



**INSUFFICIENT PROJECT PLANNING OF THE DESIGN AND  
INSTALLATION OF PHOTOVOLTAIC UNITS ON BOARD A  
SHIP MAY LEAD TO THE FAILURE OF THE PROJECT.**

**By**

**Patsourakis Ioannis**

**A THESIS REPORT  
Presented to the Project Management Program in the  
School of Management of  
City University of Seattle  
In Partial Fulfillment of the Requirements  
For the Degree of  
MASTER OF SCIENCE OF PROJECT MANAGEMENT**



06/2009



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## STUDENT NAME

Patsourakis	Ioannis, Nikolaos	Nikolaos	20099738
<small>Last name</small>	<small>First, Middle,</small>	<small>Futher's name</small>	<small>I.D.#</small>

## ADDRESS

8, Georgiou Soutsou	Egaleo	Athens	12243
<small>Number, Street</small>	<small>City</small>	<small>State</small>	<small>Zip/Country</small>

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	<small>Print or type name</small>	<small>Signature</small>	<small>Grade(d.,d)</small>	<small>Date(yy/mm/dd)</small>

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## STUDENT NAME

Patsourakis	Ioannis, Nikolaos	Nikolaos	20099738
(Last name)	(First, Middle,)	(Futher's name)	(I.D.#)

## ADDRESS

8, Georgiou Soutsou	Egaleo	Athens	12243
(Number, Street)	(City)	(State/Country)	(Zip/Country)

## COURSE

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### Dedication

This thesis is dedicated to my beloved parents Nikolaos and Aspasia and sisters Katerina and Antonia, whose help and support throughout the Msc proved to be invaluable.

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Finally the author would like to extend his heartfelt thanks to my friend Eugenia Fatourou for her continuing support throughout this thesis.

### Biography

John Patsourakis finished the 4<sup>th</sup> High School of Egaleo in 2000 and took his degree in Electrical Engineering from T.E.I of Piraeus in 2006. After completing his studies he started working for Oceanic Technical Services, a maritime company, as an electrical engineer on electrical works on ships. He has been working there ever since, filling a rather challenging position as he is in charge of designing and installing these projects.

Feeling the need to enrich further his knowledge on projects he registered for the Msc in 2007, pursuing a post graduate degree.



### Abstract

This thesis shows what needs to be done in order to have a proper project plan and what are the steps to be taken throughout the project that will lead to its success.

The project presented here has been a novel project for Greece and that means that due to its complexities and unforeseen risk factors it crashed, mainly because of an unsuitable project plan. Through this thesis, the mistakes that were made in the duration of the project are made clear.

The project mentioned is the design and installation of photovoltaic units on board a ship and the thesis presents the model project plan that could not only have been used for the project to be saved but can also be utilized as a valuable helping tool for future similar projects.

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## Chapter 1 INTRODUCTION

The depletion of the world's reserves in fossil fuel has become a sad fact in today's world. Therefore, ANEK LINES S.A have decided to install photovoltaic units on board one of their ships. For this purpose they have hired the company I work for as a project manager, OCEANIC TECHNICAL SERVICES CO, to carry out this project. After the customer's request, this project manager took on a project that would serve not only for the flawless operation of their ship but also for the energy saving, a crucial issue for the customer. Things didn't work out as expected though.

The purpose of this thesis is to demonstrate that through a thoroughly prepared project plan, based on the appropriate bibliography, the problems that occurred could have been predicted and eventually avoided. Furthermore this project, as it is intended to be a model one, can be used as a tool in future projects.

Being the project manager of OCEANIC TECHNICAL SERVICES CO, means that my position is of critical importance, since I am the one who has to make sure that the project is successfully completed. Additionally, since this specific

assignment is of great interest for my company, I have to be able not only to bring money into my company, but also make sure that the company's reputation is enhanced and firmly established, through my proper moves during the project. Taking all this under consideration, I should be able to display skills in different areas in order to achieve the goal in hand. I have to display leadership or else my project team will not perform adequately and efficiently. Certain communicative abilities from my part are essential so that I can communicate my vision to my project team and the stakeholders. This way, the members of the project team in turn, can cooperate better towards the success of the project.

Perceptiveness is another quality that I should demonstrate from the very beginning of the whole venture. I could therefore, predict any possible flaws that may occur throughout the project. Again, my communicative abilities should work here, as I need the full cooperation of my project team and the other managers of the company who could assist in detecting and preventing any such mishaps.

The project manager is first and foremost responsible for a thorough project planning. After careful consideration, along with the functional manager, I should be able to

provide a time frame within which the project has to be completed without any slippages.

Finally, drawing up an exact budget in cooperation with the financial manager and making sure that the project's works don't exceed it, is perhaps the most significant of my duties.

We should also bear in mind that the stakeholders in this thesis are the owner of ANEK LINES S.A. and the owner of OCEANIC TECHNICAL SERVICES Co.

The aim of this thesis is to demonstrate to the stakeholders the importance of a formal and thorough project plan and highlight the elements that were not taken under serious consideration and eventually led to the failure of the above mentioned project.

These elements include:

- The need for strategic planning of the project and its proper implementation.
- The proper way to handle all the people working for this project.
- The predictability of the work and the project's progress.
- The importance of making the right decisions in cooperation with or after negotiating with the stakeholders.

All the above, accompanied by the corresponding bibliography, will clearly prove the point that this project manager is trying to make.

Another fact that I also have to stress out is that I, as the project manager of OCEANIC TECHNICAL SERVICES, am answerable only to the owner of the company and in return the owner relies on me to carry out the project successfully and on time. Only with the proper completion of the job can the company collect the sum of money that was agreed as the total payment for it. Therefore, it basically is the responsibility of this project manager to provide the company with the expected income, and add to its good reputation in the market.

I aspire to show that this can be accomplished through careful preparation and flawless cooperation with the stakeholders, and hopefully provide any project manager who might find themselves in a similar position with a valuable tool.

The purpose of this study will be for me to create a model project plan, based on relevant bibliography, carefully prepared and comprehensible even to the layman so as to clearly show that with the thorough preparation any project can be achieved successfully. However, the creation of such a model project plan is a difficult venture since it is about a

project that has not been done before and of course it can be characterized as a novel project. As it is well-known a novel project cannot really be planned because it presents big complexities and certainly many unknown risks, that cannot be predicted beforehand.

As it has been clearly mentioned above, the customer has chosen to use photovoltaic units because of their "green" qualities, the depletion of fossil fuels our planet is experiencing and finally the profitable prospects they present.

We should not overlook though the fact that the use of such source of energy can have its drawbacks as well, which can be described as follows.

Firstly, the cost of the whole system can be prohibitive. It is well known that the initial cost of the photovoltaic units is a huge disadvantage because of the high cost of the materials needed for the installation of these photovoltaic units. Secondly, the panels used for the units need a wide area to be installed. Otherwise the whole system will not be able to perform adequately. Another problem is the toxicity that comes from cadmium and arsenic, which are materials used for the photovoltaic production. However if they are properly recycled this problem can be successfully dealt with. Furthermore, we should not forget that this is a

source of energy dependent on climatic conditions and is influenced by the occasional presence of the sun. This means that if the weather is cloudy the photovoltaic units may produce no power some of the time.



## Chapter 2

### PROBLEM STATEMENT

With the turn of the new millennium, the shipping company A.N.E.K. LINES S.A. decided to make some changes on the energy source aboard one of its ships. Its perceptive owner had already foreseen that the fossil fuel, which was running his ships, would very soon be depleted. Therefore an alternative source of energy should be found and implemented on his ships, beginning with his biggest one.

The Oceanic Technical Services Co. was given the job and I as their Project Manager was assigned the project of designing and installing a different source that would complement the generators of the ship and perhaps (in the distant future) even substitute them. The customer's ulterior motive was to save energy and of course money. After careful consideration, I came up with the idea of using photovoltaic units to provide some parts of the ship with energy. This whole idea posed a personal challenge for me, since nothing similar had been done before, on board a Greek ship. Besides, the photovoltaic units are most certainly environmentally friendly which has always been of the utmost importance to me. In other words, this is a novel project and as such, it surely presents a lot of uncertainties. We should of course need a project plan for it, no matter how uncertain the

project might be as it is much better to have a project plan that might predict and assess any risks involved than not having a plan at all.

It is a well-established fact that the basic principles of project planning include not only a detailed budget analysis but also a detailed analysis of the time frame. These are without a doubt the decisive factors that would lead to the successful designing and installation of the photovoltaic units on the ship.

However, towards the completion of the project, the feedback I was getting from my team was not at all encouraging. The reports coming from the financial manager clearly showed that we were heading towards serious cost overruns. To make matters worse, we realized that we had already exceeded our time plan.

Indeed we were unable to complete it on time and within our budget. In retrospect, it became painfully obvious that the project planning had not been without flaws. Right from the start, I had consented to a rather short time frame and a limited budget as well.

Unfortunately, this fact clearly showed that the communication among the project team members was not that effective. Obviously, the communication planning which I had been responsible for, did not work and the proper data I

should have got did not reach me. Therefore I made the wrong decisions. Had this been done, the whole procedure could have resulted in a success and not in the total disaster that occurred.

To sum up, the insufficient project planning of the desing and instllation of the photovoltaic units on board the ship may lead to the failure of the project.

### Chapter 3 REVIEW OF LITERATURE

The literature review for this Master Thesis includes two groups of sources: articles from electronic database (www.sciencedirect.com - Elsevier) and books relevant to the topic.

The themes the literature covers are: the importance of a formal and thorough project plan, the implementation of a project, the need for strategic planning in addition to network planning, predictability, managing the people, the decision making and the negotiation with stakeholders, and the planning for special equipment.

#### *The importance of a formal and thorough project plan.*

According to Kerzner (2006), the implementation of a carefully prepared project plan is of the utmost importance since it not only minimizes the uncertainties concerning the project's course and completion, but also improves the efficiency of the operation. It provides a better understanding of the project's objectives and a basis for monitoring and controlling the work done.

Lewis (2005) notes that good project management requires thorough project planning. It could create a great slippage though, not to consider certain mistakes that are usually made

and that may overturn any kind of planning that is done at the beginning of the project.

In this article, Jaafari (2007) present the application of certain diagnostics which can evaluate the health of large projects at any one phase and compare it to their desired target: their success. Jaafari (2007), also wishes to determine if a project team applies a systematic approach to the planning and management of the project. He presents a certain technique, which is called "PH- Check", a project health check and provides a graphical picture of the health of a project at a certain time. This picture can be found by evaluating the practices used to manage certain variables which are characteristic of the management practice on that project. The results of the health check can then be compared to the results acquired by more traditional project progress measurement tools and thus, lead to the general success of the project.

Smith (2007) wishes to establish the fact that when planning a project it is vital to define certain milestones throughout the project with deadlines. The project manager should clearly establish the project's objectives and requirements within a clear time frame. The milestones can be crucial to that but should also be selected bearing in mind any problems or mishaps that can arise. By demonstrating his/her foresight the project

manager can then anticipate problems and provide solutions on time so that project will be fulfilled successfully.

According to Verzuh (2005), the success of a project is mainly dependent on delivering the project on time without any slippages, being within the budget originally set and providing high quality and deliverables. By having all the above we can ensure the customer's satisfaction.

Additionally, when planning the project, the project manager should be able to present a statement of work (S.O.W) to the project's stakeholders which should clearly show the goals and constraints of the project. He should also provide the responsibility matrix to them so that each one would know their role in the project and the authority they may have throughout the whole process. In this way they will not be involved in each other's field of activities since they will be clear as to what they can or cannot do. All these steps taken by the project manager can certainly lead to the proper completion and success of the project.

According to CH2M Hill (2001) when planning a project the development of a proper workplan is another key element for its success. The workplan is a collection of certain documents that should be presented to everyone involved in the project and which clearly gives them all the necessary information for the project.

It provides them with the necessary data that will show them exactly what their part and responsibilities in the project are.

The author also states that the planning of a project is the most significant phase of it and that, if not performed properly right from the start, the project will not succeed. The workplan which is a part of it, refers to the techniques, the skills, the tools and the processes that should be applied so that the project team will meet the customer's requirements and successfully deliver the completed project.

According to Marmel (2007), the project management software is a very good way to monitor a project, since every project consist of many other different and difficult ones and of many procedures, as well, up to its completion. The project management software is very useful for a project, as it helps automates these procedures by performing the following:

Plan upfront. By planning beforehand your project you can make a better estimation of the time and recourses necessary for its completion.

View your progress. You can check regularly the project's progress from different aspects.

Recognize conflicts. You can also spot any conflicts that may be presented in the process and be able to provide the appropriate solutions right from the beginning.

Make adjustments. Another task that can be performed is the adjustments that can be necessary throughout the project, concerning its time frame or cost estimation.

Davidson (2000), states that a project is an endeavour which, in order to have the desired results, has to be executed within a specific amount of time and without overbudgeting. Therefore, the results of the project can be defined. However, we should bear in mind that every project is a unique process. He is also vital to say that every project may be confined by certain limitation if we want to establish an efficient W.B.S such as:

First of all we may be faced with limitations in our staff resources. Also there may be a cut back in the budget that was originally set. Furthermore the organizational resources or the equipment that were originally available can also be limited. Moreover delays on the arrival of vital items can become a reality and finally certain deliverables that have been prepared on time, may also be delayed because of approval procedures.

Having in mind that we need an efficient W.B.S, we should be able to overcome the above mentioned setbacks by performing the following.

After having recognized the events concerning these constraints, we should plot them through an outline, so that we can handle them successfully. We should also make the right assessment regarding the workdays that will be required for the



project so that we can calculate accordingly the necessary manpower and the supporting resources available, as to when and how long they can be available. Moreover, the establishment of a budget is crucial, not only for the whole project, but also for its specific stages or tasks. Finally, setting certain milestones will help meet the deadlines we should have already fixed and establishing a roster of deliverables that will be in accordance with these milestones. All these goals if set properly will most certainly lead to a successfully completed project.

Newell (2002) states that when taking on a project, certain constraints that may obstruct the project team's activities should be taken into account. Such constraints can be the project completion dates and the project budgets that should be estimated from the early beginning of the whole project process.

Furthermore, certain assumptions should also be made for the purpose of planning the project. Provided that we always have in mind the success of the project, we should successfully plan it, considering the availability of the project's resources and the vendors involved, the start dates and the contract signing. All these will lead us to the above mentioned assumptions which in turn will provide us with a precious help for the achievement of our goals.

Finally Newell (2002) says that a very significant formal process that should be put into effect is the change control

process. It should be established in order to control the project, from the moment that the scope baseline has been set and its aim is to control this scope baseline. Its purpose is to recognize any changes in the project funding, if and when there are changes in the project scope. These changes must be accordingly evaluated as to how much time and effort they may require and then implemented within the project's procedures. It is true to say that this whole process is a small project plan, as everything that is needed to be done when planning a project, should also be done when planning any project changes. When all this has been done then the cost, the schedule and the scope have been changed and the new project plan can be put into action.

According to Brandon (2006), a very significant part within a project is the procurement planning which is vital to its proper completion. In this stage, the description of the product is performed along with the description of the activities and services necessary, so that the project can be completed as desired. Following that, the product and the services are assessed so as to determine which are the most appropriate ones, according to their quality and the time and cost they may require.

Furthermore, the procurement planning procedure involves the contracts, which are in turn very crucial to the project. That is, because they contain the nature of the work that has to be

done and the tasks involved, the procurement of the proper materials and the deadlines of their delivery so that everything is exactly on time and there will be no time slippages.

Martin and Tate (2001) points out that programming all the future plannings meetings regarding the project at hand is a very important task. By doing this, everyone involved in the whole project process, can estimate and accordingly set aside the amount of time needed, based on certain factors.

First of all they should take into account how many people will get involved and how complex is the technology that will be used. The objectives of the project are also a vital element and the work and time that will be required are dependent on their extent and that means more planning. Finally an experienced team that may have worked on similar projects previously, can certainly be an asset since they may need less planning time. This of course, is something that should also be taken under consideration and combined with any historical data available from previous projects will provide more means that will eventually lead to success.

According to Hallgren and Wilson (2008), a certain planning process should be followed. Firstly there should be a project execution plan and the appropriate responsibility allocation - who is responsible for the electrical, mechanical and civil areas of the project. A time frame should also be set, the design and

fuction of the project and last an operational plan is very important as well.

The planning process should first begin with a clearly stated contract between the company and the client so that everyone involved knows what is expected of them. The project manager should then closely cooperate with the engineering, functional and other managers, so that he/she prepares a project plan that would lead to the completion of the project within the time limit set and without any cost overruns. This project plan should cover each each and every area of the project, including quality conditions, communications required resources and of course risk evaluation. The latter is no doubt a very important factor for the desired successful results. That means that the project manager should identify the potential risks and provide the potential ways of avoiding them.

Throughout the operations of the project, the project manager should also get regular reports from every manager involved, so that he/she can be up-to-date at all times and have the opportunity to deal with any problem presented. Finally if the whole planning is followed, the overall project can be successfully finished and delivered.

This article presents the causes of a project's time and cost overruns which are two of the most important factors that can lead to the failure of a project.

According to Frimpong, Oluwoye and Crawford (2003), an efficient project management plan plays a vital role in avoiding both problems. When a project manager uses the appropriate tools and techniques so that he/she can manage the money and the materials, the workers and/or the machines, it is almost certain that he/she can take the whole project to a successful completion without any delays or cost overruns.

*Implementing a project and the need for strategic planning in addition to network planning.*

PMBOK Guide (2004) states that for the implementation of a project, we have to prepare a proper project management plan, which will indicate how our project is executed (the order in which our work is being done). This project plan should include the following: "the project management processes selected by the project management team, the level of implementation of each selected process, the descriptions of the tools and techniques to be used for accomplishing those processes, how the selected processes will be used to manage the specific project, including the dependencies and interaction among those processes, and the essential inputs and outputs" (PMBOK Guide, p.88).

According to Zwikael, Cohenand and Sadeh (2006), the non-delay schedule (the early start) was found to be the most effective concept when it comes to project planning. This

specific approach can provide the project with limited project risk, limited project duration and improved project team development. If the newly developed, non-delay scheduling algorithm is also implemented, then we can have the best possible results concerning the project's duration.

Sang Hyun Lee, Fenionsky Pena-Mora and Moonseo Park (2006), note that the schedule delays and the cost overruns have become common practice in projects. With the aim of eliminating both the above, proper project planning is extremely important. Furthermore, the use of certain network-based tools (CPM-PERT) is imperative but unfortunately not enough. Along with them, when a combination of the strategic and operational approach is implemented, seems to cover all potential flaws of the project.

According to Naaranoja, Haapalainen and Lonka (2007), they discuss the usefulness of certain management tools when it comes to projects. It has been proven that a successful organisation should be run according to its set mission, vision and strategy. These are the tools that could be used accordingly throughout a project and lead to its success. Specifically, a project should also have a mission, that is a certain goal. A vision, as to how and where it should proceed and certainly an arranged strategy that could lead to its success.

Furthermore a successful project should also have a clear direction and this should of course be given to the project's

stakeholders. Without it, a project manager cannot show where the project aims to go or which are the desired results. Therefore it certainly is an important element for the overall success of the project.

According to Lewis (1995), in order to have an effective planning you need to answer the following questions:

What must be done?

Who will do it?

How will they do it?

How long will it take?

How much will it cost?

The answers to these questions involve certain tasks such as estimating. By using the appropriate tools such as W.B.S, CPM/PERT and Gantt schedules, we can tackle these tasks and achieve our desired goal which is of course the project's success. The author also stresses that the key factor for a successful project is the tactical planning. However if not applied combined with the appropriate strategy, the project may fail. It is obvious therefore, that planning and strategy are interrelated to each other and that they are both essential to the proper completion of a project.

According to Artto, Kujala, Dietrich and Martinsuo (2008), a project strategy is vital if we are determined to complete a successful project. Also they state that the project strategy

shows first and foremost the overall goal of the project manager, the direction that he/she wishes the project to follow. It also shows that this direction may change in the process, but this is not necessarily a negative factor as, if the changes are addressed properly they can also contribute to the success of the project.

Additionally, the project's success is well established when the project has fulfilled its goals and met with each stakeholder's approval. This, in turn shows that the environment in which a project is developed, is another element that has to be considered

All in all, the project strategy has to be the first and most important tool for a project manager that has to be planned and executed thoroughly in order to lead to success.

#### *Predictability.*

Raymond M. Henry, Gordon E. McCray, Russell L. Purvis and Tom L. Roberts (2007), regarding the meeting of the project's cost with the duration objectives, predictability plays a vital role. The predictability on the project's success is based on bottom-up estimating techniques, the supporting activities of team reliance, realistic targets and professional experience.

According to Zwikael and Sadeh (2007), a project's success is highly dependent on a thorough project plan. Specifically,



when it comes to projects with high level of risk, it is stated that all four of their aspects: the schedule overrun, the cost overrun, the technical performance and the customer satisfaction can be substantially improved with a better and more effective project plan.

On the other hand, a surprising finding of Zwikael, Sadeh (2007) according to field of studies, is that an improved project plan has no significant effect on a low risk project.

To sum up, it is clearly shown that a more effective project plan is highly useful to high risk projects.

#### *Managing the people.*

Min-Yuan Cheng, Ming-Hsiu Tsai and, Zhi-Wei Xiao (2006), state that an appropriate and wise method of handling the manpower working on the project is a key factor to its success. The human resource planning should be intertwined with the work plan, so that the result can be the successful course and completion of the project.

Meredith and Mantel, Jr. (2006) write about certain requirements that should be fulfilled so that we can have proper planning during the course of a project. There should be clear instructions, so that the Project Manager along with the project team will be able to complete the project without any cost overruns, time slippages and performance failings.

Heller (1998) discusses in this book the fact that working with teams and having a harmonious co-operation with your colleagues is a key element to achieving your goals, which is the proper and successful completion of a project. Therefore, the groundwork that should initially be done when dealing with a project is the wise selection of the team members. They should be chosen according to their skills and having in mind how these can be used to their maximum on the proper solutions. The manager should be able to apply his/her communicative skills and recognise each person's abilities so that he/she can place them at the best possible solution within the team. By doing this each and every one of them will be aware of exactly their assigned duties and also establish trust among them. This is, after all and according to the author, one of the golden rules if you wish to complete the project at hand with the desired successful results.

Flannes and Levin (2005) clearly state that if we want to ensure a project's success we should first of all establish the proper project team. The proper teamwork is dependent on this selection and can be guaranteed if the project managers chooses wisely. According to the authors, it is crucial for the project managers to be able to perform that task and in the process to constantly improve this team's performance. His/her communicative skills will be his/her tools so that he/she can explain clearly to each team member their purpose, the project's goals and most

importantly their individual part on this. The project manager should be in a position of monitoring each member's performance by keeping an open channel of communication with them. He/she should also keep them always alert by constantly reminding them the importance of the project's success. This is the key to fulfill your goal which is of course the flawless completion of the project.

CH2M Hill (2001) states that the project manager, whose final goal is to fulfill a successful project, should first and foremost assemble the proper project team. In order to achieve that, he should take into consideration a certain process that must be followed for the team's development and consists of the following phases.

Forming. This is the gathering of the team and is basically the phase when people are waiting to see the goals and objectives of the project.

Storming. This stage is characterized by a turmoil and there may be conflicts among the team members. In this phase, their responsibilities and authority are determined and the relationship among themselves, as well. Therefore it is expected that a certain amount of conflicts will be presented.

Norming. In this next phase, all the conflicts have been eliminated and it is time for the team members to apply their

skills and proceed to effective decision making and establish functional relationships.

Performing and Excelling. Finally, we reach this stage when the team spirit is prevalent and the high quality performance becomes common.

After all these stages, a strong team has been established, ready to achieve their goal which of course is the success of the project.

According to Newell (2002), it is undeniable fact that one of the reasons that a project may fail is the lack of its scope definition. In other words, the customer may have different expectations from the project that the project team and this of course can present difficulties throughout the whole project's process and even lead to its failure. In such a case, it is the project team's duty firstly to completely understand the customer's wishes and then try to make them realize that they have the knowledge and the "know-how" to achieve them. For this purpose it may also be necessary for the project team members to work in the customer's area for a while and trained in the work that the project is aimed at.

According to Belker and Topchic (2005), deal with a vital objective that every Project Manager should be able to accomplish. The development and building up of trust and confidence among your team members. It is widely admitted that

when it comes to compare individual work to group work, the decisions are better taken by groups. Therefore, it is important to build a strong team and that also means building their trust and confidence. It has also been established that since the technology is rapidly progressing, it is next to impossible for a single person to be aware of all its applications. So, a Project Manager most certainly needs the support of his employees, who may have very useful input to provide. In order for all this to work, the Project Manager needs to build a strong team spirit so that the project team can perform to the maximum of their abilities. Certain factors are very important for the accomplishment of this goal.

Firstly, empowerment. If you wish to have a confident, strong project team you need to encourage them by giving them the right to make certain decisions as long as you, as a Project Manager, have already set certain limitations they should have in mind. This can only create stronger bonds among them and provide them with more incentive to pursue the project's success.

Secondly, clear roles and responsibilities. Another basic element for the success of a project, is the clear definition of each team member's role within the project. Each and every one of them should be very clear as to what their responsibilities are. Not only that but they should also be aware of the other members' responsibilities and their leader's role as well. Providing they

know all that, a high team spirit can be created, that of course is bound to lead to success.

One of the most important factors of a successful project, is according to Raiden, Dainty and Neale (2004), the human resource planning. They point out that, it is of the utmost importance to be able to match the suitable and most efficient employees of a large construction organisation, to the appropriate position within a project team. In other words, one of the key elements for the successful completion of a project is, for the project manager to recognize the individual qualifications of certain employees and manage to appoint them to a position, where they can fully deploy their skills and thus, contributing to the overall success of the project.

#### *Decision-making and negotiations with stakeholders.*

According to Graham M. Winchard and John Kelsey (2005), the daily practices of eighteen construction planners base project planning- up to a certain extent - on rapid decision-making following the negotiations among the interested parties. This makes it a rather important factor for the success of the project.

This article presents the findings of a study which shows the relationship among the stakeholders of a project and their influence on a project's success.

According to Wang and Huang (2006), the engineers that were studied in this research use "relation/ guanxi" among the stakeholders as the most important criterion of a project's success. The article shows that the stakeholders' performance can be a positive factor and should be integrated into a big project team. The most important of them being the project owner, he/she should be the one who should provide his/her support to the project. By making him/her realize that the time, the cost and the quality of the project are its most crucial elements we can obtain his/her support and ensure the overall success. This fact, combined with the harmonious correlation among all the stakeholders are certainly the determining factors for the successful completion of every project.

According to Young and Jordan (2008), a factor of the utmost importance for the success of a project is the support coming from the top management. This study clearly shows that a successful project is certainly dependent on the contribution of the top management's support, which can be crucial when it comes to important issues concerning the project such as conflicts that will probably arise during the project. If this support is provided then it is certain that, along with the other tools and mechanisms used by the project manager, the project will be successfully completed.

Special equipment planning.

B. Dodin and A.A. Eliman (2008), say that, when a project is being planned, it is sometimes deemed necessary for specialized equipment to be used for its successful completion. Equipment planning therefore is essential, which then should be integrated with the project scheduling in order to have a realistic, cost-effective project. Failing to do so can have a serious impact on the project and may lead to it's crashing, unless certain factors are taken into account: the activity crashing, the equipment setup, the operator's overtime, their transition and idle time.

This paper has used an empirical study on the opinion of industry practitioners about project planning and has presented live projects to establish the following: projects generally suffer from the tendency to run over budget, exceed their time frame and even fail to fulfil the stakeholders' expectations regarding the project's scope or quality.

Therefore, Hartman and Ashrafi (2004), shows the work on the development and testing of the SMART™ project planning framework. According to the authors the traditional project management methods seem to be insufficient and cannot solve the above mentioned problems. In contrast, the SMART™ project management framework can provide an integrated solution that covers all the major concerns of a project. It uses tools which provide the mechanisms for planning and executing a project adequately. It



also shows that internal validation is another significant factor that contributes to the success of the project.

This article has assessed on an empirical basis the quality of the (Project Management Information Systems) PMIS that are currently used in organisations. Not only that but it also shows the impact they have on project managers and their performance. It tests the quality of the PMIS and their information output, their use and their effect on both the project's and the project manager's performance.

According to Raymond and Bergeron (2008), a large percentage of projects developed with the support of a project management information system has succeeded. That means that these projects gained an advantage, regarding the effectiveness and efficiency of managerial tasks.

The project management was able to demonstrate a better project planning, scheduling and overall controlling of the project, so that eventually the deadlines were met, the budget control was improved and the technical specifications on the project were fulfilled.

According to Loch, Demeyer and Pich (2006), we cannot really plan a project when it comes to novel projects. A novel project, as it is something that has not been attempted before, can present certain risks impossible to be predicted and too many factors that cannot be foreseen. However, the need for any

project is undeniable even if it may seem rather impossible to be prepared. That is because through a thorough project plan we can identify the possible risks of the project, evaluate them and attempt to prioritize them. It is the only way to solve any problems that may be presented. It is, after all, much more preferable to have a project plan, however insufficient it may seem rather than not have one at all.

To sum up, when undertaking a project the first and most crucial step the Project Manager should take is the thorough preparation of a detailed project plan. After negotiating with the stakeholders his decisions should be made quickly, thus making an early start and bringing the project one step closer to its successful completion.

The predictability on a project's success is also an important factor to be considered, based among others, on estimating techniques and the project team's reliability. Through the Project Manager's wise human resource planning and by making sure his instructions are clear, the project's implementation follows.

Last but certainly not least, the very probable use of specialized equipment should also be planned and integrated with the project scheduling. Taking everything into account and putting them into practice the completion of a cost-effective

project that also meets the required deadlines is nothing but a "one-way street".

#### Chapter 4 METHODOLOGIES AND PROCEDURES USED IN THE STUDY

The thesis presented here is a literature review. This writer has attempted to establish, through the respective bibliography, what has to be done before the beginning of a project and during its process as well, so that we can achieve the desired results. A successful project without overbudgeting or cost overruns.

First of all, it should be noted that, I have chosen this specific topic as my thesis due to the personal experience I have had at my work place. There I was given the chance to take on the project of designing and installing photovoltaic units on board a ship. During this project's process, I came to realize that if we do not plan properly our project beforehand and follow the suitable strategy, if we do not select well-trained people to work with, then it is almost certain that the whole project will end up in failure.

Furthermore, all the books and articles and generally all the resources that were used for this thesis, came from the library of the City University, the Msc books and electronic libraries, as well. It should be stated that, after a thorough study that I have conducted, I found the suitable resources that have provided me with the knowledge of what makes a proper project planning which in turn can lead to a successful project.

The spark for this attempt of mine to take on this thesis was presented during the PM 501 course (Introduction to Project Management) where I found extremely interesting the fact that the success of a project is mainly dependent on delivering the project on time without any slippages, being consistent with the budget originally set and providing the customer with high quality deliverables. Apart from that the PM 504 (Project Planning and Control) course made me realize the importance of the proper implementation of a project and how crucial this is for its success. Consequently, I have decided to base my thesis on them and focus on the problems of overbudgeting and time slippages.

As this whole venture of mine is based on and deals with a project that failed, certain conclusions have been drawn. Specifically, through the evaluation of the insufficient project planning of the design and installation of photovoltaic units on board a ship, I came to realize that first of all, it is clear that the lack of the strategic planning and the formal and thorough plan of the whole project has been the main source of its crashing.

Furthermore, if I had organized my project team in such a way that everyone participating in it would have a better understanding of their duties, not only the design but also the installation of the photovoltaic units on board the ship would

have run smoothly. This way the decisions that were made, would have also been decisive to the successful completion of the project. This research will show that all the above mentioned facts triggered a chain reaction of mishaps, which in turn led to the over budgeting of the project and the serious time slippage that finally occurred.

Finally, this writer hopes that the above conclusions will prove to be invaluable to the company I work for, since they will clearly show that no project should be undertaken if no thorough and detailed work plan is prepared.

Following, the chapters that constitute this thesis can be found.

Chapter 1- Introduction	10 December- 20 December
Chapter 2- Problem Statement	21 December- 30 December
Chapter 3- Review of Literature	10 January- 10 March
Chapter 4- Methodologies and Procedures	25 January- 20 March
Chapter 5- Results	25 March- 15 April
Chapter 6- Conclusions, Recommendations, Discussion	20 April- 10 May

## Chapter 5

### RESULTS

To begin with, throughout this thesis it has been established that the project presented is one that was taken on in the past and failed. It has also been established that we were faced with certain problems caused by certain significant mistakes that were made and eventually led to the project's failure.

Specifically, the problems that we had to tackle were related to the time frame of the project, the budgeting and the quality of the deliverables. Not only that but we also had problems with the communication - or lack of it - among the project team members who were involved.

The first problem that we faced was that there did not seem to be proper communication among the members of the project team and as a result no proper co- operation as well. That obviously happened because the roles and responsibilities that each one should have in the project were not clear to them. Consequently, they did not know exactly what they were supposed to do and so it was unavoidable for everyone of them to be getting in the way of each other's duties. Additionally, the initial designing of the project team had not been the best possible one, meaning that the suitable persons were not assigned accordingly to the proper positions within the team. That obviously can explain the team

members' confusion concerning their parts and areas of responsibilities in the project and another factor that led to the project's failure.

Apart from that, another mistake that was made was that as the project manager, I failed to keep my project team alert by constantly reminding them of the project's goals. I should have been more active by setting more regular meetings with them and help them not to deviate from the project's objectives.

Another problem that we faced was the quality of the materials we used which, as it turned out was not the highest possible.

It has already been stated that the project we took on was something that had never been done before, so there was confusion and considerable concern within the company as to its success. As a result, we took certain steps without proper consideration concerning the suppliers of the materials. Those suppliers involved did not have the suitable knowledge of the project and therefore provided us with low quality materials that did not meet the suitable specifications. In addition, there had not been any specific penalty clause in the contract concerning them. As a result, although the materials proved to be unsuitable for the project, we were not able to replace them at the suppliers's expense or get a refund for them.



Another problem that led to the project's failure was the wrongly planned time schedule. The lack of any milestones within the project that would set the necessary deadlines and resulted from the fact that we were dealing with a novelty, became painfully obvious especially towards the final deadline that we had originally set and of course were not able to meet. Additionally, the project's time slippage was also caused by the already mentioned bad communication among the project team's members. Because of this, there was a considerable delay in the decision making when it came to the problems that we faced.

Additionally, an array of problems came up concerning the time and the cost of the project because of the bad communication and co-operation among the team members. Due to that fact, they were unable to solve properly the problems that kept presenting throughout the project's course and make the proper decisions on time. As a result considerable time slippages occurred. Moreover, the time slippage was enhanced because of the procurement problems that have already been mentioned. Specifically, since our originally selected supplier, created such problems, we were forced to look for a new one that could cover our project's specifications. That of course proved to be a very time-consuming process which led us completely out of our original timeframe.

Apart from that, replacement of the supplier also affected our budget. With the new materials of higher quality, the project cost became significantly higher as well, so there came the overbudgeting.

Here, it should be noted, as has already been stated in the first chapter of this thesis, that one of the negative aspects of the photovoltaic units is the cost of the whole system that may be prohibitive. In our project's case, this unfortunately was verified, as the cost of the materials we eventually had to use was extremely high.

Finally, the manpower that we had estimated we would need for the project turned out to be insufficient. Obviously, we found ourselves in the position of hiring more people since the ones who had started working on the project were not enough to cover its needs. The project proved to be much bigger and much more difficult than predicted and hiring more workers became an unavoidable reality.

As far as our project is concerned, the major problem of the overbudgeting should have been dealt with through a series of considerations.

Chapter 6  
DISCUSSION, CONCLUSIONS, RECOMMENDATIONS

To begin with, it should be once again pointed out that the project presented in this thesis was one that had never been done before in Greece. This fact certainly renders it a novel project and this means that its complexity and risk factors could not have been foreseen. Consequently, a viable project plan could not have been applied as there is no previous experience resulting from pre-existing similar situations. By definition, a novel project is something completely new and unknown and therefore no one can predict its exact course.

However, since there cannot be a project without a project plan and according to the theory of novel projects, there should definitely be applied one, no matter how impossible it may seem. This is the only way that will allow us to identify the risks involved, evaluate them and prioritize them accordingly. It will also help the project team and the stakeholders co-operate in dealing with the potential problems of the project and come up with the proper solutions for them.

Taking everything into account, a project plan was prepared for the project of this thesis. Yet, certain very serious problems arose starting with the bad communication among the project team members. The problem was that the areas of authority for each team member had not been clarified from the start and

therefore it was inevitable for their duties to clash with each other and cause serious confusion.

It is obvious that a proper project team should have been organized right from the start so that its members could cooperate harmoniously. This would have been a key factor in order for the project not to crash. In other words, if we wish to have a strong team that will be in the position of facing any problems presented and solve them successfully, we have to make sure that it goes through certain stages:

Forming is the first stage in which the suitable persons for the project are gathered by the Project Manager, they get to know each other and expect to understand the project's goals and objectives. Then, they have to go through storming, which means that they have to realize their individual roles and responsibilities within the project. Norming is the next phase, where the team is established and the members are able to apply their skills and make important decisions concerning the project. Finally, the phase of performing and excelling is the one where the whole project team can demonstrate high performance and deal successfully with any kind of potential problem.

Furthermore, in order for a project team to be strong and work flawlessly the project manager should be able to explain clearly and remind constantly to them what is the project's goal, so that they never deviate from it. He/she has to make them

realize which exactly is their part in the project and what responsibilities they have, so as to avoid getting in the way of each other's work.

Last but not least, the project manager ought to show his/her trust and confidence to his/her project team. This is certainly a strong motive for them and will provide them with the confidence to make important decisions after having co-operated with each other in harmony. After all, any good decision is better taken by a strong team than an individual.

Furthermore, the suppliers we had selected to provide us with the necessary materials for the project, were also inexperienced to photovoltaic units. Consequently we received materials unsuitable for our project and of low quality. That of course meant that the quality of our deliverables was not of the highest standards and did not fulfill the customer's expectations.

What should have been done, is clearly a proper procurement planning which plays a major role in the completion of the project. And this is something that did not happen in our project as it has already been shown. During the stage of the procurement planning, which must be done very thoroughly, we very carefully check and select the materials that are of the proper quality and will be delivered on time and on the pre-fixed price. The procurement planning also takes into account the project's

contract, where it should be clearly agreed with the suppliers that if the materials are not of the agreed quality or not delivered on the agreed time and budget, then they are obliged to reimburse our company.

The timeframe we had set our project, became another serious problem, since we had not established any milestones for deadlines throughout the project. As a result, each time that a problem or mishap occurred, there was not enough time for us to deal with it successfully.

Consequently, the original step we should have taken is to set milestones for our project. This way, we could be clearer on our deadlines and in the position of meeting them successfully. This way, even when problems were presented we would be able to spot them and tackle them on time, since the milestones would have made our deadlines very clear. Furthermore, a better designed project team could have prevented the confusion among the members and help them make the decisions on time.

Overbudgeting became another reality for our project, deriving from different sources. First of all, the replacement of our suppliers with more knowledgeable ones was necessary. Thus, the already paid materials that had been provided by them and was one of our main problems were replaced as well, with higher quality ones, causing of course extra cost. In other words, a fact that has already been stated in this thesis proved to be

true: the cost of the whole system of the photovoltaic units actually became prohibitive.

Finally, the manpower we had predicted that would be necessary for our project proved to be less than enough, since we had not anticipated all the works that had to be done because of the novelty of the project. Therefore an additional number of workers were hired, burdening considerably the overall cost.

On the face of the above, the major problem of the overbudgeting should have been dealt with, through a series of considerations.

Firstly, if we had selected the suitable supplier, through the proper procurement planning, we could have estimated the exact project cost. We should also have estimated a better Work Breakdown Structure (W.B.S), which could have enabled us to make a correct assessment of the days needed for each task and therefore the manpower we would need to work on it. It could also be extremely useful for our project, if we had put into effect a change control process. Since it is almost certain that changes occur in every project, this process would have enabled us to anticipate them and act accordingly so that we would not have jeopardised the cost or timeframe we had set.

In conclusion, it should be stated that when it comes to a novel project, as was clearly the case with the project presented here, a proper project plan is of the utmost importance. Although

this novelty means too many "unknown unknowns" and risk factors for the whole project, a very thorough project plan is crucial as this the only way that a project manager with his/her team can spot the risks and assess their consequence for the project. This is the only way that they can therefore prioritize them and apply any solutions deemed necessary for the proper course of the project that will eventually lead to its successful completion.

Throughout this study, it has been well established that a thoroughly prepared project plan is essential for the project presented and which has already been clearly recommended. Specifically, the proposed project plan has provided solutions for the problems that we had to face during its course and were related to its timeframe, its budgeting and the quality of the deliverables. Additionally, problems concerning the communication and co- operation within the project team.

Once again, it should be taken under serious consideration that this project plan is a model one, since the project it refers to is a novel project: something that has been done for the first time in Greece. Being such a project, it is intended to be used as a useful tool in future projects that would be related to the design and installation of photovoltaic units on board ships.

Having already mentioned at the beginning of this chapter the steps that should have been taken for our project to be



successful, you can find below a project planning checklist in the form of a template.

This template can be used by the Project Manager at any time of "crisis" that may occur during the project and help him/her decide what needs to be done quickly and efficiently when such actions are needed.

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Appendix

<Project Name>

**PROJECT PLAN CHECKLIST**

Project Name:

Project Manager:

Prepared by:

Signature/ Date:

ITEM	ACTIONS	CHECK
<b>Communication</b>	1. Good design and organization of project team (Forming-Norming-Storming-Excelling).	
	2. Clear roles and responsibilities or project team members.	
	3. Project Manager's trust and confidence in his/her team.	
	4. Clear constraints concerning the project scope	
	5. Clear assumptions concerning the project scope.	
	6. Well defined project's criteria.	
	7. Project Manager encouraging his/her team and reminding them of project's objectives.	
<b>Procurement</b>	1. Arranged meetings with everyone involved regarding the contract (explaining and clarifying).	
	2. Thoroughly prepared contract.	
	3. Detailed procurement Planning.	



ITEM	ACTIONS	CHECK
<b>Time</b>	1. Set milestones.	
	2. Project team's ability to make right decisiond fast.	
	3. Change control process.	
	4. Estimation of work effort.	
	5. Estimation of duration each project's task.	
<b>Cost</b>	1. Careful selection of suppliers	
	2. Well prepared W.B.S with subtasks	
	3. Change control process.	
	4. Estimation of work force	
	5. Estimation of duration of each project's task.	