-how. The technical know-how is

very crucial because salespersons are also involved as project engineers in many projects. (b) An account manager, in close collaboration with the project manager, will observe, and manage at the appropriate level the accounts assigned to the salespersons/engineers.

**(4, 3) Private Sector Projects – IT Studies / Technical Design:** Big projects also consume big time periods, thus, some technologies can become obsolete. Excluding the actions that will have great impact on scope, applying new technology is a pleasant and feasible change for Customer of PrSP. Adding value, by implementing small changes that obviously enhance the outcomes, and result in an up-to-date deliverable, can improve relationships with customers. In order to avoid scope creep or conflicts, the project manager should plan the possibility of such needs, and also help the stakeholders to agree to the definition of the term “small change”.

Specialization Features: As Geoinformatics projects involve a lot of IT, the (a) change management plan can include such definitions. (b) Value adding changes can also be included in the project’s lessons learned documents, in order to become specs, or standardized processes for future projects with similar scope.

**(4, 4) Private Sector Projects – Services**: In addition with PuSP where all the quality issues and specs are pre-defined on a project-basis, the Customer in a PrSP (that also has previous business relationships with the organization) have more *expectations* than a new customer. “*Customer’s expectations will go beyond the needs of the project to encompass more*

*subjective elements*" [Ch2MHill, 2001] Furthermore new customer need to be delighted in order to continue business with the company delivering the project. In both conditions the quality of the service is based on official and unofficial standards. This environment should be viewed as a challenge to improve organizational relations and show competitive advantage.

Specialization Features: (a) customer service plan (part of the project management plan) that addresses to quality issues.

**(5, 1) Small Size of Business – Studies / Technical Design:** In order to participate in PuSP as contractors, the founders must be registered members of the Register of Engineering, so the Company will also have the ability to be registered.

Specialization Features: (a) Registered Engineers – Founders, (b) Registered Company

**(5, 3) Small Size of Business – IT Studies / Technical Design:** Many of the companies often cooperate externally with people having the corresponding qualifications on a project-basis, or outsource the part of the project involving IT.

Specialization Features: (a) need to organize and implement a knowledge management process for IT issues, so that people involved with IT will be more innovative and productive.

**(5, 4-5) Small Size of Business – Services / Private Sector Projects & (6, 3-4-5-6) Human Resources – IT Studies & Technical Design / Services /**

**Private Sector Projects:** The human resources in the small Business environment have an increased role as a factor in organizational change and contributor to the loss of organizational knowledge. The issues that derive from "know-how" and "organizational knowledge" are numerous and complicated. However for this study, specific actions will be proposed. A Knowledge – SWOT – Analysis is carried out in order show major knowledge issues.

| **Strengths** | **Weaknesses** |
|---|---|
| • Small enough to be able to rapidly distribute and share information.<br>• Flexible roles and responsibilities that small companies have, resulting in a culture of sharing information | • Due to heavy workload, time is never enough for structured Knowledge management<br>• The large amount of knowledge, data and metadata that usually Geoinformation Projects result, are very hard to be handled even on an "effective backup" level, resulting in "safety backups" that have the "copy and hoard" role<br>• Because of the above situation, the projects' lessons learned are not effective, retrievable, and optimal for exploitation on new projects<br>• Some companies are still not certified to any quality standard (ISO or other). This makes a |

| | |
|---|---|
| | systemic approach to knowledge management more difficult<br>• In case of consortia (especially when multidisciplinary companies are involved) it is very difficult to define "knowledge objectives" for defining what must be kept in the company and what not. |
| **Opportunities**<br>• The new staff equals new knowledge and knowledge opportunities<br>• To develop a knowledge management system or knowledge management processes, that will improve the lessons learned system for the projects | **Threats**<br>• Staff turnover results in lack of knowledge for the company<br>• Increasing the workload might result in further difficulties for managing knowledge<br>• Due to the lack of structured Knowledge Management, an increasing size of the company will continue to make knowledge sharing more difficult<br>• Future projects may not achieve optimal performance, because even if knowledge is in-house, there is not direct utilization process. This can affect project success criteria (Cost, Time, |

| | |
|---|---|
| | Quality) |

Specialization Features: (a) Define the Knowledge Database and the interaction with Projects. (b) Define Knowledge Objectives and Deliverables for every project. (c) Assign knowledge handling to individual experts. This is very crucial because some of them might not work in the company. (d) Categorize Knowledge by Project Categories. This might result in improved “response-times” for future projects. (e) Assign the role of the Knowledge Leader or Manager to one of the employees. (f) Align KM with the Quality standard that the company follows (if any). (g) Define a timetable with milestones that requires the assessment of existing knowledge. (h) Motivate people to share knowledge and follow relevant processes. (i) For big projects that involve consortia, assign one person that will invest adequate time of the working day in the company’s knowledge issues of the project

**(6, 1) Human Resources – Studies / Technical Design:** The engineering degrees that give  to the legal rights for to carry out the Closed Profession – Studies, influence the way the organizational structures of the PuSP are developed.

Specialization Features: (a) Because of the closed profession that requires engineers having the legal right to undertake projects regarding their experience and education, there often exists the phenomenon of the “working” project organizational structure which differs from the official one.

**(6, 2) Human Resources – Sales:** The sales sector often results in not only to “simple sale of product” but also in new projects. Ch2M Hill [2001]

defines in the first chapter the roles and responsibilities of the project manager. The first two – focusing on the customer and creating the project vision – can be co-executed in the very early stage both by the project manager and the person who deals directly with the sales and service. Involve project management – project manager with the services that are being carried out after the sales by utilizing (besides the product) also the project oriented philosophy of customer understanding and needs for projects and services.

Specialization Features: (a) Key project management skill required is *leadership,* not only for the project manager but also by the persons doing the after-sales. Another issue is, (b) the sales engineers, under an expanded authority of the project manager, will anticipate, leverage, and expand project lessons learned, so the organizational knowledge related with projects and project management will interact by giving results and also being simultaneously improved.

**(7, 1-3-4-5-6) Technology – Studies & Technical Design / IT Studies & Technical Design / Services / PrSP / Small Size of Companies:**

As already mentioned, Technology is strongly related with the Geoinformatics business area. The key that these interdependencies generate is *innovation.* Innovation can be assigned to each factor of the above and result in specialization features.

Specialization Features: (a) Application of Innovation on projects will add value. (b) The organization increases its competitive advantage by investing on innovation projects. (c) Project execution can be aided by technology and

improving quality. (d) New technologies can create projects leading to new markets. (e) Small companies have the opportunity for bigger profits generated by conventional projects. (f) Innovation can cause long lasting changes in a project.

**(7, 7) Technology – Human resources:** Due to the small size of the company it is required that “few-people-know-many-things”.

Specialization Features: (a) Training. In order to utilize and maintain up-to-date technology, companies might invest in further education through seminars, educational programs and other. The planning of the education could be based on specific projects and categories that the company executes or on the other hand it could also be based on projects that the company plans to add to their portfolio.

**(8, 1) Regulation / Law – Studies & Technical Design:** The studies that are being carried out under the circumstances of closed profession should be planned to a very detailed level, because often there are situations like: a consortium can loose a bid just because of an individual’s academic degree!

Specialization Features: (a) Monitoring of Tenders and their legal issues

**(8, 6) Regulation / Law – Small Size of Business:** For this interdependence the issue is the very frequent outsourcing. The Outsourcing in this case refers mainly to project parts (and less significant to other enterprise activities such IT support, accounting, cleaning etc.)

Specialization Features: (a) Contracting control for project work packages. (b) Contracting control for PuSP. A maximum percentage for outsourcing can be defined.

**(8, 7) Regulation / Law – Human Resources:** in Greece contracting with employees and with co-operators is very diverse and complicated because of the many different public health insurance schemes and the way the profession is executed by each individual.

Specialization Features: (a) Contracting control

**(9, 2) Alliances / Sales:** Alliances lead to many project outcomes (especially systems and data). Many of these outcomes are not directly related to the deliverables, so no terms of use are applicable. Such issues apply to a significant amount of data that often leads to conflicts or misunderstandings and other problems.

Specialization Features: (a) Define the need for copyrights of the non copyrighted material at an early stage.

**(9, 7-8) Alliances / Human Resources / Technology:** Working with companies that are allies can create effective knowledge exchange and / or transfer. Because of the long term organizational relationships, there is a working environment where knowledge sharing is easier than usual.

Specialization Features: (a) Define Knowledge Objectives and Deliverables for every project (b) encourage exchanging team members for a period that common projects are being executed.

**(10, 1) Consortia / Studies & Technical Design:** Many projects require individuals and companies qualification licenses that usually exceed the capability of the typical Greek Geoinformatics company. Furthermore such situations create big project teams making the communication management issues.

Specialization Features: (a) Participate in consortia. (b) Communications Management. (c) Define Knowledge Objectives and Deliverables

**(10, 3-4-5-6) Consortia / IT Studies / Services / Private Sector Projects:**

In this interaction, again, the need for communications management is very crucial.

Specialization Features: (a) Communications Management. (b) Define Knowledge Objectives and Deliverables

**(10-11, 7-8) Consortia / Subcontracting / Human Resources / Technology:**

Specialization Features: (a) Communications Management. (b) Define Knowledge Objectives and Deliverables

**(10-11, 9) Consortia / Subcontracting / Regulation & Law**

Specialization Features: (a) Contracting control for project work packages. (b) Contracting control

**(11, 1-2-3-4-5) Subcontracting / Studies & Technical Design / Sales / IT Studies / Services / PrSP**

Specialization Features: (a) Contracting control for project work packages. (b) Define Knowledge Objectives and Deliverables. (c) Communications Management (d) Quality Issues

**(11, 6) Subcontracting / Small size of Business**

Specialization Features: (a) Contracting control for project work packages. (b) Define Knowledge Objectives and Deliverables

### 4.2.2 Development Part

The SPMA consists of three basic components that were *developed* in this research, (the SPMA is fully described in chapter 5). The SPMA includes other components (except the three *developed*) that are added in order to achieve an integrated approach (see chapter 5).

PP&I. One component that embeds processes and issues into the project. Through the Specialization Matrix the Specialization Features are assigned to the project phases and to the project related business development phases. The PP&I uses the project phases and the sequence of events that are take place into a project. The project phases and the sequence of events assure the compatibility of SPMA with other or/ and wider PM systems and tools but also can lead the user of the SPMA into wider project management practices (as already stated in the concept part of this Thesis the objective of this study is not to provide exclusive guides and methodologies).

RBS – WBS. The second component gives a general risk guide defining generic risks for the Geoinformation projects. This approach [Leopoulos et al., 2003] is a very dynamic and useful utilization of both RBS and WBS for risk management purposes. This philosophy of RBS – WBS matrix was adopted from literature, accommodated in Geoinformatics, and embedded into SPMA

PKBS. The third component is the Project Knowledge Breakdown Structure. Organizational knowledge in Geoinformatics corporations derives exclusively from projects. An endeavor for capturing knowledge in such environment should obviously begin from within the project lifecycle.

# 5 RESULTS

The results consist entirely of the SPMA

## 5.1 The Structured Project Management Approach (SPMA)

In this paragraph each component of the SPMA will be described from the perspective of the finished and integrated system.

Project Processes and Issues (PP&I) component consists of three parts, on the top of the table there are the sequential events of a project per phase. These events represent also the documents that are developed (but are not necessary limited to them) in order to manage the Project. In the middle are given general recommended actions of which the project manager of Geoinformation projects should be aware. On the bottom there is an extra categorization. The main role of PP&I is to overarch the project documents and processes while simultaneously optimize their use.

The RBS-WBS component is a generic risk definition guide, which aids both Scope and Risk management plans. The RBS and the WBS that constitute the RBS-WBS are in a low detail level. For each project the RBS and the WBS should be analyzed in more levels (detail)

The PKBS component shows the knowledge tasks involved in the project. The PKBS could also be represented as the roadmap that “shows” the way from project knowledge to organizational knowledge and knowledge management.

The SPMA also includes the "*Project Management Plans & Documents*" component, which consists of the *recommended* project management plans and "Organizational Environment" component which shows the interaction of the organization and its numerous specialties with the SPMA. Furthermore, there is one additional link between PKBS and a Knowledge Base. This link underlines the need for an existing knowledge base even in a very novice operation.

The next four pages, show the SPMA as well as the three developed parts (PP&I, RBS-WBS, PKBS)

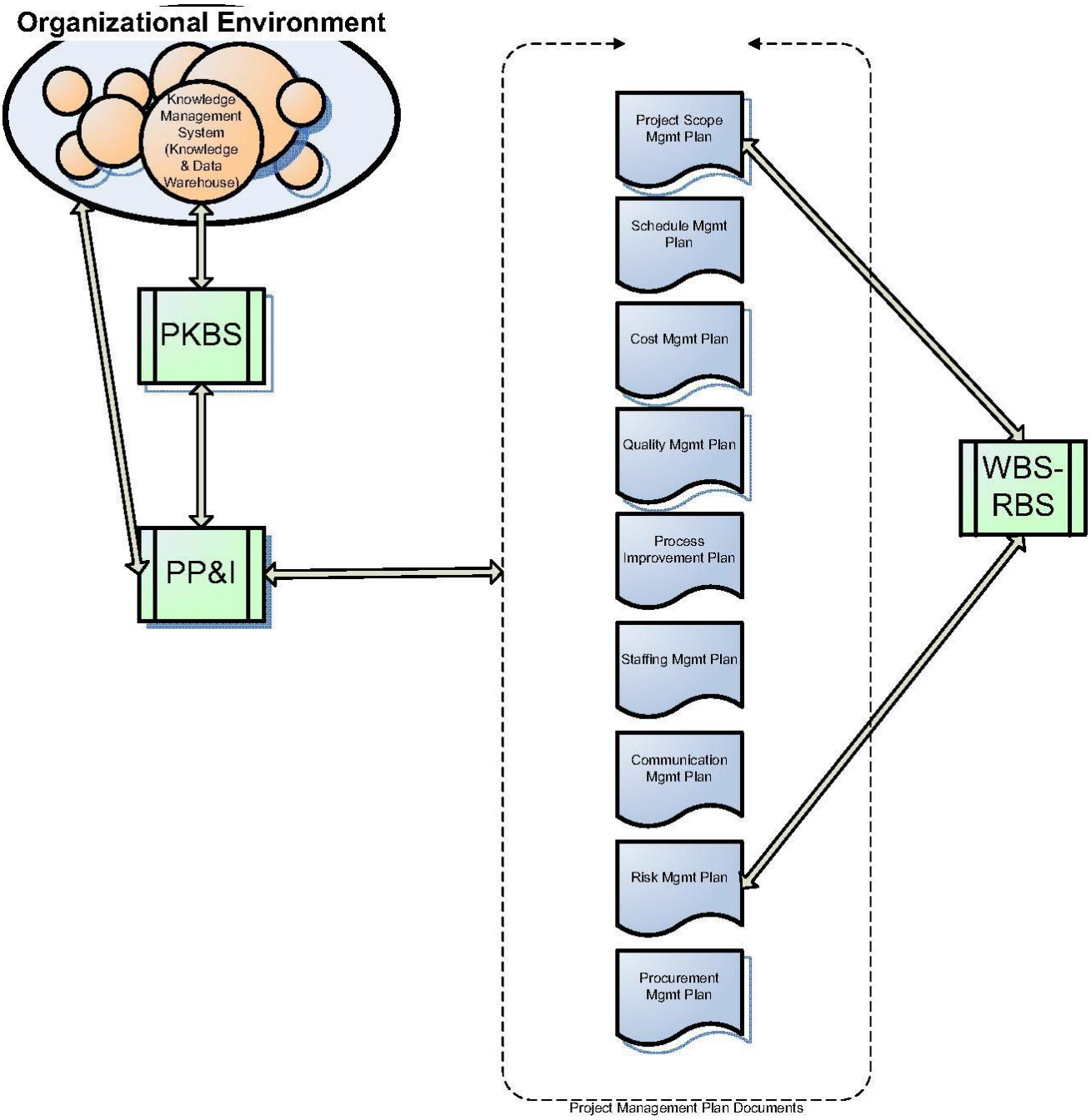


*Figure 5.1: the SPMA*

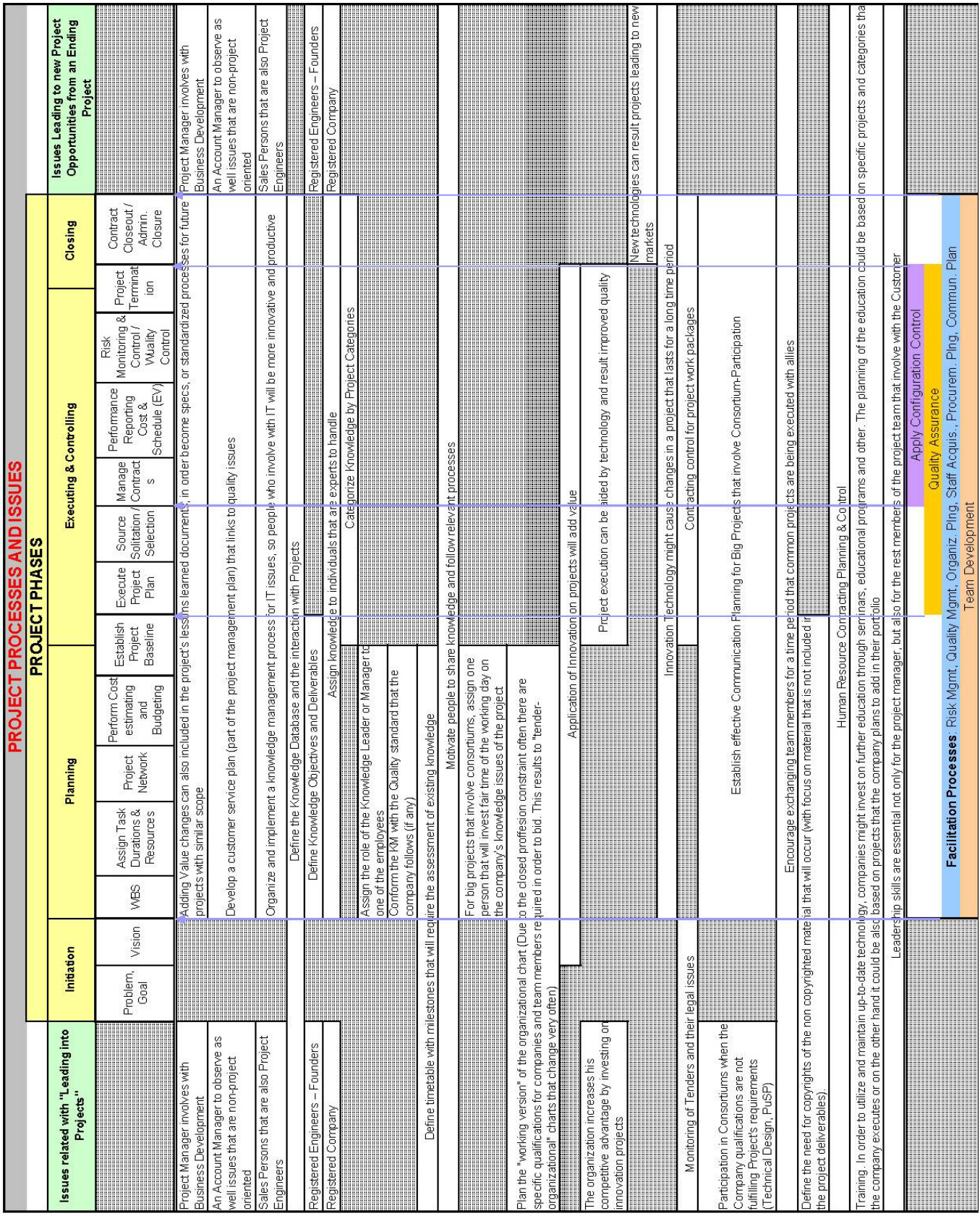


*Figure 5.2: The PP&I Component of the SPMA*

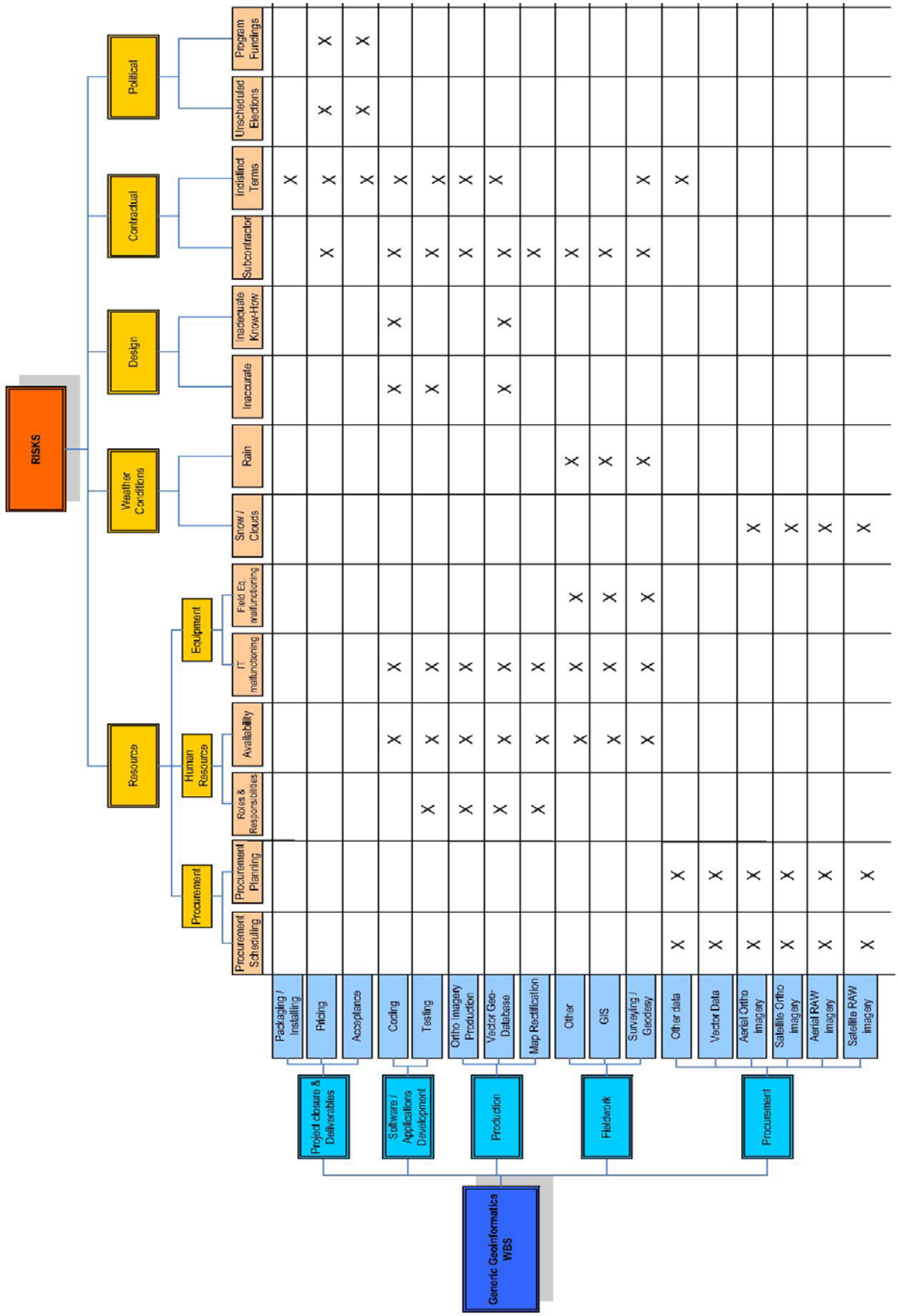


*Figure 5.3: The RBS-WBS Component of the SPMA*

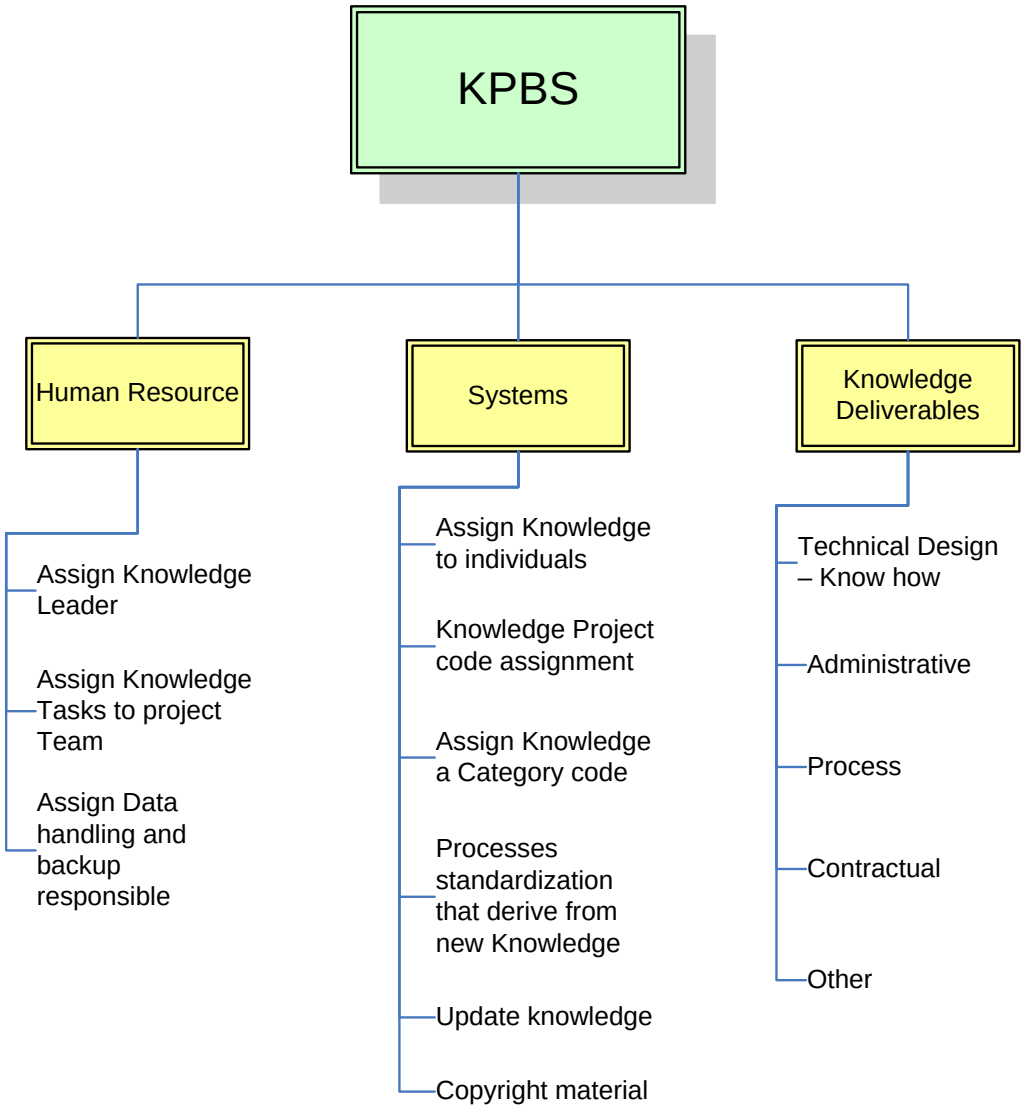


*Figure 5.4: The KPBS Component of the SPMA*

# 6 CONCLUSIONS

The study results a structured approach that embeds key processes of project management and of the Geoinformatics business area. Every component of the SPMA can be expanded depending on the needs of every corporation – organization. This capability represents SPMA as a flexible adoptable and compatible systems tool. The PP&I can include more specialization factors if required and leading to a very useful tool for a project manager. The WBS-RBS provides a disciplined way to define risks as well as the ability for further analysis that differs from project to project. The PKBS is a simple project oriented knowledge task and process tool that can provide directions for a knowledge oriented approach in order to embed knowledge management into a project.

The SPMA by its totality introduces a way that project teams execute projects in a structured way and develop standardized processes by applying knowledge management issues. The SPMA is simple for adoption by small sized companies as it does not consume excessive resources, while the “ROI” is direct and obvious as described in Purpose of Study (paragraph 1.2)

At the time this study ended, the Greek Government (aided by the European Union) called for a tender for the development of a National Project Management Standard. This fact proves not only the expanding awareness of project management, but also the necessity for companies to adopt as a minimum *structured project management* philosophy.

# 7 RECOMMENDATIONS

As mentioned many times during this study SPMA is flexible and expandable. It is developed having in mind the circumstances, the specialties, and the needs that companies in the area of Geoinformation have. The Author intends to apply the results of the thesis initially on two projects with low complexity in order to provide feedback and expand the SPMA. Feedback is a key term for the SPMA, as it should reflect a *learning part* of the organization.

Another field that is recommended by the Author for further study is the technology development that will support SPMA. An Information System that will allow the Components to interact dynamically could give SPMA the capability of continuous improvement to the ultimate degree.

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