THE CRITERIA OF PROJECT SUCCESS

By

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This Master's Thesis is dedicated to my parents, Kyriakos and Aspasia, for their

unlimited patience and encouragement, without which this course of study in

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Athens
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Biography

Anastasios K. Boukanos[1], Mechanical Engineer

Anastasios K. Boukanos is interested in the area of Planning & Design in Buildings Infrastructure. With a Bachelor (BA) in Mechanical Engineering (June 2005), he specialized in *"Treatment & Recycling of Industrial Waste"*. As an undergraduate student he worked for the Hellenic Aerospace Industry (H.A.I.) in the Department of Aircraft Maintenance. He participated in the work group for the "Upgrade Program Mirage 2000" (September 2004) which granted him a wide experience in the area of Aerospace Engineering, while he benefited from a very good level of in-service training.

After graduation, he joined a post-graduate program of the City University of Seattle (October 2005). With a variety of subjects ranging from Principles of Leadership to Financial Management, he managed in being recruited by a Software Design company. He made part of a team that was sponsored by the Greek Government in order to develop software for special use (City Planning Software), while he was appointed tutor in adult in-service training classes.

His work experience has widened since he undertook small projects in renovation of urban residences in the wider area of Athens.

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Abstract

This thesis is based on the theory of the triple constraint (cost, time, quality) for measuring project success and its inability to explain all cases of success/fail projects. In order to present and apply a new and extended model incorporating the extra parameter of the ***key stakeholders' satisfaction***, research was conducted using both theoretical analysis and qualitative data taken from a specific working environment (Geodyktio company). In addition the ***Balanced Scorecard***, that is a Project Management tool, was used in order to identify project success criteria. We hope to be able to extend our research in the future and contribute to a more clear theory of project success.

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Chapter 1 - Introduction

1.1 Nature of study

Despite the years of individual and corporate experience of managing projects and despite the fact that many projects meet the three constraints (cost, time, and quality), project results continue to disappoint stakeholders.

Project success criteria are a set of principles or standards by which project success can be judged. These are the conditions on which judgement can be made. The basic criteria of cost, time and quality (C.T.Q.), also known as the "Iron Triangle" or the "Golden Triangle", have been traditionally used as project success criteria.

However, these three criteria have been criticized as being inadequate for a series of reasons. Let us take the example of project completion times. Because of the delays, project managers occasionally pay penalties that increase the total cost of the project. Yet these projects are still considered as successful. Another example is linked with customer acceptance. We may deliver a project which was implemented on time, within cost and to some quality parameters requested, but which is not used by the customers, not liked by the sponsors and does not seem to provide improved effectiveness for the organization. It is obvious that this is not a successful project. Today we know that determining whether a project is a success or a failure is far more complex than this.

The quest for project success criteria has resulted in some publications. In addition, the findings of the literature review revealed that most models explaining project success are based on theory rather than empirical proof.

This study will examine if there are other relevant success criteria, as well as methodologies and techniques to measure these criteria. The author hopes to discover another perspective for project success by using academic research, interviews with project managers, review of relevant material from other studies as well as material from local and national Greek companies.

1.2 Needs Assessment

The perception of the various interest groups (stakeholders) is regarded as a key factor for this study since different people view project success in different ways. Stakeholders for this thesis include top management of organizations (industry, services, construction etc.), project managers who must have a clear understanding of which aspects of projects might be critical for their successful completion, the customers who are the final receivers of the project outcome, and finally the employees who are benefited by the success of the project. This thesis will provide stakeholders with a view of:

> ➢ The definition of project success
>
> ➢ The reasons for the need of new success criteria
>
> ➢ The importance of a common understanding of the success criteria early on in the project
>
> ➢ Methods for improving the evaluation of projects

➢ New success criteria as may be identified in the course of research.

➢ Methods to measure the new criteria

Since this study will also concentrate on the I.T. projects due to the author's expertise and experience, we feel we should also include a specific group of people that are involved and affect such projects. These are either employees of software companies or collaborating consultants. Milis (2004) based on the role that the different experts play in the IT projects, classifies them into four groups:

- *Managers:* they represent the parent organization. They provide funds and are the main benefactors of the project (sponsor/owner)

- *Project team members – benefactors:* they are members of the project team and thus responsible for planning, organizing and implementing the I.T. project. Specifically for this group, their involvement does not cease after handover, i.e. they receive long-term benefits from the project (this group contains for example project team members that return to their department after the termination of the project to work with a new application)

- *Project team members – no benefactors:* as with the previous group, they are members of the project team, but their involvement ceases after handover. They may be allocated to other projects, or they are the consultants whose involvement terminates after finishing the project.

- *End users:* these last ones are the users operate the outcome of the project on behalf of the management to achieve benefits

Additionally, the results of this study will be shared with students and instructors of the Project Management program and other relevant programs. Finally, this thesis will hopefully be useful to other researchers in their future studies.

1.3 Purpose of study

The author expects that research conducted for this thesis will reveal new criteria for successful projects and add more dimensions to the basic criteria (C.T.Q.). It will also provide a complete set of project success criteria that can help project participants (management, clients, sponsors etc.) to channel their efforts in achieving successful projects.

 In addition, if the author discovers new dimensions for project evaluation he will try to create indices in order for these dimensions to be measurable (i.e. 30% of criterion x). Methodologies or strategies will be created in order to help organizations to implement the new criteria for the evaluation of their projects. Results will be shared freely with interested parties.

1.4 Significance to your workplace

The author temporarily works as an external partner for a Greek firm named Geodyktio. This firm has experience in surveying studies, geographic information systems (G.I.S.), city planning, and software applications. Since 2006, Geodyktio was chosen to collaborate with the prime contractor SingularLogic-Unisystems for a large Information Technology (I.T.) project. The project consists of the development of a software (web based) programme in order to accommodate the needs of the

approximately 156 City Planning Departments all over the country. The main objectives of the project are:

> ➤ the standardization of all the official documents and processes that a city planning department uses
>
> ➤ the improvement of the productivity
>
> ➤ the improvement of the citizens' services
>
> ➤ the control and safety of all of the data
>
> ➤ the elimination of corruption symptoms between the employees and managers as well as the unfair treatment of some citizens

The author is responsible for the training of the end users as well as to provide feedback to his company in order to modify the programme according to the user's needs. We consider as users all the employees and managers working for the City Planning Departments.

Generally speaking, as we can see from various studies (i.e. Chaos reports) I.T. projects continue to fail. However, it is not an easy task to characterize an I.T. project as successful or failure. Milis K. (2004) states "An I.T. project cannot always be seen as a complete success or a complete failure. Moreover, the parties involved may perceive the terms *success* or *failure* differently". What we know is that if we want to lead an I.T project towards success, we should know in advance the criteria of success. Fulfilling these criteria should be our company's prime concern. Unfortunately, we do not always know with precision what criteria are appropriate for the effective measurement of project success.

The author hopes that this study will reveal a more complete set of project success criteria including the human dimension. In addition, he will try to demonstrate that the measurement of user's satisfaction is essential for the overall project success and he will suggest methods and techniques in order to achieve those measurements. Finally, the findings of this paper are expected to show the importance of measuring project success and will help the author's firm and himself to reach their goals.

1.5 Relation to the Program of Study

During the PM501 course lessons (Introduction to Project Management), the instructor provided the definition of project success. It was mentioned that we have to establish project priorities before the project starts, in other words to establish the success criteria. In addition, this course assisted in understanding how important it is to manage project trade-offs (C.T.Q.) and provided a method in order to manage these three constraints.

During PM504, -Project Planning and Control- the instructor pointed out that the ideal result in a project can never be achieved, since projects involve humans. In other words, the complexity of human personality cannot let us make clear assumptions concerning the final result of a project no matter hoe specific our criteria are. So there must be additional criteria directly linked with the human factor.

Moreover, the instructor mentioned that in 98% of projects, the ideal result, in other words the project success has a huge cost. The one thing we can actually do is to make trade-offs between the tree parameters (C.T.Q.) of the Iron Triangle, for

example raise cost-diminish time. The author was inspired from this statement and decided to implement this to his own thesis.

1.6 Definition of Terms

The definitions of special terms are derived from specialized dictionaries and the author's general sources. All of them are terms frequently used in the science of Project Management. They are listed in alphabetical order.

Descriptive statistics – "the use of statistics to describe a set of known data in a clear and concise manner, as in terms of its mean and variance, or diagramatically, as by a histogram" (Collins Dictionary 2005)

Factor – "an element or cause that contributes to a result" (Collins Dictionary 2005)

I.T. – "Information Technology: the technology of the production, storage, and communication of information using computers and microelectronics" (Collins Dictionary 2005)

Project Charter – "Is a document issued by the project initiator or sponsor that formally authorizes the existence of a project, and provides the project manager with the authority to apply organizational resources to project activities" (PMBOK Guide 2004)

Success criteria – "is the set of principles or standards by which project success is or can be judged" (Lim & Mohamed 1999)

Trade-off – "the amount of one factor that must be sacrificed in order to achieve more or less of another factor" (Meredith & Mantel 2002)

Triple Constraint – "A framework for evaluating competing demands. The triple constraint is often depicted as a triangle where one of the sides or one of the corners represents one of the parameters being managed by the project team" (PMBOK Guide 2004)

User – "The person or *organization* that will use the project's product or service" (PMBOK Guide 2004)

Quality – "is a meeting or exceeding customer expectation at a cost that represents a value to them" (Meredith & Mantel 2002)

W.B.S – "Work Breakdown Structure: A *deliverable* – oriented hierarchical decomposition of the *work* to be *executed* by the *project team* to accomplish the project *objectives* and create the required deliverables. It organizes and defines the total *scope* of the *project*. Each descending level represents an increasingly detailed definition of the *project work*. The WBS is decomposed into *work packages*. The deliverable orientation of the hierarchy includes both internal and external deliverables." (PMBOK Guide 2004)

Chapter 2 – Problem Statement

2.1 Problem Statement

Over the last few years Cost, Time and Quality (C. T. Q.) have been linked with measuring a projects' success. It is reasonable to believe that, if we meet the quality, time and cost targets for a project, it will be considered successful. Unfortunately, there are projects that meet all of the three targets and are yet considered failures. For example, a product that, although meets all the criteria, still has a very low commercial success! On the other end we have those projects that do not meet any of the set targets and are still considered successful. It is obvious that there is a lack of understanding concerning other criteria that may influence project success.

2.2 Rationale

In the literature there are many different definitions on the term "project success", for example, "The only truly successful project is the one that delivers what it is supposed to, gets results, and meets stakeholder expectations" (Lewis 2001). The common element in almost all definitions is the triple constraint: cost, time and performance (specifications/quality).

For the last few years we defined project success as the completion of an activity within the constraints of time, cost and performance. Today theorists have

added other elements to this definition. According to Kerzner the definition of project

success (2001, pg 6) has been modified to include additional factors such as:

- Acceptance of the project by the customer/client/user

- Use of the assigned resources in an effective and sufficient manner

- Good customer relations

- Minimum or mutually agreed upon scope changes

- Undisturbed the main work flow of the organization

- Respected corporate culture

Projects, however, continue to be described as failing despite the fact that all the factors and the criteria for success are met. The question is why this should happen if both the factors and the criteria for project success are believed to be known?

The **Standish Group** is a research firm that focuses on mission-critical project management applications. Their goal is to provide researchers and project managers with statistical data for successful and failed projects, the reasons behind failed projects, a large archive of case studies for consultation, as well as tips and methodologies for more successful project management.

According to Standish Group's reports, only 3/10 of projects in the U.S.A. are completed on-time, on-budget, and according to specifications. The survey is located at http://www.standishgroup.com. Unfortunately, in Greece there is no relevant research organization that lists and analyses projects.

The Standish Group categorizes projects into three basic types:

a) *Successful projects.* The project is complete on time and on budget, with all features and functions originally specified

b) *Challenged projects.* The project is completed and operational, but over budget, late, and with fewer features and functions than initially specified

c) *Failed projects.* The project is cancelled before completion, or never implemented

In 1994 the Standish Group conducted the "CHAOS" (a Greek word that means total disorder) study and a research report is being published annually since that year. According to the results of CHAOS study (Figure A), U.S. project outcomes showed that in 1994, 28.000 projects (16%) were successful, while in 2000, the number rose to 78.000 projects (28%). On the other hand, failed projects amounted to 54.000 in the 1994 study, and 65.000 in the 2000 study. Challenged projects grew at a rate of 62% to equal 137.000 over the 1994 number of 93.000.

The Standish Group found that approximately 175.000 projects costing more than $250 billion each year, almost 53% will overrun their initial cost estimates by an average of 189%. Most of these projects will be delivered with less than 75% of their original functionality. They conclude that the average success rate of business-critical application development projects is a miniscule of 9%.

Another study of 300 large companies conducted by the consulting firm Pit Marwick (Pinto & Rouhiainen, 2001, pp. 5-6) found that software/hardware projects fail at a rate of 65%. In other words 65% of these companies reported projects were

over budget or behind schedule, or employed technologies were nonperforming, or a combination of all the above.

Figure A: CHAOS study results
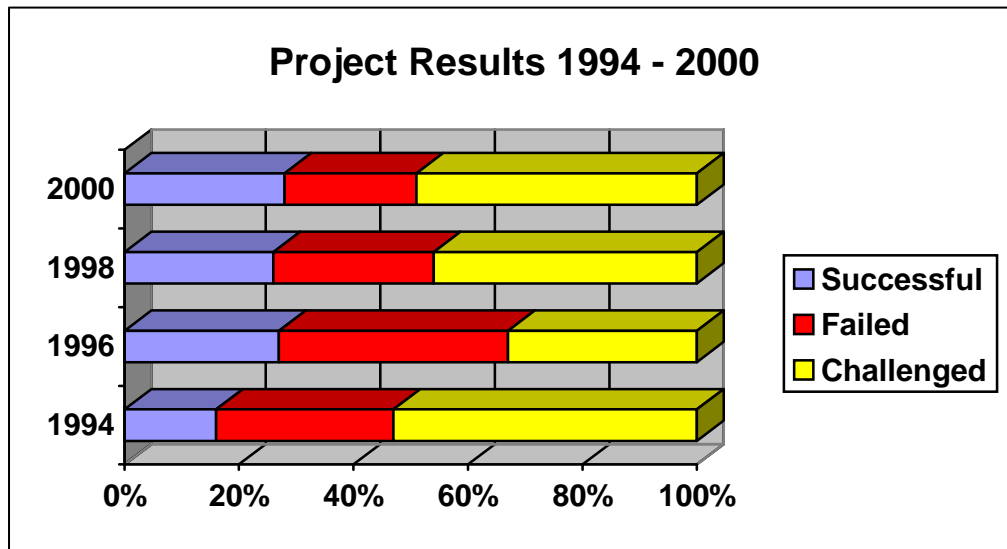
Note: Data taken from http://www.standishgroup.com/sample_research/chaos

What is the problem here? All the above numbers show that despite the project management techniques and success measurement methods that hundreds of firms are adopting, the results are mainly disappointing. These results fortify our belief that the existing system for measuring the success of projects is ineffective and it needs further development and improvement, as soon as possible!!!

2.3 Hypothesis/Objectives

If Project Management methodology adopts other relevant criteria for successful projects, companies would experience improved project execution.

Chapter 3 – Review Of Literature

3.1 Overview

A variety of resources have been used during the preparation of this paper. The two basic categories of our resources are the following:

➢ Theories about critical factors and criteria that affect project success or failure. Books, journals and web research were used in order to collect data and information about theories and theorists related with our subject.

➢ Related theoretical and empirical studies. This is a review of all the previous efforts of researchers who have focused on project success criteria.

The organization of this chapter is as follows. In the following section we will review the literature on the basic concepts of project success or failure. In the third section we will summarize some of the measurement methods and indices for time, cost and quality according to the Project Management Institute (PMI) standards. In the fourth section we will present all the previous research efforts related with this subject. During literature review we identified several new concepts, frameworks, models and theories for measuring project success. The theoretical and empirical studies are grouped chronologically. The last section is devoted to conclusions and a summary of our findings.

The aim of the literature review is to support our belief that we need to re-examine the theory of the triple constraint and add some new dimensions for project evaluation. We will try to "spot" the common elements of all the theoretical and empirical studies in order to produce new ideas for projects evaluation.

3.2 Determining Project Success or Failure

Undoubtedly, to characterize a project as successful or a failed is not an easy task. One of the problems encountered is that the different parties involved in the project view success in a different way. The science of Project Management has not yet succeeded in reaching a consensus for the definition of project success.

It is remarkable that the triple constraint is the sole universally accepted mean of evaluating projects. In other words, we characterize a project as successful if it is finished on or before the establish schedules, if it gets completed within the budget guidelines and operates according to the customer specifications. What would one expect is a new model that could both accommodate the extra parameters and satisfy all groups concerned (managers, employees, customers, contractors, etc.). Next we present and analyze the concepts for project success by various authors.

Max Wideman (2000) determines project success as a multi-dimensional construct that inevitably means different things to different people. He believes that success is better expressed at the beginning of a project in terms of key and measurable criteria upon which the relative success or failure of the project may be judged.

He gives the following principle "The measure of project success, in terms of both process and product, must be defined at the beginning of the project as a basis for project management decision making and post-project evaluation. First and foremost, project success needs to be defined in terms of the acceptability of the project's deliverables, for example scope, quality, relevance, effectiveness, and so forth; secondly in terms of its processes, for example time, cost, and so forth."[3] For Max Wideman the project evaluation has four dimensions, namely: product scope, quality grade, time-to-produce and total cost at completion. He underlines the importance of the product success to the overall success of the project.

He points out: "It is not sufficient these days to be on time, on budget, nor even that the product works just the way it should and satisfies all the requirements. At the time of the transfer of the project's product into "the care, custody and control" of the users, the product needs to be **marketed**. It needs to be sold into the market place. Then and only then, upon completion of a successful marketing campaign, will the product be a success and, ergo, the project also becomes a success"[4]

James P. Lewis in *Project Planning scheduling & Control: a hands-on guide to bringing projects in on time and on budget* (2000) states that "The only truly successful project is the one that delivers what is supposed to, gets results, and meets stakeholder expectations." In this definition of project success we underline the phrase "stakeholder expectations". Lewis and many writers as we are going to see next take into account the satisfaction of the project stakeholders as well as the unique way that each and every of them understands the term "success".

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[3] Wideman, R., M. (2000). *First Principles of Project Management* Retrieved May 2, 2007, from http://www.pmforum.org/library/papers/2000/.htm.
[4] Wideman, R., M. (2000). *Selling into Project Success* Retrieved May 2, 2007, from http://www.pmforum.org/library/papers/2000/.htm.

For Lewis there are four criteria for measuring project success. These are Performance, Cost, Time and Scope. The first has to do with technical and functional performance requirements, the second with the labor and material cost needed to accomplish a task, the third with the time required for the project to be completed and last, the scope, that is the magnitude or size of the work. These are actually the four constraints for measuring project success established by the PMI.

Pinto & Rouhiainen (2001) as well as Kerzner (2001) add a new criterion to the triple constraint concerning the customer's satisfaction/acceptance. This is very important because this criterion turns the eyes of the company outside the organization and towards the customer. Furthermore, it enhances the specific role of the marketplace in a successful project.

Verzuh in *The fast forward MBA in project management* (2004) agrees that the golden triangle is enough to define success. Except from time and cost parameters he mentions high quality. Verzuh links quality with the outcome of the project that must have two components: functionality (what the project is supposed to do) and performance (how well the functionality works).

However, Verzuh realizes that delivering a project on time, on budget and with high quality does not mean that it will necessarily be successful. The reason according to the writer is the deferent views and perceptions of success from the project stakeholders. He then refers to stakeholders' satisfaction but without suggesting the use of a new criterion or ways to measure the rate of that satisfaction as well as the need of that type of information. He clearly states: "successful projects have to meet all stakeholders' expectations" and finally proposes agreement among

the project team, customer and management on the project goals as a factor for project success.

In 2005, Angus Yu, Peter Flett, and John Bowers suggested the following definition for success/failure for software development projects: "A project is a failure if it would have been more economic not to create the indented product. Alternatively, a project is a success if its created product adds value to the client, considering the cost to the client at the point of acceptance"[5]. We can see here that the definition of project success is linked with the product success which can be compared with cost and customer acceptance.

Another definition for I.T. project success was presented by Agarwal & Rathod (2007). In this definition, they propose four basic criteria for the evaluation of a project: cost, time, quality and functionality. Their definition goes as follows: "A software project's ability to meet the scope that encompasses the software specifications in terms of functionality and quality, within budget and schedule, by adopting proper process and techniques". Once again, the triple constraint seems to be an indispensable part of project success.

Finally, Smith in *Teamwork and project management* (2007) is referred to project success while identifying cost, time, performance and client acceptance as project success criteria.

From this first review of the literature we can clearly see a new parameter emerging: the human dimension. Either as "client acceptance" or "stakeholder expectations", but in any case as the group of people who have a financial interest in

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[5]Yu, G. A., Flett, D. P., & Bowers, A. J. (2005). *Developing a value-centred proposal for assessing project success.* International Journal of Project Management, Vol. 23, pp.428-436.

the project, it seems that stress the role of the ones who have more to gain or loose, and guide us to a more complete model that includes this dimension.

3.3 The "Golden Triangle" and the Evaluation of Projects

It is evident that project success means different thing to different people. In Project Management literature this issue has been widely discussed but until today it was impossible to reach a consensus about project success criteria. According to PMBOK, the guide published by the PMI, project success criteria include the project triple constraint (time, cost, scope) and quality. The relationship among the parameters is such that if any one of the three (triple constraint) changes, at least one other parameter is likely to be affected. Figure B shows how project quality is affected by balancing the other three parameters. This PMI framework for evaluating projects is less disputable but for many authors still incomplete.
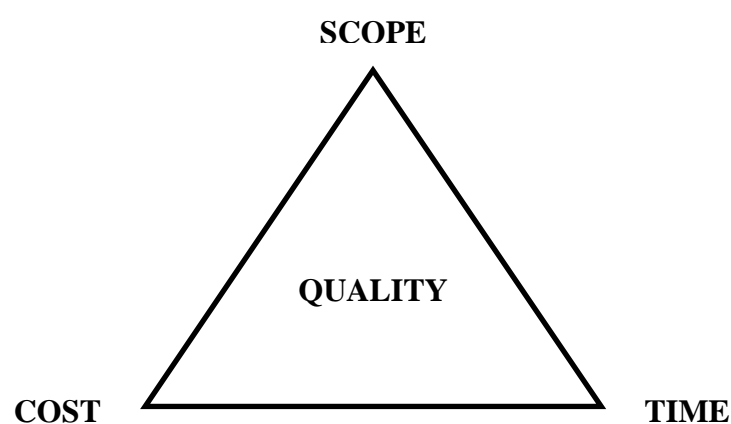
Figure B: the PMI framework for evaluating success

Next we will present a brief review of these criteria and the methods to measure them in accordance to the PMI standards.

3.3.1 Scope

For the scope criterion we have to focus on the project's deliverables. Project scope is described in a *project charter* which commonly includes a description of the business needs that the project results are intended to address and a description of the results (i.e. a service or product description).

The scope criterion is not actually measurable. It is all about changes control and management. The most common technique for scope measurement is *Variance Analysis*. According to this technique, project performance measurements are used to assess the magnitude of variation of performance. Important aspects of project scope control include determining the cause of variance relative to the scope baseline and deciding whether corrective action is required. The scope baseline includes the scope statement and the Work Breakdown Structure (WBS) – this is a project's detailed list of activities.

3.3.2 Time

For the time criterion we have to focus on a project's schedule. A project schedule captures the planned dates for activities and milestones. The most common techniques for measuring the time criterion are:

- Performance Measurement

- Project Management Software (e.g. Prima Vera)

- Schedule Comparison Bar Charts

3.3.3 Cost

For the cost criterion we have to focus on a project's budget. The budgeting process focuses on determining the cost of project activities and establishing a cost baseline. The cost baseline is a record of the planned cost for a project or project phase. The most common techniques for measuring the cost criterion are:

- Earned Value Technique (EVT)

- Forecasting

- Trend analysis

3.3.4 Quality

For the quality criterion we have to focus on the quality of a project's performance and results. In terms of project success, we may also use the term "Quality Grade". Wideman (2000) defines the term quality grade as "A particular attribute of an item, product or service, which meets all minimum project requirements but which may be delivered according to a class ranging from 'utility' (purely functional) to 'world class' (equal to the best of the best)". The most common techniques for measuring the quality criterion are:

- Control Charts

- Histograms

- Pareto Charts

- Statistical sampling

- Scatter Diagrams

- Cause and Effect Diagrams

3.4 The Quest for New Criteria

Next we present the majority of the empirical and theoretical studies we have identified from 1988 to this day and their conclusions concerning the issue of project success criteria.

Anton de Wit (1988) mentions that when measuring project success we must consider the objectives of all stakeholders throughout the project life. He gives the following definition for project success: "the project is considered an overall success if the project meets the technical performance specification and/or mission to be performed, and if there is a high level of satisfaction concerning the project outcome among key people in the parent organization, key people in the project team and key users or clientele of project effort". The key stakeholders for this study seem to be the customer, the contractor and the project team. Anton de Wit believes that they must all be satisfied by the end of the project. He also proposes a project success framework. The basic concept of this framework is that the project objectives become the project success criteria. He concludes that measuring success is complex and the success or failure of a project depends on the different views of every stakeholder. In his opinion the objective measurement of project success is something impossible.

There is an empirical study dealing specifically with success criteria for I.T. projects. Wateridge (1995) did a survey of project managers and product users to find the most important criteria for success of I.T. projects. Over 100 projects were examined. The conclusion of the study was that project managers are concentrating on success criteria which may not be appropriate for the project. For project managers it is very important to meet timescales and budgets while for the users the criterion "happy users" is very important. To meet "user requirements" is the most important

success criterion for I.T. projects according to the users and project managers though it appeared to mean differently to both the groups. This study gives us two new success criteria related with the users of the final product.

At their article Lim and Mohamed (1999) explore the issue of project success from different perspectives of people looking at the project. They believe that project success should be viewed from the perspective of the individual owner, developer, contractor, user and the general public. This explains why the same project could be considered a success by one and failure by another individual. They propose to classify project success into two categories: the macro and micro viewpoints.

For macro viewpoint (Figure C) the "completion" and "satisfaction" criteria are the two sets of conditions for determining project success. Generally, the owner, users, stakeholders and the general public are the groups of people who will look at project success from the macro viewpoint.
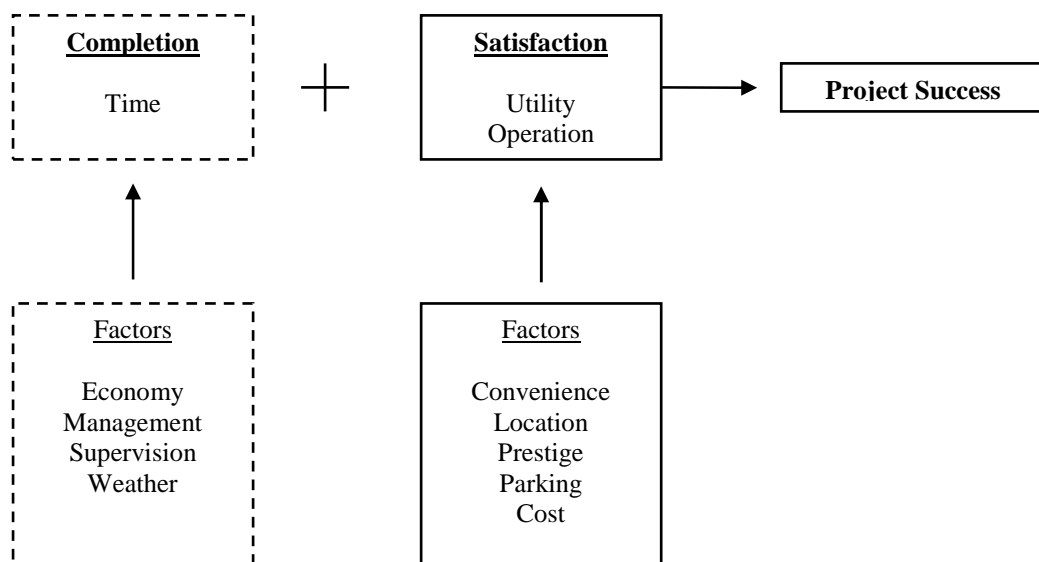
Copyright © 1999 Lim & Mohamed

Figure C: Macro viewpoint of project success

Figure D illustrates the framework for the micro viewpoint of project success. The completion criteria (time, cost, quality, performance safety), influenced by a set of factors, are the set of conditions for determining project success. The micro viewpoint usually concerns the construction parties.

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  ┌─────────────────┐
  │   Completion    │                ┌──────────────────┐
  │                 │ ──────────────►│  Project Success │
  │      Time       │                └──────────────────┘
  │      Cost       │
  │     Quality     │
  │   Performance   │
  │     Safety      │
  └─────────────────┘
          ▲
          │
          │
  ┌─────────────────┐
  │     Factors     │
  │                 │
  │    Technical    │
  │   Commercial    │
  │     Finance     │
  │      Risk       │
  │  Environmental  │
  │      Human      │
  └─────────────────┘
```
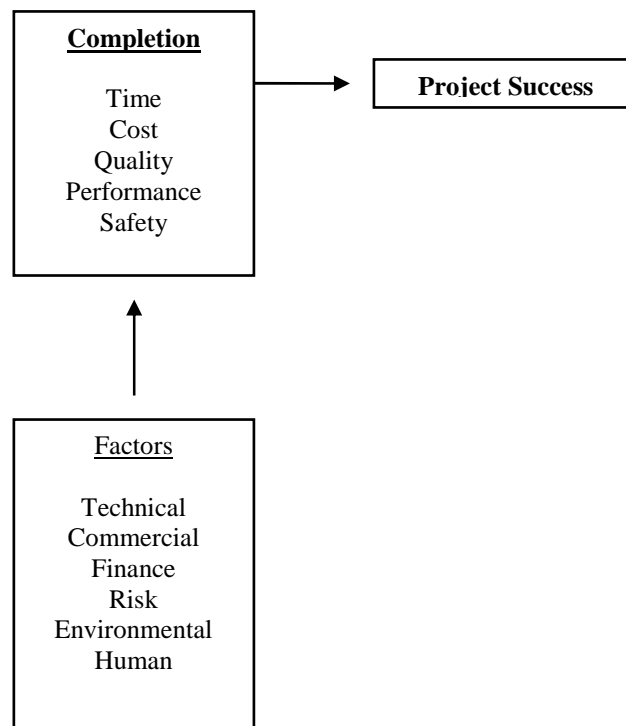
Copyright © 1999 Lim & Mohamed

Figure D: Micro viewpoint of project success

Another researcher who is reluctant to accept the effectiveness of the "golden triangle" is Roger Atkinson (1999). In his paper investigates the success criteria for I.T. management. He agrees with previous researchers that customers and users for the I.T. projects are the key in order to define project success. Taking the points mentioned by previous writers, he creates three new categories of success criteria.

These are the technical strength of the resultant system, the benefits to the resultant organization (direct benefits) and the benefits to a wider stakeholder community (indirect benefits). Furthermore, his paper suggest the "golden triangle" could be developed to become the **Square – Route** of success criteria as shown in Figure E, providing a more realistic and balanced indication of project success.

The Golden Triangle

Cost
Quality
Time

The Information System

Maintainability
Reliability
Validity
Information quality

Benefits (Organizational)

Improved efficiency
Improved effectiveness
Increased profits
Strategic goals
Organizational-learning

Benefits (Stakeholder Community)

Satisfied users
Social and
Environmental impact
Personal development
Professional learning,
contractor's profits
Capital suppliers,
content project team,
economic impact to
surrounding community

Figure E: the Square Route (Source: Atkinson 1999)

Cooke-Davies (2002) conducted an empirical research to more than 70 large multi-national or national organizations and the result was to identify 12 factors that are critical to project success. Even though his study was not focused on the success

criteria, it is interesting for two main reasons. First, he observed the need to create a different concept of project success. Second, and most important, there are human dimensions to nearly every single one of the 12 factors that have been identified. As mentioned in his paper "It is people who deliver projects, not processes and systems"[6]. Indirectly he involves the satisfaction of users and key stakeholders at the project success definition.

There has been a significant research on both success criteria and success factors by Westerveld (2003). He developed the Project Excellence Model by using research findings from both studies on success criteria and critical factors for project. The Project Excellence Model is an attempt to relate criteria with factors. Westerveld's model consists of 12 areas that play a key role in project success. The first 6 are the results of his research on project success criteria. Next we present these new criteria and their explanation according to the author. We can see that he also uses the triple constraint, in combination with other criteria

1. *Project results (time, cost, quality/scope).* The original golden triangle of project goals. Almost all projects have specific scheduling, budget and quality constraints

2. *Appreciation by the client.* The client initiates the project to fulfill a specific need. What aspect and factors does the client value in judging the success of the project?

3. *Appreciation by project personnel* The workers of the project will be concerned with reaching their personal goals as well as a good working atmosphere

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[6] Cook-Davies, T. (2002) *the "real" success factors on projects.* International Journal of Project Management, Vol. 20, pp.185-190

4.   *Appreciation by users.* Users are concerned with their overall influence in the project and the functionality of the end product

5.   *Appreciation by contracting partners.* Contracting partners try to make profit at the project. They are also concerned with getting new orders and learning possibilities

6.   *Appreciation by stakeholders.* Those parties that are not directly involved in the project but have a large influence. For example environmental groups, citizens and government agencies. These parties manage their specific interests

Another research to identify additional success criteria for IT projects were conducted by Milis (2004). Milis examined seven possible criteria from literature by using a quantitative approach. The conclusions were that the impact of the golden triangle on the evaluation of projects is rather small. New criteria such as **user happiness** and **commercial success** seem to be more important. Furthermore, the parties involved in I.T. projects who's involvement ceases after the project termination are more concerned about cost (budgets) and stakeholder satisfaction (users, project team, management), while the other parties are more concerned about time (schedules), predefined specifications (quality) and long-term commercial success.

Bryde & Robinson (2005) conducted an empirical study in order to identify the most important success criteria according to client and contractor organizations. The results of the survey showed that contractors put more emphasis on time and cost criteria while the clients put more emphasis on satisfying the needs of other stakeholders. Moreover, the study is a proof that there is lack of agreement in

organizations about the priority of success measurement due to problematic client-contractor working relationships.

A recent study for identifying new success criteria on successful software development projects was conducted by Agarwal & Rathod (2006). They investigated the issue of project success by examining the different views of internal stakeholders such as Programmers, Project Managers and Customer Account Managers. The significant findings here are basically three. Firstly, cost, time and quality seems to be very important criteria for assessing the performance of projects according to the survey results. Secondly, they found that the *scope* criterion is considered to be of utmost importance for project success. The writers named scope the combination of quality and functionality for a software project. The most interesting finding for our research is the two new additional criteria mentioned by a computable number of responders. These are namely the customer satisfaction and the project priorities, always in addition to the tree core parameters.

The same year the previous study (Agarwal & Rathod) was presented, we identify another study on the project success criteria. Wang and Huang (2006), by using a questionnaire to survey Chinese construction supervising engineers, tried to identify how the engineers evaluate project success. The authors conclude that supervising engineers use "relation/guanxi" among the key stakeholders as the most important criterion in addition to the golden triangle. *Guanxi* is a central concept in Chinese society and describes a personal connection between two people in which one is able to prevail upon another to perform a favor or service, or be prevailed upon. In our case the authors mean special relations between the stakeholders. For example,

project managers who want to keep the customer satisfied develop with the customer a personal relation/guanxi.

3.5 Summary/Conclusions

Although the direction of the literature review was on the subject of Project Success without any distinction among different types of projects, the studies were mostly for industrial and I.T. projects. As we can see, the results of each study vary according to different types of projects. However, they have quite a few common elements that can help us reach some general conclusions.

One first observation is the usefulness and the importance of the golden triangle for the majority of the studies reviewed. For many writers, the triple constraint (T.C.Q.) is indispensable. Moreover, a list of new criteria is being revealed, namely Client Satisfaction, Commercial Success, etc. The significant finding for our research is that most of the new criteria concern the human factor and more specifically, the satisfaction of critical stakeholders involved in each project (i.e. project team satisfaction, contractor satisfaction, happy users, etc.). As mentioned before, this study is focused on I.T. projects. It seems that the satisfaction of users and project team plays a very important role for the overall I.T. project success.

The results of the study on project success criteria are summarized in Table I and Table II. The first table illustrates the findings from journal articles, while the second illustrates the finding from Project Management books. At table II we can see, apart from sets of criteria, the results of each study (e.g. conclusions, new frameworks etc.)

Table I: summary of the research on project success criteria (journal articles)

Author's Name	Year	Title of paper	Results	Success Criteria
De Wit Anton	1988	Measurement of project success	1.Objectives became the success criteria 2. The key stakeholders must be satisfied	• Budget performance • Schedule performance • Client satisfaction • Functionality • Contractor satisfaction • Project team satisfaction
Wateridge John	1995	IT projects: a basis for success	Project managers should look more to users perceptions of success and the quality of product	• Meet budgets • Meet schedules • Meet user requirements • Happy users • Commercial success • Meet quality • Achieve purpose
Lim & Mohamed	1999	Criteria of project success: an exploratory re-examination	Project success should be viewed from the perspective of the owner, contractor, developer and user	• Time • Cost • According to specifications • Appreciation of project team • Appreciation of client • Appreciation of contracting partners
Atkinson Roger	1999	Cost, time and quality, two best guesses and a phenomenon, its time to accept other success criteria	1. The importance of customers and users 2. The Square route as a new framework to consider success criteria	Four sets of criteria • The golden triangle • The information system • Benefits (organizational) • Benefits (Stakeholder community)
Cook-Davies	2002	The "real" success factors on projects	12 factors critical to project success linked with the human dimension	None

Author's Name	Year	Title of paper	Results	Success Criteria
Westerveld E.	2003	The Project Excellence Model: linking success criteria and critical success factors	The relation of success factors and success criteria	• Project results (time, cost, quality) • Appreciation by customer • Appreciation by project personnel • Appreciation by users • Appreciation by contracting partners • Appreciation by stakeholders
Milis Koen	2004	Using Probabilistic Feature Models to Determine Success Criteria for ICT Projects	Small impact of the golden triangle on the evaluation of projects	• On time • Within budget • To specification • User happiness • Project team happiness • Management happiness • Financial or commercial success
Yu Flett Bowers	2005	Developing a value-centred proposal for assessing project success	A product based project definition	None
Bryde & Robinson	2005	Client versus contractor perspectives on project success criteria	Contractors put more emphasis on time and cost Clients put more emphasis on satisfying the needs of stakeholders	• Cost • Time • Meeting technical specifications • Customer satisfaction • Stakeholders satisfaction
Agarwal & Rathod	2006	Defining "success" for software projects: An exploratory revelation	The importance of time, cost and quality and scope for project success	• Cost • Time • Scope • Customer satisfaction • Project Priorities
Wang & Huang	2006	The relationships between key stakeholders' project performance and project success: Perceptions of Chinese construction supervising engineers	The importance of project owners "Relation/guanxi" as the most important criterion	• Cost • Time • Quality • Relation/guanxi

Table II: summary of the research on project success criteria (books)

Author's Name	Year	Title of book	Success Criteria
Pinto& Rouhiainen	2001	Building customer-based Project organizations	• Cost • Time • Quality • Customer satisfaction
Lewis	2001	Project Planning, scheduling and control	• Cost • Time • Scope • Performance
Kerzner	2003	Project management – A system approach to planning, scheduling and control	• Acceptance of the project by the customer/client/user • Use of the assigned resources in an effective and sufficient manner • Good customer relations • Minimum or mutually agreed upon scope changes • Undisturbed the main work flow of the organization • Respected corporate culture • Within time • Within Budget • At the proper performance level
Project Management Institute	2004	A guide to the project management body of knowledge	• Cost • Time • Scope • Quality
Verzuh	2004	The fast forward MBA in project management	• Cost • Time • High quality
Smith	2007	Teamwork and project management	• Cost • Time • Performance • Client acceptance

Chapter 4 – Methodologies and Procedures

4.1 Overview

We began investigating the issue of project success when after receiving an e-mail[7] containing an article on Project Failures in Greece. Our first step was to find statistical data of success/failed projects globally. Then we took the example of the U.S project results from 1994 until 2001, in order to proceed with our case study. After that, we started a preliminary literature review to identify definitions of Project Success as well as the criteria that have been used until today in order to measure the Project performance.

It seemed that only the triple constraint was implemented in real-time projects, although many researchers have criticized it as inadequate.   The following months we conducted an in-depth research trying to identify alternative sets of criteria and new models for evaluating project success, including journal articles, reports, textbooks, relevant case studies and online data. The purpose of the literature review was to build internal validity and to help us develop our hypothesis: a potential new model for measuring project success.

Since January 2007 the author has been involved in a large scale I.T. project (City Planning Software) as a trainer for its software users. That gave him the opportunity to include his practical observations in his thesis, while conducting an

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[7] The author is a member of Project Management Network in Greece (PM–Greece) and receives via e-mail several articles related to project management issues (http//:www.pmgreece.gr).

empirical study by using qualitative methods (Leedy & Ormond 2005). Interviews were carried out with different participants (an assistant project manager and several software users) on the I.T. project, looking at the criteria of success and the different views of participants for project success.

The final step of this thesis was to use a system thinking tool in order to test our assumptions and draw valid conclusions. We used the theory of ***Balance Scorecard*** (BSC) to create a framework for measuring project success. We describe in details this methodology in sections to follow. The research approach is summarized in Figure F.

Figure F: the three step approach for this Thesis

Step 1:	**Step 2:**	**Step 3:**
The goal is to identify additional criteria and investigate the role of the golden triangle	The goal is to test the hypothesis from literature review	The goal is to create a new set of criteria by using data from interviews and literature review
Method: Literature Review	Method: Semi structured interviews	Method: Balanced Scorecard
Result: Develop a hypothesis	Result: Fortify our beliefs and enrich our study	Result: A new framework for evaluating I.T. projects

4.2 Interviews

This study includes semi-structured interviews. Interviews were considered to be the most suitable method to provide answers to the research questions as well as to ensure the validity of our findings from literature review and to enrich and refined them.

Our semi structured interviews started with open-ended questions (Appendix A), asking the participants to tell how they view project success and the most important criteria for success in their opinion. The last part of the interview was a free conversation about the importance of the human dimension in the measurement of the project success. Our participants consisted of a small group of software users (15 in total) and an assistant project manager.

4.2.1 Users

As part of his working experience, the author had the chance to work as an in-service trainer in a small town of 55.000 inhabitants; Chalkida situated 70 kilometers North East of the capital, Athens. Since February 2007 and for a period of two months, he was responsible for providing training to a group of public servants working for the central Government in the Department of City Planning of Chalkida.

The employees of this Department (34 people) were used as "sample" for our research, while they used the software developed by the author's employer. The group consisted of the department's head, mechanical engineers, survey engineers, civil engineers and administrative personnel. During two months the author conducted interviews with the majority of users and gained numerous of useful information and a clear view of what users consider as project success, as well as their opinion for the specific project.

Here it is imperative to mention the risk of using the data collected from the users' interviews. That is because the employees of the public sector in Greece may not be willing to provide authentic views and objective opinions for fear or being

judged by their superiors. Another reason for discrepancies in the outcome is a tendency to severely criticize everything that has to do with their professional status, though the benefits of their professional situation tends to counterbalance the negative points.

4.2.2 The Assistant Manager

Miss E. Siavala is a young and enthusiastic project manager working for Geodyktio Company. She is also responsible for a large part of the I.T. project (training and support program). She was involved in the initial project planning and is part of the project team.

During our research, it was revealed that the things she was actually doing were far beyond her initial responsibilities. She was managing the majority of project activities, monitoring and controlling the project, coordinate the training program, interacting with the customer representatives, communicating and cooperating with the software developers and system engineers, testing the software program and reporting "bugs" and malfunctions, and many other activities. Moreover, she was the person that that all regarded as the "problem-solver".

We strongly believe that she is a key stakeholder that can give us valid answers to our questions and much more useful information for the needs of our study. She has undoubtedly a holistic view of the whole project. We had many interviews with her on project performance measurements, personnel issues, and obstacles for the project. The conclusion we made from this interview had a huge contribution to the final results of this study.

4.3 Balanced Scorecard

The Balanced Scorecard is a systems thinking tool that helps management to make decisions. The Balance Scorecard concept can also be adopted to assist managing projects. This study develops a Balanced Scorecard for I.T. projects that identifies measurable criteria.

We modified the framework of the Balance Scorecard by combining the Kaplan's and Norton's theory[8] with a framework for Information Systems (I.S.) developed by Martinsons, Davidson and Tse (1999). Our goal is to create a new framework able to identify success criteria for I.T. projects. Next we present a brief review of Balance Scorecard theory and the framework for I.S. organizations.

4.3.1 The Balanced Scorecard theory

The Balanced Scorecard was developed in the early 1990's by Robert Kaplan (Harvard Business School) and David Norton. They describe the innovation of the Balanced Scorecard as follows: "The Balanced Scorecard retains traditional financial measures. But financial measures tell the story of past events, an adequate story for industrial age companies for which investments in long-term capabilities and customer relationships were not critical for success. These financial measures are inadequate, however, for guiding and evaluating the journey that information age

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[8] Kaplan, R., & Norton, D. (1996). *The Balanced Scorecard: Translating Strategy into Action.* Harvard Business School Press, Boston. Retrieved May 10, 2007, from http://www.netlibrary.com

companies must make to create future value through investment in customers, suppliers, employees, processes, technology, and innovation."[9]

Balanced Scorecard is a method and a tool solely dedicated to the execution of any organizations' strategy. Its structure consists of:

➤ A *strategy map* where strategic objectives are placed over four perspectives in order to clarify the strategy and the cause-and-effect relationships that exist among them.

➤ *Strategic objectives* which are smaller parts of the strategy interlinked by cause and effect relationships in the strategy map.

➤ *Measures* reflecting the intent of each strategic objective. Their prime purpose is to measure that the desired change or development defined by strategic objectives actually takes place. Measures in a balanced scorecard never track "business as usual" unless it becomes a necessary part of the overall strategy.

➤ *Strategic initiatives* that constitutes the actual change as described by strategic objectives.

The Balanced Scorecard suggests that we view the organization from four perspectives (Figure G), develop metrics, collect data and analyze them according to each perspective. Next we describe these perspectives.

1. Financial Perspective - measures reflecting financial performance. For example number of debtors, cash flow or return on investment. The financial performance of an organization is fundamental to its success

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[9] Arveson, P. (1998). *What is the Balanced Scorecard?* Retrieved May 10, 2007, from http://www.balancedscorecard.org/basics/bsc1.html

2. Customer Perspective - measures having a direct impact on customers. For example, time taken to process a phone call, results of customer surveys, number of complaints or competitive rankings.

3. Business Process Perspective - measures reflecting the performance of key business processes. For example, the time spent for R&D efforts, number of units that required rework or process cost.

4. Learning and Growth Perspective - measures describing the company's learning curve. For example, number of employee suggestions or total hours spent on staff training.
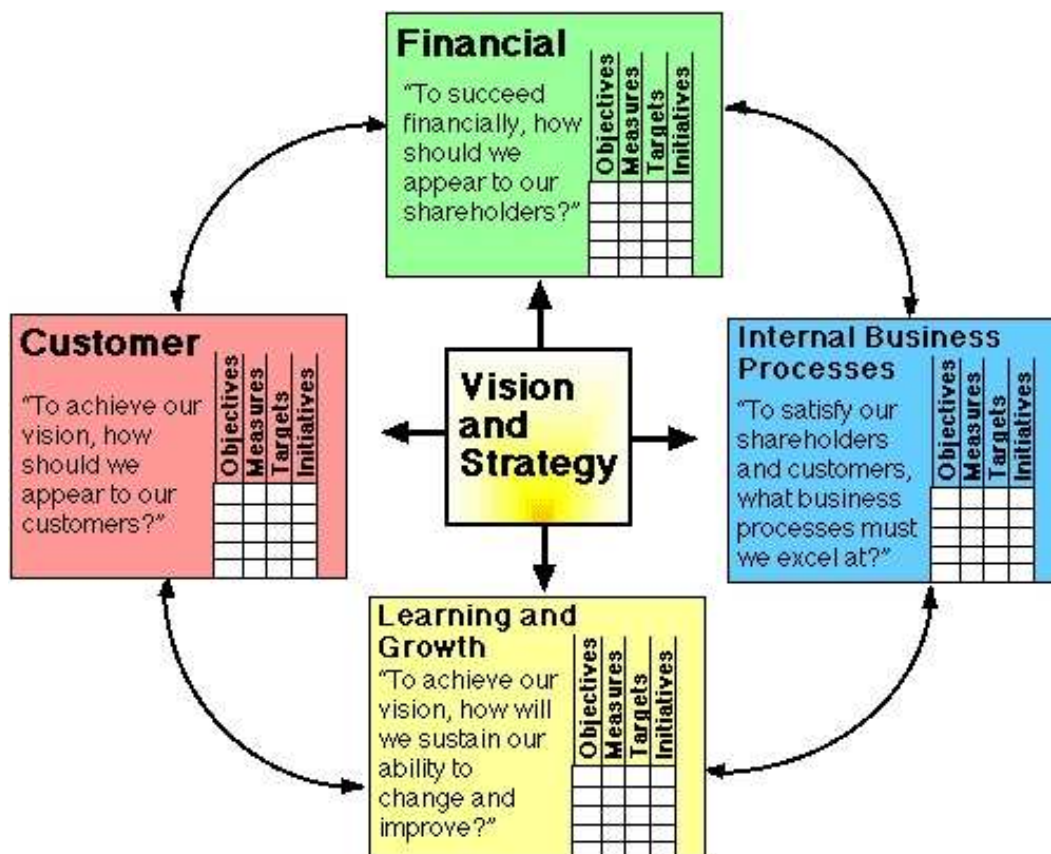
Copyright © 1998 Paul Arveson

Figure G: the Balanced Scorecard's four perspectives

The specific measures within each of the perspectives will be chosen to reflect the desired change for associated strategic objectives. The method can facilitate the separation of strategic policymaking from the implementation, so that organizational goals can be broken into task oriented objectives which can be managed by front-line staff. It can also help detect correlation between activities. In many senses, the objectives chosen are leading indicators of future performance.

4.3.2 Balanced Scorecard for Information Systems (I.S.)

Martinsons, Davison and Tse (1999) proposed a Balanced Scorecard framework to measure and evaluate I.S. application projects and the I.S. department as a whole. The following four perspectives have been suggested for the Balanced I.S. Scorecard: user orientation, business value, internal processes and future readiness. The relationships among these new four perspectives are illustrated at Figure H.
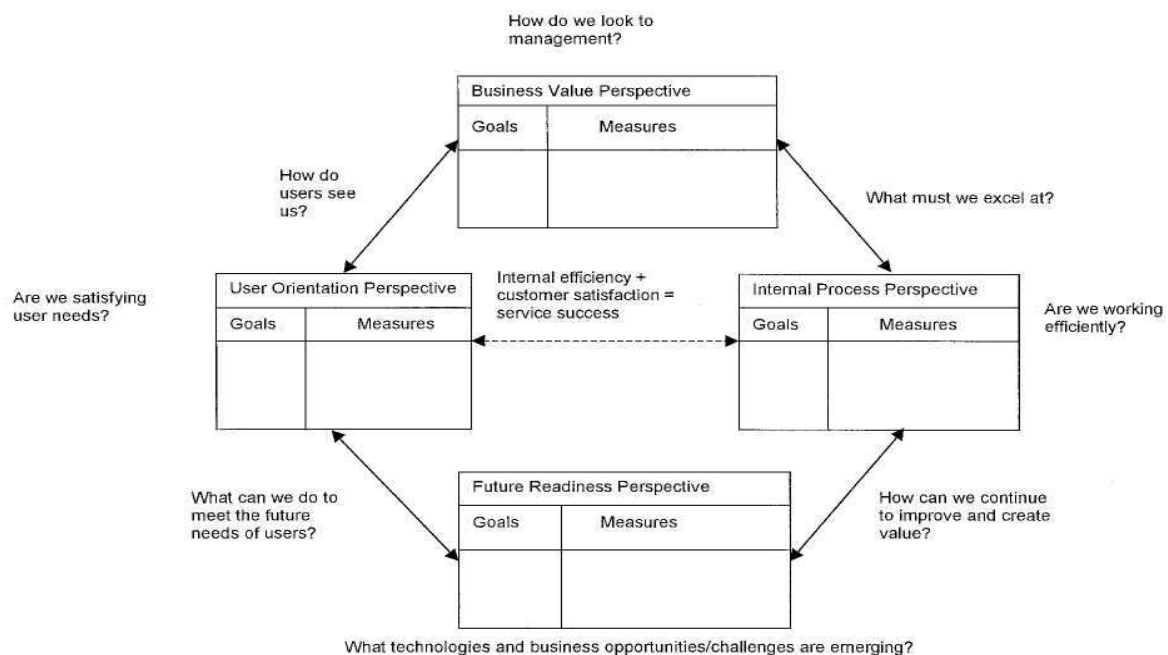
Copyright © 1999 Martinsons, Davison & Tse

Figure H: the four perspectives of an I.S. Balanced Scorecard

Next we give a short description for each perspective.

- *Business value perspective (management's view).* We should achieve our goals in order to add value to the business

- *User orientation perspective (user's view).* We should deliver value-adding products and services to the end users

- *Internal processes perspective (operations-based view).* Our I.S. products and services should be delivered in an efficient and effective manner

- *Future readiness perspective (innovation and learning view).* Our organization should be focused on continuous improvement and get prepared for future opportunities

Chapter 5 – Results

5.1 Introduction

This chapter reviews the results of the methodologies and processes described in chapter 4. Additional discussion of these results is included in chapter 6.

Our first expectation at the beginning of this thesis was to identify criteria other than the ones of the golden triangle. We also expected that the future outcome may show that it is no accident that the golden triangle has been the ultimate measure of success for projects over the years. However, this assumption does not restrict us from including more criteria in order to anticipate the whole spectrum of success and failure in project evaluation.

5.2 Results from Literature Review

In chapter 3 we presented the review of studies contacted from 1988 until today on the issue of project success criteria. It becomes obvious that there is no consensus on project success definition. We discovered several different success definitions from various authors proposing sets of criteria and frameworks for the evaluation of projects.

Most of them had an explanation for this phenomenon. We do not have a common definition of project success due to the fact that there are different points of view between the various stakeholders (i.e. De Wit, Atkinson, Wateridge, Lim & Mohamed, Milis Koen, Bryde & Robinson, and Wang & Huang). We also see that the sets of criteria and definitions of success vary according to the different type of projects (i.e. industrial, I.T.)

Another result from the literature review is that the triple constraint or golden triangle seems to be an indispensable model for the project evaluation. The majority of studies we reviewed incorporate the golden triangle to the proposed set of criteria. We must note that in some cases we saw in the place of the Quality Criterion the use of *technical specifications* or just *according to specification*. However, almost all researchers agree that using only the golden triangle is ineffective. They propose additional parameters in addition to the golden triangle in order to develop a more complete set of criteria.

Although most of the studies we reviewed generated new sets of criteria, we noticed that those sets have never been tested or used! In addition we did not at all find methodologies or techniques for measuring the additional criteria. We only found tools and methods for measuring the criteria of time, cost and quality, as expected.

Next we summarize the first results of literature review.

> A luck of consensus for project success definition
> Different perspectives of project success between the project stakeholders
> Different sets of success criteria and success definitions according to different project types

➢ The three traditional constraints are indispensable as they remain the important criteria for assessing the performance of projects

➢ The tree traditional criteria standing alone are inadequate to evaluate projects in an effective way, so there is a need for additional criteria

➢ The new criteria have not been tested

➢ There is a lack of methodologies and tools for measuring the new criteria with the exception of the triple constraint (time, cost, quality)

The primary goal of the literature review for this study is to outline a set of evaluation dimensions which appear regularly in the literature. We also discovered numerous single success criteria proposed by the researchers in their effort to give solutions to specific project problems. Still these criteria are very specific and cannot be used as a part of a common model for evaluating projects.

The triple constraint aside, the results of this study showed that client satisfaction or client acceptance and the satisfaction of key stakeholders play significant role to the evaluation of project success. This is due to a high frequency of studies using client satisfaction or stakeholders' satisfaction as a success criterion. Next we present the list of criteria that resulted from this study

➢ Cost

➢ Time

➢ Quality or technical performance

➢ Customer acceptance/satisfaction

➢ Key stakeholders satisfaction

The key stakeholders that should be satisfied vary according to the project type (i.e. I.T., industrial) and special conditions (e.g. project magnitude). We present a list with the total of stakeholder categories resulting from literature review.

- End users

- Project team

- Personnel

- Top management

- Contractors

5.3 Results from Interviews

In chapter 4 we described the qualitative approach we used in order to test our findings from the literature review, as well us to enrich our findings with new information. By using semi–structured interviews (Leedy & Ormond, 2005, p.146) we examined how people working in I.T. projects view success and what measures uses top management in order to control the project. Furthermore, we asked what additional measures should be used in order to improve the situation.

5.3.1 The user's view of project success

The interviews we carried out with the employees (software users) of the City Planning Department in Chalkida showed that product users give little attention to the triple constraint measures. They do not care if the project is over budget or if it is

beneficial for the customer (the Greek Government in our case). The statement of an employee demonstrates this point: "we do not care if it cost 1.3 million euros; we want a software program useful for our job. With such a cost we expect that the program will do miracles". In addition, the employees seem to be insensitive as far as the service cost or the manpower costs needed for their training are concerned.

Furthermore, criteria such as customer satisfaction or contractor satisfaction are not important in their opinion. However, they expect a product and services of high quality even though they view quality in their own way. They judge the software program having in mind the technical requirements that accommodate their individual needs (e.g. someone demanded automatic "save" to all electronic forms). Worth's mentioning that every single one of the software users had a different view of quality.

What was commonly agreed is that the product should be developed according to users' and not to customer's requirements. As they said: "It is us that will use the program and not the politicians or the software designers". For all users, it is very important that the software specialists and the project team listen to their needs and incorporate the corrections and modifications they suggest in order to have a more friendly and efficient tool for their job. Consequently, the user satisfaction criterion is of utmost importance for them when they consider project success.

We were amazed from several users declaring that if they do not like the software or it is useless to them they will not accept it! We also heard extreme statements such as "if they oblige us with using something we do not like, we will go on strike!!!" By making these statements they wanted to underline that they were the most important aspect of project success and top management should take this into consideration and listen to users' needs and expectations more carefully.

5.3.2 The Assistant Project Manager's view of project success

In the previous charter we described the Assistant Project Manager's (Miss Siavala E.) job function in the I.T. project. As a Project Manager for the training program she was the most suitable person to talk about human resource issues and consequently she gave us complete answers concerning the stakeholder satisfaction criteria we were investigating.

She and her company pay attention to cost, time and quality measures and has as a high priority the success criteria. The Assistant Project Manager is responsible for controlling and monitoring time and cost for her company's project, even though, as we found out, they were not using any formal project management method or tool (e.g. EVT, Gantt charts etc.).

In addition, she believes that technical requirements and customers' satisfaction play a significant role for project success. She explained that the whole project is based on customer's requirements and consequently, customer's acceptance and satisfaction. The customer has formed a special committee of experts in order to check project deliverables and evaluate project stages in order to identify non-conformance with the contract terms.

Thus the company's first priority is to keep the customer satisfied even though the company does not apply any methodologies or measures for customer's satisfaction. She believes that customer satisfaction measures would channel the company's efforts towards success because they would anticipate potential problems that could be solved early on.

According to the Assistant Project Manager the most important criterion linked directly with project success is user's satisfaction. She mentioned that a special condition for the project is the software to be tested for approximately two months before its delivery to the customer. A pilot program including five City Planning Departments and several users will be the test field. Only when the program is accepted by its users, the project will go on.

Unfortunately many problems were encountered due to lack of a measuring system for users' satisfaction. The Assistant Project Manager was receiving numerous reports of complaints, suggestions and recommendations from users and trainers. Though, she was able to join an opinion on their satisfaction. Although she knew how satisfied the users were it was a very difficult and time-consuming process to analyze all these data. In her opinion the lack of a standard method to measure user's satisfaction is an obvious obstacle for the success of any project. She believes that the project team and top management should know in advance the problems concerning the users in order to channel their efforts toward these problems and solve them on time.

She also expressed her opinion about the project team/personnel satisfaction criterion. The importance of this criterion depends on the top management and the project managers. It is vital for project success only if employers truly care about the personnel satisfaction. She believes that in most cases the project managers already "know" how satisfied their team is because they assign responsibilities and tasks to their team and work closely together.

Nevertheless, she states that "if the project team or most of the team members are not happy, that will have a negative impact to project success". Her project team

was already facing problems related with satisfaction. Some of the team members had the intention to quit the project while others had left. According to Miss Siavala, the basic reason for this situation could probably be related to very long working hours and working under pressure. The replacement of an experienced project team member before the completion of the project is a very difficult situation that cannot be dealt with, even from a very experienced Project Manager.

Chapter 6 – Discussion, Conclusions, Recommendations

6.1 Discussion

In this section we analyze our findings from the literature review and observations from the empirical study (interviews), as well as the study results. In the end of this section we propose a new model for evaluating project success.

6.1.1 The Golden Triangle

One of the first observations for this study was that the Golden Triangle of Time, Cost and Quality is included in the majority of project success definitions. We assumed that this set of measures is still a basic element for project evaluation, but not enough for a complete analysis. We tested this assumption by conducting the empirical study we described in chapters 4 and 5. The interview results showed that Time, Cost and Quality remain the important criteria for assessing the performance of IT projects in the minds of professionals. However, the software users seemed to consider Time and Cost less important than Quality.

6.1.2 The need for new criteria

The literature review revealed that the Golden Triangle is not a complete set of criteria and there is a need for a more complete model. Furthermore, our experience with the "City Planning Software Project" and the empirical study we conducted, fortifies this belief. The theory of the triple constraint does not take into account the

fact that a successful project may deliver a software product that is not accepted by its users or/and does not satisfy their specific requirements and needs. Both users and project managers consider such projects as failed even when these meet the tree core parameters.

The review of various Project Success definitions showed that the evaluation of the project success will vary according to the type of the rater (different types of person, different jobs, age, education, work position, etc.). Project stakeholders, such as customers, project managers, users, top-management, sponsors and so on, view project success differently. Consequently, project success could be measured from several viewpoints. The question remains. Which viewpoints we should take into account for each project evaluation? The answer depends on the type of project and the special conditions (e.g. political environment, project magnitude, number of stakeholders involved, finance, etc.). In other words, in every case we should identify the key stakeholders for our specific project.

Concluding, project success could be defined as the level of "satisfaction" expressed by the key stakeholders and always in accordance with the fulfillment of the tree core parameters.

6.1.3 The human dimension

Viewing the results of this research, one can realize the importance of the human dimension in relation with project success. Both researchers and the professionals we met in the work place believe that the human factor has a significant impact on the project outcome and should be part of project evaluation methodologies.

Projects are connected directly with people and their outcome depends on people decisions, efforts, and attitudes. Projects are not Project Management tools such as schedules, budgets, and Gant Charts. As Lewis (2001, p.35) states : "Projects seldom fail because of tools. They fail because of people!" A similar statement by Cook-Davis : "It is people who deliver projects, not processes and systems" points to the sane direction. Thus, it is critical to include measures concerning the human dimension in an advanced project evaluation model.

6.1.4 Stakeholder satisfaction

We mentioned before the importance of measuring the level of the key stakeholders "satisfaction" in order to have a more complete and balanced view of project success. A project achieves success by delivering value to these stakeholders. The key stakeholders are groups or individuals that are actively involved in the project , are affected by its outcome, or can influence its outcome (Smith 2000).

The present study showed that the key stakeholders of an IT project are the software users, the customer and the project team. According to the interview results, the software users seem to be the most important group category among the three. In the section to follow we closely look at these three categories.

6.1.5 Customers' satisfaction

For many organizations the customer satisfaction is the most important criterion for project success (CH2M Hill 2001). During the interviews we noticed that in IT projects there is in many cases a committee formed by the customer responsible

for evaluating the project deliverables. This committee decides if the deliverables are acceptable according to the customer's requirements and standards. If they reject a single deliverable, the project will be cancelled resulting in financial damage for the software developer.

Consequently, it is very important to know in advance the level of customer's satisfaction in order to channel our efforts towards a more desired product and more custom-made services. From the literature review we can also conclude that customer satisfaction should be included in the project success definition.

In order to know if the customer is satisfied, it is vital to establish measures. Only through listening and measurement can the organization determine total customer satisfaction (Barkley, & Saylor 2001). In addition, the organization must very well know its product, the competition in the market, as well as its the customers needs and expectations. Because customer needs and expectations is not something static but a thing that varies, we should measure the level of customer satisfaction regularly.

6.1.6 User's satisfaction

If   the empirical study results on success criteria are analyzed from the viewpoints of software users' (i.e. City Planning Department employees) or the project managers' (i.e. the Assistant PM), it is obvious that they both give emphasis to the "user satisfaction" criterion. In this case the "user satisfaction" is directly linked with the IT project success.

The software users themselves believe that the product delivered to them should absolutely meet their requirements and fulfill their needs and expectations.

They feel that they have the right to be 100% satisfied with the software product. Users will not particularly perceive a project as failed if it is over-budget or behind schedule. However, if the software program does not assist them in their work, they will definitely consider it as failed!

Furthermore, the "user satisfaction" criterion will be a useful tool for any project team in order to develop a "successful" project. The users' view of success can provide information about the project problems and precise by how much the project has fulfilled the needs of the customer. This empirical study proved that for IT projects, the customer acceptance depends on the users' acceptance and satisfaction.

6.1.7 Project team – personnel satisfaction

The last but not least stakeholder category that should be gratified in order to have a successful IT project is the project team and project personnel. The study results showed that it is crucial for organizations to measure the satisfaction of their employees.

It is very difficult for organizations to achieve project success if the level of personnel satisfaction is low. If the project team or the personnel are not pleased, this will surely has a certain impact. The personnel may transfer this dissatisfaction to the customers, simply by showing their discomfort with their "working tools". What complicated things even more is a view that project managers in Greece hold, that it to lest to be authoritative with their staff. This puts extra pressure on the personnel and multiplies their discomfort.

Schlesinger and Heskitt (1991) claim that high rates of personnel satisfaction will bring less mistakes and consequently better products and services resulting in increased customer satisfaction. It is pure common sense that if the customers are satisfied, they will bring profits to our organization. This relationship between customer and personnel satisfaction is described in Figure I.

```
                    ┌──────────────┐
          ┌────────▶│   Customer   │─────────┐
          │         │ Satisfaction │         │
          │         └──────────────┘         ▼
   ┌──────────────┐                   ┌──────────────┐
   │ Reduction of │                   │ Reduction of │
   │ human errors │                   │ customer loses│
   └──────────────┘                   └──────────────┘
          ▲                                  │
          │         ┌──────────────┐  ┌──────────────┐
          │         │  Personnel   │  │ Raised Profits│
          └─────────│ Satisfaction │◀─│  will bring   │
                    └──────────────┘  │ higher salaries│
                                      └──────────────┘
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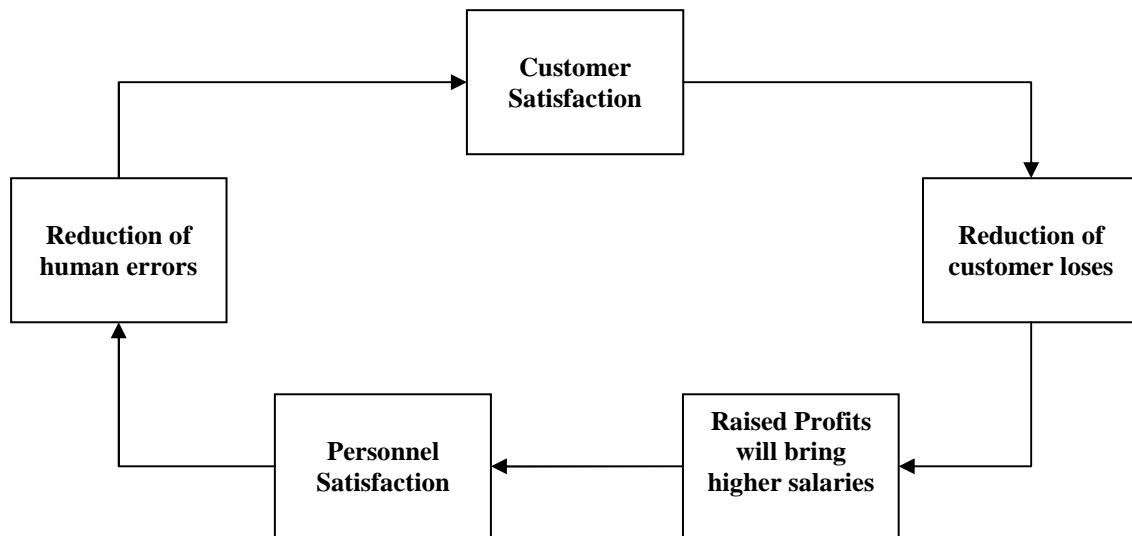
Copyright © 1991 Schlesinger & Heskitt

Figure I: The impact of personnel satisfaction to project success

Another benefit from personnel-project team satisfaction measurement is that we can identify the reasons for personnel's poor performance. It can also give top management new ideas and provide the direction with more improved strategies for project team motivation. And money is not the only reason for personnel satisfaction! For example, it is possible that a highly paid employee can be unhappy due to a negative working environment or his superiors' behavior (Locke 1969).

The interview with the Assistant PM (Geodyktio company) showed that one of the basic problems the "City Planning Software Project" was facing is related to

personnel satisfaction. The negative working environment led to some of the project team members to quit. It is true that in many cases Project Managers are trying to meet impossible goals by sacrificing the people on project team. They get focused only on budgets and schedules forgetting the needs of the individual team members.

It is not unusual for project managers in Greece to push their personnel to their limits in order to achieve the company's goals. This, in the majority of cases, results in disaster as employees get worn out and project is driven to chaos!

6.1.8 The new model of Success Criteria

Keeping in mind all the above discussion, this paper proposes a new model for evaluating project success shown in Figure J. Time, Cost and Quality are important for projects but they are only a part of the model of analysis. Project should also target at satisfying the needs of the key stakeholders. The key stakeholders for an IT project are: the software users, the project team and the customer.
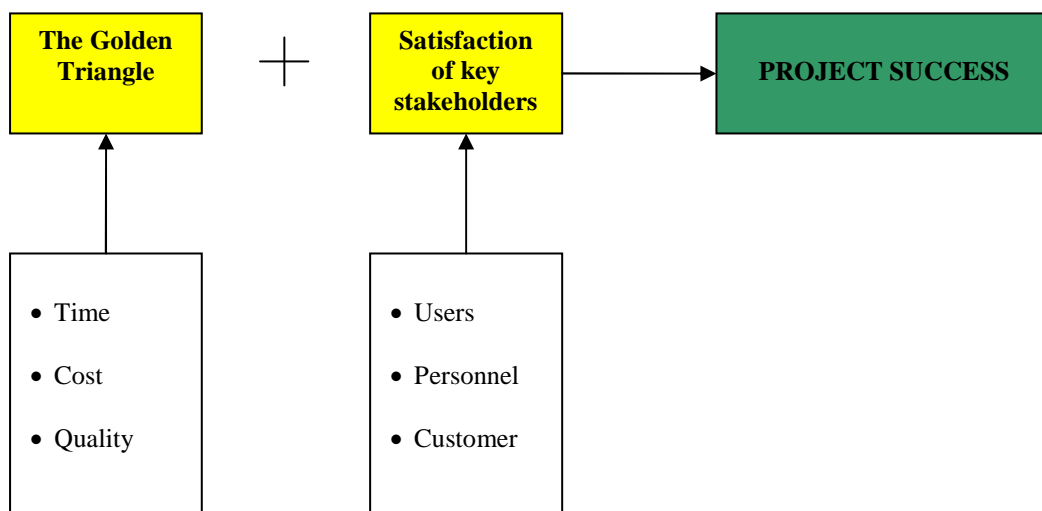
Figure J: the new model of success criteria focused on IT projects

6.2 Using a Balanced Scorecard to Identify Success Criteria

In chapter 4 we described how the Balanced Scorecard method will be incorporated in our methodology for this thesis. We also described the theoretical background we are based up in order to create a new framework for I.T. projects that could identify project measures. In this chapter we will present the new framework and implement it to our project (City Planning Software) in order to test our new model for evaluating project success (new set of criteria). The outcome of the I.T. Balanced Scorecard will help us to identify several critical measures for our project. We will then try to group them according to our new set of criteria.

6.2.1 The new framework

The Balanced Scorecard apart from a strategic management tool can also be applied in order to measure and evaluate projects, and activities that take place in business contexts. We are going to use the Balanced Scorecard concept to develop a framework that will identify measures for I.T. projects. We are using as a base the Norton & Kaplan framework while we are borrowing elements from the I.S. Balanced Scorecard (Martinsons, Davison and Tse, 1999).

We have made modifications to the four basic perspectives based on the following views: (1) The I.T. projects are commonly carried out for the benefit of both customers and software users. (2) We consider project personnel and project team as internal customers that should be benefited from the project. (3) If we give more attention to human resources, we will then have an excellent basis for improved results in the rest of the perspectives.

We suggest the following four perspectives for an I.T. Balanced Scorecard: Financial, Customer and Product User, Internal Process and Human Resources (H.R). We will analyze them further in the sections to follow. Figure K illustrates these four perspectives and Figure L shows the new framework.

Figure K: the four perspectives in an I.T. Balanced Scorecard

Financial Perspective: What goals we should achieve in order to succeed financially and what cost measures we should perform?
Customer & Product User Perspective: Are the products or services fulfilling the needs of our customers and users?
Internal Process Perspective: How efficient and effective our processes are? How should we improve them in order to have better products and services?
Human Resources Perspective: Is our personnel and project team efficient and effective? How can we improve their performance?

Figure L: the new BSC framework for I.T. Projects
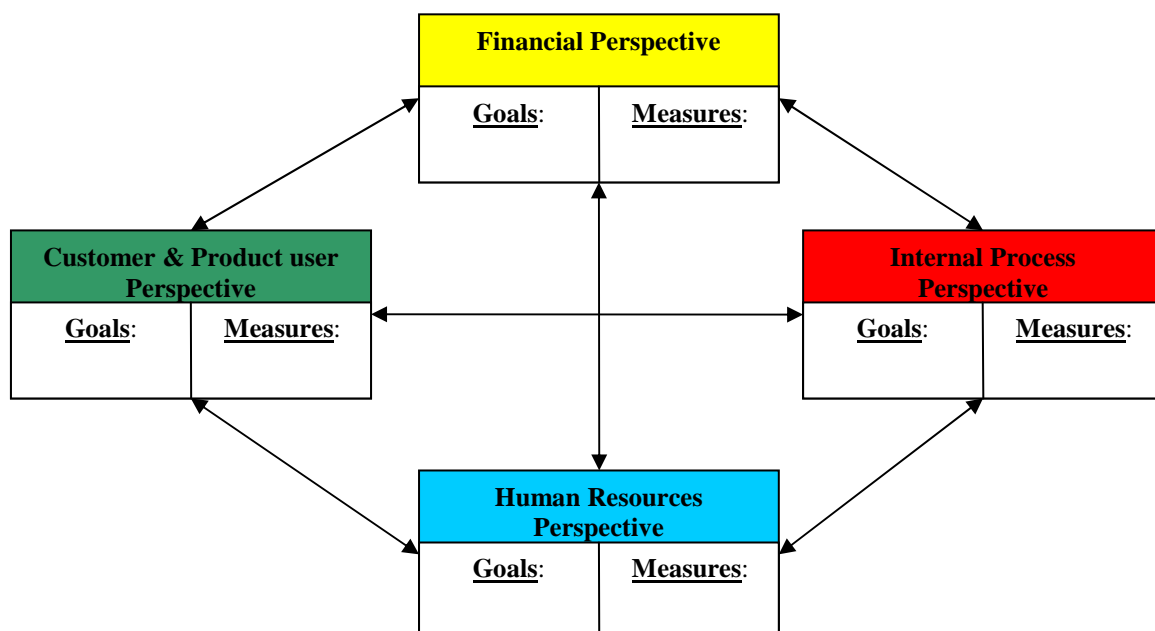
6.2.2 The "City Planning Software" Project

In this section we will describe the project that the author is involved with in order to implement the Balanced Scorecard. A brief description of the project and the main objectives were presented in the first chapter.

The "City Planning Software Project" is the Greek Governments' attempt to solve the myriads of problems related with the function of the 156 City Planning Departments all over the country. The aim of this project is the development of a web-based software program that will help the City Planning Departments to be more competent. It will also help the Government to improve the monitoring of this sector in order to eliminate corruption and unfair treatment of citizens.

A Greek City Planning Department regulates the use of privately-owned property through zoning regulation specific plan ordinances and National laws. The Department also prepares and maintains a general plan which is a comprehensive declaration of purposes, policies and programs for the development of the City including such elements as land use, service systems, public works facilities, schools and so forth.

In March 2006, Geodyktio Company, after winning a national competition became the subcontractor to SingularLogic Unisystems, the prime contractor for the Greek Government. With a total budget of 1.3 million euros and a firm-fixed price of 400.000 euros as a fee for the sub-contractor the project started the same month. The project will be completed the December 2007.

The project is divided into four basic stages. The first stage involves a feasibility study in order to identify the needs of the City Planning Departments and the program design. The second stage is the development of software (lines of code). The third stage is the test of the software through a pilot program. Five City Planning Departments will use the software in order to test its function. During this stage corrections and improvement of code lines will also take place.

The final stage involves the training of all users and on-site support services. Figure M illustrates the four project phases and Figure N the project timeline. Currently the project has already completed with success the third stage.

Figure M: the four basic project stages

Figure N: Project Time Schedule

ID	Project Stage	2006										2007												2008	
		Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb
1	Feasibility Study & Software Design		■	■	■	■	■	■																	
2	Software Development								■	■	■	■	■	■	■	■	■								
3	Pilot Program (Test Software Function)												■	■	■	■									
4	User Training & In-site Support																■	■	■	■	■	■	■	■	

6.2.3 Project objectives and measures

In order to apply the BSC framework to the "City Planning Software project" we should define the objectives of each perspective. This approach corresponds to the basic idea of the Balanced Scorecard concept that objectives of the various perspectives build on one another and finally affect the overall project success. The next step will be to link the identified project objectives to measures. These measures are oriented to the following requirements:

➢ quantify the benefit of goal achievement and not the amount

   of effort required

➢ have a motivating effect on the employees

➢ cover the various aspects of a goal

In the following paragraphs we analyze each perspective individually, determining the measures that reflect project objectives and goals. Obviously every increase or reduction to any of these measures influences the outcome of the other perspectives. Every measure is governed by multi-criteria forces.

We should underline that the outcome of this process will be a unique set of measures that can only be implemented in the project we studying. Other projects with different goals and objectives will surely require a different set of measures. The proposed metrics and objectives were extracted from the interview results, our working experience and from the I.T. management literature[10].

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[10] Martinsons, M., Davison, R., & Tse, D. (1999). *The balanced scorecard: a foundation for the strategic management of information systems*. Decision Support Systems, Vol. 25, pp.71–88

Financial Perspective

Generally speaking, the financial perspective is traditionally related to the control of budget as well as the benefits arising from the sale of products or services to third parties.

In our project there is a total budget (1.3 million euros) that must not be exceeded and a firm-fixed price (400.000 euros) as a fee for our company (the sub-contractor). The main objective here is to control all project costs and try to minimize them in order our company to benefit. The main costs of the project are the expenses per employee (trainers, programmers and project team members) and the cost of rent for special projection rooms for the training needs. The cost control process consisted of calculating the "stuff months" for every project stage and comparing the result with the actual cost from status reports and records of attendances of the employees.

Customer & Product User Perspective

We consider that the satisfaction of the end users (internal customers for our company) and our main customer is very important. It is vital to monitor customer satisfaction on a frequent basis. In addition, we must ensure that the product is manufactured according to all customer's technical requirements.

The software specialist and the project team should establish and maintain good relationships with the community of end-users, in order to understand their needs and expectations. Such a relationship will be the basis for creating trust between users and developers. The end users' views may help the developers to create a more effective product (user friendly and efficient) that will be accepted by the user

community. That will also satisfy the customer (the government's target is to provide a commonly accepted tool for the civil servants).

The customer and the end users should be surveyed periodically by using questionnaires and in the customer's case, interviews in order to gain deeper insights.

Internal Process Perspective

This perspective involves several stages during an I.T. project: project planning, design of the software, software support and maintenance, problem management, user training, etc. The main objective is to deliver high quality products and services to the users.

In the "City Planning Software Project" the performance of the internal processes will evaluated in accordance with the project timescale. The project team should achieve milestones for all the project deliverables (e.g. complete the feasibility study within six months). Consequently, all measures here have to do with **time**. It is important to know how time consuming regular problems are. For example the time needed for repairing "bugs" or the time we consume in order to address the end-user problems for a specific City Planning Department. The aim of all these "time measures" is to identify how efficient we are.

Human Resources Perspective

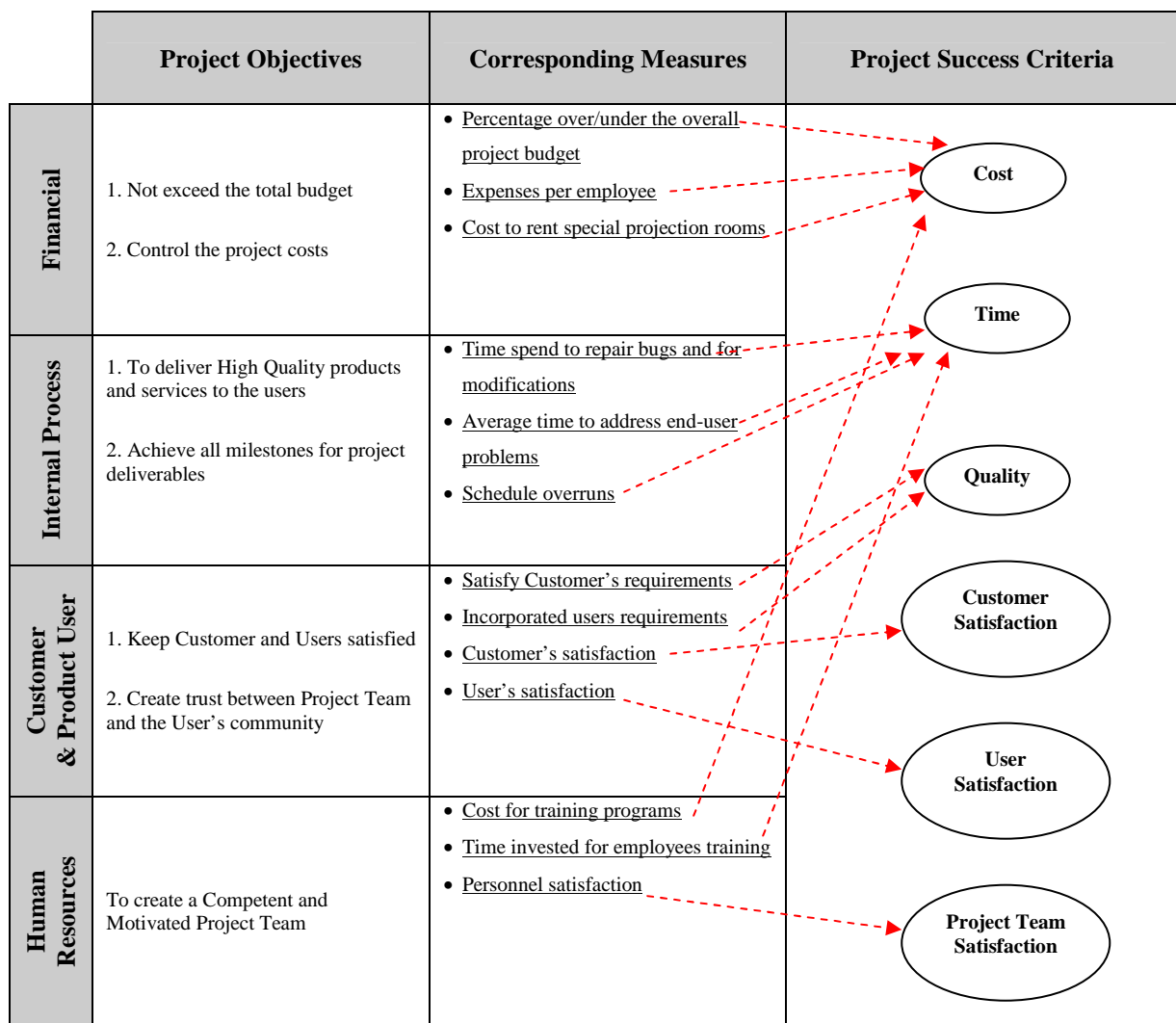The project objective for the Human Resources Perspective is to create a competent and motivated project team that would fortify the results of other perspectives. We are based on the assumption that the human factor is the "barometer" of project success. It is the project team that will deliver the product and provide services, deal with all problems and finally interact with the end-users and the

customer. Consequently, the successful completion of all the above tasks will bring the desired financial results to the firm.

In our case, it is essential to continually improving the skills of the project personnel (i.e. trainers, software specialists, etc.) and establish a policy of motivating all parties involved. The indicators we should use in order to have a clear view of how close we are to our objective might be quite difficult to measure. We suggest measures for cost and time invested for personnel training, and measures of the perceived satisfaction of the project employees.

Figure O: project objectives and corresponding measures

	Project Objectives	Corresponding Measures	Project Success Criteria
Financial	1. Not exceed the total budget 2. Control the project costs	• Percentage over/under the overall project budget • Expenses per employee • Cost to rent special projection rooms	Cost
Internal Process	1. To deliver High Quality products and services to the users 2. Achieve all milestones for project deliverables	• Time spend to repair bugs and for modifications • Average time to address end-user problems • Schedule overruns	Time Quality
Customer & Product User	1. Keep Customer and Users satisfied 2. Create trust between Project Team and the User's community	• Satisfy Customer's requirements • Incorporated users requirements • Customer's satisfaction • User's satisfaction	Customer Satisfaction User Satisfaction
Human Resources	To create a Competent and Motivated Project Team	• Cost for training programs • Time invested for employees training • Personnel satisfaction	Project Team Satisfaction

We summarize our analysis of the "City Planning Software Project" in the above scheme. Figure O groups the objectives and corresponding measures for each of the four I.T. BSC's perspectives in the first two columns. The third column includes the project success criteria we have proposed for the evaluation of I.T. projects.

We said before that the set of measures that the Balance Scorecard method generated is unique and can only be implemented to the "City Planning Software Project". In Figure O we correlate the project measures with the success criteria that this study proposes. For example, we consider that all time measures (i.e. time to repair "bugs", schedule overruns, etc.) are correlated with the Time criterion. The red arrows represent this correlation.

Table III: performance indices

	Performance Indices	Milestones Target	
		2006	*2007*
Financial	budget : x euros plus or minus (%)	± 10%	± 10%
	labor cost limit (below x euros)	± 5%	± 5%
	support costs (budget %)	2%	3%
Internal Process	average time needed for repairs	- 20%	- 40%
	average time needed to address user problems	-	- 40%
	schedule overruns (number of days)	± 5%	± 5%
Customer & Product User	number of customer's requirements incorporated	> 90%	> 98%
	number of users' requirements incorporated	-	> 70%
	customer's satisfaction	-	-
	user's satisfaction	-	-
Human Resources	cost for training programs	-	-
	time invested for employees training	+ 30%	+ 40%
	personnel satisfaction	-	-

The last part of the Balance Scorecard process is to set milestones and targets to every of the previously mentioned measures. Outcome measures without performance indices do not communicate how the outcomes are to be achieved. Table III illustrates the performance indices for each of the measures we described before. The targets are fictional and used only as an example.

6.2.4 Conclusions

Balance Scorecard process is a very useful tool, which can bring objective results when implemented correctly. We have proposed the application of the BSC concept to I.T. projects. This paper has considered the use of a BSC framework in order to measure and evaluate projects.

We implemented this new framework to the "City Planning Software Project". The outcome was a unique set of measures, in other words success criteria, that can be used in this project. We then showed the correlation of these measures to the general success criteria the study proposes. We believe that the success criteria of our new model can be used in many I.T. projects.

6.3 Measuring the New Criteria

Our quest for project success criteria resulted in a new model that includes new criteria. Time, Cost and Quality as we have seen, can be measured with quantitative methods. In other words they produce numbers that can be compared with standards or desired results. The question now is how we can measure the new criteria? We can find the answer if we search for methods measuring "satisfaction".

A very popular method in Greece for measuring customer and personnel satisfaction is the Multicriteria Satisfaction Analysis (MUSA) method. The method is developed by two Greek professors, Grigoroudis E. and Siskos Y., and is implemented to many organizations with a great deal of success.

The MUSA method is based on the logic that the total satisfaction of a an individual customer or project team member depends on a group of variables. The variables represent the characteristic of the product or services and, in case of the one employee, the characteristics of his working environment. In Figure P we can see the basic concept of the MUSA method.
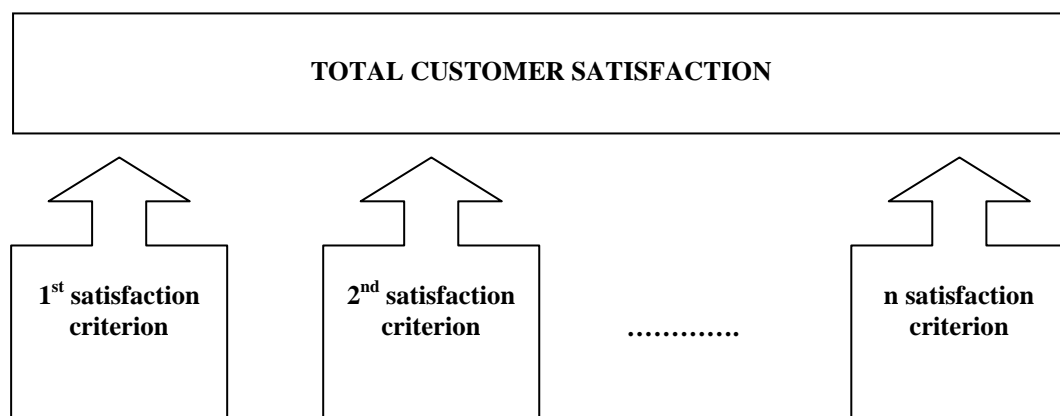
Copyright © 2005 Grigoroudis & Siskos

Figure P: the basic concept of the MUSA method

The methodology involves data collection through questionnaires. The data collected can be qualitative or quantitative. For the data analysis *descriptive statistics*[11] and the MUSA method is used. The theoretical background of the MUSA method is presented by Grigoroudis and Siskos in a series of scientific papers[12] and case studies[13].

6.4 Conclusions

Defining project success and the establishment of a set of success criteria is of utmost importance for every project-oriented organization. If an organization does not know early on in the project how they are going to measure its business success, they will surely be faced with unpleasant situations.

By knowing the criteria of success at the project's initiative phase keeps stakeholders focused on common objectives and establishes targets for evaluating progress. In other words, success criteria helps everyone involved in the project to see "the big picture".

It is commonly agreed that successful project implementation is no longer subjected to the traditional "Golden Triangle", based solely on the criteria of time, cost and quality. Although many attempts have been made to create a more complete and balanced set of criteria by various researchers, until today there is no consensus

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[11] the use of statistics to describe a set of known data in a clear and concise manner, as in terms of its mean and variance, or diagramatically, as by a histogram

[12] Grigoroudis, E., & Siskos, Y. (2002). *Preference disaggregation for measuring and analyzing customer satisfaction: The MUSA method.* European Journal of Operational Research, Vol. 143, pp. 148-170.
Grigoroudis, E., & Siskos, Y. (2005). *Ποιότητα υπηρεσιών και μέτρηση ικανοποίησης του πελάτη* (2η έκδοση). Αθήνα: Εκδόσεις Νέων Τεχνολογιών.

[13] Grigoroudis, E., & Siskos, Y. (2004). *A survey of customer satisfaction barometers: Results from the transportation communications sector.* European Journal of Operational Research, Vol. 152, pp. 334-353.

on project success definition or a more complete set of variables that cover the majority of case studies.

From literature review and the empirical study results we conclude that the use of the Golden Triangle for project evaluation is indispensable but also incomplete. One of our first findings was that in the majority of project success definitions there was the element of the human factor. There is an agreement that project success should be viewed from several perspectives. That was the basic concept that led this research towards the projects' stakeholders. Here, we need to remind ourselves the wise phrase of Cook-Davis: "It is people who deliver projects, not processes and systems"

Any project is only good if it is functional. Nothing else matters much if for example a software program is not accepted by its users. Consequently, every effort must be made toward ensuring that the project outcome fits in with customer's and/or users' needs. Our empirical study showed that, especially for I.T. projects, the intended user of the project's product is the major determinant of its success. In addition, the project team and project personnel have the final word in delivering the product to the customer and/or user.

This paper suggests that apart from time cost and quality we should measure the "satisfaction" of the customer, the users and the project personnel. These three categories of stakeholders seem to be the "protagonists" in the arena of IT projects. A new model is presented that could help companies to better implement their projects to specific situations.

Finally, this paper presents the development of a new framework for identifying critical project measures by using the theoretical background of the **Balanced Scorecard**. The IT Balance Scorecard was implemented in the "City Planning Software Project" and the results were compared with the new project success model.

Bibliography

Agarwal, N., & Rathod, U. (2006). *Defining "success" for software projects: An exploratory revelation.* International Journal of Project Management, Vol. 24, pp. 358-370.

Atkinson, R. (1999). Project management*: Cost, time and quality, two best guesses and a phenomenon, its time to accept other success criteria.* International Journal of Project Management, Vol. 17, pp. 337-342.

Arveson, P. (1998). *What is the Balanced Scorecard?* Retrieved May 10, 2007, from http://www.balancedscorecard.org/basics/bsc1.html

Barkley, B. T., & Saylor, J.H. (2001). *Customer-driven project management: Building quality into project processes* (2nd ed.). New York: McGraw Hill.

Bryde, J., D. & Robinson, L. (2005). *Client versus contractor perspectives on project success criteria.* International Journal of Project Management, Vol. 23, pp. 622-629.

CH2M Hill (2001).*Project delivery system* (4th ed.).Denver, CO: Author

Cook-Davies, T. (2002). *The "real" success factors on projects*. International Journal of Project Management, Vol. 20, pp.185-190.

De Wit, Anton (1988). *Measurement of project success.* International Journal of Project Management, Vol. 6, pp. 164-170.

Grigoroudis, E., & Siskos, Y. (2002). *Preference disaggregation for measuring and analyzing customer satisfaction: The MUSA method.* European Journal of Operational Research, Vol. 143, pp. 148-170.

Grigoroudis, E., & Siskos, Y. (2004). *A survey of customer satisfaction barometers: Results from the transportation communications sector.* European Journal of Operational Research, Vol. 152, pp. 334-353.

Grigoroudis, E., & Siskos, Y. (2005). *Ποιότητα υπηρεσιών και μέτρηση ικανοποίησης του πελάτη* (2η έκδοση). Αθήνα: Εκδόσεις Νέων Τεχνολογιών.

Harper, Collins. (2005). *Collins English Dictionary*. Glasgow, HarperCollins Publishers.

Heinz Ahn, (2001) *Applying the Balanced Scorecard Concept: An expertise Report*. Long Range Planning, Vol. 34, pp. 441-461

Kaplan, R., & Norton, D. (1996). *The Balanced Scorecard: Translating Strategy into Action.* Harvard Business School Press, Boston. Retrieved May 10, 2007, from http://www.netlibrary.com

Kerzner, H., PhD. (2003). *Project management – A system approach to planning, scheduling and control* (8th ed.) Hoboken, NJ: John Wiley & Sons.

Locke, E., A. (1969). *What is job satisfaction?* Organizational behaviour and Human Performance, Vol. 4, pp. 309-36.

Leedy, P. D., & Ormrod, J. E. (2005). *Practical research: Planning and design* (8th ed.). Upper Saddle River, NJ: Pearson Prentice Hall.

Lewis, J.P. (2001). *Project Planning, scheduling and control* (3rd ed.). New York: McGraw-Hill.

Lim, C., S., & Mohamed, M., Z. (1999). *Criteria of project success: an exploratory re-examination.* International Journal of Project Management, Vol.17, pp. 243-248.

Martinsons, M., Davison, R., & Tse, D. (1999). *The balanced scorecard: a foundation for the strategic management of information systems*. Decision Support Systems, Vol. 25, pp.71–88

Meredith, J.R., & Mantel, S. J., Jr. (2002). *Project management: A managerial approach* (5th ed.). New York: John Wiley & Sons.

Milis, Koen, (2004). *Using Probabilistic Feature Models to Determine Success Criteria for ICT Projects.* Retrieved January 15, 2007, from http://www.csrc.lse.ac.uk/asp/aspecis/20040109.pdf

Pinto, J., & Rouhiainen P. (2001). *Building customer-based Project organizations.* New York: John Wiley & Sons. Retrieved April 20, 2006, from http://www.netlibrary.com

Project Management Institute. (2004). *A guide to the project management body of knowledge (PMBOK® Guide)* (3rd ed.). Newtown Square, PA: Author

Schlesinger, L.& Heskitt, J.(1991). *Breaking the cycle of failure in services.* Sloan Management Review. Vol. 32, pp. 17-28.

Smith, K. (2007) *'Teamwork and project management'* 3rd ed., New York: McGraw-Hill

Smith, L. (2000) *"Project Clarity Through Stakeholder Analysis."* Crosstalk: the
        Journal of Defense Software Engineering. Retrieved May 12, 2007, from
        http://www.stsc.hill.af.mil/CrossTalk/2000/12/smith.html

Standish group reports. Retrieved June 15, 2006, from http://www.standishgroup.com

Verzuh, E. (2004). *The fast forward MBA in project management* (2nd ed.). New
        York: John Wiley & Sons.

Wang, X., & Huang, J. (2006). *The relationships between key stakeholders' project
        performance and project success: Perceptions of Chinese construction
        supervising engineers.* International Journal of Project Management, Vol. 24,
        pp. 253-260.

Wateridge, John (1995). *IT projects: a basis for success*. International Journal of
        Project Management, Vol. 13, pp. 169-172.

Westerveld, E. (2003). *The Project Excellence Model: linking success criteria and
        critical success factors.* International Journal of Project Management, Vol. 21,
        pp. 411-418.

Wideman, R., M. (2000). *First Principles of Project Management* Retrieved May 02,
        2007, from http://www.pmforum.org/library/papers/2000/.htm

Wideman, R., M. (2000). *Selling into Project Success* Retrieved May 2, 2007, from
        http://www.pmforum.org/library/papers/2000/.htm

Yu, G. A., Flett, D. P., & Bowers, A. J. (2005). *Developing a value-centered
        proposal for assessing project success.* International Journal of Project
        Management, Vol. 23, pp.428-436.

APPENDIX A – INTERVIEW QUESTIONS

1. How do you define Project Success and what criteria do you consider as the most important for project evaluation?
2. What project success criteria is your organization using, and how are these measured?
3. In your opinion, how important are Time, Cost, and Quality as a set of criteria for measuring success?
4. Do you believe that there should be an additional set of criteria of any additional parameters?

5. How important are the following success criteria in your opinion?
 	
   • User satisfaction
 	
   • Customer satisfaction
 	
   • Project team/personnel satisfaction

6. Do you believe that the new criteria proposed by this study could improve your organization's situation and how?

APPENDIX B - THESIS CHECKLIST

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              Street   *City*   *State Zip*

COURSE # <u>PM601</u>   **CREDITS** <u>3</u>   **TERM:** <u>Spring</u>   **YEAR:** <u>2007</u>

RESEARCH PROJECT or THESIS TITLE: <u>**The Criteria of Project Success**</u>

REVIEWING FACULTY_____**DATE**_____
                            Signature

The final document submitted to complete requirements should include and be arranged as follows:

Element	**Check if Present**
1. Title Page	_____
2. Signature Page	_____
3. Library Release Form	_____
4. Copyright information (if applicable)	_____
5. Dedication (optional)	_____
6. Acknowledgments (optional)	_____
7. Curriculum Vitae	_____
8. Abstract	_____
9 Table of Contents	_____
10. List of Tables (if applicable)	_____
11. List of Figures (if applicable)	_____
12. Text of Report	
a. Introduction	_____
b. Problem Statement	_____
c. Review of Literature	_____
d. Methodologies and Procedures Used	_____
e. Results	_____
f. Discussion, Conclusions, Recommendations	_____
13. Bibliography	_____
14. Appendices (if applicable)	_____

Comments on required Elements needing changes:

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